Working Paper

The Impact of Framing on Voters' Perceptions of Electoral Predictions

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Abstract

Electoral outcomes often generate conflicting perceptions among voters on the winning and losing sides. The negative sentiments of the losing voters have critical consequences in their judgments regarding the democratic system and can even affect personal well-being. In a preregistered laboratory study, 1,012 participants took part in a randomized controlled trial to investigate how the communication framing generates different perceptions toward the prediction outcome and the electoral process, on people whose candidate was most likely to win but ends up losing. As a moderator variable, the research included the degree to which the forecast leans towards one candidate over others, alongside four potential covariates. Results indicated that when predictions were presented as the probability of losing—instead of the equivalent probability of winning format—people were significantly less skeptical about the correctness of predictions and the legitimacy of the election overall. These findings have important implications for cost-effective communication strategies in public policy.

Keywords: framing effect, election forecasts, nudge, political communication, perception

Introduction

Elections can be emotionally charged events, where either winning or losing yield thoroughly different experiences. The *winner-loser gap* refers to the disparate perceptions between those who voted for the winning party and those who voted for the losing one, and how these opposing states affect people's opinion about the legitimacy of the process and attitudes towards the political system. This phenomenon has important consequences: voters who support the candidates who lose the election tend to harbor negative perceptions and less trust in the government and the democratic system (Anderson & Tverdova, 2001; Anderson & LoTempio, 2002; Dahlberg & Linde, 2017). Moreover, Toshkov and Mazepus (2022) showed that the consequences of this effect on voters on the losing side can be so impactful that it may lead to detrimental outcomes on their subjective assessment of health, happiness, and life satisfaction.

Polls and forecasts are an integral element of the electoral process, playing a key role in voters' perception by setting expectations about what will happen (Ansolabehere & Iyengar, 1994; Westwood, Messing, & Lelkes, 2019). In particular, when the likely winner is communicated in a probabilistic forecast format (e.g., 'the probability that candidate A will win'), instead of the expected vote share, the conviction and perception of definiteness about the projected outcome increases (Westwood et al., 2019). However, as with any probabilistic scenario, the unlikely can occur, and holding certainty presumptions may exacerbate negative sentiments in the group of voters who expected to win but end up losing. Thus, the disappointment after an unexpected loss may increase the perception of lack of integrity of the electoral process and aggravate the winner-loser gap. This conjecture aligns with Mongrain (2023) who notes that "it has often been observed that wrongly anticipating an outcome tends to create a state of psychological discomfort, which might even breed denial" (p. 1591). The reaction to disconfirmed expectations is troublesome

because in a well-functioning democracy, citizens accept the legitimacy of the elections even when their preferred candidate loses (Grant et al. 2021). For this set of reasons, it is important to investigate potential approaches that could reduce the negative sentiments associated with unexpected electoral results.

Is there a way to influence the judgment of the loser side? Fortunately in this case, perceptions are moldable. Over the few past decades, a prolific body of research has demonstrated the pervasiveness of the framing effect, a psychological phenomenon wherein the perspective or frame in which the information is presented affects the evaluation and preference of prospects, irrespective of the content itself (Kahneman & Tversky, 1979, Tversky & Kahneman, 1981; Levin, Schneider, & Gaeth, 1998; Druckman, 2001), and its application has been observed in a broad spectrum of situations such as in medical contexts (Peng et al., 2013), consumer choice (Levin & Gaeth, 1988), or investment decision-making (Cantarella, Hillenbrand, & Brooks, 2023). In a foundational study, Tversky and Kahneman (1981) showed how preferences can be reversed by altering the decision frame. Participants in one group read a hypothetical scenario about an unusual Asian disease that is expected to kill 600 people, followed by an evaluation task in which the study subjects had to choose between two programs with equivalent expected utility. When the outcomes of adopting the proposed programs were described by the number of *lives saved*, 72% of participants preferred the alternative that offered saving 200 people with certainty, while 28% preferred the equivalent alternative in which there was a 1/3 probability that 600 people will be saved and 2/3 probability that no one will be saved. However, when another group evaluated a different version of the case wherein the programs were framed as *lives lost*, 22% of participants chose the program where 400 people will die with certainty, while 78% chose the option with 1/3 probability that nobody will die and 2/3 probability that 600 will die. This experiment shows how

information presentation can influence judgment and yield a reversal of preferences, exhibiting the human tendency to be risk-averse when dealing with choices involving gains, and risk-taking when choices involve losses.

The framing effect can adopt different forms, including risky choice framing (exemplified in the Asian Disease Problem); attribute framing, in which some characteristic of an object or event takes the focus of the message; and goal framing, in which the consequence or outcome of an action is made prominent (Levin, Schneider, & Gaeth, 1998). In the present research, we are interested in the study of the impact of the framing effect on the perception of electoral predictions, by presenting one version of a pair of probabilistically equivalent statements (e.g., '90% probability of happening' or '10% probability of not happening'), which can be considered an extension of the attribute framing type. Specifically, we aim to investigate whether the sentiments of mistrust and suspicion of the supporters of the losing candidate can be mitigated, by departing from the status quo form that communicates predictions in terms of the desirable outcome (i.e., the probability of winning), and instead framing them in terms of the undesirable outcome (i.e., the probability of losing). The rationale for this approach is underpinned by the following findings:

a) *The attentional focus of the frame:* The valence in which a probability estimate is expressed reinforces the expectation towards the direction of the forecasted outcome, despite the numerical probabilistic data (Teigen & Brun, 1999).

b) *Alignment enhances perceived correctness*: Among a group of equivalent probabilistic predictions, those whose framing is congruent with the outcome are evaluated as more accurate (Yeung, 2014). Similarly, predictions are judged as less erroneous when the probabilistically unexpected outcome is congruent with the direction of the prediction's phrasing (Jenkins & Harris, 2021).

c) *The negative frame can correct errors:* In some situations, information framed in a negative direction may reduce the presence of certain cognitive biases by potentially eliciting more cautious thinking about the probabilistic scenario (Teigen & Brun, 1999).

d) *The perceived truthfulness of negative valence*: Statistical information framed in negative terms is judged as more truthful (Hilbig, 2009, 2012). Likewise, in the political realm, negative frames enhance trustworthiness of the communicator (Koch & Seeger, 2017).

Consequently, we postulate that if the prediction were presented as the probability of losing, supporters of the defeated candidates would be less likely to evaluate the prediction as incorrect and be less suspicious of the election's legitimacy.

The experiment

In this research, we investigate whether the framing effect has an impact in the way people assess the correctness of predictions and the electoral process overall, in a scenario where the voters' preferred candidate loses the election. We posit that switching the way in which predictions are framed—from the conventional way of communicating the forecast as the *probability of winning* to the equivalent version *probability of losing* the election—affects the evaluation of the prediction's credibility and the legitimacy of the electoral process.

Additionally, it is of interest to explore if this effect depends on specific levels of uncertainty of the prediction. Damnjanovic & Gvozdenovic (2016) found that across a set of domains, results regarding the risky choice framing effect varied at different levels of the presented outcome probabilities. Therefore, questions arise: Would a close electoral race reduce or increase the framing effect? And what if there is a candidate that seems to be a clear winner? To address these

scenarios, we introduce the term *prediction slant*, conceptualized as the degree to which the forecast favors one candidate over others. While the primary focus of our investigation is studying the effect of the prediction frame, we acknowledge the potential role of prediction slant as a moderator that may amplify or diminish the impact of the prediction frame on voters' perceptions. By considering this supplementary variable we aim to expand the understanding of the mechanisms through which people evaluate electoral predictions.

