

Framing and Women’s Support for Government Spending on Breast Cancer Research and Treatment Programs

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In this study, we use an experiment to evaluate how the framing of breast cancer threat shapes women’s preferences for government spending on breast cancer research and treatment programs. The results indicate that framing breast cancer in terms of mortality elicits feelings of anxiety, which in turn heightens support for government spending on behalf of women. Despite the salience of breast cancer as a women’s health issue, this relationship does not hold for the full sample of women. Instead, we observe a great deal of heterogeneity in reactions to the issue frames based on two individual-level factors: (1) women’s perceptions of their own personal risk for developing the disease and (2) the extent to which women have a general tendency to experience and express anxiety—what psychologists refer to as their level of trait anxiety. These two lines of inquiry—personality traits as moderators of framing effects and emotion as a consequence of framing—have previously been investigated somewhat independently. In this article, we integrate the two In order to gain insight into the complexity of the psychological processes that underlie public opinion toward women’s health. The results highlight the need for political rhetoric to underscore personal risk in order to mobilize support for spending on breast cancer research and treatment among women.

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Debate regarding government expenditures on health care research and services is growing increasingly contentious. Public opinion toward health care policy has been linked to political factors such as partisanship (Hidman, 2012; Tesler, 2012) but also to a host of individual characteristics including socioeconomic status, age, and gender (e.g., Gelman, Lee, & Ghitza, 2010). These characteristics shape health policy preferences because they are linked to different propensities for using the health care system and different degrees of reliance on government subsidized health care programs. Both are true for women, who tend to use health care services more frequently, pay more for the same coverage due to gender rating practices, and are more likely to rely on subsidized health care programs because they are overrepresented among the nation's poor (NWLC, 2012; Tolleson-Rinehart, 2005). Beyond this, women face a specific set of health issues linked to their unique reproductive physiology and have historically experienced some degree of health disparity as a result (Pinn, 2003; Sen, George, & Ostlin, 2002). These characteristics of women's health experiences raise important questions about their attitudes toward government involvement in health care. Are women more supportive of policies that will explicitly benefit women as a group—such as programs funding breast cancer research and treatment? And, how do women's beliefs about their own personal risk of developing a disease like breast cancer relate to their support for government spending on such programs?

In this article, we consider whether the heterogeneity that characterizes women's health attitudes and behaviors shapes their level of support for government action to address health threats. Though the objective risk of breast cancer facing American women is high—affecting one in eight women in their lifetime—women vary a great deal in their personal risk perceptions and reactions to public health communications about the disease (Consedine, Magai, Krivoshekova, Ryzewicz, & Neugut, 2004; Hay, McCall, & Magnan, 2006; McQueen, Vernon, Meissner, & Rakowski, 2008). Public health scholars have investigated the cognitive, affective, and motivational processes that underlie this variability, both for breast and other cancers, but none link these processes to specific political attitudes—such as preferences for government spending on research and treatment programs. We hypothesize that the processes outlined in the Extended Parallel Process Model (EPPM) apply not only to health beliefs but also political attitudes and test this expectation with a framing experiment. Our results support this claim and point to further opportunities for synthesis between public opinion and health communication research.

The Extended Parallel Process Model

The EPPM was designed to explain divergent reactions to public health campaigns (Witte, 1992, 1998; Witte & Allen, 2000). The model, based on cognitive appraisal theories of emotion, posits that when exposed to a public health

message framed in terms of threat (a fear appeal), people first appraise their personal susceptibility to the threat. If perceived threat is low, people ignore the message and it does not shape their subsequent attitudes or behaviors. Alternatively, if perceived personal threat is high, people experience anxiety in response to the message and engage in a secondary appraisal, in which they process the message and assess their ability to prevent or avoid the threat. If a person engages in the secondary appraisal, determines she has the self-efficacy needed to engage in a pro-health behavior, and believes that the pro-health behavior will reduce or eliminate the threat, the message proves persuasive and the positive health behavior ensues. Alternatively, if a secondary appraisal results in low assessments of self- or response-efficacy, a person will not engage in positive health behaviors, but instead engage in a defensive minimization of risk.

Fear appeals in public health campaigns are essentially frames designed to produce a particular emotional response and an associated action tendency. The basic assumption of the fear appeal is that framing a disease or health threat in terms of its dire consequences (e.g., mortality, disfigurement) will elicit feelings of anxiety that, when coupled with efficacy, will mobilize participation in screening and other preventative health behaviors (Kees, Burton, Andrews, & Kozup, 2012; Witte & Allen, 2000). For instance, the vivid cigarette warnings mandated by Health Canada, which feature images like advanced oral cancers and severely damaged lungs coupled with messages like *Smoking Kills*, have been more clearly linked to anxiety and quit intentions than the more bland U.S. Surgeon General's warning: *Cigarette Smoke Contains Carbon Monoxide* (Hay et al., 2006; Kees, Burton, Andrews, & Kozup, 2012; Keller & Lehmann, 2008).

