Political Identity and Conjunction Fallacy: Experimental Evidence from the 2024 U.S. Presidential Election

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Abstract

In the context of the 2024 U.S. presidential election, experimental participants evaluate lotteries based on electoral outcomes (Trump or Harris winning), economic outcomes (improvement or decline), and the conjunctions of these outcomes. We document a conjunction fallacy in choices: participants value lotteries on conjunctive events more than single events. This pattern is stronger when conjunctive outcomes are congruent with participants' partisan identities—for example, a Harris victory combined with improved economic condition for Democrats—than when they are incongruent. Our results challenge models that satisfy dominance and point to preference-based explanations encompassing the source and the valence of uncertainty.

Keyword: uncertainty, conjunction fallacy, source dependence, state dependence, political identity, heuristics, experiment

JEL code: C91, D81, D91

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1. Introduction

In today's polarized world, political identity has become increasingly salient, as it entrenches partisan divides, polarizes public opinion, and influences social coherence. Understanding the role of political identity in economic analysis therefore provides valuable insights into contemporary societal challenges.[1] In many settings, economic decision-making often unfolds under substantial uncertainty about political outcomes, economic outcomes, and the ways they interact. On the one hand, when individuals express political views or vote for their preferred candidates, they often consider the economic implications of candidates' potential policy positions. On the other hand, political identity can also shape consumption, investment and other economic decisions.

We examine how political identity influences the conjunction fallacy to better understand decision-making under uncertainty when people jointly consider political and economic outcomes. In the classic Linda problem (Tversky and Kahneman 1974, 1983), participants are given information describing Linda as bright, outspoken, and concerned with social justice. Many participants judged Linda to be more likely "a bank teller and a feminist" than "a bank teller". This belief violates the conjunction rule of probability theory whereby the probability of a conjunction cannot exceed the probability of its constituents. While extensive research examines conjunction fallacy in probability judgements (Zizzo et al., 2000; Stolarz-Fantino et al., 2003; Crisp and Feeney, 2009; Charness et al., 2010), how it appears in choices under uncertainty—specifically, whether individuals value lotteries on conjunctive events more than lotteries on single events—remains largely unexamined. This study aims to fill this gap by investigating how political identity shapes conjunction fallacy in both choices and beliefs when individuals jointly consider political and economic outcomes.

We conducted an experiment two days before the 2024 U.S. presidential election, a moment when political identity is highly salient. We recruited 1,171 participants from a representative U.S. sample via Prolific and elicited both their choices and beliefs about political and economic events as well as their conjunctions. On the choice side, we elicited certainty equivalents for lotteries betting on (i) the electoral outcome, (ii) two economic outcomes (U.S. public health ranking and

[1] See, for example, Lewis-Beck and Stegmaier (2000), Gerber and Huber (2009), Gillitzer and Prasad (2018), Guriev and Papaioanno (2022), Mian et al. (2023), Bauer et al. (2025), Donkor et al. (2025). Broadly speaking, identity have been integrated into economic analysis (Akerlof and Kranton, 2000; Chen and Li, 2009; Chen and Chen, 2012; Charness and Chen, 2020; Shayo, 2020).

unemployment in September 2025), and (iii) the conjunctions of electoral and economic outcomes. On the belief side, we elicited participants' probability assessments about the same set of events.

This design enables us to examine identity-driven choices and beliefs for an identical set of events within the same individual. We distinguish between *conjunction fallacy in choices* (CF in choices), which occurs when the certainty equivalent of a conjunctive-event lottery exceeds that of at least one of its constituent events, and *conjunction fallacy in beliefs* (CF in beliefs), which arises when the stated probability of a conjunctive event exceeds that of at least one of its constituents. We posit that conjunction fallacies may be shaped by a congruence channel, whereby conjunctive scenarios are evaluated more favorably when their constituent outcomes align in desirability. When the outcomes of a conjunctive event are both favorable or both unfavorable from an individual's perspective, the conjunction may appear more coherent and compelling than either component alone. For example, a Democrat may view "a Harris victory and an economic improvement" as congruent and therefore value the conjunction more than either outcome in isolation. In this way, political identity may shape not only the evaluation of individual outcome, but also the evaluation of their conjunctions conditional on the alignment of constituent outcomes. We test this identity-driven congruence effect in conjunction fallacies in our setting.

Our experimental design comprises three between-subject treatments. In the Main treatment, the conjunctive events were described with the electoral outcome stated first and the economic outcome second. In the Reverse-order treatment, the order of the two constituents was reversed, allowing us to test whether conjunction fallacy is sensitive to the presentation sequence of the constituent events. Finally, in the Odd/Even treatment, participants bet on whether the parity number of U.S. public health ranking or unemployment is odd or even, rather than on whether the economic outcomes improve or decline. By removing economic valence, this treatment provides a neutral benchmark for assessing individuals' choices and beliefs when facing conjunctions.

We arrive at three main observations. First, the conjunction fallacy in choices is pervasive, with a clear congruence effect: participants frequently value conjunctive-event lotteries more than at least one of their constituent lotteries, and this bias is stronger when the two outcomes are congruent—that is, both favorable or both unfavorable from the participant's perspective—than when they are incongruent (one favorable, one unfavorable). For example, a Democrat is more likely to value a conjunctive bet on a Harris victory coupled with economic improvement than either outcome alone, but shows a substantially weaker bias when the same Harris victory is paired

with economic decline. This congruence effect is invariant to presentation order—appearing similarly in both the Main and Reverse-order treatments—and disappears in the Odd/Even treatment, where the economic outcomes carry no substantive valence.

Second, the conjunction fallacy also arises in beliefs, again with a congruence effect: participants often judge conjunctive events as more likely than at least one of their constituents, and the bias is more pronounced in congruent scenarios. As with choices, the congruence effect in beliefs is robust to presentation order but vanishes in the Odd/Even treatment.

Third, conjunction fallacy in beliefs only partially accounts for the conjunction fallacy in choices and its congruence effect. Participants who overestimate conjunctive-event probabilities are more likely to overvalue conjunctive-event lotteries. Yet, after controlling conjunction fallacy in beliefs, participants continue to display a conjunction fallacy in choices, with a stronger effect in congruent than in incongruent scenarios. In other words, they behave as if they assign higher certainty equivalents to equally probable lotteries when the conjunctive events are congruent.

Our results provide clear evidence of how political identity distorts preferences and beliefs, with implications for models of decision-making under uncertainty. Conjunction fallacy in beliefs violates fundamental laws of probability, while conjunction fallacy in choices persists after controlling for conjunction fallacy in beliefs, thereby contradicting first-order stochastic dominance in standard models. These findings indicate that belief distortions alone are insufficient to account for the observed patterns. Instead, the evidence points to preference-based mechanisms that depend on features of uncertain events. In particular, preferences may vary with the source and valence of uncertainty: individuals may evaluate uncertainty differently depending on whether it arises from single events or conjunctive events, and depending on whether constituent outcomes are aligned or misaligned in desirability. These source- and valence-dependent patterns suggest systematic departures from dominance-based valuation in settings where political identity shapes uncertainty evaluation.

Our study contributes to the literature on the conjunction fallacy. Prior research documents that the fallacy persists across descriptive framings and feedback mechanisms but diminishes when decision problems are simplified (Zizzo et al., 2000; Stolarz-Fantino et al., 2003), strengthens with stronger perceived causal links, and weakens with mild incentives and group consultation (Crisp and Feeney, 2009; Charness et al., 2010; Erceg and Galić, 2014). Relatedly, Masaki, Masuda, and Nishimura (2021) document a "coordination fallacy" in strategic environments, whereby

individuals report higher matching probabilities for coordination profiles than for the constituent actions. Similar to ours, their observation cannot be accounted by models that respect dominance. We extend this literature by jointly examining conjunction fallacy in choices and beliefs, as well as their connection in the context of political identity.

Our study adds to the studies on the importance of affect in decision-making. Loewenstein et al. (2001) propose the risk-as-feelings hypothesis, whereby emotional reactions can diverge from cognitive, consequentialist assessments and thereby shape choices under risk and uncertainty. For example, Rottenstreich and Hsee (2001) show that individuals are less sensitive to probability when outcomes are affect-rich (e.g., a $500 coupon for a dream trip to Paris) than when outcomes are affect-poor (e.g., a $500 tuition discount). Research on source preferences documents that individuals exhibit probability insensitivity for uncertainties arising from more ambiguous and less familiar sources compared with less ambiguous and more familiar ones (Heath and Tversky, 1991; Fox and Tversky, 1995; Abdellaoui et al., 2011). More recently, studies document that desirability of events can bias both choices and beliefs (e.g., Zimmermann, 2020; Peterson and Iyengar, 2021; Möbius et al., 2022; Bauer et al., 2025; Morag and Loewenstein, 2025). For example, fans in sports betting overestimate identity-consistent outcomes and avoid profitable lotteries against their preferred team (Donkor et al., 2025). While prior research focuses on the valuation of single objects, we extend these insights to conjunctive events by examining how congruence in desirability shapes their evaluation.

Our findings are also connected to the literature on narrative economics. Existing studies examine how alternative causal structures shape beliefs and choices (Shiller, 2017; Eliaz and Spiegler, 2020; Ambuehl and Thysen, 2024; Andre et al., 2024; Charles and Kendall, 2024). In this context, we show that when outcomes are congruent, their conjunction is evaluated more favorably. Narrative with identity-relevant congruence is commonplace in politics. For example, in his January 20, 2017 inaugural address, Donald Trump declared: "Together, we will make America strong again... wealthy again... proud again... safe again... great again." By the laws of probability, the conjunction of being strong, wealthy, proud, safe, and great cannot exceed the probability of any single condition—or any subset of these conditions. Yet bundled promise may strike listeners whose judgments are shaped by partisan identity as more appealing and thus more plausible. In this regard, our study sheds light on the behavioral evaluation of narratives that conjoin political, social and economic events under uncertainty.

The remainder of the paper proceeds as follows. Section 2 describes the experimental design. Section 3 presents the analytical framework. Section 4 reports the main results. Section 5 investigates preference-based mechanisms. Section 6 discusses implications and concludes.

2. Experiment Design

We describe the setup, the three treatments, and the implementation of the experiment.

2.1 Setup and Treatment Conditions

Using the 2024 U.S. presidential election as an experimental setting, we investigate whether individuals exhibit conjunction fallacy when facing uncertainty about electoral and economic outcomes as well as their conjunctions. We focus on three categories of events: two electoral outcomes (Trump or Harris wins the election); four economic outcomes (unemployment rate increases or decreases, healthcare system ranking improves or declines); and eight conjunctive events combining each electoral outcome with each economic outcome. We elicit certainty equivalents for lotteries on these events and subjective probability estimates.

To measure individuals' valuations of lotteries on uncertain events, we implement a choice-list design for elicitation of certainty equivalents (CEs). Each participant completes 14 choice lists, where each list comprises 21 binary choices between a fixed lottery and different sure amounts listed in ascending order. The fixed lottery (Option A) offers \$5 if the specific event occurs and \$0 otherwise, while the sure amount (Option B) ranges from \$0 to \$5 in an ascending order with \$0.25 increments. We deliberately include \$0 and \$5 in the sure amounts because choosing \$0 over the lottery or choosing the lottery over \$5 would violate first-order stochastic dominance unless the participants hold extreme beliefs about the events. In general, participants choose Option A in the initial rows and switch to Option B as the sure amount increases. The switching point identifies the CE of the lottery. To improve the consistency of choices and simplify the choice task, we enforce participants to choose a single switching point for each choice list. Specifically, they can directly indicate their desired switching point, and the program automatically selects option A for all prior rows and option B for all subsequent rows (see Figure A1 in Appendix A for details). We collect subjective probability estimates for the same 14 events, in which subjects report their beliefs by clicking a slider with numbers ranging from 0 percent to 100 percent.

