Risk Orientations and Policy Frames

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In this article, we examine the effect of citizens' risk orientations on policy choices that are framed in various ways. We introduce an original risk orientations scale and test for the relationship between risk orientations and policy preferences using an original survey experiment. We find that individuals with higher levels of risk acceptance are more likely to prefer probabilistic outcomes as opposed to certain outcomes. Mortality and survival frames influence the choices citizens make, but so does our individual-difference measure of risk acceptance. Finally, using a unique within-subject design, we find that risk acceptance undercuts susceptibility to framing effects across successive framing scenarios. The findings suggest that citizens' risk orientations are consequential in determining their policy views and their susceptibility to framing effects.

Political debate routinely focuses on the potential costs and benefits of policies and the uncertainty surrounding political consequences. These political battles are often waged via competing frames. This condition is particularly relevant for debates that have become more prevalent since the terrorist attacks on 9/11, as concern has shifted toward the possibility of a bioterrorist attack and the nation's vulnerability to a smallpox epidemic. Debate over how to control a smallpox epidemic has largely focused on vaccination strategies: how it should be made available, to whom it should be administered, and whether vaccination should be compulsory or voluntary. Given that this debate typically highlights mortality or survival, it provides an opportunity to apply framing theory and the classic Tversky and Kahneman "Asian disease problem" (1981) to contemporary policy decisions.

Demonstrating framing effects in the political realm, however, is only one part of our contribution. This project moves the literature a step forward by inquiring into *who* is more or less likely to be receptive to alternative frames in political discourse. Meta-analyses of the research spawned by Kahneman and Tversky (Kühberger, Schulte-Mecklenbeck, and Perner 1999) reveal that much of the research focuses on characteristics of the *message* (i.e., the magnitude and type of stakes, context of the decision, source of the message, degree of uncertainty), largely ignoring the characteristics of the *decision maker*. Implicitly, such an approach suggests that all individuals are equally vulnerable to framing effects. In contrast, we build on the relatively smaller body of literature suggesting that not all individuals are likely to be persuaded by the same frame. This "matching effect in persuasion" (Lavine et al. 1999) suggests that the degree to which messages are persuasive should depend upon a set of individual-level characteristics and how closely those characteristics are related to the situation under consideration.[1] The key characteristic we examine is an individual's *risk orientation*. We hypothesize that when presented with public policies involving risky decisions, an individual's risk orientation should determine which alternative—the sure outcome or the risky outcome—is more preferred. We build an original scale to measure risk orientations, and we show that an individual's level of *risk acceptance* affects the initial response of an individual to a given framing scenario. Moreover, we also show that risk orientations undercut susceptibility to framing effects across multiple framing scenarios. The unique between-subject and within-subject design of our experiment provides greater insight into how individuals make decisions under risk and how strategic political elites might frame their messages to appeal to particular subsets of the public.

[1]For both a review of selected works that analyze individual differences and framing effects and one political science exception that identifies how framing effects can be contingent upon the partisanship of the source and the partisanship of the individual, see Druckman (2001).

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Risky Decisions and Risk Orientations

Kahneman and Tversky (e.g., 1979) are credited with demonstrating that the decisions people make depend largely upon how those choices are framed. In a classic example, Tversky and Kahneman (1981) introduce a pair of objectively equivalent choices:

> Imagine that the U.S. is preparing for an outbreak of an unusual Asian disease which is expected to kill 600 people. Two alternative programs to combat the disease are proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:
>
> [*Survival Frame*] If program A is adopted, 200 people will be saved. If program B is adopted, there is a 1/3 probability that 600 people will be saved and 2/3 probability that no people will be saved.
>
> [*Mortality Frame*] If program C is adopted, 400 people will die. If program D is adopted, there is a 1/3 probability that no one will die, and 2/3 probability that 600 people will die.

Given the choice between programs A and B, 72% of subjects select A over B. Given the choice between C and D, 78% of subjects select D over C. Although A and C are ''sure-thing'' programs with the same expected outcome, A is much more desirable than C (garnering 72% support, as opposed to 22% support). This classic example demonstrates a clear difference between how subjects respond to *Survival* and *Mortality* frames. With the survival frame, subjects are placed in a region of perceived gains and are less willing to take a risk (opting for the sure thing, program A). With the mortality frame, subjects are placed in a region of perceived losses and are more willing to take a risk (opting for the probabilistic program D).

Researchers have used the Asian disease problem and variations of it to replicate Kahneman and Tversky's findings with varying degrees of success (Levin, Snyder, and Chapman 1998). The discrepancies in the results have shifted the focus of research to the specific details of the frames used and the specific characteristics of the decision makers. The individual characteristics that have been investigated include socioeconomic factors and personality traits. Success (comprised of authority, income, wealth, and position) and maturity (comprised of age, seniority, and number of dependents) have both been identified as significant predictors of willingness to take risks (MacCrimmon and Wehrung 1990). Impulsivity and anxiety (Lauriola et al. 2005), intuitiveness (Schunk and Betsch 2006), and motivation (Xie and Wang 2003) have all also been shown to affect risky behavior. In addition, risk acceptance is greater among the more educated (Riley and Chow 1992; Rosen, Tsai, and Downs 2003; Sung and Hanna 1996) and among men compared with women (Byrnes, Miller, and Schafer 1999; Fagley and Miller 1990; Levin, Snyder, and Chapman 1988; Rosen, Tsai, and Downs 2003). Together, these studies suggest that identifying *who* is more or less likely to be receptive to mortality or survival frames is crucial to understanding decisions under risk.

The majority of these studies, however, have taken place outside of political science. The political science literature has generally taken the approach of predicting risk behavior from indirect evidence and assumptions of systematic responses to particular types of problems. For example, work by McDermott and Kugler (2001) and Bueno de Mesquita et al. (2001) use factors such as circumstances, expressed goals, and preferences to make predictions. Moreover, cues from the situational and international context have been used as indicators of a decision maker's willingness to take risks in a domain (Bueno de Mesquita, McDermott, and Cope 2001; McDermott 1998). A notable exception is Kowert and Hermann's (1997) examination of personality and risk taking. They investigate the relationship between general personality traits and self-reported risk-taking behaviors, finding that personality traits such as conscientiousness, openness, and altruism relate to an individual's propensity to take risks. Various personality traits also predict sensitivity to framing effects, but in ways that are not easily summarized or entirely consistent with prospect theory. While the variety of methods of studying risky decision making has allowed for advances in the field of political science, ultimately, ''the mixed (and occasionally contradictory) results . . . suggest the need for additional theoretical reflection and careful empirical progress'' (Boettcher 2004, 355). Thus, we return to the spirit of Kowert and Hermann's (1997) research and attempt to more precisely identify the relationship between risk orientations and policy choices at the individual level.

Study Design and Hypotheses

We use data from a January 2008 survey experiment that was administered to a nationally representative sample of 761 individuals who are part of Knowledge Networks' ongoing internet panel study. Our study consists of a within- and between-subject posttest-only multiple-treatment group experiment. A

prestimulus questionnaire assessed risk orientations and partisanship.

All subjects then received a description of a smallpox[2] policy proposed by the Centers for Disease Control.[3] One-half of the subjects was randomly assigned to receive a survival frame; the other half received a mortality frame. This between-subject design enables us to compare different subjects' responses to the two frames. Respondents were presented with the following scenario:

> Experts from the Centers for Disease Control (CDC) recently appeared before Congress to discuss the need to take steps to protect Americans from a possible smallpox epidemic. Although some Americans were vaccinated against smallpox in their youth, those vaccinations are now ineffective against the more powerful smallpox strains that exist today. All 300 million Americans are vulnerable to being infected by smallpox, even though the possibility of a bioterrorist attack remains very small.
>
> CDC experts proposed two programs to try to minimize the consequences of a smallpox epidemic. As an example, they illustrated the effects of the programs in a medium-sized town in the United States. They believe that an initial outbreak of smallpox in a medium-sized town of 60,000 people in the United States would kill 6,000 people. They proposed two alternative programs to combat the disease. These programs would fund research, vaccinations, medical treatment facilities, and the training of medical personnel. The scientific estimates of the consequences of the programs are as follows:
>
> [*Survival Frame*: Randomly assigned to ½ respondents] If program A is adopted, 2000 people will be saved. If program B is adopted, there is a 1/3 probability that 6000 people will be saved and 2/3 probability that no people will be saved.
>
> [*Mortality Frame:* Randomly assigned to ½ respondents] If program A is adopted, 4000 people will die. If program B is adopted, there is a 1/3 probability that nobody will die, and 2/3 probability that 6000 people will die.
>
> Imagine you were faced with the decision of adopting program A or program B. Which would you select?