Similar examples exist for breast cancer—compare the ubiquitous pink ribbon and reminder to *Think Pink* to messages that describe the high rate of incidence with terms like “epidemic” and include images of breasts outlined with medical marker to indicate an imminent mastectomy. However, research is mixed on the efficacy of the fear appeal in motivating breast self-examinations and regular mammograms (for a review, see Consedine et al., 2004). Notably, Puntoni, Sweldens, and Tavassoli (2011a, 2011b) found that the use of feminine imagery and the color pink in public health messages about breast cancer can trigger anxiety and defensive risk minimization. Women exposed to these kinds of messages rated their risk of developing the disease as lower than women viewing a more neutral message and were also less likely to donate to related charities. This finding reiterates the subjective nature of threat perceptions and the associated message “triggers” that elicit anxiety.

A key tenet of the EPPM is that a threatening message will not evoke a uniform response among recipients. Though the incidence of breast cancer among American women is relatively high, assessments of susceptibility vary considerably (see Table 1). As a result, we expect women's perceptions about whether breast cancer is threatening will vary, regardless of the objective level of threat

Table 1. Assessments of Breast Cancer Risk among Women

	Full sample	No family history	Family history
Personal risk			
High	12.8%	3.8%	33.1%
Medium	33.3	25.9	49.3
Low	53.9	70.4	17.6
<i>N</i>	459	317	142
		Chi ² (2) = 132.3***	
Risk to American women			
High	13.9%	12.9%	16.0%
Medium	79.4	81.4	75.0
Low	6.7	5.7	9.0
<i>N</i>	461	317	144
		Chi ² (2) = 2.8	

****p* < .001.

conveyed in the breast cancer frame. We also anticipate that the varied emotional and cognitive responses people have to a breast cancer frame will influence not only personal health beliefs and behaviors, as the EPPM suggests, but also further removed attitudes—namely, preferences for government action to address this health threat. The model suggests that a primary appraisal of personal risk will elicit anxiety and lead to systematic processing of the message. We expect this process will bolster support for government spending on breast cancer research and treatment programs, as a means of attempting to minimize the threat it poses.

This outcome—government spending preferences—is qualitatively different from the prevention and screening behaviors that the EPPM focuses on in several important ways. Support for government spending does not offer a direct and immediate path for controlling the danger, nor does it require much self-efficacy. In these respects, it offers a much weaker mechanism for managing one's anxiety or minimizing personal threat. In spite of this, we maintain that the scope of these framing effects is wider than previously thought and expect to observe differences in spending support across the framing conditions as a function of both personal risk and anxiety.

Political scientists have examined the role framing, emotion, and persuasion play in shaping political attitudes and actions. This work often focuses on threatening and anxiety-provoking political issues, such as terrorism and crime (Merolla & Zechmeister, 2009). While some key aspects of the EPPM are represented in political communication literature—e.g., emotion as a consequence of framing, personality as a moderator of framing effects, and the political implications of personal relevance or self-interest, they have been investigated relatively independently of one another. The EPPM offers an integrated theoretical framework that is particularly well suited for investigating how beliefs about personal health risk relate to preferences for government spending on health care programs and services.

The EPPM framework also comports with an important trend in experimental political science—evaluating variation in treatment effects across subpopulations, i.e., heterogeneous treatment effects (Green & Kern, 2012; Imai & Strauss, 2011). Experimental work on framing suggests that emotional responses to a frame are contingent on the interaction of the frame and the characteristics or predispositions of the individual. A particular frame will “resonate” more or less with any given individual based on his or her personal qualities. For instance, in their work on attitudes toward the LA riots and mandatory minimum sentencing, Gross and her colleagues (2004, 2008) found that framing effects increased in intensity when a frame “matched” a person’s political predispositions (see also Slothuus & de Vreese, 2010). Said differently, framing effects are heterogeneous with respect to party or ideological identification. This idea of frame resonance, or heterogeneous treatment effects, squares with the EPPM’s contention that messages about health threat do not produce the same response among all recipients. Accordingly, we argue that framing breast cancer in terms of mortality will “resonate” more with women who perceive their personal risk for developing the disease to be high.

Additional Moderators of Framing Effects

While a consensus has emerged on the utility of subjective threat assessments, scholars remain divided on other sources of individual differences in cognitive, emotional, and behavioral reactions to public health campaigns (Consedine et al., 2004). In particular, debate has centered on the question of whether reactions depend in some way upon deeply rooted differences in personality. In examining this question, scholars have focused on trait anxiety—a personality trait reflecting a propensity to experience and express anxiety (Spielberger, 1985; Witte & Allen, 2000). Some argue that a person’s inherent level of anxiety—or trait anxiety—determines their initial appraisal of personal threat and subsequent experience of anxiety toward it. This distinction between a person’s general disposition and the more targeted and fleeting feelings of anxiety experienced in response to a particular stimulus is sometimes referred to as a trait-state distinction. In this context, anxiety in direct response to the experimental frame is characterized as state anxiety, while the general tendency to experience anxiety across stimuli is trait anxiety.