Building on our experimental setup, we implement a between-subjects design with three treatments: Main, Reverse-order, and Odd/Even. Below we detail the design in each treatment and summarize it in Table 1.

Table 1. Summary of Treatment Conditions

Treatment	Electoral event	Economic event	Conjunctive event	Obs.
Main	Trump or Harris	Improve or Decline	Electoral first, Economic second	384
Reverse-order	Trump or Harris	Improve or Decline	Economic First, Electoral second	383
Odd/Even	Trump or Harris	Odd or Even	Electoral first, Economic second	381

Main treatment. In the Main treatment, for conjunctive events, participants are first informed of the electoral constituent, followed by the economic constituent. To illustrate, a conjunctive-event lottery reads: "If Trump wins and unemployment increases, receive $5; otherwise, $0." To avoid confusion about the conjunctive event, we emphasize to participants that "you receive money only when both specified outcomes happen. If either outcome doesn't happen, you receive nothing." This treatment establishes our baseline measure of conjunction fallacy when political and economic outcomes are presented in their natural temporal sequence. Figure A1 in Appendix A illustrates the interface.

Reverse-order treatment. The Reverse-order treatment tests whether the sequential presentation of electoral and economic outcomes affects the likelihood of conjunction fallacy. We maintain the experimental setup from the Main treatment but modify the order of constituents in the conjunctive-event lotteries. Specifically, we present participants with the economic constituent first and then the electoral constituent: "If unemployment increases and Trump wins, receive $5; otherwise, $0." The reversed order is also applied in the belief elicitation part. Figure A2 in Appendix A illustrates the interface.

Odd/Even treatment. The Odd/Even treatment examines conjunction fallacy in a setting where economic events carry no meaningful interpretation. Instead of changes in unemployment rate and healthcare system rank, we use whether the first decimal digit of the unemployment rate or the ranking number of healthcare system is odd or even to construct both single-event and conjunctive-event lotteries. As these numerical outcomes are unrelated to political considerations, this treatment serves as control to isolate the role of political identity in driving conjunction fallacy. The belief elicitation part is adjusted accordingly. Figure A3 in Appendix A illustrates the interface.

Incentives. To incentivize truthful reporting in the CE tasks, we employ the random incentive mechanism by paying each participant based on one randomly selected decision from the 14 lists. In addition to $2 show-up fee, one choice is randomly selected to determine the participant's bonus payment, which will be paid after the events are revealed (either November 2024 or September 2025, depending on which choice is selected).

For belief elicitation, we do not provide monetary incentives. This is motivated by two considerations. First, Danz et al. (2022) show that standard incentive mechanisms for belief elicitation may not achieve incentive compatibility in practice and may potentially distort the quality of elicited beliefs. Second, there is an identification problem when individuals have state-dependent preferences: betting behavior reflects both beliefs and state-dependent utilities, which makes it difficult to identify beliefs from choice data (e.g., Karni et al., 1983; Karni, 2020). Given these considerations, we collect unincentivized self-reported belief data to provide complementary evidence on the role of belief biases.

2.2 Procedure

The three treatments share common procedures. After reading instructions (see Appendix B), participants complete three sequential parts: choice list elicitation of CEs as Part 1, subjective probability estimates as Part 2, and a questionnaire as Part 3. Before making choices in the choice lists, participants are provided with examples to understand the elicitation mechanism and must answer two understanding questions about how their choices determine final payments. To improve comprehension, they receive $0.1 for each correct answer. Each choice list consists of two-step sequential display. In the first step, to ensure careful consideration of the event, participants see the event description and click a confirmation button. In the second step, participants see the choice list, choose the switching point, and confirm their choice. Both the choice lists and belief elicitation parts present the 14 events in random order.

After completing the choice lists and belief elicitations, participants proceed to the questionnaire. The questionnaire includes questions about the overall cognitive uncertainty regarding their choices in the experiment (Enke and Graeber, 2023), political views (Bauer et al., 2025), two conjunction fallacy problems based on Tversky and Kahneman (1983), and demographic characteristics. For cognitive uncertainty questions, instead of asking about each choice list, we ask "In Part 1, in general, how certain are you that the lottery is worth close to the sure amount when you switch to Option B?" and "In Part 2, in general, how certain are you that

the true probability is equal to Your Guess?". For conjunction fallacy questions, we include the Linda problem and the problem about "Mr F has one or more heart attacks and he is over 55 years old".

We recruited 1,171 participants from a representative U.S. sample on Prolific, where the representativeness of the sample is based on several criteria including gender, age, political affiliation and ethnicity. We conducted the experiment on November 3rd and 4th, 2024, before the election winner was announced on November 5th. After excluding 23 participants who spent less than 7.5 minutes or more than 1 hour completing the survey, our final sample consists of 1,148 participants: 384 in the Main treatment, 383 in the Reverse-order treatment, and 381 in the Odd/Even treatment. Table A1 in Appendix A demonstrates that our sample is balanced in terms of demographic characteristics across treatments, except that the Main Treatment includes more Republicans than the Reverse-order treatment, and more married individuals than the Odd/Even treatment. We control these demographic characteristics in the subsequent regression analyses. The mean durations were 20.05, 20.53, and 18.90 minutes, and the average payments based on participants' choices were \$2.63, \$2.75, and \$2.69 for the Main, Reverse-order, and Odd/Even treatments, respectively. The study was approved by the Institutional Review Board of Renmin University of China and pre-registered at AEA RCT Registry (AEARCTR-0014756).

3. Analytical Framework

This section presents a framework for analyzing how individuals value lotteries on conjunctive events relative to their constituent events.

3.1 Event Classification

Our experimental setting involves three types of events: electoral outcomes (denoted as *Elec*), economic outcomes (*Econ*), and conjunctive outcomes (*Conj*). We classify these events based on their desirability based on each participant's political identity.

For electoral outcomes, we define $Elec^{+}$ as the event that the participant's own-party candidate wins (Harris for Democrats, Trump for Republicans), and $Elec^{-}$ as the event that the

opposing candidate wins.[2] For economic outcomes, $Econ^+$ refers to favorable changes (e.g., lower unemployment rate or improved healthcare ranking) and $Econ^-$ refers to unfavorable changes.

We classify conjunctive events as *congruent* and *incongruent*, depending on whether the political and economic components align in desirability. Specifically, $Elec^+ \cap Econ^+$ and $Elec^- \cap Econ^-$ are congruent scenarios, where both components are either favorable or unfavorable to the participant (e.g., preferred candidate wins and economy improves). In contrast, $Elec^+ \cap Econ^-$ and $Elec^- \cap Econ^+$ are incongruent scenarios, where one component is favorable while the other is unfavorable (e.g., preferred candidate wins but economy worsens).

In the Odd/Even treatment, economic outcomes are replaced with neutral numerical events (e.g., whether the trailing digit of the unemployment rate is odd or even). We denote these events by $Econ^o$ and $Econ^e$, respectively. Since these numerical properties carry no inherent desirability, conjunctive events involving them no longer exhibit congruent versus incongruent distinctions. This treatment thus serves as a control for testing conjunction fallacy patterns when congruence effects are absent.

3.2 Theoretical Benchmarks

Denote by $p(E)$ a participant's belief estimate of event E, and CE(E) the CE of a lottery paying \$5 if E occurs and \$0 otherwise.

The conjunction rule in probability theory states that for any two events E_1 and E_2:

$$p(E_1 \cap E_2) \leq \min\{p(E_1), p(E_2)\}. \quad (1)$$

A violation of (1) constitutes a conjunction fallacy in beliefs, where the conjunctive event is judged more likely than one or both of its individual components. Such violations reflect departure from normative probabilistic reasoning.

For choices, if preferences satisfy first-order stochastic dominance, which is satisfied by a wide range of decision models under uncertainty, lotteries on events with higher probabilities should always have higher certainty equivalents, i.e., CE(E_1)>CE(E_2) whenever $p(E_1) > p(E_2)$. Combining this with the conjunction rule in probability, this implies:

[2] Our theoretical analyses treat Democrats and Republicans symmetrically--what matters is whether an event aligns with or opposes one's political identity, not which specific party the individual supports. Thus, we use $Elec^+$ and $Elec^-$ to denote the respective events of a preferred candidate or an opposing candidate winning, regardless of whether the preferred candidate is Harris or Trump.

$$\mathrm{CE}(E_1 \cap E_2) \leq \min\{\mathrm{CE}(E_1), \mathrm{CE}(E_2)\}. \quad (2)$$

We term a violation of (2) conjunction fallacy in choices, where a conjunctive-event lottery is valued more than one or both of the corresponding single-event lotteries.

Such violations may arise from two sources. First, if individuals hold distorted beliefs—specifically, if they violate the conjunction rule—then even with standard preference satisfying stochastic dominance, we will observe violations of (2). Second, even if individuals hold correct beliefs, violations may occur if preferences depend on not only the monetary payoffs but also the nature of uncertainty and events. For instance, individuals may exhibit *source preference*, whereby they value lotteries partly depending on sources of uncertainty (e.g., electoral, economic, conjunctive outcomes). They can also exhibit *state-dependent* or *valence-dependent preferences*, whereby they value lotteries partly depending on the valence of the state of the world. We will return to these mechanisms in the Discussion section.

4. Results

This section shows the results of conjunction fallacy in both choices and beliefs across different treatments. We first document conjunction fallacy in choices (CF in choices), with a focus on differences between congruent and incongruent scenarios. We then examine conjunction fallacy in beliefs (CF in beliefs) with a similar focus on the congruence effect. Finally, we assess the relationship between beliefs and choices to examine whether CF in choices can be fully explained by CF in beliefs or whether they suggest additional preference-based mechanisms.

4.1 Conjunction Fallacy in Choices

We examine whether participants exhibit CF in choices by comparing the CEs of conjunctive-event lotteries with those of their constituent single-event lotteries. To account for potential choice errors, we code the indicator for CF in choices as 1 if the CE of the conjunctive-event lottery exceeds that of at least one constituent lottery by more than \$0.25, and 0 otherwise.[3] We also

[3] We use the average of the two sure amounts adjacent to the switching point to compute the certainty equivalent. Specifically, if a participant chooses the lottery for the first N rows and switches to the sure amount afterward, CE = $0.25\times N-0.125$. If a participant chooses sure amounts for all choices, CE = 0. If a participant chooses the lottery for all choices, CE = 5. This results in a minimum possible CE difference of 0.125 at the corner. To address this issue, we employ a simplified procedure to identify conjunction fallacy in choices by directly comparing the switch points: CF in choices=1 if the switching point of the conjunctive-event lottery exceeds the minimum switching point of its two constituent lotteries by more than one.

construct a continuous measure—the conjunction premium—defined as the difference between the CE of the conjunctive-event lottery and the minimum CE of its constituent lotteries.

4.1.1 Main Treatment

Panel (A) of Figure 1 presents the proportions of CF in choices in the Main treatment across different scenarios. Across these scenarios, we observe substantial proportions of CF in choices, indicating that individuals systematically value conjunctive-event lotteries more than their constituent single-event lotteries. Beyond this tendency, we find a clear *congruence effect*: the proportion of CF in choices is significantly higher in congruent scenarios than in incongruent ones ($p < 0.01$ for Elec^+ and Elec^- cases, paired t-test).[4] Specifically, in congruent scenarios ($\text{Elec}^+ \cap \text{Econ}^+$ and $\text{Elec}^- \cap \text{Econ}^-$), the proportions of CF in choices are 44.3 percent and 41.8 percent, respectively. In incongruent scenarios ($\text{Elec}^+ \cap \text{Econ}^-$ and $\text{Elec}^- \cap \text{Econ}^+$), these proportions fall to 33.3 percent and 32.1 percent. In a similar vein, Panel (B) of Figure 1 shows that the conjunction premium is positive on average and significantly higher in congruent than in incongruent scenarios (Elec^+: \$0.59 vs \$0.17, Elec^-: \$0.63 vs \$0.39, $p < 0.01$, paired t-test).

