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EMOTION AND PUBLIC ATTENTION TO POLITICAL ISSUES

By

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A DISSERTATION

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EMOTION AND PUBLIC ATTENTION TO POLITICAL ISSUES

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University of Nebraska, 2013

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Which mechanisms underlie the orientation of public attention to political issues? Though research on media agenda-setting has been one of the most successful enterprises in political communication and behavior, little is known of the actual processes that drive this phenomenon. I hypothesize that inherent in all environmental stimuli is emotional information, and that it is this information that drives the linkages between media and public agendas. Using a combination of large-scale automated content analyses of several political issues in the *New York Times* and public search attention data, I demonstrate that negatively-valenced and arousing coverage work concurrently with the volume of news reports to drive public attention to issues. Moreover, for issues that typically receive lower levels of media coverage, the emotionality of media reports plays an especially important role in predicting the extent to which the public orients attention to those issues. By unpacking the black box of public attention, this research provides a fuller picture of how and why the media are able to set the agenda, and demonstrates how even in the absence of extensive media coverage, the public can and will pay attention to policy issues on the basis of the emotional content of issue-relevant media messages.

For Kate.

Acknowledgements

I owe many thanks to the members of my committee: John Hibbing, Mike Wagner, Kevin Smith, Sarah Michaels, Beth Theiss-Morse, Dona-Gene Mitchell, and Mike Dodd. Each member of this ridiculously large committee played an important role in the formation of my research agenda and helped me to see it through to the end. Moreover, each of my committee members are incredible scholars who deserve much more praise than I could ever give (but I'll try). I'll break out the acknowledgements to a few who I worked particularly close with, while emphasizing that I am indebted to all of you for your help in molding me into the scholar I am today.

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And last but not least: Kate Hunt. Thank you for being, well, you. I love you.

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Chapter 1   Introduction

The agenda-setting function of the mass media is one of the most important influences that exists between a free press, the citizenry, and democratic institutions within the American republic. Citizens are bombarded with information every day from a variety of sources: friends, family, coworkers, religious and political organizations, and the government itself. It is the mass media, however, that plays the greatest role in taking the multitude of policy issues, topics, and controversies, giving some "play" and others none, and in doing so ultimately influence the importance placed on and attention given to some issues rather than others by citizens (see McCombs and Shaw, 1972; McCombs, 2004). This form of influence doesn't end at attention alone either, as the issues that populate "the pictures in our heads" (Lippmann, 1922) often become the very same issues taken up by Congress or other institutions of government (see Jones and Baumgartner, 2005; Baumgartner, Jones and Leech, 1997).

Though the scholarly literature on agenda-setting has been fruitful since its empirical foundations were laid in 1972 (see McCombs and Shaw, 1972), lacking from our understanding of the phenomenon is an understanding of the mechanisms underlying it. We know very well that agenda-setting occurs, as shown in the sheer number of studies empirically demonstrating that the public agenda tends to mimic the media agenda (see especially McCombs and Shaw, 1972; McLeod, Becker and Byrnes, 1974; Benton and Frazier, 1976; Palmgreen and Clarke, 1977; Iyengar, 1979; Winter and Eyal, 1981; Neuman, 1990; Weimann and Brosius, 1994; Brosius and Weimann, 1996; Althaus and Tewksbury, 2002; Jones and Baumgartner, 2005). These and other studies have consistently found that changes in the media agenda

tend to precede changes in the public agenda, with citizens adjusting the set of issues they find important, seemingly as a direct result of the media doing likewise.

Of course, any good empiricist must ask *why* the public agenda so fluidly and so consistently mirrors the media agenda. Is it simply the result of artifacts of the survey response? When citizens are queried about the "most important problem" by Gallup, or CBS, or the New York Times, are they simply naming the most accessible issue within their minds (see Zaller, 1992)? Do citizens witness the media shifting its journalistic resources from one issue to another and perceive this shift as an importance judgment, and adjust their attitudes correspondingly (see Benton and Frazier, 1976)? Is it how political issues are framed within the news[1] that leads to citizens receiving a transfer of salience from the mass media (see Iyengar and Kinder, 1987, 2010)?

This research investigates the idea that inherent in all environmental stimuli are informational cues, specifically, emotional cues (see Clore, Gasper and Garvin, 2001; Clore and Tamir, 2002; Glaser and Salovey, 1998; Isbell, Ottati and Burns, 2006; Storbeck and Clore, 2008; Zadra and Clore, 2011), and seeks to explain the linkage between the mass media and public as a function of these cues. Inherent in any communicative medium is affective information: whether debt ceiling negotiations in Congress have been contentious and bitter, how many marine animals will likely be killed by an oil spill in the Gulf, the extent to which opponents of gay marriage view the homosexual lifestyle as "disgusting" or as an "assault" on traditional marriage. All of these examples feature (admittedly negative) affective information, information that will be shown to serve as a shortcut for citizens who are bombarded with data on the state of the world from day to day. As I will demonstrate empirically, it is within this cacophony of

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[1]In an apparent effort to fragment the framing research paradigm, some scholars term this "attribute" agenda-setting.

information that affective cues are of great utility to citizens, who make use of them in attaching importance to certain issues reported in the mass media.

In seeking to illuminate this topic I make use of a variety of approaches to the study of the media, public, emotion, and agenda-setting. The dynamics of affective information in the mass media are examined through the creation of a measure based on the *Affective Norms for English Words* (ANEW) dataset, which consists of 2,000 words pre-rated on the emotional dimensions of valence, arousal, and dominance (see Bradley and Lang, 1999; Larsen, Norris and Cacioppo, 2003; Dodds and Danforth, 2009). A large sample of news articles from the *New York Times* are then mined of textual content, with each article weighted along these three dimensions of affect for purposes of examining the emotional content of the media. This examination of media emotionality specifically engages questions as to whether the volume of news coverage acts as a proxy for articles' emotional content, and as such is inseparable from it, or whether the two constructs act independently of each other. In gauging public attention to political and policy issues, this research uses online search behavior data from *Google Trends*[2] to capture the dynamics of a fast-moving political and media environment (see Ripberger, 2011; Scharkow and Vogelgesang, 2011). The emotional measures I construct are then correlated with public attention in several ways in order to ascertain whether it is news volume, emotionality, or both that drive public attention to political issues.

This dissertation proceeds as follows. Chapter 2 focuses on establishing my theory of the emotional basis of agenda-setting. Previous research in psychology, psychophysiology, and political behavior is used to illuminate the ways in which emotions play a role in human behavior, particularly from the standpoint of political communication research. Consideration will be given to evolutionary theories of emotion, the role of emotion in information processing, and finally the

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[2]Accessible at http://trends.google.com.

current state of research on emotion in politics and political behavior. The hypotheses motivating this research will then be examined prior to proceeding to actual methods and results.

Next, variation in the emotional information present in the mass media will be examined in Chapter 3. This chapter will focus first on the use of psychological word dictionaries that have been pre-rated on the dimensions of valence, arousal, and dominance. Past findings on the correlations between these textual datasets and psychophysiological measures of emotion are used to demonstrate both the soundness and utility of using these type of data in studies of the mass media. Data on the natural variation in the emotional content of mass media will then be presented using four political issues: the debt ceiling, the controversial Keystone XL Pipeline, same-sex marriage, and Iran sanctions. The data on these political issues will be used throughout the remainder of the large-scale empirical chapters for purposes of gleaning how emotion in the media influences agenda-setting.

Chapter 4 will connect emotion in the media with public attention to issues using the aforementioned *Google Trends* data. The use of *Trends* data will be defended by examining its similarity to traditional attentional data derived from polls, as well as noting its differences from traditional survey measures. These attentional data are regressed on the emotional content of news reports across the four aforementioned policy issues in order to test the hypothesis that valence and arousal act as predictors of agenda-setting.

Chapter 5 will be used to further parse apart the dynamics of public attention as a function of emotion. Using measures of the amount of change, rather than average level, of emotional information in the media, I explore how the emergence of policy issues onto the public agenda is predicated on their receiving a "shock" of affective coverage by the mass media, with further increases in public

attention a function of these emotionality punctuations. Because this is an as-yet-unexplored avenue of research, much of this chapter focuses on first establishing evidence of punctuated equilibrium in media emotionality and then examining how punctuations influence public attention.

Chapter 6 links my dissertation research on emotion and attention to broader understandings of agenda-setting. I will demonstrate that this dissertation serves not only to further illuminate our understanding of public attention, but also points the way toward a reinvigoration of agenda-setting research. The implications that follow from this will be of use not only to scholars of political communication, behavior, and public policy, but also policy advocates and entrepreneurs who are attempting to place their preferred policies on the media agenda. In addition to this, the broader implications of this research will be considered in closing.

Chapter 2   Public Attention

"The emotions aren't always immediately subject to reason, but they are always immediately subject to action" — William James

The United States is a pluralistic democratic society home to thousands of disparate groups; groups based on political beliefs such as partisanship or ideology, religious groups, racial and ethnic groups, groups based out of gender and sexual identity, as well as myriad civic associations. Within each of these groups can be found a diversity of policy preferences, political views, and opinions, most of which undoubtedly come into opposition with each other from time to time. But prior to the drawing of any battle lines of public opinion, citizens who will come into conflict over what government should do must first reach some form of consensus over which issues are *actually worthy of the public's attention, and as a result, worthy of government's attention.* Simply put, citizens must first agree on which issues are most worthy of attention prior to disagreeing on their merits. Without broad agreement on which of the many issues facing democratic society are most important, deliberation over those issues will likely be difficult, if not impossible. For example, McCombs (1997, p. 434) notes that because the public have limited capacity in the number of issues it can attend to (see also Jones and Baumgartner, 2005; Miller, 1956), it is thus "imperative to develop substantial consensus about which issues top the agenda" in order that the public can then engage in a Habermasian debate over the issues (Habermas, 1991).

But from where does this consensus on the issues of the day emerge? Surely, citizens are not limited in their points of contact with the social, economic, and

political problems that may arise at any time, whether through friends, family, coworkers, or fellow attendees of a local church or synagogue. Further, some issues, such as the state of the economy, can be learned about simply by one's personal experience with the issue (McCombs, 1999). But undoubtedly the most powerful influence over the issues citizens give attention to at any point in time lies in the mass media itself (see McCombs, 2004; Graber, 2007). No other entity, not political parties, not interest groups, not government itself, lies in closer proximity to citizens than do the mass media and, even in those cases where an individual is made privy to a policy or political issue through a source other than the mass media, the likelihood that such an opinion leader received their information from some individual or institution other than the media is probabilistically low (see Brosius and Weimann, 1996).

The mass media function as sole intermediaries between the public and political system not only because of their much-heralded watchdog role (see Zaller, 2003) or their ability to churn out news 24 hours a day, 7 days a week (see Graber, 2009). Rather, in choosing the set of issues that appear within their product, the media constrain their agendas into a form more amenable to consumption by the mass public (Lippmann, 1922; Schudson, 2002). This act of devoting space or time to some issues rather than others signals to the public which issues are most important and serves to consolidate the public agenda in ways mimicking the media agenda.

At base, this signaling process that occurs between the mass media and public agendas involves a transfer of salience, or importance, from the former to the latter (McCombs, 2005). The idea is intuitive to its core; as the media devote more of their finite agenda space to a particular issue or issues, citizens who are attentive to the media correspondingly adjust the salience of that issue in their minds. That

those political issues most prominent or accessible in an individual's mind are more likely to be assigned importance is an idea that carries a substantial weight within political behavior research (e.g., Zaller, 1992), and has figured prominently in much of the extant agenda-setting research throughout the paradigm's 40+ year history (see Scheufele and Tewksbury, 2007; Iyengar and Kinder, 1987, 2010). It takes little more than a cursory review of the state of agenda-setting research to find an acceptance of the accessibility hypothesis, as indicated by the sheer number of studies whose primary methodology involves correlating changes in media coverage of issues with changes in the public attention to that issue (see McCombs and Shaw, 1972; McLeod, Becker and Byrnes, 1974; Benton and Frazier, 1976; Palmgreen and Clarke, 1977; Iyengar, 1979; Winter and Eyal, 1981; Neuman, 1990; Weimann and Brosius, 1994; Brosius and Weimann, 1996; Althaus and Tewksbury, 2002; Jones and Baumgartner, 2005).

The idea that increases in media coverage of an issue can lead to corresponding increases in issue salience among the public is intuitive from a theoretical standpoint for at least two reasons. Firstly, if the media are devoting more of their agenda space to an issue, members of the public are probabilistically more likely to encounter messages on the issue. Given that media-driven shifts in issue salience are predicated on actually *encountering* coverage of an issue – especially for non-obtrusive issues such as foreign policy—the total amount of coverage devoted to an issue by the media appears to be a logical predictor of likewise changes to the public agenda. Secondly, given constraints on the size of the media agenda, the fact that the media are devoting coverage to one (or some) issues at the expense of others may signal to the public that the issue is deserving of more attention than others (Benton and Frazier, 1976). In other words, the transfer of salience inherent in agenda-setting may occur simply because the public is indexing to the media.

The fundamental problem with this hypothesis, however, is that an increase in the volume of coverage afforded to political issues is likely a necessary, but not sufficient, condition for corresponding increases in the accessibility of that issue among the public. For example, the hypothesis that agenda changes are produced by changes in the volume of issue coverage on the part of the media neglects to specify *why* news volume would do so. As mentioned earlier, citizens encountering a media agenda more heavily saturated with coverage of an issue are probabilistically more likely to encounter those messages, but this explanation leaves out the linkage connecting an issue message in the media and thereafter placing greater weight on the issue. This black box of cognitive processes involved in agenda-setting, as McCombs (2005) terms it, may resemble the "top of the head" considerations cited by Zaller (1992) in examining the malleability of issue salience among the public; however, recent experimental evidence has begun to pick apart this hypothesis, at least with regard to agenda-setting (see Miller, 2007).

Another fundamental flaw in this explanation can be found in empirical research on the agenda connection between public and press. McCombs (2004) notes that numerous examples can be found of a media agenda saturated with coverage of a single issue with little-to-no corresponding issue saturation on the public agenda. One such example can be found in media coverage of the Lewinsky–Clinton scandal in the late 90s; even given the high volume of coverage of the scandal, a sizable portion of the public simply did not assign the weight to the issue the mass media did (see Fried and Cole, 2001). Another such issue is media coverage of the economy. Because economic issues are "obtrusive" issues – e.g., much of the public has first-hand experience with economic fluctuations so as to not be entirely dependent upon the media to assign importance to it – the link between economic media reportage and importance judgments on the issue are often tenuous (see McCombs, 2004).

Additionally, that the pure volume of coverage on its own can have such an impact on the populace is in line with the now-archaic view of a citizenry helplessly beholden to the media (Miller, 2007; McCombs, 2004), and ignores that much of the "hypodermic needle" style media effects research has been empirically refuted since publication of Lasswell's (1927) work putting forth the theory (see also Kinder, 2003). Treating the volume of issue coverage as the chief predictor of agenda-setting effects is likely to lead to serious misspecification of explanatory models because it ignores the important role played by the content of media messages, as much of the literature on framing demonstrates (Iyengar, 1994; Druckman, 2001; Kellstedt, 2005; Nelson and Garst, 2005; Baumgartner, De Boef and Boydstun, 2008; Schaffner and Atkinson, 2009). Moreover, it does our understanding of the process of agenda-setting a disservice by failing to consider why the public agenda so often mirrors the media agenda, other than a simple tit-for-tat ordering of priorities. The content of media messages matters in conceptualizing agenda-setting (see Kim, Scheufele and Shanahan, 2002; Soroka, 2002), and designing explanatory models that assume away the content embedded in media messages is likely to lead to flawed models of public attention.

The first empirical chapter of this dissertation, Chapter 3, addresses both the volume of issue coverage in the mass media and the content of messages, and in doing so examines the connection between the amount of coverage an issue receives and the emotionality of that coverage. For example, it has been noted that, as the media increase their coverage of social and political issues, their reportage on those issues tends to become more negative (Baumgartner and Jones, 2009); this is in line with "no news is good news" strain of thought. Moreover, the U.S. media's concurrent positions as primary sources for most citizens and profit-driven enterprises means that what is newsworthy is often that which is most emotionally gripping and enthralling (see Grabe, Zhou and Barnett, 2001), a part of democratic

life only magnified by the fact that standards of newsworthiness often emphasize the need to tell stories that are negative and arousing in order to best capture citizens' attention (see Lippmann, 1922; Wahl-Jorgensen and Hanitzsch, 2008).

The alternative to this involves my prior discussion of how increased prominence of an issue in the media may not act to orient attention *per se*, but rather increase the probability that individuals will encounter those messages, parse their contents, and adjust their attention accordingly. If this is in fact the case, the volume of coverage may not be a proxy for emotionality, but rather act as a mediator of the effects of emotion. For example, media reports on environmental issues might be increasingly negative with the onset of some controversy in that issue domain, but because of the (typically) low amount of coverage of those issues in the media (Jones and Baumgartner, 2005), the number of stories published may not substantively increase. In instances such as these, we might expect for the coverage volume–emotionality relationship to work in tandem, with the effect of emotionality increases mediated by the extent to which individuals are likely to encounter those messages.[1] I now turn to my expectations of the role of emotion in predicting public attention.

2.1 The Psychology of Emotion and Attention

Given the above criticisms of the accessibility model of public attention, it seems clear that there must be more mechanisms at work in the production of public attention than mere accessibility. Specifically, I contend that emotion, or affect, plays an important role in directing attention at political issues of the day. As will be discussed in more detail below, affect tends to play a large role in the way journalists report about government and policy (Cappella and Jamieson, 1997;

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[1]In other words, if media reports on an issue become more negative in a forest and nobody is around, does anyone orient their attention toward those issues?

Hibbing and Theiss-Morse, 1998; Gieber, 1955; Martin, 2008). As will be argued, the emotion that is present in media reports is not just there to help tell a story, but rather serves as a informational cue for a citizenry that may or may not be paying close attention to their political system (see Delli Carpini and Keeter, 1997; Schudson, 1998).

I would be remiss to discuss the role emotion and affect play in political behavior without first considering how it has been treated throughout centuries of thought on politics. Until just recently (and still continuing in many academic circles), emotion has been seen as perhaps the best example of the fallibility of human nature. For example, while Aristotle viewed emotion as a ever-present component of the human experience, he contended that individuals with higher aspirations would work to transcend the limitations of the "base" emotions (Aristotle, 2004). This line of thought continued through much of democratic theory, with the founders so concerned with the effects of human emotion so as to construct a structure of government guarding against it (Hamilton, Madison and Jay, 1788).

This normative view that rationally-based cognitive behavior *should* rise above what has been viewed as the baser emotions has long held some currency in empirical examinations of behavior in the political realm. Take for example rational choice theory (see Downs, 1957), which postulates that individuals will cognitively consider all possible alternatives prior to arriving at a choice that maximizes their utility (see also Quattrone and Tversky, 1988, for a contrast between rational choice and psychological mechanisms of decisionmaking). Under this model of decisionmaking emotions have no part, but are rather superseded by the conscious cognitions of rational individuals.

We know now, however, that what should be and what actually is when it comes to human behavior can be two entirely different things. In the past thirty

years especially research has shown repeatedly that emotions play a large role in decisionmaking and the formation of political attitudes and beliefs (see Marcus, 2000, for a summary of the myriad ways in which emotion influences behavior). Past evaluations of political leaders and objects tend to hold affective "tags" which serve to influence subsequent judgments of those entities (Cassino and Lodge, 2007; Lodge and Taber, 2005; Taber and Lodge, 2006); disgust responses are associated with opposition to homosexual behavior (Smith et al., 2011; Inbar, Pizarro and Bloom, 2009); physiological reactions to threatening auditory and visual stimuli correlate with preferences for socially protective policies (Oxley et al., 2008); those with greater propensities to arousal participate more in politics (Gruszczynski et al., 2013); and feelings of anxiety or fear lead to greater information seeking (Marcus and Mackuen, 1993). Emotion plays a rather large role in each of these examples, indicating that scholars who wish to assume away the effects of affect in behavior and attitudes are undoubtedly seeking to describe or explain a world that does not empirically exist.

The reason for the primacy of emotion in subsequent behavior lies in the way the brain processes information. Though the relationship between the two is not a simple dichotomy, emotions tend to occur more readily and more quickly in the brain than do conscious cognitions (Lang, Bradley and Cuthbert, 1998; Lodge and Taber, 2005). Emotional appraisals of environmental cues initially occur below the threshold of cognitive processing, a characteristic of behavior that manifests in species as complex as human beings or as simple as laboratory rats (Adolphs and Spezio, 2007). From an evolutionary perspective, the importance of the primacy of emotional evaluations is exemplified in unconscious reactions to stimuli in one's environment: i.e., an individual quickly takes action to avoid a nearby snake or one pulls her hand away from a hot surface without consciously deliberating on those decisions.

At root, outputs resulting from emotional activation fall within the domain of approach–avoidance behavior, otherwise known as appetitive–aversive reactions (Lang, Bradley and Cuthbert, 1998). The body's emotional responses to environmental stimuli allow for quick behavioral responses, even when those behavioral responses have not been subject to any conscious deliberation on the part of the individual. In this way the activation of emotional systems indicate that emotion is a precursor to action, a condition which has been undoubtedly experienced by anyone who has encountered a threatening situation in which the heart began pounding, sweat levels increased, blood to flow, and so on (Bradley and Lang, 2007; Appenzeller and Oribe, 1997).

Importantly for my dissertation, much psychological research on the characteristics of emotion have shown that affect is not a simple unidimensional construct, but is rather composed of two distinct underlying dimensions, valence and arousal (see Osgood, Suci and Tannenbaum, 1967; Russell, 1980; Bradley and Lang, 1999; Bradley, 2000),[2] that subsume discrete emotional states such as fear, anger, sadness, happiness, and so on (see Barrett, 1998; Bradley, 2000). Though research in political psychology has tended toward the adoption of the latter view (see Marcus, Neuman and MacKuen, 2000; Valentino et al., 2008), the use of discrete measures of emotion has tended to suffer from the fact that the multitude of possible discrete emotional states are not parsimonious and are not necessarily replicable across social and cultural contexts (Bradley, 2000). Moreover, the quantification of discrete emotional states using either survey or physiological measures is problematic because of the difficulty in distinguishing between similar emotional states (e.g., Kreibig, 2010). For these reasons I adopt the dimensional

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[2]A third dimension of emotion has been postulated as "dominance," which is associated with the degree of control one has over objects in an environment. However, its characteristics are not as well known as either valence or arousal, as indicated by the paucity of research focused upon it, and is likewise not as orthogonal to either of the other two dimensions as they are to each other (see Russell, 1980).

view of emotion.

Approach–avoidance behavior is most closely associated with the valence of objects within one's environment. Valence can be thought of as the *value* of these objects, with positively-valenced objects correlated with approach behavior and negatively-valenced objects associated with avoidance behavior (Bradley, 2000, 2009; Vuilleumier, 2005). Though the continuum of valence proceeds from negative to positive, responses to valenced objects within the environment are not symmetrical; rather, negatively valenced objects tend to be weighted more heavily by individuals encountering them (Bradley, 2000; Bradley et al., 2001; Rozin and Royzman, 2001). This negativity bias is found across species, a characteristic of valence evolutionary psychologists argue stems from a greater need to quickly identify negative stimuli in order to increase the likelihood of survival (see Leahy, 2002).

Though comprising two separate dimensions, valence and arousal are related to the extent that increasingly valenced stimuli, whether positive or negative, also tend to exhibit higher levels of arousal (Bradley, 2009). These higher levels of arousal correspond to increased motivation to engage in approach–avoidance behavior. In other words, increases in the motivation to engage in approach–avoidance behavior correspond to a heightened perception of the importance of environmental stimuli. So, whereas the positive or negative features of stimuli act as evaluative indicators, arousal intensifies the extent to which an individual is motivated to respond and attend to those stimuli in the environment and transform that attention into a behavioral response (Storbeck and Clore, 2008). Gable and Harmon-Jones (2010*b*) note that environmental stimuli eliciting more arousing emotional states, indicating salience, tend to narrow and focus attention on those stimuli and, in effect, produce more goal-oriented behavior as a result.

Whereas valence serves as an indicator of the value of objects within the

environment along a negative-positive continuum, the dimension of arousal acts as an indicator of the salience, or importance, of those objects and is related to the intensity underlying the extent to which approach-avoidance behavior is undertaken (Bradley, 2000). In other words, arousal represents the intensity of emotion (Compton et al., 2003) and is central to the conversion of dispositions about environmental cues into actual behavior (Brehm and Self, 1989). This function of arousal is encapsulated in the Latin word for emotion, *movere*, which translated means "to move" (Bradley, 2000, p. 602).

It is important to note at this point that although this approach–avoidance continuum underlying emotionally-motivated behavioral outputs is seen by many as an evolutionarily-induced characteristic of most organisms (Vuilleumier, 2005), the duality of emotion–cognition that has so often been treated as either-or by thinkers and scholars as far back as Aristotle (2004) amounts to little else but a false dichotomy. For example, numerous scholars have examined the interplay between cognition and emotion, finding that the two work in tandem in producing behavioral outputs (see Bradley and Lang, 2007; Spezio and Adolphs, 2007). Spezio and Adolphs (2007) in particular point out that the process of evaluating environmental stimuli resembles a "feedforward" process wherein some affective judgments are passed on to conscious cognitive processing, with subsequent affects and cognitions feeding information back and forth until some behavioral output is settled upon. This interplay between the emotional and cognitive portions of the brain is necessary for organisms as complex as human beings given that the range of actions necessary in the social domain are too variable for simple approach–avoidance outputs (Bradley and Lang, 2007; Vuilleumier, 2005). However that is not to say that the complexity of human experience necessitates that emotion take a backseat to cognition, but rather that the inherently complex social environs habitated by individuals demand that emotion play a role in the processing of information.

Affect as Information

The human brain has a limited processing capacity that was famously posited by Miller (1956) as being constrained to $7 +/- 2$ bits of information (see also Baddeley, 1994). Now, given the cognitive constraints of the brain, together with the context of the complex social environs which individuals occupy, the brain is required to quickly parse through mountains of information constantly, ignoring some while selectively attending to others (Bargh, 1992; Vuilleumier, 2005; Bradley, 2009). In these everyday circumstances, the limits of the human brain are such that no individual could possibly stop and take the time to parse through the information in his or her environment prior to arriving at a behavioral decision (see Simon, 1946, 1985; Loewenstein and Lerner, 2003).

The necessity of parsing through the sheer amount of information present in one's environment is one of the areas in which affect truly shines. The theory that affect acts as information is one which has been posited by numerous psychologists examining the positive role it can take in influencing attention and behavior (see Clore, Gasper and Garvin, 2001; Clore and Tamir, 2002; Peters et al., 2006; Storbeck and Clore, 2008; Zadra and Clore, 2011), which stands in stark contrast to studies of "hot" cognition that see the biases that stem from affective information as problematic to judgments and attitudes (e.g., Kunda, 1990; Lodge and Taber, 2005; Morris et al., 2003; Redlawsk, 2002; Taber, 2003).

Under the affect as information view, emotion is not seen as just an output, but rather as an informational input for further processing in the brain (Clore, Gasper and Garvin 2001, see also Bradley and Lang 2007; Spezio and Adolphs 2007). This demonstrates the aforementioned interplay between affect and cognition as put forth by Spezio and Adolphs (2007), wherein emotions provide conscious information from unconscious emotional appraisals (Clore and Tamir, 2002). In

other words, the affective cues provided by an object in one's environment act as another source of information in making a conscious judgment about the object. Though an overly-simplified example of the role of affect as information, in seeking to reach a decisional output an individual may ask herself how she feels about the object being evaluated, and use that experienced emotion as an informational resource in arriving at her decision (Storbeck and Clore, 2008).

This is not to say that the brain's use of affective information directly or necessarily includes the activation of conscious emotional appraisals of situations or objects. Clore and Tamir (2002) note that, depending on the magnitude of emotional appraisal processes, affective cues can either play an overt, consciously recognized role in influencing decisions as a result of strong emotional appraisals or a less-obvious, unconscious part in decisions that result in less-noticeable appraisals. The key here is that emotional appraisals not only play a varying role as the result of the perceived intensity of evaluations, but also that they are always at work regardless of the level of intensity (Zadra and Clore, 2011).

Compton (2003) describes how the information garnered from emotional appraisals leads to selectivity in attention. In scanning the environment, the brain takes a host of sensory inputs and evaluates the emotional significance of stimuli (a process involving the amygdala), passing those stimuli which breach some threshold of emotional significance on to further attention and processing. This initial emotional processing appears to occur very quickly, within 100-300 ms of encountering a stimulus (Zald, 2003; Bradley, 2009), and for the most part does not present a load on other attentional resources (see Compton 2003, but see Pessoa et al. 2002 for evidence to the contrary). What is important to note about the brain's processing of affective information is its inherent asymmetry in doing so. As discussed earlier, individuals exhibit negativity biases in their reactions to

emotionally-laden stimuli (Bradley, 2000; Bradley et al., 2001; Rozin and Royzman, 2001). Negatively-valenced stimuli tend to likewise lead to increased use of resources, with a narrowing of attention as a result (Gable and Harmon-Jones, 2010*a*), whereas positively-valenced stimuli lead to a broadening of attention, presumably given that unconscious value judgments deem such stimuli as lower in priority for further processing (Bradley, 2009).

The affective dimension of arousal also acts as an informational resource. Recall that whereas valence acts as an emotional *value* judgment of stimuli, arousal correspondingly works as an *importance* judgment. Storbeck and Clore (2008, p. 1827) note that the informational characteristics of arousal work hand-in-hand with valence judgments, so that evaluations of a stimulus include not only valence judgments ("how do I feel about about it?") but also arousal judgments ("how *strongly* do I feel about it?"). In this way arousal can act to amplify the perceived magnitude of emotionally-valenced stimuli – whether positively- or negatively-valenced – and serves to influence the degree to which attention is oriented to those stimuli.

2.2 Toward a Theory of Emotion and Public Attention

The fact that individuals reside within a constant deluge of information means that the use of affective cues as informational resources holds the capacity to greatly simplify the allocation of attentional resources. Jones and Baumgartner (2005, see also Simon 1985; Hanoch 2002) note that given individuals' ability only to process information serially, rather than in a parallel fashion (e.g., how the organization of Congress into committees allows for parallel processing), means that attention can only be directed toward a small handful of political or policy issues. This fact has only been compounded with the technological advances of the late-Twentieth and early-Twenty-First centuries, with their accompanying high

number of media and informational resources present in the mass media and Internet (Hargittai, Neuman and Curry, 2012; Graber, 2009, but see Sunstein 2007; Prior 2007 for a discussion of how the emergence of media choice can act as an information reducer). To put it bluntly, individuals within today's democratic society are bombarded with information on a daily basis, and as such are faced constantly with the necessity to parse through mountains of information quickly in order to separate that which is most important from that which is not.

Additionally, there are a multitude of other duties and distractions which individuals must contend with, often to the dismay of civic theorists. From a normative perspective, democratic citizens have long been expected to be exhibit a great deal of attentiveness social and political life, as exemplified in the perspectives of Wendell Berry (see Theobald and Snauwaert, 1990) and Tocqueville (see Ceaser, 1985). From an empirical perspective, we know that citizens do not often live up to this standard, whether it owes to a lack of resources (Verba, Schlozman and Brady, 1995), political knowledge (Delli Carpini and Keeter, 1997), or the sheer amount of information that populates the civic sphere (Kinder, 2003). In a way, it appears that democratic theorists were not counting on *homo politicus* getting a job and raising a family.

This dissertation is rooted in the hypothesis that the affective content of media messages offers citizens a mechanism through which to more easily attend to important policy and political issues while ignoring those that are less important. The mass media, through their role as gatekeepers, have long served as information aggregators, creating consensus on which issues of the day are most important as a result (see McCombs, 1997; Tocqueville, 2003; Lippmann, 1922). But for the most part research has neglected to investigate the way in which the affective content of mass media messages further highlight which issues, of all the issues on the media

agenda, are most pressing (but see Miller, 2007; Soroka, 2006; Graber, 2007). I contend that the two primary dimensions of emotion, valence and arousal, play important roles in orienting the public's attention to these issues.

Of course, for this hypothesis to be correct the media must actually produce emotion-laden messages that will in turn allow citizens to use said emotions in the orientation of their attention. Research on the pattern of reporting in the mass media has consistently shown that messages from the American press are, in fact, emotion-laden. The most obvious evidence lies in the how the media's pattern of reporting tends to emphasize negativity (e.g., Cappella and Jamieson, 1997).[3] While this strain of research tends to originate from the idea that negative press serves to disengage portions of the citizenry (e.g., Cappella and Jamieson, 1997; Patterson, 1996), foster distrust (e.g., Kleinnijenhuis et al., 2006), and leads to negative evaluations of political institutions and leaders (e.g., Hibbing and Theiss-Morse, 1995, 1998), other research, this dissertation included, contends that "bad" news can be good for governance because of its ability to orient attention to those parts of the political system most in need of it (Martin, 2008; Zaller, 2003; Schudson, 1998, see also Hibbing and Theiss-Morse 2002).