Trait anxiety has been the focus of scholarship in this area because it is an obvious precursor to anxiety about a specific health threat. Though the downstream implications for health attitudes and behaviors remain unclear and contested (Consedine et al., 2004; Jensen, Bernat, Davis, & Yale, 2010; Witte & Allen, 1998, 2000), scholarship on trait anxiety suggests that threatening frames or fear appeals might resonate more with trait anxious individuals. Research shows that dispositionally anxious individuals are more likely to experience anxiety about both highly probable and improbable future events (Eysenck, Payne, & Santos,

2006). While feelings of state anxiety are the most obvious consequence of trait anxiety, this disposition also has a variety of cognitive correlates. For instance, trait anxiety is related to an attentional bias toward threat and risk related information and a tendency to interpret ambiguous stimuli in a threatening fashion (Eysenck, 2000; Eysenck, Derakshan, Santos, & Calvo, 2007; Mogg et al., 1990). Thus, trait anxiety likely moderates framing effects, such that negative or threatening frames resonate more with individuals high in trait anxiety relative to those low in trait anxiety.

Research also indicates people high in trait anxiety will rely on transient feelings of anxiety to inform judgments more readily than will individuals possessing low levels of trait anxiety (Clore, 1992; Downes & Calvo, 2003). Trait anxious individuals more readily construe state anxiety as information relevant to the evaluative or decision task, thus systematically biasing the outcome of the task. Individuals high in trait anxiety should respond to the mortality frame of our breast cancer manipulation with higher levels of anxiety toward breast cancer, *and* these feelings should more strongly influence support for government funding.

Expectations Regarding Complex Framing Effects

Using the experiment outlined below, we seek to better understand these connections between emotion, personality, and framing. Our expectations expand insights about heterogeneity in response to disease framing from the EPPM to preferences for health spending priorities in the United States. Participants were randomly assigned to one of three breast cancer frames: a mortality frame, a survival frame, and a neutral frame. Hypothesized responses to the frames are presented in Figure 1. Consistent with the EPPM, we anticipate that framing effects are moderated by two characteristics of the individual—threat perceptions and trait anxiety [henceforth H1]. This relationship is depicted as a three-way interaction in Figure 1. We anticipate that the mortality frame will resonate most with women who view their risk as moderate or high and are also high in trait anxiety, such that breast cancer anxiety will be highest when these three conditions are met. When women view their personal risk as low or are low in trait anxiety, the effect of the mortality frame on breast cancer anxiety will be indistinguishable from the survival and neutral conditions.

The second half of our proposed causal chain specifies a positive relationship between breast cancer anxiety and support for government funded breast cancer research and treatment [H2]. In our study, anxiety toward breast cancer is endogenous. It is triggered by exposure to the mortality frame. As a result, we expect it partially conveys, or mediates, the effect of the frame on policy preferences [H3]. While H2 and H3 hypotheses posit a direct link between breast cancer anxiety and policy preferences, it is possible that trait anxiety moderates the relationship between these two variables. The use of emotional cues in judgment

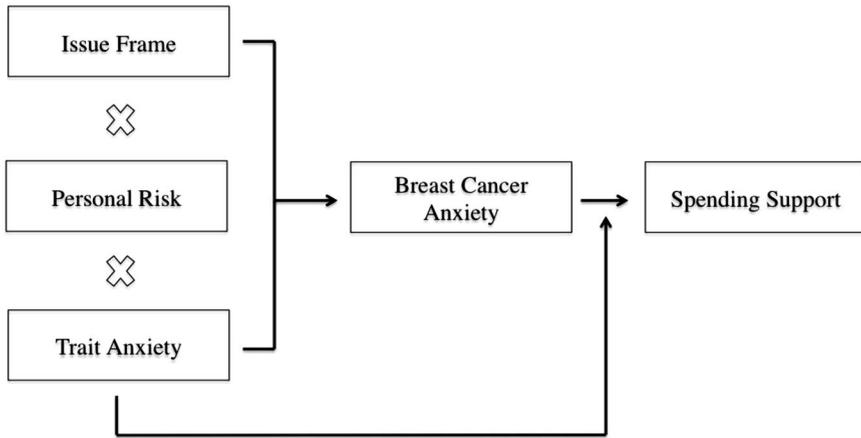


Fig. 1. Hypothesized determinants of support for government spending.

and decision-making tasks varies by chronic differences in emotional disposition (Clore, 1992; Downes & Calvo, 2003). If individuals high in trait anxiety are more likely to use “affect as information,” not only will this group be more inclined to experience breast cancer anxiety (as stated in H1), but they may also assign more weight to their feelings when making a judgment about government spending on breast cancer [H4]. Thus trait anxiety operates at two points in the causal chain— influencing levels of breast cancer anxiety experienced in response to the frame and then moderating its effects on government spending preferences.

