

**The American Public's Preference for Preparation for the Possible Effects of Global Warming:  
Impact of Communication Strategies**

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# **The American Public's Preference for Preparation for the Possible Effects of Global Warming: Impact of Communication Strategies**

## *Executive Summary*

Communicators discussing efforts to prepare for the effects of global warming can choose many different words to describe the same phenomena. This study explored whether choice of words affects the public's attitude toward preparation. Experiments were embedded in surveys of nationally representative probability samples of American adults. Specifically, we assessed whether attitudes toward preparation varied depending on (1) who endorses preparation efforts, (2) the stated purpose of preparation efforts, (3) the specific global warming consequences targeted in a preparation message, and (4) the specific words used to describe the notion of preparation.

The study yielded six main findings:

- (1) A large majority of Americans preferred taking steps to prepare for possible consequences of global warming rather than waiting for these consequences to occur and dealing with them then, no matter how preparation and its alternative were described.
- (2) Preference for preparation was greatest when no particular group of individuals endorsed such efforts or when such efforts were endorsed by government officials or university researchers. Endorsement of preparation by business leaders or religious leaders reduced preference for preparation.
- (3) The largest number of people preferred preparation when it was described as "increase preparedness" and least when it was described as "increase resilience."

- Preference for preparation was in between these when described as to “reduce risk”, to “reduce vulnerability”, to “increase readiness”, or to “prevent maladaptation”.
- (4) People reacted equivalently to various expressions describing the consequences of global warming. Public preference for preparation was the same regardless of which of three potential consequences were described: effects of global warming on (1) people, the environment, and property, (2) public health, or (3) beaches, properties along the coast, seafood supply, and wildlife.
  - (5) More people expressed a preference for preparation if it was described as “planning” rather than “preparing”.
  - (6) More people preferred preparation when the alternative was described as “respond” to the consequences of global warming after they occur than when the alternative was described as “adapting to” or “adjusting to” those consequences.

These and other findings illustrate how public attitudes toward preparation do and do not differ depending upon how such efforts are described.

## **The American Public's Preference for Preparation for the Possible Effects of Global Warming: Impact of Communication Strategies**

In recent years, communities seeking to increase their resilience to the effects of global warming have employed two strategies. The first has entailed reducing greenhouse gas emissions in the hope that this will reduce the amount of global warming that may occur in the future and the intensity of its impacts. The second strategy has been preparing to deal with expected impacts of future warming. The first of these strategies has been a focus of global warming discussions at local, national, and international levels for decades. The latter, also known as “adaptation to climate change,” is becoming an increasingly visible topic of discussion (e.g., Eakin and Luers 2006; Holdren 2010; NRC 2010a, b; ORNL 2012a, b). A growing number of government-issued reports have called for implementation of adaptation policies (e.g., CNRA 2009; CEQ 2010; NPS 2010; EOEEA 2011).

The International Panel on Climate Change defines adaptation as “adjustments in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC 2007). Adaptation can also be thought of as “adjustments that improve a social or natural system’s capacity to cope with the effects of the changing climate; such adjustments will generally reduce vulnerability to potential loss or damage or help increase resiliency” (Luers and Moser 2006). Notice that these definitions refer both to dealing with effects of global warming that have already appeared and preparing for effects of global warming that are expected to appear in the future. In this paper, we focus only on efforts to prepare in advance for effects of global warming that are expected to occur in the future.

Efforts by governments and other organizations to implement preparation efforts might be facilitated or impeded by public opinion on this issue. If most people see wisdom in preparation efforts, then implementing such efforts may be considerably easier than if most people prefer to wait to see future effects of global warming and deal with them after they occur. And indeed, some government officials perceive a lack of public support, which they see as a barrier to implementing efforts to execute preparation efforts (Hart et al. 2012).

Government agencies, non-governmental organizations, academics, and other interested parties can use different terminologies when talking about preparation, and public reactions may differ depending upon the language that is used. For example, the purpose of preparation can be described as to “reduce risk” (Etkin and Ho 2007; Frumkin et al. 2008), “reduce vulnerability” (Smit and Skinner 2002; Tol 2005), “increase resilience” (van Aalst 2006; Wernberg et al. 2011; Jopp et al. 2010), “increase preparedness” (Meinke and Stone 2005; Salinger 2005), or “increase readiness” (de Loë et al. 2001; Jopp et al., 2010) of people and the environment for the likely consequences of global warming, or to “prevent maladaptation” (Tol et al. 2004; Thomsen et al. 2012) to the consequences of global warming. A preparation effort can be described as targeting specific consequences of global warming, including (1) damage to people, the environment, and property, (2) adverse effects on public health, or (3) adverse consequences for beaches and property along the coast, seafood supply, and wildlife. The very notion of preparation can be described using the phrases “adapt to”, “prepare for”, “plan for”, “respond to” or “adjust to” the likely consequences of global warming. And communications about preparation might mention endorsement by university researchers, government officials, business leaders, religious leaders, or leaders of non-governmental organizations.

The literature on persuasion provides a basis for anticipating how choosing among the

above communication strategies might affect the appeal of preparation to the public. A great deal of research has explored factors that govern the impact of a persuasive communication on beliefs and attitudes (e.g., Albarracin et al. 2005). Message persuasiveness is influenced by characteristics of the source (e.g., credibility; Hovland et al. 1953), of the message recipient (e.g., motivation to process the message's arguments; Cacioppo et al. 1983), and of the message itself (e.g., argument strength; Petty et al. 1981). This research has yielded rich theory and valuable empirical findings that constitute a framework for anticipating the potential persuasiveness of various messages regarding preparation (Gawronski and Bodenhausen 2006; Monroe and Read 2008; Petty and Wegener 1998).

According to much theory and empirical evidence, people are more likely to accept a person's assertion if that person is perceived to be trustworthy (Hovland et al. 1953; Sternthal et al. 1978). Trust in the source of a message has been shown to regulate attitude change with regard to social capital formation (Putnam 1993), the impact of the news media on evaluations of presidents (Miller and Krosnick 2000), voter choice (Hetherington 1999), beliefs about whether global warming has been happening (Malka et al. 2009), and many other phenomena.