As was discussed earlier, given the influence negative information can have upon the orienting of attention (e.g., Bradley, 2000; Bradley et al., 2001; Rozin and Royzman, 2001), it is intuitive to suggest that those media accounts that feature some level of negative valence are more likely to be given attention—and, subsequently, assigned more importance—by citizens than accounts that do not (see Marcus and Mackuen, 1993; Marcus, Neuman and MacKuen, 2000, for an example of negative information's influence on political behavior). This has been tested, to an extent, using experimental methods. Meffert et al. (2006), using an information

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[3]Surprisingly, there is much less research on negative reporting in the news than of negative political campaign ads; see Ansolabehere and Iyengar 1997; Bradley, Angelini and Lee 2007; Brians and Wattenberg 1996; Geer 2006.

board experiment, found that individuals exhibited a negativity bias in deciding which information to give attention, with negative information attended to much more often than positive or neutral information. This is demonstrative that negative stimulis' ability to serve as useful indicators that the environment should be appraised more closely by individuals encountering negatively-valenced objects, and increases the likelihood that individuals will act outside the boundary of habitual behavior.

Likewise, Miller (2007) varied whether participants were exposed to neutral or negatively-valenced media reports on the issue of crime in order to examine whether it is the encountering of media reports on an issue or the valenced content of those reports that predicts agenda-setting effects. In several trials the research found that participants exposed to negatively-valenced emotional content of news reports on the issue of crime exhibited much higher agenda-setting effects than participants exposed to non-valenced media reports. Similarly, Bolls, Lang and Potter (2001) found negative radio advertisements to elicit more attention than positive advertisements.

A caveat, though: a potential issue with experimental examinations of negative valence and agenda-setting lies in the negativity inherent in the mass media (see Cappella and Jamieson, 1997; Zaller, 1998; Moy, Pfau and Kahlor, 1999). A good example of the news media's emphasis on negative information lies in the research of Metzger (2000), who finds that citizens infer that an issue has been resolved because of its absence in the mass media. If the majority of information reported by the media is cast in a negative light (see Cappella and Jamieson, 1997), any potential cueing effects inherent in that negative information should hypothetically disappear because the media agenda is so saturated with that type of content. In other words, it is unlikely that negative information can act as a

distinguishing cue if it there is no variance in the amount of negativity present in reportage.

Whereas valence can act as a cue to which objects in the environment need attention, the emotional dimension of arousal plays an important role in indicating the salience, or importance, of those objects (see McDermott, 2004), and is related to the intensity to which approach or avoidance is undertaken (Bradley, 2000). In other words, arousal represents the intensity of emotion (Compton et al., 2003), and is instrumental in translating dispositions to respond to valenced stimuli into behavioral outputs (Brehm and Self, 1989).

Given arousal's role as an indicator of salience and importance, it is plausible that the level of arousing language in media reports might positively correlate with the salience citizens give to issues reported in the media. Importantly, Miller (2007) tested for the effect of arousal on agenda-setting but found no effect. However, the measure used in that research, which was garnered by summing the absolute value of valence levels in text, is problematic given that arousal and valence are orthogonal (Bradley and Lang, 2007). Valence and arousal have been demonstrated to be separate neurological constructs (Compton, 2003), and so measuring arousal as an offshoot of valence might lead to a confounding of the two. This research contends that measuring arousal as its own (rightly) independent construct will demonstrate an effect between the emotionality of media reports and agenda-setting effects given arousal's role in acting as indicating the importance of environmental stimuli.

Importantly, though valence and arousal are orthogonal to each other, research has also found them to interact in important ways with regard to the focusing of attention toward objects in the environment (see Gable and Harmon-Jones, 2010a; Storbeck and Clore, 2008; Zadra and Clore, 2011). For example, Gable and Harmon-Jones (2010a) notes that it is with increases in

negative valence of environmental stimuli, arousal acts to narrow attention. In other words, encountering a negative object in one's environment may initially indicate its value, and higher levels of arousal will then lead to an evaluation of the level of importance or salience of the stimuli itself, completing the orienting response.

2.3   Issues Selected for Analysis

In order to test the hypotheses offered in any study of the broad dynamics of media agenda setting, a range of issues must be selected that is representative of numerous policy areas. Moreover, the issues must exhibit some modicum of variation over the time period studied in order to give statistical treatments the opportunity to "bite" into them. For these reasons I have selected four issues to use as testbeds for my research questions: the debt ceiling, a fiscal crisis created by Congress for purposes of (potentially) lowering the national debt; the Keystone XL Pipeline, a system of transporting tar sands oil from Alberta, Canada to the Gulf of Mexico; gay marriage, a long-entrenched social issue with a divisive partisan flavor; and sanctions against Iran, which have been oft-featured in U.S. foreign policy since the Iranian Revolution of 1979.

These four issues were selected for analysis in order to account for economic (debt ceiling), environmental (Keystone pipeline), social (gay marriage), and foreign policy (Iran sanctions) issues. Including this wide range of issue types should offer a test of whether any of the possible results generalize across issues. For example, economic issues have long been noted to present less of a media–public connection than other issues due to the simple fact that citizens often experience those issues firsthand outside of the mass media (McCombs, 2004). Though the debt ceiling is less of a "close" economic issue than, say, unemployment rates, this issue may still represent one where the media are apt to have less influence over the public than on issues such as foreign policy, which most common citizens experience only through

the media.

The selection of an environmental issue (the Keystone Pipeline) for these analyses presents different expectations than is the case for economic issues. For one, real-world conditions in environmental issues tend not to correlate to public attention to those issues (see Ader, 1995), which increases the likelihood that changes in coverage of these issues will correlate with public attention. On the other hand, the public has also tended to pay little attention to environmental issues relative to other political issues, at least since the environmental consciousness movements of the 1960s and 70s, a fact compounded by the tendency of the mass media to not give as much agenda space to environmental problems as other problems (Baumgartner and Jones, 2009). I believe that these characteristics of environmental issues in the media make selection of such a policy problem especially pertinent to this dissertation, as the lower (relative) levels of attention they receive from either the media or public represent a more conservative test of my hypotheses of emotional attention.

The social and foreign policy issues selected, gay marriage and Iran sanctions, differ quite substantially from either the debt ceiling or Keystone Pipeline. For one, the issue of same-sex marriage is one that has long occupied a prominent position in the morality politics in the United States, and sanctions against the Iranian regime have been a common component of U.S. foreign policy toward the country. Because these are not new issues, unlike the debt ceiling or pipeline, they are likely to already be present in the minds of citizens. In a way this offers another conservative test of the ability of emotional cues in the media to orient attention, as these issues likely already have affective "tags" (see Lodge and Taber, 2005) that citizens rely on. What I mean by this is that the issues themselves are likely to already have been evaluated by citizens prior to recent media coverage, and so carry with them

baggage that newer negative or arousing language may have difficulty displacing. In any case, the inclusion of four issues from different policy areas, two new and two old, offers me the opportunity not only to test my hypotheses across a swath of policy problems, but also to investigate whether the dynamics of public attention and media emotionality differ on the basis of the "freshness" of those issues.

Following the testing of specific hypotheses in Chapters 3 and 4, Chapter 5 will examine the effect of *changes* in media emotionality on public attention. A burgeoning strand of research in the policy change literature has found rapid changes, or punctuations, among various constructs (budgetary cycles, Congressional attention, etc) to be important indicators of changes in the broader political environment. Under what Baumgartner and Jones (2009, 1993) term "punctuated equilibrium," activity surrounding policy issue areas alternate between periods of equilibrium and upheaval, with public and governmental attention suddenly oriented toward those issues experiencing a recent shock to the system (see also Jones and Baumgartner, 2005).

Though this line of research has been fruitful in building a grand theory of policy change, to this point it has not been explored in terms of whether shocks in media emotionality occur that orient attention (though Baumgartner and Jones (2009) and Jones and Baumgartner (2005) explain concurrent increases in both media negativity and public attention arising from exogenous shocks). It stands to reason that if the current emotional status of media reports on issues influence public attention, then recent changes, especially large changes, might serve to play an even greater role in attracting mass attention.

Recall the role of emotional information as a quick indicator of both the value and significance of environmental objects (e.g., Bradley, 2000, 2009; Vuilleumier, 2005). Under this view of emotion, the entrance of some object into

one's environment will trigger an emotional appraisal for purposes of evaluating a response to that object. However, if the media on the whole tend toward the negative in reporting on political issues (and they do, e.g., Cappella and Jamieson, 1997), scanning the environment for negative features may not provide useful informational cues; in other words, if the environment is overwhelmingly negative and/or arousing, those features won't distinguish one issue from another.[4] However, if recent shocks in emotionality occur beyond these average levels of emotionality, than these shocks might also serve as cues to issues needing attention.

As was mentioned, there has been no empirical investigation into whether punctuations in media emotionality occur, especially if one excepts Baumgartner and Jones' (2009) noting that news coverage tends to become more negative after an external shock to an issue area. It owes to this that Chapter 5 is more exploratory and thus avoids *a priori* hypotheses about what I expect to happen in the case of emotional punctuations. To be sure, I am inclined to believe that emotionality in the media will be punctuated at least to an extent, but I have no theoretical justification underlying this belief, so I prefer to avoid offering up false hypotheses in the process of examining this question. Thus Chapter 5 will combine an investigation of whether emotionality in the media is punctuated and, if it is, whether these punctuations influence public attention.

I turn now to the first empirical chapter, which examines emotionality in the media as well as its relationship to news coverage volume.

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[4]This is related to "redundancy" in information: items that occur very often in one's information environment carry less information than more unique items (see Pierce, 1980).

Chapter 3   The Emotional Nature of the News

"All the reporters in the world working all the hours of the day could not witness all the happenings in the world … Yet the range of subjects these comparatively few men manage to cover would be a miracle indeed, if it were not a standardized routine." — Walter Lippmann

Emotions are a staple of media reportage. A headline from the *New York Times* notes that a "Day of Subdued Protests Follows Night of Clashes in Chicago." The lead in a story from *Fox News* announces that "Hamas attack victims slam U.S. for siding with Iran." A feature story from *CNN* purports that Mount Everest is "like a morgue." Across the mass media, whether the outlet deals in traditional print, cable, or online news, the emotional characteristics of stories are afforded a central place in constructing pictures of the world, to both grasp the attention of audiences and sell the news (see Entman, 2006; Lippmann, 1922).

There is a paradox inherent in critiques of the American press as being too rife with negativity. That citizens rely upon the "miscast institution" of the media, as Patterson (1994) terms it, to serve as a vigilant watchdog of the government and a "good neighbor" to citizens (Poindexter, Heider and McCombs, 2006) means that the media has thrust upon it a duality that is difficult to resolve. The U.S. media's concurrent positions as sole arbiters of information for citizens *and* profit-driven enterprises means that what is newsworthy is often that which is most emotionally gripping and enthralling, often to the point of sensationalism (see Grabe, Zhou and Barnett, 2001). And this facet of life with the media is only magnified by the fact that standards of newsworthiness often emphasize the need to tell stories that are negative and arousing in order to best capture citizens' attention (see Lippmann,

1922; Wahl-Jorgensen and Hanitzsch, 2008).

Though emotion *per se* has not been central to analyses of the media (but see Young and Soroka, 2012), but rather *"tone,"* media scholars have tended to focus on whether the press exhibit negativity biases across a wide range of contexts, including excessive negativity on the basis of partisanship (Niven, 2001), political leaders' and candidates' public approval (Groeling and Kernell, 1998; Patterson, 1994), the performance of democratic institutions (Hibbing and Theiss-Morse, 1995, but see Aday, Livingston and Hebert 2005; Bennett, Lawrence and Livingston 2007), and race and crime (Gilliam et al., 1996; Romer, Jamieson and Aday, 2003). Broader-ranging research has focused upon critiquing the overall negativity of the media as detrimental to political participation and efficacy (Cappella and Jamieson, 1997; Johnston and Davey, 1997).

But as was was put forth in the previous chapter, the emotion present in journalistic reportage on political issues is not necessarily entirely detrimental to citizens within a democracy. If individuals do in fact (consciously or unconsciously) use the emotional cues present in news stories as information in judging the value and importance of issues present in the media, then the emotion inherent in the mass media may actually act as a stimulant for greater attention. Prior to examining whether public attention is a function of media emotionality, however, the dynamics of emotions in the media must first be established. Specifically, the extent to which emotionality occurs in the media will be addressed, followed by an examination of how emotionality relates (if at all) to the volume of news coverage in order to assess whether volume stands in as a proxy variable for the emotional content of the news.

It has been noted that, as the media increase their coverage of social and political issues, their reportage on those issues tends to become more negative

(Baumgartner and Jones, 2009); this is in line with "no news is good news" strain of thought. Moreover, the U.S. media's concurrent positions as primary sources for most citizens and profit-driven enterprises means that what is newsworthy is often that which is most emotionally gripping and enthralling (see Grabe, Zhou and Barnett, 2001), a part of democratic life only magnified by the fact that standards of newsworthiness often emphasize the need to tell stories that are negative and arousing in order to best capture citizens' attention (see Lippmann, 1922; Wahl-Jorgensen and Hanitzsch, 2008). Owing to these characteristics of the news media, I hypothesize that coverage volume and emotionality are related to the point that news volume works as a proxy for the emotionality surrounding political issues:

$H_{3.1}$: **Media emotionality is positively related to media coverage volume.**

Of course, it may well be that emotion and media coverage volume are in fact separate constructs. Should this be the case, the likelihood exists that the two may work independently in producing public attention to political issues – should any such relationship exist between emotionality and attention – or may have a mediated effect, wherein they work independently yet interact to produce attention under some circumstances. This latter possibility will not be addressed until the chapter bringing in public attention data, but a hypothesis is offered positing a null relationship between emotionality and news coverage volume:

$H_{3.2}$: **Media emotionality will is orthogonal to media coverage volume.**

The conversation now turns to measuring emotion in media texts, with initial attention given to past attempts to quantify media emotionality, the current state of text emotionality research, and finally a presentation of the method of

emotional quantification used through the remainder of this research.

3.1   The Measurement of Affective Content in Text

The use of text as a unit of analysis has a long history in the study of political and social behavior. As Krippendorff (2003) notes, much of what behavioral scientists are interested in – attitudes, beliefs, preferences – is not necessarily directly observable, but can be inferred from systematic examination of text, which acts as an observable indicator of underlying latent constructs. In political science the approach began with the work of Lippmann (1922), through Lasswell's analysis of symbolism and propaganda (1952; 1927), and forward to today's research on agenda-setting (McCombs and Shaw, 1972; Jones and Baumgartner, 2005) and framing research (Chong and Druckman, 2007; Scheufele and Tewksbury, 2007). The central theme underlying these and other works is that the content of the political texts is both quantifiable and theoretically useful to our understanding of phenomena as varied as elite framing (Wagner, 2009; Gruszczynski and Michaels, 2012), Congressional priorities (Baumgartner and Jones, 2009; Jones and Baumgartner, 2005), and perceptions of minorities and outgroups (Iyengar, 1994; Schneider and Ingram, 1997), to name but a few.

Of the many ways in which the content of the media have been studied by political scientists, perhaps one of the most consistently examined characteristics is that of tone, or the negativity/positivity of political texts. Though this obviously has some overlap the current investigation of media emotionality, especially valence, these previous exercises represent what I will hereafter refer to as *context dependent* tone. For example, Hopmann et al. (2010) coded news statements as positive or negative depending on whether the campaign they were directed at would see them as such; Shaw (1999) evaluated tone by considering whether increased reportage on certain political events would be helpful or detrimental to campaigns; Just, Crigler

and Buhr (1999) evaluated statements on the perceived "optimism" or "pessimism" inherent within; Baumgartner and Jones (2009) coded statements about policy issue areas for tone by evaluating whether they had positive or negative implications for those specific issues. There are multitudes of operationalizations of context dependent media tone in the literature besides these.

From the perspective of measuring affect in the media, there is a twofold problem with previous endeavors such as these. First, the measurement of context dependent media tone is highly dependent upon the establishment of a strict definition of what constitutes negative or positive tone for purposes of internal reliability (see Krippendorff, 2003). Given that traditional content analyses are executed by a human coder or coders, ensuring that the construct of interest is actually being measured through the methodology requires a great deal of training in the conceptualization of tone specific to that research. This isn't to say that previous research is in error; after all, conducting intercoder reliability tests can help to ensure that the measure is internally reliable, if not externally valid (see Krippendorff, 2003; Hayes and Krippendorff, 2007; Neuendorf, 2001).[1] But these measures of tone do tend toward a degree of specificity that makes their generalization to other domains of interest difficult at best.

Second, though these methods aim at measuring the negativity–positivity continuum, they may fail to measure emotion in the strictest sense due to their context dependent operationalization. For example, analyzing one message as negative due to its effect on a candidate's chances in a political campaign (see Shaw, 1999; Hopmann et al., 2010) doesn't necessarily mean the message is negative, but instead may only mean that the message is unfortunate for that campaign. Take,

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[1]Of note, there have been many advancements in automating the classification of text into categories of interest, including the negative-neutral-positive classifications. Examples include Hopkins and King (2010) and Jurka et al. (2012), both of which use machine learning of human-coded documents to classify "virgin" documents.

for example, a controversy concerning dog ownership that erupted during the early stages of the 2012 presidential campaign. The scandal (somewhat) erupted following allegations that Republican candidate Mitt Romney tied his family's dog to the roof of their car during a trip, which was followed by revelations that President Barack Obama had eaten dog meat while visiting his grandmother in Indonesia. Now, news stories reporting on these "controversies" might elicit a negative reaction among members of the public; however, it can hardly be argued that a headlines reading "Romney straps dog to roof of family car" or "Obama ate dog meat as a child" contain any explicitly emotional content. Rather, these statements are emotional to the extent to which *individuals encountering them are sympathetic to the plight of dogs owned by presidential candidates.* In short, lacking corresponding measures of the emotional responding of media consumers to such messages we cannot easily infer a particular valence from these messages.

A solution to this issue is to construct lexical dictionaries of words with varying emotional meanings and simply count their occurrences within a corpus of text (see Krippendorff, 2003; Weber, 1990) in order to gauge the emotional content of communication messages. The use of dictionary methods of content analysis improves upon the problems inherent in other measures of emotionality for several reasons. For one, the use of word frequencies derived from dictionaries avoids the problem of the internal reliability of content analytic procedures, especially in cases where the coding is done by computer rather than by hand. Given a text corpus already cleaned and preprocessed for the task, word counts are easily derived either from commercially-available software or simple researcher-coded programs. This does not mean that dictionary methods are perfectly suited to any content analysis task, of course, because the dictionary employed in the research must constitute a valid representation of the construct of interest, a point which will be discussed in more detail below.

For the same reason that dictionaries are more internally reliable than are other content analytic procedures, they are also more amenable to replication and comparison across corpuses of text (Krippendorff, 2003). As long as the dictionary used is made available to interested researchers, the method employed in one research project can be easily replicated and extended, a characteristic of this approach which is much more difficult to come by in context-dependent, hand-coding of articles. As with any methodological tool, of course, the dictionary method is not without its faults. The first fault lies in selecting a dictionary that can be said to validly represent the construct of interest, which in the case of this research is the construct of emotions within political texts.

In terms of affect in particular, numerous dictionaries have been developed since the 1960s, including Lasswell's Value Dictionary (see Weber, 1990), Linguistic Inquiry and Word Count, Wordnet-Affect, Roget's Thesaurus (Young and Soroka, 2012), and Affective Norms for English Words (Bradley and Lang, 1999). These dictionaries and others have seen wide use throughout a range of disciplines in quantifying the emotional content of texts (see Young and Soroka, 2012, for a review). However, for purposes of this research the Affective Norms for English Words (ANEW) dictionary will be used to glean the emotional content of political texts, due to the fact that it features words pre-rated according to the dimensional view of emotion, has been demonstrated to correlate with physiological indicators of emotion (see Larsen, Norris and Cacioppo, 2003), and is available free of charge for use in academic research, a feature not often present in commercially available dictionary sets. These advantages of the ANEW dictionary will be considered in turn.

3.2   Quantifying Emotionality with the *ANEW* Word Set

The *ANEW* dictionary consists of just over 2,000 words varying along the dimensions of valence, arousal and, to a lesser extent, dominance (see Bradley and Lang, 1999).[2] The word set, which is publicly available to academic researchers, is pre-rated along the three dimensions using the "self-assessment manikin," a technique that asks raters to assess the degree to which a word stimulus evokes each of the three dimensions of emotion with respect to the participants themselves (Bradley and Lang, 1994). Each rating dimension is measured on a 9-point scale, with arousal proceeding from 1 (calm) to 9 (excited), valence ranging from 1 (unhappy) to 9 (happy), and dominance ranging from 1 (controlled) to 9 (in control) (see Bradley and Lang, 1999).

Each *ANEW* word's rating on valence and arousal is plotted in Figure 3.2. As has been found with valence and arousal more generally (see Bradley et al., 2001), valenced word ratings exhibit a biphasic relationship with arousal, with increasing positive valence corresponding to increased arousal and increasing negative valence doing likewise (see Lewis et al., 2007). As Lewis et al. (2007) suggest in discussing how negative and positive self-reports do not always correlate, the biphasic characteristics of valence may indicate that it is not in itself a simple unimodal dimension, but rather composed of two sub-dimensions that must be considered separately. This is important to keep in mind when discussion turns to the measurement of valence in political texts below.

Though the *ANEW* word set is pre-rated along these emotional dimensions – a characteristic that sets it apart from many other affective word dictionaries, such as LIWC or Roget's – what is even better about the word set is its use in studies

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[2]Though the 1999 word set consisted of about 1,000 words, more recently Bradley et al. expanded the word list to 2,000 words.

Figure 3.1: Valence and Arousal Ratings of ANEW Words
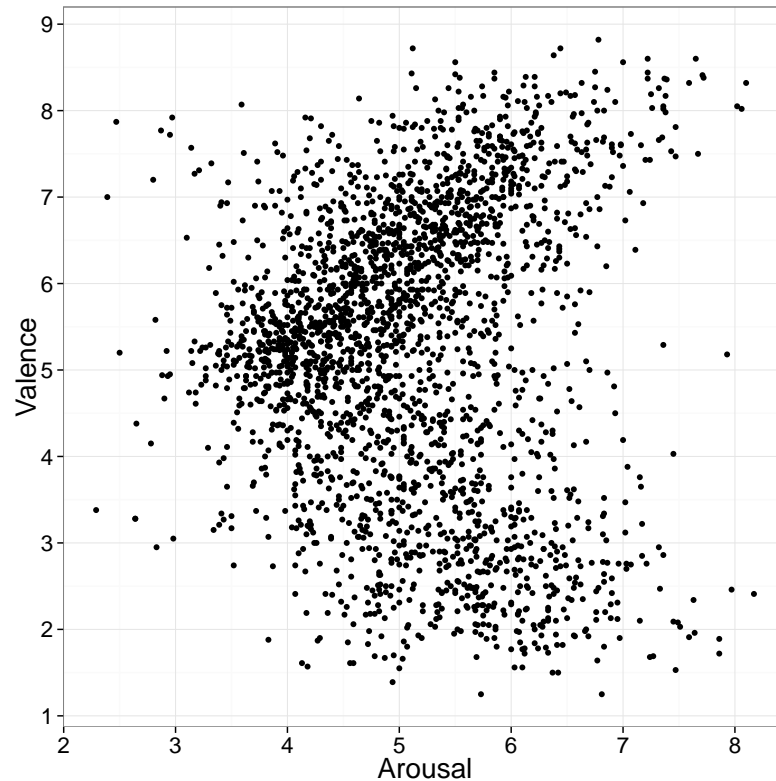
correlating the ratings with physiological measures of emotion, which has also been undertaken for the *International Affective Picture System* (IAPS) and *International Affective Digitized Sounds* (IADS, see Larsen, Norris and Cacioppo 2003 for physiological correlates of each rating set). For example, with regard to valence Larsen, Norris and Cacioppo (2003) found that activity at the *corrugator supercilii*, a facial muscle implicated in valence reactions (see Partala, Surakka and Vanhala, 2005), showed significantly higher activity when participants were exposed to negatively-valenced words rather than was the case when faced with positively-valenced words.[3] In terms of positive valence, there was no significant

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[3]Importantly, correlations between valenced words were not as strong as those between sound and image sets, undoubtedly due to the more immersive nature of sounds and images as compared to words.

difference in activity at the *zygomaticus major* muscle, which is associated with positive affective responses, though positive words inhibited activity at the *corrugator* muscle (Larsen, Norris and Cacioppo, 2003). Research has also examined the correlation between self-report arousal ratings of words and physiological correlates of arousal, specifically electrodermal response (EDR), an indicator of sympathetic nervous system arousal (see Dawson, Schell and Filion, 2007; Kreibig, 2010).For example, Buchanan et al. (2006), investigating arousal and word recall, found significantly heightened levels of EDRs as a result of (negative) arousing words.

Given the fact that the *ANEW* word set is not only a set of pre-defined emotional words, but also a pre-rated dictionary that has been shown to correlate with lower-level physiological indicators of emotion (see Larsen, Norris and Cacioppo, 2003; Buchanan et al., 2006), this research uses it as the groundwork from which to study the emotionality of the mass media, as well as the impact of that emotionality on public attention. It is my viewpoint that gauging the emotionality of political texts using pre-rated word sets such as *ANEW* offers a much less context-dependent metric of affect than do previous content analytic procedures that are reliant upon more subjective judgments of the researcher.

That said, there are a few points that bear mentioning about the extent to which emotional measures such as these influence individuals invariantly. First of all, research has repeatedly shown that negative emotional states (i.e., moods) individuals find themselves in when encountering stimuli can negatively impact effort mobilization (e.g., Gendolla, Abele and Krsken, 2001) and lead to greater error reactions in experimental tasks (e.g., Luu, Collins and Tucker, 2000). Regardless of the content of stimuli, individuals still bring some emotional baggage to the table that may be prone to influence their processing of that content.

Secondly, recent research in political psychology has shown that attention (Dodd et al., 2012) and reactions (Oxley et al., 2008) to negative stimuli vary as a function of ideology. In other words, in addition to their emotional baggage, individuals are also likely predisposed to process differently as the result of political characteristics. With regard to the measures used in this research, however, which focus on *mass* attention on the part of the public, neither of these potentially confounding features can be addressed. To be sure, that the emotional word set selected for use in this research has been pre-rated across many subjects means that some level of context-free text emotionality will be gained from this analysis, but I still think it necessary to mention this caveat.

Data Collection and Methods

The first step in any content analysis study is to select a sample of text from the entire universe of text, a step not to be taken lightly when your universe of text includes a multitude of media sources across newspapers, network and cable sources, and new media such as blogs. Because the purpose of this research is to examine the drivers underlying the media and public agendas, it is important to select sources that are at least somewhat representative of what the public would encounter in their own media environments on a daily basis, or at the very least act as gatekeepers for "lower" media sources that follow their cues in reporting the news (see Kiousis, 2004).

As per a multitude of studies in the past, *The New York Times* was selected as a source of data given its primacy in setting the national agenda of many other newspapers (see Dearing and Rogers, 1996, see also Kiousis 2004). The *Times* is one of the most widely read papers in the United States, with its weekday circulation placing it at #3 spot among all U.S. newspapers, behind *The Wall Street Journal* and *USA Today.* Importantly, the latter two newspapers were not included

in the analysis because the *Journal* was not available from *LexisNexis* and *USA Today* did not cover politics to a sufficient degree to offer useful data for my analyses. Given past examples of the *New York Times* as one of the primary sources of political information in communication research (see Kiousis, 2004; Dearing and Rogers, 1996), it should suffice for the purposes of this research.

Articles were retrieved from each of these news sources by searching the *LexisNexis* database for search terms related to the debt ceiling ("debt ceiling" OR "debt plan" OR "debt limit"), the Keystone XL pipeline ("Keystone" AND "pipeline" OR "XL" OR "oil"), gay marriage ("marriage" AND "gay" OR "homosexual" OR "same-sex"), and Iran sanctions (simply "Iran sanctions").[4] The resulting article sets were then examined to ensure that they actually pertained to each issue in question. Editorials, op-eds, and other opinion pieces were culled from the resulting document lists in order to ensure that only straight-news pieces were part of the analysis.

All resulting documents were downloaded from the *LexisNexis* database in HTML format. I created a library of pre-processing scripts in the Python programming language for purposes of pulling the text data into a usable form for analysis. Various components of this library pulled relevant meta-information from each article, including date of publication, page number, authorship, news source, and word count, with the main text of each document then pulled into a dataset.[5] Words were then converted to lowercase, punctuation removed, and stemming procedures next undertaken on the body text of each article. Stemming consists of taking each word and breaking it down to its root so that word variants can be picked up in the frequency counting process. An example of stemming is

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[4]Each set of search terms also included the following: AND NOT SECTION(op-ed OR opinion OR editorial OR obituary) AND NOT "The New York Times Blogs" AND NOT HEADLINE(Corrections) in order to exclude editorials, obituaries, and corrections.

[5]See Appendix A for the code used in the text processing.

represented in the words "angry" and "angrily" being distilled down to their root, the word stem "angr." At this point each word in the *ANEW* set was also stemmed to prepare to pull their variants from the media articles.

Following these pre-processing stages, each word that occurred in a document was recursively counted, netting a total document word-frequency dataset for each article. The *ANEW* word set was then iterated over for each article, pulling the total frequency of each word in every article into a smaller dataset consisting only of *ANEW* words. In order to measure the dimensions of negative valence and arousal, only those words that were rated 1 standard deviation below the mean of valence (the valence dimension goes from negative to positive) and 1 standard deviation above the mean of arousal ended up in the final word counts for each document (see Francisco and Gervs, 2006; Dodds and Danforth, 2009). Valence was separated between positive and negative due to the biphasic characteristics the dimension exhibits, especially in relation to arousal (see Lewis et al., 2007).

In order to obtain a mean negative-valence and arousal score for each article, the frequency of each ANEW word in an article was multiplied by that word's respective mean rating from the ANEW data, summing the weighted counts of all ANEW words, and finally dividing the summed weighted frequencies by the total number of ANEW words appearing in the article. This measure allowed for both the formulation of average valence and arousal scores for each article and to control for the length of each article, eliminating the possibility that longer articles might present larger scores on the emotional dimensions due to their containing more words. The computation of mean negative-valence and arousal are shown below, where f is the frequency for each ANEW word i in an article, and a and v are the mean scores for arousal and valence, respectively:

$$mean\ arousal = \frac{\sum_{i=1}^{n} f_i a_i}{\sum f_{i...n}} \qquad\qquad mean\ negative\ valence = \frac{\sum_{i=1}^{n} f_i v_i}{\sum f_{i...n}}$$

The resulting *ANEW* word frequencies, sums, and weighted means were then merged and combined with each article's meta-information, merged into a dataset and prepared for analysis. The following section presents the characteristics of the media on these four issues, including emotionality, frequency of reportage, and the dynamics of the reportage related to them.

3.3   A First Look at Media Emotionality

Prior to examining more the more in-depth results, descriptive results will be examined across each of the issues, shown in Table 3.1. For the time period spanning January 1, 2011 through June 1, 2012 there were a similar number of articles on each issue (200–400). That the issue of sanctions against Iran received the most coverage is intuitive given that foreign policy issues tend to occupy a substantial portion of the media agenda (see Jones and Baumgartner, 2005; Boydstun, 2008). The average word counts for each article were similar as well, though articles about Iranian sanctions tended to be much longer, on average, than stories pertaining to the other issues.

In terms of valence, specifically negative valence, there were also similar results across issues, though valence was highest for the issues of gay marriage and the debt ceiling as compared to the Keystone pipeline and Iran sanctions. These descriptives make intuitive sense given the long-standing polarization with regard to same-sex marriage, as well as the conflictual nature of the debt ceiling issue, which represents a policy problem constructed by Congress to essentially force conflict on the federal deficit.

Table 3.1: Descriptive Statistics – News Coverage Volume and Emotionality

	Debt Ceiling	Pipeline	Gay Marriage	Iran Sanctions
No. of Articles	319	209	313	387
Mean Articles (Per Day)	1.611	1.239	1.534	1.654
	(1.167)	(0.630)	(1.019)	(0.952)
Mean Word Count	1007	844.3	825.4	1706
	(572.62)	(813.74)	(495.70)	(1599.20)
Mean Valence	0.597	0.511	0.619	0.513
	(0.156)	(0.206)	(0.290)	(0.166)
Mean Arousal	6.542	6.549	6.671	6.530
	(0.098)	(0.104)	(0.176)	(0.138)

Standard deviations in parentheses

On the other hand, mean levels of arousal were highly consistent across each of the issues, with no one issue substantially higher than any of the others. Comparing valence and arousal, valence demonstrated consistently higher variability than arousal. Obviously only conjectures can be made until public attention is actually correlated with these measures, but the fact that valence showed more variation than arousal is an early sign that it may in fact change often enough to act as a distinguishing feature.