Table 2 corroborates these observations using regression analysis. We regress CF in choices and conjunction premium on an indicator for congruent scenarios, separately for Elec+ and Elec– cases. The congruence indicator is positive and highly significant in both specifications. For CF in choices, the estimated congruence effects are 11 (Elec+) and 9.7 (Elec–) percentage points, respectively. For the conjunction premium, congruent scenarios generate premiums of \$0.41 (Elec+) and \$0.24 (Elec–) relative to incongruent scenarios. These results confirm that the congruence effect is robust for both binary and continuous measures.

[4] To facilitate the analysis, we classify participants as Democrats (Democrats and Independents leaning Democratic) and Republicans (Republicans and Independents leaning Republican) based on their responses to the party affiliation questions.

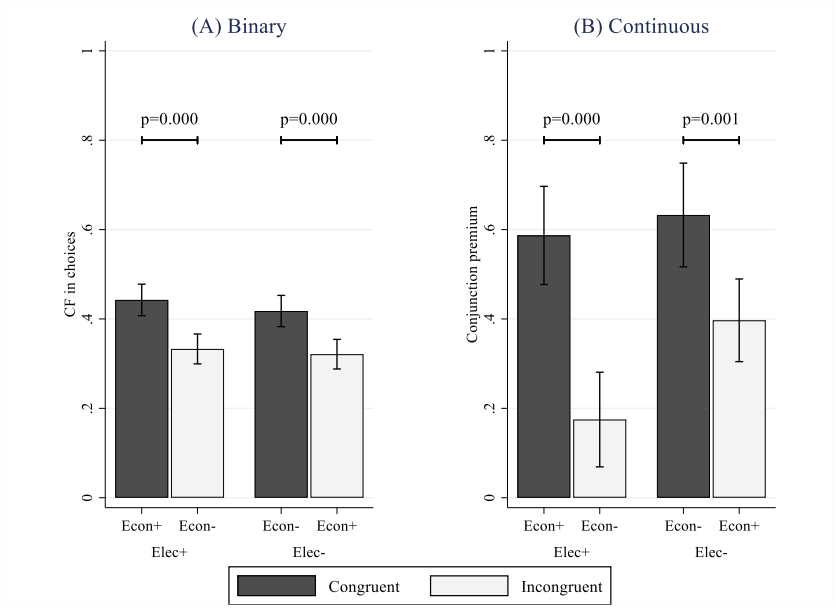

Figure 1. CF in choices in Main treatment. Panel (A) shows proportions of CF in choices. Panel (B) shows the conjunction premium. Black (grey) bars represent congruent (incongruent) scenarios. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing-party) candidate wins. $Econ^{+}$ ($Econ^{-}$) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

Table 2. Regression results of CF in choices and conjunction premium in the Main treatment.

	CF in choices		Conjunction premium	
	Elec+	Elec-	Elec+	Elec-
	(1)	(2)	(3)	(4)
Congruence	0.110***	0.097***	0.412***	0.236***
	(0.024)	(0.024)	(0.082)	(0.081)
Constant	0.333***	0.321***	0.175***	0.397***
	(0.012)	(0.012)	(0.041)	(0.041)
Observations	1532	1532	1532	1532
R-squared	0.395	0.438	0.391	0.425

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Congruence equals 1 for congruent scenarios, 0 otherwise. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Individual fixed effects are controlled in all columns.

These patterns persist across a range of robustness checks. The congruence effect remains significant when excluding Independents who lean toward a party (Figure A4, Table A2), when dropping choices violating first-order stochastic dominance (Figure A5, Table A3), and when applying more strict definitions of CF in choices that do not allows for choice errors (Figure A6,

Table A4). We also examine alternative measurements. Instead of comparing the CE of the conjunctive-event lottery to the minimum CE of the two constituent lotteries, we compare it separately to each constituent (Figure A7) and to their average (Figure A8). Across both approaches, the congruence effect remains significant.[5] These analyses support the finding that participants systematically overvalue conjunctive-event lotteries compared to their single-event counterparts, especially when the two events are congruent.[6]

Observation 1A*: CF in choices is substantial across scenarios, and it is more pronounced in congruent scenarios than in incongruent scenarios.*

4.1.2 Reverse-order Treatment

Figure 2 reports results from the Reverse-order treatment, where the order of the two events is reversed relative to the Main treatment. The overall incidence of CF in choices remains substantial, with a higher proportion of CF in choices in congruent scenarios than in incongruent scenarios. Regression results in Appendix Table A5 confirm a significant congruence effect within this treatment. More specifically, in congruent scenarios ($\text{Elec}^{+} \cap \text{Econ}^{+}$ and $\text{Elec}^{-} \cap \text{Econ}^{-}$), CF in choices rates are 43.4 percent and 39.2 percent, which are not significantly different from the corresponding rates in the Main treatment (44.3 and 41.8 percent; $p = 0.753$ and $p = 0.318$, two-sample t-test). In incongruent scenarios ($\text{Elec}^{+} \cap \text{Econ}^{-}$ and $\text{Elec}^{-} \cap \text{Econ}^{+}$), the proportions are 33.6 percent and 31.0 percent, again not significantly different from those in the Main treatment (33.3 and 32.1 percent; $p = 0.885$ and $p = 0.646$, two-sample t-test). These patterns suggest that reversing

[5] Here, the congruence effect is defined as the difference between congruent and incongruent scenarios under each alternative comparison. Figure A9 further classifies individual choices into four categories if the CE of conjunctive event lottery exceeds (1) that of both single events by more than \$0.25, (2) that of the election event by more than \$0.25, (3) that of the economy event by more than \$0.25, and (4) others. Congruence effect persists across the first three categories.

[6] The consistently high proportions of CF in choices across all scenarios—over 30 percent even in incongruent cases—merit closer attention. To evaluate whether these levels are driven by noise, we conduct three tests. First, CF in choices remains substantial among participants who answered all understanding questions correctly (Figure A10). Second, after excluding choices with response times in the bottom and top 5 percent of the distribution, CF in choices remains around 28-31 percent in incongruent scenarios (Figure A11). Third, simulation analyses show that random choice behavior would generate CF in choices at rates close to 60 percent when allowing for a \$0.25 choice error, which is far above the percentages we observe (Figure A12). We also calculate the theoretical probability that a randomly drawn value a exceeds the minimum of two independently drawn values b and c. Under uniform distributions, $P(a > \min(\mathrm{b}, \mathrm{c}) + 1) \approx 0.598, P(\mathrm{a} > \min(\mathrm{b}, \mathrm{c})) \approx 0.644$. Together, these analyses suggest that while decision errors are possible, the observed patterns are unlikely to be fully explained by noise.

the order of constituents in the conjunctive event does not affect CF in choices or the congruence effect.

Observation 1B*: In the Reverse-order treatment, the CF in choices and the congruence effect persist.*

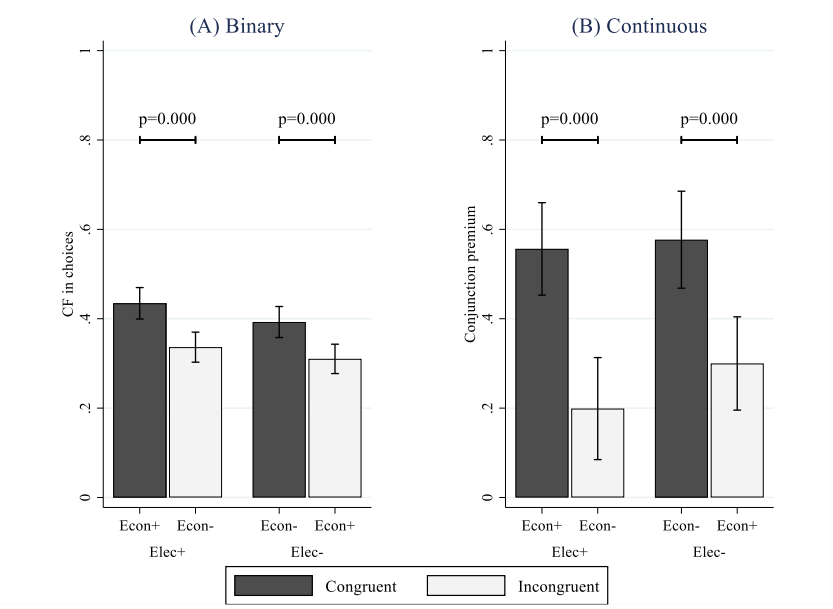

Figure 2. CF in choices in the Reverse-order treatment. Panel (A) shows proportions of CF in choices. Panel (B) shows the conjunction premium. Black (grey) bars represent congruent (incongruent) scenarios. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing-party) candidate wins. $Econ^{+}$ ($Econ^{-}$) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

4.1.3 Odd/Even Treatment

Figure 3 reports results from the Odd/Even treatment, where meaningful economic outcomes are replaced with neutral parity events. While the overall incidence of CF in choices remains substantial across all scenarios, there are no systematic differences between odd and even events. For conjunctive events involving own-party wins ($Elec^{+}$), CF in choices rate is 37.6 percent when paired with odd outcomes and 39.4 percent when paired with even outcomes (no significant difference, $p > 0.1$, paired t-test). Similarly, for conjunctive events involving opposing-party wins ($Elec^{-}$), the corresponding rates are 31.2 percent (odd) versus 31.1 percent (even), showing no significant difference ($p > 0.1$, paired t-test). This contrasts sharply with the sizable (10-12 percentage point) congruence effects observed in the Main and Reverse-order treatments.

Regression results in Appendix Table A6 confirm that the odd/even indicator coefficients are close to zero and statistically insignificant across all specifications. The conjunction premium also shows no systematic pattern between odd and even scenarios, unlike those observed in the Main and Reverse-order treatments. These null differences provide a benchmark, and demonstrate that the congruence effects observed in the Main and Reverse-order treatments reflect systematic patterns rather than generic features of combining two events.

Observation 1C*: In the Odd/Even treatment, CF in choices rates remain substantial while showing no systematic differences between odd and even scenarios.*

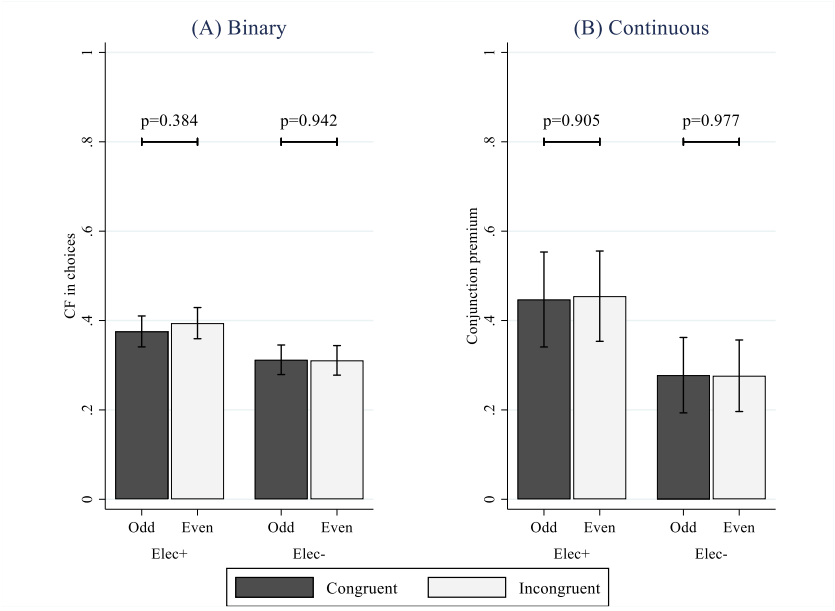

Figure 3. CF in choices in the Odd/Even treatment. Panel (A) shows proportions of CF in choices. Panel (B) shows the conjunction premium. Black (grey) bars represent congruent (incongruent) scenarios. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing-party) candidate wins. Odd (Even) refers to whether the economic-event lottery is about an odd (even) scenario, i.e., whether the first decimal digit of the unemployment rate or the ranking number of the healthcare system is odd (even). Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

4.1.4 Heterogeneity Analyses

Having established that the congruence effect is robust to presentation order (Reverse-order treatment) and disappears when meaningful economic outcomes are replaced with neutral events

(Odd/Even treatment), we now focus on the Main treatment to examine heterogeneity to understand which types of individuals drive these patterns.