The Framing Experiment

To test these hypotheses, we experimentally manipulated the framing of the health threat posed by breast cancer in a national telephone survey. Participants were read short statements containing different information regarding incidence of the disease in the population, mortality rates, and the efficacy of available treatments. Three frames were utilized, the tone of which varied to include threatening, reassuring, and neutral content:

Mortality frame. I would like to ask you some questions about breast cancer, a disease that has received a lot of attention in recent years. As you might know, breast cancer kills 40,000 women every year in the United States. Approximately one out of eight women will develop breast cancer sometime in their lives.

Survival frame. I would like to ask you some questions about breast cancer, a disease that has received a lot of attention in recent years. As you might know,

over 85% of women survive breast cancer. If detected early, the recovery rate is almost 100%. After being diagnosed with breast cancer the average woman undergoes treatment and goes on to lead a fairly normal life.

Control frame. I would like to ask you some questions about breast cancer, a disease that has received a lot of attention in recent years. As you might know, as women age, The American Cancer Society recommends that they be screened for breast cancer. Women can conduct self-exams, and professionals can use procedures like mammograms and clinical breast examinations to detect the disease in its early stages.

No significant differences in responses to the survival and neutral control frames were found in the analyses. To simplify the presentation of the models and gain statistical power, we combined these two conditions and report differences between the mortality frame the survival/neutral frames.

The experiment was embedded in a nationwide, random digit dial (RDD) telephone survey conducted by the Indiana University Center for Survey Research. The sample consists of 800 American adults, 58% of whom were female. The median participant age was 51 years, and the median household income fell in the 35 and 50 thousand dollars range. The median level of educational attainment was some college. The ethnic background of participants varied, with 74.2% identifying as Caucasian, 8.8% as Black or African American, 5% as Latino/a, 3.7% as Native American, 1.5% as Asian, and 6.8% identifying as another racial or ethnic category.

Key Measures

The measure of trait anxiety employed in this study is a modified version of the Spielberger Trait Anxiety Scale (Spielberger, 1985).¹ The six items we used were strongly intercorrelated (mean correlation = .50) with a reliability coefficient of $\alpha = .76$. The items were combined and rescaled to range from zero to one, where a score of one corresponds to high levels of trait anxiety.² In order to gauge threat assessments, participants were asked to evaluate their personal risk of developing breast cancer, along with risk to the average American woman. Specifically, “[Are you personally / Is the average American woman] at high risk, moderate risk or

¹ The scale was shortened to include only six items. The response format was also shortened to a four-point scale.

² The distribution of trait anxiety was highly skewed in this sample, with $\mu = .20$ and $\sigma = .17$. As a result, trait anxiety scores were transformed by taking the square root of the original standard score. The resulting scores are more evenly distributed, with $\mu = .38$ and $\sigma = .24$. This facilitated the estimation of models including interaction terms. The skew is related to the diagnostic function of the trait anxiety scale. Very high levels of trait anxiety are considered to be pathological and uncommon, but subclinical variation in trait anxiety reflects a meaningful dimension of personality.

low risk for developing breast cancer?” Responses were given on this three-point Likert scale.

Following the manipulation, anxiety toward breast cancer was measured with two items. Participants indicated on a four-point scale how *anxious* and *afraid* breast cancer made them feel. The two items were strongly correlated ($r = .60$) and formed a reliable scale ($\alpha = .75$). They were combined and rescaled to range from zero to one, with scores of one corresponding to high levels of cancer anxiety. Three items were included to determine preferences for government spending on breast cancer research and treatment: (1) Do you support or oppose having the federal government devote more public funds to medical research on breast cancer?; (2) Do you support or oppose paying higher taxes if it means that more money will be spent on breast cancer research?; and (3) Do you support or oppose paying higher taxes if it means that more money will be spent on training the medical professionals who diagnose and treat breast cancer? Responses to the items were highly correlated (mean correlation = $.54$), and the resulting scale proved reliable ($\alpha = .70$). The measure ranges from zero to one, with one corresponding to the highest level of support for increased government spending on breast cancer.

Analysis

We begin by examining a basic assumption of our research design: there is variability among women regarding their perceived risk for developing breast cancer. When asked to gauge their own level of risk, 53.9% indicated low risk, 33.3% moderate risk, and 12.8% high risk. While women tended to rate their own risk as relatively low, when asked about the risk breast cancer poses to the average American woman, responses were markedly different. Only 6.7% rated the average woman as at a low risk for developing the disease. Alternatively, 79.4% indicated the average woman faced a moderate risk, and 13.9% indicated high risk. This distribution of responses shows that even when women may perceive their personal risk to be low, they tend to view breast cancer as significant women’s health issue.

Where does this variance come from? While the origins are likely complex, a family history of the disease is an expected correlate, given that the disease has a heritable component. In our survey, we asked whether each respondent had a family member who was diagnosed with breast cancer. Differences in risk assessments across the two groups are presented in Table 1. The point biserial correlation between a family history of breast cancer and personal risk is $.54$ ($t(457) = 13.58, p < .001$). Among women with a family history of breast cancer, 82.8% felt their personal risk of developing the disease was moderate or high, compared to only 30.1% of women who do not have a family history of breast cancer, a statistically significant difference ($\chi^2(2) = 132.30, p < .001$). The relationship between personal risk assessment and the other key variables were

more modest. For example, the correlation between trait anxiety and personal risk was only .07 ($p = .11$).³ We also evaluated the relationship between family history and perceptions of risk facing the average women, but did not uncover a significant association.