Though descriptives are an important component of any study, it is necessary to look further in order to get a more nuanced view of any set of data, especially with regard to Hypothesis 3.1, which posited that news volume would be positively related to emotionality, and thus has acted as a proxy variable in previous studies. The next several figures present the time-series data for each of the four political issues in this study. The graphs plot the total number of stories for each

Figure 3.2: Time Series Plots of News Volume and Emotionality – Debt Ceiling
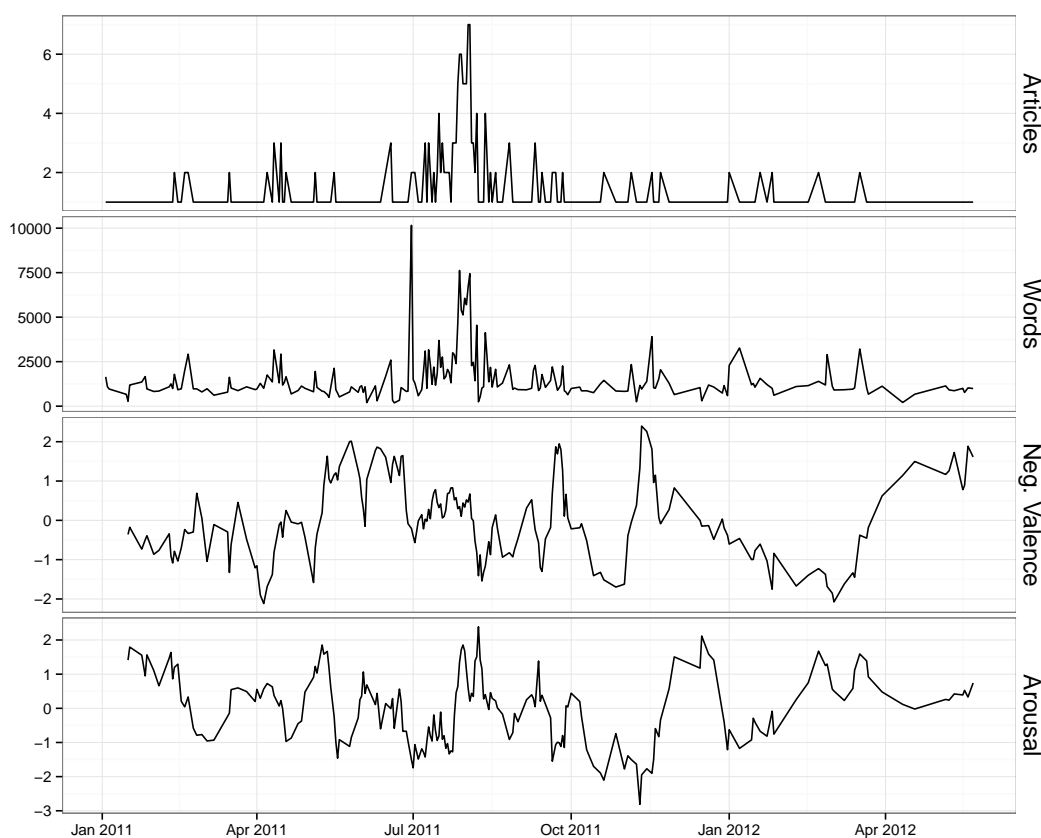
Note: Negative valence and arousal plots are standardized z-scores.

day of the time series, the total word count, and the level and variability of valence and arousal over each time period. Given that the metric of emotionality has little intuitive meaning taken alone, each of the valence and arousal graphs plot standardized scores for the measures, and as a result each 1-point change from 0 represents a 1-standard deviation increase or decrease. Additionally, the measures of emotion have been transformed into moving averages in order to ease the visual presentation of plots, which serves to separate the underlying signal of each measure from "noise" (or the random walk) present in day-to-day variability of any measure (see Shumway and Stoffer, 2010).

Figure 3.2 plots the time series graphs for the debt ceiling issue. As would be expected, the total number of stories and word counts for each day appear to be highly correlated, which is also demonstrated in a Pearson's correlation of r = .85 (p < .001). These plots for the volume of coverage given to the debt ceiling issue by the *Times* also demonstrate the dynamics of the issue. For example, the large spike in coverage that occurred in July and early August of 2011 coincides with the conflict that occurred between Democrats and Republicans in Congress during that time over whether the debt ceiling could be raised, which of course happened around August 1 of that year, averting a shutdown of the federal government. Additional spikes in the volume of coverage occurred later in December of that same year, as well as in April of 2012, as further deliberations between party members in the two chambers occurred over the issue.

Visually examining the relationship between the volume of news coverage and the two dimensions of emotion in question isn't terribly revealing of how the two interact, if at all. The level of negative valence appears to kick up around the time of the summer 2011 debt negotiations, though it precedes the increase in news volume by about a month. There is a mild correspondence that appears to occur during the large spike in coverage, but it doesn't appear to be closely related. Correlating these measures nets non-significant correlation coefficients between negative valence and total volume (r = .05) and word counts (r = .001). Though Hypothesis 3.1 posited that news volume may be a proxy for negative valence in signaling to individuals the value of policy, it doesn't appear to be such in a statistical sense given such low and non-significant correlations.

Arousal likewise doesn't appear to be closely related with news volume, though there were positive increases in this emotional dimension that occurred in the same period as the spike in volume occurring around the summer 2011

Figure 3.3: Debt Ceiling Scatterplots – News Volume and Emotion
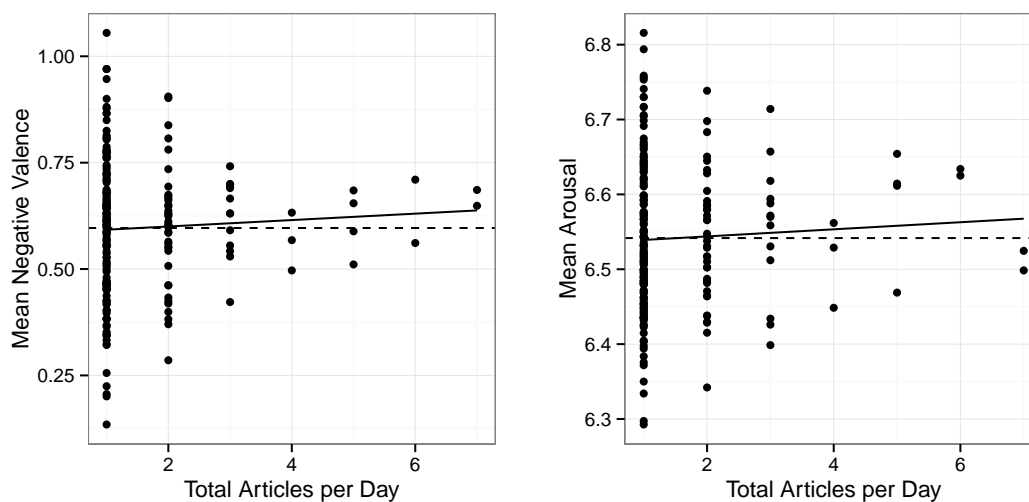
Note: Dotted line is the mean of negative valence/arousal. Solid line is the fitted regression line.

negotiations. Additionally, the pre-showdown period around April 2011 saw corresponding spikes between volume and arousal, though visually it doesn't appear to be a robust association. Again, this is demonstrated in non-significant correlation coefficients between arousal and both total volume (r = .05) and word counts (r = .01). Like its non-relationship to negative valence, coverage volume does not appear to be acting as a proxy for the significance (arousal) of the debt ceiling issue.

To get a closer look at volume–emotionality relationships, the scatterplots in Figure 3.3 graph the two dimensions of emotion against news volume (as represented by the word counts) for the issue of the debt ceiling. The x-axes correspond to news volume as measured by the total number of articles per day and the y-axes represent mean negative valence or arousal for each observation in the data. The solid line in each graph is the fitted regression line between the two variables, while the dotted line delineates that mean level of the emotional dimensions for each issue. Several interesting and unexpected characteristics of

Figure 3.4: Time Series Plots – Keystone Pipeline
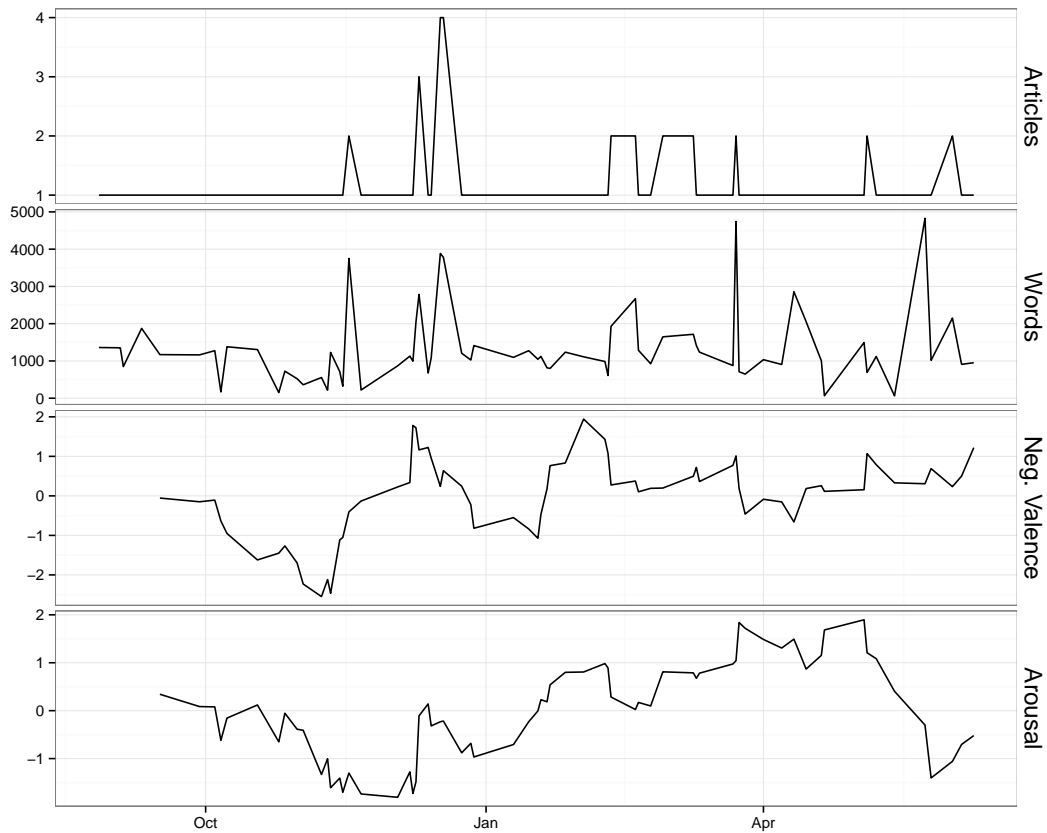
Note: Negative valence and arousal plots are standardized z-scores.

these relationships are readily apparent. At low volumes of news coverage the distribution of both valence and arousal are very wide. However, as news volume increases the distributions of valence and arousal exhibit much less variability, even though there is neither a statistical nor graphical linear relationship between these variables and volume. What is especially interesting is that both emotional dimensions appear to settle into an equilibrium around the mean as the amount of coverage increases. While I can only conjecture about why this relationship emerges, it may well be that increases in coverage of this issue bring about more balance in the emotionality of the stories.

Figure 3.4 plots the time series plots for media data on the Keystone pipeline issue. This issue represents quite a departure from the previous in that it started out as an issue with a primary focus on Nebraska politics. However, following President Barack Obama's denial of a building permit for the pipeline, which originates in Alberta, Canada, crosses the central United States and ends in the Gulf of Mexico, the issue took on a national, partisan side. In late 2011 Republicans in Congress attempted to force the administration's hand through the drafting of legislation overriding the president's permit denial (they were unsuccessful). Following that time the issue periodically reappeared on the Congressional agenda, followed by the requisite partisan wrangling that one would expect.

These periodic shifts of attention to the issue manifest in the volume of news coverage on this issue. As was the case in the prior issue, news volume as represented in both articles printed and words devoted to the issue are highly correlated, albeit less so (r = .64). In addition, increases in negative valence peaked around the same time as the largest spike in volume of coverage around December of 2011. Likewise corresponding spikes between volume and valence occurred throughout 2012, indicating that valence may be more closely associated with news volume than was the case with the issue of the debt ceiling. Though not significant, the correlation coefficient for this relationship does show a more systematic relationship than was the case with the debt ceiling (r = .13).

Arousing language in coverage of this issue also showed some level of association with news volume, with spikes in December 2011, March 2012, and May 2012 corresponding to likewise increases in volume. What is especially interesting about arousing language is that it shows an upward trend (with some drops) throughout the time series. Like valence, arousal also has a small, albeit non-significant, relationship with news volume (r = .10). As shown with the

Figure 3.5: Keystone Pipeline Scatterplots – News Volume and Emotion
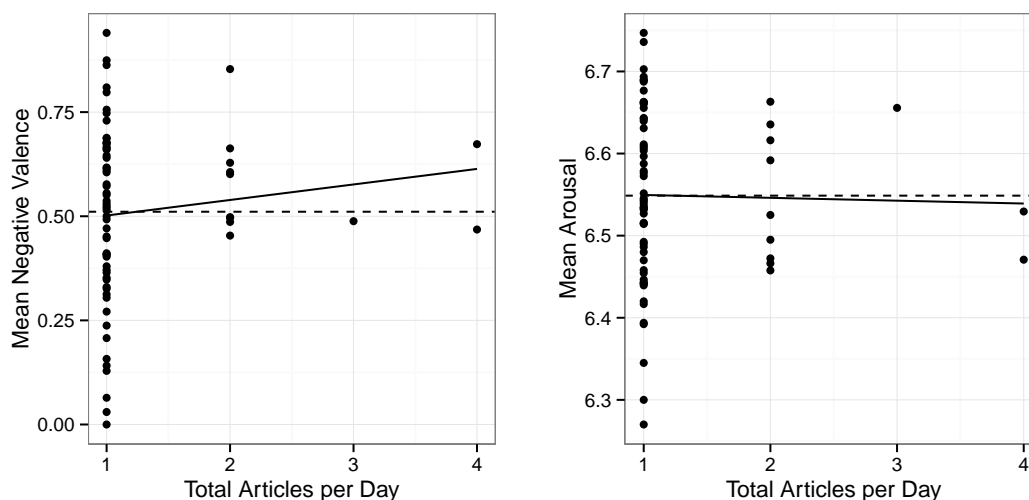
Note: Dotted line is the mean of negative valence/arousal. Solid line is the fitted regression line.

previous issue, it is clear given these weak associations that both valence and arousal are independent from the volume of news coverage.

Figure 3.5 plots news volume for the Keystone issue against both valence and arousal in order to again assess the nuances of news volume and emotion. As the time-series plots suggested, there appears to be somewhat of a relationship between valance and news volume. Additionally, there again appears to be a decrease in the variability of valence as news volume goes up, though it is not a clean linear relationship. The Pearson's r coefficient for this relationship bears this out (r = .13).

The relationship between arousal and news volume appears to be even more clear with regard to this issue. Again, the variability of arousal levels within reports on the Keystone pipeline decreases as the frequency of reportage increases. However, taking into account the covariation between the variables, there doesn't appear to be any relationship as the fitted (solid) regression line nearly completely overlays

Figure 3.6: Time Series Plots – Gay Marriage
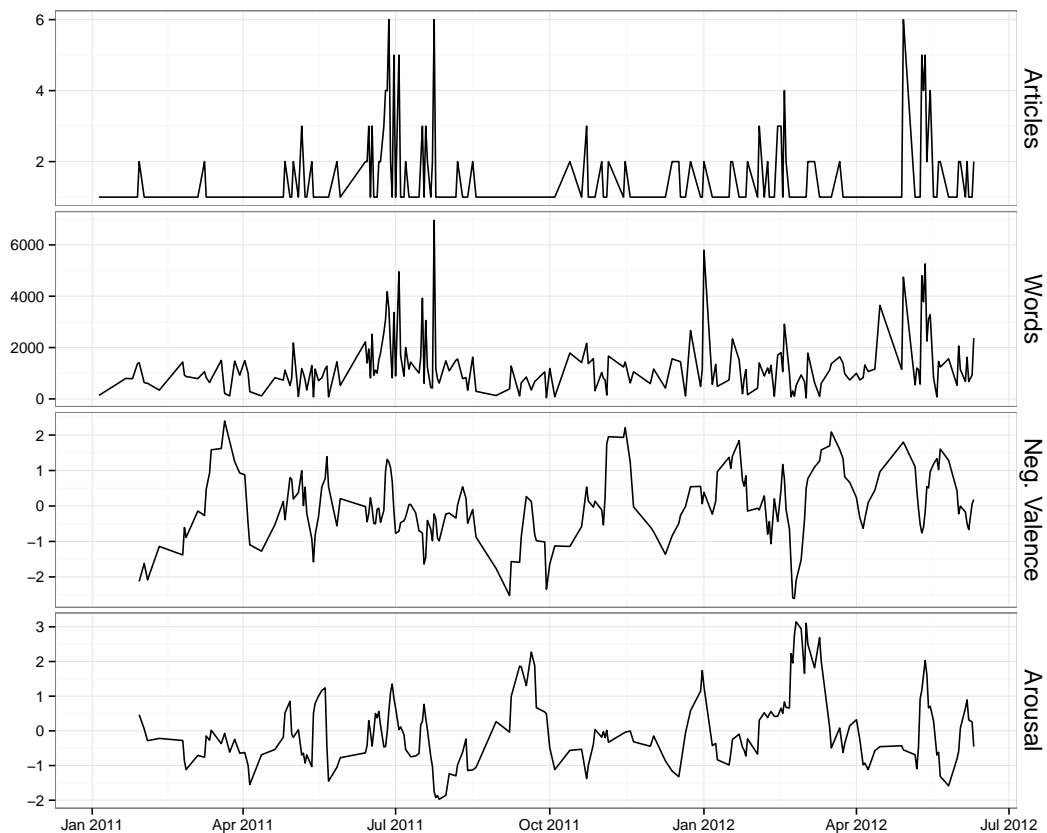
Note: Negative valence and arousal plots are standardized z-scores.

the mean level of arousal, regardless of coverage volume. Correlations reinforce this low relationship, though the direction of the relationship is positive (but still non-significant, r = .11). As was the case with the debt ceiling, neither valence nor arousal share a great deal of movement with coverage volume, as the highest association (valence and coverage volume) explained only about 2% of the variance.

Figure 3.6 shows the time-series plots for the issue of gay marriage, Unlike the previous two issues, gay marriage is not an issue that emerged for the first time during this timeframe. Rather, this has been a political issue for several decades, at least since passage of the *Defense of Marriage Act* (DOMA) in the mid-1990s. As

Figure 3.7: Gay Marriage Scatterplots – News Volume and Emotion
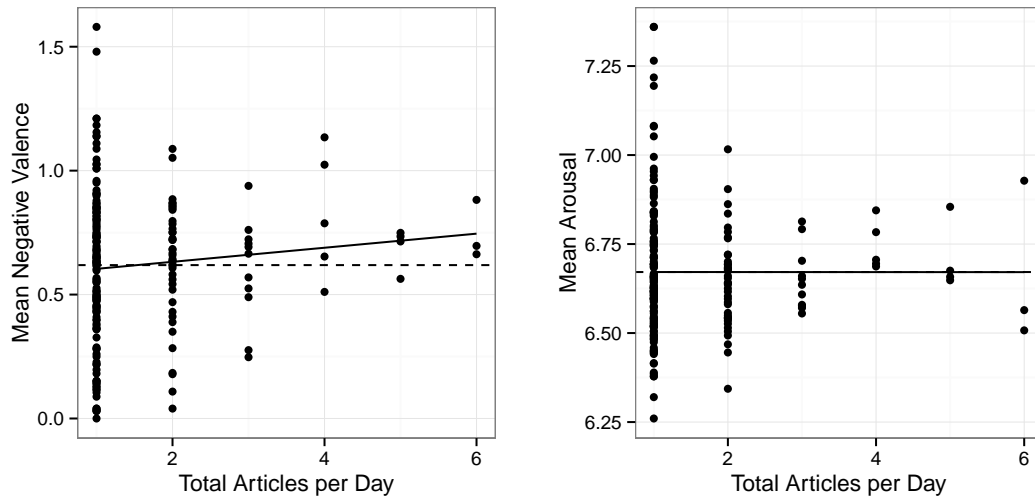
Note: Dotted line is the mean of negative valence/arousal. Solid line is the fitted regression line.

before, article counts and word counts for this issue correlate highly (r = .82). There doesn't seem to be much of a relationship between valence and news volume, as there appears to be a high degree of variation in valence that doesn't correspond with news volume. That said, there is a decent correlation between the two, indicating a marginal relationship at the very least (r = .17).

There is a likewise (visually) weak relationship between arousal and news volume. Though several spikes in arousal appear to correspond with increases in news volume, specifically in Jul 2011 and March and May of 2012, for the most part there is a large degree of variability in arousing language that is not mirrored in the volume of coverage of news volume. In fact, the correlation coefficient for this relationship is actually negative, though not significant (r = −.11).

The scatterplots for news volume and the dimensions of emotion are shown in Figure 3.7. The positive relationship noted above manifests in the

Figure 3.8: Time Series Plots – Iran Sanctions
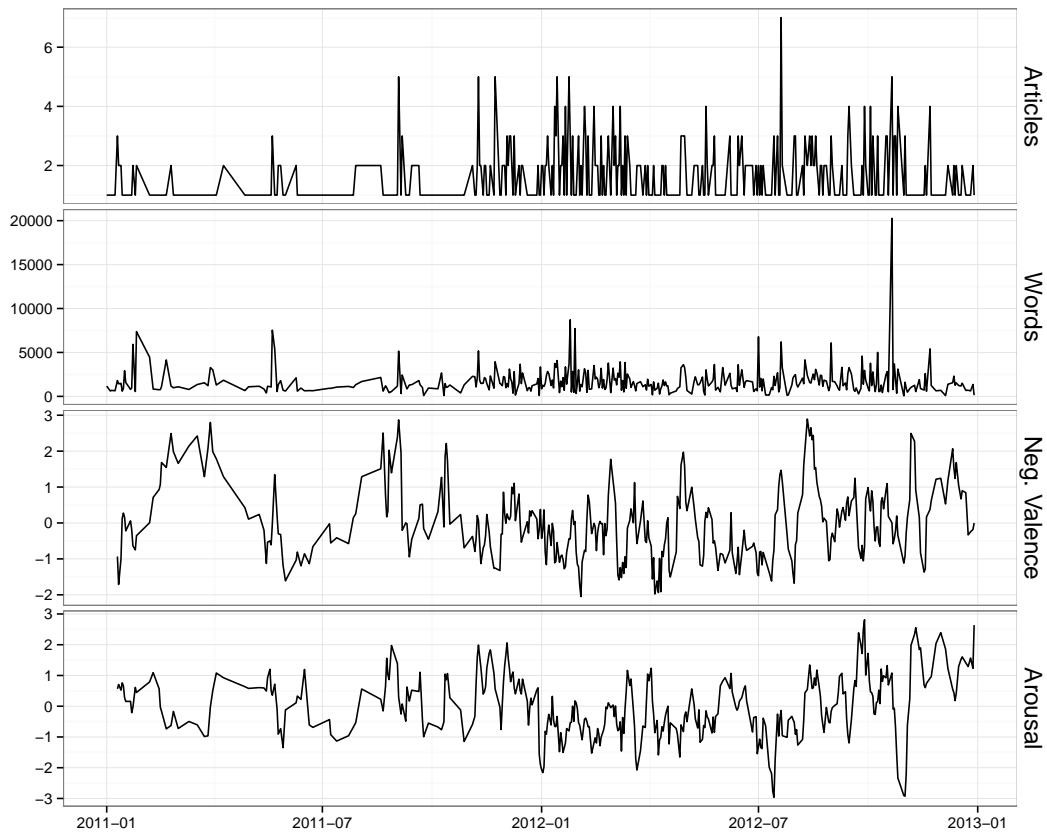
Note: Negative valence and arousal plots are standardized z-scores.

valence–volume scatterplot, though with a substantial amount of variability in valence at low levels of news volume. As has been the case with all issues to this point, the level of negative valence does not appear to be conditioned by the volume of coverage, but its variability is conditioned upon volume, with higher volume levels leading to less variability about the mean of valence. The weak, negative relationship between arousal and news volume fails to appear in the scatter plot, as the fitted regression line overlays the mean of arousal. As has been the case with the other issues analyzed in this research, it appears that valence and arousal operate mostly independent of the volume of coverage in the media.

The final piece considered here is Iran sanctions, an issue with a long history in United States foreign policy. The time-series plots for this issue, shown in Figure 3.8, reflect this to a substantial degree in the sheer amount of news coverage throughout most of the time period under study. Theoretically, the issue of Iran should provide a useful test case for affect-as-information, as individuals may need to look to cues other than simply the amount of news coverage due to its ever-present place in the mainstream media. Further, because citizens tend to pay much less attention to foreign policy issues than to domestic policy (see Anand and Krosnick, 2003), testing for an influence of affect on attention might represent a stringent test of my hypotheses.

Given that most citizens have little-to-no personal contact with foreign policy issues, of course, the media typically have an especially strong ability to set the agenda on foreign policy issues, which represents a much different situation from that of, say, economic issues (McCombs, 2004). Nonetheless, the fact that such a high proportion of media coverage is devoted to foreign affairs issues (Jones and Baumgartner, 2005; Boydstun, 2008), coupled with non-elites' ignorance on those issues, should provide a useful test of the role of affect-as-information in the orientation of public opinion. Prior to examining the emotionality of this coverage, it should be noted that the number of articles and word counts were again highly related (r = .75).

Given the heavy frequency of reporting on Iran it is difficult to visually compare either valence or arousal to the pattern of reportage. There does appear to be a spike in valence that is associated with an increase in coverage in August 2011, and smaller spikes thereafter somewhat mirroring coverage, but for the most part this is a tough issue to visually disentangle. Turning instead to simple correlational tests, there was a positive and marginally significant association between total

Figure 3.9: Iran Sanctions Scatterplots – News Volume and Emotion
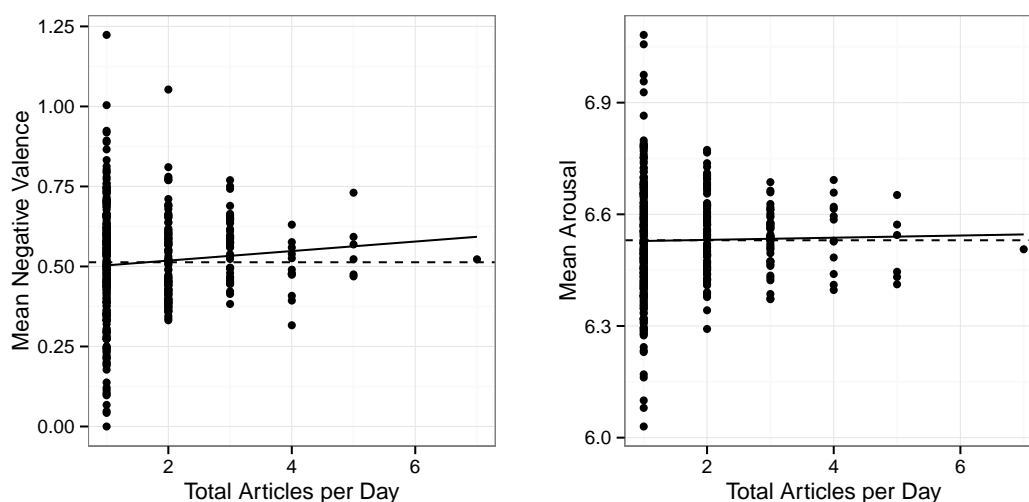
Note: Dotted line is the mean of negative valence/arousal. Solid line is the fitted regression line.

coverage and valence (r = .09, p < .10). Unlike most of the previous issues, negative valence and the volume of coverage afforded this issue is related; however, the effect is not large – the proportion of variance unexplained by this bivariate relationship is great (Residual R^2 = .99) – so it appears that news volume may not necessarily be a proxy variable for negativity in this case, as was the case with the other issues. Arousal is likewise difficult to examine visually for relationships. In the October 2011–July 2012 time period it appears that some smaller spikes may be related to news volume, but again this is a difficult relationship to parse visually. Unlike negative valence, there was no significant correlation between arousal and coverage volume, (r = .02, p = .692).

Figure 3.9 plots text emotionality against coverage volume for the issue of Iran sanctions. As has been the case with all such scatterplots, the interesting relationship that emerges isn't so much one of systematic covariation but rather one of decreasing variability in emotion as news volume increases. Case in point is

valence and news volume which, as the small correlation coefficient suggested, shows little systematic pattern of correlation. As issues prior demonstrated, though, increasing volume of coverage appears to be associated with decreasing variability in valence. Higher levels of news coverage don't produce likewise increases in negative valence (or decreases), but rather appears to cause valence to "settle in" to an equilibrium around the mean.

This is the case with arousal as well. The spread of arousal is fairly wide at lower levels of news volume, though excepting one outlier this isn't as much the case as in valence. Increasing news coverage is also associated with decreases in the variability of this form of emotional language, with a tight spread occurring on the high end of coverage about the mean of arousal. These low correlational relationships strongly suggest that news volume does not act as a proxy for emotionality in the media with regard to agenda-setting.

To this point, the evidence has appeared to be damning to Hypothesis 3.1, which posited that the volume of coverage on political issues acts as a proxy variable for the emotionality of media messages, and confirmatory for Hypothesis 3.2, which posited an orthogonal relationship between emotionality and volume. For almost every single issue, valence and arousal showed non-significant relationships with the level of attention given by the media. However, for two reasons the likelihood exists that simple bivariate correlations do not capture the relationship fully. First, because the data on news coverage is measured in counts, the distribution of the data is likely not normal and thus is prone to inefficient estimates of relationship using correlations. Figure 3.10 plots the histograms for each issue to examine this potentiality. Each of the issues appears to follow a count distribution, which may necessitate a more nuanced approach to getting at whether emotionality is related to news volume.

Figure 3.10: Histograms of Issue Coverage Volume
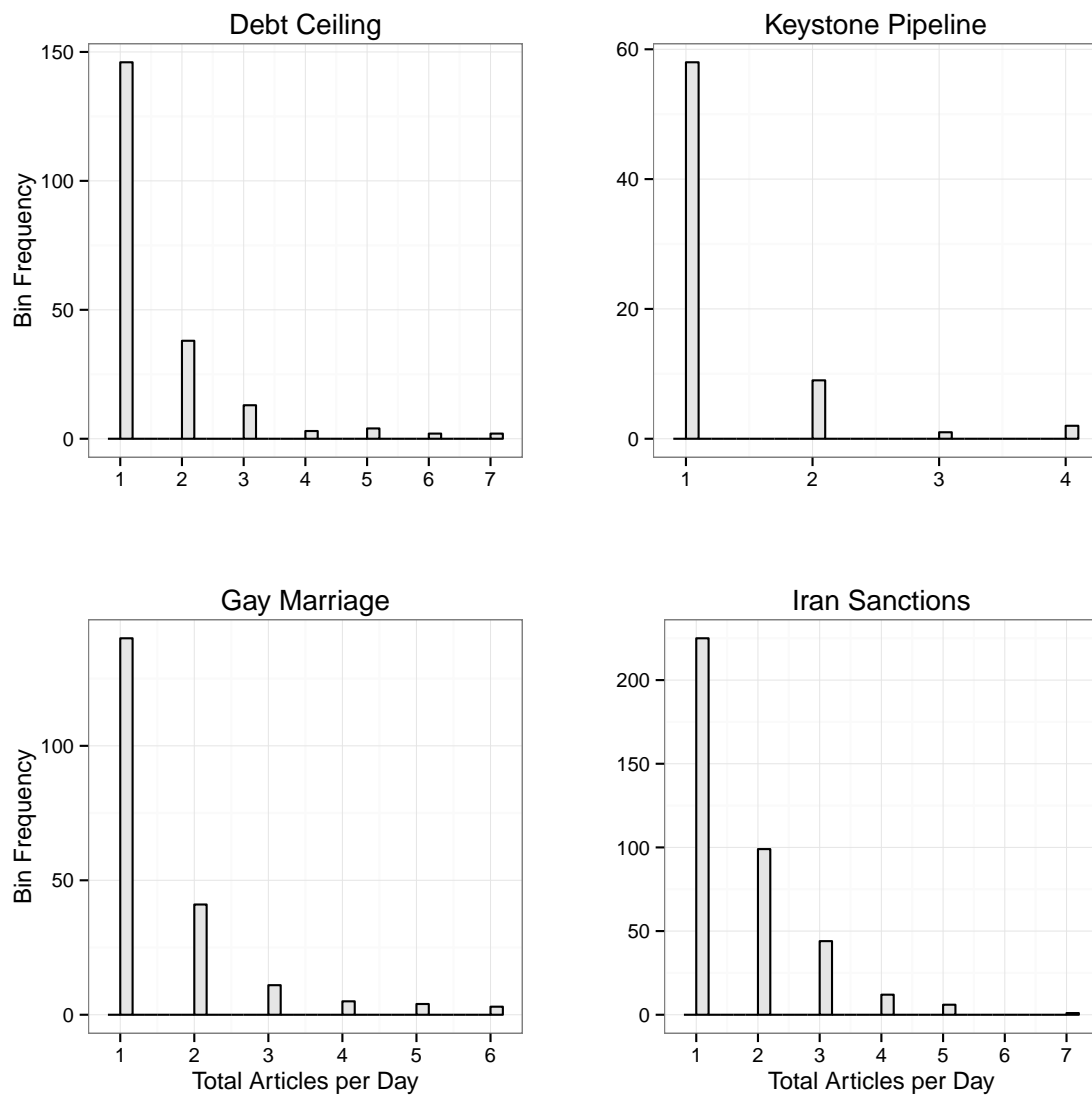
The second reason to formulate more stringent tests of possible emotionality–coverage volume relationships is that the potential remains that the variation in news volume is a function of an additive combination of both valence and arousal, rather than one or the other in isolation. For example, it might be that it is both highly negative and highly arousing content, in combination, that coverage volume acts as a proxy for, rather than just high valence or high arousal taken on their own. I'll close this chapter up with an investigation of these possibilities by (Poisson) regressing news coverage volume on valence, arousal, and the additive combination of the two to see whether there is any relationship at all between emotionality and media attention.

Table 3.2 presents the Poisson regression models for each of the issues, with a model each for valence and arousal in isolation, as well as an additive model including both. Though univariate relationships have already been explored between each emotional dimension and volume, including them here in Poisson regression models should allow for more stringent tests of any connection between them, given the count-distributed nature of news volume.