Respondents were then asked how certain they were of their choice of program A or B. Next, the experiment was repeated, but this time the assignment of frames was reversed and the programs presented were labeled C (the sure thing) and D (the probabilistic outcome). Those who received the survival frame first were then shown the mortality frame; those who initially received the mortality frame were given the survival frame. This within-subject design enables us to capture preference reversals among subjects, as a single subject is exposed to both frames.[4]

With this design, we test the following hypotheses:

> *H1: Risk acceptance will increase the probability of opting for a gamble over a sure thing.*

This hypothesis builds from existing theories of risk orientations, several of which are situated within an approach/avoidance framework. For example, Schneider and Lopes' (1986) motivational theory suggests a psychological mechanism for understanding how attitudes towards risk should shape preferences. They argue that individuals are motivated by two desires: a desire for security and a desire for high returns. Risk-averse individuals are most influenced by a desire for security (avoid a negative outcome), whereas risk-seeking individuals are most influenced by a desire for a high return (approach a positive outcome). In the scenarios that we present to respondents, the risk-averse who desire security should register a preference for the sure-thing option, whereas the risk-seeking who desire a high return should register a preference for the probabilistic option. Similarly, Atkinson's (1957) theory of achievement and failure motive suggests that some individuals are more motivated to achieve success

[2]We use smallpox because it remains a well-known and more concrete threat than a generic "Asian disease." It thus provides the stimulus with contemporary political relevance while still allowing us to conform to the canonical Asian disease framework. The CDC keeps it in the category of agents believed to present the greatest possible threat to harming public health. In a 2008 Harvard School of Public Health/Robert Wood Johnson Foundation survey, a full 42% of respondents believed that "improving the country's ability to respond to the threat of bioterrorist attacks using diseases like smallpox and anthrax" was an "extremely important" thing to do; 36% saw it as "very important" and 16% saw it as "somewhat important."

[3]The CDC is viewed as a credible and trustworthy source. A survey by the Harvard School of Public Health Project on the Public and Biological Security in fall 2006 found that 60% of respondents trust the CDC "a lot" "to give you useful and correct information." The percentages of respondents trusting newspapers, television commentators, religious leaders, governors, and local officials "a lot" was far lower (10%, 12%, 28%, 28%, and 39%, respectively). Only "your doctor or health care professional" outranked the CDC.

[4]Following this question, respondents then were debriefed: "This survey involved the effect of attitudes towards risk on policy choices. During the survey, you may have been told that policymakers were considering various smallpox prevention policies. These were not actual policies, but hypothetical scenarios designed to assess whether people are sensitive to how policies are described." Respondents were then given contact information of the PIs' Institutional Review Board and thanked for their participation in the survey.

while other individuals are more motivated to avoid failure. Under this theory, the risk-averse would want to avoid their part in a failure by opting for a sure thing and removing the responsibility for failure from themselves, whereas the risk-seeking would want to achieve success by selecting a probabilistic outcome.

H2: The effect of risk acceptance will vary with frames.

According to Prospect Theory, the "Certainty effect" leads individuals to prefer a certain positive outcome to a set of probabilistic options, and the "Reflection effect" leads individuals to prefer a set of probabilistic options to a certain negative outcome (Kahneman and Tversky 1979). Prospect Theory's lessons, however, deal with aggregate preferences and ignore heterogeneity among individuals. The underlying logic of this hypothesis derives from a trait-state view: that under some circumstances, the effect of individual differences can be accentuated or attenuated. We expect that risk orientations will be particularly influential in the mortality frame, where subjects are choosing between a certain number of deaths and the probability that everyone will die or no one will die. Part of this is attributable to the region of gains (the survival frame) versus losses (the mortality frame) and to the fact that the mortality frame deals with a choice directly causing death and the survival frame deals with a choice that directly saves people. The psychological desire among the risk averse to avoid failure (an assured negative outcome is preferable to the "failure" of playing a role in bringing about an even more negative outcome) should be particularly strong in the mortality frame. Additionally, among the risk averse, the certain option enables them to minimize regret "thus avoiding the worst possible outcome" (Neumann and Politser 1992). Hence, the psychological mechanism that leads the risk averse to prefer a certain outcome to a probabilistic outcome should operate with a stronger imperative in the mortality frame. At the same time, the psychological desire among the risk accepting to desire a high return and to achieve success should be more strongly triggered in the mortality frame, where the anxiety brought on by the substantive content in a region of losses (deaths caused by the policy) should trigger a stronger desire to take the gamble than would be triggered in the region of gains (lives saved by the policy).

H3: An individual's degree of preference reversal across successive frames can be predicted by risk acceptance. The risk acceptant will exhibit consistent preference for sure-things while the risk tolerant will exhibit consistent preference for gambles across successive frames.

Existing studies do not provide empirical evidence on how risk orientations affect decisions when individuals are exposed to a succession of frames. Most studies of framing and risky decisions rely on a between-subject design, where subjects are exposed to only a single frame: a mortality or survival frame, but not both. Work that discusses preference reversals often uses a between-subject design and finds, on the aggregate, reversals across different framing scenarios. Researchers have inferred from these results that a given individual would exhibit preference reversals across successive frames (thus, highlighting the notion that individual preferences can fluctuate on the flip of a coin), but this type of design merely assumes that an individual would reverse his/her preferences without actually testing the degree to which preference reversals actually occur.

While there are some framing studies that do expose subjects to multiple types of problems, they typically use the same frame (e.g., Druckman and McDermott 2008; Fagley and Miller 1997).[5] In one exception, Schneider (1992) finds that when subjects were exposed to both positive and negative frames, less than 20% of subjects showed a reliable change in preference with the change in frame. Frisch (1993), Zickar and Highhouse (1998), Kowert and Hermann (1997), and Wang (1996) all suggest that the individual's risk orientation may account for this lack of preference reversal, as individuals with extreme (i.e., high or low) risk preferences should be more likely to make their choices using their level of risk acceptance, regardless of the frame. However, the use of between-subject designs prevents more definitive conclusions from being drawn about how a particular individual reacts to multiple frames; our within-subject design enables us to speak to exactly this issue.

Risk Acceptance: The Measure and Its Correlates

Our first interest is in the extent to which risk orientations explain the policy choices subjects make. Thus, we begin by operationalizing our key individual difference measure, *Risk Acceptance*. We conceive of risk orientations as a stable individual difference.

[5]See Kowert and Hermann (1997) for an exception, where each subject read six scenarios: three different types of problems (economic, medical, and political), framed as gains and then losses.

The existing literature provides a variety of ways of examining risk orientations. Some work analyzes risk preferences, but treats preference for risk as a latent construct (Zickar and Highhouse 1998). Since this type of latent model only infers risk preference, it is difficult to point to this study as conclusive evidence. Other work (e.g., Elliot and Archibald 1989; Rowe and Puto 1987) uses direct measures in the form of a series of gambles, each containing a choice between a probabilistic outcome and a certain outcome. These questions are so similar to the Asian disease-type problems used as a dependent variable of policy preferences that it is likely that the authors in both cases did not actually measure risk orientations, but rather, just created another measure of risk behavior.