We measure the congruence effect at the individual level as the difference in the number of CF in choices between congruent scenarios ($\text{Elec}^{+} \cap \text{Econ}^{+}$, $\text{Elec}^{-} \cap \text{Econ}^{-}$) and incongruent scenarios ($\text{Elec}^{+} \cap \text{Econ}^{-}$, $\text{Elec}^{-} \cap \text{Econ}^{+}$). Since each participant faces four conjunctive events in each type of scenario, the measure ranges from -4 to 4 and takes a positive value when CF in choices occurs more often in congruent than in incongruent scenarios.

Figure 4 displays the individual congruence effect across demographic groups. The effect is present in most groups but close to zero for Republicans and for Asians. This asymmetry indicates that the congruence effect is pronounced among Democrats but nearly absent among Republicans. We further examine the heterogeneity of the congruence effect across groups with different levels of partisan identification. As shown in Appendix Figure A13, individuals with moderate political affiliations exhibit weaker congruence effects, suggesting that the overall magnitude of the effect depends in part on identity strength. Taken together, these results show that while the congruence effect is present in the aggregate, its strength varies across groups.

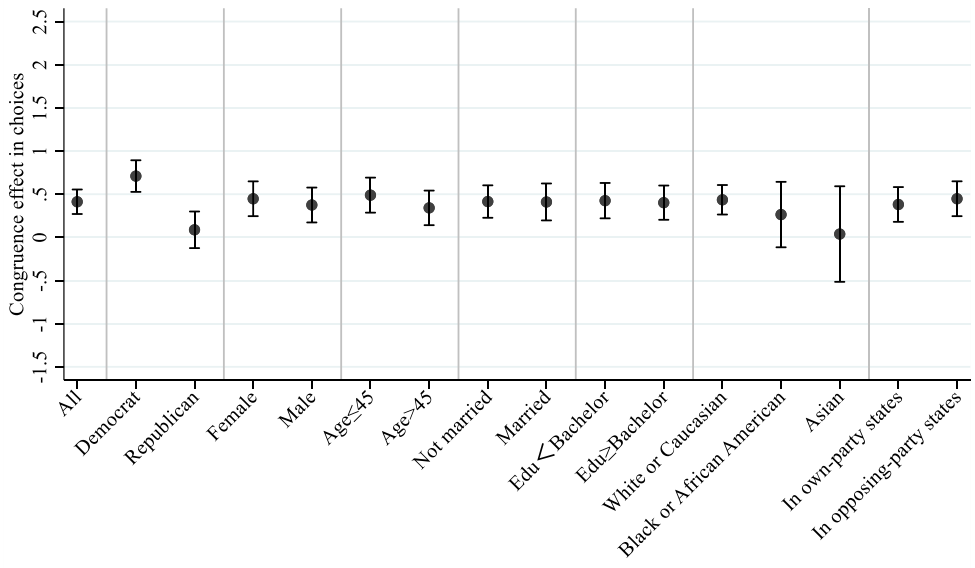

Figure 4. Heterogeneity analyses of congruence effect in choices across different demographic groups. Error bars represent 95% confidence intervals.

Figure 5 reports heterogeneity by behavioral factors. We first consider candidate preference. Based on participants' CEs and subjective probability estimates of the electoral outcomes, we

classify individuals into those who prefer their own-party candidate, those who prefer the opposing-party candidate, and those with no clear preference.[7] Individuals who prefer their own-party candidate display a more pronounced congruence effect, whereas those who prefer the opposing-party candidate show no significant effect.

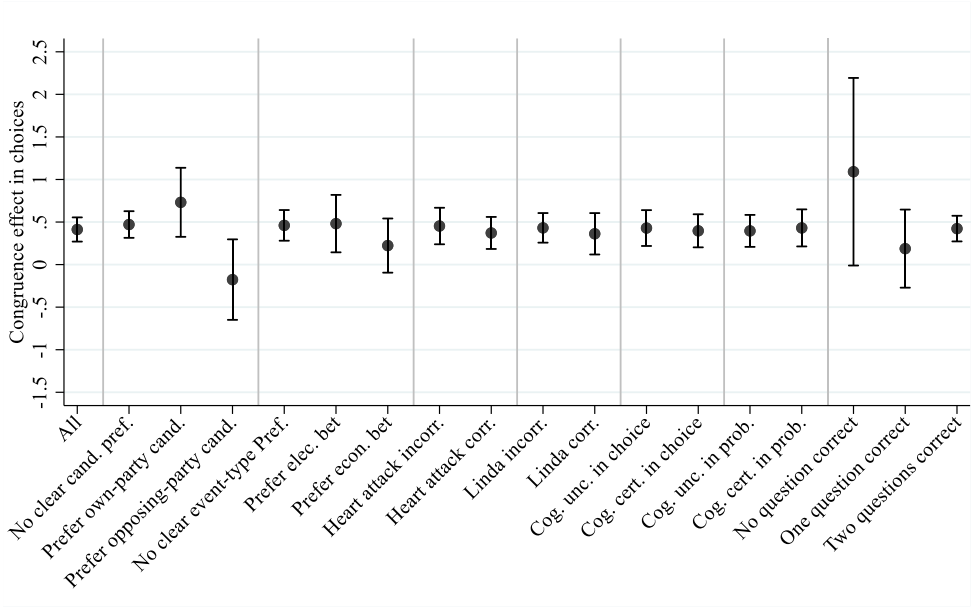

Figure 5. Heterogeneity analyses of congruence effect in choices by behavioral patterns. Error bars represent 95% confidence intervals.

We then consider event-type preference, distinguishing whether individuals tend to favor election-event lotteries or economic-event lotteries.[8] Individuals classified as preferring election lotteries display a stronger congruence effect, whereas those preferring economic lotteries show little or no effect. These results suggest that congruence effect is more pronounced among individuals who prefer their own-party candidate and among those who favor election lotteries, indicating that the effect is closely linked to how strongly political identity is engaged in shaping evaluations.

[7] An individual is classified as preferring own-party candidate if $p(\text{Elec}^+) \leqslant p(\text{Elec}^-)$ and $\text{CE}(\text{Elec}^+) > \text{CE}(\text{Elec}^-)$. Conversely, an individual is classified as preferring the opposing-party candidate if $p(\text{Elec}^+) \geqslant p(\text{Elec}^-)$ and $\text{CE}(\text{Elec}^+) < \text{CE}(\text{Elec}^-)$. Individuals who do not satisfy either condition are classified as having no clear candidate preference.

[8] An individual is classified as preferring election lotteries if $\max\{p(\text{Econ}^+), p(\text{Econ}^-)\} \geq \max\{p(\text{Elec}^+), p(\text{Elec}^-)\}$ and $\max\{\text{CE}(\text{Econ}^+),\text{CE}(\text{Econ}^-)\} < \max\{\text{CE}(\text{Elec}^+),\text{CE}(\text{Elec}^-)\}$. Conversely, an individual is classified as preferring economic lotteries if $\max\{p(\text{Econ}^+), p(\text{Econ}^-)\} \leq \max\{p(\text{Elec}^+), p(\text{Elec}^-)\}$ and $\max\{\text{CE}(\text{Econ}^+),\text{CE}(\text{Econ}^-)\} > \max\{\text{CE}(\text{Elec}^+),\text{CE}(\text{Elec}^-)\}$. Individuals who do not satisfy either condition are classified as having no clear event-type preference.

We further examine whether the congruence effect correlates with behavior on two CF tasks (e.g., the heart attack problem and Linda problem from Tversky and Kahneman, 1983), a form of cognitive uncertainty (Enke and Graeber, 2023), and understanding test performance. We observe no significant differences across these groups. Taken together, these patterns suggest that the congruence effect may reflect specific political-economy reasoning patterns rather than general susceptibility to conjunction fallacies or cognitive frictions.

4.2 Conjunction Fallacy in Beliefs

We next examine CF in beliefs. We code the indicator for CF in beliefs as 1 if a participant's probability estimate for a conjunctive event exceeds the minimum of the probability estimates for its two constituent events by more than five percentage points, and 0 otherwise.

Figure 6 displays the proportions of CF in beliefs across the three treatments. Panel (A) shows the results from the Main treatment. CF in beliefs is pervasive: nearly 30 percent in incongruent scenarios and more than 60 percent in congruent scenarios. The difference between congruent and incongruent scenarios is large and statistically significant ($p < 0.01$, paired t-test). Panel (B) presents the Reverse-order treatment. Changing the order of constituent events does not alter the pattern: CF in beliefs remains substantially higher in congruent than in incongruent scenarios, with magnitudes similar to those in the Main treatment. Panel (C) reports the Odd/Even treatment. Here, approximately 26 percent of probability estimates exhibit CF in beliefs in conjunctive events involving opposing-party wins (Elec^{-}), and about 40 percent in conjunctive events involving own-party wins (Elec+). Importantly, there is no significant difference between odd and even cases ($p > 0.05$, paired t-test).

Regression analyses confirm these patterns. Appendix Table A7 reports estimation results from regressing CF in beliefs on the congruence indicator across the three treatments. The coefficients are significantly positive in the Main and Reverse-order treatments, but close to zero and statistically insignificant in the Odd/Even treatment. These patterns of CF in beliefs closely mirror the qualitative patterns for CF in choices: reversing the order of constituent events does not matter, while the effect disappears once economic outcomes are replaced with neutral parity events.

Observation 2*: CF in beliefs is pervasive across treatments and more pronounced in congruent scenarios than in incongruent scenarios in the Main and Reverse-order treatments, but not in the Odd/Even treatment.*

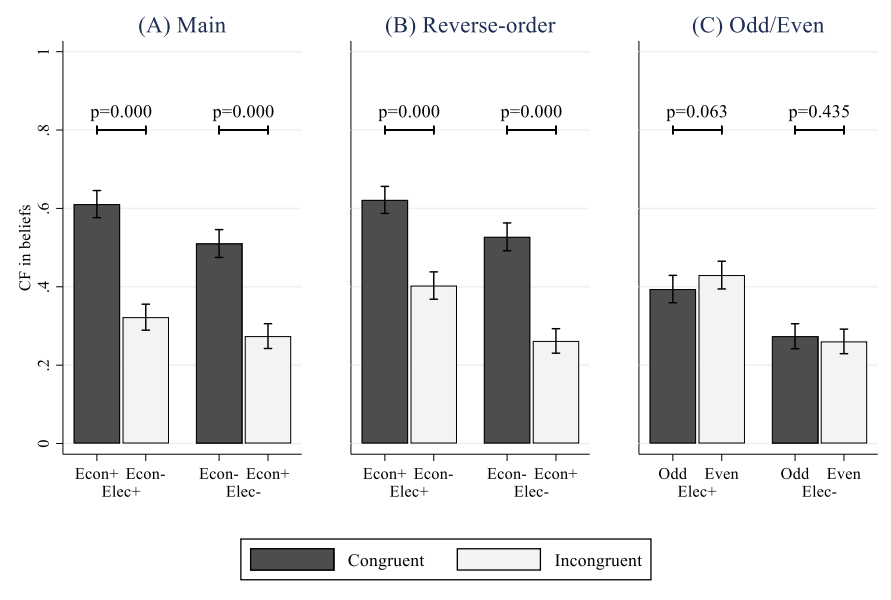

Figure 6. CF in beliefs across treatments. Panels (A), (B) and (C) show the proportions of CF in beliefs in the Main, Reverse-order, and Odd/Even treatments, respectively. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec-) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Odd (Even) refers to whether the economic-event lottery is about an odd (even) scenario, i.e., whether the first decimal digit of the unemployment rate or the ranking number of the healthcare system is odd (even). Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

4.3 Linking Choices and Beliefs

In both choices and beliefs, a considerable proportion of individuals assign higher CEs to conjunctive-event lotteries, or higher probabilities to conjunctive events, than to their respective constituents. In this subsection, we examine whether CF in beliefs can account for the observed CF in choices.

