Weather, mood, and voting:

An experimental analysis of the effect of weather beyond turnout

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Abstract

Theoretical and empirical studies show that inclement weather on an election day reduces turnout, potentially swinging the results of the election. Psychology studies, however, show that weather affects individual mood, which – in turn – affects individual decision-making activity potentially beyond the simple decision to turn out on an election day. This paper evaluates the effect of weather, through its effect on mood, on the way in which voters who do turn out decide to cast their votes. The paper provides experimental evidence of the effect of weather on voting when candidates are perceived as being more or less risky. Findings show that, after controlling for policy preferences, partisanship, and other background variables, bad weather depresses individual mood and risk tolerance, i.e.. voters are more likely to vote for the candidate who is perceived to be less risky. This effect is present whether meteorological conditions are measured with objective or subjective measures. *This draft*: May 20, 2013.
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Much has been written about the effect of bad weather on Presidential Election Day turnout and whether it benefits one party over another. The issue of weather and its impact on elections is one that receives constant media and political campaigner hype at every election. Understanding the possible effects of weather conditions on voting behavior is crucial: in today's contentious elections, even a small difference in numbers of votes over a large geographical area could tilt the vote one way or the other. For example, Ludlum (1984) finds that weather proved decisive in the presidential election of 1960, when John F. Kennedy defeated Richard Nixon by a razor-sharp margin of 11,500 votes in five states. Heavy rains, caused by a cold front in swing states like Illinois, deterred rural voters (mostly Republicans) from going to the polls, while not affecting the urban voters (mostly Democrats) in Chicago. The analysis of other cases (Ludlum, 1984) confirm this effect, providing support for an axiom of New York politics that holds that [...a rainy day favors a Democratic candidate since the upstate Republicans would not turn out in full in inclement weather, while the urban Democrats would not be put to undue inconvenience.] (Ludlum, 1984, p. 102)

With Republicans continuing to hold a greater share of the vote in rural areas and Democrats continuing to dominate in urban areas, the New York politics' adage seems not to hold anymore. Recent studies (De Nardo, 1980; Knack, 1994; Gatrell and Bierly, 2002; Gomez et al, 2007, Keele and Morgan, 2013) show mixed results.

Although the issue of weather and its effects on elections is one that invariably arises in every election year, most of the literature focuses on the effect of weather on turnout exclusively: these studies fail to investigate whether the effect of weather goes beyond turnout, affecting the way in which voters, who do turn out, decide how to cast their vote. However, some findings (Gomez et al., 2007) suggest that the effect of weather on parties' vote share may be greater than the indirect effect through turnout (their findings show that for every inch of rain above average, turnout decreases only by approximately 0.9%, but that the Republican candidate receives approximately an extra 2.5% of the votes). Few studies have investigated this question. The effect of extreme weather (such as natural disasters) has been analyzed in a context of public opinion and elections by Healy and Malhotra (2010), who analyze the effect of tornados on electoral outcomes, finding that voters appear to reward or punish the incumbents according to their perceived performance in handling the disaster. Gerber (2013) studies the relationship between partisanship and climate policy of the local government. Cohen (2011) tackles the question of how general weather affects public opinion, finding a positive relation between presidential approval ratings and sunshine exposure.

To have a better understanding of the effect of weather on voters' decisions, we need to both assess the effect of weather on voters' actions and beliefs and to understand the mechanism through which climate conditions exert such an effect. Psychology literature suggests that weather affects both conscious and subconscious mood and that mood affects human behavior. Whether, however, the effect of weather on mood is strong enough to drive human's behavior is less clear.

Laboratory experiments provide the best tool for testing these behavioral questions because of the precise control that they afford and the possibility to analyze data that do not naturally occur (Woon, 2012b). Bassi et al. (2013) provides experimental evidence of the link between weather, mood, and risk aversion. Similarly, this paper investigates whether such an effect is present in a voting setting. Specifically, this paper identifies the existence of an effect of weather on individual voting decisions. Findings suggest that sunlight and good weather have a positive impact on the likelihood of voting for riskier candidates, while voters rely more heavily on less risky candidates in bad weather. This result holds for both objective and subjective measures of weather conditions.

Furthermore, this paper helps identify a specific pathway through which weather affects voting decisions. The paper provides an analysis of the mechanism at work by employing a psychological questionnaire called PANAS-X (Watson and Clark, 1994) used to measure respondents' moods. I find that "positive mood" feelings such as self-assurance and attentiveness display a statistically significant decrease in bad weather conditions, while sadness displays a statistically significant increase. Results also show that positive mood feelings and states that are sensible to weather conditions are also positively associated with the likelihood of voting for a riskier candidate. I interpret these findings as offering evidence of a causal mechanism at work: the impact of weather (through mood) on voting choice. Subjects are more willing to accept the level of risk associated with a risky candidate when they are in a better mood.

1 Weather, Mood, and Behavior

The impact of sunlight and weather in general on human mood has been widely examined in the clinical psychology literature. For example, good mood has been associated with low levels of humidity (Sanders and Brizzolara, 1982); high levels of sunlight (Cunnigham, 1979; Parrot and Sabini, 1990; and Schwartz and Clore, 1983); high barometric pressure (Goldstein, 1972); and high temperature (Cunningham, 1979; Howarth and Hoffman, 1984). Furthermore, the effect of temperature and sunlight is especially strong in the spring, when people have been deprived of such weather (Keller et al., 2005).

By the same token, mood has been proven to significantly affect how individuals make decisions. For example, research in experimental psychology has proven that mood affects the way agents make decisions in risky or uncertain environments by affecting their levels of risk aversion. A person's mood may affect the subjective judgment of the likelihood of a future event (Wright and Bower, 1992): a happy person is "optimistic," i.e., she reports higher probabilities for positive events and lower probabilities for negative events. Conversely, a sad person is "pessimistic," perceiving lower (higher) probabilities to be attached with positive (negative) events. Experimental studies have documented a negative link between anxiety (and depression) and "sensation seeking" measures, which have been extensively documented to be reliable proxies for risk-taking behavior. More recently, Eisenberg et al. (1998) show in experimental studies that depressed individuals tend also to be more risk averse in a series of hypothetical everyday-life situations. In this framework, people in a good mood would be more willing to engage in activities and choices yielding a degree of risk. This conduct has been identified in the literature as "mood-risk tolerance" channel. Bassi et al. (2013) show that weather affects risk aversion through this "mood-risk channel."

Mood on Election Day can swing voter choice of a marginal voter – the one who is still undecided – through this "mood-risk tolerance" channel. A voter who is virtually or almost indifferent between two candidates might lean toward the "riskier" candidate when she feels in an upbeat mood, or might resort to the "safer" candidate when she feels more depressed or pessimistic. If the "safer" choice is also equivalent to the status quo, this effect can also be interpreted as "status quo bias," "loss aversion," "endowment effect," or "regret avoidance."

A related stream of literature analyzes the effect of emotions on risk assessments. Johnson and Tversky (1983) show a positive link between emotions and risk assessments, indicating that optimistic emotions lead to optimist risk assessments and vice versa. Hsee and Weber (1997) suggest that positive emotions lead to greater risk seeking because people are more optimistic about future outcomes, while negative emotions such as anxiety make agents more pessimistic about the future and thus more risk-averse. What makes the literature on mood and emotions complementary but not equivalent is the fact that, although mood and emotions are tightly linked, not all negative emotions lead to negative mood states and viceversa (DeSteno et al., 2000). Druckman and McDermott (2008) show that emotions need to be differentiated beyond their positive or negative general state, as different negative emotions exert opposite effects on individuals' risk attitudes. MacKuen et al. (2010), Huddy et al. (2007), and Feldman et al. (2013) stress that negative emotions such as anxiety need to be distinguished from other negative emotional responses such as anger.