Other works measure risk orientations through lengthy batteries of questions. Two of the most often-used measures are the Choice Dilemmas Questionnaire (CDQ), which asks subjects to give recommendations to actors across 12 distinct vignettes, and Zuckerman's sensation-seeking scale (Zuckerman, Eysenck, and Eysenck 1978), which consists of 40 items that tap thrill and adventure seeking, experience seeking, dis-inhibition, and boredom susceptibility. The length of these instruments makes them cumbersome to administer outside of the laboratory and implausible for inclusion in surveys.[6] As a consequence, we developed our own instrumentation.[7]

Very few works in political science have utilized psychological scales of risk orientations. Political scientists have typically used a single indicator to examine the relevance of risk orientations for politics. Some have found that risk orientations affect trust in government and vote choice (Morgenstern and Zechmeister 2001; Peterson and Lawson 1989). Nadeau, Martin, and Blais (1999) find that the risk-accepting use costs and benefits in determining their policy preferences, whereas the risk-averse are particularly prone to "worst-case-scenario" reasoning. Berinsky and Lewis (2007) develop an estimator of "risk proclivities" to argue that the U.S. electorate is not nearly as risk averse as the classic quadratic spatial model predicts. Additionally, Tomz and Van Houweling (2009) find that in a hypothetical non-partisan election, risk orientations predict respondents' willingness to tolerate ambiguous candidate positions. Since risk orientations have been used in the context of electoral decisions, it is not a far leap to expect that they would also affect policy preferences.

One shortcoming of the existing work in political science on risk orientations, however, is that each study relies primarily on only one item rather than a scale. Since any given measure is likely to contain measurement error, reliability nearly always increases with multiple items. Hence, we improve upon the handful of political science studies that examine risk orientations by constructing a multiple-item scale. Our measure of *Risk Acceptance* is an additive index comprised of responses to a seven-question battery. The items were culled from existing research in political science, sociology, and psychology and are representative of each type of risk measure. The first question asks respondents to place themselves on a seven-point scale, anchored at the value of 1 with the statement "You should be cautious about making major changes in life" and at the value of 7 with the statement, "You will never achieve much in life unless you act boldly."[8] This question was based on one that appears on the 1990 and 1995 installments of the World Values Survey (analyzed by Miller 2000 and Freese 2004; a variant of the question appeared on a 1997 Mexican national survey and was analyzed by Morgenstern and Zechmeister 2001). The next question was drawn from the 1972 National Election Study; it asks respondents about whether they would keep betting on horses (or take their winnings) if they had just won a race. This item is analyzed by Berinsky and Lewis (2007). The next items are drawn from a psychological battery, the Brief Sensation Seeking Scale (developed and analyzed by Hoyle et. al 2002), and they ask respondents about their views on new experiences. The last question asks respondents, "In general, how easy or difficult is it for you to accept taking risks?" This item is analyzed by Nadeau, Martin, and Blais (1999).

Our measure of *Risk Acceptance* gives us leverage because (1) the questions are all clearly distinct in nature from the decision task; (2) the questions are distinct from the focus of the dependent variable (public policy, the political context, and probabilistic choices); and (3) the questions have been used as valid indicators of risk preference in prior studies

[6]Our search turned up only a single political science article that used the CDQ: Kowert and Hermann (1997), which analyzes responses from a sample of 125 undergraduates.

[7]Also noting possible problems with the scale, Hoyle et al. (2002) developed a 4-item Brief Sensation Seeking Scale, drawn from the original 40 items. Given the broad use of the sensation-seeking scale in psychology, we have incorporated this brief scale into our instrumentation.

[8]Question text, means, and standard deviations appear in the appendix.

across several academic fields, making the final index applicable across domains. Moreover, the questions, as they appeared on the questionnaire, varied in direction, in order to avoid acquiescence response bias. Finally, the measure is compact enough to be administered in a survey context, thus avoiding some of the difficulties with the long and administratively cumbersome measures in psychology.

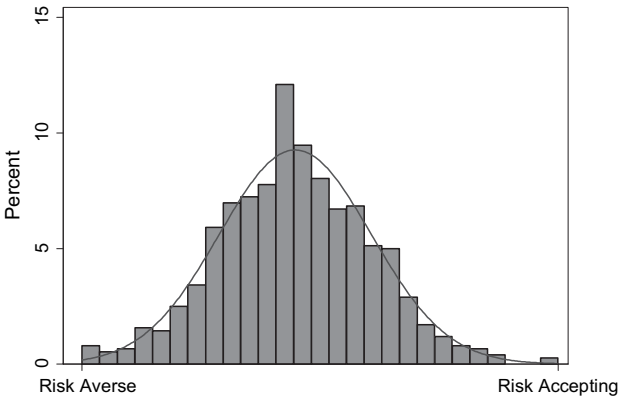
The items were rescaled to range from 0 (risk averse) to 1 (risk acceptant), summed together, and then rescaled in to a *Risk Acceptance Index*, ranging from 0 (risk averse) to 1 (risk acceptant). The seven-item scale has good reliability (Cronbach's $\alpha = 0.753$).[9] The scale is distributed with a mean of 0.448, a standard deviation of 0.159. The histogram of the scale appears in Figure 1.

We ascertain the validity of our *Risk Acceptance* measure by examining its relationship to a series of individual-level characteristics and comparing these findings to national survey data which used comparable questions. Table 1 features this analysis.

Consistent with the existing literature (e.g., Fagley and Miller 1990; Levin, Snyder, and Chapman 1988; MacCrimmon and Wehrung 1990; Riley and Chow 1992; Smith et al. 2004), female subjects in all three samples are significantly less risk acceptant than male subjects, and *Risk Acceptance* declines with age. We also find positive and significant relationships between *Risk Acceptance* and education and income, consistent with existing literature (Halek and Eisenhauer 2001; MacCrimmon and Wehrung 1990; Riley and Chow 1992; Rosen, Tsai, and Downs 2003; Sung and Hanna 1996).[10]

Two politically relevant characteristics are significantly correlated with attitudes towards risk in our sample. Positive correlations emerge between R*isk Acceptance* and our seven-category measures of both *Ideological Identification* ($r = 0.166$, $p < 0.000$) and *Partisanship* ($r = 0.106$, $p < 0.003$), such that liberals are more risk accepting than conservatives and Democrats more risk accepting than Republicans.[11] Similar relationships between partisanship, ideology, and risk acceptance appear in the NES and WVS.[12] Overall, the high level of consistency between the existing literature, our sample, and the NES and WVS supports the criterion validity of our measure.

FIGURE 1 **Histogram of *Risk Acceptance***



Histogram overlaid with Normal distribution.
N = 760

Risk Acceptance and Framing Effects

Having developed our individual difference measure, we now examine the relationship between *Risk Acceptance* and reactions to smallpox policies. We begin with an analysis of the first trial—where respondents are presented the scenario for the first time. Recall that subjects were randomly assigned to receive the *Survival Frame* or the *Mortality Frame*, and they were asked to choose between Program A

[9]The reliability of our scale compares very favorably with that of existing measures of risk attitudes. Kogan and Wallach (1964) report alpha reliabilities for the Choice Dilemmas Questionnaire of 0.53 for men (N = 114) and 0.62 (N = 103) for women. Zuckerman (1994) reports reliabilities of 0.83–0.86 for his entire Sensation-Seeking Scale (which contains 40 items).

[10]We also explored the relationship between *Risk Acceptance* and other covariates. Marital status appears to be related to risk orientations: divorced and single people have a significantly higher mean value on *Risk Acceptance* than people who are marries, widowed, or separated ($p < 0.000$). In both the NES and WVS, married people also had the lowest levels of risk acceptance. In all three samples, there were no significant differences by race/ethnicity, region of residence, or homeownership.

[11]The mean level of risk acceptance among those identifying themselves as "Liberal" or "Extremely Liberal" is 0.478 (s.e. = 0.013), whereas the mean level of risk acceptance among those identifying themselves as "Conservative" or "Extremely Conservative" is 0.405 (s.e. = 0.014), a significant difference at two-tailed $p < 0.001$. Similarly, the mean level of risk acceptance among Strong Republicans is 0.401 (s.e. = 0.018), while the mean level of risk acceptance among Strong Democrats is 0.462 (s.e. = 0.013); these differences are significant at two-tailed $p < 0.007$.

[12]The finding that liberals are more risk accepting than conservatives holds across both WVS and 1972 NES. The WVS does not ask respondents for their party identification. Using the WVS question about which party the respondent would vote for in an upcoming election as a proxy for party identification, we find that Democrats are more risk accepting than Republicans. The 1972 NES data do not reveal a significant relationship between partisanship and risk acceptance, but given the substantial changes in partisan alignment between 1972 and the present, this is perhaps not surprising.