The variability we observe in personal risk assessment affords a means of assessing whether framing effects vary as a function of personal risk. The EPPM maintains that framing a health threat in terms of mortality will elicit anxiety and the associated behavioral responses only among people who feel susceptible to the health threat (see Figure 1). As a result, we expect to observe framing effects to be highly specific and evident only among those who report their risk of developing the disease to be moderate or high.

Emotional Reactions to the Breast Cancer Frames

How do women respond to the frame surrounding breast cancer? To answer this question, we compared mean levels of breast cancer anxiety reported across the experimental conditions. We decomposed the sample by personal risk assessments and trait anxiety, because we expect these characteristics determine reactions to the frames. (H1) The results are presented in Figure 2. Breast cancer anxiety among participants low in trait anxiety is presented on the left side of the figure. No differences are evident between the framing conditions. Instead, differences in reported anxiety are primarily a function of personal risk. Mean breast cancer anxiety is significantly higher among those who believe they are at moderate or high risk for developing the disease ($M_{Low} = .49$, $M_{Mod/High} = .67$, $t(381) = -6.52$, $p < .001$), but neither groups' level of anxiety is heightened by the mortality frame.

The results differ among the high trait anxiety participants, who are represented on the right side of Figure 2. For both the low and moderate/high risk groups, anxiety toward breast cancer is more pronounced in the mortality frame condition. While this difference is in the hypothesized direction for both risk groups, it is only statistically significant in the moderate/high risk group ($M_{Survival} = .69$, $M_{Mortality} = .93$, $t(37) = -2.71$, $p < .01$). Thus, anxiety toward breast cancer is a joint function of the information conveyed in the frame, trait anxiety and personal susceptibility for women, consistent with our first hypothesis derived from the EPPM.

Breast Cancer Frames and Support for Government Spending

As was the case with breast cancer anxiety, we anticipate the frames interact with personal risk assessment and trait anxiety to shape support for government

³ A correlation matrix for all variables can be found in the Supporting Information.

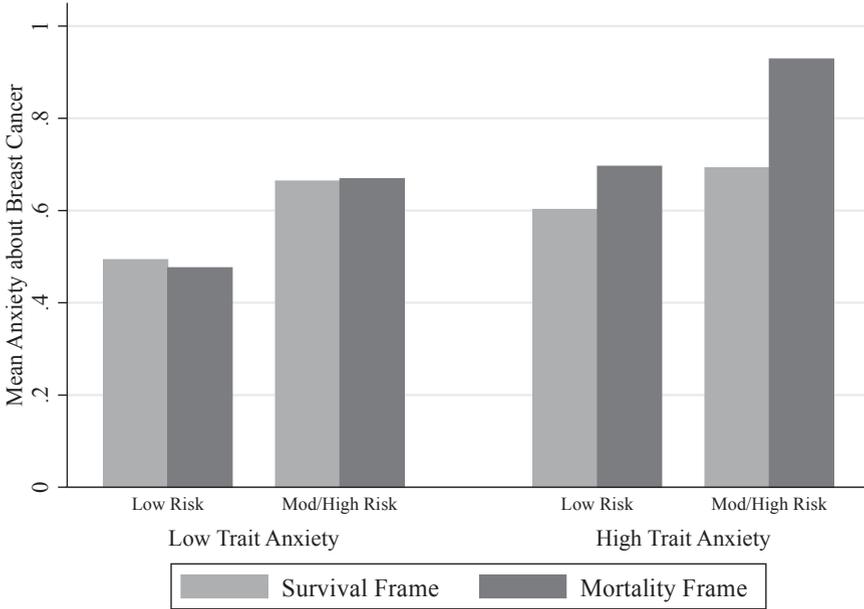


Fig. 2. Breast cancer anxiety by experimental condition, personal risk, and trait anxiety.

spending. First, we report the direct effects of the frames on support for spending among our key subgroups defined by personal risk and trait anxiety. Mean levels of spending support are presented in Figure 3. One can see that the effects of the frame here are more modest than for breast cancer anxiety (Figure 2). Among participants low in trait anxiety, the frames have no effect on support for spending. Again, the main determinant of support among this group is personal risk, with those reporting moderate or high levels of personal risk also reporting higher levels of spending support ($M_{Low} = .59, M_{Mod/High} = .65, t(381) = -2.34, p < .05$). Among respondents high in trait anxiety, framing effects are observed but only within the moderate/high risk group. The effect is modest but suggestive ($M_{Survival} = .64, M_{Mortality} = .78, t(37) = -1.23, p = .10$). Though the effects are weak, they are consistent with the hypothesis (H2) that the mortality frame resonates most with this high risk/trait anxiety group.