This paper explores the way in which weather influences how individuals vote between candidates framed as risky choices via a "mood-risk tolerance" channel. Mood may provide an important key in explaining the different effects of weather variables on voting behavior. The goal of this paper is to enrich, rather than negate, earlier findings on the effect of emotions on elections and public opinion by analyzing how the mood variables that are susceptible to change with weather conditions affect voting. I next describe how individuals' risk assessments map into voting decisions. A similar approach has been taken by Eckel, El-Gamal, and Wilson (2009), who investigate the link between risk preferences and emotions in a sample of hurricane Katrina evacuees right after the natural disaster and a year later, finding the first sample to be more risk-loving than the second. The authors ascribe the higher risk tolerance of the first sample to the prominence of negative emotions.

2 Uncertainty, Prospects, and Risk Attitudes

As Berinsky and Lewis (2007) suggest, analyzing the question of whether risk attitudes affect voters' preferences regarding risky candidates requires discussion of the (1) specification of the voters' utility function over different candidates; and (2) specification of how the uncertainty about future outcomes enters in their utility calculations.

Concerning the first question, the standard approach – the expected utility model – assumes that the individual utility function is concave, that is, the marginal utility of an additional dollar diminishes when the total utility increases (Bernulli, 1954). However, Kahneman and Tversky (1979) argue that individuals display diminishing marginal utilities only for prospects with positive outcomes, while displaying increasing marginal utilities for prospects with negative outcomes, suggesting that individuals are risk-averse for gains, but risk-seekers for losses. The key element of this argument is that individuals engage in decision making first by identifying a reference point from which people tend to be risk-averse for gains and risk-loving for losses. Therefore, risk aversion is a function not only of the riskiness of an option, but also of its desirability (see McDermott, 2001, for a comprehensive review).

The way in which individuals interpret their choices, as gains or as losses, influences how much risk they will take. As has been found in several experiments on framing (Druckman, 2001a, 2001b, 2001c), the way in which information is framed influences individuals' judgment as well, in that it affects how they interpret their choices. Kahneman and Tversky (1979) found that framing a policy as a gain (for example, by describing a 10% rate of unemployment as an employment rate of 90%) induces individuals to consider their choices in a domain of gain, while framing the same policy as a loss induces them to consider their choices in a domain of losses.

As regards the second question, Alvarez and Franklin (1994) suggest that no consensus exists in the literature on how uncertainty affects the voter's evaluation of the candidates. Most of the literature focuses on the uncertainty about the policies that the candidates would put in place once elected: Shepsle (1972), Enelow and Hinich (1981), Bartels (1998) and Palfrey and Poole (1987). consider how the uncertainty about candidate locations enters voters' expected utility. Alternatively, Quattrone and Tversky (1988) focus on how uncertainty about candidates' performance affects voting choice. They test a voting choice between an incumbent and a challenger with identical policy preferences but with different degrees of likelihood to implement the policy. Quattrone and Tversky (1988) confirm Kahneman and Tversky (1979)'s predictions in a social choice domain: voters are averse to voting for risky candidates in the domain of gains but they do seek out the riskier candidate in the domain of losses. This prediction has been extended to data from real-world elections in Mexico by Morgenstern and Zechmeister (2001), who found risk attitudes to be a strong determinant of voter behavior when deciding between an incumbent and a challenger.

As the objective of the paper is to analyze the way in which weather influences voting decisions via a "mood-risk tolerance" channel, the paper's design builds on the Quattrone and Tversky (1988) classical design, in which respondents vote between two candidates with identical policy preferences. This assumption, though not natural in all situations, provides a necessary preliminary to a more general analysis and may be reasonable in some circumstances (for instance in parties' primaries, in which policy differences might be negligible). With this design, the impact of background personal characteristics on individual decision-making in voting choices is controlled for, and the effect of weather on individual choices can be imputed to its effect on the individual level of risk aversion caused by mood.

3 Expectations and Conjectures

The expectations about the experimental results can be described by the following hypotheses.

1. *The vote share for a risk-free candidate is larger than the vote share for a risky candidate who yields the same expected utility in a positive prospect.*
   I expect this finding, because according to both the standard expected utility theory and prospect theory, agents are risk-averse in the positive domain. So, when an individual is presented with two candidates who are identical in all dimensions but for the degree of risk that they yield, individuals are expected to choose the one candidate who carries the least risk.

2. *The vote share for a risk-free candidate is larger in the domain of gains (positive*

prospect) than in the domain of losses (negative prospect).

According to prospect theory, agents are more risk-averse in the positive domain. So, voters are expected to choose the one candidate who carries the least risk more frequently in the positive prospect than in the negative one.

3. *The vote share for a risk-free candidate is smaller than the vote share for a risky candidate who yields the same expected utility in a negative prospect.*

   According to prospect theory, agents are not only more risk-tolerant in the negative domain, but they actually seek risk. Voters are therefore expected to choose the one candidate who carries the most risk, but who can yield a positive or higher outcome.

4. *The vote share for a risk-free candidate is larger in bad weather days than in good weather days.*

   Regardless of the prospect framing, I expect bad weather conditions to positively affect the likelihood of voting for the riskier candidate and viceversa.

5. *Exposure to bad weather is positively correlated with bad mood and vice versa.*

   This is the standard psychological prediction, and I expect results consistent with those of Denissen et al. (2008).

6. *Good (bad) mood is positively correlated with risk tolerance (aversion) behavior.*

   This is the conventional mood-risk channel prediction, positing that anxiety and other negative mood states lead to higher risk-aversion while positive mood states produce a higher risk-tolerance (Eisenberg et al., 1998).

To test these expectations, I implemented a controlled laboratory experiment, which I describe in the following section.

4 The Experimental Design

This analysis investigates whether subjects' voting decisions, when candidates' performance is uncertain, differ when the weather conditions are perceived as favorable or poor. To examine whether risk preferences are associated with objective and/or perceived weather conditions, I ran a controlled experiment in which subjects were exposed to different weather treatments. To operationalize the weather treatments and control the assignment of subjects, I scheduled twin pairs of experimental sessions per week in days with diametrically opposed weather forecasts. Subjects could register to participate in the experiment only by registering for both of the twin sessions. Subjects were told that they would be ultimately selected to participate in one of the twin sessions, but that they could not choose which one. Subjects were randomly allocated by the experimenter to one of the two sessions.

The experiment was conducted by paper and pencil in a large classroom of the Kenan-Flagler Business School that allowed for exposure to the outside weather conditions. The same classroom was used in all experimental sessions and all sessions were run at the same time of the day (from 2:00 pm to 3:30 pm). A total of 199 participants has been recruited from December 2011 to January 2013, with 95 participants allocated to the bad weather treatment and 104 to the good weather treatment. Out of this pool, 166 subjects actually participated in the experiment, with 81 subjects in the bad weather treatment and 85 in the good weather treatment. The participation rate was very similar across weather treatments, at 85.2% and 81.7% for the bad and good weather, respectively.[1]

The overall design consists of a lottery choice experiment with a 2 x 2 design, with two weather treatments (good and poor weather) and two prospect treatments (pos-

[1]Tables A1 and A2 in the on-line Appendix report the demographics of the sample on which the experiment was conducted. Even though the majority of the participants were college or graduate students, the sample appears to be evenly distributed with regard to age, gender, racial group, income, political leaning and religiousness. This makes this experiment an ideal laboratory to test our hypothesis about the effect of weather on voting, after controlling for other personal characteristics.

itive and negative prospect). A between-subjects design has been used for the weather treatments: subjects were randomly allocated to participate in only one of the weather treatments. Furthermore, a within-subject design has been used for the prospect treatments: every subject participated in both prospect treatments sequentially. The order of the prospect treatments has been randomized to eliminate any order effect. Before computing payoffs, subjects were asked to complete an affect scale form about their mood (PANAS-X), and at the end of the experiment and before being paid, subjects were asked to complete a questionnaire about socioeconomic characteristics such as: i) general information about the subject; ii) individual and family income and education; iii) health; iv) religion; v) political views; and vi) economic assessments. The Appendix provides specific details about the experimental procedures and the instructions distributed to the subjects.