When deciding whether to support preparation efforts, people who trust a particular endorser of preparation efforts may be inclined to prefer preparation as a result, whereas an endorsement may have no impact on people who do not trust the source. So, for example, people who trust business leaders may be more likely to prefer preparation efforts after hearing that business leaders endorse such efforts. Thus, preference for preparation efforts may be increased if they are endorsed by highly trusted sources.

According to the Allstate/National Journal Heartland Monitor Poll of the American public conducted between May 19 and 23, 2012, 37% of Americans trusted "scientists and

academics” “a great deal”, in contrast to 22% for “clergy and other religious leaders”, 4% for “elected officials”, and 3% for “leaders of major corporations” (Allstate/National Journal 2012). Similarly, General Social Surveys conducted between 1972 and 2012 revealed that 37% of Americans expressed complete confidence or a great deal of confidence in “churches and religious leaders”, compared to 22% in “business and industry”, 17% in “government departments”, and 16% in the U.S. Congress (General Social Surveys 1972-2012). And in the Northeastern University Innovation in Higher Education Survey, done between October 13 and 18, 2012, 29% of respondents expressed “a great deal” of trust in information from “college and university professors”, as compared to 6% in information from “leaders of major corporations” and 3% for “elected public officials” (Northeastern University 2012). Taken together, these surveys suggest that public trust in college and university scientists is greater than trust in religious leaders, which may be greater than that in business leaders and government officials. So perhaps this ordering provides clues about which sources will be most likely to induce support for preventive efforts regarding global warming consequences.

To explore these issues, experiments were embedded in surveys of nationally representative probability samples of American adults to assess whether the impact of a message varied depending on (1) the endorser of preparation efforts, (2) the stated purpose of preparation efforts (e.g., to reduce risk, increase resiliency), (3) the effects of global warming that are mentioned as a focus of preparation efforts (e.g., on public health), and (4) the words used to describe a preparation effort (e.g., to prepare for, plan for, adapt to) and its alternative (e.g., respond to, adjust to).

In Study 1, an experiment tested the impact of the source of an endorsement. Specifically, respondents were randomly assigned to hear an endorsement either from no

specified source or from one of four specific sources: business leaders, religious leaders, government officials, or university researchers. We assessed whether varying the source altered people's attitudes toward preparation efforts.

We also employed a similar experimental design to compare the impact of various stated purposes of preparation efforts: to “reduce risk”, “reduce vulnerability”, “increase resilience”, “increase readiness”, “increase preparedness”, or “prevent maladaptation”. According to a Google search conducted on September 13, 2013, “reduce risk” appears on about 4 million web pages, compared to about 287,000 for “reduce vulnerability”, 164,000 for “increase resilience”, 25,000 for “increase readiness”, 19,000 for “increase preparedness”, and 1,000 for “prevent maladaptation.” Because frequency of exposure to a stimulus increases the feeling of familiarity (Jacoby and Kelley 1987; Whittlesea and Williams 2000, 2001), and because familiarity generally increases liking (e.g., Zajonc 1968), “reduce risk” might be the phrase most likely to elicit positive reactions, and “prevent maladaptation” might be least likely to do so. Studies 1 and 2 explored whether people reacted differently to alternative objectives.

Study 2 also gauged whether people reacted differently depending on which effects of global warming were described by a message: (1) damage to people, the environment, and property, (2) adverse effects on public health in terms of illnesses and premature deaths, or (3) adverse consequences for beaches and property along the coast, seafood supply, and wildlife. We are not aware of any existing research suggesting which of these stated impacts might be most motivating to people.

Studies 3 and 4 explored whether people reacted differently to alternative action phrases describing preparation (“prepare for” vs. “plan for”) and alternative phrases to describe not preparing (“adapt to”, “adjust to”, or “respond to”). As shown in Table 1, “plan for” appeared on



slightly more web pages than “prepare for”, so perhaps people might feel that “plan for” is slightly more familiar, and it might be slightly more persuasive. “Respond to” appeared on many more web pages than “adapt to”, which appeared on more web pages than “adjust to.” So perhaps the first of these phrases might be most persuasive, and the last might be least persuasive.

These experiments also allowed us to explore the predictors of attitudes toward preparation. Past research on environmental attitudes suggests that demographic groups differ in their support for efforts to protect the natural world (for a review, see, e.g., Daniels et al. 2013). Often, women have been found to be more pro-environment than men, perhaps due to women’s socialization attaching greater value to nurturing or altruism (Daniels et al. 2013). Some past work suggests that racial minorities might be more supportive of environmental protection, perhaps due to increased perceptions of vulnerability to environmental problems, but this pattern has often not been consistently observed (Daniels et al. 2013). Some past studies suggest that younger adults are more pro-environment, perhaps because they expect to live longer with the environment than will older individuals (Daniels et al. 2013). One might imagine that formal education increases an understanding of the value of the environment and of natural resources, but such a relation has been observed in only a minority of past studies that tested for it (Daniels et al. 2013). Similarly, income has rarely been found to be a predictor of environmental attitudes. More reliably, Democrats have been more pro-environment than have Republicans (Daniels et al. 2013). We used the survey data to gauge the associations of these variables with attitudes toward preparation.

We begin below by describing our methodology and then describe the findings of the studies and their implications.

## Method

### Study 1

In Study 1's test of the impact of the source of endorsement of preparation efforts, respondents were randomly assigned to hear either no endorsement from any specified source or to hear an endorsement from one of four specific sources: business leaders, religious leaders, government officials, or university researchers. We assessed whether a specific source expressing endorsement altered people's attitudes toward preparation efforts. Study 1 also tested the impact of mentioning various objectives: "reduce risk", "reduce vulnerability", "increase resilience", "increase preparedness", "increase readiness", or "prevent maladaptation".

Sample. Ipsos conducted interviews with a nationally representative sample of 1,004 U.S. adults by telephone between January 3 and 6, 2013 (804 people via landline telephones, and 200 via cell phones). Interviews were administered in English and Spanish. The AAPOR Response Rate 3 was 4.2%.