To determine whether the effect of the mortality frame on policy support is mediated by breast cancer anxiety, in the fashion depicted in Figure 1, we estimated a series of Ordinary Least Squares (OLS) regression models that included our key variables along with a set of relevant covariates: age, family history of breast cancer, partisanship, and risk to the average

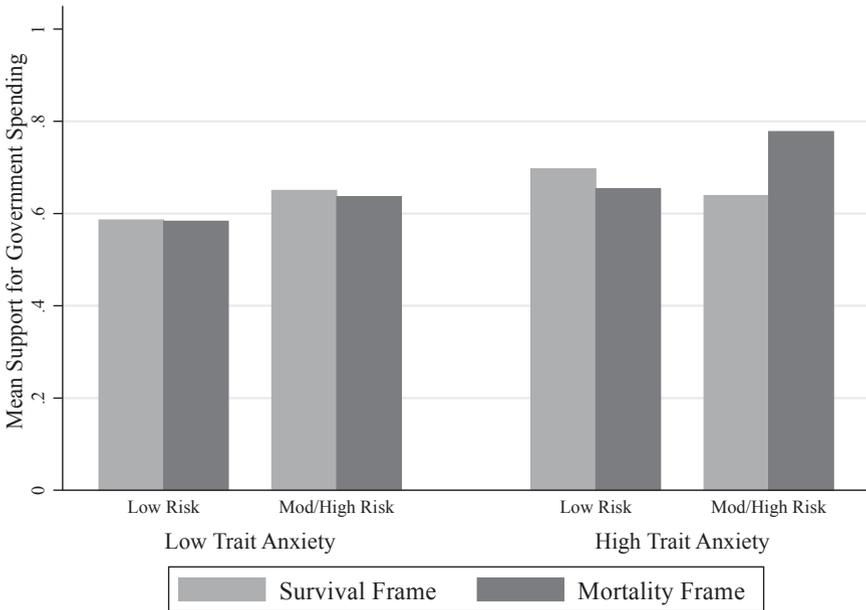


Fig. 3. Support for government spending by experimental condition, personal risk, and trait anxiety.

American woman.⁴ Information from these models was used to test the meditational relationship outlined in H3. With cancer anxiety and the political variables included in the model, there is no direct effect of the mortality frame or trait anxiety on spending attitudes. Instead, the effects of these variables are indirect and conveyed by cancer anxiety—but only among moderate/high risk participants. A Sobel test (Sobel, 1982) confirmed that the effects of the frame and trait anxiety on support for spending among high risk participants were mediated by their anxiety toward breast cancer ($z = 2.53$, $p < .01$), consistent with H3.

We also evaluated whether trait anxious participants not only experience more anxiety about breast cancer, but whether its effect on support for spending is more pronounced (H4). We expect breast cancer anxiety has a larger impact on spending support among women high in trait anxiety because they rely more heavily on their present feelings of anxiety when formulating their preference

⁴ We include a dummy variable indicating whether each participant reports a family history of breast cancer, partisanship (measured on a 7-point Likert scale) to capture a general orientation toward government spending, and the risk to American women in general (see Table 1) assess whether a general tendency for women to support women's interests. The models can be found in the Supporting Information.

Table 2. Trait Anxiety Moderates the Effect of Breast Cancer Anxiety on Support for Government Spending

	Full sample	Low risk	Moderate/high risk
Mortality frame	-.01 (.02)	-.01 (.03)	-.02 (.03)
Trait anxiety	-.21 (.12) ⁺	-.08 (.17)	-.40 (.20) [*]
Cancer anxiety	.04 (.08)	.02 (.12)	.08 (.10)
Trait* cancer	.34 (.18) ⁺	.12 (.29)	.62 (.26) [*]
Family history	.00 (.02)	-.01 (.06)	-.02 (.03)
Age	-.02 (.01) ^{**}	-.02 (.01) [*]	-.01 (.01)
Party identification	-.14 (.03) ^{***}	-.15 (.04) ^{***}	-.14 (.04) ^{**}
Women's risk	.08 (.06)	.15 (.08) ⁺	-.01 (.08)
Constant	.71 (.07) ^{***}	.70 (.10) ^{***}	.71 (.11) ^{***}
<i>N</i>	452	238	214
<i>R</i> ²	.12	.10	.17

Entries are OLS regression coefficients with robust standard errors in parentheses.

⁺*p* < .10, ^{*}*p* < .05, ^{**}*p* < .01, ^{***}*p* < .001.

for government action—essentially using their “affect as information” (Gasper & Clore, 1998). This relationship is depicted in Figure 1, by the arrow extending from trait anxiety to the link between breast cancer anxiety and spending support. Dispositional anxiety magnifies the influence of cancer anxiety arising from the manipulation on spending support.