TABLE 1 Risk Acceptance and Individual Correlates

	Our Sample	1972 National Election Study	1990 & 1995 World Values Survey[a]
Female	−0.132***	−0.135***	−0.051***
Age	−0.175***	−0.015[b]	−0.072***
Education	0.109**	0.097***	0.112***
Income	0.072**	0.113***	0.135***

Table entry is the Pearson correlation coefficient.
[a]U.S. sample only
[b]Although there was not a significant correlation when age was calculated as a continuous variable, splitting the sample at age 65 yields a significant correlation of r = -.052**. This is consistent with the literature that notes a decline in risk acceptance among those over the age of 65 (Riley and Chow 1992; Smith et al. 2004).
***$p < 0.01$; **$p < 0.05$; *$p < 0.10$, two-tailed

and Program B.[13] In our experiment, we find that among those given the *Survival Frame*, 68.2% of respondents selected the sure-thing Program A (''2000 people will be saved'') and 31.8% selected the probabilistic Program B. These findings mirror those of Tversky and Kahneman (1981), who report that 72% of subjects prefer Program A to Program B in their classic version of the experiment. Among those given the *Mortality Frame*, a sharp reversal occurs: only about 27.6% selected the sure-thing Policy A (''4000 people will die''), whereas 72.4% selected the probabilistic Policy B. These findings again mirror those that Tversky and Kahneman (1981) uncovered (where 78% in the *Mortality Frame* prefer the probabilistic option).[14]

As with existing work, we find that the frame matters. However, we also suspect that individual differences should predict policy choices. Our first hypothesis is that *Risk Acceptance* should increase preference for a gamble over a sure thing. The probit regression in Table 2 provides a first test of this hypothesis, where we use *Preference for the Probabilistic Outcome* as a dependent variable (coded 0 for Program A and 1 for Program B), and we include two independent variables: a dummy for *Mortality Frame* (coded 1 if the respondent received the Mortality Frame) and *Risk Acceptance*.

The first column of results (H1a) indicates that both *Frame* and *Risk Acceptance* significantly predict *Preference for the Probabilistic Outcome*. To ensure that these results can be attributable to risk orientations and not other covariates, the next column controls for the six covariates that had the strongest bivariate relationship with *Risk Acceptance*: gender, age, education, household income, and a composite of partisanship and ideology.[15] The relationship between *Risk Acceptance* and *Preference for the Probabilistic Outcome* remains.[16]

Figure 2 illustrates the substantive impact of the frame and of risk acceptance. It plots the predicted probability of electing the probabilistic outcome, across values of *Risk Acceptance*. The frame accounts to a significant degree for *Preference for the Probabilistic Outcome*, as shown by the wide gap between the solid and dashed predicted probability lines. Both predicted probability lines display a positive slope upwards, such that willingness to take the gamble increases with *Risk Acceptance*. To gauge the impact of a one-unit shift in *Risk Acceptance* (from minimum to maximum), we see that a *Survival Frame* respondent who is minimally risk acceptant prefers the probabilistic outcome with only a 0.24 probability; a respondent who is maximally risk acceptant prefers the probabilistic outcome with a 0.43 probability. *Here, Risk Acceptance nearly doubles the preference for a probabilistic outcome.* In the *Mortality Frame*, a minimum to maximum shift in *Risk Acceptance* increases the probability of selecting the probabilistic outcome from 0.64 to 0.81. The effect of a one-unit shift in *Risk Acceptance* thus ranges between 0.19 (for the survival frame) and 0.17 (the for mortality frame). The

[13]Before examining any differences across frames, we ensured successful randomization by comparing mean values on a series of nine individual-level variables (risk orientations, gender, age, education, ideology, partisanship, race/ethnicity, region, and presence of the internet in the household). Hotelling's T-squared test of the vector of means across groups suggests that we cannot reject the null of no difference in means across cells (p~0.433).

[14]Our findings are statistically indistinguishable from Tversky and Kahneman's (1981); p>0.15 for the two tests of proportions (comparing our sample with that of Tversky and Kahneman, by frame).

[15]Partisanship and ideology correlate at 0.599; Cronbach's α = 0.721.

[16]In contrast with existing work, we do not find that females are more likely to take the risk-averse (certain) outcome. Nor do we find that framing effects are contingent upon sex of the respondent.

TABLE 2 Risk Acceptance and Preference for the Probabilistic Outcome, Trial 1

	(H1a) Mortality Frame and Risk Acceptance	(H1b) Adding Controls	(H2) Frame × Risk Acceptance
Mortality Frame	1.068***	1.082***	1.058***
	0.097	0.099	0.294
Risk Acceptance	0.521*	0.628*	0.507
	0.306	0.318	0.481
Female		0.105	
		0.099	
Age		0.262	
		0.217	
Education		−0.214	
		0.199	
Household Income		0.205	
		0.225	
Partisan Ideology Index		0.038	
		0.191	
Risk Acceptance			0.023
x Mortality Frame			0.624
Intercept	−0.706	−0.933	−0.700
	0.155	0.259	0.227
lnL	−453.185	−450.481	−453.184
$p > \chi^2$	0.000	0.000	0.000
N	752	750	752

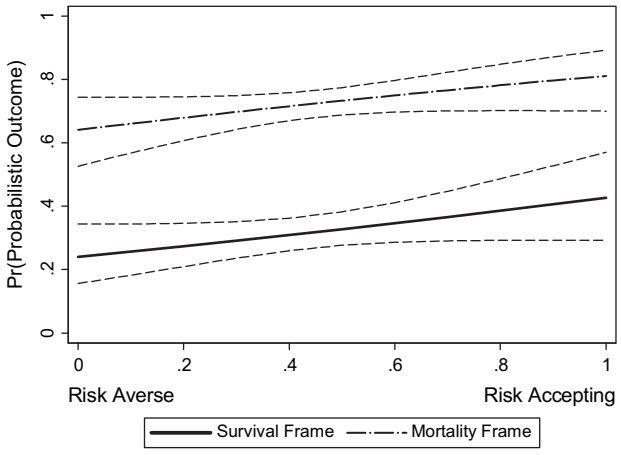
Table entry is the probit coefficient with standard error below.
Dependent variable is *Preference for the Probabilistic Outcome* (0 = Policy A; 1 = Policy B).
All independent variables are scaled to range from 0 to 1.
***$p < 0.01$; **$p < 0.05$; *$p < 0.10$, two-tailed

substantive effect of the frame is a bit larger, ranging from 0.40 (for the risk averse) to 0.38 (for the risk accepting).

So far, we have found that those who are risk accepting are willing to take the gamble, regardless of whether it means forgoing the possibility that 4000 people will survive with certainty, or whether it means opting out of the possibility that 2000 people will die with certainty. The effect of risk orientations emerges, controlling for the frame presented to the subjects. However, we have only estimated a single effect for *Risk Acceptance*, as reflected in our first hypothesis. The second hypothesis suggests a conditional relationship: that the effect of *Risk Acceptance* might depend upon the specific frame presented to the respondents. In particular, we hypothesize that the mortality frame, by situating respondents in a region of losses, might do more to activate risk orientations than the survival frame (which situates respondents in a region of gains). In order to test this hypothesis, we take the basic model featured under H1a (since the controls were essentially irrelevant) and include an interaction between *Mortality Frame* and *Risk Acceptance*. These results appear in the last column of Table 2.

We see that there is no support for H2: the effect of *Risk Acceptance* does not appear to depend upon which frame is presented to respondents. We come to this conclusion not simply because the coefficient on

FIGURE 2 Effects of Frame and Risk Acceptance on Preference for the Probabilistic Outcome



Predicted probabilities with 95% confidence intervals.
Based on estimates from Table 1, H1a.

interaction term is insignificant, but also because it is substantively miniscule (essentially zero).[17] The individual difference of *Risk Acceptance* predicts preference for a probabilistic outcome over a sure thing—*regardless of how that outcome is framed*.

Risk Acceptance and Resistance to Successive Frames

Recall that our experimental design included a within-subjects component. Each subject was randomly assigned to receive the mortality or the survival frame. The subject then answered a question about his/her certainty about that policy choice. Then, the subject was given a second scenario. If the respondent received the mortality frame in the first trial, then the respondent received the survival frame in the second trial (and vice versa if the subject received the survival frame in the first trial). This unique within-subject design allows us to test H3, the proposition that risk orientations will predict consistency in choices across successive framing trials.