This study was pre-registered on OSF https://osf.io/qmdg8; hypotheses, experimental design, sampling, and analysis plan were registered before the beginning of data collection.

Our research hypotheses are the following:[1]

Hypothesis 1: When a forecast predicts that the most likely scenario of an election is that voters' preferred candidate will win, but ends up losing, the frame in which the prediction is communicated (e.g., '90% probability of winning' or '10% probability of losing') has an effect on people's assessment of the prediction's correctness and election's legitimacy.

Hypothesis 2: The effect of the frame on people's assessment of the prediction's correctness and election's legitimacy, is moderated by the prediction's slant level (high, medium, low).

[1] In the preregistration document, the term 'accuracy' was chosen as a way to capture participant's perception about the prediction credibility. However, upon further reflection, we consider 'correctness' to be a more appropriate term for our research objectives, as we aim to assess whether individuals perceive the predictions as right or wrong. In contrast, 'accuracy' implies a measurement of proximity to the exact answer.

The next sections will provide a detailed account of our methodology, present our empirical findings, and discuss their implications for the communication of election predictions.

Method

The data set, analysis code, and other materials related to this study are available in our OSF project repository osf.io/e69v7.

Participants

To determine the number of participants we conducted a power analysis with the software G*Power. Our goal was to obtain .95 power to detect an effect size of $f = 0.15$ with a .05 alpha error probability. The analysis suggested a minimum sample size of 885 participants. We aimed to recruit 1,200 participants to account for individuals who might not pass the attention check or satisfactorily complete the study. Subjects were recruited via the online research platform Prolific. The data set registered 1,219 entries, representing the total number of survey responses received from Prolific. Participants were from the United States and spoke English as their first language. They were paid the equivalent of £0.15 for participating in the study.[2]

To ensure data quality, three questions were included as part of an attention check, resulting in the exclusion of 205 participants who failed the procedure (see Appendix A for the attention check questions and acceptance criteria). Additionally, two participants were excluded because they did not answer both questions that measured the dependent variables. The median response time for

[2] The payment settings for participants on the Prolific platform were configured in British pounds.

participants who passed the attention check was 73 seconds (IQR: 57 - 99 seconds). The final sample size of the study was 1,012 participants, with diverse socio-demographic characteristics. The gender distribution was relatively balanced with 474 identifying as females, 521 as males, and 17 individuals preferring to self-describe. In terms of education, the majority of participants had completed college (484), while others had completed high school (340), a master's degree (159), or a doctoral degree (29). Age was measured in ranges, showing a diverse distribution with the largest group being 25–34 years old (255), closely followed by the 35–44 years old group (233). Political party preferences also varied, including participants identifying as Democrats (521), Independents (281), Republicans (189), and others (21). The results shown in Appendix B, supported by a Chi-Square goodness of fit test, confirmed the randomization process generated a relatively uniform distribution of participants across the experimental groups.

Experimental Design

The study employed a 2 (prediction frame) x 3 (prediction slant) between-subjects factorial design. Participants were randomly assigned to one of the six experimental groups through the online platform that hosted the experiment. This approach allowed us to study the main effect and potential interaction of the independent variables on participants' perceptions of prediction correctness and election legitimacy. Prediction frame was presented in either the *probability of winning* (e.g., 90% probability of winning) or its complement, the *probability of losing* (e.g., 10% probability of losing). As for prediction slant, it was operationalized as the degree of disparity or gap in the probability of victory between the candidates. Thus, a high prediction slant means the forecast strongly favors one candidate over the others; and on the contrary, a low prediction slant indicates the forecast is close to a scenario in which any candidate could win. The three levels of prediction slant were the following complementary forecasts:

a) High prediction slant condition: either “90% probability of winning” or “10% probability of losing.”
b) Medium prediction slant condition: either “75% probability of winning” or “25% probability of losing.”
c) Low prediction slant condition: either “60% probability of winning” or “40% probability of losing.”

Two dependent variables were measured. The first was *perceived incorrectness of the prediction*, where participants were asked to rate their level of agreement with the statement “The predictions made by polls and forecasters for this election were wrong.”[3] The second was *perceived illegitimacy of the election*, where participants evaluated their agreement with the statement “The legitimacy of this election is doubtful.” We chose to phrase the statements in a negative form; however, they could be alternatively presented in positive terms, as noted in the discussion section. The possible answers for both statements were presented on a Likert scale of seven points that included: Strongly disagree, Disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Agree, and Strongly agree (Appendix C). Under this measurement approach, a high level of agreement with each statement independently indicates a high perception of prediction incorrectness and electoral illegitimacy, respectively.

[3] Strictly speaking, polls are not predictions; rather, they are snapshots of public opinion, attitudes and preferences at a specific time. However, for the purpose of this study, we use the term 'predictions' in a broader, colloquial sense. This usage aligns with common public perceptions where polls are often interpreted as indicating likely outcomes of elections. Our terminology reflects this general interpretive approach, rather than a technical definition, to engage with the conceptual framework familiar to the public.

Materials

The experimental approach required creating a hypothetical situation that could bring about the negative sentiments associated with experiencing an electoral defeat. This effect was intensified by setting up the most likely outcome as favoring the participants' candidate, increasing the discontent when the results are revealed. Thus, the vignettes described a brief scenario in which participants' preferred candidate was likely to win, only to later find out that they lost the election.

The following vignette illustrates the 'High prediction slant with a 10% probability of losing' condition, one of the six created for the study (See Appendix D for all vignettes):

"Imagine today is the presidential Election Day.
Over the past months, polls and forecasters have predicted that the candidate you strongly support has a **10% probability of losing the election**.
The voting process is over and the results have just been announced:
Your candidate lost."

Procedure

After reading the scenario to which they were randomly allocated, participants were asked three attention check questions.[4] Next, they were asked to rate their level of agreement with each of the statements corresponding to the dependent variables. After completing this section, participants were asked to answer a series of sociodemographic questions regarding their gender identity, age

[4] Individuals who failed the attention check were later removed from the data analysis procedure.

group, education status, and political party preference. This information aimed to gather data on potential covariate variables in the study.

Results

Prior to the data analysis process, the set of possible responses to the statements operating as dependent variables were transformed into a numerical scale, ranging from 1 (Strongly disagree) to 7 (Strongly agree). The conversion into a numerical scale allowed us to evaluate participant's level of agreement with the proposed statements using an analysis of variance approach (Norman, 2010).

Dependent variable 1: Perceived incorrectness of the predictions (Agreement with statement "The predictions made by polls and forecasters for this election were wrong").