These regression models drive the point home even further that the amount of coverage given to political issues is not, in fact, acting as a proxy for the emotionality of coverage. Whereas in a few select cases the bivariate correlations between individual emotional dimensions and news coverage were significant, these relationships do not manifest when accounting for the distributional characteristics of news volume. Additionally, testing for the possibility that issue coverage is a function of *both* negative valence and arousal results in no significant relationships between volume and emotionality. These relationships are so non-existent that none of the overall models are significant, regardless of the variables included or the issue. In short, I believe it is safe to surmise that in no way is news volume, so often used

Table 3.2: Regressing Coverage Volume on Media Emotionality

Issue	Debt Ceiling			Keystone Pipeline		
Negative Valence	0.238		0.260	0.280		0.278
	(0.360)		(0.362)	(0.531)		(0.531)
Arousal		0.379	0.414		-0.101	-0.088
		(0.572)	(0.574)		(1.039)	(1.038)
Intercept	0.285	-2.055	-2.436	0.073	0.879	0.648
	(0.224)	(3.747)	(3.783)	(0.300)	(6.806)	(6.810)
AIC	585.77	585.77	587.25	168.66	168.93	170.66
χ^2	0.438	0.430	0.950	0.297	0.010	0.286
N	208	208	208	70	70	70

Issue	Gay Marriage			Iran Sanctions		
Negative Valence	0.228		0.229	0.297		0.300
	(0.195)		(0.195)	(0.239)		(0.248)
Arousal		-0.001	0.025		0.084	-0.014
		(0.322)	(0.326)		(0.286)	(0.299)
Intercept	0.285*	0.437	0.117	0.350**	-0.046	0.437
	(0.137)	(2.150)	(2.187)	(0.131)	(1.870)	(1.920)
AIC	566.47	567.83	568.46	1084.3	1085.7	1086.3
χ^2	1.365	0.0001	1.371	1.543	0.086	1.546
N	204	204	204	387	387	387

Dependent variable in each model is total number of articles per day.
Standard Deviations in Parentheses
** $p < .01$, * $p < .05$, + $p < .10$

as the primary predictor of agenda-setting effects, a stand-in for emotionality. These two constructs are independent, and thus Hypothesis 3.1 is soundly rejected and Hypothesis 3.2 is confirmed

Discussion

The key takeaway point of this chapter is that, contrary to Hypothesis 3.1 and in line with Hypothesis 3.2, news volume and emotionality are independent constructs. To be sure, oftentimes null hypotheses are a disappointment in one's research; in the case of my research, however, the consistent finding that the two act independently has the potential to be especially illuminating with regard to how public attention is oriented in a ever-saturated information environment. For example, two of the issues under study here – the Keystone pipeline and Iran sanctions – represent polar opposites in terms of how much coverage they receive. The former received not so much over this time period while the latter was very heavily reported. In both of these cases emotionality may (theoretically) work to transcend the effect of coverage volume. In the case of the Keystone pipeline, for public attention to be oriented to the issue there probably needs to be some cue rather than volume that attracts attention, owing to the low level of coverage it received as a mostly regional issue. On the other hand, Iran sanctions receives a level of coverage that is almost constant, so news volume may not be variable enough to act as an indicator of importance or value; rather, emotionality may signal its importance to individuals. These possibilities will be explored in the next chapter when public attention is brought into the discussion.

This is not to say that the amount of coverage these issues receive will not matter when examining actual public attention. For one, that emotionality and coverage volume are almost entirely independent leaves the door wide open for the latter's continued influence over attention. As I stated in the theory section of Chapter 2, it may well be that news volume acts as a mediator of attention; after all, for the media to have an effect in the first place there has to be some modicum of reportage on an issue. The rejection of the Hypothesis 3.1, in fact, appears to

make it more likely that coverage volume acts more as a necessary but insufficient condition to attention, in that it probabilistically increases the likelihood that citizens will encounter an issue in the first place. I now turn to the next chapter, which investigates how, if at all, emotionality and news volume work alone and in tandem in producing public attention.

Appendix: ANEW Words Selected for Analysis

Following are lists of the *ANEW* words selected for inclusion in the analysis. Bracketed numbers indicate the reference number for each word in the *ANEW* dictionary. Note that the words below are the raw, unstemmed words from the dictionary; prior to pulling word counts both the text of articles of interest and word lists were stemmed in order to consistently pull each word and its lexical variants' word counts.

Arousal (words > than 1 s.d. above mean arousal)

abuse [1], accident [2], accuse [1047], action [1049], actor [1050], admire [1055], admired [5], adventure [630], affair [1061], affection [7], afraid [8], aggravation [1066], agony [10], airplane [1070], alarm [1072], alert [11], amaze [1078], ambitious [1079], ambulance [15], ambush [1080], amusement [1082], anger [17], angry [18], annoy [20], anxiety [1090], anxious [21], appall [1094], arena [1101], argue [1102], arouse [1104], aroused [24], arson [1106], assassin [26], assault [27], astonished [28], athlete [1114], athletics [644], attack [1117], award [1127], bankrupt [32], bark [1146], bastard [33], bear [1159], beautiful [654], bees [583], betray [37], beware [1173], bikini [1178], birth [1181], birthday [39], bitch [1182], blade [1183], bloody [584], bomb [46], bonus [1199], boom [1200], bothered [1205], brave [668], brownie [1221], brutal [53], burglar [1230], burn [586], cancer [60], car [551], carnival [1251], cash [503], casino [680], castle [1258], cavity [1263], challenge [1269], chaos [684], chase [1273], cheer [69], cheerful [1275], choke [1286], christmas [686], cinema [1291], cliff [553], climax [1303], cockroach [75], concert [1332], condom [1334], confident [79], confusion [1335], conquer [1336], conquest [1337], controlling [85], cookout [1343], couple [506], cram [1362], crash [89], crave [1364], crazy [1365], criticism [1370], crucify [91], cruiseship [1376], crush [1379], cult [1380], cure [1385], cyclone [98], dagger [99], dance [1390], danger [713], dare [1391], dazzle [717], deadly [1395], decapitate [1396], defiant [104], delight [1405], demon [106], desire [508], despise [111], destroy [112], detest [114], devil [115], die [1425], disaster [121], discount [1430], disloyal [125], distressed [127], divorce [128], dollar [729], drama [1446], dreams [1447], drown [1451], drown [591], drunk [1453], eager [1465], eagerness [1466], ecstasy [735], ecstatic [1471], ejaculate [1475], elated [138], embarrass [1479], embarrassment [1480], energy [1488], engaged [143], enjoy [1492], enraged [149], enthusiastic [1494], erect [1501], erotic [512], erupt [1504], evil [741], exam [1510], excite [1513], excitement [152], exercise [155], exhilaration [1518], explosion [1524], extreme [1526], fail [1531], fame [157], fear [592], fearful [163], festive [749], feud [1554], fight [751], fire [166], fireworks [513], first [1562], flee [1569], flight [1570], flirt [754], fly [1576], football [1580], fornicate [1586], frenzy [1589], frightened [1592], frustration [1597], fun [759], funny [1599], furious [1600], fury [1603], future [1605], gang [1612], genius [1617], ghost [1619], gift [184], giggle [1620], goal [1632], graduate [192], guillotine [196], gun [593], gym [1659], happiness [1665], happy [200], hate [201], hatred [202], haunt [1673], heart [787], hero [1683], holiday [791], horror [213], hostage [216], hostile [217], humiliate [797], humiliation [1703], hurricane [798], hysterical [1708], ignite [1710], infatuated [1718], infatuation [516], injection [1724], intelligence [1729], intercourse [819], intimate [821], intoxicated [1732], intruder [822], invent [1734], irritated [1736], island [1737], jealous [1743], jealousy [237], joke [826], joy [240], kidnap [1758], killer [244], kiss [248], laugh [1771], laughter [251], leader [844], leprosy [254], liar [1784], lightning [598], like [1787], lion [518], lips [1791], loud

[1802], love [263], loved [264], loving [1804], luck [1806], lucky [266], lust [519], mad [856], marry [1825], mate [1833], memories [871], midnight [1848], millionaire [278], miracle [279], missiles [1853], mob [1855], mother [286], motorcycle [1869], murderer [289], musician [1876], mutilate [292], mutilation [1877], nerves [1885], nervous [899], nightmare [295], noisy [904], nude [520], nudist [1901], obsessed [1906], obsession [915], opportunity [1917], orgasm [920], outrage [921], outstanding [922], overwhelmed [300], pain [301], panic [601], party [305], passion [306], pervert [312], pistol [939], plane [539], play [1978], poison [319], police [1991], pollute [321], power [323], praise [2008], pregnant [2013], pressure [944], prince [2018], profit [331], promotion [332], punish [2032], python [949], quarrel [338], quick [953], rabies [340], rage [342], rally [2045], rape [344], rejected [349], rescue [352], reunion [961], reveal [2089], revolt [357], riches [359], rifle [603], riot [361], risk [2101], roach [363], rob [2104], robbery [2105], rollercoaster [528], romance [2109], romantic [364], rude [366], rush [2123], satisfaction [2135], scare [2137], scared [604], scary [2139], scold [2146], scream [605], seduction [2155], seize [2157], sex [384], sexy [530], shame [2167], shark [606], shock [2173], shotgun [979], sinful [393], skate [2194], ski [2196], skijump [531], slap [396], slaughter [397], slave [398], slayer [2205], snake [609], soar [2228], song [987], sports [2252], squeal [2257], startled [410], starvation [2260], sting [2268], stress [413], strive [2279], stun [2283], success [417], suffer [2291], sunlight [1003], supper [2296], surgery [612], surprise [2301], surprised [422], suspicious [423], sword [2308], talent [427], tattoo [2319], teenager [2325], tense [428], terrible [430], terrific [431], terrified [432], terror [2333], terrorist [614], thief [435], threat [2345], thrill [438], thrilled [2347], tickle [2354], tiger [2355], topless [2367], tornado [444], torture [445], touch [2371], toxic [446], tragedy [447], trauma [616], travel [1018], treasure [449], trick [2385], trip [2386], triumphant [452], trouble [454], tumor [459], ulcer [461], uncomfortable [2400], unfaithful [462], unsafe [2407], valentine [469], vampire [470], vandal [471], venom [474], vibrator [2417], victim [618], victory [475], violent [478], volcano [619], vows [2428], war [482], waterskiing [2440], wed [2443], wicked [493], wild [2452], win [494], windsurfers [2456], winner [2458], wolf [2463]

Negative Valence (words < 1 s.d. below mean valence)

abduction [621], abortion [622], abuse [1], accident [2], accuse [1047], ache [627], addict [581], addicted [628], affair [1061], afraid [8], aggravated [1065], aggravation [1066], agony [10], alarm [1072], alcoholic [582], allergy [636], alone [12], ambulance [15], anger [17], angry [18], anguished [19], annoy [1086], annoy [20], annoyance [1087], anxiety [1090], apprehension [1098], argue [1102], arson [1106], assassin [26], assault [27], attack [1117], avalanche [645], awful [1129], awkward [1130], bad [1134], ban [1141], banish [1144], bankrupt [32], bastard [33], bawl [1156], bees [583], beg [1164], beggar [36], betray [37], bicker [1176], binge [1179], bitch [1182], blackmail [40], blame [1184], bleed [1186], blind [43], blister [661], bloody [584], bomb [46], bored [48], boring [1204], bothered [1205], braces [1209], broken [672], bruise [1222], brutal [53], bulge [1228], bullet [673], burdened [55], burglar [1230], burial [56], burn [586], cancel [1242], cancer [60], carcass [679], castrate [1259], cavity [1263], cemetery [65], choke [1286], chore [1287], cigarette [1290], clot [1307], cocaine [1315], cockroach [75], coffin [76], communism [1325], confused [80], confusion [1335], corpse [86], corrupt [702], court [1354], coward [703], cram [1362], cranky [1363], crash [89], crime [704], criminal [705], cripple [1368], crisis [706], critic [1369], criticism [1370], crucify [91], crude [707], cruel [92], crushed [93], crutch [708], cult [1380], dagger [99], damage [712], danger [713], dead [588], deadly [1395], death [100], debt [101], decapitate [1396], decay [1397], deceit [718],

decompose [102], defeat [1400], defeated [103], defecate [1401], deformed [720], delayed [721], demon [106], denial [1410], dent [1412], depressed [107], depression [108], deserter [109], despairing [110], despise [111], destroy [112], destruction [723], detach [1418], detain [1419], detest [114], devil [115], die [1425], difficult [1426], dirty [590], disability [1427], disappoint [120], disappointed [1428], disappointment [1429], disaster [121], discomfort [726], discouraged [122], disease [1431], disgusted [124], disgusting [1432], disloyal [125], disorder [1435], displeased [126], distress [1437], distressed [127], divorce [128], doubt [1442], doubtful [1443], dreadful [131], dreary [731], droop [1450], drown [1451], drown [591], dumb [1458], dummy [732], dump [733], embarrass [1479], embarrassed [140], embarrassment [1480], end [1486], enraged [149], envy [1497], evict [1508], evil [741], exam [1510], execution [154], expel [1520], expire [1523], fail [1531], failure [156], fake [1535], false [744], famine [1539], fat [160], fatigued [162], fault [747], fear [592], fearful [163], feeble [164], feud [1554], fever [750], filth [165], fire [166], flabby [167], flaw [1567], flea [1568], flee [1569], flood [755], flu [1573], foe [1577], forbid [1581], forget [1584], foul [169], fraud [171], fright [1591], frightened [1592], frigid [758], frown [1595], frustrated [177], frustration [1597], funeral [178], fungus [179], furious [1600], fury [1603], gang [1612], gangrene [181], garbage [182], germ [1618], germs [764], gloom [188], gossip [767], grave [1642], greed [769], grief [195], grieve [1645], grime [772], gripe [774], grovel [1652], guillotine [196], guilt [1655], guilty [197], gun [593], handicap [779], handicapped [1662], harass [1666], harassment [1667], hardship [782], harsh [1669], hate [201], hatred [202], haunt [1673], headache [203], hell [788], helpless [206], hive [1691], homeless [1695], hooker [793], horrible [1697], horror [213], hostage [216], hostile [217], humiliate [797], humiliation [1703], hunger [1704], hurl [1706], hurricane [798], hurt [222], idiot [223], ignorance [803], ignore [1711], illness [804], immature [806], immoral [807], impair [808], impotent [224], infect [1719], infection [228], inferior [812], infest [1720], inject [1723], injection [1724], injure [1725], injury [595], insane [815], insecure [230], insult [817], intruder [822], invade [1733], invader [823], irritate [235], irritated [1736], isolation [1738], jail [236], jealous [1743], jealousy [237], jerk [1747], kidnap [1758], killer [244], lack [1765], lawsuit [842], leak [1775], leprosy [254], liar [1784], lice [256], lie [257], loneliness [260], lonely [261], lose [1799], loser [851], loss [1800], lost [852], louse [262], mad [856], maggot [269], malaria [860], malice [270], malnutrition [1817], manure [865], massacre [867], mastectomy [1830], measles [272], menace [275], messy [873], mildew [277], miserable [1852], misery [879], missiles [1853], missles [600], mistake [880], mob [1855], molest [1858], moody [883], morbid [284], morgue [285], mosquito [885], mourn [1870], mucus [886], murderer [289], mutilate [292], mutilation [1877], nag [1880], neglect [898], nervous [899], nightmare [295], nuclear [1900], nuisance [908], obesity [911], obnoxious [913], odor [1909], offend [917], old [1912], orphan [1924], overweight [1928], owe [1929], pain [301], pale [1935], panic [601], paralysis [926], parch [1941], penalty [931], perish [1959], pervert [312], pessimism [1962], pest [313], pester [1963], pity [940], poison [319], pollen [1994], pollute [321], pollution [1995], poor [1999], pout [2007], poverty [322], pressure [944], prison [329], problem [2020], pry [2026], punish [2032], punishment [335], pus [602], pushy [2035], putrid [337], quarrel [338], quit [2038], rabies [340], rage [342], rape [344], rash [2048], rat [345], regret [2065], regretful [348], rejected [349], rejection [2067], remorse [2075], repulsed [2081], resign [2082], retard [2086], ridicule [360], riot [361], roach [363], rob [2104], robber [964], robbery [2105], rot [2113], rotten [365], rude [366], sad [368], sadness [2125], scalding [970], scandal [971], scar [973], scared [604], scary [2139], scold [2146], scorch [2147], scorn [375], scornful [376], scum [377], scurvy [378], seasick [379], selfish [382], sever [2164], severe [978], sewage [2165], shaky [2166], shame [2167], shamed [386], shoplifter [2175], shun [2183], sick [607], sickness [390], sin [392], sinful [393], sissy [394], slap [396], slaughter [397], slave [398], slime [400], slob [2208], slum [401], smack [2212],

smallpox [402], smoke [2218], snake [609], snob [403], sob [2229], sorrow [2240], spider [610], stalk [2259], starvation [2260], starve [2261], starving [611], steal [2264], stench [996], stifle [2267], sting [2268], stingy [2269], stink [411], stolen [2270], stress [413], stricken [2276], stupid [415], suffer [2291], suffocate [418], suicide [419], surgery [612], syphilis [425], terrible [430], terrified [432], terror [2333], terrorist [614], theft [2336], thief [435], thirst [2342], threat [2345], tired [2357], tobacco [441], tomb [442], toothache [443], tornado [444], torture [445], toxic [446], traffic [2376], tragedy [447], traitor [448], trash [615], trauma [616], trouble [454], troubled [455], tumor [459], turmoil [2393], tyrant [2398], ugly [460], ulcer [461], uncertain [2399], uncomfortable [2400], uneasy [2402], unfaithful [462], unhappy [463], unsafe [2407], unsure [2408], upset [465], urine [617], useless [467], vandal [471], venom [474], victim [618], violent [478], virus [2423], vomit [481], war [482], wart [2438], wasp [484], waste [485], weep [2445], welfare [2448], whore [492], wicked [493], worry [2468], wounds [620], wrath [2470], wrong [2473]

Chapter 4   Evidence of Emotional Attention

This present chapter takes the measures of emotionality and news coverage volume developed in the previous section and adds to them the extent to which the public is paying attention to the four political issues in question. As I stated prior, I expect negative valence and arousal to be positively correlated with public attention; i.e., as the two increase, so will public attention. As such, I offer several hypotheses that will be tested in this chapter:

$H_{4.1}$: **Increases in the level of negative valence in media reports on an issue will be associated with increases public attention.**

Under the affect-as-information theory, negative emotion acts as an indicator of the value of an object within one's environment (Bradley, 2000). If that object leans negative, the emotional cue present indicates to an individual that further attention is necessary in order to mitigate any potential threat stemming from it (Marcus and Mackuen, 1993). Thus Hypothesis 3 posits that as negativity increases, public attention will correspondingly increase as well.

Concerning arousal, the next hypothesis puts forth a similar expectation for its role in attention:

$H_{4.2}$: **Increases in the arousing content of media messages will be**

associated with increased public attention.

Just as valence indicates the value of some object in an individual's environment, arousal acts as an indicator for the importance of that object (Bradley, 2000). In other words, arousal is related to the intensity to which an individual engages in approach or avoidance behavior. As I stated in the theoretical section of Chapter 2, the emotional dimension of arousal is less studied in political psychology and communication than is valence. However, given that embedded in arousal is salience, which is an important characteristic of attentional processes (e.g., McCombs, 2004), it is likely to play an important role in predicting public attention to political issues.

Although valence and arousal are orthogonal to each other, I expect that the two will work together interactively to produce public attention. This expectation derives from previous research finding them to interact in important ways with regard to the focusing of attention toward objects in the environment (see Gable and Harmon-Jones, 2010a; Storbeck and Clore, 2008; Zadra and Clore, 2011). For example, Gable and Harmon-Jones (2010a) notes that it is with increases in negative valence of environmental stimuli, arousal acts to narrow attention. In other words, encountering a negative object in one's environment may initially indicate its value, and higher levels of arousal will then lead to an evaluation of the level of importance or salience of the stimuli itself, completing the orienting response. So, from the perspective of political issues in the media, I expect that issues exhibiting both negatively-valenced *and* arousing features will receive more attention than those issues exhibiting only one or the other of these two emotional dimensions. Thus the next hypothesis is posited:

H$_{4.3}$: **Increases in both negative valence and arousal within media**

messages will interact in causing a greater orientation of public attention.

The final hypothesis of this chapter is combinatorial in the sense that it posits a relationship between news volume and media emotionality. Recall in Chapter 3 that news volume and emotionality were largely orthogonal to one another; i.e., there was no statistical relationship between either valence or arousal and the amount of coverage given to political issues in the media. Now, a statistically non-significant relationship does not necessarily mean that two constructs are *substantively* unrelated. Rather, it could be that one construct mediates the effects of another without being directly correlated with it. For example, in the theoretical section I put forth the notion that the reason news volume acts so well as a predictor is due to the simple fact that increases in the amount of issue coverage simply increase the probability that an individual will encounter an issue, as well as messages about that issue. Should this be the case, coverage volume may work in tandem with emotionality as such: as coverage volume increases, citizens are more likely to encounter an issue, and if messages about that issue are negatively valenced and arousing, attentional shifts will occur. This mediating relationship is posited in Hypothesis 6:

$H_{4.4}$: **The volume of news coverage on an issue moderates the effect of emotionality on public attention, with higher levels of volume increasing the effects of emotionality.**

I turn now to investigating whether public attention to political issues varies as a function of the type of coverage accorded them by the media, including the emotionality of reporting. This chapter proceeds as follows: first, several measures

of attention used in past research are considered in turn. Second, the measure selected for this research, self-motivated search engine queries for political issues, is examined in full. Finally, this measure of attention is correlated using a variety of means with levels and changes in emotionality and news volume, including pertinent interactions between these variables.

4.1 The Measurement of Public Attention

Though there have been myriad measures of public attention formulated by researchers of political behavior and public opinion, the most longstanding metric has been asked by the Gallup polling organization, known as the "most important problem" (MIP) question. Since 1939, Gallup has periodically queried U.S. citizens: "what do you think is the most important problem facing the nation today?" or variants of that question. This measure, variants of which have also been asked by the American National Election Study and National Annenberg Election Study, has been used a great deal in agenda-setting research in particular, including that of Jones and Baumgartner (2005), Yeager et al. (2011), Althaus and Tewksbury (2002) and numerous others. In fact, taking the lead of McCombs and Shaw (1972), a great deal of agenda-setting research not utilizing the Gallup/ANES/NAES survey batteries have utilized some form of the MIP question (e.g., Benton and Frazier, 1976; Erbring, Goldenberg and Miller, 1980; McCombs, 2004).

Though the MIP question queries respondents on the what they deem to be the most pressing problem, rather than what issue they are paying most attention, many of these previous forays have used the MIP question as a proxy for attention. For example, Smith (1980) contends that the question wording ("*most* important problem") compels poll respondents to decide which problem, of all the current problems, is deemed most worthy of the public's attention. Jones and Baumgartner (2005) see this forced ranking as problematic because it forgoes a basic ranking of

the relative importance across society's issues rather than accounting for the likelihood that multiple problems occupy the public agenda; however, they nonetheless deem the MIP question the best we have for measuring public attention.

The question must be asked, though, whether this method of obtaining what may or may not be actual attention is a reliable indicator of actual public attention. The first criticism that comes to mind with regard to this question is whether a question that asks citizens which issue they see as most important *problem*, and not which issue they are giving the most *attention*, can be reasonably assumed to represent public attention. There is likely some overlap between the two; for example, if a citizen is paying particular attention to a some social problem they are probably more likely to deem it as an important problem. However, it seems risky to infer attention from a poll question that makes no mention of attention anywhere in its text.

Second, as is often the case with survey-based research, the wording of the MIP question itself brings up issues of question-answering effects. Individuals confronted with a pollster seeking a response to the MIP question will likely give an answer, regardless of whether or not the individual actually believes that the issue they speak of is actually important or not (see Zaller, 1992). This brings up further issues of whether respondents are honestly answering the question with their true belief or simply mentioning the first issue at the "top of their head," a la Zaller's research (1992).[1]

Lastly, as is also the case with most survey methodologies, the MIP question and its variants, though asked for a long period of time, are not asked at a consistent interval across time. In fact, Jones and Baumgartner (2005) note that

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[1]Miller (2007) uses a novel approach to avoid question-answering effects by having experimental participants solve word puzzles that could either be filled in with crime-related words (she examines agenda-setting and the issue of crime) or non-crime-related words. However, her measure is more a gauge of salience, rather than attention, and so is not discussed at length here.

there are many years when the question is either not asked or not asked very often (see also Henry and Gordon, 2001). Though they mention the early 1950s as a case-in-point, it has also been my experience that many of the polls conducted by the Gallup organization post-2000 are either inconsistent in the frequency of the MIP question's appearance or simply not available to researchers.[2] Most importantly, given the increasingly-quick pace with which the media environment changes in the 21st Century, irregularly-spaced polls with weeks (or months) between them may also pose a problem to political communication researchers aiming at parsing apart the dynamics of attention (this researcher included). Downs (1972) once noted that public attention, once focused, tends to be fleeting; given this, it doesn't seem likely that polls conducted on a monthly (at best) basis will aid us in understanding that attention when it does focus on an issue.[3]

Quantifying Attention Using Self-Motivated Search Queries

A relatively new solution to this issue, using online search trends in lieu of traditional polling methods, offers a way around the above problems. Search trends data, particularly the *Google Trends* database, is a method of tracking public attention to any number of issues that has begun to receive some play in the political science literature (e.g., Ripberger, 2011; Scharkow and Vogelgesang, 2011; Scheitle, 2011; Gruszczynski and Wagner, N.d.). *Trends* works as sort of a reverse search engine: wherein normally a user enters search terms and is presented with a list of results, this service takes a term or set of terms and provides data on the variation in searches on those terms. These trends data are not limited to political

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[2]This conclusion was arrived at through a thorough search and review of the Roper iPoll online database, which collects the majority of Gallup polls conducted since 1939, among others.

[3]Importantly, Stone and McCombs (1981) once contended that the time lag between media coverage of an issue and the issue appearing on the public agenda is as long as six months. Given increased penetration of cable news, the Internet, and other forms of media since publication of that work, however, it seems unlikely that an issue would take that long to transfer from the media to the public agenda.

issues, either, but instead include any number of potential areas of interest (just so long as the areas of interest have been searched for to a sufficient degree). For example, researchers affiliated with Google have created a tool tracking searches on a variety of flu-related terms, and have demonstrated that increases in searches on these terms predict the spread of illness (Ginsberg et al., 2009). In fact, the data derived from the method have been shown to be predictive of the Centers for Disease Control's own data on flu trends ahead of their being released. The *Trends* data have also been shown to be predictive of automobile purchases, with increased searches on specific brands and models predating increases in purchase behavior by consumers (Choi and Varian, 2009).

Prior to discussing the specific methods employed in this section of the dissertation, in-depth discussion of what *Google Trends* is actually composed of is necessary. The *Trends* is a massive time-series database made up of the volume of searches on every imaginable topic from 2004 to present. Any time a user of the *Google* search engine enters a search query, that query is logged and amalgamated with every other search done on that topic on a daily basis. Additionally, the approximate location (using IP addresses) of each user making a query or queries is logged, with aggregate search data able to be broken down by country or state if so desired.

Unfortunately, for reasons of privacy raw search data is not available from *Google*. Instead, the search company standardizes the data by dividing the number of queries about a specific term by the total number of queries made on each day, meaning that the data made available to the public is an index of search volume that runs from 0 to 100, with 0 being no searches and 100 being the highest extent of searches possible for any given date. Importantly, though the standardization of the data on Google's end means that some context is lost–i.e., researchers have no

idea what the total volume of searches were on the dates under examination–the standardization should not theoretically impact researchers' ability to get at search trends themselves.

Search engine query data has the potential to solve the problem of question-answering effects present in traditional survey research because of the very nature of Internet searches themselves. Unlike surveys, search query data is entirely self-motivated; there are no questions put forth by pollsters to be answered, but rather individuals seeking out information of their own accord. Whereas with polling data concerns are always present as to whether the survey itself may be confounding the results—i.e., as the result of question wording or mere presence of a pollster—search query data most likely arises without the intervention of those who are studying a phenomenon of interest, making the data potentially more reliable in what it tells us. This type of data may also serve as a better measure of attention than is present in MIP-type questions, as the very act of seeking out information on a political issue online is indicative that individuals' attention is oriented toward those issues (see Ripberger, 2011), whereas it is questionable that traditional attentional measures, such as the MIP question, are gauging attention or something else altogether.

The advantages of search query data are many, but perhaps the most advantageous feature of them all is the fact that it is not subject to the same time and money commitments as traditional polling. Search query data are collected on a daily basis and, at least in the case of Google query data, are updated on a daily basis. The main advantage of this characteristic of search query data lies in easy access to day-to-day data on the attentional trends of Internet users. This fine-grained temporal resolution means that the dynamics of attention between the media and public are much more within reach than has been the case with other

data sources. This is especially important in the modern media environment where issues enter and exit the media agenda at a much faster pace than was the case even 20 years ago (see Bucy, Gantz and Wang, 2007).

The use of query data to measure attention to political issues has already been shown to be productive, even given the relative youth of these measures. For example, Ripberger (2011) finds *Trends* search query data to be highly and consistently correlated with media coverage on health care, global warming, and terrorism. Additionally, he finds that the searches are not only predicted by media coverage of each of these issues (with the exception of health care), but also that search queries also feed back into media coverage of the issues, indicating a dynamic media–public agenda relationship. Scheitle (2011) finds a likewise correspondence with regard to the salience of political issues and media coverage. Shifting to the diffusion of campaign controversies onto the public agenda, Gruszczynski and Wagner (N.d.) find that major communication memes present in the 2008 presidential campaign are dynamically correlated between the mainstream media, political blogs, and online search use, while Weeks and Southwell (2010) find a likewise correlation between media coverage of questions about President Barack Obama's religion and searches on that issue.

Unfortunately, given the relative freshness of the *Google Trends* search data, little research has been undertaken correlating search attention with public attention measured using more traditional survey measures. That said, research is beginning to crop up testing for the construct validity of search data. An unpublished manuscript by Mellon (2013) seeks to correlate Gallup's MIP question with search data from Google, and finds across myriad issues (healthcare, the economy, and many others) that the two measures index very highly with one another. This recent research is promising for agenda-setting scholars in that it further increases

the likelihood that the use of *Trends* data is valid, and owing to its availability on a day-to-day basis, may be able to supplant the "slower" survey-based MIP items.

Given the small, but burgeoning, set of research utilizing search query data to track public attention, it is clear that these measures hold a great capacity to inform our understanding of the mechanisms underlying this phenomenon. This research proceeds in this endeavor by seeking to explain public attention as manifest in search query data as a function of the emotional content of the mass media. Doing so will not only further our understanding of what explains these search query patterns, but also our understanding of how public attention more generally is influenced by the emotionality of media coverage. Discussion now turns to the methods and measures employed in this portion of the research.

4.2   Methods & Measurement

Data from the *Trends* service were gathered similarly to that collected from *LexisNexis*, with some variation in the search terms used to find data. *Trends* offers data at a daily, tri-daily, or weekly level, depending on whether the user desires all data for one month, a year, or in all years since 2004, respectively.[4]. Because this research seeks to parse apart the day-to-day dynamics between the media and public agendas, data were downloaded month-by-month using scripts written for this research.[5]

One of the drawbacks of the *Trends* service lies in the fact that web users can and do search for a variety of terms, many of which may be related to a central concept of interest but composed of different terms. There are two ways to get around this: the first is to compile a list of terms that all may be indicators of an overall concept (e.g., the use of many flu-related terms by Ginsberg et al., 2009, in

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[4]The *Trends* data begins on January 1, 2004
[5]Scripts available in Appendix A.

assessing trends in disease), and the second is to simply formulate issues of enough specificity as to avoid the construction of large lists of terms (e.g., Ripberger, 2011; Weeks and Southwell, 2010). Given the specificity already inherent in the issues selected for analysis in this research, the latter approach was chosen. Intuitive search terms were then selected for debt ceiling ("debt ceiling"), the Keystone XL pipeline ("Keystone pipeline"), gay marriage ("gay marriage"), and Iran sanctions ("Iran sanctions").

In order to assess the possibility that the terms selected were not sufficient to pick up attention to these issues, the *Google Correlate* service was used, which presents users with search terms highly correlated to those submitted.[6] Several similar terms were obtained for the debt ceiling issue ("debt limit", "debt plan"), but entry of those terms into the *Trends* database were limited in their occurrence; thus the original search terms formulated for this analysis were used alone. The data for each issue were then downloaded on a month-by-month basis from January 1, 2011 through June 8, 2012. I chose to begin the data collection at the beginning of 2011 because Google adopted a new metric of scaling search data after this date. Data were then downloaded for each issue using "fixed-scaling" measures, which scale the magnitude of search terms on each day to an earlier point in time.

Table 4.1: Descriptive Statistics for Google Trends Search Attention Data

	Mean	*s.d.*	*N*
Debt Ceiling	11.130	23.311	172
Keystone Pipeline	5.341	7.590	67
Gay Marriage	2.476	4.019	204
Iran Sanctions	46.890	26.761	301

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[6]Accessible at http://www.google.com/correlate.