Phone numbers to be called were drawn from the landline and cellular telephone random digit dial (RDD) frames by Survey Sampling International, LLC. Landline telephone numbers were drawn with equal probabilities from active blocks (area code + exchange + two-digit block number) that contained one or more residential directory listings. The cell phone sample was generated through systematic sampling from 1000-blocks dedicated to cellular service according to the Telcordia database.

Weights were computed that accounted for unequal probabilities of selection and post-stratified to population proportions in terms of age and sex cross-tabulated, education, ethnicity and race cross-tabulated, Census region, and metro density.

The wordings of questions used to measure demographics and coding of answers to those

questions are described in Appendix A for the English questionnaire, and Appendix C presents the Spanish questionnaire's wordings. Table A1 in Appendix B displays distributions of unweighted and weighted demographics of the respondents and of the nation (according to the October 2012 Current Population Survey, done by the U.S. Census Bureau). These distributions show that the survey sample was similar to the American population before the weights were applied and was more similar after the data were weighted. The results reported here were generated using weighted data.

Measures. Respondents were randomly assigned to be asked one of five versions of a question measuring preferences regarding preparation. The first version of the question was:

“Many scientists who study the world’s climate believe that the earth has been warming over the past 100 years and will continue to do so in the future. These scientists believe that past and future warming will have effects on people and the environment and will change how people live their lives.

One option people and organizations have is to wait for these changes to happen and then adapt to them. However, people and organizations could instead do things soon to try to prepare for these changes before they happen to reduce risk for people and property.

If you had to choose, which would you prefer that people and organizations do? Wait for the changes to happen and then adapt to them, or try to prepare for these changes before they happen to reduce risk for people and property?”<sup>1</sup>

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<sup>1</sup> To explore whether there might be a response order effect, respondents were randomly assigned to hear the question as stated here or to hear the two alternatives in the reverse order (“try to prepare for the changes before they happen...” preceded “wait for these changes to happen and

In the second version of the question, “However, people and organizations could” was replaced by “However, many business leaders think that people and organizations should”. In the third, fourth, and fifth versions of the question, “business leaders” in the second version was replaced with “religious leaders”, “government officials”, and “university researchers”, respectively.

Respondents were also randomly assigned to hear one of six different wordings regarding preparation objectives. The second, third, fourth, fifth, and sixth versions of the questions were constructed by replacing “reduce risk” in the first version (above) with “reduce vulnerability”, “increase resilience”, “increase preparedness”, “increase readiness”, and “prevent maladaptation”, respectively.

Responses were coded 1 for respondents who preferred advance preparation and 0 for respondents who did not prefer advance preparation.

## **Study 2**

Study 2 employed an experimental design similar to that of Study 1 without any specific endorsers and again compared the impact of stating different preparation objectives and focusing on different consequences of global warming: effects on “people, the environment, and property” generally, on public health in terms of “injuries, illnesses, and deaths”, and on coasts in terms of “beaches and property along the coast, seafood supply, and wildlife”.

Sample. Ipsos conducted interviews with a nationally representative sample of 1,000 U.S. adults by telephone between February 7 and 11, 2013 (800 respondents via landline telephones, and 200 via cell phones). Interviews were administered in English and Spanish. The

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then adapt to them”. This manipulation did not cause a statistically significant change in the distribution of responses in the full sample ( $p = .46$ ) or among respondents who had no college education, for whom response order effects are typically strongest ( $p = .96$ ).

AAPOR Response Rate 3 was 1.7%.

Sample drawing and weight construction were performed in identical ways as in Study 1. Distributions of unweighted and weighted demographics of the respondents and of the nation are shown in Table A2 in Appendix B. These distributions show that the respondents were similar to the American population before the weights were applied and were more similar after the data were weighted. The weighted sample slightly overrepresented people aged 45 to 54 and high school graduates. The results reported here were generated using weighted data.

Measures. Respondents were randomly assigned to be asked one of three versions of a question varying the stated consequence of global warming. The first version of the question—focused on people, the environment, and property—was:

“Many scientists who study the world’s climate believe that the earth has been warming over the past 100 years and will continue to do so in the future. These scientists believe that past and future warming will have effects on people and the environment and will change how people live their lives.

One option people and organizations have is to wait for these changes to happen and then adapt to them. However, people and organizations could instead do things soon to try to prepare for these changes before they happen to reduce risk for people and property.

If you had to choose, which would you prefer that people and organizations do? Wait for the changes to happen and then adapt to them, or try to prepare for these changes before they happen to reduce risk for people and property?”

The second version of the question, focused on health, was:

“Many scientists who study the world’s climate believe that the earth has been warming over the past 100 years and will continue to do so in the future. And scientists believe that past and future warming will cause more injuries, illnesses, and deaths.

One option people and organizations have is to wait for these changes to happen and then adapt to them. However, people and organizations could instead do things soon to try to prepare for these changes before they happen to reduce risk for people’s health.

If you had to choose, which would you prefer that people and organizations do? Wait for the changes to happen and then adapt to them, or try to prepare for these changes before they happen to reduce risk for people’s health?”

The third version of the question, focused on coastal impacts, was:

“Many scientists who study the world’s climate believe that the earth has been warming over the past 100 years and will continue to do so in the future. And scientists believe that past and future warming will destroy beaches and properties along the coast, reduce seafood supply, and disrupt wildlife.

One option people and organizations have is to wait for these changes to happen and then adapt to them. However, people and organizations could instead do things soon to try to prepare for these changes before they happen to reduce risk for beaches, properties along the coast, seafood supply, and wildlife.

If you had to choose, which would you prefer that people and organizations do? Wait for the changes to happen and then adapt to them, or try

to prepare for these changes before they happen to reduce risk for beaches, properties along the coast, seafood supply, and wildlife?”

Responses were coded as in Study 1.

### **Study 3**

Study 3 employed an experimental design similar to that in Study 2, exploring the impact of various descriptions of consequences and determining whether people reacted differently to different words describing preparation (prepare for, plan for the consequences of global warming) and different words describing not preparing (adapt to, adjust to, or respond to).