To test this hypothesis, we included an interaction term between trait anxiety and breast cancer anxiety in the regression models. The results of this analysis are provided in Table 2. One can see from the first column of coefficients that the hypothesis is confirmed with the full sample. The coefficient on the interaction term is positive and statistically significant ($\beta = .34$, $SE = .18$, $p < .10$), suggesting that the effect of breast cancer anxiety on policy support is heightened at high levels of trait anxiety. When the sample is disaggregated by risk perceptions (columns 2 and 3) it becomes clear that this interactive effect is really driven by women who perceive themselves to be at moderate or high risk for developing the disease. The interaction term is positive and significant for this moderate/high risk group ($\beta = .62$, $SE = .26$, $p < .05$) but does not attain statistical significance for the low risk group.⁵

The interaction is depicted in Figure 4, which shows a plot of the predicted values of spending support across the range of breast cancer anxiety for women high and low in trait anxiety and perceived personal risk. The distinctive slope of the line for the high trait anxiety/high personal risk group illustrates that effect of breast cancer anxiety on spending preferences is most pronounced among

⁵ The negative coefficient on trait anxiety is unexpected, but driven by sample size. In this specification, the coefficient for trait anxiety gives its effect when trait anxiety is at its maximum value and breast cancer anxiety is at its minimum value. There are very few cases in which this is true, given the positive correlation between trait anxiety and breast cancer anxiety ($r = .25$, $p < .001$).

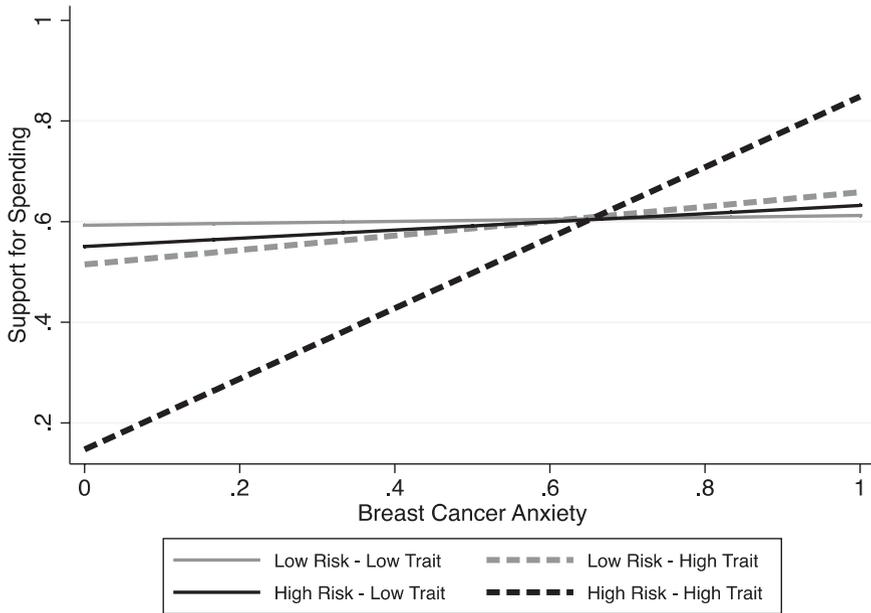


Fig. 4. The joint influence of risk group, trait anxiety, and breast cancer anxiety on support for government spending.

women who perceive their personal risk to be high and are also high on trait anxiety. For the other risk-trait groups, the lines are relatively flat, indicating little effect. These results suggest women high in trait anxiety do rely more on their feelings of contemporaneous anxiety when formulating spending preference, which is consistent with the psychological literature on trait anxiety as well as the affect-as-information perspective on cognition.

Discussion

Theoretical Implications

Our work illustrates the complexity and scope of framing effects in public health communications. Although breast cancer is a women's health issue, we find that not all women support spending on research and treatment programs to the same extent, nor do they respond to issue frames in a comparable fashion. Our experiment allowed us to unpack this heterogeneity among women and to better understand the psychological processes that underlie framing effects. Drawing

on the EPPM, we uncovered two factors—risk perceptions and trait anxiety—that explain why our mortality frame resonated more with some women than others. These observations about trait anxiety support our claim that individual differences related to personality condition framing effects—a notion that remains unsettled in the health communication literature (Consedine et al., 2004; Witte & Allen, 2000). However, the main contribution of our study lies in extending the emotional and appraisal processes outlined in the EPPM to policy preferences. Our results illustrate that the framing found in fear appeals has implications for citizens' thinking about the relationship between government and health.

The EPPM is a model of health attitudes and—critically—behaviors. The model is grounded in a functional perspective on emotion and relies on the notion that anxiety generates an action tendency or motivation toward some goal-oriented behavior (e.g., Lowe, Herrera, Morse, & Ziemke, 2007). While emotions are closely linked to action tendencies, an action or behavior does not necessarily follow from an emotional experience. The action tendency is not a behavior itself but the activation of a set of appraisals or cognitions that increase the likelihood of a particular behavioral outcome (e.g., approach or avoidance) (Frija, 2004; Lowe & Ziemke, 2011). Rather than looking for a specific behavior, we investigate political attitudes that reflect the cognitions activated by the experience of anxiety. We expect that anxiety corresponds broadly to preferences and motivations for risk reduction. In our case, government spending on breast cancer research and treatment programs offers a mechanism for risk reduction.⁶ Future work on the political implications of anxiety and other emotional states could benefit from more careful attention to the action tendencies associated with emotional responses to a range of mass communications—including public health campaigns.