Table 3 reports individual-level regressions of CF in choices on CF in beliefs. Columns (1) and (4) use the congruence indicator as the only explanatory variable, confirming a strong and significant congruence effect. Columns (2) and (5) additionally include CF in beliefs. The coefficients of CF in beliefs are positive and highly significant, showing that CF in choices and CF in beliefs are positively correlated. Importantly, the congruence indicator remains significantly positive, although its magnitude decreases by around 30 percent. Adding demographics and task-performance measures does not change these results (Columns (3) and (6)). These findings suggest

that CF in beliefs explains part of the observed CF in choices, but the congruence effect in choices persists even after accounting for belief distortions.

Table 3. Regression of CF in choices on CF in beliefs at the individual level.

	CF in choices					
	Elec+			Elec-		
	(1)	(2)	(3)	(4)	(5)	(6)
Congruence	0.110***	0.079***	0.079***	0.097***	0.061**	0.061**
	(0.024)	(0.025)	(0.025)	(0.024)	(0.024)	(0.024)
CF in beliefs		0.108***	0.103***		0.149***	0.146***
		(0.029)	(0.028)		(0.028)	(0.029)
Constant	0.333***	0.298***	0.157*	0.321***	0.280***	0.477***
	(0.019)	(0.021)	(0.095)	(0.020)	(0.021)	(0.109)
Control	N	N	Y	N	N	Y
Observations	1532	1532	1528	1532	1532	1528
R-squared	0.013	0.024	0.056	0.010	0.031	0.046

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. CF in choices is defined as in Section 4.1 and CF in beliefs as in Section 4.2. Congruence equals 1 for congruent scenarios, 0 otherwise. Elec^{+} (Elec^{-}) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Columns (1) and (4) include only the congruence indicator. Columns (2) and (5) add CF in beliefs. Columns (3) and (6) further control for demographics and task-performance measures.

We further analyze the relationship between congruence effect in choices and in beliefs at the individual level. We define the congruence effect in choices (beliefs) as the difference between the number of CF in choices (beliefs) in congruent scenarios and in incongruent scenarios. We observe significant but moderate positive link between the congruence effect in choices and in beliefs (Spearman correlation of 0.19, $p < 0.001$; see Figure A14, Table A8). We conduct several robustness checks. For each pair of complementary events, such as Elec^{+} vs. Elec^{-}, Econ^{+} vs. Econ^{-}, the two probability estimates should sum to 100 percent. We exclude individuals whose sums fall in the top or bottom 5 percent of the distribution. Regression results in Appendix Table A9 show that the main findings remain robust when these participants are excluded.

Observation 3*: CF in choices positively correlates with CF in beliefs, while the congruence effect in choices persists after controlling for CF in beliefs.*

5. Discussions

Conjunction fallacy in beliefs is commonly viewed as evidence in support of heuristics in probability judgment, whereby individuals use mental shortcuts to make quick judgments that can result in systematic biases (Tversky and Kahneman, 1974; 1983). Common heuristics include representativeness and availability, drawing on perceived similarity, causal and correlational attributions, and the salience of associations and exemplars between events. For example, if being over 55 can be viewed as causally or correlationally linked to having a heart attack, respondents may judge the conjunction "Mr. F is over 55 and has had at least one heart attack" as more probable than either constituent event. Recent work provides a more explicit account of these intuitions by linking representativeness to selective recall in memory (Bordalo et al., 2021, 2023). In line with this account, congruent scenarios in our setting, where electoral and economic outcomes align in desirability, form particularly coherent narratives that appear more representative, resulting in higher CF in beliefs than in incongruent scenarios.

As belief-based mechanisms alone can only partially account for the observed violations in choices, we discuss preference-based channels operating conditional on subjective beliefs. Consider a broad class of non-expected utility models in which individuals evaluate our binary lotteries via a probability weighting function f and a utility index u:

$$\mathrm{CE}(E) = u^{-1}(f(p(E))u(5)).$$

Under monotone f, individuals respect first-order stochastic dominance, and the model satisfies *valuation-based conjunction rule*: $\mathrm{CE}(E_1 \cap E_2) \leq \min\{\mathrm{CE}(E_1), \mathrm{CE}(E_2)\}$. Violation of this rule can arise either from belief-based distortions, $p(E_1 \cap E_2) > \min\{p(E_1), p(E_2)\}$, or from preference-based mechanisms that affect valuation even holding beliefs fixed. We therefore focus on the latter channel and examine two preference-based mechanisms: preferences over sources of uncertainty and preferences over the valence of events.

Source Preference. Source preference approach allows individuals to value lotteries differently depending on how uncertainty arises. The literature has examined not only the classic distinction between risk and ambiguity in the Ellsberg paradox, but also differences across natural sources of uncertainty that vary in the degree of competence, familiarity, and related attributes (Heath and Tversky, 1991; Fox and Tversky, 1995). For example, Fox and Tversky show that participants from the University of California at Berkeley prefer to bet on the temperature in San Francisco over that in Istanbul. Building on such observations, Tversky and Kahneman (1992) incorporate

source dependence into cumulative prospect theory to capture the idea that the source of uncertainty affects decision making on top of likelihood (see also, Chew and Sagi, 2008; Abdelloui et al., 2011).

In our setting, participants may perceive electoral outcome, economic outcome, and their conjunction and as distinct sources of uncertainty and therefore evaluate lotteries associated with these events differently. Formally, their certainty equivalents may allow either the probability weighting function f or the utility index u to depend on the source s:

$$\mathrm{CE}(E) = u_s^{-1}(f_s(p(E))u_s(5)), \quad s \in \{\mathrm{elec}, \mathrm{econ}, \mathrm{conj}\}.$$

For a given probability $p(E)$ and prize of 5, participants may assign higher CEs to electoral lotteries than to economic lotteries, when u_{elec} is more convex than u_{econ} or when the weighted probability f_{elec} is greater than f_{econ}. Moreover, if participants also perceive the conjunctive-event lotteries as a distinct source and exhibit greater risk seeking towards that source, the likelihood of observing

$$\mathrm{CE}(\mathrm{Elec}^i \cap \mathrm{Econ}^j) > \min\{\mathrm{CE}(\mathrm{Elec}^i), \mathrm{CE}(\mathrm{Econ}^j)\}$$

increases for $i, j \in \{+, -\}$. In this regard, source preference can account for CF in choices for both congruent and incongruent events. However, because source preference operates at the level of event type, it does not differentiate whether the constituents align in desirability. Therefore, this mechanism does not predict a systematic congruent-incongruent gap.

Valence Preference. A valence mechanism, a form of state-dependent utility, allows utility to depend not only on monetary payoffs but also on the desirability of the underlying event (Karni et al., 1983; Karni, 2020; Brandenburger et al., 2024). In a well-known exchange between Aumann and Savage in 1971 on the separation of subjective probabilities and utilities (as recounted by Drèze, 1985), Aumann presents a thought experiment: Mr. X refuses to bet on whether his beloved wife will survive an operation with a known survival probability of 1/2, because his life would be less meaningful if he were to lose her. This example illustrates the intuition behind state-dependent preferences, whereby the utility of outcomes varies with the state yet to be realized.

In our setting, individuals may attach additional utility to certain states, such as their preferred candidate winning, or their preferred candidate winning alongside improved economic outcomes. Formally, let $\gamma_d(E)$ denote a valence adjustment term capturing individuals' attitudes toward different events, where $d \in \{\mathrm{elec}, \mathrm{econ}, \mathrm{conj}\}$:

$$\mathrm{CE}(E) = u^{-1}(f(p(E))u(5) + \gamma_d(E)).$$

In political contexts, identity shapes the valence term $\gamma_d(E)$. For example, a Democrat may have $\gamma_{\text{elec}}(Harris\ win) > 0$ and $\gamma_{\text{elec}}(Trump\ win) < 0$.

For conjunctive events, we allow valence to reflect both constituents and their interaction:

$$\gamma_{\text{joint}}(\text{Elec}^i \cap \text{Econ}^j) = \alpha \cdot \gamma_{\text{elec}}(\text{Elec}^i) + \beta \cdot \gamma_{\text{econ}}(\text{Econ}^j) + \kappa \cdot \delta_c,$$

where $\alpha, \beta > 0$, $\kappa > 0$, and δ_c is an indicator for congruence of two constituent events ($\delta_c = 1$ for $(+,+)$, $(-,-)$; -1 for $(+,-)$, $(-,+)$; and 0 otherwise). Under this structure, the likelihood of observing

$$\text{CE}(\text{Elec}^i \cap \text{Econ}^j) > \min\{\text{CE}(\text{Elec}^i), \text{CE}(\text{Econ}^j)\}$$

is higher for congruent than for incongruent conjunctive events, holding beliefs fixed. In Odd/Even treatment, economic outcomes are valence-neutral ($\gamma_{\text{econ}}(\cdot) = 0$) and the congruence interaction $\kappa \cdot \delta_c$ vanishes. Accordingly, there would be no odd-even gap in this treatment.

Testing Source and Valence Preferences. We provide two tests for source and valence preferences. To test source preference, Figure A15 plots normalized CEs as a function of beliefs across three sources of uncertainty: electoral, economic, and conjunctive events. We find that normalized CEs differ significantly across sources ($p < 0.05$ in nine out of ten belief bins, Friedman test), indicating that the source of uncertainty itself affects valuation conditional on beliefs. In particular, conjunctive events are evaluated as a distinct source relative to their constituent events. To test valence preference, Figure A16 plots normalized CEs as a function of beliefs across states that differ in political and economic valence. We find that, holding beliefs fixed, participants assign higher CEs to lotteries on own-party candidate wins than losses ($p < 0.01$ in all belief bins, Wilcoxon signed-rank test), to favorable rather than unfavorable economic outcomes ($p < 0.05$ in six out of ten belief bins, Wilcoxon signed-rank test), and to congruent conjunctive events rather than incongruent ones ($p < 0.05$ in seven out of ten belief bins, Wilcoxon signed-rank test). Taken together, these results are consistent with the presence of both source-related and valence-related preference components in choices.

From a broader perspective, our preference-based framework is complementary to heuristic accounts of choice that emphasize the cognitive processes underlying judgement and decision making. A growing literature documents how individuals rely on simplifying rules, affective cues,

or narrative coherence when evaluating prospects in complex environments.[9] From this perspective, conjunction fallacy in choice may reflect heuristic processing in which congruence or affective alignment becomes salient cues in the assessment of political lotteries. While heuristic approaches focus on the cognitive mechanisms through which decisions are formed, our analysis characterizes the choice patterns through a structured representation of preferences over sources and valence. Incorporating heuristic processes into political choices remains an interesting direction for future research.