A two-way ANOVA was conducted, finding a significant effect of prediction framing on the level of agreement with the statement indicating predictions for this election were wrong $F(1, 1006) = 541.19$, $p < 0.001$, $\eta^2 = 0.34$ (Table 1). The mean score for the *probability of winning* condition was 6.14 ($SE = 0.05$), whereas *the probability of losing* condition was 3.71 ($SE = 0.10$) (Figure 1). The analysis also found significant main effects of prediction slant, $F(2, 1006) = 15.71$, $p < 0.001$, $\eta^2 = 0.020$. The average ratings for the conditions also varied between the High Slant ($M = 5.34$, $SE = 0.12$), Medium Slant ($M = 5.06$, $SE = 0.11$) and Low Slant ($M = 4.57$, $SE = 0.11$) conditions (Figure 2).[5]

[5] In addition to the ANOVA procedure, we conducted a Kruskal-Wallis non-parametric test as a robustness check. The results indicated a significant effect of both prediction framing, $H(1) = 320.89$, $p < 0.001$, and prediction slant, $H(2) = 42.01$, $p < 0.001$, on 'Perceived incorrectness of the predictions.'

A post-hoc comparison test was conducted using the Benjamini-Hochberg procedure to control for false discovery rate, indicating significant differences between High Slant and Low Slant conditions (adjusted $p < 0.001$), as well as between Medium Slant and Low Slant (adjusted $p = 0.003$). No significant difference was observed between High Slant and Medium Slant (Table E3 in Appendix E).

Additionally, a significant interaction effect was found between prediction framing and prediction slant, $F(2, 1006) = 4.11$, $p = 0.017$, $\eta^2 = 0.005$ (Figure 3). This finding suggests that the effect of prediction framing on the agreement with the statement "The predictions made by polls and forecasters for this election were wrong" is potentially moderated by prediction slant. However, the effect size of this interaction was very small and subsequently rendered statistically not significant upon the introduction of demographic covariates ($p = 0.052$; see Covariate Analysis section below).

Covariate Analysis

To assess the robustness of the framing effect and the role of the prediction slant on the dependent variable, we fitted a model with covariates for gender, education level, political party affiliation, and age. Results showed that p-values and effect sizes of the main effects in the model with covariates were consistent with those in the simpler model which did not include covariates. However, the interaction was deemed statistically not significant ($p = 0.052$, $\eta^2 = 0.004$). Both gender ($p = 0.014$, $\eta^2 = 0.005$) and age ($p = 0.021$, $\eta^2 = 0.008$) were statistically significant. Political party preference yielded a p-value of 0.053 and $\eta^2 = 0.005$. These findings showed that the main effects were not altered even after including participants' sociodemographic characteristics (Table E4 in Appendix E).

Table 1

Two-Way ANOVA for effects of Prediction Framing and Prediction Slant on 'Perceived Incorrectness of the Predictions'

Source of Variation	*Sum of Squares (SS)*	*df*	*F*	*Pr(>F)*	η^2
Prediction Framing	1,472,54	1	541.19	<0.001	0.341
Prediction Slant	85.510	2	15.71	<0.001	0.019
Prediction Framing * Prediction Slant	22.34	2	4.11	0.017	0.005
Residual	2,737.28	1,006			

Figure 1

Mean Score for 'Perceived Incorrectness of The Predictions' by Prediction Framing. Error Bars Indicate the 95% Confidence Intervals Around the Mean.

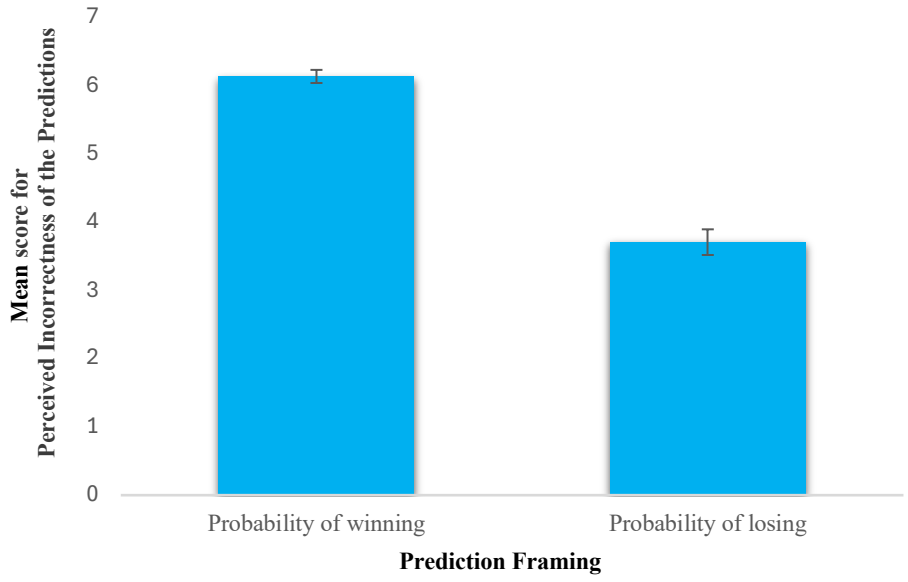


Figure 2

Mean Score for 'Perceived Incorrectness of the Predictions' by Slant Condition. Error Bars Indicate the 95% Confidence Intervals Around the Mean.

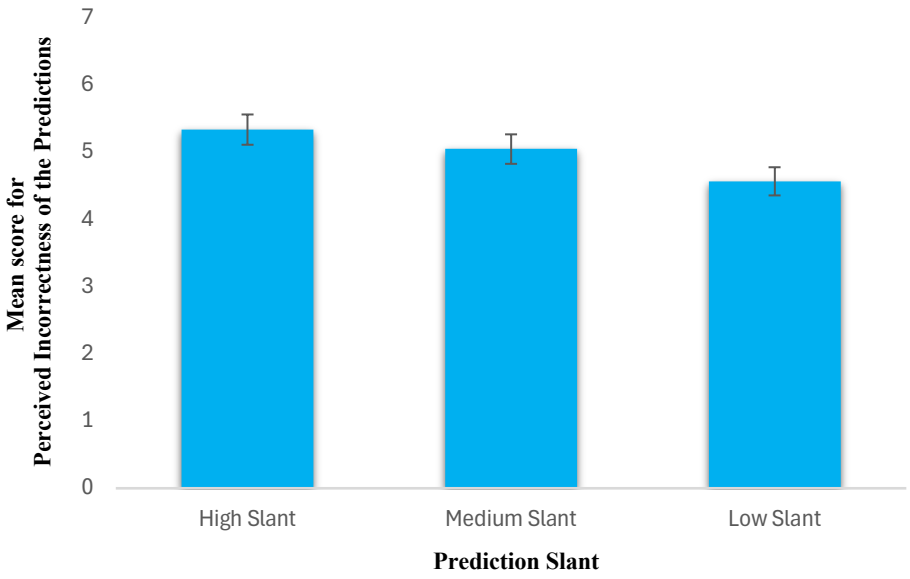
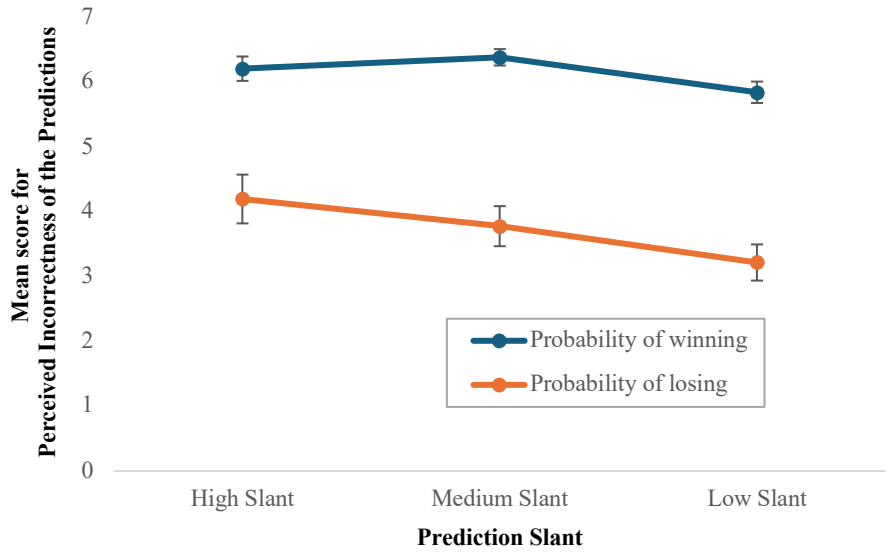


