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# Cognitive Biases and the Strength of Political Arguments

**Kevin Arceneaux** Temple University

*Competition in political debate is not always sufficient to neutralize the effects of political rhetoric on public opinion. Yet little is known about the factors that shape the persuasiveness of political arguments. In this article, I consider whether cognitive biases influence the perceived strength of political arguments, making some arguments more persuasive than others. Lessons from neurobiology and recent political psychology research on emotion lead to the expectation that individuals are more likely to be persuaded by political arguments that evoke loss aversion via a fearful response—even in the face of a counterargument. Evidence from two experiments corroborates this expectation. I consider the normative implications of these empirical findings and potential avenues for future research.*

The normative prescription underlying most empirical research on representation and democratic responsiveness places public opinion causally prior to the actions of political representatives. If anything, though, the past 60 years of research on the topic leaves much uncertainty around whether the causal arrow either does or can point from the public to elites. Americans tend to be uninformed about political issues and are generally uninterested in becoming more informed (e.g., Delli Carpini and Keeter 1996). Because many Americans only give cursory thought to current issues, they tend to have weak preferences over policy means (Popkin 1991). As a result, policy opinions often can be easily swayed by arbitrary changes in the presentation of an issue (e.g., Nelson 2004; Nelson, Clawson, and Oxley 1997). To make matters worse, the malleability of public opinion raises the possibility that political elites are able to structure the agenda and employ crafted rhetoric to manipulate public opinion, reversing the causal arrow from elites to the public (Bartels 2003; Ginsberg 1986; Lippmann 1922).

Many scholars temper concerns about elite manipulation by noting that citizens in a democracy generally

observe dueling rhetoric deployed by competing elite factions and that competition tends to neutralize the effects of crafted political rhetoric (Brewer and Gross 2005; Druckman 2004; Druckman and Nelson 2003; Sniderman and Theriault 2004; Zaller 1992). Nevertheless, recent scholarship suggests that there is no guarantee that competition in elite discourse neutralizes the effects of political rhetoric across all conditions and for all individuals. As Chong points out, “Certain frames of reference are easier to promote than others because the public is already predisposed to give priority to some dimensions over others” (1996, 222). Indeed, in a recent study, Chong and Druckman (2007) demonstrate that stronger arguments do a better job of moving opinion in the direction advocated by the message, even in competitive situations. Consequently, if we wish to better understand the capacity of political rhetoric to shape public opinion, we must consider the conditions under which some people perceive arguments to be stronger than others *even in the face of a competing message*.

Understanding what makes some arguments stronger than others has bedeviled students of rhetoric for millennia, and despite the fact that argument strength occupies

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a central position in information-processing theories of persuasion (e.g., Petty and Cacioppo 1986), scholars still understand little about the factors that shape argument strength (Areni 2003; Hosman, Heubner, and Siltanen 2002). Rather than taking on this weighty question in its entirety, I draw on recent work in neurobiology and political psychology to theorize about the role anxiety plays in activating built-in predispositions—often called “cognitive biases”—that may shape perceptions of argument strength. I start by considering whether a well-documented cognitive bias, loss aversion, privileges some arguments over others. Other scholars have speculated that individuals are predisposed to accept the recommendations of political arguments when they emphasize avoiding losses rather than realizing gains (e.g., Cobb and Kuklinski 1997; Jerit 2009; Quattrone and Tversky 1988). Evidence from two randomized experiments extends this research by demonstrating that loss-framed arguments are more persuasive than gain-framed counterarguments, but only when individuals are in an anxious state.

## The Powerful Influence of Cognitive Biases on Human Decision Making

Rather than making decisions by soberly weighing competing alternatives, people’s choices often reflect contextually contingent predispositions for particular solutions, which have been acquired through the course of human evolution (Haselton and Buss 2003). For example, while conducting their seminal work on prospect theory, Tversky and Kahneman (1981) discovered that people are willing to take risky action if they believe it might avert taking a loss. In a now famous experiment, they presented nearly identical problems to two different groups of subjects. In both, subjects were confronted with the prospect of an “unusual Asian disease” killing 600 people, and they were asked to choose between two alternatives devised to fight the disease. One group was told that Program A would “save” 200 people with certainty, while Program B would save everyone with one-third probability or save no one with a two-thirds probability. For the other group, people were given logically equivalent statements, but the choices were framed in terms of the number of people expected to die (e.g., 400 people would “die” in Program A). This subtle difference in the presentation of alternatives caused subjects to make drastically different choices. Even though both choice sets are logically equivalent, subjects who thought about the problem in terms of relative gains (i.e., the “saved” condition) overwhelmingly picked the seemingly less-risky sure thing in Program A, while

subjects who thought of it in terms of relative losses (i.e., the “die” condition) overwhelmingly chose to take a gamble on Program B.

Since Tversky and Kahneman’s (1981) discovery, a multitude of studies conducted across a wide range of situations find that humans loathe losses more than they enjoy gains (Camerer 2003). Because individuals exhibit loss aversion even in contexts where rationality plainly points to a more optimal choice, many psychologists refer to it as a *cognitive bias* (Shafir and LeBoeuf 2002). A built-in preference against losses makes sense in the context of human evolution in which our distant ancestors lived in a subsistence economy where even small losses threatened their chances of survival (McDermott, Fowler, and Smirnov 2008). In such an environment, erring on the side of avoiding losses would be a more successful survival strategy than erring on the side of pursuing gains.

Loss aversion is but one example of the many cognitive biases identified by psychologists (Haselton and Buss 2003; Kahneman and Tversky 2000), and extant research in psychology and neurobiology points toward a general dual-process model for the activation biases in cognition. The model specifies two routes by which individuals arrive at decisions (cf. Chaiken, Liberman, and Eagly 1989; Petty and Cacioppo 1986). The first route relies on habitual and previously learned responses to arrive at a quick judgment, while the second route requires deliberate consideration of available options (Bargh and Chartrand 1999). Because the second route is cognitively taxing, much of human decision making occurs using the first route. Yet sometimes individuals face situations that require deliberate processing, and emotional responses developed over the course of human evolution to operate as mechanisms that direct people’s conscious attention. These emotions act like “superordinate programs” that coordinate the interplay of sometimes conflicting automatic and controlled cognitive processes (Cosmides and Tooby 2004, 91–92).