Preferences in the second trial were much less polarized than they were in the first trial. In the *Survival Frame*, 49.9% of respondents chose Policy C (the sure thing: ''2000 will live''), whereas 50.1% chose Policy D (the probabilistic outcome). In the *Mortality Frame*, 42.1% of respondents chose Policy C (the sure thing: ''2000 will die''), whereas 57.9% of respondents chose policy D (the probabilistic outcome). The comparison between choices in Trial 1 and Trial 2 appears in Figure 3.

We could treat the second trial as an independent replication (although for reasons discussed below, we might not necessarily want to). If so, then we can repeat the analyses above, using the *Preference for the Probabilistic Outcome* in the second trial as the dependent variable. These results appear in Table 3. Here, we see that the coefficients on frame and *Risk Acceptance* are both statistically significant. Notice, though, that the size of the coefficient on *Mortality Frame* is quite a bit smaller than it was in the first trial, and it is substantively smaller in magnitude than the coefficient for *Risk Acceptance*.[18] These results suggest that the decision-making process in Trial 1 is probably not independent of the decision-making process in Trial 2.[19] The substantive impact of the frame is much smaller in Trial 2—instead of the 38 to 40 percentage point shift that appeared on the first trial, we instead see only an 8 percentage point difference attributable to frame (with those who received the *Mortality Frame* more likely to take the gamble). In contrast, the substantive impact of the *Risk Attitudes* is quite similar, in that a movement along the range of the covariate is associated with about a 20 percentage point increase in the probability of electing the gamble.

The analyses in Table 3 suggest that we might not want to treat the two trials as independent of each other. Surely some contamination occurs between trials, since the effectiveness of the frame is drastically reduced in the second scenario. If respondents were solely responsive to the content of the frame, then we would expect to see substantial preference reversals. This is not what we find, however. The bulk of respondents (63%) proved invulnerable to the classic preference reversal: just over one quarter of respondents (27%) selected sure-thing choices in both trials, and just over a third of respondents (36%) selected probabilistic outcomes in both trials.

What predicts consistency in preference for sure thing and for probabilistic outcomes across the two trials? According to H3, we hypothesized that *Risk Acceptance* would predict consistent choices.[20] First, we examine the mean level of *Risk Acceptance* across the choices respondents make. Respondents who chose ''sure thing'' options on both trials are less risk acceptant than respondents who chose probabilistic outcomes on both trials (this comparison of means is statistically distinguishable from zero at $p < 0.02$). The mean level of risk acceptance among

[17]For a discussion of interpretation of interactions, see Kam and Franzese (2007).

[18]We also included an interaction term between *Risk Acceptance* and *Mortality Frame in Trial 2*; this term was statistically indistinguishable from zero.

[19]If the decision-making process in Trials 1 and 2 were completely independent of each other, then we would expect to see identical effects in Tables 2 and 3. This connection between the trials is perhaps not surprising. As Campbell and Stanley note, in within-subject designs, ''effects of prior treatments are not erasable'' (1963, 6). We included the within-subjects design, however, because to some degree it mimics real political debates: individuals can be exposed to successive frames that conflict with each other.

[20]This design feature is somewhat similar to that of Kowert and Hermann (1997). In their study, subjects read six different scenarios (an economic gamble, a medical gamble, and a military gamble, each presented slightly differently with either a loss or a gain frame). The gambles, however, are each slightly different in content. In contrast, we keep the underlying scenario constant; moreover, we estimate a regression that parses out the effect of frame, risk acceptance, and their interaction.

FIGURE 3 Choices in Trial 1 and Trial 2

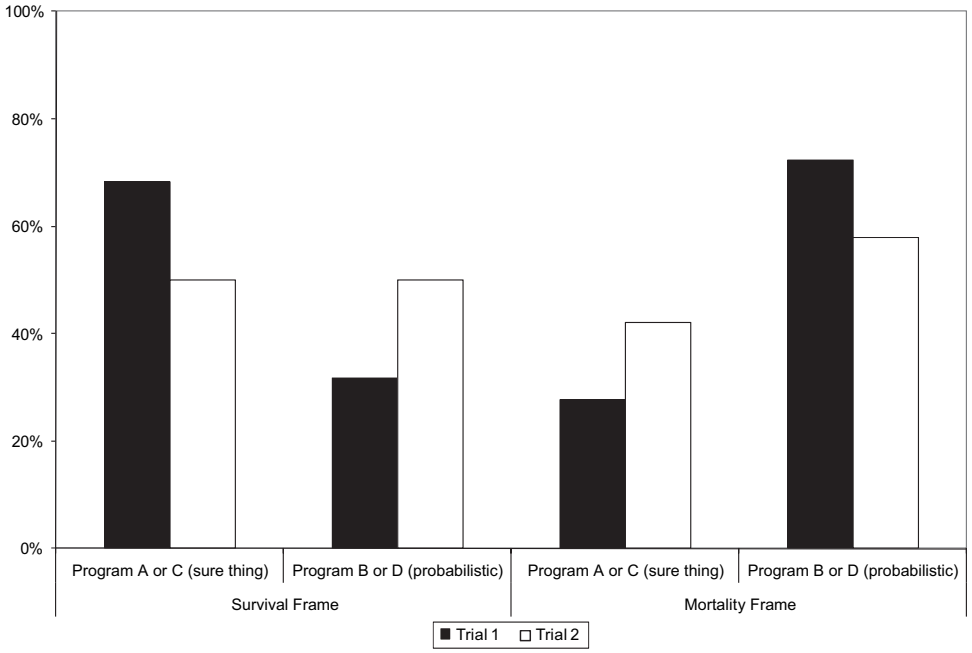


TABLE 3 Risk Acceptance and Preference for the Probabilistic Outcome, Trial 2

	(H1a) Mortality Frame and Risk Acceptance	(H1b) Adding Controls
Mortality Frame in Trial 2	0.202**	0.186**
	0.093	0.094
Risk Acceptance	0.544*	0.691**
	0.288	0.302
Female		0.169*
		0.094
Age		0.153
		0.207
Education		−0.016
		0.191
Household Income		0.126
		0.214
Partisan Ideology		−0.107
Index		0.182
Intercept	−0.242	−0.451
	0.143	0.234
lnL	−515.394	−511.744
$p>\chi^2$	0.017	0.082
N	752	750

Table entry is the probit coefficient with standard error below.
Dependent variable is *Preference for the Probabilistic Outcome on the second trial* (0 = Policy C; 1 = Policy D).
All independent variables are scaled to range from 0 to 1.
***$p < 0.01$; **$p < 0.05$; *$p < 0.10$, two-tailed

those who experienced preference reversals lies in between.[21] This comparison of means is consistent with H3, since risk orientations predict consistency in the types of choices individuals make across trials.

To engage in a more stringent statistical test, we estimate a multinomial logit model using a four-category dependent variable: (1) electing sure-thing outcomes on both trials, (2) electing probabilistic outcomes on both trials, (3) electing a sure thing then a probabilistic outcome (the classic preference reversal for those who received the *Survival Frame* first), or electing a probabilistic outcome and then a sure thing (the classic preference reversal for those who received the *Mortality Frame* first).[22] The results appear in Table 4.

The first column of results displays the probability of selecting probabilistic outcomes in both trials, relative to the baseline of selecting two sure-thing outcomes. Here, we see that the coefficients on both the initial frame and *Risk Acceptance* are statistically significant and in the expected direction. Those

[21]For those who chose both "sure-thing" options, the mean level of risk acceptance is 0.428 (s.e. = 0.011). For those who chose both probabilistic options, the mean level of risk acceptance is 0.462 (s.e. = 0.010). For those who chose one sure-thing and one-probabilistic outcome, the mean risk acceptance is 0.445 (s.e. = 0.013 and 0.014 for those who chose A and D, and B and C, respectively).

[22]The Hausman and the Small-Hsiao tests of IIA supported the null hypothesis of independence.