Table 4.1 presents the descriptive statistics for the *Trends* data on each of these four issues. Iran sanctions received the most attention in searches *vis-a-vis* the other issues, which is intuitive given its constantly provocative stance against the United States, as well as rumors of its nuclear program during this time period. The debt ceiling also received a great deal of attention *vis-a-vis* the other issues, though much less than did searches on Iranian sanctions. Given that debt ceiling negotiations heated up in the summer of 2011 and returned several times over throughout the remainder of the time period, it is not surprising that public searches on the issue were so high. Additionally, both the debt ceiling and sanctions issues, however, were highly variable in the amount of day-to-day searches that occurred, especially as compared to the pipeline and gay marriage issues. In other words, not only were searches high on these two issues (perhaps given their prominence), searches also tended to fluctuate quite dramatically as well.

The other two issues, Keystone Pipeline and gay marriage, received far less attention on average than did the sanctions and debt ceiling issues. This is not at all surprising for the Keystone Pipeline given its mostly regional nature, as during the time period studied most discussion of the pipeline centered on the state of Nebraska's refusal to allow construction of the oil route over the Ogallala Aquifer. However, searches on the pipeline still managed to exhibit a fair amount of variability, which from a statistical standpoint may indicate that there is sufficient movement in searches for analyses to sink their teeth into. Finally, of the four issues gay marriage showed the lowest amount of search attention, as well as the lowest extent of variability. Given that in the 2011-2012 time period same-sex marriage did not occupy a particularly prominent position in American politics this is not surprising.

Figure 4.1 plots the histograms of searches for each of the four issues in

Figure 4.1: Histograms for Searches on Each Issue
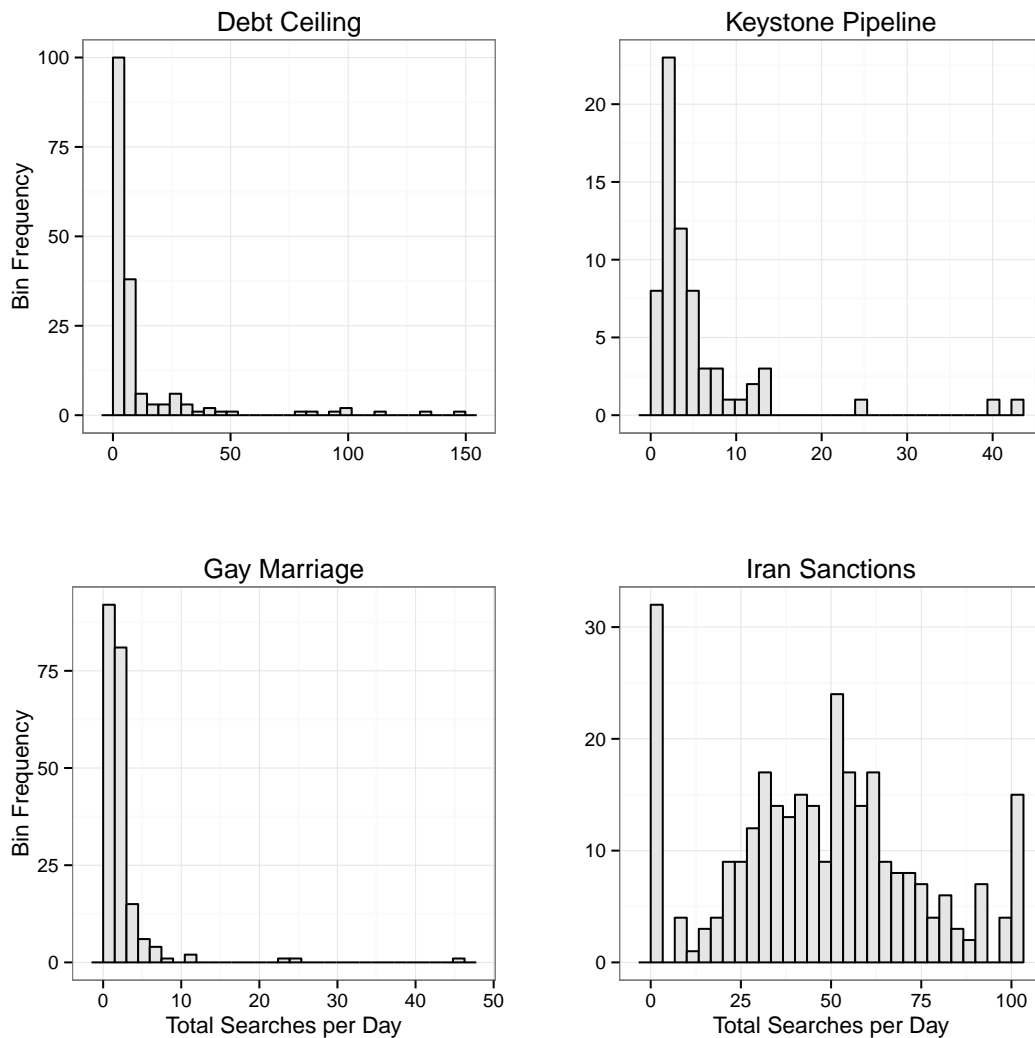
question. What is quickly apparent from these data is that each of the issues

demonstrates an obvious lack of normality to their distributions, each with a

pronounced positive skew and little-to-no normality on the left-hand side of the

distribution (save for the Iran issue). The distributions appear to resemble count

distributions, as many of the observations for each are centered around zero and less

frequent spikes in searches occurring in the right-hand tail (see Gelman and Hill,

2006). The prominence of zeroes in the data is to be expected with search attention

data, given that online attention tends to be fleeting as new issues and interests rise in prominence. Though several research analyses have been published using *Trends* data (see Ripberger, 2011; Scharkow and Vogelgesang, 2011; Weeks and Southwell, 2010),[7] none to date have addressed the asymmetry present in search distributions. However, it is likely due to the dynamic nature of public attention in the age of the Internet; because individuals must be self-motivated to a degree in order for a modicum of searches to take place, most search trends will undoubtedly feature a great deal of data centered around zero.

There are two primary ways in which these asymmetries may be corrected for using regression models. The first would involve square-root transforming the data in an attempt to impose some normality upon its distributional structure, thus allowing for the use of OLS regression models, or variants of regression can be used that do not depend upon the assumption of normally-distributed error variance for unbiased parameter estimates. Given that these data are for the most part similar in their distributional characteristics, the latter approach was selected; this owes to the idea that these distributions are not normally distributed, their characteristics represent useful information that should be leveraged rather than "corrected" for use in linear models (see Braumoeller, 2006). To this end, Poisson regression models, which reside within the generalized linear modeling family, were selected as the technique of choice. Importantly, Poisson regression depends upon the presence of count data in the outcome variable, which these data are technically not. However, each of the issues' *Trends* data were binned into count data by rounding the decimal places. No substantial loss of variance was accompanied by doing this for the issues of the debt ceiling (s.d. = 23.311 versus s.d. = 23.32 for rounded data), the Keystone pipeline (7.590 versus 7.589), gay marriage (4.019 versus 4.063),

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[7]There have not been, in fact, research in *any* field using these type of data that acknowledge the distributional features of searches, unfortunately.

or Iran sanctions (.404 versus .452).

4.3 Public Attention as a Function of News Volume, Valence & Arousal

In order to parse apart the unique and interactive relationships between valence, arousal, and coverage volume, five Poisson regression models were run on each of the issues. Importantly, coverage volume on each issue is included in every model given its prominence in past treatments of the agenda-setting effect and public attention (McCombs, 2004). The following four tables (Tables 4.2, 4.3, 4.4, and 4.5) present the results of each of the models, with Models 1–3 considering only additive effects of emotionality and coverage volume on attention, and Models 4 and 5 including differing combinations of interactions between each of the independent variables. It should be noted that although all significant interactive relationships will be discussed at length, only the highest-order interactions will be visually presented due to their outranking lower-order interactions in presenting relationships accurately.

Model 1 of Table 4.2 (debt ceiling) models coverage volume and negative valence together, netting a positive and significant relationship between volume and searches on the issue, but no significant relationship for negative valence. Contrary to the expectation in Hypothesis 4.1, negative valence does not appear to predict public attention to the debt ceiling issue when controlling for coverage volume. Model 2 in Table 4.2 models public attention as a function of arousal and coverage volume. Like the previous model, coverage volume has a positive and significant effect on debt ceiling searches; however, unlike valence, arousal is positive and significant (consistent with Hypothesis 4.2), with increases in arousing language associated with increased searches on the debt ceiling issue.

Table 4.2: Regressing Debt Ceiling Searches on News Volume and Emotionality

Model	1	2	3	4	5
Coverage	0.586**	0.585**	0.584**	0.584**	22.372**
	(0.010)	(0.010)	(0.010)	(0.010)	(7.531)
Valence	0.064		0.123	-3.545	58.421*
	(0.201)		(0.201)	(13.392)	(24.155)
Arousal		0.851**	0.866**	0.526	4.587+
		(0.266)	(0.267)	(1.271)	(2.377)
Valence x Arousal				0.560	-8.708**
				(2.043)	(3.686)
Valence x Coverage					-41.624**
					(11.651)
Arousal x Coverage					-3.250**
					(1.144)
V x A x C					6.238**
					(1.770)
Intercept	0.990**	-4.537**	-4.710**	-2.478	-29.935+
	(0.126)	(1.741)	(1.764)	(8.127)	(15.590)
AIC	2156.4	2146.3	2148.0	2149.9	2087.9
χ^2	2602.5**	2612.6**	2610.9**	2617.1**	2685.0**
N	172	172	172	172	172

Dependent variable is web searches for debt ceiling issue
Standard Deviations in Parentheses
** $p < .01$, * $p < .05$, + $p < .10$

Model 3 considers the additive relationship between valence, arousal and coverage volume, and is consistent with the findings from both Models 1 and 2. Coverage volume is again positively and significantly related to searches on the debt ceiling issue–in fact, the coefficient barely budges from its values in earlier models–again indicating that higher media coverage of this issue led to greater public attention through web searches. Negative valence was again non-significant,

with no systematic covariation between it and public search attention. Moreover, as before, arousing language was positively and significantly related to web searches on the debt ceiling issue, with increases in arousing content associated with higher public attention to the issue online. It appears on this issue that Hypothesis 4.2 (arousal predicts attention) is consistently confirmed while Hypothesis 4.1 (negative valence predicts attention) is consistently rejected.

While these initial results are telling, whether valence and arousal interact to produce greater attentional shifts (Hypothesis 4.3) is yet to be seen. Model 4 of Table 4.2 considers this by including news coverage volume, valence and arousal in isolation, and the valence x arousal interaction. For the issue of the debt ceiling no significant interactive effect existed between valence and arousal, which is not surprising given that negative valence has not yet been significantly related to search attention in isolation. More importantly, arousal drops from significance in this model, and in fact the only significant predictor of search attention in the model is news coverage volume, which holds steadfast in the value of its coefficient. At least for the debt ceiling, Hypothesis 4.3, which posited that the two emotional dimensions would positively interact in predicting attentional trends, is rejected.

As stated in Hypothesis 4.4, if citizens are both probabilistically more likely to encounter an issue due to increases in news reports and prone to orient their attention as a function of the emotionality of those reports, the likelihood exists that news volume mediates the effects of emotionality. Model 5 in Table 4.2 explores this possibility by including all of the variables in the model previous, as well as 2- and 3-way interactive relationships between valence, arousal, and volume. Valence, arousal, and news coverage are significant and positive independent predictors of attention, with increases in each associated with increased attention on the debt ceiling issue. However, in this model the valence*arousal interaction is

Figure 4.2: Interactive Effects of Arousal, Valence and News Volume on Debt Ceiling Searches
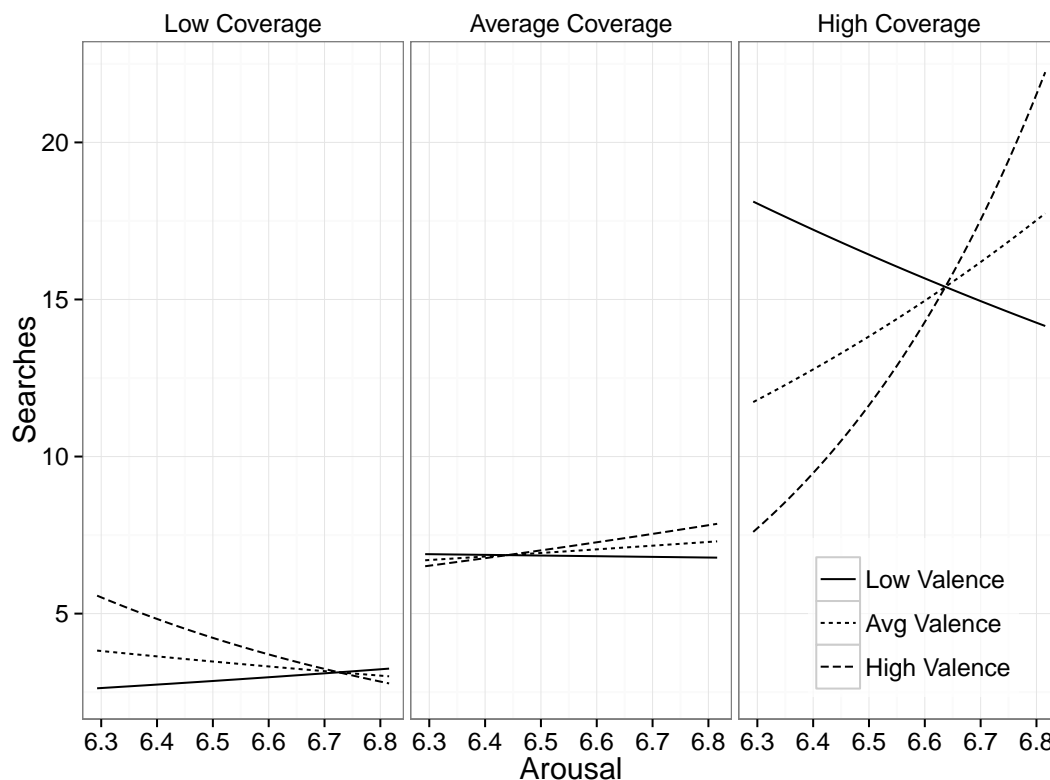
negative, indicating that as one increases the effect of the other decreases. The same is true for both valence*coverage and arousal*coverage, indicating that increases in coverage somewhat negate the role of emotional language and vice versa. Though these negative moderated relationships are interesting given findings of models previous, the presence of a positive and significant 3-way interaction between valence, arousal, and coverage indicates that the lower-order interactions may be misleading taken on their own.

Evidence of this is shown in Figure 4.2, which plots the interaction between coverage volume (the three panels, increasing from left to right), valence (three lines, from low to high valence) and arousal, shown on the x-axis. Somewhat perplexingly, at low coverage volume the greatest level of attention to the debt

ceiling occurs when valence is high and arousal is low, though this relationship is not significantly higher than the relationships present in either of the other two regression lines. One potential explanation is that in the case of very negative, but non-arousing, news reports during periods of low coverage may still indicate the value of an issue, motivating individuals to seek out more information. This would theoretically be more likely in the case of individuals who have a high need for information about, or orientation toward, political issues (see McCombs, 2004). However, further evidence and testing of this hypothesis would be necessary, with individual-level data, in order to empirically assess whether this is the case. In the second panel there was no significant interaction between average coverage volume, valence or arousal in predicting attention, though the overall influence of average coverage volume was higher than that of low coverage.

The most interesting component of this interactive relationship is that present in the high coverage volume plot; in essence, this plot shows convincing evidence that it is neither emotionality nor news volume taken alone that produces public attention, but rather a multiplicative relationship between the two dimensions of emotion and volume that does so. For example, at a high volume of coverage, low valence has no effect on public attention, regardless of the extent to which news reports are arousing. This could be due to the role of valence in transmitting 'value' information to individuals; without information indicating some negative feature in the social environment, no level of arousal appears to motivate individuals to orient their attention to an issue. At high news volume and average levels of valence, however, increasing arousal is associated with significantly higher public attention. In other words, there is a degree of value information present in the environment, it is present in high levels of news reports, and increasing arousal impacts the magnitude of those value judgments, leading to increased attention. This relationship becomes even more apparent in high-coverage and valence

environment, with increasing arousal leading to the highest instances of public attention to the issue of the debt ceiling. Additionally, it is important to notice the large importance of arousal to this interactive relationship, for at mean levels of arousal in a high-volume news environment, there is no difference in public attention across levels of valence; however, it is when arousal increases above the mean that the largest shifts in attention occur. For the issue of the debt ceiling, it appears that Hypothesis 4.4 is confirmed, as news coverage volume acts as a moderator of emotion in producing public attention.

It is apparent from this discussion of the influence of emotionality and news volume on public attention that previous endeavors in explaining public attention may be lacking in their use of news volume as the sole determinant of public attention. To be sure, volume of coverage is a consistently important part of public attention. However, it is when coverage volume is considered interactively with emotionality that public attention is most influenced by the mass media. That said, these hypotheses must be tested on more issues before any overarching conclusions can be made.

Table 4.3 presents the same five regression models for the issue of the Keystone Pipeline. As before, Model 1 regresses search attention on valence news coverage volume. As was the case with the debt ceiling, there is no significant relationship between negative valence and public attention when controlling for news coverage volume. Also as before, coverage volume is positively and significantly related to public search attention; in other words, as the media covered the Keystone Pipeline more, searches on the issue increased. Once again, Hypothesis 4.1 is not supported by the data.

Model 2 regresses search attention on both coverage volume and arousal and, like the debt ceiling issue, shows a significant and positive effect for both coverage

Table 4.3: Regressing Keystone Searches on News Volume and Emotionality

Model	1	2	3	4	5
Coverage	0.389**	0.396**	0.393**	0.396**	8.743
	(0.019)	(0.019)	(0.019)	(0.019)	(18.751)
Valence	0.106		0.110	-52.319**	-74.106*
	(0.085)		(0.085)	(5.356)	(37.463)
Arousal		0.430**	0.434**	-3.731**	-1.966
		(0.166)	(0.165)	(0.451)	(2.963)
Valence x Arousal				8.025**	11.402*
				(0.820)	(5.748)
Valence x Coverage					20.740
					(36.227)
Arousal x Coverage					-1.264
					(2.880)
V x A x C					-3.212
					(5.560)
Intercept	3.403**	0.631	0.557	27.750**	16.118
	(0.052)	(1.089)	(1.088)	(2.939)	(19.293)
AIC	4328.4	4323.2	4323.5	4229.9	4133.8
χ^2	355.7**	360.9**	360.6**	462.19**	564.36**
N	67	67	67	67	67

Dependent variable is web searches for Keystone pipeline issue
Standard Deviations in Parentheses
** $p < .01$, * $p < .05$, + $p < .10$

volume and arousing language. As the level of arousing language increases, so too does search attention to this issue; this lends further support to Hypothesis 4.2, which suggested a positive relationship between arousal and search attention. Bringing both emotional dimensions into the model together with news coverage volume, Model 3 shows more of the same: arousal and coverage volume were

Figure 4.3: Interactive Effect of Arousal & Valence on Keystone Pipeline Searches
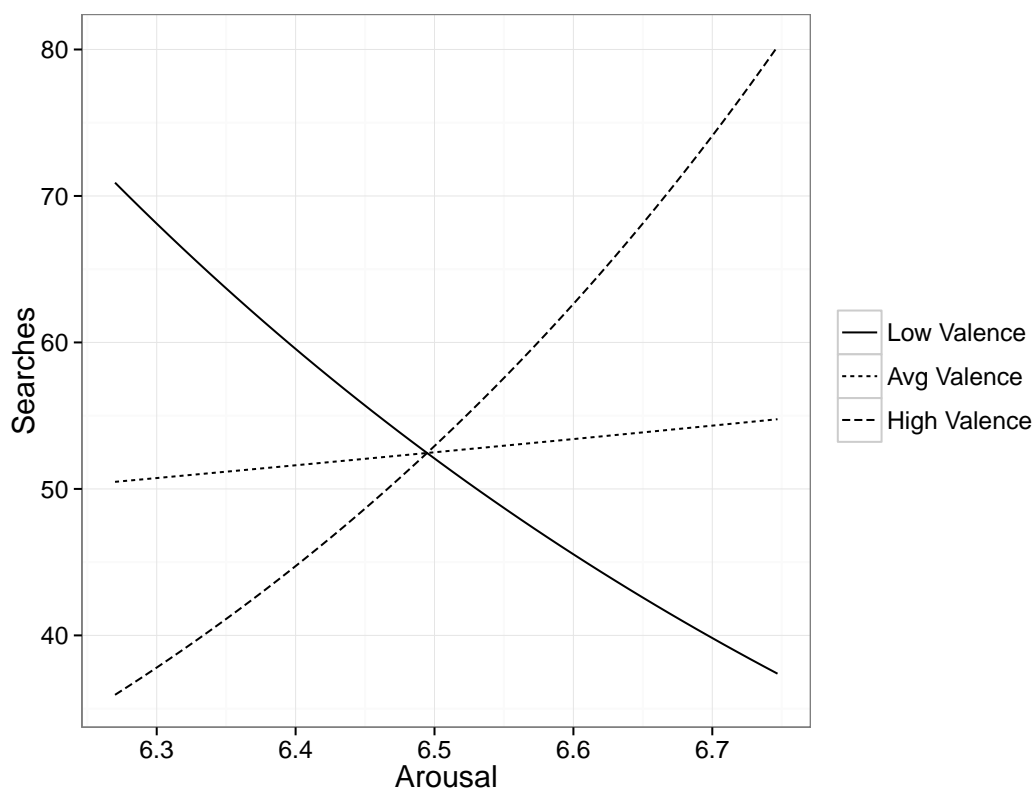
positively and significantly related to search attention on the Keystone Pipeline, and negative valence had no effect.

Model 4 of Table 4.3 introduces the interaction term between valence and arousal in predicting public attention to the Keystone pipeline issue, and in doing so presents a test of Hypothesis 4.3. Both valence and arousal switch to negative relationships with attention in this case, and significantly so. Though this indicates that attention *decreases* as a function of either of the two, there is a positive interactive relationship between these two dimensions of emotion that make interpreting the main effects problematic without first considering the interactive relationship. This interaction is shown in Figure 4.3. At low levels of arousal the highest attention came when valence was low, and significantly so. At levels of

average valence there was no effect for arousal on public attention; the slope of this line is more or less flat. However, as before, high levels of valence and arousal interact to produce the highest degree of public attention to the Keystone pipeline issue, which is significantly higher than the degree of attention present when both arousal and valence were low. The takeaway message with this interaction is mixed; although the low end of the valence-arousal interaction presents somewhat puzzling results, at high arousal the model performs as posited in Hypothesis 4.3.

Model 6 of Table 4.3 introduces 2- and 3-way interactions between valence, arousal, and coverage volume into the equation, and in doing so presents another test of Hypothesis 4.4. Taken alone, valence was significantly and negatively related to attention, while arousal and coverage volume were non-significant. However, the valence*arousal interaction continued to be positive and significant, even when controlling for coverage volume, as well as the valence*arousal*coverage interaction, the latter of which was not significant. This is an interesting finding given that the issue of the debt ceiling saw a significant 3-way interaction between these variables; it could be that, due to the lower coverage volume overall on this issue, valence and arousal play a larger role in producing attention than does volume itself, even when interacted. It could be that especially at low levels of coverage individuals pick up on valence and arousal as indicators of an issue's importance, even when there is a low level of coverage. This makes intuitive sense given that the Keystone pipeline issue centered mostly on the state of Nebraska, and as such did not receive very much coverage in the *Times*, at least until Republicans in Congress began picking up the issue. In any case, the valence*arousal interaction was identical in result to the previous two models including that relationship, which demands further investigation.

It could well be that, for this issue at least, the high search attention

produced by low valence-low arousal instances has to do with the nature of discrete emotions related to this combination. Because valence in the case of this research encompasses only the portion of that dimension related to *negative* valence, and thus excepts positive valence, a low valence-low arousal combination is indicative of more depressing emotional cues (sad, dismal, etc). Perhaps in the case of environmental issues depressing emotional cues, like high arousal-high negativity cues, incite individuals to seek out further information to mitigate uncertainty. Whether this is the case or not is beyond the scope of this research and would require targeted individual-level experiments to examine, so I will leave this to future research. However, the possibility that this is the case – and especially that it could be related to the nature of environmental policy issues – is an inviting prospect for further research.

Table 4.4 presents regression models for the third issue in this analysis, gay marriage. As before, the analysis begins with the regressing of attention on negative valence and news coverage volume. Unlike the previous two issues under consideration, in Model 1, valence was positively and significantly related to increases in attention, with increasing negative valence associated with more public attention on the issue of gay marriage. This presents the first instance of Hypothesis 4.1 being confirmed by the data. As has been consistently the case, coverage volume was positively and significantly related to searches on the issue of gay marriage.

Model 2 likewise regresses attention on arousal, resulting in a significant positive relationship between the two and again confirming Hypothesis 4.2. As was the case with prior issues, increases in arousal were associated with increased attention to the issue of gay marriage. The effect of news volume continued to be positive and significant (the coefficient barely moves from Model 1 as well, showing a great deal of stability as before). Testing for whether the emotional variables

Table 4.4: Regressing Gay Marriage Searches on News Volume and Emotionality

Model	1	2	3	4	5
Coverage	0.368**	0.380**	0.365**	0.364**	33.733**
	(0.028)	(0.027)	(0.028)	(0.028)	(5.768)
Valence	0.457**		0.528**	-15.042**	50.348**
	(0.168)		(0.165)	(5.828)	(11.360)
Arousal		1.354**	1.445**	0.068	6.120**
		(0.240)	(0.244)	(0.584)	(1.118)
Valence x Arousal				2.310**	-7.596**
				(0.866)	(1.679)
Valence x Coverage					-49.287**
					(7.897)
Arousal x Coverage					-5.041**
					(0.852)
V x A x C					7.431**
					(1.164)
Intercept	-0.068	-8.854**	-9.779**	-0.488	-40.343**
	(0.129)	(1.612)	(1.658)	(3.931)	(7.582)
AIC	877.47	855.57	847.4	841.95	756.22
χ^2	143.23**	165.13**	173.3**	186.71**	278.44**
N	204	204	204	204	204

Dependent variable is web searches for gay marriage issue
Standard Deviations in Parentheses
** p < .01, * p < .05, + p < .10

continue to be predictive of public attention when considered together, Model 3 regresses attention on both valence and arousal, as well as news coverage volume, finding that both have a unique effect effect on attention independent of the other. Both valence and arousal increases were associated with increased attention to the issue of gay marriage, which also held true for news coverage volume. Taken

Figure 4.4: Interactive Effect of Arousal & Valence on Gay Marriage Searches
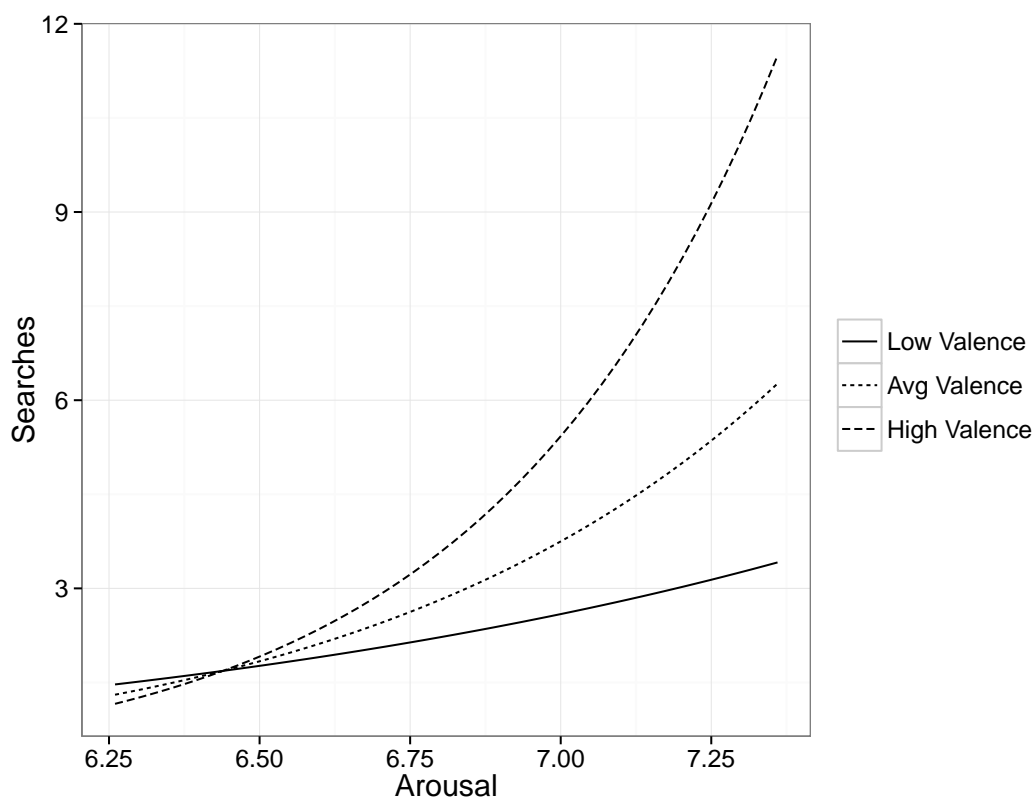
together, the results thus far for this issue are very supportive of Hypotheses 4.1 and 4.2, the former of which has to this point received no support from the data.

Model 4 considers the possible interactive effect of valence and arousal on attention to the issue of gay marriage while controlling for coverage volume. While valence flipped signs in this instance, becoming negatively related to attention, and arousal dropped from significance, the multiplicative effect of the two emotional dimensions was positive and significant, indicating that their combined effects play an influence in public attention to this issue.

Figure 4.4 plots the interactive relationship between valence and arousal on attention, and presents a test for Hypothesis 4.3. What this graphical representation tells us about the interactive relationship is that the effect of each

emotional dimension is conditioned upon the value of the other. For example, there is no effect of negative valence on attention to gay marriage at low levels of arousal; however, as arousal increases, negativity begins exerting an influence, with higher valence netting larger effects as arousal increases.

Model 5 of Table 4.4 introduces all interactions between the variables in question, testing for Hypothesis 4.4. For this model, both valence and arousal are positively and significantly related to public attention to gay marriage. Interacting the two variables produces a negative relationship. Coverage volume is also positive and significant with relation to attention, with increased coverage associated with higher attention to the issue of gay marriage. Interacting coverage volume separately with valence and arousal produces negative and significant coefficients, indicating that with increases in one, the effect of the other on attention is lessened. For example, at higher levels of negative valence/arousal, the effect of coverage volume on attention is lessened. The same is true in the reverse: as coverage increases, the influence of emotionality on attention (whether arousal or negative valence) decreases.

As always, however, these relationships may not tell the entire story given the presence of a positive and significant 3-way interaction between the emotionality variables and coverage volume. Figure 4.5 plots the 3-way interaction between valence, arousal, and coverage volume on attention to gay marriage. At low coverage levels on this issue, the highest attention to gay marriage comes when valence is low and arousal is high. This may owe to a lack of information about value in the environment due to valence being low, thus leading individuals to seek out more information on the issue (see McCombs, 2004). However, at average levels of news volume the relationship flips and is more representative of the earlier 2-way interaction that controlled for coverage volume, with high valence and arousal

Figure 4.5: Interactive Effects of Arousal, Valence and Volume on Gay Marriage Searches
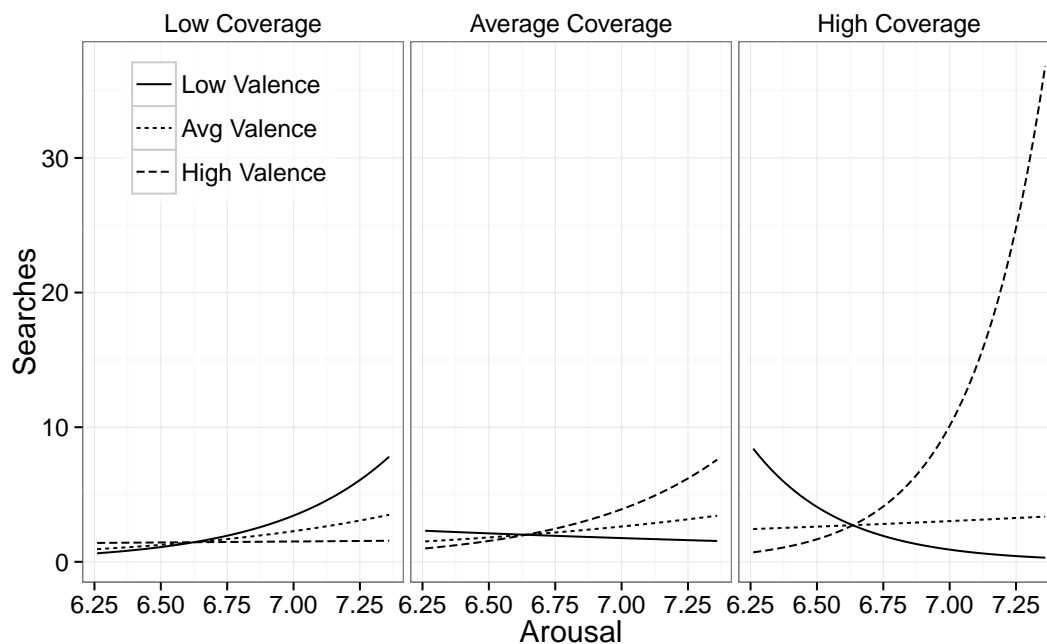
producing the highest level of public attention to this issue. As can be seen in the figure, though, what is most striking is the interactive effect of valence and arousal when coverage volume is high. At those points in media coverage of this issue, the multiplicative effect of the two dimensions of emotion is such that increases in both leads to a substantially higher degree of public attention to the issue. As was the case with the debt ceiling issue, this is indicative of the mechanics that underly the media's influence on public attention; it is not coverage volume alone that produces attention, but rather a combination of volume and emotionality that leads to the orienting of public attention. It appears that news coverage of an issue is important as a mediating variable, in that it probabilistically increases the likelihood that citizens will encounter an issue, but the actual driver of attention is the emotionality of media messages.