Anxiety is an important focusing emotion. It alerts individuals to potential threats to desired outcomes, interrupting habitual routines and activating cognition directed at finding alternative solutions (Gray 1987; LeDoux 1996). In an anxious state, individuals are less likely to rely on habitual responses and more likely to weigh alternatives in developing a novel response. While anxiety may cause individuals to behave in a more “rational” fashion (Marcus, Neuman, and MacKuen 2000), recent work in neurobiology shows that it may also direct people to rely on contextually appropriate cognitive biases (Williams et al. 2007; see also Eysenck 2000). For instance, when anticipating a loss is associated with activity in brain regions that trigger anxiety, people are more likely to choose

strategies designed to minimize their losses, and in the absence of a fear response, people are not more likely to behave in a loss-averse fashion (Breiter et al. 2001; Kuhnen and Knutson 2005; see also Druckman and McDermott 2008).

In effect, anxiety may help individuals to shift from one set of biases—habitual responses acquired through experience—to another—ones acquired through human evolution as adaptive solutions and hardwired to be activated when contextually useful.<sup>1</sup> As Haselton and Buss (2000, 2003) point out, many biases in cognition should be viewed as “design features” from an evolutionary perspective rather than “design flaws.” Because some errors were more costly to human ancestors than others (e.g., it is less costly to mistake a nonpoisonous snake for a poisonous one than the obverse), it is possible that many observed biases in cognition were selected during human evolution to reduce the overall cost of cognitive errors rather than the number. As such, these predispositions are only errors in the context of a narrowly defined model of rationality. Nevertheless, I use the term *cognitive bias* here in order to maintain continuity with previous research and construe “bias” as a neutral descriptive term (i.e., as a predisposition) rather than a normative judgment (i.e., as an error).

## Cognitive Biases and Argument Strength

When confronted with competing arguments, individuals are often motivated to consciously evaluate and reconcile the opposing considerations raised by each argument (Druckman 2004; Kuklinski et al. 2001). Because cognitive biases alter the attractiveness of prospective solutions, they may also influence the perceived persuasiveness of arguments. To understand how, consider the general model of argument strength introduced by Chong and Druckman (2007, 639). Synthesizing across previous models of persuasion, they contend that in order for a consideration raised by an argument to influence an individual’s opinion, it must be *available*, *accessible*, and deemed *applicable*. If the consideration is not available in long-term memory, then it is unlikely that the individual will understand the argument, and it will not shape his or her attitude. Likewise, if the consideration is available in long-term memory but not actually retrieved (i.e., made accessible), then it cannot be incorporated into

one’s attitude. Finally, even if a consideration is available and accessible, it will not influence one’s attitude if the individual does not see it as an effective, or applicable, solution.

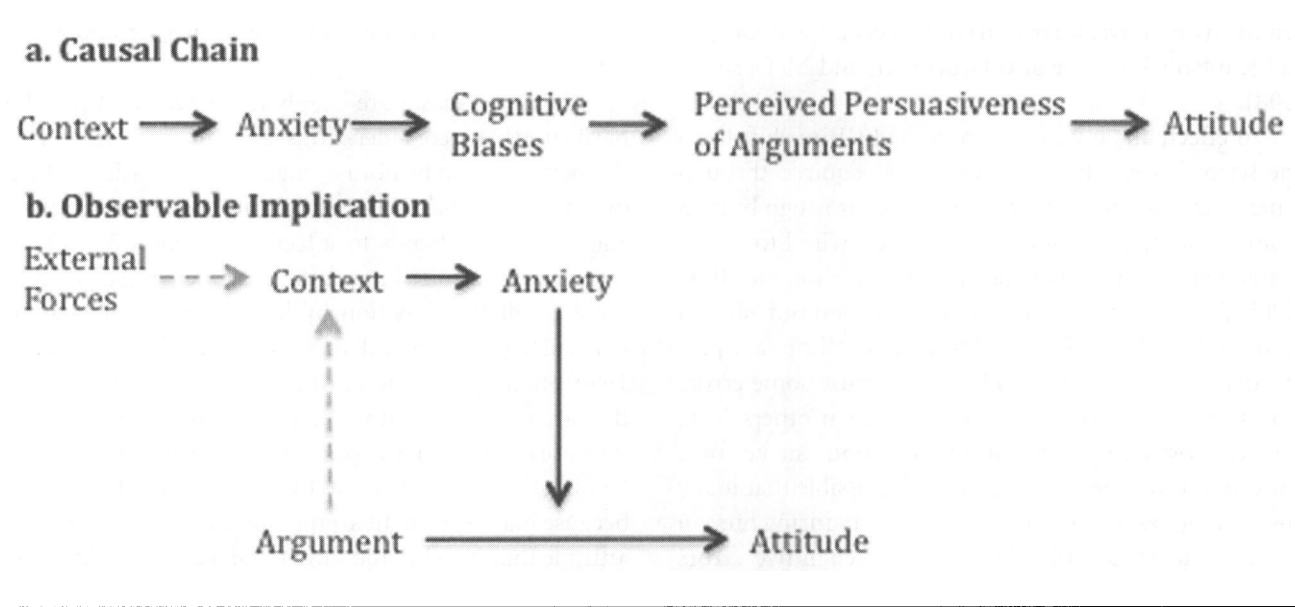
Cognitive biases are deeply ingrained (and possibly hardwired), so considerations that are consistent with them are likely to be both available and accessible. Moreover, two interrelated processes in attitude formation may allow cognitive biases to affect the applicability of the considerations raised in a message as well. First, attitudes serve a valuable function by helping individuals attain particular psychological goals (Clary et al. 1995; Shavitt 1990). Second, people are motivated to form attitudes that are consistent with directional goals (Kunda 1990). Because cognitive biases prime the importance of particular directional goals (such as the need to avoid losses), and because bias-congruent arguments advocate adopting an attitude that matches the functional basis for holding the attitude (e.g., avoiding losses or other threats to survival), people should be motivated to view arguments that recommend action in line with an underlying cognitive bias as more applicable than other arguments.

Anxiety likely plays an important role in boosting the strength of bias-congruent arguments. As a focusing emotion, it causes people to be more open to persuasion (Brader 2005, 2006; Marcus, Neuman, and MacKuen 2000; Marcus et al. 2005), and as discussed above, anxiety also activates cognitive biases. Consequently, when individuals are in an anxious state, they should be more likely to see bias-congruent arguments as persuasive and are, therefore, more likely to incorporate them into their attitudes. Figure 1a depicts the causal chain in what I call the *bias-matching thesis*. Contextual information triggers anxiety, which, in turn, triggers contextually appropriate cognitive biases. These biases alter the perceived persuasiveness of the considerations raised by political arguments and ultimately influence attitude formation. In short, the effects of anxiety are mediated through cognitive biases and the perception of argument strength.