Sample. Ipsos conducted telephone interviews with a nationally representative sample of 1,003 U.S. adults between March 7 and 11, 2013 (801 via landline telephones, and 202 via cell phones). Interviews were administered in English and Spanish. The AAPOR Response Rate 3 was 3.3%.

Sample drawing and weight construction were performed as in Study 1 and 2. Distributions of unweighted and weighted demographics of the respondents and the nation are shown in Table A2 in Appendix B. These distributions show that the respondents were similar to the American population before the weights were applied and were more similar after the data were weighted. The sample slightly overrepresented high school graduates. The results reported here were generated using weighted data.

Measures. Respondents were randomly assigned to be asked one of six versions of a question varying the descriptions of actions. The first version of the question was:

“Many scientists who study the world’s climate believe that the earth has been warming over the past 100 years and will continue to do so in the future.

These scientists believe that past and future warming will have effects on people

and the environment and will change how people live their lives.

One option people and organizations have is to wait for these changes to happen and then adapt to them. However, people and organizations could instead do things soon to try to prepare for these changes before they happen to increase readiness for people and property.

If you had to choose, which would you prefer that people and organizations do? Wait for the changes to happen and then adapt to them, or try to prepare for these changes before they happen to reduce risk for people and property?”

In the second and third versions of the question, the word “adapt” in the phrase “wait for these changes to happen and then adapt to them” in the first version was replaced with the word “adjust” or “respond”, respectively. The fourth, fifth, and sixth versions of the question were formulated by replacing the word “prepare” in the first, second, and third versions with the word “plan.”

Responses were coded as in Studies 1 and 3.

#### **Study 4**

Study 4 employed the same design as in Study 3.

Sample. Ipsos conducted telephone interviews with a nationally representative sample of 1,003 U.S. adults between April 4 and 8, 2013 (800 via landline telephones, and 201 via cell phones). Interviews were administered in English and Spanish. The AAPOR Response Rate 3 was 2.9%.

Sample drawing and weight construction were performed as in Study 1, 2, and 3. Distributions of unweighted and weighted demographics of the respondents and the nation are



shown in Table A3 in Appendix B. These distributions show that the respondents were similar to the American population before the weights were applied and were more similar after the data were weighted. The sample slightly overrepresented high school graduates. The results reported here were generated using weighted data.

Measures. The same measures were employed in Study 4 as in Study 3.

### **Analytical Methods**

We gauged the impact of various messages on preference for preparation by combining the data from all experiments and controlling for demographics and political party affiliation. An OLS regression predicting preference for preparation gauged the causal impact of the wording manipulations.

## **Results**

### **Overall Preference for Preparation and Demographic Predictors of It**

Combining across all studies, about three-quarters of the respondents (74%) said they preferred preparation over waiting. An OLS regression identified various predictors of preference for preparation. First, consistent with past research, preference for preparation was greatest among Democrats and lowest among Republicans, with Independents in between. Democrats' preference for preparation was 16 percentage points greater than that of Independents' ( $p < .01$ ), and Republicans' preference was 11 percentage points lower than that of Independents' ( $p < .01$ ).

Also in line with some past research, (1) preference for preparation was greater among females than among males, a significant difference of 7 percentage points ( $p < .01$ ), (2) Hispanics were 12 percentage points more likely to prefer preparation than non-Hispanic whites ( $p < .01$ ), and (3) preference for preparation was higher among younger American adults,

a significant difference of 4 percentage points ( $p = .03$ ). Preference for preparation was also higher among more educated people: people with some college or college degrees were 4 percentage points more likely to support preparation than people with high school degrees or less ( $p = .05$ ). Preferences did not differ significantly by income or by region of residence and was not different between whites and non-Hispanic blacks.

### **Endorsement**

76% of respondents expressed a preference for preparation when hearing no endorser, 71% said so when hearing government officials endorse preparation, 70% said so when hearing university researchers endorse it, 67% said so when hearing business leaders endorse it, and 61% said so when hearing religious leaders endorse it.

Endorsement by religious leaders significantly reduced preference for preparation ( $b = -.15, p < .05$ ), and endorsement by business leaders marginally significantly reduced preference for preparation ( $b = -.10, p < .10$ ). Endorsement by government officials and university researchers did not significantly alter preference for preparation.

### **Preparation Objectives**

77% of people expressed a preference for preparation when its objective was described as to increase readiness, 74% did so when the objective was described as to increase preparedness, 71% did so when the objective was described as to reduce risk, 71% did so when the objective was described as to reduce vulnerability, and 70% did so when the objective was described as to prevent maladaptation, and 68% did so when the objective was described as to increase resilience. Preference for preparation was marginally significantly higher when people heard “increase preparedness” than when they heard “increase resilience” ( $b = .07, p < .10$ ); no other differences between the phrases were statistically significant.

## **Consequences**

75% of people expressed a preference for preparation when focused on the consequences of global warming for people, the environment, and property generally, 75% did so when hearing about the public health consequences of global warming, and 73% did so when hearing the coastal consequences of global warming. None of these figures are significantly different from one another.

## **Words Used to Describe Preparation**

79% of respondents expressed a preference for preparation when hearing it described as doing things to “plan for” changes, and 72% did so when hearing it described as doing things to “prepare for” changes, a marginally significant difference ( $b = -.05, p < .10$ ).

## **Words Used to Describe Waiting**

82% of the public expressed a preference for preparation when hearing the alternative described as “respond to” changes after they happen, 77% did so when hearing the alternative described as “adjust to” changes, and 71% did so when hearing the alternative described as “adapt to” changes. Adapting was the most appealing way to describe not preparing, significantly more appealing than “respond to” ( $b = -.10, p < .01$ ). Adjusting was marginally significantly more appealing than “responding” in describing not preparing ( $b = -.07, p < .10$ ).