TABLE 4 Risk Acceptance and Preferences Across Two Trials

	Probabilistic in Both Trials	Sure Thing to Probabilistic	Probabilistic to Sure Thing
Mortality Frame in Trial 1	1.120***	−0.870***	2.229***
(Survival Frame in Trial 2)	0.198	0.251	0.292
Risk Acceptance	1.713***	1.134	0.910
	0.641	0.766	0.750
Female	0.354*	0.291	0.134
	0.198	0.233	0.235
Age	0.490	−0.237	0.104
	0.437	0.511	0.518
Education	−0.343	−0.248	−0.725
	0.398	0.477	0.475
Household Income	0.329	−0.832	−0.539
	0.458	0.535	0.529
Partisan Ideology Index	−0.066	−0.119	0.158
	0.376	0.450	0.455
Intercept	−1.444	−0.040	−1.771
	0.519	0.580	0.631
lnL	−920.950		
$p>\chi^2$	0.000		
N	750		

Table entry is the multinomial logit coefficient with standard error below.
Baseline reference category for the dependent variable is *Sure Thing in Both Trials.*
All independent variables are scaled to range from 0 to 1.
***$p < 0.01$; **$p < 0.05$; *$p < 0.10$, two-tailed

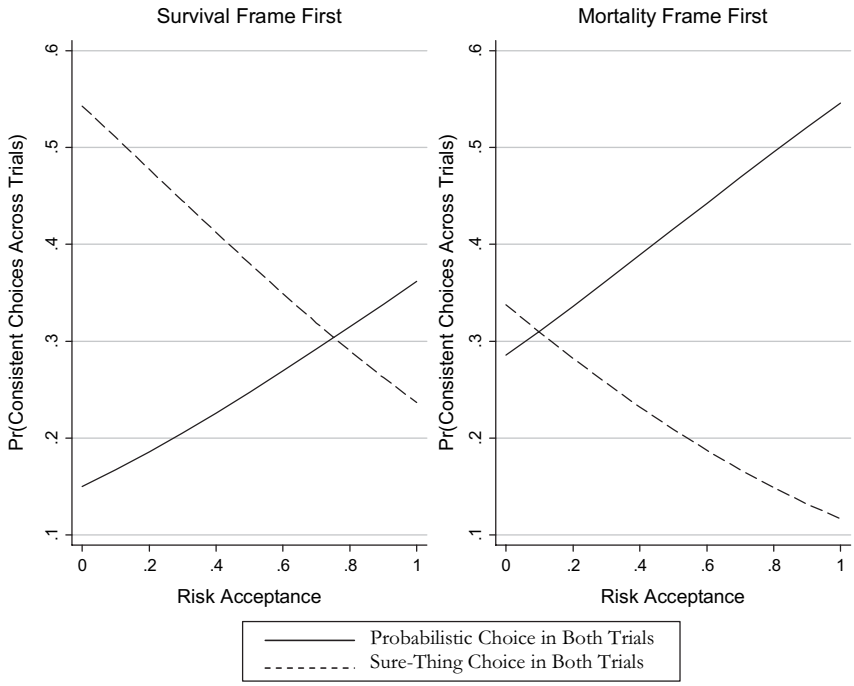
who received the mortality frame first were more likely to make two probabilistic choices compared with two sure-thing choices. Meanwhile, those who received the survival frame first were more likely to make two sure-thing choices compared with two probabilistic choices. The positive and statistically significant coefficient on *Risk Acceptance* indicates that subjects who are risk accepting are significantly more likely to select consistently probabilistic over sure-thing choices, while those who are risk averse are significantly more likely to select consistently sure-thing choices over consistently probabilistic choices. Since both *Mortality Frame* and *Risk Acceptance* are coded from 0 to 1, we can compare the relative magnitude of the effects. Notice that the magnitude of the effect of *Risk Acceptance* actually exceeds that of the *Mortality Frame*, suggesting that risk orientations are a stronger predictor of consistency in choices. Since most of the subjects are located in these two cells (selecting consistently sure-thing or consistently probabilistic choices), the comparison between selecting sure thing in both trials and probabilistic outcomes in both trials is especially relevant.

Figure 4 illustrates the magnitude of the effect of *Risk Acceptance* and *Frame*, with the predicted probability of electing both probabilistic and both sure-thing policies.[23] Across the two graphs, we see that the initial frame is associated with an intercept shift across individuals. However, the direction and relative magnitude of the effect of *Risk Acceptance* on the probability of electing consistent choices is similar regardless of which frame was initially presented. Across the range of *Risk Acceptance*, the probability of selecting both probabilistic choices rises (as shown by the solid line), regardless of whether the survival frame or the mortality frame was initially presented. Additionally, across the range of *Risk Acceptance*, the probability of electing both sure-thing choices declines sharply (as shown by the dotted line). Table 4 and Figure 4 thus provide support for H3: risk orientations predict consistency in choices across successive frames.

The subsequent columns of Table 4 show that preference reversals are primarily a function of the initial frame that was presented. The second column of results allows a comparison between those who stayed with the sure thing on both trials and those

[23]These predicted probabilities are generated for males who are of average education, income, and age, and who are independents and ideological moderates.

FIGURE 4 Predicted Probability of Electing Consistent Choices in Both Trials



Predicted probabilities based on estimates from Table 4.

who moved from sure thing on the first trial to probabilistic on the second trial. The negative and significant coefficient on *Mortality Frame in Trial 1* suggests that among those who selected the sure thing in Trial 1, receiving the survival frame in Trial 2 discourages taking the probabilistic outcome. Those who received the survival frame in the first trial *and selected the sure thing* (which the vast majority of respondents did) are willing to switch to the probabilistic outcome on the second trial (thus displaying the classic preference reversal effect). The small minority of subjects who received the mortality frame in the first trial *and selected the sure thing* become anchored to going with the sure thing. The next column of results looks at the comparison between those who selected the sure thing on both trials, compared with those who opted for the probabilistic outcome on the first trial and switched to the sure thing on the second trial. We see a huge effect for receiving the *Mortality Frame in Trial 1*: among those who received the mortality frame in trial 1 (and the survival frame in trial 2), they are significantly more likely to switch (thus exhibiting the classic preference reversal) compared with those who received the survival frame in trial 1. *Risk Acceptance* adjudicates between those who opt for the sure thing in both trials and those who opt for the probabilistic outcome on both trials. *Risk Acceptance* discriminates better between these two groups of subjects than the initial frame does.[24]

Conclusion

Benjamin Franklin declared that "... in this world nothing can be said to be certain, except death and taxes"[25], political life often *is* uncertain. The ways in which political elites frame policy choices does not always reflect this uncertainty. Some candidates may be described as "known quantities" while others are seen as "risky choices." Policies can be framed as ensuring a gain or providing an opportunity, or as deterring a loss or tempering a threat (e.g., Jerit 2009; Lupia and Menning 2009). In particular, a number of studies since 9/11 have focused on the ability of politicians to send strategic signals about threats in order to gain support for antiterrorism policies (e.g., Huddy et al. 2005; Kam and Kinder 2007). Our results build on this literature and suggest that how

[24]We also included interactions between frame and risk acceptance; these were insignificant.

[25]Letter to Mr. Le Roy, Paris. *Memoirs of Benjamin Franklin*. 1834, p. 619.

policies are framed shapes how citizens respond to political choices.

Consistent with the canonical "Asian disease problem," we found that subjects in our experiment responded strongly to whether policies were presented using a survival or mortality frame. Additionally, however, we pursued the possibility that an individual-level difference variable would predict reactions to the policies. We developed and tested a new individual-difference measure, *Risk Acceptance*, derived from measures employed across several disciplines. This new measure has the virtue of encompassing several existing measures while being administratively tractable enough to be implemented in a nationally representative survey.

We found that this measure of *Risk Acceptance* also predicted reactions to the policies, above and beyond the framing effects. Those who were more risk acceptant were more likely to prefer policies with probabilistic outcomes, whereas those who were more risk averse were more likely to prefer policies that promised sure things. The effects of *Risk Acceptance* operated independently of the frame that was presented to subjects, and there was no evidence of a conditioning effect between frame and *Risk Acceptance*. We attribute our ability to find strong effects of *Risk Acceptance* across multiple dependent variables to the careful construction of our *Risk Acceptance* index. Comparatively little research has taken seriously individual differences in risk acceptance (with some notable exceptions cited above). We posit that this is due to the fact that less comprehensive measures of *Risk Acceptance* do not adequately capture the variation in individuals' risk orientations. We hope that future studies will benefit from incorporating the measure of *Risk Acceptance* we have developed and validated here.