Although the causal chain proposed by the bias-matching thesis is straightforward, it is difficult to establish causal mechanisms empirically (Bullock, Green, and Ha 2010). Consequently, Figure 1b outlines the observable implication generated by the causal model in Figure 1a. If anxiety triggers cognitive biases that alter people’s perceptions of argument strength, then it suggests that when individuals are in an anxious state, they will be more likely to accept the recommendations of arguments that are framed in a bias-congruent fashion (e.g., a loss frame) and less likely to accept the recommendations of arguments that are framed in a fashion that is incongruent with the activated cognitive bias (e.g., a gain frame).

<sup>1</sup>I wish to thank one of the anonymous reviewers for making this key insight.

FIGURE 1 Bias-Matching Thesis



In other words, the bias-matching thesis predicts that anxiety will *moderate* the effect of an argument on attitudes related to the argument. As the dashed gray lines show in Figure 1b, the contextual information that triggers the anxious reaction may come from the argument itself (e.g., a fear appeal that triggers anxiety), or it may simply be present in the information environment (e.g., external events that trigger anxiety). I test the bias-matching thesis with two randomized experiments in which subjects were presented with political arguments designed to activate loss aversion.

**Study 1**  
**Participants and Procedure**

In the spring of 2006, I recruited 210 individuals to participate in a study on “preference formation,” for which they were compensated \$5.00. Most of the subjects were students at Temple University, but a handful ( $n = 10$ ) was drawn from the broader community. The sample is by no means representative of the broader population, but it is quite diverse (see the online supporting information).

Subjects were asked to read a few mock newspaper articles about a political issue and answer survey questions. The mock newspaper articles were attributed to the *New York Times* online edition and made to look exactly like an article printed from the *New York Times* website. Drawing on the well-known Asian disease experiment (Tversky and Kahneman 1981), I primed loss aversion by presenting subjects with a news story about recent con-

cern over the Asian bird flu spreading to humans and sparking a global flu pandemic. The article focuses on whether scientists should stockpile an existing flu vaccine that will inoculate some people with certainty or divert money into the more risky endeavor of developing a vaccine that may, if successful, inoculate everyone. Because the article presented the possibility of a bird flu pandemic as a relative loss (i.e., “... could cost the lives of millions of Americans”), the more risky choice (diverting funds to develop a new vaccine) is the loss-averse response. Subjects randomly assigned to the bias-congruent condition ( $n = 50$ ) read a one-sided argument in support of the risky choice, and to maximize its similarity to the original Asian disease experiment, the risk-averse stockpiling option was framed negatively (i.e., “... if the government puts money into stockpiling known vaccines many will still *die* in the event of a flu outbreak”; emphasis added).<sup>2</sup> In contrast, those randomly assigned to the counterargument condition ( $n = 50$ ) read a one-sided argument in support of the risk-averse choice, and it was framed more positively (“... some lives will be *saved*...”; emphasis added). Subjects randomly assigned to the competing arguments condition ( $n = 60$ ) were presented with both arguments and, thus, saw both frames (“... some lives

<sup>2</sup>Reyna and Brainerd (1991) successfully replicate the findings observed in the original Asian disease experiment after replacing the numerical information with words that give the gist of the quantities (e.g., “some” and “many”).

will be saved and many will still die . . .").<sup>3</sup> The remaining subjects ( $n = 50$ ) were assigned to the control group, where they were only asked to complete the survey.<sup>4</sup> See the online supporting information for a detailed description of the experimental stimuli.

## Measures

After reading the article, subjects answered a number of questions that form the basis of key measures. For the dependent variable, subjects responded to items about their opinion on the flu vaccine issue addressed by the article and the persuasiveness of the arguments presented in the article. The opinion item read, "To prepare for a possible flu pandemic, should the government spend money on stockpiling existing vaccines or on developing a better one?" Subjects answered this question on a 7-point scale with 1 = "stockpile existing vaccines" and 7 = "develop better vaccine" ( $M = 5.1$ ,  $SD = 1.7$ ). The persuasiveness items all began with the same wording, "How persuasive did you find the argument in this news article for\_\_\_?" For the bias-congruent condition, the rest of the question read, "developing a new vaccine," and for the counterargument condition, "stockpiling existing vaccines" completed the question. Subjects in the competing arguments condition were asked both sets of questions, and subjects in the control group, since they did not read any articles, were not asked the persuasiveness questions. Like the opinion question, the persuasiveness items were placed on a 7-point scale with 1 = "not at all persuasive" and 7 = "very persuasive."

I also measured subjects' emotional reactions to the articles by asking them to rate the degree to which they felt a list of emotions while reading the article. Although the primary interest here is the moderating effects of anxiety, subjects were asked to rate their feelings with respect to a number of emotional referents in order to mask the aim of the study (specifically: fear, anxiety, anger, happiness, and relaxed). Admittedly, self-reported measures of emotion are incomplete indicators, but carefully constructed self-report items can provide a meaningful marker of emotions that do reach the level of consciousness. Accordingly, the measures were constructed in light of prevailing best practices (cf. Marcus, Neuman, and Mackuen 2000, 174). In particular, the items clearly identified the target and

specific time frame for their emotional evaluations. Subjects in the treatment conditions were asked after the article to "indicate the degree to which you experienced" the listed emotions "while reading the article." Control-group subjects read the same question wording, but since they did not read the articles, they were asked to evaluate their emotions "at this time." In addition, clearly understood emotional terms were used, and subjects were asked to record their evaluations on unipolar scales (1 = do not experience at all, 7 = do experience a great deal;  $M_{\text{fear}} = 3.5$ ,  $SD_{\text{fear}} = 1.8$ ).