4.1 Prospects and Decisions

The decision problems in this experiment build on those of the classical experimental study by Quattrone and Tversky (1988). The design focuses on framing political decisions in a domain of gains or losses. A reference point is induced by providing the subjects with the level of wealth – measured through the Standard of Living Index (SLI)– of other comparable countries. In this way the wealth of other countries appears to the subjects to be a feasible and reasonable goal to achieve or surpass: if they are satisfied with the domestic level of wealth, they would consider the decision in a domain of gain; otherwise, they would consider the decision to be in a domain of loss.[2]

In the experimental surveys conducted by Quattrone and Tversky (1988), respondents are asked to imagine facing a voting decision between two candidates, who

[2]Heath et al. (1999) claim that goals serve as reference points and systematically alter the value of outcomes, as described by the psychological principles in the prospect theory's value function.

are known to favor different economic policies which would affect the respondents' wealth. Experts provide different forecasts of the SLI in case the two candidates should win the election: forecasts for one candidate are mostly consistent among economic experts, while forecasts for the other candidate are more diverse. This feature implies that although both candidates are risky, the latter is more risky than the former.

4.2 Risk Preference Elicitation

The experimental design improves on the Quattrone and Tversky (1988) design in two ways. First, experimental data are collected not by means of hypothetical questions, but by means of actual decisions that affect the remuneration of the subjects. This approach improves the salience, and thus the internal validity, of the experiment. Second, the experimental design is not limited to the analysis of a reversal in the voting decisions of the respondents as a function of a reversal of the reference point: rather, the design aims to analyze voting decision as a function of the risk associated with the two candidates in both domains.

The elicitation procedure used to ascertain voting decisions as a function of candidates associated risk in the experimental laboratory is a variation of the Multiple Price List (MPL) design.[3] The original MPL design entails giving the subject an ordered array of binary lottery choices to make all at once. The MPL requires the subject to pick one of the lotteries on offer; then the experimenter plays that lottery out for the subject to be rewarded. The design used in this experiment departs from the original MPL in two ways. First, the respondents are not given the binary lotteries (elections between two candidates) in an array; instead, they make each binary lottery choice in a sequence. In this way, consistency and monotonicity of voting de-

[3] The earliest use of the MPL design is by Miller et al. (1969). Later used by Schubert et al. (1999), and by Holt and Laury (2002), the method became the standard procedure to elicit and measure risk attitudes.

TABLE 1
PAYOFF TABLES - RISK AVERSION ELICITATION

	Candidate C's projected SLI	Candidate I's projected SLI
Election 1 :	$66,000 w.p 50% , $42,000 w.p 50%	$42,000 w.p 50% , $42,000 w.p 50%
Election 2 :	$66,000 w.p 50% , $42,000 w.p 50%	$46,000 w.p 50% , $46,000 w.p 50%
Election 3 :	$66,000 w.p 50% , $42,000 w.p 50%	$48,000 w.p 50% , $48,000 w.p 50%
Election 4 :	$66,000 w.p 50% , $42,000 w.p 50%	$50,000 w.p 50% , $50,000 w.p 50%
Election 5 :	$66,000 w.p 50% , $42,000 w.p 50%	$52,000 w.p 50% , $52,000 w.p 50%
Election 6 :	$66,000 w.p 50% , $42,000 w.p 50%	$54,000 w.p 50% , $54,000 w.p 50%
Election 7 :	$66,000 w.p 50% , $42,000 w.p 50%	$56,000 w.p 50% , $56,000 w.p 50%
Election 8 :	$66,000 w.p 50% , $42,000 w.p 50%	$58,000 w.p 50% , $58,000 w.p 50%
Election 9 :	$66,000 w.p 50% , $42,000 w.p 50%	$60,000 w.p 50% , $60,000 w.p 50%
Election 10 :	$66,000 w.p 50% , $42,000 w.p 50%	$62,000 w.p 50% , $62,000 w.p 50%

cisions is not produced as a procedural artifact of the design. Second, as one of the options entails no risk, the variant of the MPL instrument that is adopted (as developed by Schubert et al., 1999) entails that the respondents choose between a risk-free option ("candidate I", characterized as the incumbent), whose payoffs are fixed, and a risky option ("candidate C", characterized as a challenger), whose payoffs are determined by his chances of success or failure. Thus, risk aversion in this context can be equivalently interpreted as status quo bias. While the payoffs attached to candidate C remain fixed in each election, the "secure" payoff attached to candidate I increases monotonically moving from one election to the next. As the amount of the secure payoff grows, choosing candidate C looks less attractive to a risk-averse respondent, who would switch to the safer candidate. Table 1 describes the variant of the MPL design used.

This experiment departs from a classical political economy experiment in that it aims to analyze behavioral responses to environmental conditions, rather than context-free theoretical expectation. The use of a context in this case is desirable, in that it provides clues to help subjects interpret the task as a voting decision rather than as an abstract choice (Woon, 2012a, discusses the desirability of contextualized scripts in voting experiments). To contextualize the voting decision in a setting where one can-

TABLE 2
RISK AVERSION ELICITATION - PROSPECTS

	Positive Prospect Other 4 nations' SLI	Negative Prospect Other 4 nations' SLI
Election 1 :	$42,000	$66,000
Election 2 :	$42,000	$66,000
Election 3 :	$42,000	$66,000
Election 4 :	$42,000	$66,000
Election 5 :	$42,000	$66,000
Election 6 :	$42,000	$66,000
Election 7 :	$42,000	$66,000
Election 8 :	$42,000	$66,000
Election 9 :	$42,000	$66,000
Election 10 :	$42,000	$66,000

didate is considered more risky than the other, the two candidates have been labeled as "challenger" and "incumbent", respectively.[4]

Payoffs were decided by a fair throw of a twenty-sided die and a coin. In Election 1, the first (second) payoff is paid if the subjects has chosen candidate C and the coin has landed heads up (down); the third (fourth) payoff is paid if the subject has chosen candidate I and the coin has landed heads up (down).

As one proceeds down the matrix, the payoffs and attached probabilities of candidate C remain the same, but the payoffs attached to candidate I change. The matrix of ten election scenarios for each prospect is designed in such a way that only extremely risk-seeking subjects choose candidate C in the last row, and only extremely risk-averse subjects choose candidate I in the first few rows.[5] A risk-neutral subject would choose candidate C as long as the expected utility of candidate C is higher than the expected utility of candidate I (in the first five elections), and candidate I otherwise

[4]A manipulation check treatment with abstract candidate labels has been run to test for possible framing effects. The results show no significant difference between the framed and the abstract treatment.

[5]Notice that rational players should always choose candidate C in the first election, because it weakly dominates the alternative option: it never yields a lower payoff and it yields a strictly larger payoff with a positive probability. Thus the first election is considered as a control that the subject has understood the instructions.

(last 4 elections).

Table 2 describes the design used for the prospect treatments. While payoffs remain exactly identical to the ones described in Table 1, gain and loss domains are created by contextualizing the voting decision internationally. The subjects are given information about the relative wealthiness of other comparable countries by making the other countries appear to be the reference point.

5 Prospect treatment results

I now investigate the effect of prospects on voting decisions (e.g., hypotheses 1, 2 and 3). Figure 1 reports the raw results of the prospect treatment. Consistent with the extant literature, subjects display a considerable degree of risk aversion in the positive prospect, in that they switch from the risky to the safer candidate much earlier than would a risk neutral agent. As shown by Figure 1, in election 6, around 75% of the subjects vote for the safer candidate, as against 25% for the risky candidate, even though the two candidates are identical in terms of expected utility (e.g., hypothesis 1). Even when the safer candidate yields a lower expected utility (election 5), subjects still prefer to vote for him rather than for the risky candidate (around 65% of the subjects vote for the safer candidate).