Figure 3

Interaction Effect of Prediction Framing and Prediction Slant on 'Perceived Incorrectness of the Predictions.' Error Bars Indicate the 95% Confidence Intervals Around the Mean.



Dependent Variable 2: Perceived illegitimacy of the election (Agreement with statement "The legitimacy of this election is doubtful").

To examine the effect of the independent variables on the perception of election illegitimacy, a two-way ANOVA was conducted. In line with the 'Perceived incorrectness of the predictions' evaluation, a significant main effect of prediction framing was found on the level of agreement with the statement that the legitimacy of the election is doubtful $F(1, 1006) = 17.82$, $p < 0.001$, $\eta^2 = 0.017$ (Table 2), showing that the mean score of the *probability of winning* condition ($M = 3.25$, SE = 0.07) was higher than in the *probability of losing* condition ($M = 2.81$, $SE = 0.07$) (Figure 4). The analysis also found a significant main effect of prediction slant, $F(2, 1006) = 13.54$, $p < 0.001$, $\eta^2 = 0.026$.[6]

The Benjamini-Hochberg procedure showed significant differences between High Slant and Medium Slant conditions (adjusted $p < 0.001$), as well as between High Slant and Low Slant (adjusted $p < 0.001$). No significant differences were observed between Medium Slant and Low Slant conditions (Table E7 in Appendix E).

An interaction effect was found between prediction framing and prediction slant, $F(2, 1006) = 3.38$, $p = 0.035$, $\eta^2 = 0.006$ (Figure 6). As in the analysis of perception of prediction incorrectness, this finding suggests that the effect of prediction framing on the agreement with the statement "The

[6] The Kruskal-Wallis test was also conducted for 'Perceived illegitimacy of the election.' The test showed significant effects for both prediction framing, $H(1) = 18.68$, $p < 0.001$, and prediction slant, $H(2) = 24.89$, $p < 0.001$.

legitimacy of this election is doubtful" is moderated by prediction slant, although the effect size of this interaction was similarly very small and subsequently rendered statistically not significant upon the introduction of sociodemographic covariates ($p = 0.085$; see Covariate Analysis section below).

Covariate Analysis

The model that included covariates for gender, education level, political party preference, and age showed significant main effects of prediction framing and prediction slant. (Table E8 in Appendix E). However, once again the interaction was found to be statistically not significant ($p = 0.085$, $\eta^2 = 0.004$). Two covariates, gender ($p < 0.001$, $\eta^2 = 0.018$) and political party preference ($p < 0.001$, $\eta^2 = 0.059$) were statistically significant.

Table 2

Two-Way ANOVA for Prediction Framing and Prediction Slant on 'Perceived illegitimacy of the Election'

Source of Variation	Sum of Squares (SS)	df	F	Pr(>F)	η^2
Prediction Framing	44.39	1	17.82	<0.001	0.017
Prediction Slant	67.47	2	13.54	<0.001	0.026
Prediction Framing * Prediction Slant	16.83	2	3.38	0.035	0.006
Residual	2,506.45	1,006			

Figure 4

Mean Score for 'Perceived Illegitimacy of the Election' by Prediction Framing, Error Bars Indicate the 95% Confidence Intervals Around the Mean.

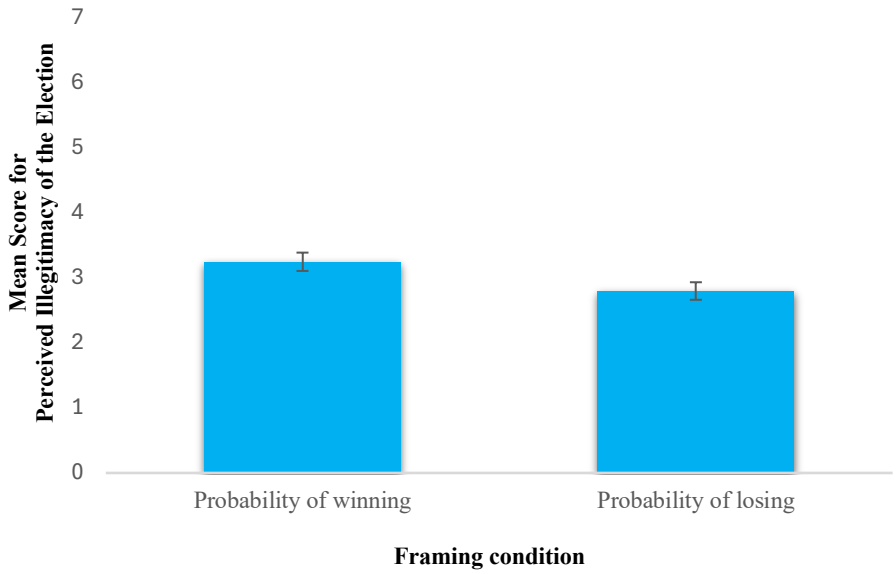


Figure 5

Mean Score for 'Perceived Illegitimacy of the Election' by Slant Condition. Error Bars Indicate the 95% Confidence Intervals Around the Mean.