Consistent with neurological models of emotion, I conceptualize anxiety as a discrete emotional state that arises from two underlying continuous dimensions: arousal and valence (see Marcus 2003 for in-depth discussion of theoretical models of emotion). Where individuals' emotional state falls on these dimensions generates qualitatively different emotions (e.g., anger, sadness, anxiety, terror, etc.), and each may produce specific effects on judgment (e.g., Lerner and Keltner 2000). As a result, I make no predictions about the functional form that describes the relationship between anxiety and the perceived persuasiveness of arguments. Once one's emotional state tips over into anxiety, the bias-matching thesis predicts that cognitive biases will be activated. However, as higher levels of valence or arousal tip anxiety into different, but related, emotional states (e.g., terror), a different psychological process may take over. Consequently, I measure anxiety as a dichotomous indicator by using the median to identify empirically which subjects score as "high" on the anxiety measure relative to others.<sup>5</sup>

## Analysis

The first two columns of Table 1 report the direct effects of the various arguments on attitudes toward developing a new flu vaccine (column 1). The control group serves as the baseline for all the models reported in Table 1. The picture that emerges from both of these analyses, displayed in Figure 2, is consistent with previous research on competitive framing (e.g., Druckman 2004; Sniderman and Theriault 2004). Subjects who only received the bias-congruent argument were more likely to express support for developing a new flu vaccine relative to subjects in the control group ( $p = 0.003$ , one-tailed test) and counterargument group ( $p < 0.001$ , one-tailed test). Yet when confronted with both arguments, subjects' attitude toward

<sup>3</sup>In this condition, the arguments were randomly rotated so that in half of the cases, the bias-congruent argument was presented first, and in the other half, the counterargument was presented first.

<sup>4</sup>A randomization check shows that demographics and political predispositions do not jointly predict treatment assignment ( $\chi^2[24] = 18.48$ ,  $p = 0.779$ ).

<sup>5</sup>The distributions of the emotional items analyzed here are not bunched around the median, reducing concerns that the effects of emotions uncovered below result from knife-edged differences on the self-reported scale (see the supporting information for details).

**TABLE 1** The Effects of Bias-Congruent Arguments on Issue Opinions, Study 1

	(1)	(2)	(3)	(4)
Bias-Congruent Argument	0.900 (0.324)	0.560 (0.374)	1.135 (0.494)	0.898 (0.507)
Counterargument	-0.205 (0.325)	-0.527 (0.397)	-0.158 (0.501)	-0.334 (0.518)
Competing Arguments	-0.008 (0.311)	-0.403 (0.372)	-0.015 (0.489)	-0.193 (0.497)
Fear		-0.579 (0.533)		-0.668 (0.548)
Anxiety × Congruent Argument		1.297 (0.735)		1.459 (0.758)
Anxiety × Counterargument		1.027 (0.709)		1.059 (0.747)
Anxiety × Competing Arguments		1.267 (0.687)		1.308 (0.742)
Anger			0.266 (0.486)	0.389 (0.494)
Anger × Congruent Argument			-0.416 (0.676)	-0.698 (0.689)
Anger × Counterargument			0.032 (0.676)	-0.236 (0.706)
Anger × Competing Arguments			0.133 (0.646)	-0.294 (0.693)
Constant	4.940 (0.229)	5.079 (0.261)	4.765 (0.395)	4.843 (0.398)
N	208	208	208	208
R <sup>2</sup>	0.05	0.06	0.04	0.05
F	4.686	2.982	2.225	1.976

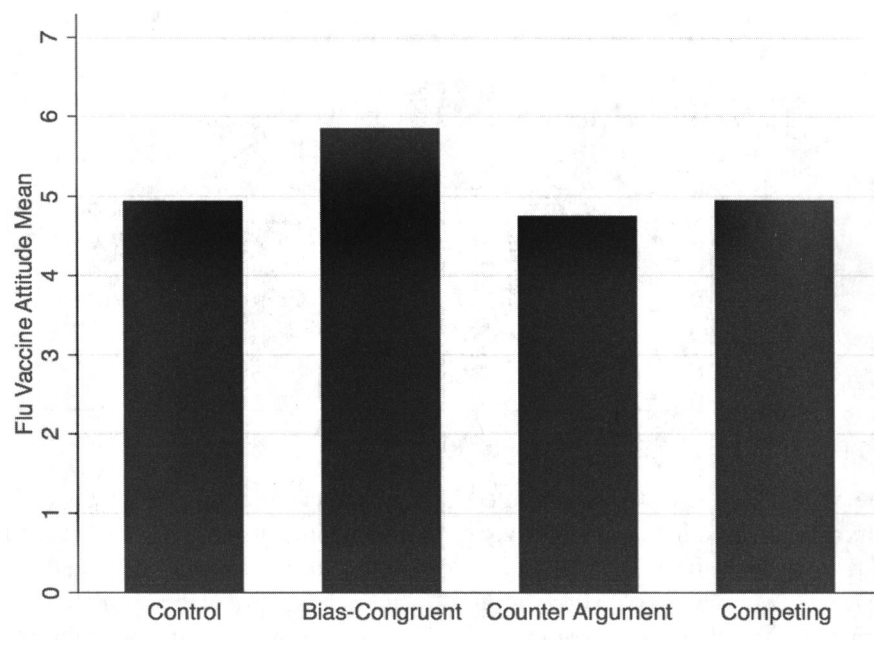
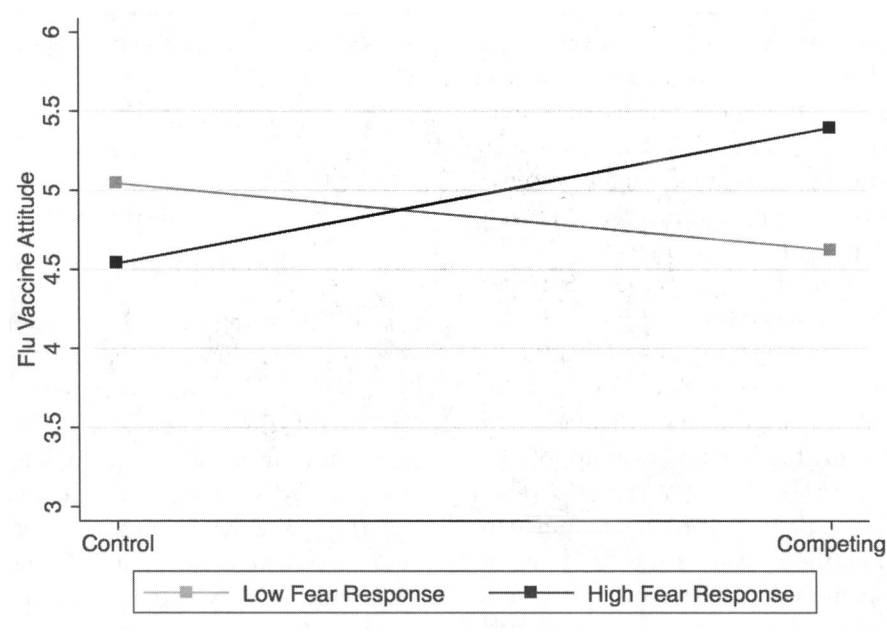
Note: OLS coefficients in cells; standard errors in parentheses.

the flu vaccine is no different from the control group ( $p = 0.98$ , two-tailed test). Because control group subjects were not presented with either argument, their opinions reflect attitudinal responses uninfluenced by political debate. If bias-congruent arguments hold an advantage, subjects in the competing arguments group should be more likely than those in the control group to express opinions in line with the bias-congruent argument's recommendation. In essence, then, the overall effects show that the persuasiveness of political rhetoric can be neutralized in the face of equally matched competing arguments.