## **Conclusions**

These experiments yielded six main findings:

- (1) A large majority of Americans preferred taking steps to prepare for possible consequences of global warming rather than waiting for these consequences to occur and dealing with them then.
- (2) Preference for preparation was greatest when no particular group of individuals

- endorsed such efforts or when such efforts were endorsed by government officials or university researchers. Endorsement of preparation by business leaders or religious leaders reduced preference for preparation.
- (3) The largest number of people preferred preparation when it was described as “increase preparedness” and least when it was described as “increase resilience.” Preference for preparation was in between these when described as to reduce risk, to reduce vulnerability, to increase readiness, or to prevent maladaptation.
  - (4) People reacted equivalently to various expressions describing the consequences of global warming. Public preference for preparation was the same regardless of which of three potential consequences were described: effects of global warming on (1) people, the environment, and property, (2) public health, or (3) beaches, properties along the coast, seafood supply, and wildlife.
  - (5) More people expressed a preference for preparation if it was described as “plan for” changes rather than “prepare for” changes.
  - (6) More people preferred preparation when the alternative was described as “respond” to the consequences of global warming after they occur than when the alternative was described as “adapting to” or “adjusting to” those consequences.

One way to look at these findings is as a way to understand how the public has been and will react to messages describing preparation and non-preparation options differently. This sort of experimentation has a long history in political psychology. For example, Kinder and Sanders (1990) were interested in the impact of public debates on public opinion on affirmative action. Sometimes, opponents of affirmative action have characterized it as entailing reverse discrimination against qualified White candidates; other times, opponents have characterized

affirmative action as giving unfair advantages to minority candidates. Did this difference in framing change the way the general public formed opinions on the issue?

To answer this question, Kinder and Sanders (1990) asked White respondents in a national survey about whether they favored or opposed affirmative action programs in hiring and promotions and in college admissions. Some respondents were randomly assigned to receive a description of opposition to affirmative action as emanating from the belief that it involves reverse discrimination. Other respondents, again selected randomly, were told that opposition to affirmative action emanates from the belief that it provides unfair advantages to minorities. This experimental design revealed how different ways of talking about affirmative action altered the ways that people think about the policy. Our experiments are analogous.

Another way to look at our findings is as illustrating how different question wordings can produce different results in surveys. A huge literature has explored such phenomena (e.g., Schuman and Presser 1981). Although our experiments showed some instances in which a change in wording changed the distribution of respondents' answers, we also observed many instances in which wording changes did not change the distribution of answers. This suggests that survey results are not necessarily so easily manipulated by wording changes or so fragile as some critics suggest.

The evidence here that question wording alterations affect answers is in line with a variety of other studies showing that people sometimes react differently to different words expressing the same idea. For example, Dawes (2000) asked some respondents, "What are the chances that on your next renewal for your car insurance, you will change from your existing provider?" For other respondents, "change from" was replaced with "renew with." The same experiment was replicated addressing home insurance as well. We might expect that probability

judgments on a 0-10 scale should be symmetric for the two question wordings, but this was not the case. For example more people said there was no chance they would defect on car insurance (51%) than said they were certain they would renew (41%), a significant difference. The same pattern of differences appeared in the home insurance experiment as well.

Similar results were reported in a study of evaluations of a person with responsibility for coordinating the activities of committees of people, who can be referred to as the committee “chair” or the committee “chairperson.” Although these might seem to be synonyms, McConnell and Fazio (1996) found that a person labeled “chair” was perceived as more masculine than the same person labeled “chairperson,” but only if the person was said to have chosen the label for himself/herself. This effect of label occurred regardless of whether the target person was said to have a man’s name, a women’s name, or a gender-ambiguous name. But when respondents knew that the label was chosen by someone other than the person to whom it was attached, the label had no impact on inferences of his/her personality. Our findings contribute to the literature on such effects by documenting some wording changes that were consequential and some that were not. Our findings suggest humility when guessing whether a change in question wording will alter responses, because some changes that seemed likely to alter reactions did not.

Another way in which our findings might seem surprising involves the effects of endorsement. We proposed the possibility that trust in endorsers might predict their impact on preference for preparation. And we reviewed survey evidence suggesting that public trust in college and university scientists is greater than trust in religious leaders, which may be greater than that in business leaders and government officials. Consistent with this logic, preference for preparation was greater when it was endorsed by university researchers than when endorsed by religious leaders or business leaders. But preference for preparation was greater when it was

endorsed by government officials than when endorsed by religious leaders and business leaders. This challenges the notion that general trust in these endorsers can be used to predict the impact of their endorsements on preference for preparation. Likewise, the appeal of various phrases describing preparation and waiting was not in line with the frequencies of the use of those phrases documented in Table 1. This challenges the notion that mere familiarity is a good basis for anticipating the appeal of a word or phrase.

Collapsing across all wordings we examined, 74% of Americans expressed a preference for preparation efforts. The largest percentage observed was 82% in response to the following framing:

“One option people and organizations have is to wait for these changes to happen and then respond to them. However, people and organizations could instead do things soon to try to plan for these changes before they happen to reduce risk for people and property.”

The smallest percentage observed was 61% in response to the following framing:

“One option people and organizations have is to wait for these changes to happen and then adapt to them. However, many religious leaders think that people and organizations should instead do things soon to try to prepare for these changes before they happen to reduce risk for people and property.”

Thus, viewed from one perspective, we observed considerable variation – a range of 61% to 82%. On the other hand, no matter how the question was phrased, a majority of respondents said they preferred preparation. So this aspect of the results appears to be robust to the manipulations implemented here.

We should be careful about generalizing these results to non-survey settings. In this

study, questions were asked by survey interviewers who respondents are likely to have perceived as unbiased with regard to the issue of global warming. When a message is delivered by a representative of government, business, non-governmental organizations, research organizations, or other organizations, different responses might be observed, though we see no strong reason why this should occur. Furthermore, the results reported here may apply most readily to situations in which people hear a message aurally and form opinions quickly, as happens during survey interviews. If respondents read a message and/or take a longer time to formulate a judgment after hearing a message, different results might be observed.



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Table 1: Occurrence Frequency of Various Phrases on Webpages

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Phrase	Frequency of Occurrences	Frequency of Occurrences (along with “global warming” or “climate change”)
Plan for	79 million	12 million
Prepare for	61 million	8 million
Respond to	161 million	20 million
Adapt to	21 million	7 million
Adjust to	12 million	1 million

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*Notes:* Presented are the numbers of web pages, rounded to the nearest million, containing the phrases, obtained using Google on August 19, 2013.