Subjects seem, however, to also be risk-averse in the negative prospect. Figure 1 shows that in election 6, around 70% of the subjects vote for the safer candidate, contradicting hypothesis 3. However, the likelihood of choosing the safer candidate seems to be larger in the gain domain than in the loss domain in nearly every election (e.g., hypothesis 2), even though the domain's effect seems to be more modest, as compared to the previous studies of Quattrone and Tversky (1988). This variance is caused by a difference of incentives that the subjects face between this experiment and those in Quattrone and Tversky. As reported by Laury and Holt (2008)[6], the use of real

[6]Despite the widespread references to prospect theory in theoretical and experimental work, few

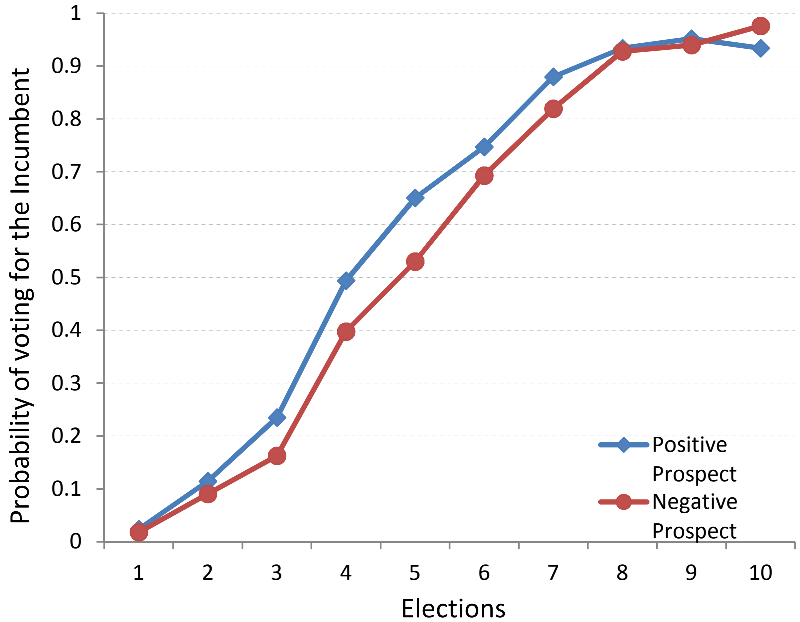

FIG. 1 - The effect of prospects: the vertical axis reports the percentage of votes for candidate I. The horizontal axis reports the election number. The blue line refers to observations in the domain of positive prospects, while the red line refers to the domain of negative prospects.

incentives dramatically reduces the incidence of reflection behavior around the reference point. However, considering that the positive or negative domain does not affect the subjects' earnings, by inducing only a psychological framing, the results provide support for the prospect theory: subjects are less risk-averse in the loss treatment than in the gain treatment.

To test whether the effect of prospect (e.g., hypothesis 2) shown in Figure 1 is statistically significant, I calculated the average frequencies of votes for candidate I (the safer choice) across all subjects for the two prospect treatments. Across all ten elections, subjects vote for the safer candidate on average 5.96 times in the positive prospect, and 5.55 times in the negative prospect. The difference is statistically sig-

studies have tested the theory with incentivized tasks (Kahneman and Tversky, 1979 and Tversky and Kahneman, 1992 are based on hypothetical payoffs). Laury and Holt (2008) use a simple tool to measure risk preferences directly, based on a series of lottery choices with significant money payoffs in parallel gain and loss treatments.

nificant according to a *Welch test*, which tests the null hypothesis that the average number of votes for the safer candidate in the negative prospect ($\hat{\mu}_{neg}$) exceeds the average number of votes in the positive prospect ($\hat{\mu}_{pos}$). Denoting as $\hat{\sigma}^2_{\hat{\mu}_{neg}}$ and $\hat{\sigma}^2_{\hat{\mu}_{pos}}$ the estimated variances of the average of the votes for candidate I in the negative and positive prospect respectively, the test statistic has a t-distribution under the null hypothesis.[7]

$$\frac{\hat{\mu}_{neg} - \hat{\mu}_{pos}}{\sqrt{\hat{\sigma}^2_{\hat{\mu}_{neg}} + \hat{\sigma}^2_{\hat{\mu}_{pos}}}}$$

With a *p-value*=0.0179, the alternative hypothesis that the average of votes for the incumbent in the positive prospect is larger than the average of votes in a negative prospect cannot be rejected.

6 Weather treatment results

To investigate the effect of weather on voting (e.g., hypothesis 4), three definitions of weather quality are used to characterize the actual weather on the day of the experiment.

The amount of sunlight is the primary measure for the weather condition. Data were collected on how many minutes the sky was clear, partly cloudy, and overcast for the ZIP code of the city in which the experiment was conducted. The website of Weather Underground (www.wunderground.com) offers detailed historical data on intra-daily weather conditions for most ZIP codes in the United States. Accordingly, a good weather day is defined as one in which the sky was clear for the majority of the time, i.e. for more than 50% of the time between 7 a.m. and the time of the end of the experiment. This measure will be referred to as the "clear/overcast" measure.

[7] The number of degrees of freedom of the t-distribution is $\frac{(N_{neg}-1)(N_{pos}-1)\left(\hat{\sigma}^2_{\hat{\mu}_{neg}} - \hat{\sigma}^2_{\hat{\mu}_{pos}}\right)}{(N_{pos}-1)\hat{\sigma}^4_{\hat{\mu}_{neg}} + (N_{neg}-1)\hat{\sigma}^4_{\hat{\mu}_{pos}}}$, where N_{neg} and N_{pos} are the sample sizes of the two prospect treatments.