However, once the conditional effect of anxiety is taken into account (see column 2 of Table 1), the results support the bias-matching thesis. The interaction

between anxiety and the competitive argument condition suggests, as expected, that the effectiveness of the bias-congruent argument depends on subjects' emotional reaction to the message ( $p = 0.033$ , one-tailed test). As shown in Figure 3, subjects who reported a low level of anxiety in response to the message in the competitive argument group were not more likely to express support for developing a new flu vaccine relative to subjects in the control group. In contrast, subjects who reacted with a higher level of anxiety tended to express more support for the position advocated by the bias-congruent argument. Subjects who read both arguments and had an anxious reaction were more supportive of the risky choice to develop a new vaccine by nearly a point on a 7-point scale when compared to the control group (Cohen's  $d = 0.52$ ), which is a medium-sized effect ( $p = 0.068$ , one-tailed test). Moreover, an anxious response boosts support for the risky choice among those who read either the one-sided bias-congruent argument or the one-sided counterargument. This pattern is consistent with the thesis that anxiety moderates the effect of an argument on attitudes through the activation of cognitive biases. Anxiety enhances the effectiveness of the bias-congruent argument, while diminishing the effectiveness of the bias-incongruent counterargument.

Of course, it is possible that the self-reported anxiety measure is not tapping subjects' level of anxiety, per se, but merely capturing how negatively people reacted to the news article. If this were the case, anxiety would not be responsible for altering the persuasiveness of arguments as the bias-matching thesis holds. Rather, it may simply be the valence of the response to the message, with more negative arguments seeming more persuasive (Bizer, Larsen, and Petty 2011). As discussed above, the appraisal-tendency model of emotion, which undergirds the affective intelligence approach, rejects this line of reasoning. In this framework, different appraisals give rise to different emotions, which in turn affect people's judgment and behavioral tendencies. According to the appraisal-tendency model, anxiety leads to enhanced persuadability, while anger dampens the persuasive effects of messages even though both emotions are characterized by negative valence (Lerner and Keltner 2000; see also Petersen 2010; Valentino et al. 2011). The results displayed in columns 3 and 4 of Table 1 are consistent with these expectations. By itself, anger does not moderate the effect of the competitive message (see column 3), nor does it when anxiety is included (see column 4). Moreover, the conditional effects of anxiety remain in the presence of anger and its interaction with the message conditions. Therefore, it appears that anxiety, rather than the valence

**FIGURE 2 The Direct Effects of Competing Arguments, Study 1****FIGURE 3 The Moderating Effect of Anxiety, Study 1**

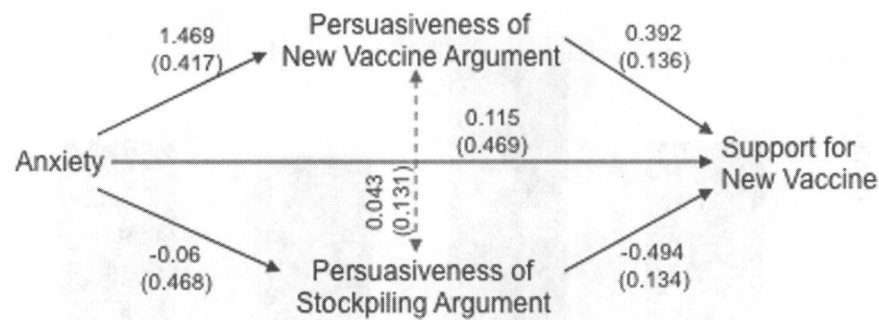
of the response, moderates the persuasive effect of bias-congruent messages.

The bias-matching thesis contends that the causal mechanism through which anxiety moderates the influence of arguments is by altering the perceived persuasiveness of the bias-congruent messages. If we make strong assumptions about the absence of hidden biases, it is

possible to model the causal chain shown in Figure 1a using mediation analysis (cf. Baron and Kenny 1986) and provide another indirect test of the bias-matching thesis. Because subjects in the competitive arguments condition received both messages, they were asked to rate the persuasiveness of both arguments, making it possible to assess whether the effects of anxiety on issue attitudes are



**FIGURE 4 The Effects of Anxiety on Issue Opinions Mediated Through Message Persuasiveness, Study 1  
n = 59**



mediated through the persuasiveness of the loss-framed argument.<sup>6</sup> The results are displayed in Figure 4 and corroborate the notion that anxiety affects issue opinions through the persuasiveness of the bias-congruent argument. Subjects who reacted with anxiety to the competing messages were substantially more likely to find the new vaccine argument persuasive ( $p < 0.001$ , one-tailed test), which translates into a more supportive attitude toward developing a new flu vaccine ( $p = 0.003$ , one-tailed test). Furthermore, the effect of anxiety on the flu vaccine attitude is mostly mediated through its effect on message persuasiveness (83.38% of fear's effect mediated through persuasiveness, Sobel test  $t_{59} = 2.23$ ,  $p = 0.013$ , one-tailed test). In contrast, anxiety has little effect on the perceived persuasiveness of the stockpiling argument, and thus, its effect on the flu vaccine attitude is not mediated through the persuasiveness of the stockpiling argument (Sobel test  $t_{59} = 0.13$ ,  $p = 0.449$ , one-tailed test).

Nonetheless, the overriding limitation of this study is the endogenous measure of anxiety. Both the interactive models and the mediation analysis are essentially observational in nature, requiring the standard assumption that unobserved heterogeneity is not present (Bullock, Green, and Ha 2010). While the pattern of results is consistent with the bias-matching thesis, it does not firmly establish that anxiety causes individuals to view the loss-averse argument as more persuasive. Instead, it could be the case that individuals who are predisposed to experience anxiety tend to be loss averse (cf. Eysenck 2000). Consequently, the analyses reported above may not tap the effect of anxiety but merely differences in stable predispositions. Furthermore, the context (threat of bird flu) and the argument (how best to handle vaccines) in the

newspaper article are intertwined, much like one would observe in a natural setting where fear appeals lay the context for triggering anxiety in the course of making the argument. Yet while this approach has the benefit of mimicking a common feature of political messages, it does so at the cost of confounding the source of anxiety with the argument. I address each of these concerns in Study 2 by experimentally manipulating anxiety before presenting subjects with competing arguments in which the frames of the arguments (loss versus gain) are manipulated as well.