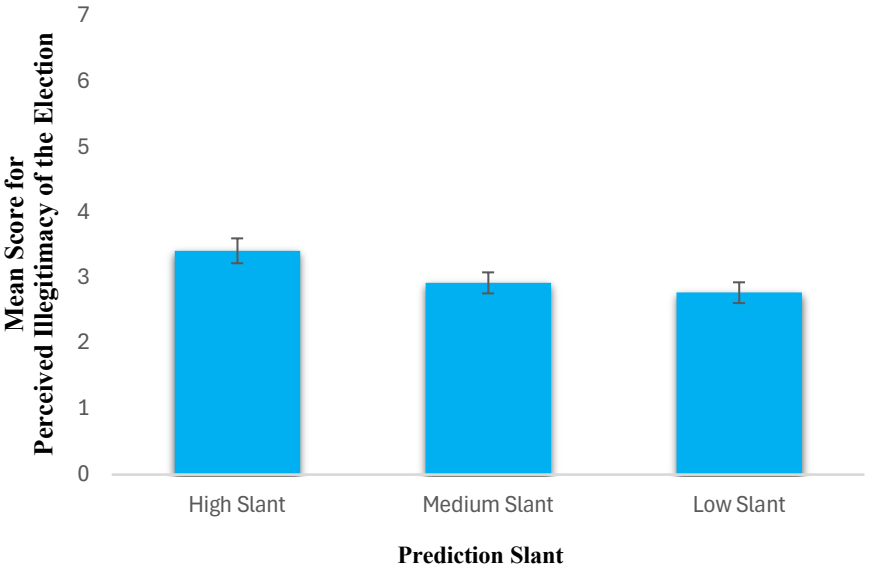
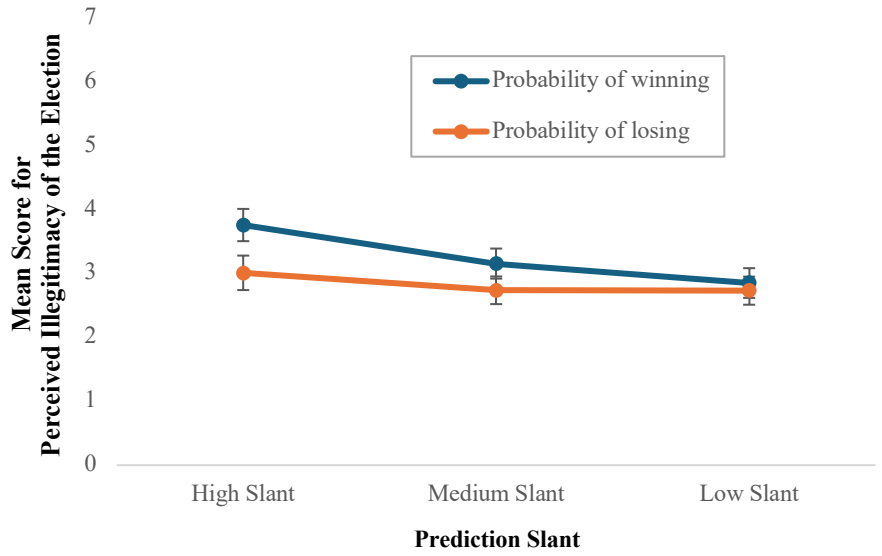


Figure 6

Interaction Effect of Prediction Framing and Prediction Slant on 'Perceived Illegitimacy of the Election.' Error Bars Indicate the 95% Confidence Intervals Around the Mean.



Post-hoc analysis on High Slant

One of the central aims of this study was to investigate ways to mitigate the negative sentiments of mistrust and suspicion regarding the legitimacy of the election by means of the framing effect. Thus, we carried out an in-depth analysis on the slant level that was associated with a greater perception of electoral illegitimacy, which was found to be the High Slant condition (Figure 5). Consequently, in a post hoc analysis that was not included in the preregistration, the study showed that in the High Slant condition, the prediction framing was significant, $F(1,304) = 15.05$, $p < 0.001$, $\eta^2 = 0.041$, even after including the covariates in the model (Table E9 in Appendix E). Further analysis showed that prediction framing was also significant in the Medium Slant condition, $F(1,321) = 10.53$, $p = 0.001$, $\eta^2 = 0.029$ (Table E10 in Appendix E). In the Low Slant

condition, prediction framing was not significant $F(1,342) = 1.87$, $p = 0.17$, $\eta^2 = 0.005$ (Table E11 in Appendix E).

Discussion

The present study found that prediction framing influences the way in which people perceive predictions' correctness and electoral legitimacy. Specifically, in the scenario where the participant's preferred candidate is expected to win but ultimately loses, predictions presented in terms of the probability of losing are associated with lower perception of incorrectness and reduced perception of electoral illegitimacy. These findings remained stable even after accounting for sociodemographic covariates, thereby supporting our first hypothesis, and contributing to the deepening and expansion of the body of knowledge on the framing effect. Regarding the role of prediction slant, conditions where the slant was higher were associated with increased perception of both incorrectness and illegitimacy, suggesting that in situations of lesser uncertainty—where a 'clear winner' was predicted—an unexpected electoral outcome generates increased sentiments of doubt and mistrust. This observation indicates that the *winner-loser* gap effect might also be affected by voters' expectations regarding the degree of certainty that their preferred candidate will secure the election.

Additionally, considering the practical implications of exploring ways to mitigate the mistrust and suspicion regarding the electoral process, the study delved into the potential influence of the framing effect at the circumstance in which perception of electoral illegitimacy was greater. The statistical analysis found that under the High Slant scenario the effect of the prediction framing was significant and accounted for approximately 4% of the variance in the perceived illegitimacy of the election. This effect could be considered at the lower end of a medium effect size, and it

might be used as a valuable communication tool for public policies aimed at reducing the winner-gap effect in a cost-efficient way. Future longitudinal studies could explore the impact of the repeated exposure to the predictions framed in terms of the probability of losing. Interestingly, at the opposite end of the spectrum, prediction framing was not statistically significant in the Low Slant condition, suggesting that the framing effect is observable once the gap between candidates' probabilities of victory exceeds a threshold: in our experimental setup, it was detected from the Medium Slant condition wherein the participant's preferred candidate was three times more likely to win (or three times less likely to lose) than the opponent.

As part of our second hypothesis, the research aimed to evaluate whether the prediction framing was moderated by the prediction slant. For both dependent variables the statistical analyses found significant, nevertheless very small, interaction effects. After including a set of sociodemographic covariates in the model, the interaction effects were not significant, rejecting the hypothesis.

The methodological strength of the study is grounded in the inclusion of sociodemographic characteristics to control for covariates that could also explain variations in people's perceptions. This procedure allowed us to obtain evidence indicating that the influence of the frame in which predictions were communicated is not attributable to these other factors. Furthermore, exploring the relationship between the independent variables enabled us to gain a more detailed understanding of the interactions between the framing in which potential outcomes are presented and the specific values of the given prediction. However, it is important to consider the limitations of the study. First, even though the sample was diverse, it was not statistically representative of the broader population of the United States. Also, the results might diverge in countries with different partisan perceptions and sociodemographic characteristics. Second, it is possible that the

first research question participants had to answer affected the results of the second question, suggesting that the randomization of their presentation should be considered in future research. Third, different results may be observed if the statements asked for perception of correctness rather than wrongness, and trustworthiness instead of doubtfulness. Finally, to focus participants' attention on their preferred candidate's situation, we presented a simplified scenario that solely described the candidate's probability of winning or losing. However, in naturalistic contexts, probabilities for each candidate are often presented (e.g., 'Candidate A has a 10% probability of winning the election, whereas Candidate B has a 90% probability of winning'). In a follow-up study, we aim to explore setups that incorporate the complete set of probabilities for the candidates involved.

In conclusion, by switching the communication format from the probability of winning to the probability of losing, the study found evidence of the framing effect’s impact on reducing skepticism about the correctness of predictions and the legitimacy of the election. If applied, such an intervention could have important consequences for the perception of the electoral system.