The complexity of the processes underlying reactions to the breast cancer frames raises an important methodological consideration for further work on threat, emotion, and framing, as it suggests failure to account for subjective risk assessments and key personality dimensions will likely result in biased estimates of treatment effects. The average treatment effects assessed among the full sample of women obscured important underlying dynamics based on threat perceptions, creating the appearance of more modest treatment effects than were actually present. The subpopulation analysis based on risk group proved enlightening here. Among the low-risk group, partisanship and the perceived risk to American women in general drove support for government spending on breast cancer research and training. Among the high-risk group, support was a joint function of

⁶ This kind of link between anxiety and risk-averse political preferences has been demonstrated in other applied contexts, such as preferences for isolationism following the 9/11 terror attacks (Huddy et al., 2005; Huddy et al. 2007), restrictive immigration policies (Brader, Valentino, & Suhay 2008) and attitudes toward crime (Peterson, 2010), suggesting a common underlying process.

exposure to the mortality frame, trait anxiety, and anxiety specifically about breast cancer—consistent with the expectations laid out in the EPPM. Future work on framing should carefully consider the conceptualization and measurement of subjective threat perceptions in order to better understand heterogeneity in response to threatening issue frames.

Limitations

While the results have some interesting implications for understanding public opinion toward government expenditures on health care and research, the study is not without limitations. We identify a key role for personal risk perceptions, but take variation in these perceptions as a given. Family history is related to perceived susceptibility for the disease (Table 1), but we lack the data to further investigate the correlates of personal risk. In spite of this limitation, primary appraisals of personal risk are the focal point of our analysis. Secondary appraisals receive comparatively little attention or discussion. Future applications of the EPPM to the study of public opinion would benefit from more direct measurement or cleaner manipulation of self and response efficacy. Our framing manipulation combines threat information and response efficacy information. This problem is encountered elsewhere in the literature on the EPPM, because efforts to test the extreme assumptions of the model intentionally compare a high threat/low efficacy frame with a low threat/high efficacy frame (e.g., Gore & Bracken, 2005). Ideally, threat and efficacy would not be combined in this fashion and future work will better account for efficacy appraisals—perhaps by drawing a parallel between response efficacy and political efficacy or trust in government.

An additional limitation is that our study considers only women's attitudes toward a single women's health issue. There is little reason to expect the psychological processes outlined here are gender specific—work on the EPPM has revealed few meaningful gender differences in response to fear appeals across a variety of threats (Maloney, Lapinski, & Witte, 2011; Witte & Allen, 2000). But, given the specificity of our study we have limited leverage for making claims about generalizability to other health threats and policy preferences. Beyond this, we consider only a single emotional response to threat. While anxiety has been the focus of considerable research in this area, it is plausible that people might react to personal threat with anger, disgust, or some other emotion, and that the associated action tendencies may produce a different pattern of attitudinal and behavioral responses (e.g., Lowe & Ziemke, 2011). Many of these limitations point to fruitful areas for continued research into the connection between the public's beliefs about personal health risks and support for government efforts to address health threats.

Practical Implications

In spite of these limitations, this study draws much-needed attention to women's health care attitudes and government spending priorities – an area that is currently underdeveloped in the public opinion literature. This issue warrants attention in part due to the sheer magnitude of breast cancer as a public health issue. Breast cancer is the second most frequently diagnosed cancer among women in the United States, and the American Cancer Society (ACS) estimates that one in every eight women will be diagnosed with breast cancer in their lifetimes. It is among the leading causes of cancer death among women, second only to lung cancer (ACS, 2012). It is also a costly problem. In 2010, direct costs alone for breast cancer treatment were estimated at \$16.5 billion—approximately 13% of the total direct costs attributed to all cancer care in the United States (Yabroff et al 2011). While the EPPM focuses on promoting individual prevention and screening behaviors, the figures cited here raise the larger question of how screening, prevention, and treatment programs will be funded. Given the scope of the problem facing women, it is somewhat surprising that our results show a range of support for government spending on research and treatment programs. One would expect this is an issue that women would coalesce around, but the heterogeneity we observe is indicative of the many challenges facing efforts to address women's health issues.

The role played by personal risk perceptions here suggests that, much like public health communications, political rhetoric surrounding women's health should underscore personal risk in order to mobilize support among women for spending on breast cancer research and treatment. However, such rhetoric will only resonate with women who consider their personal risk to be moderate or high. Alternative strategies—perhaps engaging positive emotions like hope rather than anxiety—will need to be employed to boost support among women with low susceptibility. Group-based appeals stressing solidarity with other women (e.g., the Susan G. Komen “Think Pink” approach) may prove successful in this regard. This work implies a kind of market segmentation strategy should be applied to mobilizing support for government spending in this arena. Politicians and public health officials cannot expect all women to unite around a unified message to support programs designed to promote women's health.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Table A1. Correlation Matrices

Table A2. Predictors of Breast Cancer Anxiety among Women

Table A3. Predictors of Support for Policies to Reduce Breast Cancer Threat

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