## Study 2

### Participants and Protocol

During the spring of 2011, 300 subjects participated in a study on “public opinion,” and all but two completed the study. Subjects were recruited from the *Amazon.com Mechanical Turk* panel. The entire study took about 5 minutes for subjects to complete, and subjects were compensated \$0.50 in Amazon.com credit. The *Mechanical Turk* panel has been increasingly used in psychology experiments (Buhrmester, Kwang, and Gosling 2011). Moreover, Berinsky, Huber, and Lenz (2012) demonstrate that the *Mechanical Turk* panel is more diverse than student panels, and they are able to successfully replicate classic experiments that were originally conducted with student samples, such as Tversky and Kahneman's (1981) seminal Asian disease experiment. In short, the *Mechanical Turk* panel may constitute a specialized population, but it is no more specialized than college students. The sample here is certainly more diverse than the sample in Study 1 across a range of demographic characteristics (see the supporting information).

<sup>6</sup>If the mediation analysis is conducted in both of the single-message conditions, substantively similar results are obtained.

TABLE 2 Experimental Design, Study 2

		Proban Argument		Total N
	Antiban Argument	Loss Frame	Gain Frame	
Happy Prime	Loss Frame	32.8	34.0	72
		(7.3)	(5.6)	
		[30]	[42]	
	Gain Frame	22.4	25.7	85
(3.1)		(5.3)		
		[41]	[44]	
Fear Prime	Loss Frame	30.9	20.5	77
		(5.7)	(4.3)	
		[40]	[37]	
	Gain Frame	32.4	30.2	64
(6.6)		(6.3)		
		[33]	[31]	
	Total N	144	154	298

Note: Mean support rating for Ban on Gay-Straight Alliance clubs in high schools in cells, standard errors in parentheses, and number of observations in brackets.

I employ a  $2 \times 2 \times 2$  design in which emotion was manipulated (high anxiety/low anxiety) before subjects read a two-sided argument about a political controversy where they confronted both a pro and anti argument that was framed either in terms of losses or gains. The design is shown in Table 2 with cell sizes displayed in the square brackets.<sup>7</sup> Emotion was manipulated by asking subjects to view a series of pictures under the pretext that they were to “provide a descriptive tag for each image,” which is a common task in the *Mechanical Turk* environment. The images come from the International Affective Picture System (IAPS) database compiled by the Center for the Study of Emotion and Attention (CSEA). The images in the IAPS database have been normed with respect to emotional arousal and valence and offer researchers a standardized set of emotionally evocative images (Lang, Bradley, and Cuthbert 2008). The database is available to any academic researcher who requests it from the CSEA, but researchers must agree not to publish the images as a condition for receiving them. Only the identification numbers attached to the images may be published. Subjects assigned to the high-anxiety condition were asked to view three images that have been shown to reliably

<sup>7</sup>A randomization check shows that demographics and political predispositions do not jointly predict treatment assignment ( $\chi^2[24] = 24.47, p = 0.435$ ).

TABLE 3 Experimental Stimuli

<b>Factual Stem</b>
A proposal has been put forth that will allow school boards to ban Gay-Straight Alliance clubs from forming in high schools. Students who form these clubs say that their goal is to make school communities safe and welcoming to all students regardless of sexual orientation or gender identity.
<b>Pro-ban Argument [loss frame/gain frame]</b>
<b>Argument for:</b> The traditional family is the bedrock of our nation, and these groups are part of an agenda to encourage impressionable teenagers to adopt alternative lifestyles. School administrators and parents should be able to ban these groups so that we [do not lose/can strengthen] our connection to traditional family values.
<b>Anti-ban Argument [loss frame/gain frame]</b>
<b>Argument against:</b> Freedom of speech is a central tenet of a free society, and high school is a time for finding one’s voice and learning what it means to be a part of a democracy. We should not allow school boards to ban these groups so that students [do not lose/can secure] their right to free speech.

induce feelings of anxiety (elevated arousal and negative valence; IAPS image numbers: 1,300; 1,930; and 6,370), while subjects assigned to the low-anxiety condition were asked to view three images that have been shown to reliably induce feelings of contentment (i.e., medium arousal and positive valence; IAPS image numbers: 1,710; 5,825; and 7,502; see Lang 1995).

After viewing the images, subjects read pro and anti arguments in a political controversy surrounding a proposal to ban high school students from forming gay-straight alliance clubs. To provide some factual context, all subjects read the same factual stem that explained the professed goal of these clubs; subjects were then confronted with a clearly labeled “argument for” and “argument against” the ban (see Table 3).<sup>8</sup> Subjects were assigned to either a loss- or gain-framed proban argument and to either a loss- or gain-framed antiban argument, creating four possible combinations of pro and anti arguments. As Table 3 shows, the loss- and gain-framed arguments are parallel with subtle changes in wording. The loss-framed proban argument contends that the ban is necessary “... so that we *do not lose* our connection to traditional family values,” while the gain-framed proban

<sup>8</sup>The order of the pro- and antiban arguments was randomly rotated.

argument uses the phrase "...so that we *can strengthen...*" (emphasis added). Likewise, the loss-framed antiban argument opposes the ban "...so that students *do not lose* their right to free speech," and the gain-framed antiban argument casts the phrase as "...so that students *can secure...*" (emphasis added).

Just as in Study 1, these subtle differences in wording mirror the Asian disease experiment. A key difference from Study 1 is that the setup of the problem and presentation of the arguments are more streamlined and efficient, much like the Asian disease experiment. Through this simplified setup, it is possible to decouple the argument itself from the factual context surrounding the argument and better ensure that observed treatment effects reflect the manipulation of the frame. Another important difference from both Study 1 and the Asian disease experiment is that the underlying issue does not prime an existential threat. Irrespective of people's views toward Gay-Straight Alliance clubs, their existence or absence does not present a life or death situation. Instead, the issue touches on symbolic politics and cultural controversies currently at play in American politics.