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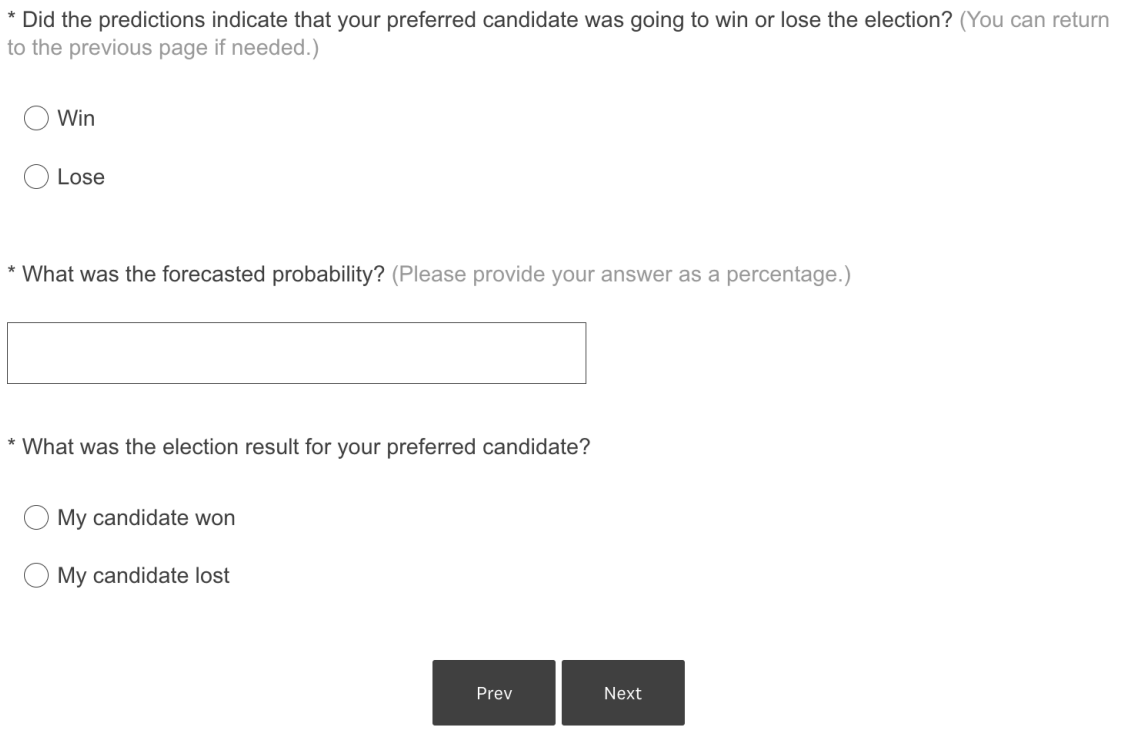
Appendix A

Figure A1

Attention check questions



Attention Check Procedure Criteria

The questions specifically tested the participants' recall of the prediction framing and the probability slant presented to them, as well as their recollection of whether their chosen candidate ultimately won or lost the election. In an effort to ensure fairness and acknowledge different cognitive processing styles, we made accommodations for responses that correctly captured the essence of the conditions presented, albeit in a complementary manner. For instance, if participants were initially presented with a condition described as "90% probability of losing" we accepted the

inverse but equivalent response of "10% probability of winning" as valid. This approach not only refined our evaluation of participants' answers but also allowed for a broader interpretation of attentiveness, accommodating logical inverse responses within the validation process. Next, we present the step-by-step process carried out.

Data Processing for Attention Checks

This section outlines the methods employed to process and assess responses to the attention checks incorporated within our survey. These checks are designed to gauge the attentiveness and understanding of participants, ensuring the exclusion of participants who may have misunderstood instructions or not engaged fully with the survey content:

1. **Attention Check 1 Validation:**

   Each participant's response to Attention Check #1 was compared to the Framing Condition initially presented. If the answer matched this condition, the check was passed.

Framing Condition Presented to Participant	Participant's Input to Attention Check #1	Outcome
Win	Win	Pass
Win	Lose	Exclude
Lose	Win	Pass
Lose	Lose	Exclude

2. **Attention Check 2 Pre-Processing:**

   Responses for Attention Check #2, initially in free-form text, were processed to convert them into a numeric, consistent format, to facilitate quantitative analysis. This was implemented through a two-step process, involving cleansing and normalization steps:

   a. **Removing Extraneous Characters and Converting to Numeric Format:**

      All non-numeric characters were removed from the "Attention Check #2" field, retaining only numerical digits and decimal points (e.g., entries such as “25”, “25%”, and “25% lose” were all converted to “25”). Entries that could not be converted into numeric values were treated as invalid.

   b. **Normalizing Data:**

      Some responses were noted to have used decimal fractions (e.g., “0.4” instead of “40%”). These were normalized to a 0 – 100 percentage scale by multiplying by 100.

3. **Direct Validation of Attention Check 2:**

   The cleansed, normalized numeric value of Attention Check #2 (in validation step 2 above) was compared to the numeric value of the Probability Slant initially presented. A direct match resulted in a pass in this step.

4. **Complementary Validation of Attention Check 2:**

   The analysis found that 132 participants answered the Attention Check #2 question using the complementary value of the information provided in the case. For example, they were told

that their preferred candidate had a ‘10% probability of losing the election’ and when asked to recall this information they reported a ‘90% probability of winning the election.’

We decided to include these participants because thinking in terms of the complementary is not only logically correct, but it is also an indication of the cognitive process underlying the way in which participants dealt with the proposition of the electoral prediction communicated in a unusual format (131 of the 132 participants who answered using the complementary value were part of the group assigned to the negative -i.e., “losing”- framing condition). Future research may study in-depth the reasons and the mechanisms behind the spontaneous reframing that some people conduct to adapt unusual prediction format.

To operationalize the above proposal, a complementary validation logic was applied to participants who failed Attention Check #1 (validation step 1). The cleansed, normalized numeric value of Attention Check #2 (calculated in validation step 2 above) was compared to the complement of the Probability Slant presented (100 minus the numeric value of the Probability Slant).

Examples of Participants Passing Attention Check #2 Via Complementary Criteria:

Overall Condition Presented to Participant	Participant’s Input to Attention Check #1	Participant’s Input to Attention Check #2 (raw input)
40% Losing	Win	60%
25% Losing	Win	75
10% Losing	Win	90% win

5. **Attention Check 3 Validation:**

   Responses to Attention Check #3 were evaluated based on a specific criterion: the answer must exactly match "My candidate lost."

6. **Combined Criteria Validation**

   a. **Strict Criteria for Final Attention Check**

      A strict criterion for overall attention check passing was established. A participant must pass all individual checks—Attention Check #1 (validation step 1), the direct validation of Attention Check #2 (validation step 3), and Attention Check #3 (validation step 5)—to be considered as having passed the attention checks under strict conditions.

   b. **Complement-Based Criteria for Final Attention Check**

      An alternative criterion allowed passing based on the successful completion of the complementation validation of Attention Check #2 (validation step 4), and Attention Check #3 (validation step 5).

   c. **Aggregate Final Attention Check Passing**

      The final determination of whether a participant passed the attention checks was made by combining the results from the strict (validation step 6a) and complement-based criteria (validation step 6b). Meeting either set of criteria deemed the participant as having successfully passed the attention checks.

7. **Exceptions**

   Upon a final review of the results, three instances of valid responses were found to have been incorrectly excluded by the criteria described above.

   Specifically, three participants answered the Attention Check #2 question in a logically correct yet unexpected format, which was not properly handled by the validation step 2 logic.

Respondent ID	Overall Condition Presented to Participant	Participant's Input to Attention Check #1	Participant's Input to Attention Check #2 (raw input)	Participant's Input to Attention Check #3
118336618093	10% losing	Win	90%win 10% loss	My candidate lost
118336594516	25% losing	Win	25% loss 75% win	My candidate lost
118336593356	25% losing	Win	75% they would win, 25% they would lose.	My candidate lost

These three entries were deemed to have successfully passed the attention checks.