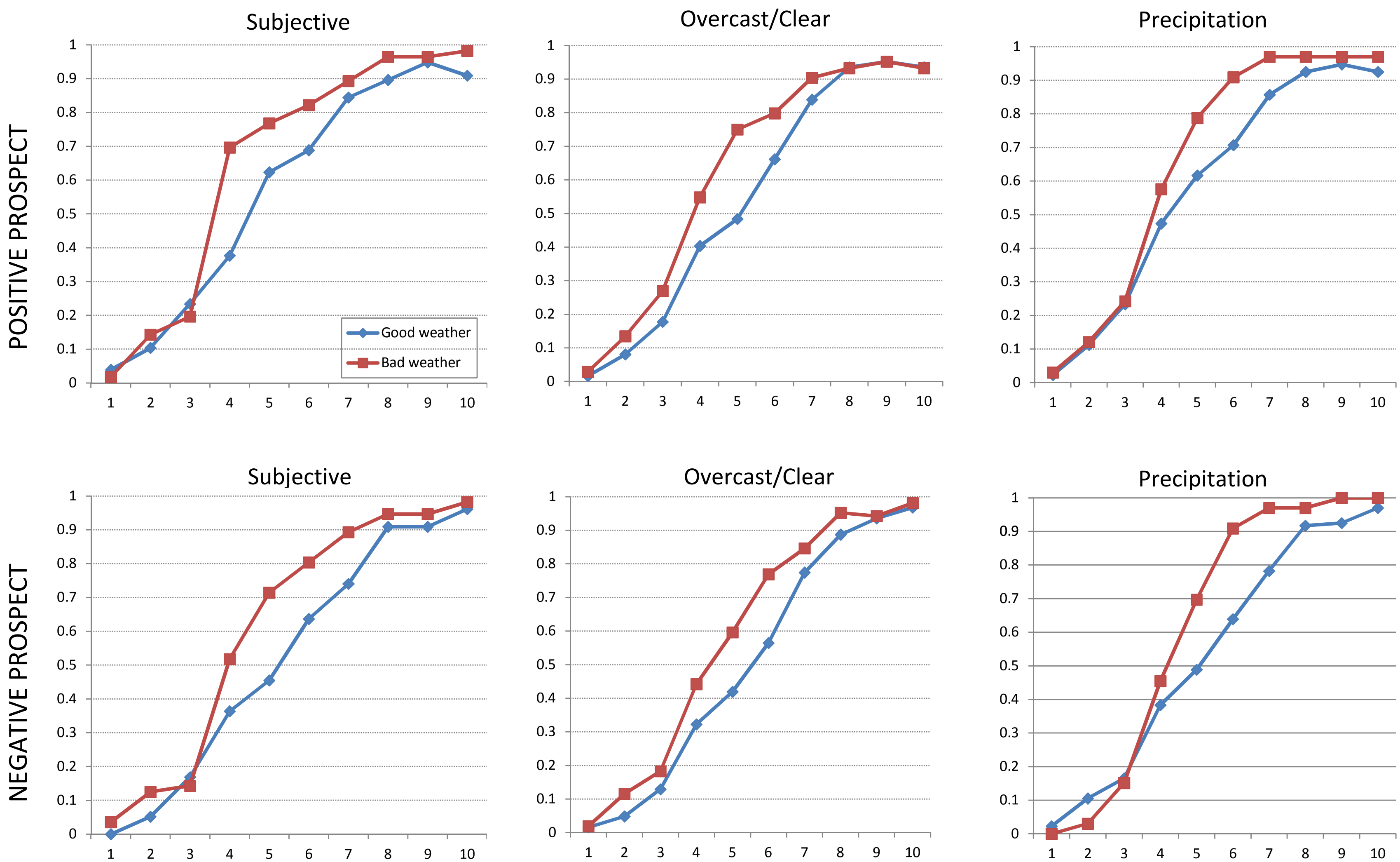

FIG. 2 - The effect of weather: the vertical axis reports the percentage of votes for candidate I. The horizontal axis reports the election number. In each panel, the blue line represents “good weather” data, while the red line refers to “bad weather” data. The top panel refers to observations in the positive prospect treatment, while the bottom panel refers to observations from the negative prospect treatment. Observations are grouped according to the weather measures. The plots on the left refer to subjective weather assessment; the ones in the center, to clear/overcast measure; the ones on the right, to the precipitation measure.

Because the subjective component plays a key role in assessing the perceived quality of weather, the answers to the question “How do you feel about the weather today?” provided in the questionnaire was used as a subjective measure of good/bad weather. Specifically, subjects were asked to answer this question on a scale from 1 to 7, where 1 is “Terrible” and 7 is “Awesome.” Subjects were pooled into three groups: those who provided an assessment of weather between 1 and 3; those who provided a neutral assessment of 4; and those who provided a weather assessment between 5 and 7. With this measure, I focus on the differences between the first group, who perceived the weather as “good”, and the third group, who assesses the weather conditions as being “bad”. This measure will be referred to as “subjective” measure.

Finally, precipitation provides another indicator of the quality of weather in any given day. Accordingly, a rainy day is defined as one in which the amount of rainfall exceeds the daily average amount in the area in which the experiment was conducted (which is 0.12 inches per day). According to this measure, a rainy day is a bad weather day. This assessment of the weather condition is referred to as the “precipitation” measure.

Figure 2 reports the raw data of the effect of weather. This figure shows the experimental distribution of the safer choice, i.e. candidate I, in each of the 10 elections. Observations are pooled according to the three measures of weather assessment: the subjective measure in the first column, the clear/overcast in the second column, and the precipitation measure in the last column. Good weather is represented by a blue line and bad weather by a red line. Note that in this figure greater risk aversion implies a leftward shift of the frequency line.

The top panel refers to observations in a domain of “positive outcomes,” while the bottom panel refers to observations in a domain of “negative outcomes.”

The plots of raw data suggest support for hypothesis 4: good weather increases the likelihood of voting for the risky candidate, and this happens for all three measures

TABLE 3
AVERAGE FREQUENCIES OF VOTES FOR CANDIDATE I

	Subjective	**Clear/overcast**	**Precipitation**
		Positive Prospect	
Good Weather	5.66	5.48	5.82
Bad Weather	6.45	6.25	6.55
$[p - values]$	[0.0054]	[0.0034]	[0.0177]
		Negative Prospect	
Good Weather	5.19	5.06	5.40
Bad Weather	6.11	5.85	6.18
$[p - values]$	[0.0015]	[0.0027]	[0.0109]

Notes - The table reports the mean across all subjects of the average number of votes for candidate I (the safer candidate) across the ten elections conditional on good and bad weather conditions. The definitions of weather conditions are reported in the first row of the table. The numbers in the squared brackets represent the p-values of the Welch test for the null hypothesis that the mean in good weather conditions is larger than the mean in bad weather conditions.

of weather conditions adopted. The impact of weather is particularly pronounced for decisions 3 to 7, the marginal decisions, where the majority of subjects start switching from the riskier to the safer lottery.

Are the differences in voting choice documented in Figure 2 statistically significant? To assess the validity of my hypothesis, I calculated the average frequencies of votes for candidate I (the safer choice) across all subjects and for the three definitions of weather that I adopted. The results of the experiment are strikingly clear: good weather promotes greater propensity to vote for the risky candidate. These differences are shown to be statistically significant. The null hypothesis that the average number of safe choices in good weather ($\hat{\mu}_{good}$) exceeds the average number of safe choices in bad weather ($\hat{\mu}_{bad}$) can be tested using the *Welch test*, as is done in the previous section. Based on the low *p-values* reported in Table 3, the alternative hypothesis that the average of votes for the safer candidate with bad weather is larger than the average of votes with good weather cannot be rejected. Similar results are shown for the negative prospect.

TABLE 4
VOTES FOR CANDIDATE I – POSITIVE PROSPECT

	Precipitation	**Overcast-Clear**	**Subjective Weather**
Intercept	6.149 [0.204]	5.848 [0.200]	5.916 [0.207]
Bad-Good Weather	0.355** [0.161]	0.392*** [0.082]	0.434*** [0.138]
Gender (Male-Female)	−0.821*** [0.243]	−0.857*** [0.205]	−0.849*** [0.241]
Race (White-Black)	0.004 [0.100]	0.061 [0.079]	0.128 [0.092]
Income	0.340* [0.181]	0.320** [0.142]	0.379*** [0.119]
Religious (Yes-No)	−0.038 [0.108]	0.002 [0.111]	0.004 [0.111]
Political Leaning (Liberal-Conservative)	0.051 [0.171]	−0.022 [0.153]	0.067 [0.177]

Notes - The table reports the estimated coefficients of the regressions of the number of votes for candidate I (the safer candidate) on a dummy variable which is equal to 1 when the weather is bad and -1 when the weather is good. The numbers in square brackets are the standard errors of the estimated coefficients. One star, two stars, and three stars refer to statistical significance at the 1, 5 and 10 percent levels, respectively.

7 Further Controls

To investigate whether the results are led by confounding variables, such as personal characteristics and socio-economic attitudes, the total number of votes for candidate I is regressed on dummy variables representing each of the weather-related variables, plus additional controls.

The explanatory variables used as control are reported in the first column of Tables 4 and 5.[8] All the weather-related variables appear to be strongly statistically significant at conventional confidence levels. The only socio-economic controls that are significant in the positive prospect are gender (women display less tolerance to risk

[8]A gender dummy equals 1 if male, and -1 if female; a race dummy equals 1 if white, and -1 if black, an income variable is expressed in U.S. dollars; a religiousness dummy equals 1 if the subject self-declared as religious person, and -1 otherwise; and a political leaning dummy equals 1 if the subject self-declared as liberal or most liberal, and -1 if conservative or most conservative).

TABLE 5
VOTES FOR CANDIDATE I – NEGATIVE PROSPECT

	Precipitation	**Overcast-Clear**	**Subjective Weather**
Intercept	5.935 [0.258]	5.599 [0.223]	5.667 [0.209]
Bad-Good Weather	0.421*** [0.117]	0.398*** [0.116]	0.451** [0.176]
Gender (Male-Female)	−0.341 [0.256]	−0.385* [0.222]	−0.376 [0.247]
Race (White-Black)	−0.240** [0.098]	−0.173 [0.118]	−0.103 [0.141]
Income	0.152 [0.164]	0.125 [0.176]	0.186 [0.156]
Religious (Yes-No)	−0.146 [0.112]	−0.104 [0.117]	−0.127 [0.153]
Political Leaning (Liberal-Conservative)	−0.057 [0.201]	−0.133 [0.188]	−0.042 [0.210]

Notes - The table reports the estimated coefficients of the regressions of the number of votes for candidate I (the safer candidate) on a dummy variable which is equal to 1 when the weather is bad and -1 when the weather is good. The numbers in square brackets are the standard errors of the estimated coefficients. One star, two stars, and three stars refer to statistical significance at the 1, 5 and 10 percent levels, respectively.

as also found by Eckel and Grossman, 2007) and income (risk aversion– or status quo bias –seems to increase with the level of wealth). No control is significant across all the weather measures in the negative prospect treatment.