## Measures

The subjects' emotional state was measured directly after the photo-tagging task. The instructions read, "Below are a list of common emotions. Please tell us how much or how little you feel these emotions right now." The list of emotional words comes from the Positive and Negative Affect Schedule (PANAS-X), which has been shown to reliably measure particular emotional states (Watson and Clark 1994). Four of the words in the list are reliable indicators for anxiety (nervous, frightened, afraid, jittery;  $M = 12.6$ ,  $SD = 16.9$ ,  $\alpha = 0.89$ ). Subjects recorded their emotional state using a slider widget, which allows them to move the slider to any point on a 101-point number line (0 to 100, where 0 = do not feel at all and 100 = feel more than ever before). The slider interface is less constraining than the standard discrete-point response system, which forces responses to particular points on the visual plane.

After completing the emotional response battery, subjects were randomly assigned to one of the argument conditions. Subjects read the arguments and then were asked to express their opinion on the issue: "Do you agree or disagree that school boards should be able to ban Gay-Straight Alliance clubs in high schools?" Responses to this question were also recoded using a slider widget (0 = strongly disagree and 100 = strongly agree;  $M = 28.4$ ,  $SD = 34.6$ ).

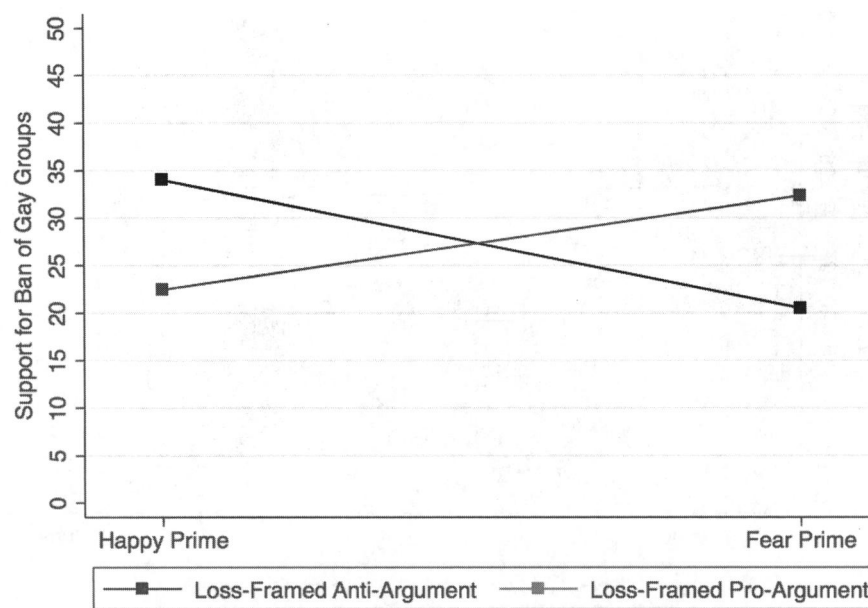
## Findings

The design of Study 2 offers a straightforward test of the bias-matching thesis. Subjects randomly assigned to the high-anxiety condition should be more receptive to the loss-framed argument than the gain-framed argument, even if the position advocated by the loss- and gain-framed arguments are reversed. This prediction is premised on the success of the anxiety manipulation, and a manipulation check demonstrates that the level of anxiety was higher in the group exposed to the fear-priming photos than it was in the group exposed to the happy-priming photos ( $M_{\text{happy}} = 9.5$ ,  $M_{\text{fear}} = 16.1$ ,  $p < 0.01$ ). To be sure, the level of anxiety in the fear-photo condition is modest, but it is, importantly, higher relative to the happy-photo condition. Moreover, because subjects were randomly assigned to the fear-photo and happy-photo groups, the design ensures the higher level of anxiety in the fear-photo condition was caused by a change in emotional state (rather than a difference in stable traits). It also ensures that the higher level of anxiety is unrelated to the argument manipulations, because the photo-tagging task occurred prior to reading the issue arguments.

Mean support for a ban on gay-straight alliance clubs is broken down by treatment in Table 2. Figure 5 shows that the fear prime moderates the persuasive effect of the loss-framed argument in a manner consistent with the bias-matching thesis. When the antiban argument is framed in terms of losses and the proban argument is framed in terms of gains (i.e., the black line in Figure 5), subjects in the high-anxiety condition are less likely to support banning gay-straight alliance clubs than subjects in the low-anxiety group ( $M_{\text{happy}} = 34$ ,  $M_{\text{fear}} = 20.51$ ,  $p = 0.043$ , one-tailed). Conversely, when the proban argument is framed in terms of losses and the antiban argument is framed in terms of gains (i.e., the gray line in Figure 5), subjects in the high-anxiety condition are *more* likely to support banning gay-straight alliance clubs than subjects in the low-anxiety group ( $M_{\text{happy}} = 22.44$ ,  $M_{\text{fear}} = 32.36$ ,  $p = 0.11$ , one-tailed). The standardized differences in means (i.e., Cohen's  $d$ ) are 0.39 and 0.29, respectively, and represent medium-sized effects. As expected, anxiety boosts the persuasiveness of the loss-framed argument relative to the gain-framed argument and is capable of reversing the relative effectiveness of the pro- and antiban arguments (difference in slopes = 23.41,  $p = 0.02$ , one-tailed).

The experimental design also allows us to see what happens when loss- and gain-framed arguments are pitted against one another. If anxiety boosts the effectiveness of loss-framed arguments, then the effects of the two

**FIGURE 5 Effect of Fear Prime on Acceptance of Loss-Framed Argument versus Gain-Framed Argument**



competing loss-framed arguments should cancel out, and we should observe no difference in support for banning gay-straight alliance clubs in the low- and high-anxiety conditions. Likewise, anxiety should have no effect on the persuasiveness of gain-framed arguments in the absence of a loss-framed counterargument. Consequently, there should be no difference in support for banning gay-straight alliance clubs in the low- and high-anxiety conditions when the two competing gain-framed arguments are pitted against one another. These results are shown in Figure 6. As expected, the difference in support for banning gay-straight alliance clubs between the low- and high-anxiety conditions is *de minimis* and statistically insignificant when the competing loss frames go head-to-head and when the competing gain frames go head-to-head ( $p > 0.5$ , two-tailed).