Appendix B

Table B1

Gender Characteristics of Participants at Baseline, Total and by Experimental Group

Gender	10% Losing	25% Losing	40% Losing	60% Winning	75% Winning	90% Winning	All
Female	61 (43.6%)	86 (50.3%)	79 (45.7%)	88 (47.8%)	70 (42.4%)	90 (50.3%)	474 (46.8%)
Male	74 (52.9%)	81 (47.3%)	90 (52.0%)	95 (51.6%)	92 (55.8%)	89 (49.7%)	521 (51.5%)
Prefer to self-describe	5 (3.6%)	4 (2.3%)	4 (2.3%)	1 (0.5%)	3 (1.8%)	0 (-)	17 (1.7%)
All	140 (100%)	171 (100%)	173 (100%)	184 (100%)	165 (100%)	179 (100%)	1,012 (100%)

Note: Chi-Square Test of Association: $\chi 2 = 11.58$, $df = 10$, $p = 0.31$

Table B2

Education Level Characteristics of Participants at Baseline, Total, and by Experimental Group

Education level	10% Losing	25% Losing	40% Losing	60% Winning	75% Winning	90% Winning	All
Completed high school	53 (37.9%)	50 (29.2%)	56 (32.4%)	64 (34.8%)	48 (29.1%)	69 (38.5%)	340 (33.6%)
Completed college	61 (43.6%)	82 (48.0%)	80 (46.2%)	85 (46.2%)	91 (55.2%)	85 (47.5%)	484 (47.8%)
Completed master's degree	21 (15.0%)	30 (17.5%)	33 (19.1%)	30 (16. 3%)	22 (13.3%)	23 (12.8%)	159 (15.7%)
Completed doctoral degree (PhD)	5 (3.6%)	9 (5.3%)	4 (2.3%)	5 (2.7%)	4 (2.4%)	2 (1.1%)	29 (2.9%)
All	140 (100%)	171 (100%)	173 (100%)	184 (100%)	165 (100%)	179 (100%)	1,012 (100%)

Note: Chi-Square Test of Association: $\chi 2 = 15.88$, $df = 15$, $p = 0.39$

Table B3

Age group of Participants at Baseline, Total and by Experimental Group

Age	10% Losing	25% Losing	40% Losing	60% Winning	75% Winning	90% Winning	All
18-24	15 (10.7%)	10 (5.8%)	23 (13.3%)	9 (4.9%)	16 (9.7%)	23 (12.8%)	96 (9.5%)
25-34	32 (22.9%)	41 (24.0%)	44 (25.4%)	51 (27.7%)	48 (29.1%)	39 (21.8%)	255 (25.2%)
35-44	30 (21.4%)	42 (24.6%)	37 (21.4%)	43 (23.4%)	40 (24.2%)	41 (22.9%)	233 (23.0%)
45-54	29 (20.7%)	36 (21.1%)	21 (12.1%)	35 (19.0%)	21 (12.7%)	27 (15.1%)	169 (16.7%)
55-64	21 (15.0%)	30 (17.5%)	23 (13.3%)	29 (15.8%)	26 (15.8%)	30 (16.8%)	159 (15.7%)
65+	13 (9.3%)	12 (7.0%)	25 (14.5%)	17 (9.2%)	14 (8.5%)	19 (10.6%)	100 (9.9%)
All	140 (100%)	171 (100%)	173 (100%)	184 (100%)	165 (100%)	179 (100%)	1,012 (100%)

Note: Chi-Square Test of Association: $\chi 2 = 29.52$, $df = 25$, $p = 0.24$

Table B4

Political Party Preference of Participants at Baseline, Total and by Experimental Group

Political party preference	10% Losing	25% Losing	40% Losing	60% Winning	75% Winning	90% Winning	All
All Other	3 (2.1%)	2 (1.2%)	5 (2.9%)	4 (2.2%)	2 (1.2%)	5 (2.8%)	21 (2.1%)
Democrat	75 (53.6%)	92 (53.8%)	79 (45.7%)	94 (51.1%)	100 (60.6%)	81 (45.3%)	521 (51.5%)
Republican	27 (19.3%)	36 (21.0%)	44 (25.4%)	28 (15.2%)	24 (14.5%)	30 (16.8%)	189 (18.7%)
Independent	35 (25.0%)	41 (24.0%)	45 (26.0%)	58 (31.5%)	39 (23.6%)	63 (35.2%)	281 (27.8%)
All	140 (100%)	171 (100%)	173 (100%)	184 (100%)	165 (100%)	179 (100%)	1,012 (100%)

Note: Chi-Square Test of Association: $\chi 2 = 22.52$, $df = 15$, $p = 0.09$

Appendix C

Figure C1

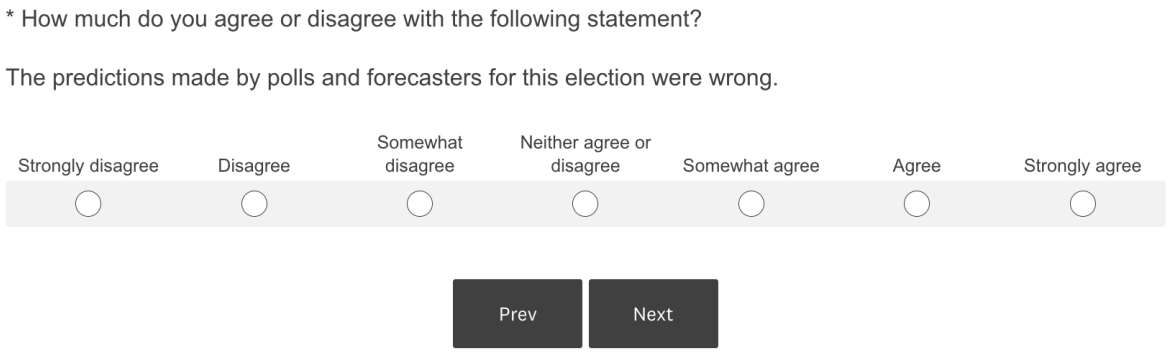
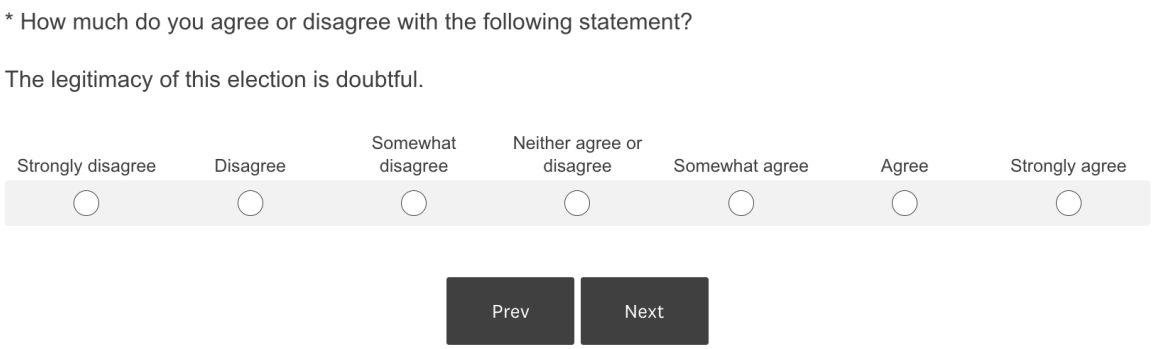


Figure C2



Appendix D

Vignettes of each experimental condition

a) High prediction slant with a 10% probability of losing condition:

Imagine today is the presidential Election Day.