The final issue examined in this analysis, that of Iran sanctions, is subjected

Table 4.5: Regressing Iran Sanctions Searches on Volume and Emotionality

Model	1	2	3	4	5
Coverage	-0.033**	-0.029**	-0.033**	-0.035**	10.324**
	(0.009)	(0.009)	(0.009)	(0.009)	(3.440)
Valence	0.187**		0.264**	8.277**	34.4961**
	(0.056)		(0.059)	(1.901)	(7.180)
Arousal		-0.208**	-0.290**	0.327*	1.889**
		(0.060)	(0.063)	(0.159)	(0.586)
Valence x Arousal				-1.231**	-5.181**
				(0.292)	(1.100)
Valence x Coverage					-24.714**
					(6.501)
Arousal x Coverage					-1.560**
					(0.527)
V x A x C					3.732**
					(0.994)
Intercept	3.811**	5.256**	5.662**	1.660	-8.754*
	(0.032)	(0.393)	(0.404)	(1.028)	(3.819)
AIC	7329.7	7328.8	7310.5	7294.8	7263.8
χ^2	19.2**	20.1**	38.4**	62.139**	99.083**
N	301	301	301	301	301

Dependent variable is web searches for Iran sanctions issue
Standard Deviations in Parentheses
** p < .01, * p < .05, + p < .10

to the same five regression models, with the results shown in Table 4.5. Model 1 examines the univariate relationship between negative valence and attention, controlling for coverage volume, and demonstrates a positive and significant relationship between the two. As negative valence increases, so too does attention to the issue of sanctions against Iran, as measured using internet searches. As was the

case with the gay marriage issue (but none of the other issues), this is supportive of Hypothesis 4.1.

Model 2 regresses attention on mean levels of arousal, controlling for coverage volume, and reveals a (somewhat counterintuitive) negative and significant relationship between both variables and search attention. These two univariate relationships persist when taken together in Model 3, which explores the additive effect of negative valence and arousal on attention. As before, increases in negative valence were associated with increases in attention, while increases in both arousal and coverage volume were associated with decreases in attention.

The interactive relationship between valence and arousal may be illustrative of how (if at all) these separate emotional dimensions influence attention; Model 4 tests this interaction. As before, negative valence is positive and significant, and this model brings arousal into a positive relationship as well. What's interesting is that interacting valence and arousal brings about a negatively signed, significant relationship with attention.

Figure 4.6 illustrates well why the direction of relationship between arousal and attention flips when that variable is interacted with valence – the effect of valence is conditioned upon the value of arousal, much like the models for previous issues. However, in this case the highest level of searches occurred when arousal was low but valence was high. As the level of arousing language in news reports on sanctions increases, higher levels of negative valence actually *depress* attention toward the issue. Though this finding is counterintuitive, I will further explore its nuances in later models interacting emotionality with news volume, given the important effect of volume within previous models on the debt ceiling and gay marriage. In any case, Hypothesis 4.3 does not appear to be supported by the data for this issue.

Figure 4.6: Interactive Effect of Arousal & Valence on Iran Sanctions Searches
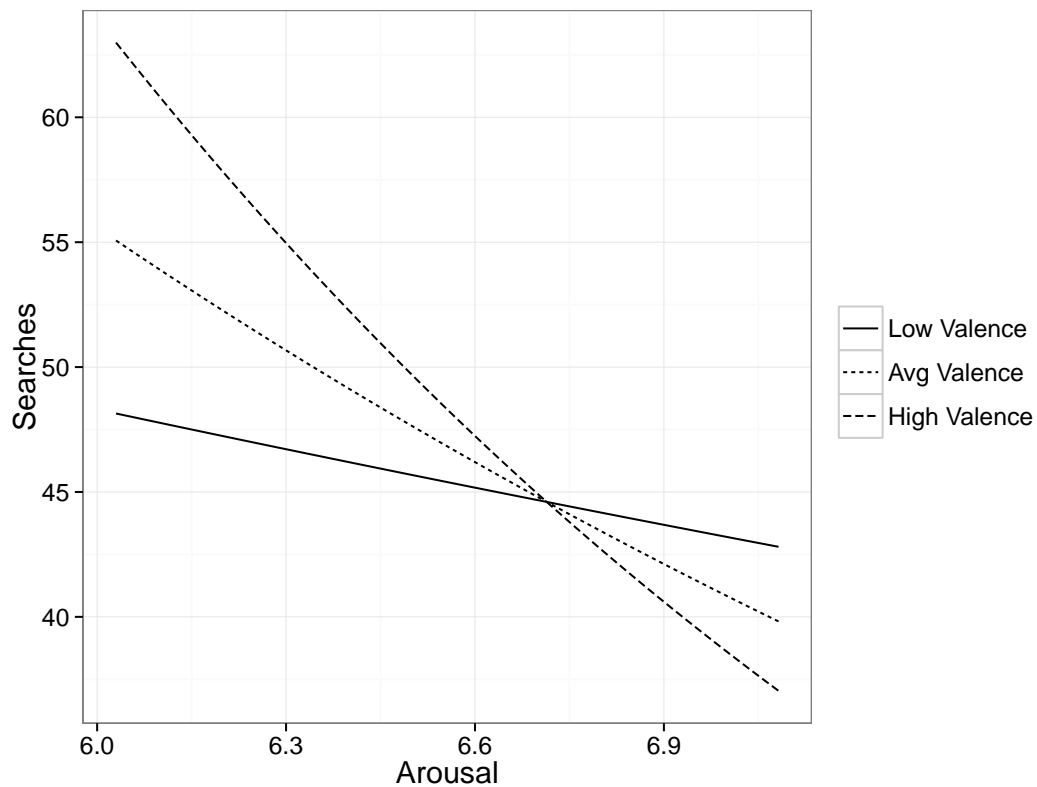
Could it be that this is another instance of a relationship moderated by news coverage volume? Model 5 creates all 2-way and 3-way interactions between negative valence, arousal, and news volume on attention, as well as their independent effects. Negative valence has a very strong independent effect on attention, in fact the strongest out of all predictors, with increases in negativity associated with likewise increases in attention to Iran sanctions. Arousal also has positive and significant relationship with attention, albeit a weaker one than that of valence and attention. As before, the valence*arousal interaction was negatively signed and significant, indicating that increases in one depress the effect of the other, as before. The effect of news volume on attention flipped signs to positive in Model 5, with increases in coverage associated with increases in attention; this change in signage suggests, yet again, that accounting for the interactive effects of

emotionality and volume is important to understanding attentional dynamics.

The 2-way interactions between valence and coverage volume and arousal and volume bear out these dynamics. Both are negatively signed and significant, though the valence*coverage interaction showed a much stronger effect than did the arousal*coverage interaction. The negative signage of both indicates a conditional depressive relationship between the variables involved. For example, at higher levels of coverage volume, the effect of negative valence, which is positively related to attention independently, washes out. The same holds true for arousal and coverage volume. Conversely, when valence or arousal is high, the effect of coverage volume on attention is washed out.

These 2-way interactions don't tell the entire story, however, given that a significant 3-way interaction exists between these variables. As always, these types of interactions are difficult to interpret without some graphical assistance, so Figure 4.7 plots the interactive relationships of valence and arousal, conditioned by the volume of news coverage.

Figure 4.7 demonstrates just how important the dynamics between coverage volume, valence, and arousal are in explaining attention to the issue of Iran sanctions. At low coverage volume, the earlier 2-way relationship between valence and arousal becomes even more extreme, with high valence having a very large effect on attention when arousal is low, but this effect going away at high levels of arousal. Average levels of coverage volume demonstrate essentially the same relationship shown in Figure 4.6, with high valence, low arousal periods producing higher levels of attention than high valence, high arousal periods. What is perhaps most interesting, though, is that at high levels of both coverage and arousal, high valence produces a great deal of attention to the issue Iran sanctions. Low valence-low arousal-high coverage does likewise, which is interesting because the

Figure 4.7: Interactive Effects of Arousal, Valence, & Volume on Iran Sanctions Searches
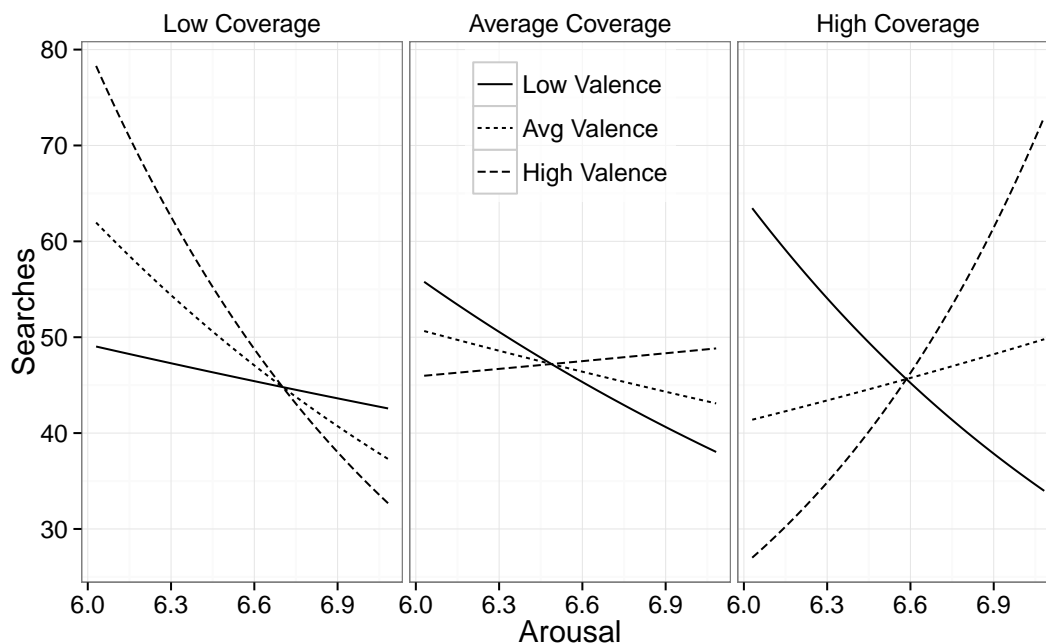
combination of low valence and arousal is typically associated with discrete emotions such as depression. For the issues of the debt ceiling and gay marriage, this combination produced low levels of attention, which begs the question of whether depressing news on foreign policy issues produces different attentional patterns than domestic policy issues. Though the issues used in my dissertation do not allow for further tests of this, future research would possibly be productive in exploring whether this relationship persists on other foreign policy issues.

4.4   What Emotion Tells Us About Public Attention

In Chapter 3 I found that the emotionality of media reportage on these four issues under study was almost entirely independent from the volume of coverage devoted to them, opening the door to tests whether news volume would remain an important predictor, albeit one acting more as a mediator of emotion than as a

proxy measure. This (Hypothesis 4.4) appears to have mostly been confirmed, as in three of the four issues (Keystone pipeline excepted) the highest effect of emotionality appeared when the number of reports on these issues was at its highest.

As I theorized in the theoretical section of the dissertation, this relationship between emotionality and coverage volume makes more theoretical sense than traditional models of agenda-setting, which tend to simply correlate the amount of coverage of issues in the media with public attention to those issues. The idea that the level of media attention to political issues acts as the sole determinant of attention operates under the assumption that citizens are so easily influenced by the media so as to assign importance to any issue that reaches some critical threshold of coverage. To be sure, coverage of an issue itself is indicative of some value or importance; after all, if the media are reporting on an issue, it must be important. Moreover, this has been the core of most agenda-setting studies for decades. That said, there must be some other driver of public attention other than sheer coverage, especially given that some issues receive systematically less coverage than others (say, the environment versus foreign policy, see Boydstun 2008), yet substantial groups of individuals find them important.

Emotion is the missing piece to this puzzle. Whereas these analyses have shown coverage volume to be an important condition of attention, it appears that emotion plays an important part in its own right. For example, in the case of both the debt ceiling and gay marriage, increases in the volume of coverage played a positive and significant role in predicting attention, but it was these increases taken together with increases in arousal and valence that really drove attention, in line with Hypothesis 4.4.

Conversely, the issue present in the Keystone pipeline showed how emotion can act independently of coverage volume, which is especially the case given that

this issue did not net a high degree of attention from the *New York Times.* In a low coverage issue such as this (which tends to be the case with environmental issues), the volume of the news devoted to an issue doesn't appear to be as important a predictor of attention as does the emotionality contained within those news reports. It appears that, especially under conditions of low coverage, the most useful indicator of the importance of an issue in the media is how negative and arousing the coverage of that issue is.

This finding in particular has important implications not only for our understanding of the linkages underlying the media-to-public transfer of salience, but also for practitioners of politics. For example, under traditional understandings of agenda-setting the primary route to getting an issue of importance to a person or group onto the public agenda would simply be to push (or hope) for the media to accord it a greater extent of attention. Unfortunately for groups attempting to obtain a portion of the agenda for their cause, this isn't often a viable route because the issues the media tend to give the most attention (e.g., foreign policy) consistently dominate the agenda, and "friction" in altering the makeup of the media agenda is quite high, lacking a focusing event or punctuation (see Baumgartner and Jones, 2009, 1993; Boydstun, 2008; Kingdon, 2002). What my research shows, however, is that it may not necessarily be just getting a story front and center that orients attention, but rather just stressing the importance and negative features of an issue. This shows especially in the case of the Keystone XL pipeline, an issue that was (mostly) regionally oriented and received the least amount of coverage of all four issues, yet netted some degree of public attention. To be sure, the results on the other four issues demonstrated that a combination of coverage volume and emotionality netted increases in public attention, but for issues that are prone to be covered with less frequency, emphasis on the negative and arousing can offer an alternate route for those who seek public agenda space.

With these results in hand, I turn now to the most exploratory section of the dissertation, Chapter 5. In the following chapter I will first investigate whether media emotionality experiences punctuations and, if so, how these punctuations influence both public attention and our understanding of the agenda-setting process. Taken together with the current chapter, the ensuing results should provide new theoretical foundations for why the public orients to political issues, and under which conditions attention most thrives.

Chapter 5   The Punctuated Nature of Media Emotionality

Thus far my discussion of media emotionality has focused upon the analysis of means-based measures, which is obviously an important part of this research. However, as posited in the theory chapter, it is not always simply the current status of one's environment that affects the orientation of attention, but also recent changes in the environment as well (Jones and Baumgartner, 2005). Recall that, particularly in the case of valence, emotional information serves as a quick indicator of both the value and significance of environmental objects (e.g., Bradley, 2000, 2009; Vuilleumier, 2005). Under this view of emotion, the entrance of some object into one's environment will trigger an emotional appraisal for purposes of evaluating a response to that object. The most obvious example of this process is in the onset of some new object into one's environment: given the appearance of said object, an individual will quickly appraise that object for positive/negative value (e.g., is it a snake or rabbit?), as well as its significance (e.g., is it close? How large is it? Is it trying to bite my ankle?).

While this conceptualization of emotional information-based appraisal has great utility to our understanding of political behavior, within the media environment there are literally hundreds of (metaphorical) snakes at any one time. Given that the mass media is well noted for its emphasis on the negative when reporting on political issues and events (Cappella and Jamieson, 1997; Patterson, 1994), it may be overly simplistic to theorize that citizens are merely scanning the media environment for negative features associated with political or policy issues; if no news is good news (see Martin, 2008), then simply being on the lookout for negatively valenced features will likely net a great deal of political objects needing

attention.

With this preponderance of "bad" news in the daily media environment, what may better explain the role of emotion in public attention are recent *changes* in the levels of media emotionality related to these political and policy issues. As discussed, the levels of affective information in the mass media may be consistently tilted at least somewhat toward the negative and arousing ends of the spectrum, which was shown to be the case for these issues in Table 3.1 in Chapter 3 of this dissertation. For emotional content to play a role as information in public attention, the affective content of reports on an issue must set that issue apart from other issues that are also receiving negative and arousing attention within the media; otherwise, there are no distinguishing affective cues for purposes of the orientation of attention (see Storbeck and Clore, 2008). However, it could be that recent changes, especially dramatic changes, in the emotional content of political news may offer a more useful cue than the simple level of emotionality, while periods of more gradual change in emotionality may represent a simple "random walk" of the media in reporting on an issue that is not experiencing a great deal of upheaval. This chapter investigates this hypothesis by applying the theory of punctuated equilibrium of Baumgartner and Jones (2009, 1993) to the study of emotionality and attention.

5.1   Punctuated Equilibrium

The theory of punctuated equilibrium stems not in political science, but in the study of the evolutionary "bursts" of adaptive processes within organisms (Gould and Eldredge, 1977). Without delving too far into its role in biological processes, punctuated equilibrium hypothesizes that the evolutionary process is one characterized by periods of stasis or incremental change, with rapid shifts occurring occasionally as an organism takes on new adaptive features. Baumgartner and Jones (2009, 1993, see also Jones and Baumgartner 2005) applied this theory to that

of policy change in helping to answer the debate over whether policy change features frequent chaotic shifts or more incremental piecemeal change. In doing so they found that political institutions tend to be characterized by long periods of incrementalism, wherein change occurs slowly and the status quo is favored; however, these equilibriums are occasionally subject to punctuations that serve to upend the status quo and drastically alter the direction of policy issue areas.

Though their work focuses primarily upon the policymaking institution that is the U.S. Congress (but see Jones and Baumgartner, 2005), the media are also representative of political institutions due to their ability to control which public issues are highlighted and which are ignored (see Sparrow, 1999; Jones and Baumgartner, 2005). To a certain extent punctuated equilibrium has been applied to the media elsewhere, specifically Boydstun (2008) in her examination of how political issues become front page news, and Baumgartner and Jones (2009) in their examination of the way changes in the framing of issues can lead to large shifts in media attention (often the result of changes in beats and reporters covering the issue). To that end, though Baumgartner and Jones (2009) have discussed how punctuations in the policy environment can serve to shift the "tone" of coverage of an issue from positive to negative, it is an open question whether media emotionality itself is punctuated and, if so, whether its punctuated nature can act to orient public attention to political issues.

Beyond its theoretical contributions to the study of politics and policy, punctuated equilibrium also makes important contributions to how we understand politics statistically. Most notably, whereas traditional understandings of political phenomena seek to understand variation in constructs of interest by making point predictions and analyzing differences in means – endeavors which my dissertation to this point have focused upon as well – examining political processes using the

punctuated equilibrium framework demands the analysis of the distributions of phenomena under study. For example, the most well-known assumption underlying quantitative empiricism is that of the normal distribution; without a normally-distributed dependent variable, analyses such as ordinary least squares regression return biased standard error estimates, and so transformations of skewed or otherwise non-normally distributed variables are undertaken in order to meet these assumptions. However, researchers working under the punctuated equilibrium (hereafter denoted as PE) framework note that the distributional characteristics of variables of interest that might lead to violations of normality assumptions are interesting in and of themselves, and thus are deserving of study (see Breunig and Jones, 2011, see also Braumoeller 2006).

The primary construct of interest in PE theory is that of change in some entity, whether we're talking about the federal budget process (Baumgartner and Jones, 2009), government attention (Jones and Baumgartner, 2005), or media emotionality (this research). The distribution of change in a variable can tell us much about whether it is, on average, in equilibrium and varying infrequently on a small scale, or characteristic of both equilibrium and dramatic shifts in its value. For example, a political system of interest would be illustrative of an incremental (and stable) system if the distribution of changes in its values approached a normal distribution centered around 0. Given the Central Limit Theorem, 95% of its changes would occur within two standard deviations from the mean and resemble a "random walk" process, with most changes due only to minor variability (see Breunig and Jones, 2011). A system in this state experiences few, if any, dramatic changes, as evidenced by its change distribution.

On the other hand, a system that experiences periodic large shifts (punctuations) in the positive and/or negative tails will feature a change

distribution less resembling a normal curve and more resembling either a Paretian (stretched exponential) or exponential distribution (Baumgartner and Jones, 2009; Breunig and Jones, 2011). These distribution types tend to feature a high degree of leptokurtosis (peakedness) around the mean, as well as "soft" shoulders that give way to fat tails containing the large shifts characteristic of PE theory; some skewness is also likely to be present, especially if large shifts occur on one side of the distribution in particular. Importantly, a distribution of change scores resembling one of these two fat-tailed distributions does not mean that small shifts in the variable of interest are nonexistent; rather, the leptokurtosis indicates that some degree of incrementalism is present at intervals, with more leptokurtosis indicative of greater periods of incrementalism or "friction" (Jones and Baumgartner, 2005). Likewise, the extent to which the ends of the tails are populated with observations signals the probability of punctuations occurring within the system, and to an extent the incremental and punctuated nature of a system run counter to each other, although not perfectly so (e.g., a system with a high degree of friction may feature fewer punctuations, but when they occur they may be larger in magnitude as a result of the tipping point being higher).

This measure of change, which is employed in this research is adapted from Jones and Baumgartner (2005), operationalizes shifts in media emotionality using the following equation, where e represents the emotionality of media text:

$$\Delta e = \{\frac{e_t - e_{t-1}}{e_{t-1}}\}$$

For each issue in this research this equation nets a distribution of change ratios, as the numerator of the righthand side of the equation computes the net change from the previous to current time period (1 day), with division of the net change by the previous period's score standardizing the metric.

Several methods of testing for distributions consistent with the PE framework will be used. The first and most obvious tests involve simple examinations of distributional moments, particularly skew and kurtosis, statistical tests for deviation from normality (Shapiro-Wilk test), and visual inspection of the change distributions using histograms and quantile-quantile (Q-Q) plots. The latter two methods are especially necessary given that many of the properties of kurtosis measures are unknown to researchers (e.g., Braumoeller, 2006). Q-Q plots in particular are useful in that they superimpose the empirical distribution of interest over a theoretical Gaussian distribution with the same mean and variance in order to show deviations from a normal curve.

If the change distributions of the media emotionality data show deviations from normality, including kurtosis and/or fat tails, the distributions can be compared directly to either Paretian or exponential probability distribution functions (PDFs) by log-transforming the cumulative distributions of the theoretical PDFs and regressing the resulting data on the category midpoints of the empirical distribution tails (semi-log) and the logged category midpoints of the empirical distribution tails (log-log, see Breunig and Jones 2011). If, upon plotting these two sets of values on each other, the points of the empirical change distribution follow a straight line, the data can be said to either follow a Paretian (power) or exponential distribution, respectively. Moreover, the slope of the resulting regression line will tell us the degree to which punctuations occur in the tails, with shallower regression slopes indicating more observations in the far ends of the tails. I turn now to an examination of media emotionality using the data across the four issues under study.

5.2   Investigating Punctuated Media Emotionality

The negative valence and arousal data was first converted to difference distributions by subtracting each score at t_{n-1} from t_1 and dividing the result by

the score at t_{n-1}, as per the earlier discussion of Jones and Baumgartner (2005). Table 5.1 presents the moments of the change distributions for each of the issues, as well as the Shapiro-Wilk normality test statistics.

Looking across the issues, mean and median changes in negative valence were positive across the board, indicating that, on average, there were more increases in negative valence than decreases. Likewise, the variance for negative valence change distributions tended to be fairly high, with the issues of gay marriage and the Keystone Pipeline showing the most variability along this dimension of emotion. Negative valence also tended to be highly positively skewed, a finding that is suggestive of more observations on the right-hand side of the distributions, which may hint at some degree of punctuated equilibrium. Maximum change scores across these issues were also much higher than the minimum.

L-kurtosis, a measure that is typically used in place of simple kurtosis because of its robustness (see Breunig and Jones, 2011), was also high across issues for negative valence. Taking this in hand with the consistently positive skew across issues, this is suggestive that negative valence changes both incrementally and in large shifts, which is consistent with the PE hypothesis. Tests of normality using the Shapiro-Wilk test were significant for negative valence change distributions across issues, meaning that I can safely reject the notion that changes in negative valence are normally distributed.

The characteristics of the arousal change distributions tell a much different story from those related to negative valence. Mean and median arousal change was very low across all issues (0.003 at the highest), indicating that, on average, arousal showed few large jumps in time-to-time change across issues. This is buttressed by similarly low variances across issues for arousal, as well as a minuscule level of negative skew for each issue, save for Iran. Likewise, for each issue L-kurtosis was in

Table 5.1: Media Emotionality Change Distribution Moments

| | *Debt Ceiling* | | *Pipeline* | |
	Valence	Arousal	Valence	Arousal
Mean	0.098	0.0002	0.321	0.0001
Median	0.003	0.003	0.100	0.001
Variance	0.310	0.001	1.420	0.001
Skewness	0.294	-0.041	0.390	-0.023
L-kurtosis	0.266	0.130	0.392	0.110
Shapiro-Wilk	0.750**	0.993	0.647**	0.990
Minimum	-0.802	-0.065	-1.000	-0.047
Maximum	3.833	0.051	6.580	0.010

| | *Gay Marriage* | | *Iran Sanctions* | |
	Valence	Arousal	Valence	Arousal
Mean	0.705	0.001	0.208	0.001
Median	0.705	-0.0001	-0.019	0.001
Variance	8.716	0.001	1.290	0.001
Skewness	0.581	-0.005	0.415	0.033
L-kurtosis	0.493	0.155	0.395	0.184
Shapiro-Wilk	0.405**	0.993	0.481**	0.984**
Minimum	-1.000	-0.092	-1.000	-0.077
Maximum	29.250	0.101	11.290	0.101

** $p < .01$ (Shapiro-Wilk normality tests)

a range not substantially far from what would be expected given a normal distribution, and the Shapiro-Wilk tests were non-significant on each issue except for Iran sanctions. Whereas tests of normality were consistently rejected in the case of negative valence, changes in arousal appear to be mostly normally distributed and thus not subject to punctuations.

The next step to further our understanding of the distributional characteristics of emotionality change is to investigate these distributions visually, using a combination of histograms and Q-Q plots. For each histogram a normal PDF with a mean and variance equal to the empirical distribution is superimposed

in order to show deviations from what would be expected in a Gaussian distribution. The process of investigating Q-Q plots for an observed distribution's similarity to a reference distribution goes as such: the theoretical distribution is plotted as a straight line approximately 45 degrees across the plotting area (unless the observed distribution is skewed, wherein the line is adjusted to accommodate more extreme values in the plotting area). If the observed distribution is approximate to the theoretical distribution (in this case the Gaussian) the observations of the distribution will more or less follow the theoretical distribution's plotted line. Deviations from the line can indicate any number of things, but in the case of investigating the presence of punctuations points plotted will either deviate below the line on the left-hand side of a Q-Q plot (negative punctuations, indicative of a long tail to the left of the distribution) and/or deviate above the line on the right-hand side (positive punctuations, indicative of a long tail on the right side).

Figure 5.1 plots changes in negative valence and arousal for the issue of the debt ceiling. As indicated by Table 5.1, the change distribution for negative valence appears to feature a fat tail on the right-hand side, suggesting that punctuations occur sporadically with regard to negative valence increases. The Q-Q plot reinforces this finding, as a great deal of observations on the right-hand side of the valence change distribution depart from what we would expect given a normal distribution (i.e., these observations are above the reference line), backing up what earlier appeared to be a punctuated system when I examined the moment statistics. What the Q-Q plot is not as effective at showing is kurtosis; as the histogram shows (and Table 5.1 suggested) is a great deal of observations centered around 0. Together with the positive skew, this distribution is highly suggestive of a system that follows the PE hypothesis, with periods of incremental change periodically punctuated with large, sudden increases in negative valence.

Figure 5.1: Debt Ceiling – Emotionality Change Distributions

Negative Valence
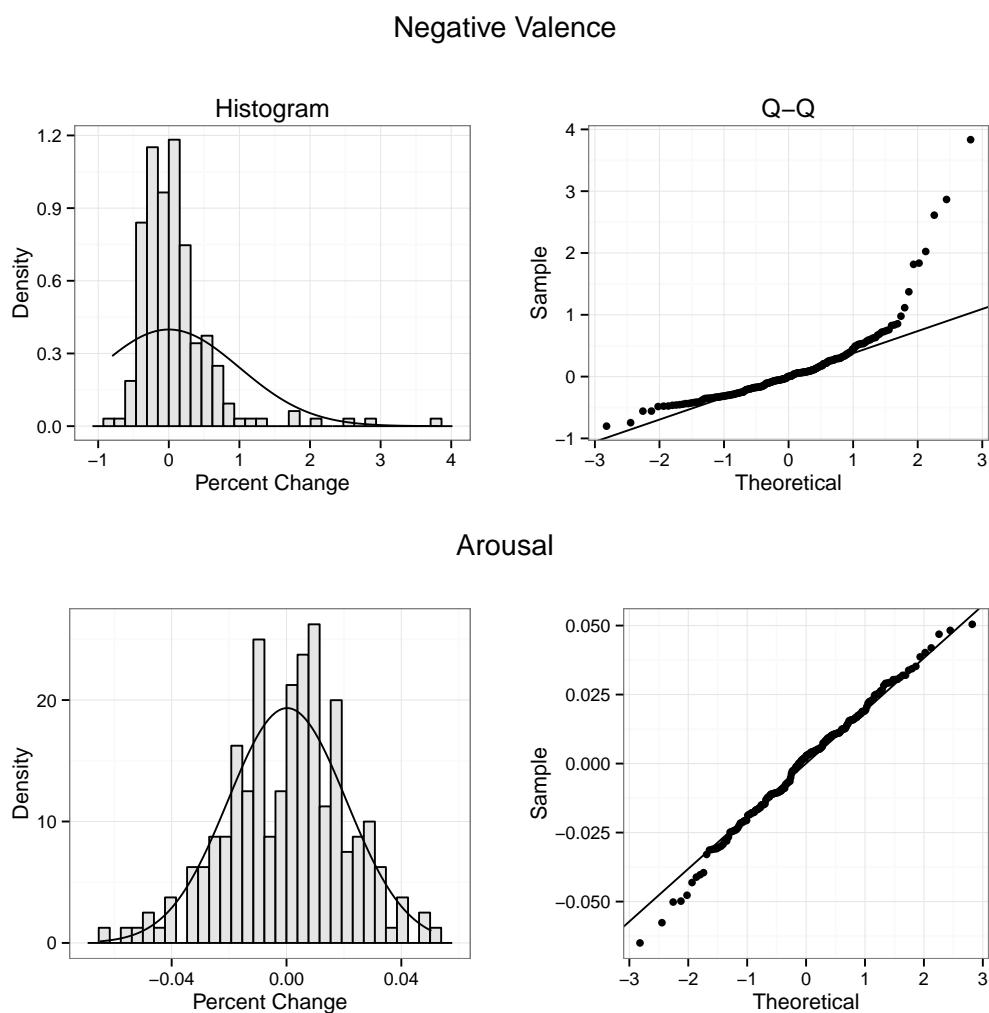
Arousal

Turning to the arousal change distribution for the debt ceiling, the findings of normality in Table 5.1 appear to be backed up upon visual inspection. The arousal change distribution is slightly leptokurtic, but does not differ dramatically from the Gaussian PDF superimposed on the histogram. Additionally, though there were slightly more observations of both negative and positive changes in arousal in the tails, these observations don't appear to differ more than we might expect due to chance. The Q-Q plot for arousal change also back up the normality of the distribution; though the left tail of the distribution was slightly thicker than would

Figure 5.2: Debt Ceiling – Valence Log-Log and Semi-Log Plots

Log–Log Plot
$\beta_{pos} = -1.296$ $R^2 = 0.946$

Semi–Log Plot
$\beta_{pos} = -0.491$ $R^2 = 0.882$
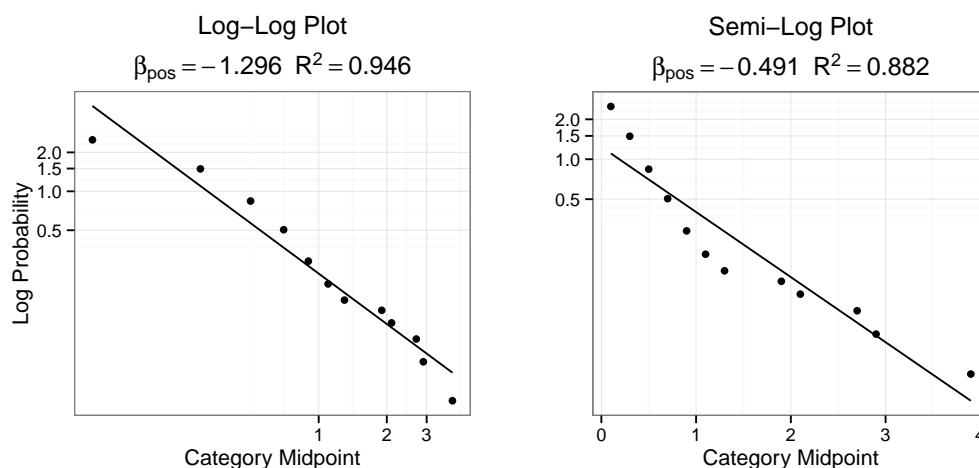
be expected in a normal distribution, it doesn't appear to be punctuated. Also note the magnitude difference in change scores along the x-axis between negative valence and arousal – arousal simply didn't experience large shifts on this issue.