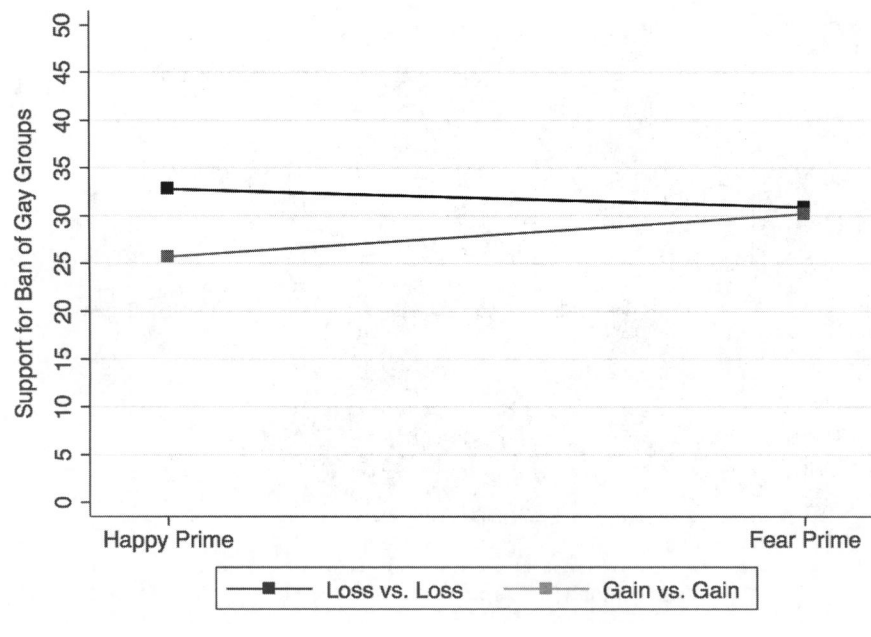
## Discussion

From an intuitive standpoint, it is undoubtedly the case that some arguments are more persuasive than others. Yet much remains unknown about the process by which arguments obtain their perceived strength (Chong and Druckman 2007). In this article, I entertain one potential source by beginning with the supposition that ingrained cognitive biases may influence the perception of strength. Over the course of human evolution, our ancestors found

particular strategies more effective than others at attaining immediate goals, such as food, shelter, and a healthy mate. Those who adapted by adopting these strategies were more likely to survive and pass along their genes to future generations compared to those who did not. Consequently, the architecture of the modern human mind continues to bear the imprint of decisions made by our distant relatives and leaves us with predispositions for solutions that are designed to solve particular adaptive problems (Haselton and Buss 2003). Of particular interest in this study is our strong distaste for losses, which was likely a successful response to adaptive pressures faced by humans millennia ago (McDermott, Fowler, and Smirnov 2008).

Because humans appear to have built-in preferences to avoid losses, arguments that claim to avert losses have the potential to be more persuasive than those that claim to realize gains. Nevertheless, loss-framed arguments are not guaranteed to win the day. The contextual information surrounding the message (either internal or external to the message) must successfully activate biased information processing. Consistent with recent work in neurobiology and political psychology, this article finds that emotional responses to arguments provide an indirect indicator of bias activation. In the experiments reported here, anxiety caused subjects to view the loss-framed arguments as more persuasive than the gain-framed arguments.

**FIGURE 6 No Differences between Loss-Framed and Gain-Framed Arguments When Pitted Against One Another**



These findings underscore that political rhetoric has an affective dimension, which has been often overlooked by purely cognitive approaches to the study of opinion formation (Gross and D'Ambrosio 2004). They also suggest that successful persuasion requires elites to match the context with the semantic framing of their arguments, which is inconsistent with the notion that elites need only get the words right when crafting rhetoric. The evidence presented here is broadly consonant with the affective intelligence model, as it demonstrates that anxiety enhances people's openness to persuasion (Brader 2005; Marcus, Neuman, and MacKuen 2000). It is also consistent with the general conclusion reached by recent work in social psychology that anxiety leads people to adopt particular courses of action at the exclusion of others, but it is not consistent with the specific finding that anxiety necessarily leads to an increase in risk aversion (e.g., Huddy et al. 2005; Lerner et al. 2003; Meijinders, Midden, and Wilke 2001). Instead, I find that anxiety can also lead to an increase in risk acceptance. One way to reconcile these findings is to reinterpret them in light of prospect theory. Anxiety alerts individuals to the prospect of losses. Whether individuals opt for taking a risk depends on the reference point. In the domain of relative losses, the risky choice is the loss-averse choice (e.g., the Asian disease experiment), while in the domain of relative gains, the safe choice is the loss-averse choice (Quattrone and Tversky 1988; Scholer et al. 2010).

The normative implications of these empirical findings are not clear-cut. Viewed from the perspective of the propaganda model (e.g., Ellul 1973), they could be interpreted as an operational model of demagoguery, confirming concerns that politicians can build support by playing to people's fears. However, an alternative interpretation might note that political rhetoric does not become suspect just because it persuades individuals by appealing to their emotions (Garsten 2006). This argument is especially apropos in situations where politicians alert people to real immediate threats. Whether their recommended course of action to deal with a threat is normatively desirable depends on the particular situation and the moral framework in which it is judged.

Irrespective of these normative considerations, the findings do suggest that elite competition may not always neutralize the effects of political rhetoric. If one political faction is able to activate cognitive biases when positioning their preferred alternative, it may gain an advantage in political discourse. Study 2 suggests that one can fight loss-framed arguments with loss-framed counterarguments. Yet because political parties are somewhat constrained in the arguments that they can make and the issues that they can credibly address (Petrocik 1996), and because the news media can unintentionally privilege particular frames in its coverage of political events (Nelson, Oxley, and Clawson 1997, 236), the potential for asymmetries in political debate does exist.

Additional study should be directed at the influence of other cognitive biases on perceptions of argument strength and the factors that shape the effectiveness of counterarguments. In addition to loss aversion, individuals tend to anchor their opinions to an initially suggested reference point (Tversky and Kahneman 1974). People tend to value things in their possession more than things outside of their possession (Thaler 1980), which in combination with loss aversion creates a strong preference for the status quo (Kahneman, Knetsch, and Thaler 1991). The aversion to being played for a sucker by others often leads individuals to engage in costly punishment (Hibbing and Alford 2004). People's preference for their ingroup and weariness of outgroups cause "ingroup interests [to] have greater legitimacy than appeals to personal self-interest" and enable political elites to play up outgroup threats in attempts to gain or maintain power (Brewer 1999, 438; Green, Glasser, and Rich 1998). The list could continue, underscoring the fertile ground that exists for future research.

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## Supporting Information

Additional Supporting Information may be found in the online version of this article:

Description of Study Participants

Study 1

Study 2

Measure of Anxiety in Study 1

Experimental Stimuli for Study 1

Bias-Congruent Condition

Counterargument Condition

Competitive Argument Condition

**Figure A1:** Histogram of Anxiety Measure, Study 1

**Figure A2:** Histogram of Anger Measure, Study 1

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