Table 2: OLS Regression Marginal Probabilities Estimating the Impact of Wording on Preference for Preparation Efforts

Predictor	Marginal Probabilities
<u>Experimental Conditions</u>	
Endorsement source: none (omitted)	-
Endorsement source: business leaders	-0.10* (0.06)
Endorsement source: government officials	-0.05 (0.07)
Endorsement source: religious leaders	-0.15** (0.07)
Endorsement source: university researchers	-0.05 (0.07)
Policy objective: increase resilience (omitted)	-
Policy objective: reduce risk	0.03 (0.04)
Policy objective: reduce vulnerability	0.03 (0.04)
Policy objective: increase preparedness	0.07* (0.03)
Policy objective: increase readiness	0.06 (0.04)
Policy objective: prevent maladaptation	0.03 (0.04)
Consequence: people, the environment, and property (omitted)	-
Consequence: public health	-0.02 (0.03)
Consequence: coasts	-0.03 (0.03)
Verb in describing taking action: prepare (omitted)	
Verb in describing taking action: plan	0.05* (0.02)
Verb in describing waiting: respond (omitted)	-
Verb in describing waiting: adapt	-0.10***

Verb in describing waiting: adjust	(0.03)
	-0.07*
	(0.04)

Demographic Predictors

Democrat	0.16***
	(0.02)
Republican	-0.11***
	(0.03)
Female	0.07***
	(0.02)
Age 55 or older	-0.04**
	(0.02)
Age - missing	-0.07
	(0.09)
Non-Hispanic Black	0.03
	(0.03)
Hispanic	0.12***
	(0.02)
Non-Hispanic other race	-0.02
	(0.04)
HS graduate or less	-0.05**
	(0.02)
Education - missing	-0.21**
	(0.09)
Income \$75,000 or more	0.01
	(0.02)
Income - missing	-0.07*
	(0.04)
Northeast	0.03
	(0.03)
Midwest	0.01
	(0.03)
South	0.02
	(0.02)

Dummy Variables for Studies

Study 1	0.02
	(0.04)
Study 3	-0.06
	(0.05)
Study 4	-0.02
	(0.04)

N 4,008

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Notes: Presented are marginal probabilities with standard errors in parentheses of logistics regressions predicting support for preparation efforts on message experimental conditions and demographics among the general population

adjusting for sampling weights with data pooled from Ipsos Omnibus survey conducted in January 2013, February 2013, March 2013 and April 2013. The dependent variable was coded 1 for respondents who said that “people and organizations should try to prepare for these changes” and was coded 0 for all other respondents. All predictors were dichotomous. *Age 55 or older* was coded 1 if respondent was age 55 or older and 0 otherwise. *High school graduate or less* was coded 1 if respondent was a high school graduate or less and 0 otherwise. *Income \$75,000 or more* was coded 1 for respondents whose household income was \$75,000 or more and 0 otherwise. *Age – missing* was coded 1 for respondents who did not report their age and 0 otherwise. *Education – missing* was coded 1 for respondents who did not report their education and 0 otherwise. *Income – missing* was coded 1 for respondents who did not report their income and 0 otherwise. *Study 1 Study 3* and *Study 4* are indicators for studies. Omitted experimental condition: no endorsement source, reduce risk as objective, consequence from global warming on people and property, and action phrases of “adapt” and “prepare”. Omitted demographic categories were Independent, male, age under 55, non-Hispanic White, some college or higher, income less than \$75,000, and living in South.

\*\*\* $p < .01$  \*\* $p < .05$  \* $p < .10$



## **Appendix A: Question Wording and Coding of Demographics Measures**

Age. In all studies, respondents were asked, “In what year were you born” and “Have you already had a birthday this year?” People who refused to report their year of birth were asked to select an age range from among the following categories: under 25, 25-34, 35-44, 45-54, 55-64, 65-74, and 75 or older. Based on these questions, we constructed indicators for the following age groups: age 18 to 24, age 25 to 34, age 35 to 44, age 45 to 54, age 55 to 64, and age 65 or older.

Race and ethnicity. In all studies, respondents were asked, “Are you of Hispanic ethnicity?” and “Are you White, Black, Asian, American Indian, or other?” Indicators for non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic other race were constructed.

Education. In all studies, respondents were asked, “What is the last year of school you completed – Grade school or some high school, Completed high school, Some college but did not finish, Completed a two year college degree, Completed a four year college degree, or Completed a post-graduate degree such as Master’s or PhD?” Indicators were constructed to identify respondents in the following groups: “Completed Grade school or some high school”, “Completed high school”, “Some college but did not finish” or “Completed a two year college degree”, and “Completed a four year college degree” or “Completed a post-graduate degree such as Master’s or PhD”.

Region. In all studies, the firm that generated the sample of telephone numbers to dial provided the region in which each respondent’s residence was located. We created dummy variables identifying these four regions: Northeast, Midwest, South and West.

Political Party Affiliation. In all studies, respondents were asked, “Do you consider yourself a Democrat, a Republican, an Independent, or none of these?” Indicators were coded for Democrat, Republican, and Independent or none of these.

## Appendix B: Demographics of the Samples

Table A1: Demographics of the Samples in Study 1 and the Current Population Survey