6. Concluding Remarks

We examine the effect of political identity on conjunction fallacy in both choice and belief. Tversky and Kahneman (1983) suggest that individuals judge conjunctions as more likely than their constituents and "*favors outcomes that make good stories or good hypothesis*". Our results refine what counts as a "good story" in identity-relevant settings: it is not only representativeness that matters, but also the alignment of desirability across components--two favorable components combined make the conjunctive event especially attractive. By identifying preference-based mechanisms that operate beyond belief distortions, we provide a structured account of how identity shapes valuations in identity-relevant decisions. Our experimental setting highlights two features that are particularly relevant for understanding conjunction fallacy in choice. First, the events are forward-looking, allowing anticipatory considerations to influence valuation. Second, events have temporal structure (electoral outcomes followed by economic outcomes), which naturally invokes causal reasoning about how political success leads to economic improvement. This sequential structure aligns with recent experimental evidence that externally providing causal narratives systematically change choices (Andre et al., 2024; Charles and Kendall, 2024). Taken together, our findings suggest that conjunction fallacy in choice is closely linked to how individuals evaluate identity-relevant, sequential, and narrative-rich prospects.

Beyond conjunction fallacies, the valence mechanism connects to the broader role of identity in economic behavior. A large body of experimental literature documents how identity shapes both

[9] Examples include and middle bias or naïve diversification (Read and Loewenstein, 1995; Benartzi and Thaler, 2001; Rubinstein, 2002; Choi et al., 2006; Halevy and Mayraz, 2024), status quo bias (Masatlioglu and Ok, 2005; Ortoleva, 2010), simplicity seeking (Iyengar and Kamenica, 2010), caution (Cerreia-Vioglio et al., 2015, 2024), and mental accounting (Gilboa et al., 2021).

preferences and beliefs, ranging from in-group favoritism (Chen and Li, 2009) to partisan information demand and belief formation (Peterson and Iyengar, 2021; Bauer et al., 2025), as well as investment and valuation decisions (Dekel and Shayo, 2024; Donkor et al., 2025). Our evidence highlights a preference-based channel through which individuals derive additional utility from outcomes aligned with their identity. In this sense, identity-consistent outcomes carry intrinsic value beyond their instrumental consequences. More broadly, it connects identity-driven behavior to the general notion of state-dependent preference where identity acts as a key state variable shaping both valuations and beliefs. It thus offers a framework for understanding phenomena such as expressive voting and motivated reasoning across economics and political domains.

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Online Appendix A: Additional Figures and Tables

Question #	Option A		Option B
Q1	If Trump wins and unemployment increases, receive $5; otherwise, $0.	● ○	$0.00
Q2		● ○	$0.25
Q3		● ○	$0.50
Q4		● ○	$0.75
Q5		● ○	$1.00
Q6		● ○	$1.25
Q7		● ○	$1.50
Q8		● ○	$1.75
Q9		● ○	$2.00
Q10		● ○	$2.25
Q11		○ ●	$2.50
Q12		○ ●	$2.75
Q13		○ ●	$3.00
Q14		○ ●	$3.25
Q15		○ ●	$3.50
Q16		○ ●	$3.75
Q17		○ ●	$4.00
Q18		○ ●	$4.25
Q19		○ ●	$4.50
Q20		○ ●	$4.75
Q21		○ ●	$5.00

Figure A1. Choice list example in the Main treatment

Question #	Option A		Option B
Q1	If unemployment increases and Trump wins, receive $5; otherwise, $0.	● ○	$0.00
Q2		● ○	$0.25
Q3		● ○	$0.50
Q4		● ○	$0.75
Q5		● ○	$1.00
Q6		● ○	$1.25
Q7		● ○	$1.50
Q8		● ○	$1.75
Q9		○ ●	$2.00
Q10		○ ●	$2.25
Q11		○ ●	$2.50
Q12		○ ●	$2.75
Q13		○ ●	$3.00
Q14		○ ●	$3.25
Q15		○ ●	$3.50
Q16		○ ●	$3.75
Q17		○ ●	$4.00
Q18		○ ●	$4.25
Q19		○ ●	$4.50
Q20		○ ●	$4.75
Q21		○ ●	$5.00

Figure A2. Choice list example in the Reverse-order treatment

Question #	Option A		Option B
Q1	If Trump wins and unemployment decimal is odd, receive $5; otherwise, $0.	● ○	$0.00
Q2		● ○	$0.25
Q3		● ○	$0.50
Q4		● ○	$0.75
Q5		● ○	$1.00
Q6		● ○	$1.25
Q7		● ○	$1.50
Q8		○ ●	$1.75
Q9		○ ●	$2.00
Q10		○ ●	$2.25
Q11		○ ●	$2.50
Q12		○ ●	$2.75
Q13		○ ●	$3.00
Q14		○ ●	$3.25
Q15		○ ●	$3.50
Q16		○ ●	$3.75
Q17		○ ●	$4.00
Q18		○ ●	$4.25
Q19		○ ●	$4.50
Q20		○ ●	$4.75
Q21		○ ●	$5.00

Figure A3. Choice list example in the Odd/Even treatment

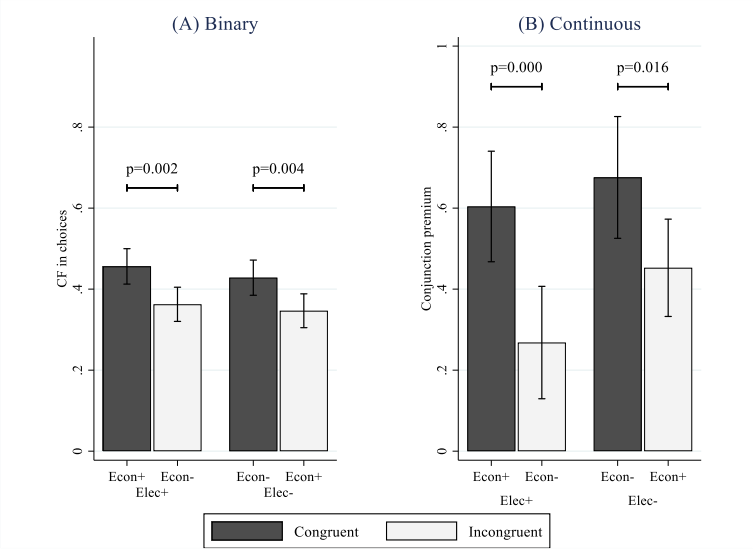


Figure A4. Robustness check of CF in choices in the Main treatment by excluding Independents who lean toward a party. Panel (A) shows proportions of CF in choices. Panel (B) shows the conjunction premium. Black (grey) bars represent congruent (incongruent) scenarios. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing-party) candidate wins. $Econ^{+}$ ($Econ^{-}$) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

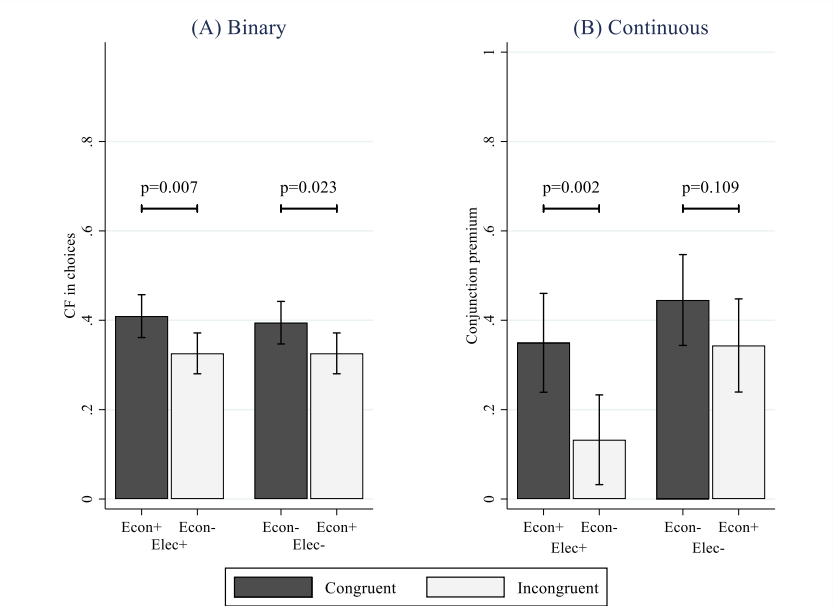


Figure A5. Robustness check of CF in choices in the Main treatment by dropping choices violating first-order stochastic dominance. Panel (A) shows proportions of CF in choices. Panel (B) shows the conjunction premium. Black (grey) bars represent congruent (incongruent) scenarios. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing-party) candidate wins. $Econ^{+}$ ($Econ^{-}$) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

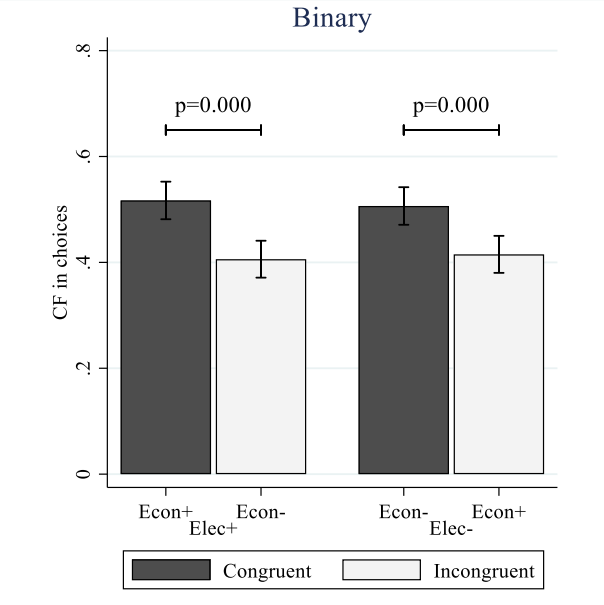


Figure A6. Robustness check of CF in choices in the Main treatment by allowing for no choice errors. Panel (A) shows proportions of CF in choices. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec–) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

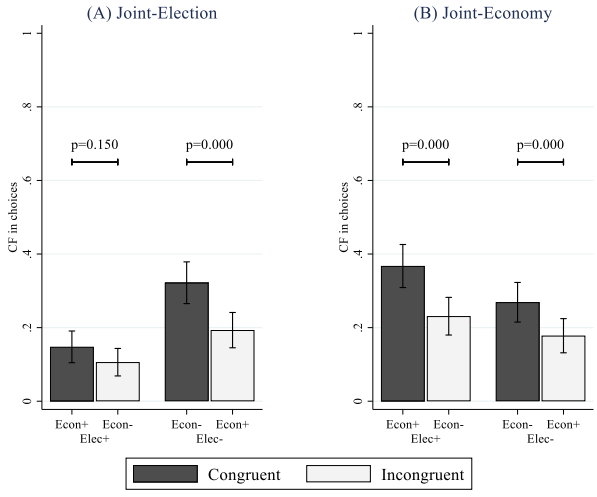


Figure A7. CF in choices in the Main treatment by comparing CEs of the conjunctive-event lottery separately to each constituent lottery. We show proportions of CF in choices. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec–) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