Moreover, our unique within-subject design also enables us to examine how subjects respond to a series of frames. Across two trials, some of our respondents displayed the classic preference reversal predicted by framing theory. But many more of our respondents resisted the new frame. *Risk Acceptance* provides one means (and, moreover, the *only* systematic means in our dataset) of explaining resistance to the second frame. Our results reflect the well-known anchoring and adjustment heuristic (e.g., Tversky and Kahneman 1974), in which subsequent decisions are influenced by prior judgments. In our case, the initial judgment was anchored not so much by the mortality versus survival frame initially presented to subjects, but more so by the resonance of the certain versus probabilistic outcome with their risk orientations. Our results thus add to this literature by showing that risk orientations play a role in how individuals anchor themselves to previous judgments.

Our results also speak to current work on competitive framing. Most existing framing studies have examined the effects of frames when individuals are exposed to one-sided frames; as such, these framing studies ignore the fact that in political life, individuals are often exposed to competing frames: frames that are lodged in immediate succession, one after another (for a discussion of competing frames, see, e.g., Chong and Druckman 2007a, 2007b; Sniderman and Theriault 2004). Our within-subject design enables us to examine responses to different frames, and our results suggest that citizens are not merely blown around by each frame that comes by.

In addition, our results suggest that frames matter, but primarily upon the first presentation. On repeated trials, the strongest predictor is the individual difference measure of *Risk Acceptance*. This finding maps onto discourse in political life, where citizens are often exposed to different types of frames describing a particular set of policy options. It also suggests that framing effects as they unfold in real life might be anchored by responses to an initial frame. After the initial frame is presented, responses are more likely to be directed by individual differences. Our results speak generally to the literature on political communication: more specifically, in explaining how it is that individuals can resist political communications transmitted in the information environment. Finally, responses to initial frames, we have discovered, are a consequence of both the type of frame (survival versus mortality), the kind of language used to describe policy outcomes (sure-thing versus probabilistic outcomes), and individual differences (risk orientations in our case).

Our experiment focuses on a specific type of problem: one about smallpox disease. The specific example focuses on an issue where lives are at stake, and existing research (Druckman and McDermott 2008; Fagley and Miller 1997; Jou, Shanteau, and Harris 1996; Kowert and Hermann 1997; Wang 1996) leads us to suspect that the results we have uncovered may be more pronounced in this domain than in other, nonmortality relevant domains.[26] Still,

[26]Kowert and Hermann (1997) find that framing effects are most pronounced when it comes to problems that concern "the potential loss of life" (medical and military scenarios). Druckman and McDermott (2008), on the other hand, uncover framing effects across both the Asian disease problem and an investment problem, although risk-averse choice is more likely in the latter.

whether or not risk orientations would be more or less consequential in mortality versus nonmortality related domains remains an empirical question, one deserving of further investigation. Existing work suggests that risk orientations are consequential in electoral decision making (Morgenstern and Zechmeister 2001; Berinsky and Lewis 2007; Nadeau, Martin, and Blais 1999; Tomz and Van Houweling 2009), thus giving us some reason to suspect that the relationship we have uncovered between risk orientations and decisions between choices framed as probabilistic versus certain should not be limited to mortality-related domains. Candidates and policies are uncertain quantities. They invite predictions about what will happen in the future (Jerit 2009), and as such, they can be framed using probabilistic versus sure-thing frames. Our work suggests that risk orientations should predict the extent to which these frames, at least upon initial presentation, resonate with citizens.

We have also illustrated another aspect of the classic Tversky and Kahneman "Asian-disease problem" that appeals very clearly to respondents—the idea of presenting an outcome as certain versus probabilistic. Clearly one type of outcome appeals more to some citizens versus others: certain outcomes appeal to the risk averse, while probabilistic gambles appeal to the risk acceptant. Our results thus speak to how strategic political elites might attempt to craft their messages to win over different types of citizens. To the extent that risk orientations are correlated with politically relevant characteristics (sex, age, education, income, ideology, and partisanship), our results suggest that different subgroups of the population may be differentially swayed by policies that are sure things versus gambles—and, perhaps by extension, differentially pulled in by public policies and candidates that promise certain versus probabilistic outcomes.

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Appendix Risk-Acceptance Scale Items

Item	Mean (0=risk averse to 1 = risk accepting)	Standard Deviation
Some people say you should be cautious about making major changes in life. Suppose these people are located at 1. Others say that you will never achieve much in life unless you act boldly. Suppose these people are located at 7. And others have views in between. Where would place yourself on this scale?	0.51	0.24
Suppose you were betting on horses and were a big winner in the third or fourth race. Would you be more likely to continue playing or take your winnings? (Definitely continue playing; Probably continue playing; Not sure; Probably take my winnings; Definitely take my winnings)	0.35	0.28
I would like to explore strange places. (Strongly disagree to strongly agree, 5 categories)	0.62	0.26
I like to do frightening things. (Strongly disagree to strongly agree, 5 categories)	0.34	0.26
I like new and exciting experiences, even if I have to break the rules. (Strongly disagree to strongly agree, 5 categories)	0.39	0.26
I prefer friends who are exciting and unpredictable. (Strongly disagree to strongly agree, 5 categories)	0.48	0.22
In general, how easy or difficult is it for you to accept taking risks? (Very easy; Somewhat easy; Somewhat difficult; Very difficult)	0.45	0.23

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References

Atkinson, John W. 1957. "Motivational Determinants of Risk-Taking Behavior." *Psychological Review* 64: 359–72.

Berinsky, Adam J., and Jeffrey B. Lewis. 2007. "An Estimate of Risk Aversion in the U.S. Electorate." *Quarterly Journal of Political Science* 2: 139–54.

Boettcher, William A., III. 2004. "The Prospects for Prospect Theory: An Empirical Evaluation of International Relations Applications of Framing and Loss Aversion." *Political Psychology* 25: 331–62.

Bueno de Mesquita, Bruce, Rose McDermott, and Emily Cope. 2001. "The Expected Prospects for Peace in Northern Ireland." *International Interactions* 27: 129–67.

Byrnes, James, David Miller, and William Schafer. 1999. "Gender Differences in Risk-Taking: A Meta-Analysis." *Psychological Bulletin* 125: 367–83.

Campbell, Donald T., and Julian C. Stanley. 1963. *Experimental and Quasi-Experimental Designs for Research*. Boston: Houghton Mifflin.

Chong, Dennis, and James N. Druckman. 2007a. "Framing Public Opinion in Competitive Environments." *American Political Science Review* 101 (4): 637–55.

Chong, Dennis, and James N. Druckman. 2007b. "Framing Theory." *Annual Review of Political Science* 10: 103–26.

Druckman, James N. 2001. "On the Limits of Framing Effects: Who Can Frame?" *Journal of Politics* 63 (4): 1041–66.

Druckman, James N., and Rose McDermott. 2008. "Emotion and the Framing of Risky Choice." *Political Behavior* 30 (3): 297–321.

Elliot, Catherine, and Robert Archibald. 1989. "Subjective Framing and Attitudes toward Risk." *Journal of Economic Psychology* 10 (3): 321–38.

Fagley, N. S., and Paul M. Miller. 1990. "The Effect of Framing on Choice: Interactions with Risk-Taking Propensity, Cognitive Style, and Sex." *Personality and Social Psychology Bulletin* 16 (3): 496–510.

Fagley, N. S., and Paul M. Miller. 1997. "Framing Effects and Arenas of Choice: Your Money or Your Life?" *Organizational Behavior and Human Decision Processes* 71: 355–73.

Franklin, Benjamin. 1834. *Memoirs of Benjamin Franklin*. Philadelphia: McCarty & Davis.

Freese, Jeremy L. 2004. "Risk Preferences and Gender Differences in Religiousness: Evidence From the World Values Survey." *Review of Religious Research* 46 (1): 88–91.

Frisch, Deborah. 1993. "Reasons for Framing Effects." *Organizational Behavior and Human Decision Processes* 54: 399–429.