Demographic Group	January 2013 Survey (unweighted)	January 2013 Survey (weighted)	CPS October 2012	January 2013 Survey (weighted) – CPS
<u>Gender</u>				
Male	47.4%	48.6%	48.1%	.5%
Female	52.6	51.5	51.9	-.5
Total	100.0%	100.0%	100.0%	
	(N = 1004)	(N = 1003)	(N = 101,289)	
<u>Age</u>				
18-24	7.1%	11.6%	12.8%	-1.2%
25-34	11.6	19.2	17.5	1.7
35-44	12.8	13.2	16.9	-3.7
45-54	20.8	23.0	18.5	4.5
55-64	23.6	15.3	16.4	-1.1
65+	24.1	17.6	18.0	-.4
Total	100.0%	100.0%	100.0%	
	(N = 998)	(N = 998)	(N = 101,289)	
<u>Race and Ethnicity</u>				
Non-Hispanic White	68.7%	68.0%	66.2%	1.8%
Non-Hispanic Black	6.2	11.2	11.5	-.3
Hispanic	20.6	13.9	15.0	-1.1
Other	4.5	6.9	7.4	-.5
Total	100.0%	100.0%	100.0%	
	(N = 1004)	(N = 1004)	(N = 101,289)	
<u>Education</u>				
Less than HS	11.2%	13.9%	12.4%	1.5%
HS graduates	22.6	33.9	29.9	4.0
Some college	29.1	24.5	28.9	-4.4
College or higher	37.1	27.8	28.9	-1.1
Total	100.0%	100.0%	100.0%	
	(N = 994)	(N = 994)	(N = 101,289)	
<u>Region</u>				
Northeast	18.9%	18.5%	18.3%	.2%
Midwest	22.3	21.9	21.5	.4
South	36.4	37.0	37.0	-.1
West	22.4	22.7	23.2	-.5
Total	100.0%	100.0%	100.0%	
	(N = 1004)	(N = 1004)	(N = 101,289)	

Table A2: Demographics of the Samples in Study 2 and 3 and the Current Population Survey

Demographic Group	February 2013 Survey (unweighted)	February 2013 Survey (weighted)	March 2013 Survey (unweighted)	March 2013 Survey (weighted)	February 2013 CPS	Difference of Survey from February 2013 CPS (weighted)	Difference of Survey from March 2013 CPS (weighted)
<u>Gender</u>							
Male	53.2%	48.1%	48.2%	48.6%	48.1%	.0%	.5%
Female	46.8	51.9	51.8	51.5	51.9	.0	-.4
Total	100.0%	100.0%	100.0%	100.0%	100.0%		
	(N = 1000)	(N = 1000)	(N = 1003)	(N = 1003)	(N = 100,497)		
<u>Age</u>							
18-24	7.6%	15.9%	8.1%	13.9%	12.6%	3.3%	1.3%
25-34	9.3	15.0	10.6	16.9	17.5	-2.5	-.6
35-44	10.9	12.2	10.4	13.5	16.8	-4.6	-3.3
45-54	18.3	24.1	17.3	22.7	18.4	5.7	4.3
55-64	25.3	15.3	24.3	13.7	16.5	-1.2	-2.8
65+	28.5	17.6	29.5	19.2	18.2	-.6	1.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%		
	(N = 987)	(N = 987)	(N = 994)	(N = 994)	(N = 100,497)		
<u>Race and Ethnicity</u>							
Non-Hispanic White	75.7%	67.9%	69.2%	67.1%	66.0%	1.9%	1.1%
Non-Hispanic Black	10.6	10.8	10.5	11.5	11.6	-.8	-.1
Hispanic	8.3	13.8	13.9	13.8	15.0	-1.2	-1.2
Other	5.4	7.5	6.5	7.6	7.3	.2	.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%		
	(N = 1000)	(N = 1000)	(N = 1003)	(N = 1003)	(N = 100,497)		
<u>Education</u>							
Less than HS	6.7%	10.3%	7.4%	11.7%	12.2%	-1.9%	-.5%
HS graduates	21.5	37.4	22.3	36.1	29.9	7.5	6.2
Some college	31.1	24.5	33.5	24.5	29.0	-4.5	-4.5
College or higher	41.4	27.7	36.8	27.7	29.0	-1.3	-1.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%		
	(N = 988)	(N = 988)	(N = 990)	(N = 990)	(N = 100,497)		
<u>Region</u>							
Northeast	19.0%	18.5%	18.5%	18.5%	18.2%	.3%	.3%
Midwest	22.5	21.9	21.9	21.9	21.4	.5	.5
South	36.2	37.0	37.0	37.0	37.1	-.1	-.1
West	22.3	22.7	22.7	22.7	23.3	-.6	-.6
Total	100.0%	100.0%	100.0%	100.0%	100.0%		
	(N = 1000)	(N = 1000)	(N = 1003)	(N = 1003)	(N = 100,497)		

Table A3: Demographics of the Sample in Study 4 and the Current Population Survey

Demographic Group	April 2013 Survey (unweighted)	April 2013 Survey (weighted)	February 2013 CPS	Difference of Survey from February 2013 CPS (weighted)
<u>Gender</u>				
Male	47.4%	48.6%	48.1%	.5%
Female	52.7	51.4	51.9	-.5
Total	100.0%	100.0%	100.0%	
	(N = 1001)	(N = 1001)	(N = 100,497)	
<u>Age</u>				
18-24	6.5%	14.2%	12.6%	1.6%
25-34	10.6	16.7	17.5	-.8
35-44	10.3	13.2	16.8	-3.6
45-54	18.1	23.1	18.4	4.7
55-64	24.1	14.0	16.5	-2.5
65+	30.4	18.9	18.2	.7
Total	100.0%	100.0%	100.0%	
	(N = 977)	(N = 977)	(N = 100,497)	
<u>Race and Ethnicity</u>				
Non-Hispanic White	71.0%	66.5%	66.0%	.5%
Non-Hispanic Black	8.2	11.5	11.6	-.1
Hispanic	13.9	13.7	15.0	-1.3
Other	6.9	8.3	7.3	1.0
Total	100.0%	100.0%	100.0%	
	(N = 1001)	(N = 1001)	(N = 100,497)	
<u>Education</u>				
Less than HS	6.4%	11.8%	12.2%	-.4%
HS graduates	21.3	36.0	29.9	6.1
Some college	34.2	24.5	29.0	-4.5
College or higher	38.1	27.8	29.0	-1.1
Total	100.0%	100.0%	100.0%	
	(N = 973)	(N = 973)	(N = 100,497)	
<u>Region</u>				
Northeast	19.0%	18.5%	18.2%	.3%
Midwest	22.4	21.9	21.4	.5
South	36.3	37.0	37.1	-.1
West	22.4	22.7	23.3	-.6
Total	100.0%	100.0%	100.0%	
	(N = 1001)	(N = 1001)	(N = 100,497)	

## Appendix C: Spanish Translations

### Study 1:

“Muchos científicos que estudian el clima mundial creen que la Tierra se ha estado calentando durante los últimos 100 años y que continuará haciéndolo en el futuro. Estos científicos creen que el calentamiento en el pasado y futuro tendrá efectos sobre las personas y el medio ambiente, y que cambiará la forma en que las personas vivirán sus vidas. Una opción que tienen las personas y organizaciones es esperar a que estos cambios sucedan y después adaptarse a ellos.