Though the deviations from normality occurring in the negative valence change distribution on the debt ceiling issue are suggestive of punctuated equilibrium, further tests are necessary to assess whether this distribution can better be described as either Paretian or exponential, both of which feature the fat tails necessary to definitively state whether changes in negative valence on this issue really do experience punctuations. Figure 5.2 shows the log-log and semi-log plots associated with this distribution. Note that only the positive tail is included in these plots, as the left-hand side of the change distribution was not sufficiently fat to warrant distribution fitting in this manner (each of the following log-log and semi-log plots follow this pattern). The fitted regression line in the log-log plot shows a good fit between a theoretical Paretian distribution and the right tail of the empirical change distribution ($beta_{pos}$ = -1.296, R^2 = .946). The semi-log plot also

Figure 5.3: Keystone Pipeline – Emotionality Change Distributions

Negative Valence

Arousal
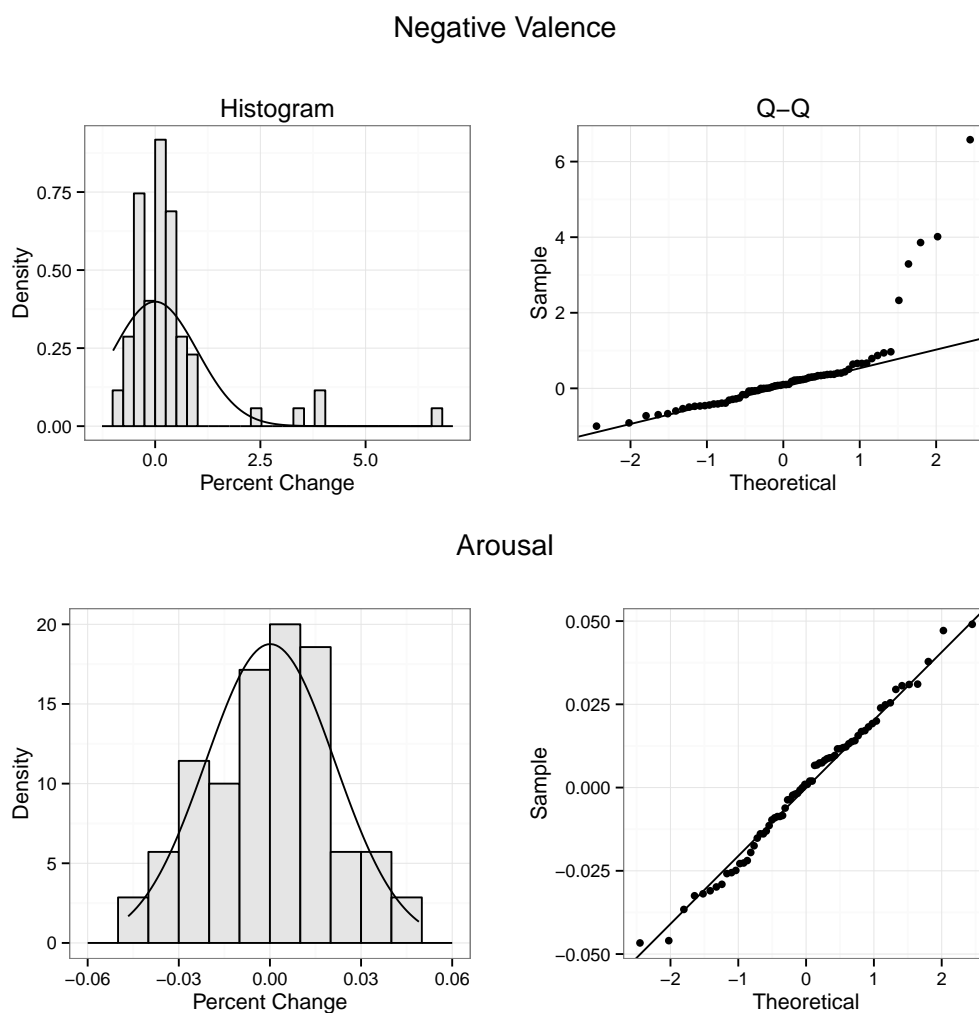
shows decent fit between the theoretical and empirical distributions, and while the slope of the fitted line is shallower, indicating more punctuations when fitted in this manner, the fit is significantly worse than that of the log-log treatment ($beta_{pos}$ = -0.491, R^2 = .882). It appears that right hand-side punctuations in negative valence on the issue of the debt ceiling follow a Paretian distribution, and can thus be safely placed into the punctuated distribution category.

Figure 5.3 plots the change distributions for valence and arousal on the issue

Figure 5.4: Keystone Pipeline – Valence Log-Log and Semi-Log Plots
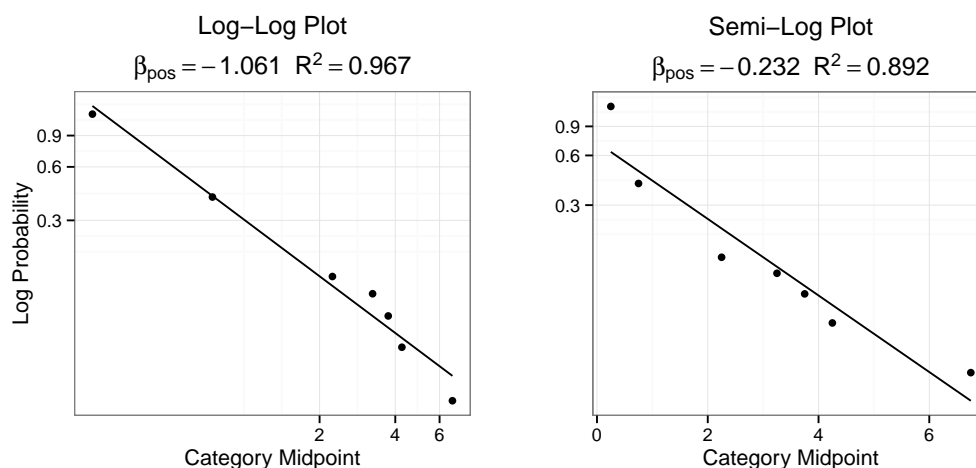
of the Keystone Pipeline, superimposed with the Gaussian PDF to demonstrate deviations from normality. As was the case with the debt ceiling, negative valence departs substantially from the normal distribution, with a great deal of kurtosis centered around 0, indicating incrementalism, and numerous punctuations on the right-hand side of the distribution, suggestive of punctuations. Because of the lower number of observations associated with this issue the valence distribution shows lower continuity between right-hand observations, but nonetheless it appears that large positive shifts in the level of negative valence occur at least periodically. Also as before, the distribution of changes in arousal appears to adhere to normality quite well, in fact better than was the case with the debt ceiling. There was only slight kurtosis in the case of arousal, and the empirical distribution (as evidenced by the Q-Q plot) hews quite closely to the normal distribution. As was the case with the debt ceiling, it appears that negative valence may be consistently punctuated while arousal is not.

As before, Figure 5.4 shows the log-log and semi-log plots associated with the

right-hand tail of the negative valence distribution for the Keystone Pipeline.
Again, the fitted line for the log-log plot fits very well ($beta_{pos} = -1.061$, $R^2 = .967$),
with most of the points falling along the regression line quite closely. The semi-log
plot, on the other hand, fits the observed distribution significantly worse, with the
midpoints departing from the fitted line to a greater extent and the model fit being
substantially lower ($beta_{pos} = -0.232$, $R^2 = .892$). Again, it appears that the
Paretian distribution fits the negative valence change distribution for the Keystone
Pipeline, especially as compared to the exponential distribution.

Figure 5.5 plots the change distributions for negative valence and arousal
against the Gaussian of the same mean and variance. The negative valence change
distribution is highly positively skewed, with many observations occurring on the
right-hand side. This is evidenced by both the histogram and Q-Q plot.
Additionally, the valence distribution is leptokurtic around 0, which is suggestive of
periodic incrementalism. There is very little deviation from the mean on the left
side of the distribution, which as before shows that all of the punctuations with
regard to negative valence occur on the increasing rather than decreasing side.

Also as before, the change distribution for arousal is very close to normality.
Table 5.1 demonstrated a low level of kurtosis for this issue with regard to arousal,
which is backed up by the histogram. Likewise, there were few deviations from the
Gaussian distribution in the tails on arousal, a finding that further strengthens the
findings that arousal follows a random walk, as opposed to negative valence, which
is both incremental and punctuated in nature.

Given that, as with other issues, the issue of gay marriage showed only a
punctuated system with regard to negative valence, Figure 5.6 shows the log-log and
semi-log plots for valence on this issue. As with previous issues, the log-log plot
shows a very good fit between the theoretical Paretian distribution and the observed

Figure 5.5: Gay Marriage – Emotionality Change Distributions

Negative Valence

Arousal
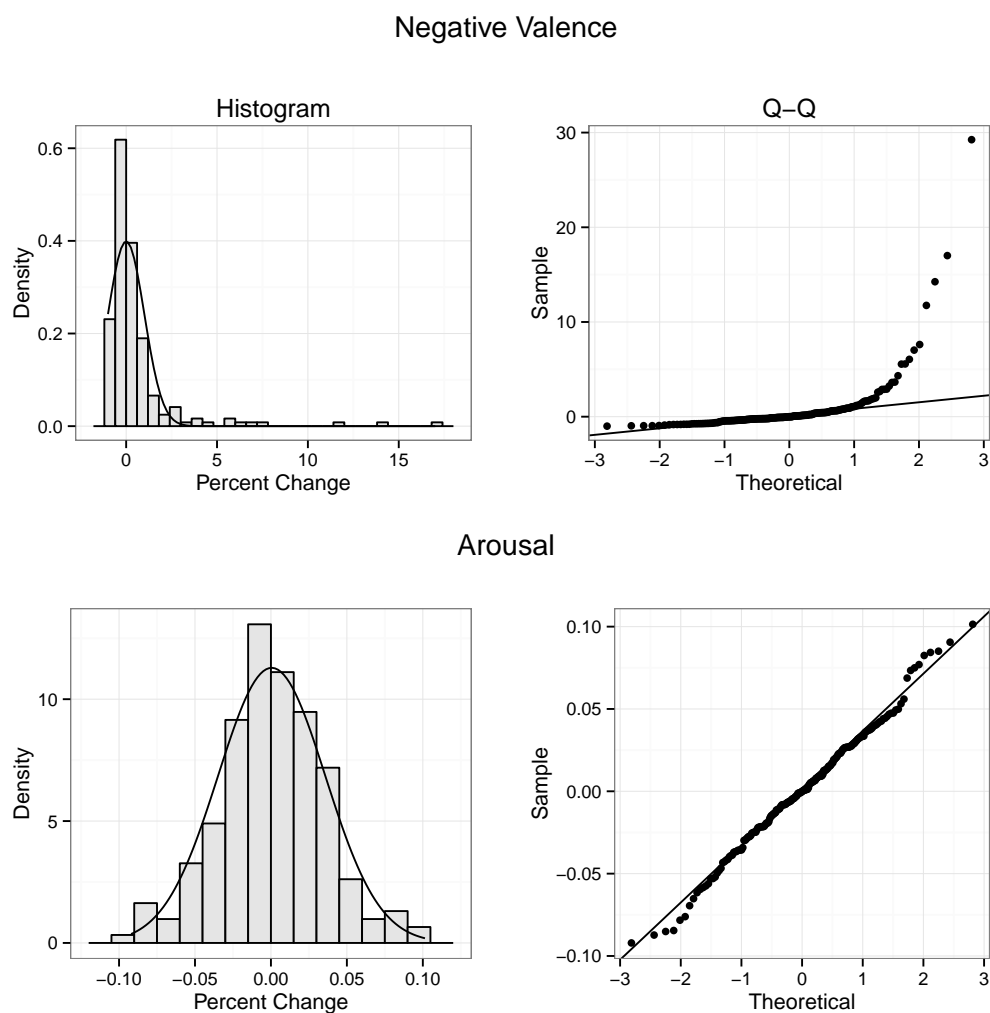
change distribution ($beta_{pos} = -0.979$, $R^2 = .977$). The semi-log plot, on the other hand, fits significantly worse, as evidenced by both the fitted regression line and model statistics ($beta_{pos} = -0.061$, $R^2 = .761$). At this point it appears that negative valence is consistently punctuated and follows a power (Paretian) distribution.

The final change distributions, for the issue of Iran sanctions, are shown in Figure 5.7. The negative valence change distribution appears to be highly

Figure 5.6: Gay Marriage – Valence Log-Log and Semi-Log Plots
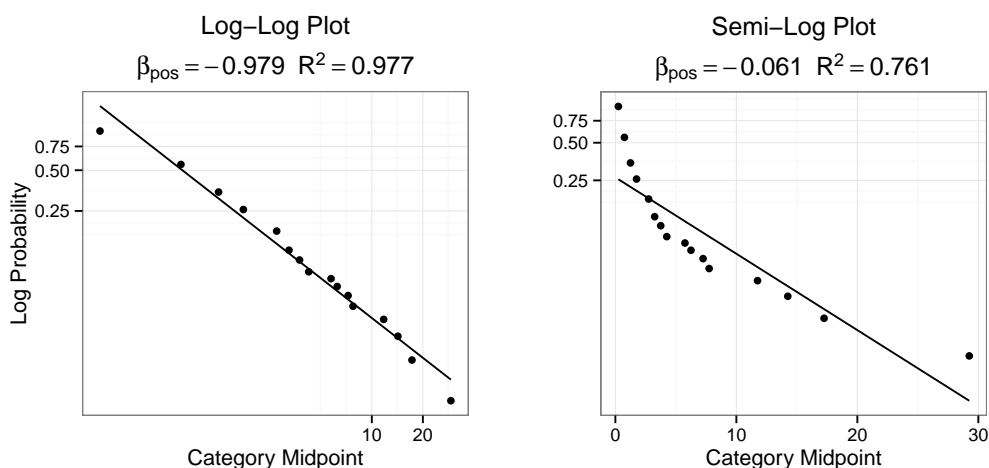
leptokurtic, with a great deal of observations centered around 0, while a fat tail again emerges on the right hand side of the distribution. Additionally, levels of arousal change are also (slightly) leptokurtic, which is in opposition to previous arousal change distributions showing highly normally-distributed change distributions; this visual demonstration falls in line with the moment statistics in Table 5.1. Additionally, arousal shows a greater number of changes on the right hand side than we would expect from a standard Gaussian distribution, though not to the extent shown by negative valence. Nevertheless, this is the first time that an arousal change distribution has shown a substantial deviation from normality in the case of the issues under study.

Figure 5.8 again plots the right-hand tails of the negative change distribution against theoretical Paretian and exponential distributions. Once again, the Paretian distribution fits the right valence change distribution tail quite well, as evidenced by the log-log plot ($beta_{pos} = -1.398$, $R^2 = .941$). Also as before, the theoretical exponential distribution fits the empirical valence change distribution substantially

Figure 5.7: Iran Sanctions – Emotionality Change Distributions

Negative Valence

Arousal
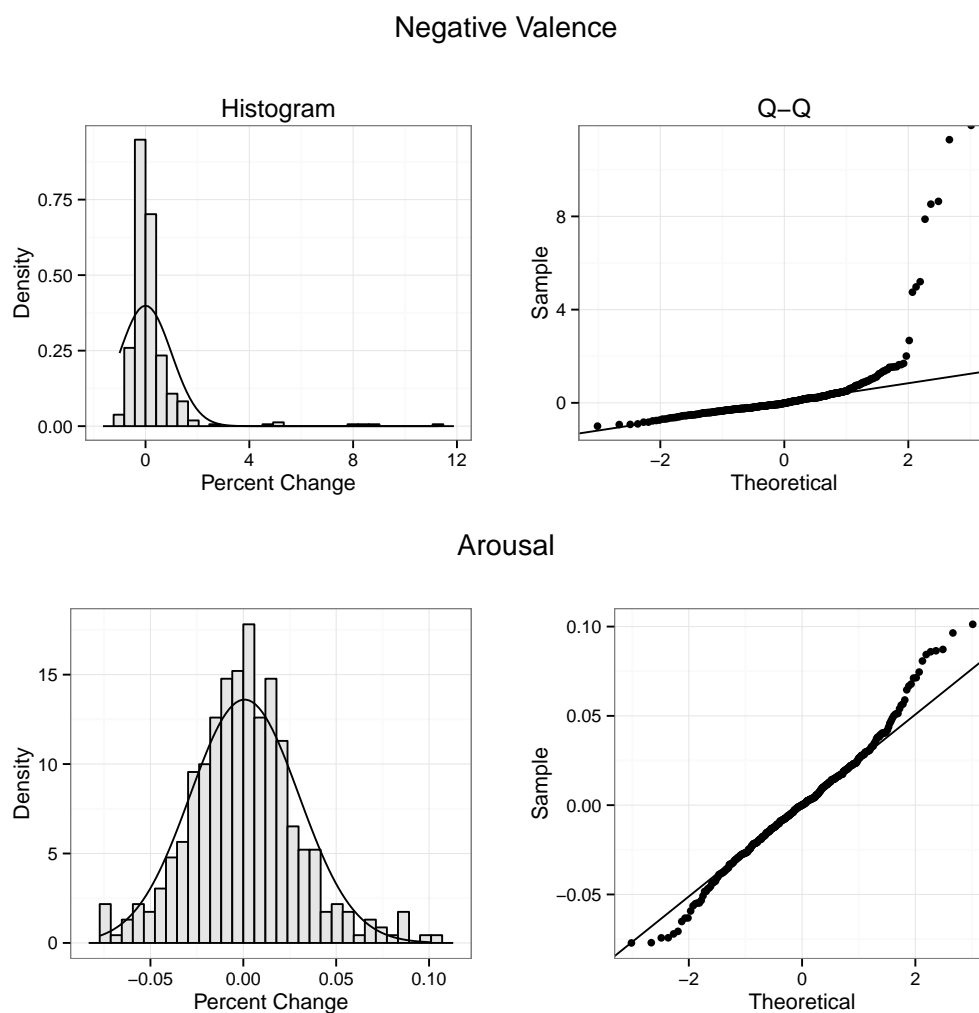
worse, with the plotted points more often falling away from the line and model fit being significantly worse ($beta_{pos} = -0.478$, $R^2 = .888$). Taken across each of these four issues, it appears that negative valence changes are consistently punctuated and resemble power (Paretian) distributions.

Unlike the arousal change distributions for the other issues under study, the distribution of arousal change for Iran sanctions departed significantly from normality, as evidenced by both the significant Shapiro-Wilk test statistic (S-W =

Figure 5.8: Iran Sanctions – Valence Log-Log and Semi-Log Plots
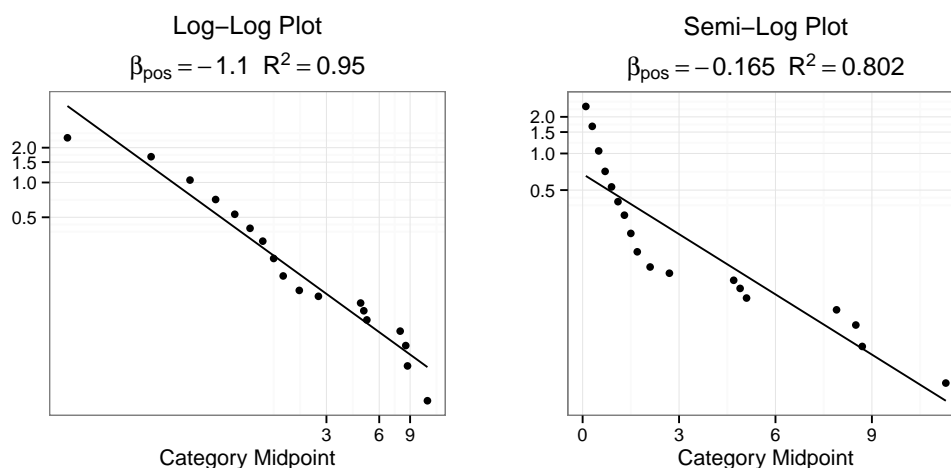
.984, p < .01) and quantile-quantile plots. As with valence change distributions, log-log and semi-log plots were fitted to the observed distribution to test for punctuations in the right-hand tail. These plots are shown in Figure 5.9.

The log-log plot for the right-hand tail of the arousal change distribution shows a substantially worse fit than was the case with valence change distributions across issues. The proportion of variance explained by the Paretian distribution is low ($R^2 = .862$) and the plotted points deviate significantly from the regression line in all but one case. The poor fit between the Paretian distribution makes sense given the near-normality of the change distribution, which though leptokurtic did not exhibit a substantial number of observations in the tails.

The fit between the exponential distribution and this distribution is substantially better, with almost the totality of variance explained by the exponential ($R^2 = .999$). However, the deep slope of the fitted regression line ($\beta_{pos} = -19.624$) indicates that the number of observations quickly falls off as one further departs from the center of the distribution, meaning that few, if any,

Figure 5.9: Iran Sanctions – Arousal Log-Log and Semi-Log Plots
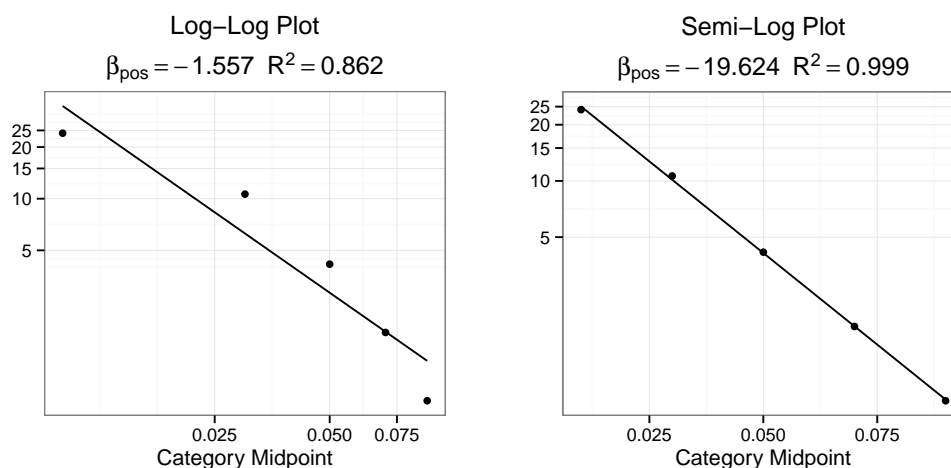
punctuations occur with regard to arousal on the issue of Iran sanctions. Again, going back to the histograms and Q-Q plots in Figure 5.7 provides a visual cue that this is indeed the case. While the distribution of change scores departs slightly from normality, it doesn't appear to represent a classic punctuated distribution.

5.3 Changes in Media Emotionality and Attention

Given that, across issues, negative valence within the media appears to alternate between periods of incremental change and periods of extreme swings, the next step is to test whether attention is oriented to political issues as the result of these sudden shifts and, if so, if these rapid changes better explain attentional processes than do day-to-day levels of media emotionality. As stated in the introduction to this chapter, the question remains as to whether individuals are more likely to be alerted to a problem within their political environment if a sudden upswing in emotionality occurs in a specific policy domain, rather than as the result of the overall level of emotionality surrounding an issue, because the overall media

environment consistently trends negative.

Several models integrating emotional changes were run on the attention data in order to ascertain whether it is rapid rises in or the overall level of emotion present in media reports on these issues; each of the following models is a Poisson regression given that the *Google Trends* data is count distributed. First, univariate models were executed in order to isolate the effect, if any, of punctuations in negative valence on attention. Changes in arousal are left out of these models for two reasons. First, with the exception of Iran sanctions, the distributions of changes in arousal were normally distributed and, for the sanctions issue, the distribution only slightly departed from normality. Even for the issue of sanctions, there was no empirical evidence that punctuations in arousal occurred. Second, the variance of change distributions of arousal was low, with the average of deviations from the mean (zero change) falling very closely to the center of the distribution. That such small changes in arousal could serve to orient public attention to these issues on their own, given these findings, makes little theoretical sense.

Table 5.2 provides the results from these univariate Poisson tests across each of the four issues under study here. On the debt ceiling issue, the relationship between changes in negative valence and search attention was significant, albeit negatively signed; as the degree of change in negative valence in the media rises, searches on this issue decreased. This relationship is contrary to the hypothesis of a positive relationship between valence change and attention, and is likewise contrary to the findings in Chapter 4 of a positive relationship between the average level of negative valence and attention.

Turning to the Keystone XL Pipeline issue, the relationship between changes in negative valence and attention was positive and significant, a finding in line with the hypothesis. As negative valence within Keystone XL reports shifted increasingly

Table 5.2: Regressing Attention on Media Emotionality Change

Model	Debt Ceiling	Pipeline	Gay Marriage	Iran Sanctions
Δ Neg. Valence	-0.211**	0.130**	-0.007	-0.010
	(0.063)	(0.011)	(0.016)	(0.008)
Intercept	2.418**	3.927**	0.900**	3.849**
	(0.023)	(0.018)	(0.046)	(0.009)
AIC	4749.1	4537.5	1019.4	7342.6
χ^2	11.858**	122.93**	0.182	1.695
N	172	67	203	300

Dependent variable is public searches on each issue.
Standard Deviations in Parentheses
** p < .01, * p < .05, + p < .10

upward, public searches on this issue increased likewise. This finding, unlike that of the previous issue, is in line with the positive relationship in Chapter 4 between average negative valence and attention. The issues of gay marriage and Iran sanctions, on the other hand, showed no significant relationship between changes in negative valence and search attention. Moreover, neither of the overall models were statistically significant.

Overall, the findings for a 1:1 relationship between negative valence changes and attention are mixed, given that only two of the four issues demonstrated significant relationships between the two and, even for those issues, the findings were mixed. Given that some of the previous research on agenda-setting effects have found the effect to be lagged (Stone and McCombs, 1981), there is a possibility that attention to issues is more time-dependent, with not only today's changes in valence but also *recent* changes in valence combining to produce attention.

Table 5.3 tests for a more time-dependent relationship by including both the prior negative valence change variable and a 1-day lagged valence change variable. In order to ensure that the effect of lagged negative valence change isn't acting as a proxy for the previous day's search attention, a 1-day lagged search attention variable is included in the equations as well. This is especially pertinent to these tests given that the best predictor of behavior is what occurred behaviorally at some previous time (Shumway and Stoffer, 2010).

As before, Table 5.3 tests the effects of these variables across each of the four issues. As would be expected, lagged attention is a significant and positive predictor of current attention, regardless of issue. For the debt ceiling, changes in negative valence were negatively related to search attention for both current and lagged values, though this relationship is only significant in the case of the latter. Positive changes in negative valence were associated with decreases in attention to the debt ceiling, as measured by online searches.

Results of these models on the issue of the Keystone XL Pipeline were similar to the previous univariate models, with both current and lagged changes in negative valence significantly and positively related to search attention; both variables were significant as well. Moreover, the coefficient for current changes in negative valence was over twice as large as the lagged version of the variable, demonstrating that the recency of changes in valence matters the most in predicting attention in these models.

The time-dependent model regressing attention to gay marriage on changes in negative valence was significant overall, which did not occur in the univariate model of this relationship. However, as was the case with the debt ceiling, changes in negative valence demonstrated a negative relationship with search attention, though this was only significantly so in the case of the lagged valence change

Table 5.3: Regressing Public Attention on Time-Dependent Changes in Emotion

Model	Debt Ceiling	Pipeline	Gay Marriage	Iran Sanctions
Δ Neg. Valence	-0.137	0.184**	-0.003	-0.025**
	(0.087)	(0.010)	(0.016)	(0.008)
Δ Neg. Valence$_{t-1}$	-0.172*	0.083**	-0.036+	-0.018*
	(0.088)	(0.011)	(0.021)	(0.009)
Attention$_{t-1}$	0.025**	0.005**	0.061**	0.012**
	(0.0004)	(0.0001)	(0.004)	(0.0003)
Intercept	1.720**	3.463**	0.704**	3.242**
	(0.033)	(0.024)	(0.053)	(0.020)
AIC	1876.4	2858.2	876.9	5767.4
χ^2	2606.0**	1822.0**	143.7**	1575.8**
N	171	64	201	298

Dependent variable is public searches on each issue.
Standard Deviations in Parentheses
** p < .01, * p < .05, + p < .10

variable. Unlike the debt ceiling issue, however, the effect of negative valence change was very small and just bordering on significance (p < .10).

The time-dependent model on the Iran sanctions issue in Table 5.3 was also significant overall, unlike its analogue in the previous univariate model. As was the case with gay marriage, the effect of changes in negative valence on search attention was negative, indicating that increases in media negativity were associated with drops in search attention. This negative relationship was significant for both current and lagged values of this variable, though as was the case with gay marriage the effect was quite small, as evidence by the small model coefficients. The preponderance of negative relationships between valence change and search attention across all but the Keystone XL issue are counterintuitive, especially given

the previous findings in Chapter 4 showing a positive relationship between *levels* of negative valence and attention; the possible causes of these relationships will be explored briefly.

Though the use and exploration of punctuated data is often a fruitful endeavor, one particularly glaring drawback lies in the nature of PE data itself: interesting or no, punctuations in any variable of interest are still statistical outliers (see Robinson, 2006). Robinson (2006) notes that, if punctuated data make up a (dependent or independent) variable of interest, and the punctuations themselves are of primary interest, then the data is made up of very few observations–problematic to say the least for n-driven quantitative models.

My research seeks to get around this by including all observations within the change distributions, whether the changes are small or large. While this boosts the number of observations considerably, this procedure has its own drawbacks as well. For one, the calculation of day-to-day change in emotionality outlined earlier in this chapter (e_t - e_{t-1} / e_{t-1}) creates a set of values that is somewhat, but not completely, agnostic to the previous level of emotionality as compared to the current level. The division of the first difference between current and 1-day lagged values by the lagged value weights those changes that occur nearer to zero than those that are further from zero, so there is a heavier weight applied to "earlier" increases in magnitude, but this weighting is small. To put this into a more understandable context, I have plotted hypothetical punctuated valence data in Figure 5.10 below.

The y-axis of this hypothetical data is a constructed measure of negative valence, while the x-axis is a simple measure of time. It is important to note that from $time_1$ to $time_2$ the emotionality stays level at .30, from $time_2$ to $time_3$ it rises from .30 to .35, from $time_3$ to $time_4$ a punctuation occurs that sees an increase in emotionality of .15, and from $time_4$ to $time_5$ this shift tapers off with another .05

Figure 5.10: Hypothetical Punctuation Data
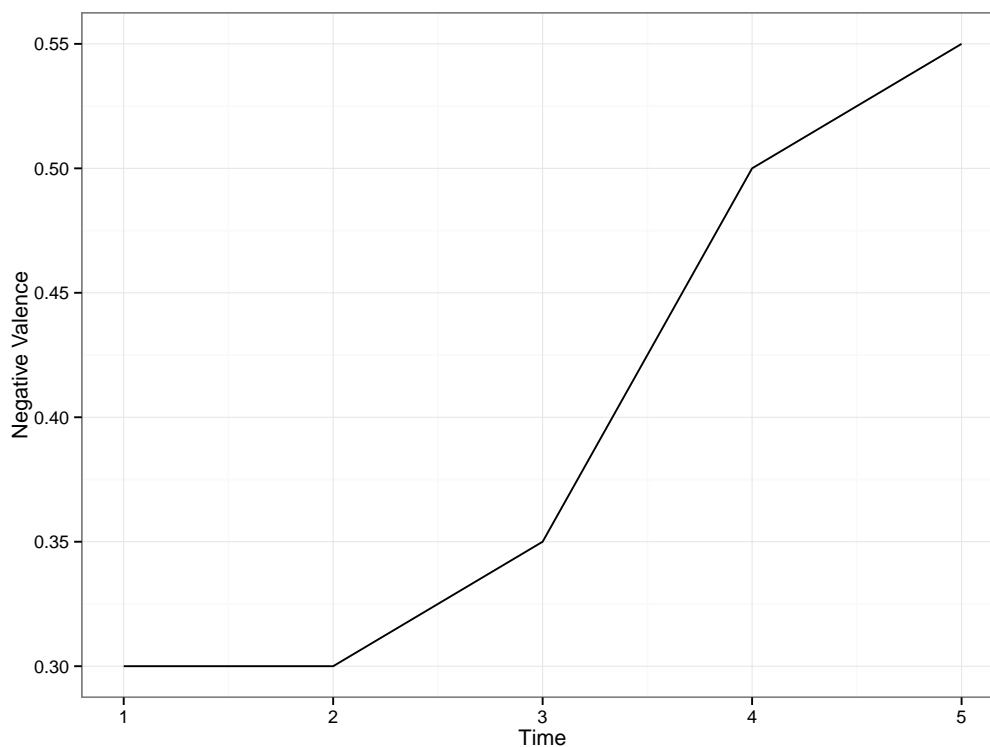
rise. Now, computing change scores for the two identical .5-unit rises occurring on either end of the punctuation, we get .167 for the pre-punctuation shift and .1 for the post-punctuation shift. Though the change of the earlier rise is weighted more heavily than the later rise, the weighting is small and may still wash out the effect of the origin point of valence.

What this means is that it may be important to test for the effect of changes in emotionality, controlling for the previous (mean) levels of emotionality, in order to ascertain whether these changes predict public attention to political issues. Specifically, I interact 1-day lagged values of mean negative valence on changes in negative valence to attempt to find out how changes in negative valence influence public attention to these issues given the *previous* day's level of media emotionality.

This will effectively weight more heavily those instances where valence shifts upward from a previously low point, while weighting shifts that occur from an already high level of valence downward to get at the recency of increases in negativity.