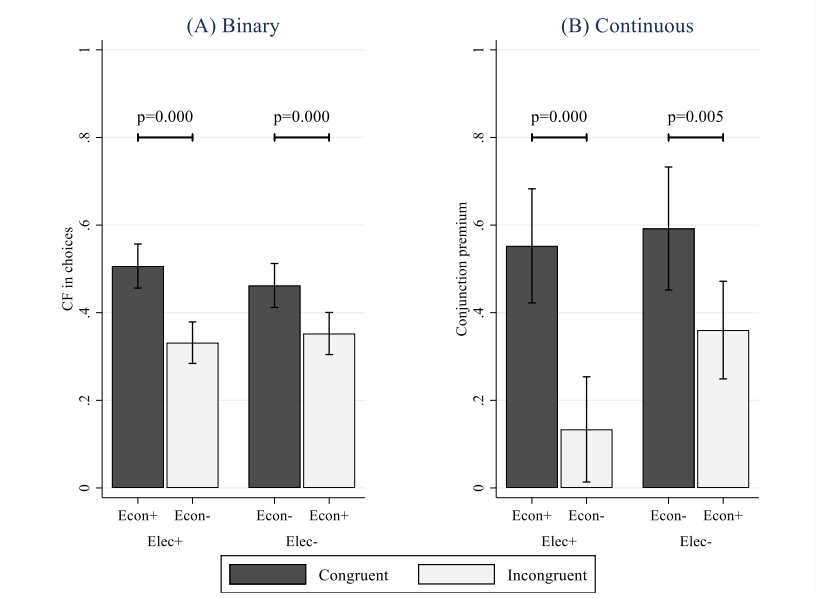


Figure A8. CF in choices in the Main treatment by comparing CE of the conjunctive-event lottery to the average CE of its constituents. Panel (A) shows proportions of CF in choices. Panel (B) shows the conjunction premium. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec–) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

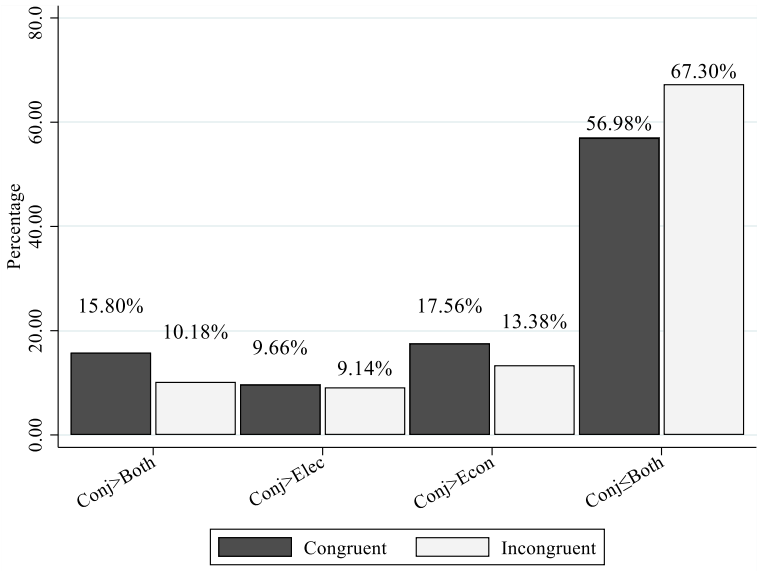


Figure A9. Categorization by the CEs of conjunctive and single events. We show proportions of CF in choices. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec–) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

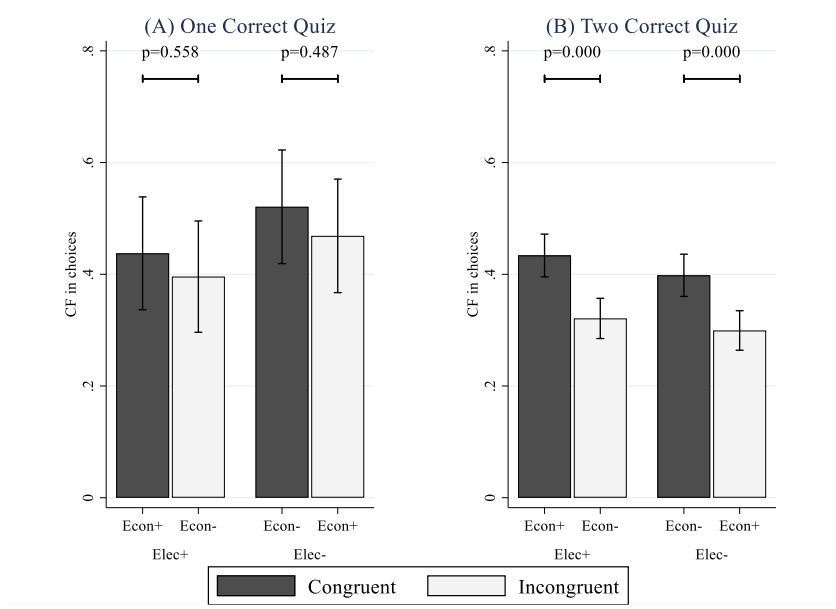


Figure A10. CF in choices by understanding question performance. We show proportions of CF in choices. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec–) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

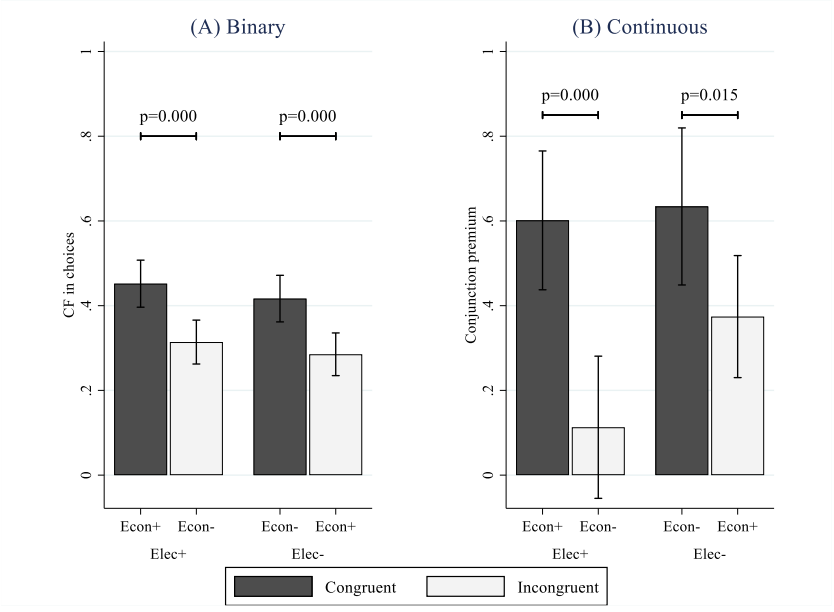


Figure A11. CF in choices by excluding choices with response times in the bottom and top 5 percentiles of the distribution. Panel (A) shows proportions of CF in choices. Panel (B) shows the conjunction premium. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec–) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

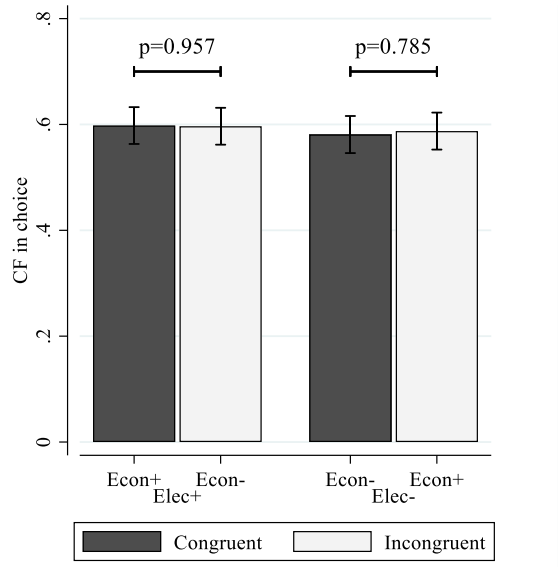


Figure A12. CF in choices by simulation data. We show proportions of CF in choices. Black (grey) bars represent congruent (incongruent) scenarios. Elec+ (Elec–) denotes own-party (opposing-party) candidate wins. Econ+ (Econ–) refers to favorable (unfavorable) economic changes. Error bars represent 95% confidence intervals. P-values from paired t-test are shown above bars.

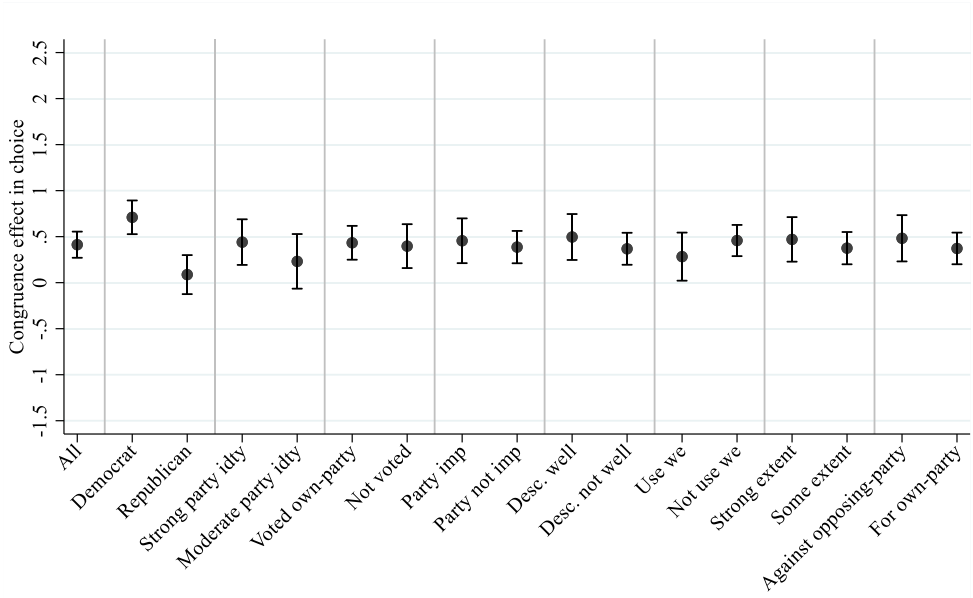


Figure A13. Heterogeneity analyses of congruence effect in choices across different party identification groups. Error bars represent 95 percent confidence intervals.

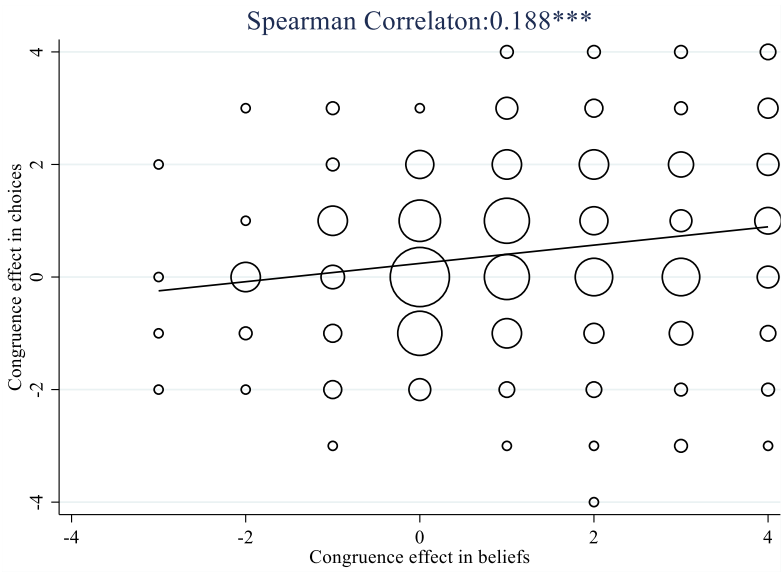


Figure A14. Correlations between congruence effect in choices and congruence effect in beliefs. The x-axis is the congruence effect in beliefs and the y-axis is the congruence effect in choices. We show spearman correlations between congruence effect in choices and beliefs for the whole sample.