Sin embargo, para reducir los riesgos a personas y propiedades, las personas y organizaciones podrían tomar medidas pronto para prepararse ante estos cambios. Si tuvieras que escoger, ¿qué preferirías que hicieran las personas y organizaciones?

Esperar a que los cambios sucedan y después adaptarse a ellos o tratar de prepararse ante estos cambios para reducir los riesgos a personas y propiedades”

In the second version of the question, “las personas y organizaciones” was replaced by “muchos líderes empresariales piensan que las personas y organizaciones”. In the third, fourth, and fifth versions of the question, “líderes empresariales” in the second version was replaced with “líderes religiosos”, “muchos funcionarios gubernamentales”, and “muchos investigadores universitarios”, respectively.

“Muchos científicos que estudian el clima mundial creen que la Tierra se ha estado calentando durante los últimos 100 años y que continuará haciéndolo en el futuro. Estos científicos creen que el calentamiento en el pasado y futuro tendrá efectos sobre las personas y el medio ambiente, y que cambiará la forma en que las personas vivirán sus vidas.

Una opción que tienen las personas y organizaciones es esperar a que estos cambios sucedan y después adaptarse a ellos.

Sin embargo, para reducir riesgos a personas y propiedades, las personas y organizaciones podrían tomar medidas pronto para prepararse ante estos cambios.

Si tuvieras que escoger, ¿qué preferirías que hicieran las personas y organizaciones? Esperar a que los cambios sucedan y después adaptarse a ellos, o tratar de prepararse ante estos cambios para reducir riesgos a personas y propiedades.”

The second, third, fourth, fifth and sixth versions of the questions were constructed by replacing “reducir riesgos ” in the first version with “reducir la vulnerabilidad ”, “aumentar la resistencia ”, “aumentar la preparación ”, “aumentar la preparación ”, and “prevenir la mal adaptación ”, respectively.

## Study 2:

The first version was:

“Muchos científicos que estudian el clima mundial creen que la Tierra se ha estado calentando durante los últimos 100 años y que continuará haciéndolo en el futuro. Estos científicos creen que el calentamiento en el pasado y futuro tendrá efectos sobre las personas y el medio ambiente, y que cambiará la forma en que las personas vivirán sus vidas.

Una opción que tienen las personas y organizaciones es esperar a que estos cambios sucedan y después adaptarse a ellos. Sin embargo, para reducir riesgos a personas y propiedades, las personas y organizaciones podrían tomar medidas pronto para prepararse ante estos cambios.

Si tuvieras que escoger, ¿qué preferirías que hicieran las personas y organizaciones? Esperar a que los cambios sucedan y después adaptarse a ellos, o tratar de prepararse ante estos cambios para reducir riesgos a personas y propiedades.”

The second version of the question was:

“Muchos científicos que estudian el clima mundial creen que la Tierra se ha estado calentando durante los últimos 100 años y que continuará haciéndolo en el futuro. Y los científicos creen que el calentamiento pasado y futuro causará más lesiones, enfermedades y muertes.

Una opción que tienen las personas y organizaciones es esperar a que estos cambios sucedan y después adaptarse a ellos. Sin embargo, para reducir riesgos a la salud de personas, las personas y organizaciones podrían tomar medidas pronto para prepararse ante estos cambios.

Si tuvieras que escoger, ¿qué preferirías que hicieran las personas y organizaciones? Esperar a que los cambios sucedan y después adaptarse a ellos, o tratar de prepararse ante estos cambios para reducir riesgos a la salud de personas.”

The third version of the questions was:

“Muchos científicos que estudian el clima mundial creen que la Tierra se ha estado calentando durante los últimos 100 años y que continuará haciéndolo en el futuro. Y los científicos creen que el calentamiento pasado y futuro destruirá playas y propiedades a lo largo de la costa, reducirá el suministro de productos del mar, y desbaratará la vida silvestre.

Una opción que tienen las personas y organizaciones es esperar a que estos

cambios sucedan y después adaptarse a ellos. Sin embargo, para reducir riesgos a las playas, propiedades a lo largo de la costa, el suministro de productos del mar y la vida silvestre, las personas y organizaciones podrían tomar medidas pronto para prepararse ante estos cambios.

Si tuvieras que escoger, ¿qué preferirías que hicieran las personas y organizaciones? Esperar a que los cambios sucedan y después adaptarse a ellos, o tratar de prepararse ante estos cambios para reducir riesgos a las playas, propiedades a lo largo de la costa, suministro de productos del mar, y vida silvestre.”

### **Studies 3 and 4:**

“Muchos científicos que estudian el clima mundial creen que la Tierra se ha estado calentando durante los últimos 100 años y que continuará haciéndolo en el futuro. Estos científicos creen que el calentamiento en el pasado y futuro tendrá efectos sobre las personas y el medio ambiente, y que cambiará la forma en que las personas vivirán sus vidas.

Una opción que tienen las personas y organizaciones es esperar a que estos cambios sucedan y después adaptarse. Sin embargo, para aumentar la preparación de las personas y propiedades, las personas y organizaciones podrían tomar medidas pronto para prepararse ante estos cambios.

Si tuvieras que escoger, ¿qué preferirías que hicieran las personas y organizaciones? Esperar a que los cambios sucedan y después adaptarse a ellos, o tratar de prepararse ante estos cambios antes de que sucedan.”

In the second and third versions of the question, the word “adaptarse” in the phrase “esperar a que estos cambios sucedan y después adaptarse” in the first version was replaced with the word “ajustarse” or “responder”, respectively. The fourth, fifth, and sixth versions of the question were formulated by replacing the word “prepararse ante” in the first, second, and third version with the word “planificar”, respectively.