Over the past months, polls and forecasters have predicted that the candidate you strongly support has a **10% probability of losing the election**.

The voting process is over and the results have just been announced:

Your candidate lost.

b) Medium prediction slant with a 25% probability of losing condition:

Imagine today is the presidential Election Day.

Over the past months, polls and forecasters have predicted that the candidate you strongly support has a **25% probability of losing the election**.

The voting process is over and the results have just been announced:

Your candidate lost.

c) Low prediction slant with a 40% probability of losing condition:

Over the past months, polls and forecasters have predicted that the candidate you strongly support has a **40% probability of losing the election**.

The voting process is over and the results have just been announced:

Your candidate lost.

d) High prediction slant with a 90% probability of winning condition:

Imagine today is the presidential Election Day.

Over the past months, polls and forecasters have predicted that the candidate you strongly support has a **90% probability of winning the election**.

The voting process is over and the results have just been announced:

Your candidate lost.

e) Medium prediction slant with a 75% probability of winning condition:

Imagine today is the presidential Election Day.

Over the past months, polls and forecasters have predicted that the candidate you strongly support has a **75% probability of winning the election**.

The voting process is over and the results have just been announced:

Your candidate lost.

f) Low prediction slant with a 60% probability of winning condition:

Imagine today is the presidential Election Day.

Over the past months, polls and forecasters have predicted that the candidate you strongly support has a **60% probability of winning the election**.

The voting process is over and the results have just been announced:

Your candidate lost.

Appendix E

Table E1

Descriptive Statistics for 'Perceived Incorrectness of the Predictions' by Prediction Framing Condition

Framing condition	Number of Observations	Mean	Std. Error
Probability of winning	528	6.14	0.05
Probability of losing	484	3.71	0.10

Table E2

Descriptive Statistics for 'Perceived Incorrectness of the Predictions' by Prediction Slant Condition

	N	Mean	Std. Error
High Slant	319	5.34	0.12
Medium Slant	336	5.06	0.11
Low Slant	357	4.57	0.11

Table E3

Post-Hoc Comparisons Between Prediction Slant Conditions (Benjamini – Hochberg Adjustment) for 'Perceived Incorrectness of the Predictions'

Condition 1	Condition 2	Mean Diff.	SE Diff.	T-Stat.	P-Value	Adj. P-Value	Sign. at <0.05
High Slant	Medium Slant	-0.29	0.161	1.77	0.077	0.077	No
High Slant	Low Slant	-0.77	0.157	4.90	<0.001	<0.001	Yes
Medium Slant	Low Slant	-0.49	0.155	3.12	0.002	0.003	Yes

Table E4

Two-Way ANOVA for Effects of Prediction Framing, Prediction Slant, and Covariates on 'Perceived Incorrectness of the Predictions'

Source of Variation	Sum of Squares (SS)	df	F	Pr(>F)	η^2
Prediction Framing	1,449.68	1	546.32	<0.001	0.339
Prediction Slant	79.13	2	14.91	<0.001	0.018
Framing * Prediction Slant	15.69	2	2.96	0.052	0.004
Gender	22.74	2	4.28	0.014	0.005
Education	17.57	3	2.21	0.086	0.004
Political Party Preference	20.48	3	2.57	0.053	0.005
Age	35.30	5	2.66	0.021	0.008
Residual	2,634.94	993			

Table E5

Descriptive Statistics for 'Perceived Illegitimacy of the Election', by Framing Condition

	Number of Observations	Mean	Std. Error
Probability of winning	528	3.25	0.07
Probability of losing	484	2.81	0.07

Table E6

Descriptive Statistic for 'Perceived Illegitimacy of the Election' by Prediction Slant Condition

	Number of observations	Mean	Std. Error
High Slant	319	3.42	0.10
Medium Slant	336	2.93	0.08
Low Slant	357	2.79	0.08

Table E7

Post-Hoc Comparisons Between Prediction Slant Conditions (Benjamini – Hochberg Adjustment) on 'Perceived Illegitimacy of the Election'

Condition 1	Condition 2	Mean Diff.	SE Diff.	T-Stat.	P-Value	Adj. P-Value	Sign. at <0.05
High Slant	Medium Slant	-0.49	0.127	3.85	<0.001	<0.001	Yes
High Slant	Low Slant	-0.63	0.127	5.02	<0.001	<0.001	Yes
Medium Slant	Low Slant	-0.14	0.116	1.25	0.213	0.213	No

Table E8

Two-Way ANOVA for Effects of Prediction Framing, Prediction Slant, and Covariates on 'Perceived Illegitimacy of the Election'

Source of Variation	**Sum of Squares (SS)**	**df**	**F**	**Pr(>F)**	**η^2**
Prediction Framing	57.82	1	25.08	<0.001	0.022
Prediction Slant	63.97	2	13.88	<0.001	0.024
Prediction Framing * Prediction Slant	11.38	2	2.47	0.085	0.004
Gender	48.69	2	10.56	<0.001	0.018
Education	11.44	3	1.65	0.175	0.004
Political Party Preference	156.77	3	22.67	<0.001	0.059
Age	10.84	5	0.94	0.453	0.004
Residual	2,288.79	993			

Table E9

Post-Hoc Analysis of the Effects of Prediction Framing and Covariates in the High Slant Condition on 'Perceived Illegitimacy of the Election'

Source of Variation	Sum of Squares (SS)	df	F	Pr(>F)	η^2
Prediction Framing	39.88	1	15.05	<0.001	0.041
Gender	22.80	2	4.30	0.014	0.024
Education	9.55	3	1.20	0.309	0.010
Political Party Preference	80.70	3	10.15	<0.001	0.083
Age	11.62	5	0.88	0.496	0.012
Residual	805.51	304			

Table E10

Post-Hoc Analysis of the Effects of Prediction Framing and Covariates in the Medium Slant Condition on 'Perceived Illegitimacy of the Election'

Source of Variation	Sum of Squares (SS)	df	F	Pr(>F)	η^2
Prediction Framing	22.02	1	10.53	0.001	0.029
Gender	23.47	2	5.61	0.004	0.031
Education	0.93	3	0.15	0.931	0.001
Political Party Preference	25.97	3	4.14	0.007	0.034
Age	21.24	5	2.03	0.074	0.028
Residual	671.11	321			

Table E11

Post-Hoc Analysis of the Effects of Prediction Framing and Covariates in the Low Slant Condition on 'Perceived Illegitimacy of the Election'

Source of Variation	Sum of Squares (SS)	df	F	Pr(>F)	η^2
Prediction Framing	3.91	1	1.87	0.172	0.005
Gender	8.07	2	1.93	0.146	0.009
Education	28.52	3	4.56	0.004	0.034
Political Party Preference	80.85	3	12.92	<0.001	0.095
Age	14.66	5	1.41	0.222	0.017
Residual	713.57	342			