Halek, Martin, and Joseph Eisenhauer. 2001. "Demography of Risk Aversion." *Journal of Risk and Insurance* 68 (1): 1–24.

Highhouse, Scott, and Payam Yuce. 1996. "Perspectives, Perceptions, and Risk-Taking Behavior." *Organizational Behavior and Human Decision Processes* 65 (2): 159–67.

Hoyle, Rick H., Michael T. Stephenson, Philip Palmgreen, Elizabeth Pugzles Lorch, and R. Lewis Donahew. 2002. "Reliability and Validity of a Brief Measure of Sensation Seeking." *Personality and Individual Differences* 32 (3): 401–14.

Huddy, Leonie, Stanely Feldman, Charles Taber, and Gallya Lahav. 2005. "Threat, Anxiety, and Support of Antiterrorism Policies." *American Journal of Political Science*, 49: 593–608.

Jerit, Jennifer. 2009. "How Predictive Appeals Affect Policy Opinions." *American Journal of Political Science* 53 (2): 411–26.

Jou, Jerwen, James Shanteau, and Richard Jackson Harris. 1996. "An Information Processing View of Framing Effects: The Role of Causal Schemas in Decision Making." *Memory and Cognition* 24 (1): 1–15.

Kahneman, Daniel, and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica* 47: 263–91.

Kam, Cindy D., and Robert J. Franzese, Jr. 2007. *Modeling and Interpreting Interactive Hypotheses in Regression Analysis*. Ann Arbor: University of Michigan.

Kam, Cindy D., and Donald R. Kinder. 2007. "Terror and Ethnocentrism: Foundations of American Support for the War on Terrorism." *Journal of Politics* 69 (2): 318–36.

Kogan, Nathan, and Michael Wallach. 1964. *Risk Taking: A Study of Cognition and Personality*. New York: Holt, Rinehart, and Winston.

Kowert, Paul, and Margaret Hermann. 1997. "Who Takes Risks? Daring and Caution in Foreign Policy Making. *Journal of Conflict Resolution* 41: 611–37.

Kühberger, Anton, Michael Schulte-Mecklenbeck, and Josef Perner. 1999. "The Effects of Framing, Reflection, Probability, and Payoff on Risk Preference in Choice Tasks." *Organizational Behavior and Human Decision Processes* 78 (3): 204–31.

Lauriola, Marco, Paolo Russo, Fabio Lucidi, Cristiano Violani, and Irwin Levin. 2005. "The Role of Personality in Positively and Negatively Framed Risky Health Decisions." *Personality and Individual Differences* 38 (1): 45–59.

Lavine, Howard, Diana Burgess, Mark Snyder, John Transue, John Sullivan, Beth Haney, and Stephen Wagner. 1999. "Threat, Authoritarianism, and Voting: An Investigation of Personality and Persuasion." *Personality and Social Psychology Bulletin* 25: 337–47.

Levin, Irwin P., Sandra Schneider, and Gary Gaeth. 1998. "All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects." *Organizational Behavior and Human Decision Processes* 76: 149–88.

Levin, Irwin P., Mary Snyder, and Daniel Chapman. 1988. "The Interaction of Experiential and Situational Factors, and Gender in a Simulated Risky Decision-Making Task." *Journal of Psychology* 122: 173–81.

Lupia, Arthur, and Jesse Menning. 2009. "When Can Politicians Scare Citizens into Supporting Bad Policies?" *American Journal of Political Science* 53 (1): 90–106.

MacCrimmon, Kenneth R., Donald A. Wehrung, and W. T. Stanbury. 1986. *Taking Risks: The Management of Uncertainty*. New York: The Free Press.

MacCrimmon, Kenneth R., and Donald A. Wehrung. 1990. "Characteristics of Risk Taking Executives." *Management Science* 36 (4): 422–35.

McDermott, Rose M. 1998. *Risk-Taking in International Politics: Prospect Theory in American Foreign Policy*. Ann Arbor: University of Michigan.

McDermott, Rose M., and J. Kugler. 2001. "Comparing Rational Choice and Prospect Theory Analyses: The U.S. Decision to Launch Operation 'Desert Storm', January 1991." *Journal of Strategic Studies* 24: 49–85.

Miller, Alan S. 2000. "Going to Hell in Asia: The Relationship between Risk and Religion in a Cross Cultural Setting." *Review of Religious Research* 42 (1): 6–14.

Morgenstern, Scott, and Elizabeth Zechmeister. 2001. "Better the Devil You Know Than the Saint You Don't? Risk Propensity and Vote Choice in Mexico." *Journal of Politics* 63 (1): 93–119.

Nadeau, Richard, Pierre Martin, and André Blais. 1999. "Attitude toward Risk-Taking and Individual Choice in the Quebec Referendum on Sovereignty." *British Journal of Political Science* 29: 523–39.

Neumann, Peter J., and Peter E. Politser. 1992. "Risk and optimality." In *Risk-taking Behavior*, ed. Yates, J. Frank. West Sussex: John Wiley & Sons, 27–47.

Peterson, Steven, and Robert Lawson. 1989. "Risky Business: Prospect Theory and Politics." *Political Psychology* 10: 325–39.

Riley, William B., and K. Victor Chow. 1992. "Asset Allocation and Individual Risk Aversion." *Financial Analysts Journal* 48 (6): 32–37.

Rosen, Allison B., Jerry S. Tsai, and Stephen M. Downs. 2003. "Variations in Risk Attitude Across Race, Gender, and Education." *Medical Decision Making* 23 (6): 511–17.

Rowe, Debra, and Christopher Puto. 1987. "Do Consumers' Reference Points Affect Their Buying Decisions?" *Advances in Consumer Research* 14: 182–87.

Schneider, Sandra L. 1992. "Framing and Conflict: Aspiration Level Contingency, the Status Quo, and Current Theories of Risky Choice." *Journal of Experimental Psychology* 18 (5): 1040–157.

Schneider, Sandra L., and Lola Lopes. 1986. "Reflection in Preferences under Risk: Who and When May Suggest Why." *Journal of Experimental Psychology* 12: 535–48.

Schunk, Daniel, and Cornelia Betsch. 2006. "Explaining Heterogeneity in Utility Functions by Individual Preferences for Intuition and Deliberation." *Journal of Economic Psychology* 27: 386–401.

Smith, V. Kerry, Mary Evans, Hyun Kim, and Donald Taylor. 2004. "Do the Near-Elderly Value Mortality Risks Differently?" *The Review of Economics and Statistics* 86: 423–39.

Sniderman, Paul M., and Sean M. Theriault. 2004. "The Structure of Political Argument and the Logic of Issue Framing." In *Studies in Public Opinion*, Saris, Willem E. and Paul M. Sniderman. Princeton, NJ: Princeton University Press, 133–65.

Sung, Jaimie, and Sherman Hanna. 1996. "Factors Related to Risk Tolerance." *Financial Counseling and Planning* 7 (1): 11–20.

Tomz, Michael, and Robert P. Van Houweling. 2009. "The Electoral Implications of Candidate Ambiguity." *American Political Science Review* 103 (1): 83–98.

Tversky, Amos, and Daniel Kahneman. 1974. "Judgment under Uncertainty: Heuristics and Biases." *Science* 185: 1124–30.

Tversky, Amos, and Daniel Kahneman. 1981. "The Framing of Decisions and the Psychology of Choice." *Science* 211 (4481): 453–58.

Wang, XiaoTian. 1996. "Framing Effects: Dynamics and Task Dynamics." *Organizational Behavior and Human Decision Processes* 68: 145–57.

Xie, Xiao-Fei, and XiaoTian Wang. 2003. "Risk Perception and Risky Choice: Situational, Information, and Dispositional Effects." *Asian Journal of Social Psychology* 6 (2): 117–32.

Zickar, Michael J., and Scott Highhouse. 1998. "Looking Closer at the Effects of Framing on Risky Choice: An Item Response Theory Analysis." *Organizational Behavior and Human Decision Processes* 75 (1): 75–91.

Zuckerman, Marvin, Sybil Eysenck, and Hans Jergen Eysenck. 1978. "Sensation Seeking in England and America." *Journal of Consulting and Clinical Psychology*, 46: 139–49.

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