7.1 Causal pathway

The underlining hypothesis of this experiment is that mood is the intermediate variable that determines the shift in risk tolerance that we detect in this analysis. Here, I investigate the effect of weather on mood (e.g., hypothesis 5) by using the responses that the subjects provided to a psychological questionnaire called PANAS-X (Watson and Clark 1994).

The PANAS-X methodology, which is widely used in psychology literature, uses two main scales to measure positive and negative affects, the dominant dimensions of emotional experience. Positive affect is defined as feelings that reflect a level of pleasurable engagement with the environment, such as happiness, joy, excitement, enthusiasm, and contentment (Clark, Watson, and Leeka, 1989). Negative affect measures feelings such as fear, anger, anxiety, and depression. In addition to the two higher-order scales, the PANAS-X measures eleven specific affects: fear, sadness, guilt, hostility, shyness, fatigue, surprise, joviality, self-assurance, attentiveness, and serenity. The Appendix reports the questionnaire as it was presented to the subjects.

The scale consists of a number of words and phrases that describe different feelings and emotions, such as cheerful, sad, and active. Subjects were required to assess on a scale from 1 to 5 the extent to which they had felt each feeling and emotion during the day of the experiment. The individual scores for each feeling were added within each mood category and re-scaled on a 0-1 scale.

Table 6 reports the differences of the scores between bad and good weather for all the PANAS-X mood characteristics. A positive number in this table means that the score is larger with bad weather, whereas a negative number means that the score is larger with good weather. The results suggest that amount of sunlight, my primary measure for the weather condition, has an effect on the extent of overall positive feelings (displayed by the higher-order scale), and less of an effect on the extent of negative feelings. As regards as specific affect states, feelings of self-assurance and attentiveness demonstrate a statistically significant increase in good weather conditions. The only negative affect feeling that displays a significant difference in the two weather treatment is sadness, which appears to be larger in bad weather conditions. Fatigue and serenity, also display significant differences in the weather treatments, with the former being significantly more pronounced in bad weather conditions, and the latter being higher in good weather days.

I investigate the importance of mood as an explanation of the results (e.g., hypothesis 6), by regressing the total number of votes for the risk-free candidate, across the

TABLE 6
PANAS TEST

Panel A: General Dimensions Scales

	Clear/Overcast	Precipitation	Subjective Weather
Negative Affect	0.010	0.003	0.036
	[0.301]	[0.436]	[0.034]
Positive Affect	−0.129	−0.032	−0.063
	[0.000]	[0.218]	[0.077]

Panel B: Basic Negative Emotion Scales

	Clear/Overcast	Precipitation	Subjective Weather
Fear	0.024	0.036	0.048
	[0.139]	[0.079]	[0.041]
Hostility	−0.011	0.020	−0.014
	[0.344]	[0.184]	[0.171]
Guilt	−0.018	−0.013	−0.012
	[0.294]	[0.222]	[0.234]
Sadness	0.045	−0.013	0.063
	[0.011]	[0.284]	[0.019]

Panel C: Basic Positive Emotion Scales

	Clear/Overcast	Precipitation	Subjective Weather
Joviality	−0.037	0.004	−0.040
	[0.181]	[0.464]	[0.196]
Self-Assurance	−0.127	−0.004	−0.072
	[0.001]	[0.469]	[0.056]
Attentiveness	−0.126	−0.033	−0.097
	[0.000]	[0.201]	[0.014]

Panel D: Other Affective States

	Clear/Overcast	Precipitation	Subjective Weather
Shyness	−0.050	−0.031	0.020
	[0.091]	[0.061]	[0.241]
Fatigue	0.135	0.000	0.135
	[0.007]	[0.498]	[0.008]
Serenity	−0.132	−0.049	−0.059
	[0.003]	[0.135]	[0.114]
Surprise	0.013	0.025	−0.017
	[0.373]	[0.279]	[0.345]

Notes - Each entry reports the spread of the scores between the bad and the good weather condition in the corresponding column. The numbers in squared brackets represent the p-values for the null hypothesis that the average score in bad weather conditions is smaller than the average score in good weather conditions (when the spread is positive) or that the average score in bad weather conditions is larger than the average score in good weather conditions (when the spread is negative).

prospect treatments discussed above, on the PANAS-X scores in the feelings that are displayed to be significantly affected by weather as shown in Table 6. Table 7 reports the findings. The results are clear: Positive feelings decrease the likelihood of choosing the safer choice; or, equivalently, better mood promotes risk-taking behavior. This effect appears to be statistically significant at the conventional levels.

The middle panel of Table 7 sheds additional light on the plausibility of mood changes as a pathway for the described effect of weather on human behavior.[9] Mood is decomposed into a weather-related component, namely, the projection of the six PANAS-X mood categories reported in the table on the three weather variables defined in Section 3, and a non-weather related component, that is, the residual of the regression. Overall, mood accounts for around 10% of the observed decision-making behavior (see "Total R^2"), and weather accounts for a large fraction of it (see "Weather Mood R^2"). This evidence suggests an explanation of the experimental results in terms of the subjects being more or less in a good mood and therefore more or less willing to accept the risks at stake in the experimental treatment.

The mood-risk channel that is established in this paper is not mutually exclusive with other cognitive biases or with other channels through which mood affects individuals' behavior. The PANAS-X questionnaire shows that not all mood states are affected by weather. Mood states such as "joviality" (including happiness, joyfulness, delightfulness, cheerfulness, excitedness, enthusiasm, and liveliness) or "hostility" (including anger, hostility, irritability, scornfulness, and loath) are not found to be affected by weather conditions, but might strongly affect voters' behavior. A growing literature analyzes the effect of these mood states on individual political actions and attitudes. For instance, Healy et al (2010) analyze the effect of happiness generated by the performance of local sport franchises on the likelihood of re-electing the incumbent and on the presidential approval rating, finding that higher performances affect positively

[9] Table A.3 shows the effect of other mood affect states on the participants' voting decisions.

TABLE 7
MOOD, WEATHER, AND VOTING

	Positive Affect	**Self-Assurance**	**Attentiveness**	**Sadness**	**Fatigue**	**Serenity**
Intercept	11.371	11.371	11.371	11.371	11.371	11.371
	[0.476]	[0.487]	[0.483]	[0.505]	[0.505]	[0.485]
Mood	-0.519^{**}	-0.412	-0.367^{**}	-0.145	-0.156	-0.510^{***}
	[0.240]	[0.294]	[0.185]	[0.438]	[0.167]	[0.194]
Total R^2	0.105	0.077	0.103	0.026	0.116	0.097
Weather Mood R^2	0.101	0.075	0.102	0.021	0.098	0.092
Non-Weather Mood R^2	0.003	0.002	0.000	0.005	0.018	0.005

Notes - The top panel reports the estimated coefficients of the regressions of the combined number of votes for the safer candidate in the two prospect treatments on an intercept and on the standardized scores of the PANAS-X categories reported on the first row. The numbers in square brackets are the standard errors of the estimated coefficients. One star, two stars, and three stars refer to statistical significance at the 1, 5 and 10 percent levels, respectively. In the bottom panel, mood is divided into a weather-related component, the projection of the standardized scores of the PANAS-X categories reported on the first row on the three weather dummies defined in Section 3, and a non-weather related component, the residual. Total R^2 refers to the R^2 of the regressions of votes for the safe candidate on both weather and non weather related components, while Weather Mood R^2 and Non-Weather Mood R^2 refer to the variance explained by the two subcomponents.

the likelihood of re-electing the incumbent or ratings of the president's performance; Miller (2013) analyzes the effect of professional sports records on incumbent mayoral elections, finding that winning sports records boost incumbents' vote totals.