Table 5.4: Regressing Public Attention on Emotionality Changes and Levels

Model	Debt Ceiling	Pipeline	Gay Marriage	Iran Sanctions
Δ Neg. Valence	0.608+	0.435**	0.019	0.022
	(0.350)	(0.043)	(0.030)	(0.020)
Mean Neg. Valence$_{t-1}$	0.295	1.620**	0.036	0.413**
	(0.204)	(0.091)	(0.170)	(0.058)
Valence Δ*Mean$_{t-1}$	-1.064+	-0.416**	-0.046	-0.099*
	(0.563)	(0.062)	(0.070)	(0.040)
Attention$_{t-1}$	0.026**	0.006**	0.061**	0.012**
	(0.0004)	(0.0001)	(0.004)	(0.0003)
Intercept	1.521**	2.575**	0.661**	3.033**
	(0.130)	(0.058)	(0.113)	(0.035)
AIC	1877.4	2574.2	884.61	5754.9
χ^2	2867.3**	1983.7**	137.83**	1501.5**
N	171	64	201	298

Dependent variable is public searches on each issue.
Standard Deviations in Parentheses
** p < .01, * p < .05, + p < .10

Table 5.4 presents the results of these analyses in full. Because these analyses once again focus on the time-dependency of emotionality and attention, one-day lags of search attention are used as predictors, and each are significant and positive as would be expected. For the issue of the debt ceiling, changes in negative valence were positive and significant, indicating that positive changes in negative valence led to increases in public attention to this issue. Lagged mean negative valence was not significant. However, interacting lagged average values of negative valence on

changes in valence revealed a significant negative relationship between the two measures. This indicates that for those instances when negative valence increased from a previously low level, public attention increased likewise. Conversely, when the previous time period was characterized by high levels of negative valence, positive changes in negative valence had little effect. As was hypothesized above, positive changes in negative valence appear to only matter to the orientation of attention when the issue was previously at some emotional equilibrium.

The Keystone pipeline issue shows similar results. Coefficients for both changes in negative valence and lagged mean negative valence were positive and significant, indicating that as either increased public attention to this issue increased correspondingly. As with the debt ceiling, the valence mean*change interaction was negative and significant, indicating again that when increases occur from an already higher level of negative valence, the effects are minimal, while increases from lower valence levels serve to orient attention.

The gay marriage issue continued its tradition of avoiding statistical significance in the case of negative valence change, and adds lagged mean valence to those ranks in this model. Only lagged attention was significant in this model, not entirely surprising given how shaky previous models were for this issue in terms of valence change.

Unlike gay marriage, the issue of Iran sanctions showed some significance within its model, with lagged mean negative valence positive and significant, though changes in negative valence, in isolation, were not significantly related to attention. However, the interactive relationship between these two variables was negatively signed and significant, indicating that changes in negative valence have less effect when the previous level of valence was higher. This at least partly explains the non-significant relationship between valence change and attention, as any effect of

valence change is conditioned upon there being a low level of valence in the previous time period.

Discussion

The results of these models featuring change data demonstrate that shifts in negative valence can serve to influence public attention to the issues, but some further interpretation is necessary to make sense of them. Out of the four issues, shifts in negative valence consistently affected two issues, and only one of them had constant signage of relationships across models (Keystone pipeline). For the issues of gay marriage and Iran sanctions, oftentimes significant relationships did not emerge and, when they did, the direction of these relationships tended to be a bit shaky.

Perhaps there are characteristics of the issues themselves at play here. Recall that the two issues with consistently significant relationships between changes in negative valence and attention, the debt ceiling and Keystone pipeline, are the two issues that are also the most recent in terms of their emergence onto the national stage. It could be that, because issues such as same-sex marriage and Iran sanctions have been around as national-level issues for the last several decades, quick increases in the emotionality of reportage on those issues is prone to have less of an effect than is the case for newer issues that individuals don't have as much (if any) experience with.

Recall that in Chapter 4, which first correlated media emotionality with attention, both the debt ceiling and Keystone pipeline issues showed the most consistent effects of emotionality, especially as compared to the other two issues. Perhaps what explains the results in this and the previous chapter is that citizens who come to the table with fewer well-formed preferences on the issues are more apt to rely on emotionality cues than they would on issues they have encountered

before. If this is in fact the case, our understanding of how citizens process and attend to issues within the broader political environment must account for the "freshness" of policy areas in the media environment. Unfortunately, the data I have collected for this research does not allow for controls on factors such as political knowledge or experience with these issues, so future research should attempt to fill this gap by making use of individual-level data for these purposes. Lacking this, investigating more issues that are either new or well-entrenched in political life should also allow me to uncover more of the nuances in public attention with regard to this open question.

In closing this section, the results of the analyses within this chapter are important for two primary reasons. First, I have broken new ground in answering the question of whether media emotionality is punctuated. To be sure, this is by far the most exploratory segment of my dissertation research, and as such contained a great deal of barefoot empiricism, but I believe this question (and its answer) is important. That media reportage across each of these issues so consistently showed evidence of punctuations in negativity reveals more questions than it answered. How do punctuations in negative valence influence other aspects of behavior? When political issues experience rapid increases in negativity, do these punctuations compel governmental institutions to divert more resources to their solutions than do issues not experiencing punctuations? Or are the punctuations themselves simply the byproducts of government action that is already occurring? Additionally, what causes these punctuations? It is my belief that seeking answers to these newly formed questions represents a media agenda in its own right, outside of just public attention.

The finding that negative valence was both more widely variable *and* more apt to show punctuations than arousal is also indicative of valence's greater role in

attentional processes. As I have stated numerous times in this research, for a characteristic of a policy issue to act as a useful informational cue, it must distinguish itself from other issues grappling for attention within the media environment. In other words, if the characteristics of issues are redundant (see Pierce, 1980), it is likely difficult for citizens to separate the wheat from the chaff in deciding what to devote already limited attention toward. As I showed in this chapter, negative valence fits this bill quite nicely, because it varies considerably, often to the point of extreme swings, which offers this form of emotionality a way in to individuals' attention. With regard to changes, it doesn't appear to be either theoretically or empirically likely that arousal does likewise, as it simply does not vary widely enough to alert citizens to important changes within their political environs.

I turn now to the overarching conclusions of my research, as well as future directions of inquiry.

Chapter 6   Implications and Conclusions

"Nature abhors a vacuum." — Aristotle

Maxwell McCombs, the intellectual grandfather of the agenda-setting paradigm, once noted that for all our understanding of the how and the when of public attention, we still have very little understanding of *why* the public picks up on cues in the media in deciding which issues deserve attention and which do not (2004). It is well established empirically that, given a media agenda saturated with an issue, citizens will adjust their agendas to match, with subsequent increases or decreases in the former are matched tit-for-tat by the public, until finally the media and public seemingly decide collectively that an issue demands no more attention and moves on to another.

As I have noted throughout this dissertation, simply noting that the two move together more or less in tandem is not enough. Sure, citizens may follow Aristotle's claim about nature and vacuums to the letter in diverting attention toward prominent issues in the media, presumably because of a need to mitigate uncertainty about what's going on in the world as a response to increasing coverage of an issue or issues (McCombs, 2004; Matthes, 2006; Weaver, 1980). This simple association has worked well in the study of agenda-setting, as hundreds of publications attest over the past 40 years (see McCombs and Shaw, 1972; McLeod, Becker and Byrnes, 1974; Benton and Frazier, 1976; Palmgreen and Clarke, 1977; Iyengar, 1979; Winter and Eyal, 1981; Neuman, 1990; Weimann and Brosius, 1994; Brosius and Weimann, 1996; Althaus and Tewksbury, 2002; Jones and Baumgartner, 2005). But for every research endeavor focused upon agenda-setting,

whether based out of an audience need for orientation (Matthes, 2006; Weaver, 1980), lack of firsthand knowledge of social issues (McCombs, 2004) or simple public-to-media indexing (Benton and Frazier, 1976), the question remains: what actually drives media agenda-setting?

I have demonstrated that one of the primary causal linkages underlying media agenda-setting is emotion, specifically, citizens' use of emotional cues for guidance as to which issues demand the most attention. Citizens are confronted with a multitude of social and political issues on a daily basis, and cannot possibly devote sufficient attentional resources to each and every issue while also engaging in their work and personal lives; there are simply too many things competing for prominence to engage them all (Simon, 1985). Individuals are confronted with attentional choices, and in a world increasingly characterized by a preponderance of choice, it seems likely that some other explanation is required to account for which issues make up the pictures in citizens' heads and which do not.

In my exploration of an alternative explanation for why agenda-setting occurs, I have added to our knowledge of the attentional processes that comprise agenda-setting in several ways. I will consider these in turn.

Media Emotionality is Separate from Issue Prominence.

When I began theorizing about the role of emotion in reporting on political issues, I surmised that the connection between traditional explanations of agenda-setting (increases in coverage volume and prominence predict attention) and emotionality would represent a strong, linear relationship. Previous scholarship has shown that the emergence of an issue onto the media agenda tended to correspond to increased negativity (see Baumgartner and Jones, 2009). Perhaps, I theorized, measures of coverage volume act as proxies for emotionality, with increases in the

negativity and arousal levels of issues rising and falling as journalists report on different stages of a public problem. Would my research have found this relationship, findings by scholars such as Metzger (2000), who noted that citizens tend to deem an issue as solved when it disappears from the media agenda, would have been buttressed.

I did not find this, however. Across multiple tests of relationship between emotionality and coverage volume, very few significant associations emerged, and even for those that did, the strength of relationship was tenuous at best. Across the four issues under study, only two issues (Keystone and Iran sanctions) showed correlations between negative valence and coverage volume above .10, meaning that, on average, 1% or less of the variation in total news coverage can be explained by the level of valence. The findings were even *more* tenuous for arousal, which at its peak association with total coverage (the debt ceiling) achieved only a correlation of .06, or about 0.4% explained variability between the two. Surely, when we're dealing with percentages of percent explained variance, it seems clear that two variables are independent of one another. Further, when accounting for the fact that news volume is count-distributed, and thus requiring statistical tests without assumptions of normality (Poisson regression, in this research), these already tenuous relationships between emotionality and coverage volume went away completely.

Though scholars are often (admittedly) disappointed in such wide ranging statistical non-significance, what emerged from this portion of my research is a much more interesting research puzzle than one just attempting to further explain why coverage volume has worked so well as a variable for 40+ years. Instead of total coverage simply being a proxy for emotionality, the possibility emerged that, because of this independence, the two work in interesting ways both in isolation and in tandem. On the former point, that emotionality functions separately from the

amount of coverage given to issues opens the door to public attention on those issues that don't typically receive much play in the mainstream media. If this is in fact the case – and I think the results of my analyses show that it probably is – there is hope that underserved issue areas can garner some modicum of public attention, even lacking large shifts in the amount of coverage given by the media.

With regard to how emotionality works in tandem with the volume of coverage given to issues, I surmised that the reason coverage volume has worked so well in the past is because, for the media to exert influence over the public on an issue, they must first report on it. In doing so, the likelihood exists that citizens will confer some importance on the issue – if the media are reporting on it, it must be important (see McCombs, 2005) – because of "indexing" that occurs between the media and public. As we know, however, sometimes issues receiving a great deal of coverage in the mass media don't trigger likewise increases in public attention (Fried and Cole, 2001). But in any case, what coverage volume *does* do is increase the likelihood that citizens will encounter an issue in the first place, opening a window to the content of those media messages to further influence citizens about which issues are important and which are not. In other words, I hypothesized that coverage of an issue is an open door, while the content (emotionality) is the foot in that door.

Emotionality Matters, But So Too Does the Amount of Coverage.

In Chapter 4, I tested this hypothesized volume-emotionality interaction across these four issues using the *Google Trends* database of online search trends. While use of such a resource has its own special drawbacks (explained in further detail later in this chapter, as well as in the preface to Chapter 4), its use allows agenda-setting scholars to get a more fine-grained and dynamical view of citizens' attentional processes than offered by traditional survey methods, which unfortunately are sporadic at best in terms of their timing (see Ripberger, 2011;

Scharkow and Vogelgesang, 2011).

Demonstrating emotionality's independence from coverage volume, of course, is one thing; showing that it too influences public attention is another. Chapter 4 demonstrated that emotionality, on its own, does in fact serve to orient public attention to political issues. As the negativity of reportage on the issues increases, individuals tend to correspondingly ratchet up their attention to those issues. Increases in arousing content in those same messages does likewise. Moreover, the interaction of the two multiplicatively increases attention to issues; e.g., valence and arousal matter independently, but taken together, highly negative and arousing content is associated with even higher public attention to political issues. Aside from adding to our knowledge of how agenda-setting works, these findings demonstrate that measures of emotional arousal – so often neglected in research on political psychology and behavior – play an important role in our understanding of broader political processes. Negative valence matters, to be sure, but these findings are indicative of a need to further account for other emotional dimensions in seeking to explain why people act the way they do (for their part, Marcus, Neuman, and MacKuen address arousal in their work, but the emphasis mostly centers upon the role of valence, as has so often been the case in political psychology research).

It was when I brought the primary explanatory variable in most previous agenda-setting research, news volume, that the results became most interesting in this research. In three of the issues (debt ceiling, Keystone pipeline, and gay marriage), controlling for news volume in addition to the interactive relationship between arousal and valence continued to show significant relationships between the latter and attention. Moreover, the effect of coverage volume also tended to be positive and significant, indicating further that emotionality and coverage are independent while holding concurrent influence over attention to these issues.

The creation of full models interacting the two emotionality variables with news volume provided evidence that although emotionality and volume are independent, they do interact in interesting ways in producing attention. For example, for all but the Keystone pipeline issue, the arousal-valence interaction was significantly related on its own, but accounting for possible mediation effects of coverage volume, I demonstrated that these measures really work to orient attention when coverage volume is high. In other words, emotionality matters on its own, and news volume matters on its own, but when positive increases in valence, arousal, and coverage volume happen concurrently, a veritable perfect storm of public attention results. As I stated previously, these findings make intuitive sense: if emotionality is high but the media aren't heavily covering a political issue, the probability that an individual will encounter stories on that issue – and those stories' accompanying emotional nature – is low. Hence this research has added a great deal to our understanding of the agenda-setting process. Both coverage and content matter on their own, but at certain points in time they come together to matter even more in showing citizens which issues are most worthy of their limited attention.

One final note bears mentioning here, and it is related to the issue of the Keystone pipeline. When I went about selecting issues to use as fodder for this research, what was most inviting about the Keystone pipeline issue was its status as a mostly regional issue (the State of Nebraska's actions to halt the project at both state and federal levels) that received some national play periodically. This shows in the data I have assembled, as this particular issue received the lowest level of coverage of the four over the time period utilized. This is also the only issue where no significant 3-way interaction between arousal, valence, and news volume emerged. Now, it could be that, with such low levels of coverage, and hence fewer data points, this interactive relationship ate up too many degrees of freedom in the regression analyses to have sufficient variance between predictors. While this appears on its

face to be primarily a statistical problem, by its very nature the Keystone pipeline issue demonstrates that, lacking a great deal of news coverage, issues can still make it onto the agenda should they exert enough emotional muscle. That said, much more research into lower-profile political issues will be necessary to see if this relationship holds; however, I think this especially interesting for our understanding of the agenda-setting process. If, in fact, issues can get on the public agenda without the (heretofore) requisite weight of the media agenda behind them, there may be some hope for public problems that traditionally carry little weight in the mass media, such as poverty, minority and gender issues, and other environmental issues. Unfortunately for now I must chalk this into the "future research" column.

Valence in the Media is Punctuated, and it Matters.

The final substantive chapter of my dissertation research focused upon an exploration of whether it is not just the level, but also changes, in emotionality within media reports that influences public attention. As stated prior, this is an important endeavor because in an environment so often characterized by negative reportage (e.g., Cappella and Jamieson, 1997; Patterson, 1994) it may be difficult for citizens to recognize one issue as more pressing than another if negativity is the name of the game to start with. Instead, it may be that sudden shifts (punctuations) in media emotionality act as signals that an issue is important and demands attention.

Given that very little prior research even acknowledges that the emotionality of the media may exhibit a punctuated nature (but see Baumgartner and Jones, 2009, for *some* acknowledgment), this chapter first did an exploratory analysis of the dynamics of media emotionality. Using the punctuated equilibrium framework, I constructed data composed of day-to-day changes in emotionality and subjected it to multiple distributional tests in seeking to answer this question. What is most

striking about this component of my research is how consistently punctuated negative valence is in the media, while at the same time arousal shows almost no evidence of likewise punctuations (excepting Iran sanctions, though there existed only weak evidence of this). In other words, negative valence in the media alternates between periods of equilibrium, with only incremental changes, and large swings upward into the realm of high negativity. Conversely, changes in arousal happen very, very gradually and rarely punctuate at all. I theorized that these shifts in valence would matter especially for attention, given the role of that emotional dimension in indicating the value of objects within one's environs (Bradley, 2000, 2009).

Following this line of thought, I constructed models featuring the negative valence change variable and increasing numbers of controls, including the previous day's attention, mean levels of valence, and news coverage volume. Unfortunately, using simple bivariate regressions between attention and negative valence change, only the debt ceiling and Keystone pipeline issues showed a significant relationship, and then only Keystone was in the expected (positive) direction. Controlling for time-dependent dynamics of these relationships brought in another significant relationship in the form of the Iran sanctions issue, but also in the opposite direction from that I expected. Finally, accounting not only for changes in and the mean level of emotionality, but also the *previous* level of emotionality, I showed that shifts in negative valence matter for attention across all issues excepting gay marriage, and in doing so demonstrated that when a shift occurs from a previously low level of negativity in the media to a higher level, public attention is oriented to these issues as a result.

Admittedly, both more empirical observation and theory building is necessary at this point with regard to this issue, given that this area of inquiry is

mostly untilled at this point. That said, I believe that this component of my research has shown that agenda-setting, for all its successes as a paradigm, still has a great deal to account for if we are to understand the causal processes driving it. For example, I have shown that punctuated media emotionality can serve to drive attentional processes, but what drives the punctuations themselves? The immediate (and obvious) answer is that these punctuations occur for the same reasons as other shocks to political systems, such as focusing events (e.g., Kingdon, 2002) or changes in framing and information (e.g., Baumgartner, De Boef and Boydstun, 2008). Given the multitude of groups fighting for attention and power over the agenda, however, the ability of emotional shifts to capture attention begs the question of what extent elite actors and interest groups, to name just a few, can seek power over the agenda by seeking to highlight the emotional characteristics of political issues in the media.

Shortcomings

As is the case with any strand of research, the end brings with it as many new questions and qualms as it does closure, if not more. One of the primary drawbacks of this research has been its emphasis on mass level attention, with no accounting for individual-level differences in propensity to experience emotion, as well as the role of partisanship and ideology. For example, a burgeoning field of research within political psychology has shown that individuals experience and recognize emotions differently in the act of processing social and political cues, and that this differential processing of emotional information varies with ideology (see Dodd et al., 2012; Oxley et al., 2008; Smith and Hibbing, 2007; Smith et al., 2011). Moreover, research in psychology has shown a great deal of variability in individual-level emotionality, whether the result of traits (e.g., Blascovich, 1990) or states (e.g., Gendolla, Abele and Krsken, 2001; Luu, Collins and Tucker, 2000). Utilizing mass level measures of

attention, such as I have, does not allow one to account for these factors in exploring how emotionality relates to attention. Future research should account for these factors, either through the use of psychophysiological[1] measures or traditional survey-based measures to account for individual level differences in emotionality in the former case and political demographics in the latter.

Another shortcoming of this research lies in its reliance upon *Google Trends* data for its measure of attention. To be sure, researchers have had continuing success with this data's use to that end (Ripberger, 2011; Scharkow and Vogelgesang, 2011; Scheitle, 2011; Weeks and Southwell, 2010), but there is still a great deal we don't know about the characteristics of search data at this point. For example, not one study has focused solely upon the assumptions underlying the use of *Trends* data for attention research, such as the effect of day of the week on search (searches are less frequent on weekends and holidays), as well as how it correlates with traditional measures of attention, such as Gallup's *Most Important Problem* question. I believe my research has taken our use of this data further by accounting for the fact that it is (mostly) count-distributed, and controlled for this in my statistical models, but much more progress is necessary before we can contend that *Google Trends* is the pentultimate measure of public attention.

This research made use of the *Affective Norms for English Words* (ANEW) dataset in measuring the affective content of news texts (see Bradley et al., 2001). Now, while I explained my motivation for using this set of 2,000 words earlier in the dissertation – including the fact that it is pre-rated and cross-checked with physiological indicators of valence and arousal (Larsen, Norris and Cacioppo, 2003; Partala, Surakka and Vanhala, 2005) – choosing which dictionary to employ in research such as this always carries with it the risk that results do not replicate

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[1] As my committee knows, I had planned on including a physiological approach to this study in its original iteration, but massive lab failures precluded its use in the end.

across other word sets (see Krippendorff, 2003). Though I remain steadfast in my belief that the *ANEW* dictionary represents the best collection of words for purposes of this research, investigations into the effect of emotional language on public attention would do well to include other dictionaries for purposes of cross-validation. To a certain extent other scholars, specifically Young and Soroka (2012), have been engaged in testing the use of affective word dictionaries for political communication research, but for the most part this is an untilled field. As my research agenda moves forward I hope to integrate other dictionaries into these analyses in order to test for whether the results hold, but to be sure this lands squarely in the realm of future research.

One final shortcoming of this research lies in the number of issues investigated. Deciding on which issues make the cut and which do not is always a judgment call – and I believe I've done right by my research question in including one each from economic, social, environmental, and foreign policy issues – but for this line of research to be truly generalizable, it should account for more issues across a wider spectrum of media attention and time. Further, including more of each type of issue should allow me to glean whether important differences actually exist between issue types, attention, and emotionality, and in doing so make this research more applicable to a greater number of political questions.

Conclusion

Along with the framing of political issues, agenda-setting represents one of the most consequential powers of the mass media to influence the attitudes and behaviors of citizens living in democratic society. As Bernard Cohen once opined (1963), the press isn't usually successful at telling people what to think, "but it is stunningly successful in telling its readers what to think about." The very fact that the media are so able to confer importance upon some issues while ignoring others,

and in doing so compel citizens to do likewise, makes clear why the study of this process has proceeded steadily since McCombs and Shaw published the first empirical confirmation of this phenomenon in 1972.

But for all its successes as a field of study, agenda-setting research has more or less proceeded along the same path laid out by McCombs and Shaw in examining how variability in the media agenda is correlated with variability in the public agenda. We've gained some nuance along the way, for sure: e.g., agenda-setting is based out of an innate need for orientation (Matthes, 2008), important differences exist in the size of effect at the local and national level (Palmgreen and Clarke, 1977), changes in the public agenda are lagged against the media agenda (Stone and McCombs, 1981), and so on. But in most of these explorations, scholars have neglected to ask *why* (but see Miller, 2007). Why do citizens adjust their agendas to match that of the media's? What are the processes underlying these adjustments?

To be fair, this path dependency rears its head in most endeavors making use of the scientific method (see Feyerabend, 1993). But given over 40 years of research into this phenomenon, the time is ripe for taking a crack at the causal mechanisms driving it. I have done so in this research, and have shown that the content of the media must be considered when studying the agenda-setting function of the mass media. Specifically, this research has demonstrated how important it is to account for emotionality within the media in order to understand this phenomenon.

The amount of coverage the news media give to political issues matters. In devoting coverage to an issue, the mass media not only signals its importance to citizens, but also increases the likelihood that citizens will encounter reports on that issue, consider them, and (perhaps) confer some modicum of importance to them. At root, it's not difficult to understand why scholars to this point have so often focused their empirical energies on correlating media attention with public attention,

for without the former, media influence is all but impossible. I demonstrate that this is a necessary condition for agenda-setting to occur, as well as a sufficient one – after all, even when controlling for emotionality, the level of coverage given to an issue, for the most part, remains a significant predictor of attention.

But it may not be as sufficient as past research would suggest. The theory I have developed in undertaking this research posits that there must be some mechanism at work that is both complementary to and separate from news volume that serves to orient citizens' attention to these issues. That mechanism is emotion. As I have shown across repeated models, the emotional content of media messages acts to orient attention as well. Both in isolation from and in tandem with the volume of news coverage, citizens do, in fact, appear to make use of emotional cues in deciding which issues are most deserving of their attention. Even in instances of a media heavily covering an issue, emotion serves as an indicator of value (valence) and importance (arousal), such that they drive further citizens' attention to an issue. And, importantly, for an issue that has received relatively low levels of media coverage (the Keystone pipeline) emotion only appears to play a larger role *vis a vis* coverage volume.

In closing, the research I have undertaken on the role of emotion in the orientation of public attention sets the stage for further, more nuanced approaches to understanding this longstanding paradigm. In adding the study of dimensional emotion to the agenda-setting toolbox, my research serves to reopen lines of inquiry into the causal linkages of media influence, and begs the question of more dynamical understandings of the press-public relationship. For example, the results of this research are suggestive of a differential effect of media emotionality upon public attention, with newer issues, such as the debt ceiling and Keystone pipeline, showing larger, more consistent effects of emotion than those issues that have been

part and parcel of American politics for quite some time. If this is the case, perhaps it is those issues that have not received consideration that are most prone to receive attention due to emotional factors, while "older" issues follow the more traditional trajectory of agenda-setting, that which is due to simple coverage volume. Future research will help to further parse apart these dynamics, and will more adequately capture the linkages between the media and the citizenry.

Chapter 7   Appendix 1: Programming the Dissertation

The following series of modules were programmed for purposes of measuring the emotionality of texts using articles downloaded from the *LexisNexis* online database. In short, the code first cleans the body of text, pulls meta information (date, page, source, etc), stems and lowers words, pulls instances of *ANEW* words from each document, and computes weighted affective text occurrences based on the 1-standard deviation threshold discussed in the text. Statistical analyses were then undertaken in *R*.

Sample code to run script, given a file 'lexis.html':

```
data = affectData('lexis.html')
```

Modules:

```
def affectData(doc, sdn=1):
    "One function to rule them all"

    counts = affectLexis(doc)
    valweight = dimScore(counts, 'v')
    arouweight = dimScore(counts, 'a')

    data = dimCalc(counts, valweight, arouweight, sdn)

    return(data)

def affectLexis(doc):
    # pull file in, split on articles
    infile = open(doc,'r').read()
    articles = re.split('<\DOCFULL>', infile)

    # prepare dictionary list
    dictlist = []

    # prep ANEW list
    anew = anewWordList()

    n = 0
```

```
        # iterate through articles
        for article in articles[1:len(articles)]:

            n += 1
            print(n)

            # pull text and stem
            text = lexisBody(article)
            stemmed = stemlower(text)

            # count words
            counts = wordCounts(stemmed)

            # prepare and populate temporary dictionary
            dict = lexisMeta(article)

            for j in anew:
                dict.update({j : counts[j]})

            dictlist.append(dict)

    d = DataFrame(dictlist)
    return(d)

def dimScore(data, dimension):
    "Elementwise multiplication of ANEW word counts by dimensions of emotion"

    # pull ANEW dictionary
    a = anew()

    # check for which dimension is being pulled
    if dimension == 'a':
        dim = 'arousal'
    elif dimension == 'd':
        dim = 'dominance'
    else:
        dim = 'valence'

    # pull dictionary
    d = data.copy()

    # iterate through ANEW word list
    for i in a:
        d[i] = d[i].apply(lambda x: x * a[i][dim])
```

```
        return(d)

def dimCalc(cdata, valdata, aroudata, sdn=1):
    "Calculates scores on dimensions based on cutoff points"

    # pull ANEW dictionary
    a = anew()
    adata = DataFrame(a).T

    # calculate thresholds for each dimension
    nvalthresh = adata['valence'].mean(1) - adata['valence'].std(1) * sdn
    pvalthresh = adata['valence'].mean(1) + adata['valence'].std(1) * sdn
    arouthresh = adata['arousal'].mean(1) + adata['arousal'].std(1) * sdn

    del(adata)

    # build anew word lists for thresholds
    nvalmodlist = []
    pvalmodlist = []
    aroumodlist = []

    for i in a:
        if a[i]['valence'] <= nvalthresh:
            nvalmodlist.append(i)
        if a[i]['valence'] >= pvalthresh:
            pvalmodlist.append(i)
        if a[i]['arousal'] >= arouthresh:
            aroumodlist.append(i)

    newdata = cdata[['_date','_source','_page','_byline','_dateline',
                     '_count','_headline']]

    newdata['nval_wsum'] = valdata[nvalmodlist].sum(1)
    newdata['nval_csum'] = cdata[nvalmodlist].sum(1)
    newdata['nval_avg'] = newdata['nval_wsum'] / newdata['nval_csum']

    newdata['pval_wsum'] = valdata[pvalmodlist].sum(1)
    newdata['pval_csum'] = cdata[pvalmodlist].sum(1)
    newdata['pval_avg'] = newdata['pval_wsum'] / newdata['pval_csum']

    newdata['arou_wsum'] = aroudata[aroumodlist].sum(1)
    newdata['arou_csum'] = cdata[aroumodlist].sum(1)
    newdata['arou_avg'] = newdata['arou_wsum'] / newdata['arou_csum']
```

```
        return(newdata)

def lexisMeta(doc):
    "Pull meta information from articles"

    date = ''
    source = ''
    head = ''
    page = ''
    byline = ''
    dateline = ''
    wc = ''

    # pull date
    date = re.search('<DIV CLASS="c3"><P CLASS="c1">
                            <SPAN CLASS="c2">(.*?)<', doc)
    if date:
        d = date.group(1)
        d = d.split()[0:3]
        d = ' '.join(d).replace(",", "")
        try:
            d = time.strptime(d, "%B %d %Y")
            date = time.strftime("%Y-%m-%d", d)
        except ValueError:
            print "Incorrect Date Placement"

    # pull source
    source = re.search('<DIV CLASS="c0"><BR><P CLASS="c1">
                                <SPAN CLASS="c2">(.*?)<', doc)
    if source:
        source = source.group(1)

    # pull headline
    headTemp = re.search('<DIV CLASS="c4"><P CLASS="c5">
                                    <SPAN CLASS="c6">(.*?)<', doc)
    if headTemp:
        head = headTemp.group(1)

    # pull section, page, etc
    pageTemp = re.search('<DIV CLASS="c4"><P CLASS="c5">
                                    <SPAN CLASS="c7">SECTION: </SPAN>
                                    <SPAN CLASS="c2">(.*?)<', doc)
    if pageTemp:
        page = pageTemp.group(1)
        page = page.split('Pg.')[-1].replace(' ','')
```

```
        page = re.sub('\D', '', page)

    # pull byline
    bylineTemp = re.search('<DIV CLASS="c4"><P CLASS="c5">
                                        <SPAN CLASS="c7">BYLINE: </SPAN>
                                        <SPAN CLASS="c2">(.*?)<', doc)
    if bylineTemp:
        byline = bylineTemp.group(1)

    # pull dateline
    datelineTemp = re.search('<DIV CLASS="c4"><P CLASS="c5">
                                        <SPAN CLASS="c7">DATELINE: </SPAN>
                                        <SPAN CLASS="c2">(.*?)<', doc)
    if datelineTemp:
        dateline = datelineTemp.group(1)

    # pull word count
    wcTemp = re.search('<DIV CLASS="c4"><P CLASS="c5">
                                    <SPAN CLASS="c7">LENGTH: </SPAN>
                                    <SPAN CLASS="c2">(.*?)<', doc)
    if wcTemp:
        wc = wcTemp.group(1)
        wc = [int(s) for s in wc.split() if s.isdigit()][0]

    meta = {'_date':date, '_source':source, '_page':page, '_byline':byline,
            '_dateline':dateline, '_count':wc, '_headline':head}

    return(meta)

def lexisBody(doc):
    "Return only text of the document"
    soup = BeautifulSoup(doc)
    results = soup.findAll('p', attrs={'class' : 'c8'})
    text = []
    for i in results:
        try:
            text.append(i.string.encode('ascii','ignore'))
        except AttributeError:
            continue
    text = ' '.join(text)
    return(text)

def lexisToken(doc):
    "Tokenize text with punctuation separate"
    tokenizer = WordPunctTokenizer()
```

```
        return(tokenizer.tokenize(doc))

def anew():
    "Pull ANEW data into dictionary"

    this_dir, this_filename = os.path.split(__file__)
    data_path = os.path.join(this_dir, "data", "ANEW2010All.txt")

    a = open(data_path)
    a.readline() # drop header row
    a = a.read()

    d = {}

    for line in a.split('\n'):
        col = line.split('\t')

        stemmer = PorterStemmer()
        stemmed = stemmer.stem(col[0])
        val = float(col[2])
        aro = float(col[4])
        dom = float(col[6])

        d[stemmed] = dict(word = col[0], valence = val,
            arousal = aro, dominance = dom)

    return(d)

def anewWordList():
    "Pull ANEW words into list"

    this_dir, this_filename = os.path.split(__file__)
    data_path = os.path.join(this_dir, "data", "ANEW2010All.txt")

    a = open(data_path)
    a.readline() # drop header row
    a = a.read()

    d = []

    for line in a.split('\n'):
        col = line.split('\t')

        stemmer = PorterStemmer()
        stemmed = stemmer.stem(col[0])
```

```
        d.append(stemmed)

    return(d)


def stemlower(text):
    "Lowercase and stem words"

    # tokenize using wordpuncttokenizer (removes punctuation)
    tokenizer = WordPunctTokenizer()
    tokenized = tokenizer.tokenize(text)

    # stem and lowercase words
    stemmed = []
    stemmer = PorterStemmer()
    for i in tokenized:
        stemmed.append(stemmer.stem(i.lower()))

    return(stemmed)


def wordCounts(text):
    "Count number of occurrences in a text for anew words"

    c = Counter()
    for word in text:
        c[word] += 1

    return(c)
```

Chapter 8   Bibliography

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