8 Conclusions

An increasing number of media outlets have recently focused on the effect of weather on U.S. elections, claiming that inclement weather favors the Republican candidates. No consensus exists, however, in either the theoretical or the empirical literature about the net effect of inclement weather on an election day. It is not clear who the marginal voter is that the weather deters from turning out, or what the final effect of weather is on elections' outcomes.

This paper provides an alternative analysis of the effect of weather on voters' decisions, not by examining the decision to turnout, but rather by investigating the decision-making activity of the voters who do turn out. The impact of weather on human mood and hence on decision-making activity has been widely examined in the psychology literature. Bassi et al (2013) show that weather (through the intermediate variable of mood) affects risk preferences and, thus, the degree with which individuals are tolerant to risk. A growing stream of literature has begun to analyze how risk and uncertainty affects voters' actions and preferences. This paper tackles this question by analyzing a specific aspect of uncertainty, the risk attached to the future performance of the candidates running in the election. Quattrone and Tversky (1988) test a similar scenario, confirming that, with all else being equal, voters display a significant degree of risk aversion in choosing less risky candidates.

The paper provides experimental evidence of the effect of weather– measured in terms of precipitation, sunlight exposure, and subjective assessment –on the likelihood that individuals will vote for the candidate who is perceived to be less risky. After measuring bad and good weather conditions with a large set of variables, findings show that bad weather decreases risk tolerance, thus increasing the likelihood of voting in favor of the risk-free candidate, while good weather conditions promote risk-taking behavior. In "marginal elections," in which a voter is likely to consider whether to switch from a riskier to the safer candidate, bad weather may result in up to a twice-as-large probability of choosing the safer candidate over the risky one.

Although the abstract setting of this experiment can hardly explain voting behavior in all kinds of political elections (where partisanship, political attitudes, and information about candidates vary), these findings provide an initial step to understanding the effect of weather and mood on voting choice.

The results of this analysis suggest that not only policy ambiguity (as most commonly explored in the literature) but also performance uncertainty might be an important factor in determining voters' choices, especially when candidates' policy preferences are perceived to be close enough. This opens up new questions to pursue to advance our collective understanding of risks and their effect on individual decision-making activity and voting: what kind of individual characteristics or personal and professional experiences make a candidate perceived to be more or less risky by the voters? What kind of risks are voters more sensible to, and what risks they are more willing to tolerate?

Moreover, the paper sheds light on the effect of mood on voting choice, by distinguishing between affect states and by differentiating feeling states. Employing a design that measures participants' mood states, this study is not only able to indicate precisely the mood states that are sensible to weather conditions, but also the direct effect of these mood states on voting behavior. Further analysis of the effect of mood states on risk tolerance would advance the understanding of variation in human behavior not only in political settings, but also in economics, sociology, and finance.

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On-line Appendix: Experimental procedures and Instructions

Subjects were recruited from the UNC e-recruit subject pool. Subjects had joined the subject pool voluntarily by completing a form on line indicating their interest in participating in experiments. When a student enrolled for participation in the experiment, she was told only that she would participate in an experiment about decision making under uncertainty. When a subject entered the laboratory, she was given a card with a unique subject number, which identified the subject during the experiment, she was given a consent form and she was assigned to separate workplace, each far enough to others' subjects workplace such that the subjects could not see what the other subjects were doing, nor could they be seen by other subjects.

After signing the consent form, subjects were given 20 sets of political scenarios, each representing 20 different elections among two candidates the subjects needed to vote for with monetary payoffs attached to every candidate. Instructions were given to the subjects along with the 20 scenarios and they were read aloud. There was no time limit for the instructions and subjects had the opportunity to ask questions in private. A monitor was present to answer questions and to ensure that subjects did not communicate with each other. After the subjects made their decisions, they were given the PANAS-X affect scale form to complete. When all subjects had completed the PANAS-X form, experimental personnel went to each subject to randomly determine their payoffs.[10] Subjects were payed in private after completing their own questionnaire and they could leave the room.

[10]Experimental personnel rolled 1 die first and then tossed a coin. First, a twenty-sided die determined which of the twenty scenario was payoff-relevant. Second, the coin was used to determined whether which amount was payed out to them in the following way. If the coin landed heads up, subjects were paid a payoff equal to the forecast of expert 1 (for either candidate, depending who they chose), elsewhere they were paid the forecast of expert 2.

Background: Suppose there is a continent consisting of five nations, Alpha, Beta, Gamma, Delta, and Epsilon. The nations all have very similar systems of government and economics, are members of a continental common market, and are therefore expected to produce very similar standards of living and rates of inflation. Imagine you are a citizen of Alpha, which is about to hold its presidential election between the incumbent Mr. I and the challenger Mr. C. The two candidates have similar policy preferences and they differ from each other primarily in their expected performance once elected (i.e. capability of implementing the policies). Mr. I's performance has been observed and measured through the realized standard of living index (SLI). The SLI measures the goods and services consumed (directly or indirectly) by the average citizen yearly. It is expressed in dollars per capita so that the higher the SLI the higher the level of economic prosperity. The performance of Mr. C. is unknown and can only be forecasted by looking at his past experience and expertise. The expected performance of Mr. C. has been studied by Alpha's two leading experts, who are of equal expertise and are impartial as to the result of the election. After studying the past performance and experience of Mr. C, each expert make a forecast. The forecast consists of a prediction about the expected standard of living index (SLI) in case Mr. C wins the election.

	Projected SLI in Dollars per Capita
	Mr. C
Expert 1	$66,000
Expert 2	$42,000

Instructions: You are a citizen of Alpha, you are asked to cast your vote for Mr. C or Mr. I. The projected SLI per Capita in case Mr. I wins the election and the projected SLI per Capita of the other four nations will be specified in 20 different scenarios in the following 8 decision sheets. Suppose that your vote is decisive and that whoever you vote for will win the election. The SLI produced by the winner of the election has a 50% chance to be equal to the forecast of Expert 1 and a 50% chance to be equal to the forecast of Expert 2. Before you make your choice, please let me explain how this choice will affect your earnings for this part of the experiment. Here are a 20-sided die and a coin that will be used to determine payoffs. After you have made all of your choices, first we will roll the die to select one the 20 scenario to be used and second we will toss the coin to determine what the realization of SLI is. If the coin lands heads up, the SLI is equal to the forecast of Expert 1, if it lands heads down, the SLI is equal to the forecast of Expert 2. Even though you will make twenty decisions, only one of these will end up affecting your earnings, but you will not know in advance which decision will be used. Obviously, each decision has an equal chance of being used in the end. Earnings in experimental points will be converted at a rate of $1000 SLI=20 cents. You will be paid all earnings in cash when we finish. Please look at the questions on the attached decision sheets. You will now have to cast a vote, in each of the possible scenarios, either for Mr. C or Mr. I. Please do not talk with anyone while doing this; raise your hand if you have a question.

PANAS-X Test:

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate <u>to what extent you have felt this way today</u>. Use the following scale to record your answers:

1 very slightly or not at all	2 a little	3 moderately	4 quite a bit	5 extremely

______ cheerful	______ sad	______ active	______ angry at self
______ disgusted	______ calm	______ guilty	______ enthusiastic
______ attentive	______ afraid	______ joyful	______ downhearted
______ bashful	______ tired	______ nervous	______ sheepish
______ sluggish	______ amazed	______ lonely	______ distressed
______ daring	______ shaky	______ sleepy	______ blameworthy
______ surprised	______ happy	______ excited	______ determined
______ strong	______ timid	______ hostile	______ frightened
______ scornful	______ alone	______ proud	______ astonished
______ relaxed	______ alert	______ jittery	______ interested
______ irritable	______ upset	______ lively	______ loathing
______ delighted	______ angry	______ ashamed	______ confident
______ inspired	______ bold	______ at ease	______ energetic
______ fearless	______ blue	______ scared	______ concentrating
______ disgusted with self	______ shy	______ drowsy	______ dissatisfied with self

Classification of PANAS-X Categories:

General Dimension Scales
Negative Affect: afraid, scared, nervous, jittery, irritable, hostile, guilty, ashamed, upset, distressed
Positive Affect: active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong

Basic Negative Emotion Scale
Fear: afraid, scared, frightened, nervous, jittery, shaky
Hostility: angry, hostile, irritable, scornful , disgusted, loathing
Guilt: guilty, ashamed, blameworthy, angry at self, disgusted with self, dissatisfied at self
Sadness: sad, blue, downhearted, alone, lonely

Basic Positive Emotion Scale
Joviality: happy, joyful, delighted, cheerful, excited, enthusiastic, lively, energetic
Self-Assurance: proud, strong, confident, bold, daring, fearless
Attentiveness: alert, attentive, concentrating, determined

Other Affective States
Shyness: shy, bashful, sheepish, timid
Fatigue: sleepy, tired, sluggish, drowsy
Serenity: calm, relaxed, at ease
Surprise: amazed, surprised, astonished

Table A.1
Demographic Statistics

	1	2	3	4	5	6	7
In what year were you born? (1=(-,80], 2=(80, 85], 3=(85,87], 4=(87,89], 5=(89,90], 6=(90,91], 7=(91,+))	16.38	0.86	3.45	6.03	9.48	18.10	45.69
Gender? (1=Male, 2=Female)	33.62	66.38					
Racial or ethnic group (1=White, 2=Black, 3=Hispanic, 4=Am Indian, 5=Asian, 6=Pacifi, 7=Multi)	52.59	19.83	6.03	0.00	17.24	0.86	2.59
Marital status (1=Married, 2=Single, 3=Divorced, 4=Widowed, 5=Other)	7.76	87.93	1.72	0.86	0.86		
Current employment (1=Full-time outside, 2=Part-time outside, 3=Student, 4=Research Assistant, 5=Other part time at school)	11.21	23.28	49.14	6.03	9.48		
Major (1=Natural Sc, 2=Humanities, 3=Social Sc, 4=NA)	22.41	6.03	56.03	15.52			
Current school year (1=Fr, 2=So, 3=Jr, 4=Sr, 5=Graduate, 6=Law, 7=NA)	9.48	20.69	24.14	18.97	11.21	0.86	13.79
Personal income (1=[0,5], 2=[6-15], 3=[16-30], 4=[31-45], 5=[46-60], 6=60+)	53.45	20.69	12.07	6.03	1.72	5.17	
Family income (1=[0,40], 2=[41-80], 3=[81-120], 4=[121-160], 5=[161-200], 6=200+)	25.86	24.14	25.86	8.62	7.76	5.17	
Family size (Actual size; 7=7 or more)	11.21	14.66	16.38	35.34	18.10	0.86	3.45
Highest education (1=some HS, 2=HS, 3=some College, 4=College, 5=Master, 6=Doctorate)	1.72	6.90	23.28	30.17	27.59	9.48	
Geographic area of birth (1=North America, 2=South America, 3=Europe, 4=Asia, 5=Australia, 6=Africa)	81.90	0.00	6.03	11.21	0.00	0.00	
Geographic area in which lived longest (1=North America, 2=South America, 3=Europe, 4=Asia, 5=Australia, 6=Africa)	91.38	0.00	2.59	5.17	0.00	0.00	
Voted in last Presidential Election (1=Yes, 2=No)	45.69	54.31					
Candidate voted in last Presidential Election (1=Democrat, 2=Republican)	75.00	25.00					
Chance to vote in next Legislative Election (1=[0-20], 2=(20,40], 3=(40,60], 4=(60,80], 5=(80,100])	100.00	0.00	0.00	0.00	0.00		
Chance to vote in next Presidential Primary (1=[0-20], 2=(20,40], 3=(40,60], 4=(60,80], 5=(80,100])	97.78	0.00	0.00	0.00	2.22		
Chance to vote in next Presidential Election (1=[0-20], 2=(20,40], 3=(40,60], 4=(60,80], 5=(80,100])	14.91	1.75	1.75	3.51	78.07		
How often do you play lotteries? (1=once/week, 2=once/mo, 3=once/yr, 4=never	0.86	5.17	30.17	61.21			
Do you gamble? (1=once/week, 2=once/mo, 3=once/yr, 4=never	0.86	3.45	23.28	69.83			
Are you religious? (1=Yes, 2=No)	41.38	58.62					
Do you attend religious service? (1=Never, 2=Special occ, 3=once/yr, 4=once/mo, 5=evry oth wk, 6=once/week, 7=more than once/week)	27.43	18.58	11.50	14.16	10.62	11.50	6.19
Religious faith (1=Christianity, 2=Judaism, 3=Islam, 4=Buddism, 5=Induism, 6=Unaffiliated, 7=Other)	55.96	2.75	0.00	1.83	1.83	35.78	1.83

TABLE A.2
DEMOGRAPHIC STATISTICS

	1	2	3	4	5	6	7
Interested in gvt and politics? (1=Uninterested, 7=Very Interested)	1.72	8.62	12.07	12.93	24.14	18.97	20.69
Can people affect gvt? (1=No Effect, 7=Large Effect)	0.86	17.24	12.07	24.14	24.14	12.07	8.62
Describe your political leaning (1=Most Liberal, 7=Most Conservative)	10.34	25.00	21.55	24.14	11.21	6.03	0.86
Do you support the Tea Party? (1=Oppose, 7=Support)	23.28	9.48	10.34	44.83	7.76	1.72	0.86
Can you trust Federal Gvt? (1=Almost Never, 7=Almost Always)	7.76	11.21	19.83	33.62	22.41	3.45	0.86
US political party you most agree with (1=Democratic, 7=Republican)	14.66	32.76	13.79	20.69	8.62	4.31	3.45
Was economic stimulus good for economy? (1=Mostly Bad, 7=Mostly Good)	3.45	4.31	6.90	24.14	35.34	18.97	3.45
Concerned about financial situation? (1=Not at All, 7=Extremely)	8.62	13.79	18.10	8.62	22.41	18.97	6.90
How is the economy with respect to 1 yr ago? (1=Much Worse, 7=Much Better)	1.72	5.17	15.52	19.83	37.07	14.66	3.45
What about 1yr from now? (1=Much Worse, 7=Much Better)	0.00	2.59	9.48	21.55	37.93	21.55	3.45
Describe your health (1=Poor, 7=Very Good)	0.00	0.00	1.72	4.31	20.69	49.14	21.55
How do you feel about the weather? (1=Terrible, 7=Awesome)	3.45	6.90	13.79	19.83	18.10	27.59	10.34
Weather forecast in the next few weeks? (1=Much Poorer, 7=Much Better)	0.86	4.31	7.76	15.52	27.59	34.48	9.48

Notes - These tables report the answers to the questionnaire

Table A.3
Mood and decision making

	Negative Affect	Positive Affect	Fear	Hostility	Guilt	Sadness	Joviality	Self-Assurance	Attentiveness	Shyness	Fatigue	Surprise	Serenity
Intercept	11.371	11.371	11.371	11.371	11.371	11.371	11.371	11.371	11.371	11.371	11.371	11.371	11.371
	[0.499]	[0.476]	[0.497]	[0.503]	[0.503]	[0.505]	[0.460]	[0.487]	[0.483]	[0.499]	[0.505]	[0.485]	[0.488]
Mood	−0.071	−0.519	−0.213	0.075	0.226	−0.145	−0.714	−0.412	−0.367	−0.170	−0.156	−0.510	−0.520
	[0.323]	[0.240]	[0.329]	[0.291]	[0.158]	[0.438]	[0.275]	[0.294]	[0.185]	[0.222]	[0.167]	[0.194]	[0.224]
Total R^2	0.000	0.105	0.032	0.056	0.112	0.026	0.101	0.077	0.103	0.026	0.116	0.097	0.041

Notes - The top panel reports the estimated coefficients of the regressions of the combined number of votes for the safe candidate in the two prospect treatments on an intercept and on the standardized scores of the PANAS-X categories reported on the first row. The numbers in square brackets are the standard errors of the estimated coefficients. One star, two stars, and three stars refer to statistical significance at the 1, 5 and 10 percent levels, respectively. Total R^2 refers to the R^2 of the regressions of votes for the safe candidate on each mood affect state.