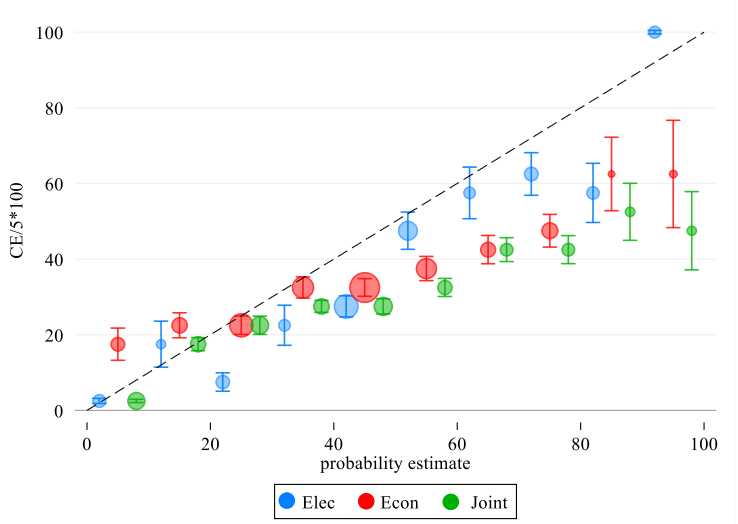


Figure A15. Normalized CE and beliefs across different types of events. This figure displays the average normalized CE (CE/5*100) across electoral, economic, and conjunctive events. The x-axis represents participants belief estimates, while the y-axis shows the median normalized CE (CE/5*100). The 45-degree dashed line corresponds to the benchmark of a risk-neutral individual. Under risk aversion, normalized CEs should be a convex increasing function of beliefs and lie below the 45-degree line. Error bars represent $\pm$ 1 std. error of the median. We exclude individuals whose sum of probability estimates for complementary election events and economic events fall in the top or bottom 5 percent of the distribution. $p < 0.05$ in nine out of ten belief bins, Friedman test.

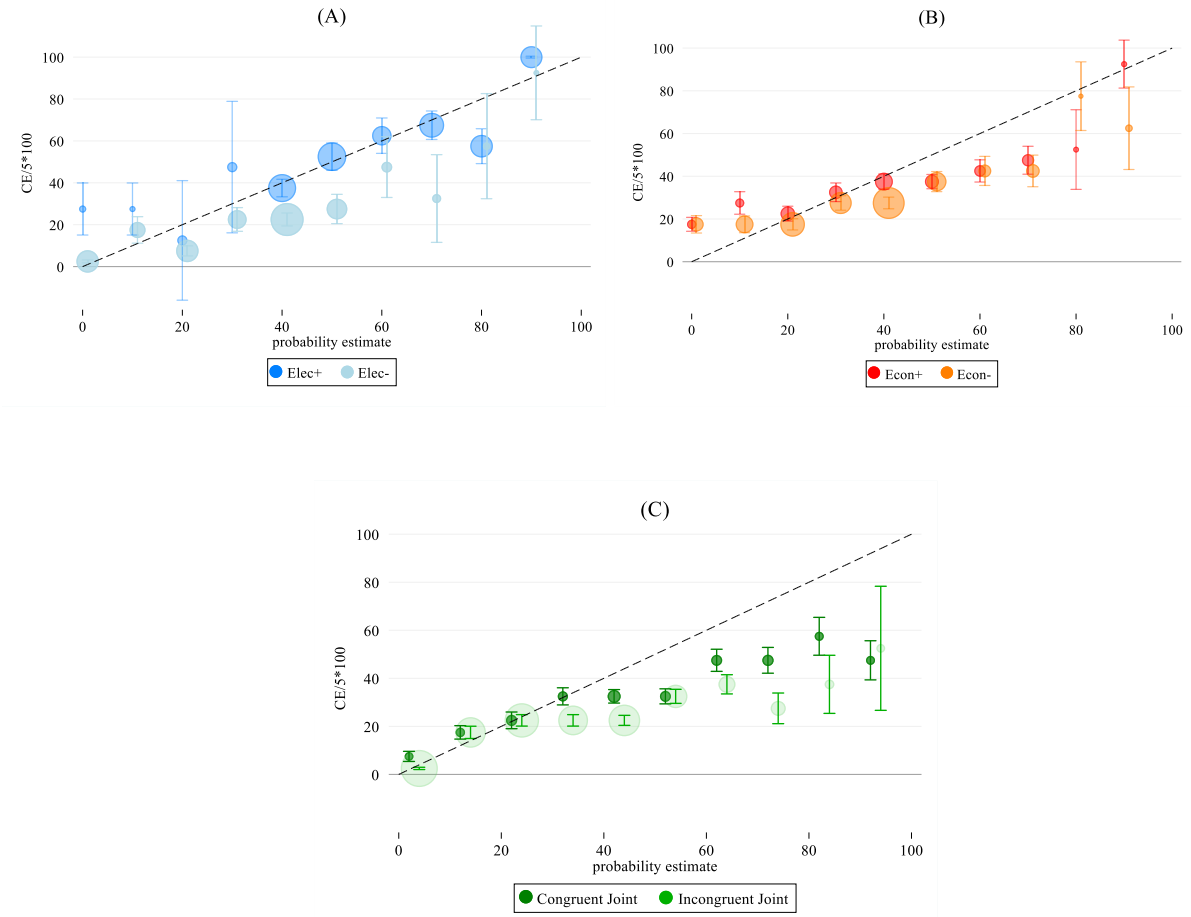


Figure A16. Normalized CE and beliefs across different valence outcomes. This figure displays the average normalized CE (CE/5*100) across electoral, economic, and conjunctive events. The x-axis represents participants belief estimates, while the y-axis shows the median normalized CE (CE/5*100). The 45-degree dashed line corresponds to the benchmark of a risk-neutral individual. Under risk aversion, normalized CEs should be a convex increasing function of beliefs and lie below the 45-degree line. Error bars represent ± 1 std. error of the median. We exclude individuals whose sum of probability estimates for complementary election events and economic events fall in the top or bottom 5 percent of the distribution. Panel (A): $p < 0.01$ in all belief bins, Wilcoxon signed-rank test. Panel (B): $p < 0.05$ in six out of ten belief bins, Wilcoxon signed-rank test. Panel (C): $p < 0.05$ in seven out of ten belief bins, Wilcoxon signed-rank test

Table A1. Balance check

	Main Treat (N=384)	Reverse-order (N=383)	Odd/Even (N=381)	Two-sample t-test *p* value		
	(1)	(2)	(3)	(1) vs (2)	(1) vs (3)	(2) vs (3)
Democrat	0.321	0.350	0.359	0.387	0.252	0.779
Republican	0.334	0.248	0.291	**0.009**	0.210	0.178
Independent	0.344	0.400	0.341	0.111	0.941	0.096
vote	0.672	0.666	0.691	0.859	0.586	0.470
age	46.729	45.162	44.790	0.164	0.100	0.749
male	0.482	0.455	0.514	0.447	0.367	0.097
edu	4.282	4.120	4.136	0.099	0.138	0.867
married	0.511	0.444	0.376	0.065	**0.000**	0.054
race	2.349	2.357	2.441	0.958	0.580	0.615

Table A2. Robustness check of CF in choices and conjunction premium in the Main treatment by excluding Independents who lean toward a party

	CF in choices		Conjunction premium	
	Elec+	Elec-	Elec+	Elec-
	(1)	(2)	(3)	(4)
Congruence	0.094***	0.082**	0.336***	0.223**
	(0.031)	(0.031)	(0.106)	(0.109)
Constant	0.363***	0.347***	0.268***	0.453***
	(0.016)	(0.016)	(0.053)	(0.054)
Observations	1004	1004	1004	1004
R-squared	0.370	0.435	0.399	0.431

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Congruence equals 1 for congruent scenarios, 0 otherwise. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Individual fixed effects are controlled in all columns.

Table A3. Robustness check of CF in choices and conjunction premium in the Main treatment by dropping choices violating first-order stochastic dominance

	CF in choices		Conjunction premium	
	Elec+	Elec-	Elec+	Elec-
	(1)	(2)	(3)	(4)
Congruence	0.074***	0.054*	0.250***	0.065
	(0.028)	(0.028)	(0.073)	(0.067)
Constant	0.344***	0.331***	0.132***	0.324***
	(0.014)	(0.014)	(0.036)	(0.034)
Observations	1099	1053	1099	1053
R-squared	0.398	0.432	0.411	0.505

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Congruence equals 1 for congruent scenarios, 0 otherwise. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Individual fixed effects are controlled in all columns.

Table A4. Robustness check of CF in choices in the Main treatment by allowing for no choice errors

	CF in choices					
	Pool		Democrat		Republican	
	Elec+	Elec-	Elec+	Elec-	Elec+	Elec-
	(1)	(2)	(3)	(4)	(5)	(6)
Congruence	0.111***	0.091***	0.178***	0.157***	0.038	0.019
	(0.026)	(0.025)	(0.035)	(0.034)	(0.037)	(0.035)
Constant	0.406***	0.415***	0.370***	0.353***	0.445***	0.484***
	(0.013)	(0.012)	(0.017)	(0.017)	(0.019)	(0.018)
Observations	1532	1532	800	800	732	732
R-squared	0.376	0.440	0.379	0.451	0.384	0.433

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Congruence equals 1 for congruent scenarios, 0 otherwise. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Individual fixed effects are controlled in all columns.

Table A5. Regression results of CF in choices and conjunction premium in the Reverse-order treatment

	CF in choices		Conjunction premium	
	Elec+	Elec-	Elec+	Elec-
	(1)	(2)	(3)	(4)
Congruence	0.098***	0.082***	0.357***	0.277***
	(0.024)	(0.024)	(0.081)	(0.074)
Constant	0.336***	0.310***	0.199***	0.300***
	(0.012)	(0.012)	(0.040)	(0.037)
Observations	1528	1528	1528	1528
R-squared	0.355	0.460	0.345	0.466

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Congruence equals 1 for congruent scenarios, 0 otherwise. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Individual fixed effects are controlled in all columns.

Table A6. Regression results of CF in choices and conjunction premium in the Odd/Even treatment

	CF in choices		Conjunction premium	
	Elec+	Elec-	Elec+	Elec-
	(1)	(2)	(3)	(4)
Odd	-0.019	0.001	-0.007	0.001
	(0.021)	(0.018)	(0.061)	(0.044)
Constant	0.394***	0.311***	0.455***	0.276***
	(0.011)	(0.009)	(0.030)	(0.022)
Observations	1512	1512	1512	1512
R-squared	0.449	0.558	0.494	0.521

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Odd equals 1 for odd scenarios, 0 otherwise. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Individual fixed effects are controlled in all columns.

Table A7. Regression results of CF in beliefs in the Main, Reverse-order, Odd/Even treatments

	CF in beliefs					
	Main		Reverse-order		Odd/Even	
	Elec+	Elec-	Elec+	Elec-	Elec+	Elec-
	(1)	(2)	(3)	(4)	(5)	(6)
Congruence	0.289***	0.236***	0.219***	0.266***	-0.036*	0.013
	(0.026)	(0.025)	(0.027)	(0.025)	(0.020)	(0.019)
Constant	0.322***	0.274***	0.403***	0.262***	0.430***	0.261***
	(0.013)	(0.012)	(0.013)	(0.013)	(0.010)	(0.009)
Observations	1532	1532	1528	1528	1512	1512
R-squared	0.429	0.476	0.378	0.431	0.587	0.581

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. In Columns (1)-(4), Congruence equals 1 for congruent scenarios, 0 otherwise. In Columns (5) and (6), the main independent variable is a dummy indicating whether the economic event is about an odd scenario. $Elec^{+}$ ($Elec^{-}$) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Individual fixed effects are controlled in all columns.

Table A8. Congruence effect in choices and congruence effect in beliefs at the individual level

	Congruence effect in choices	
	(1)	(2)
Congruence effect in beliefs	0.162***	0.176***
	(0.047)	(0.050)
Constant	0.242***	0.565
	(0.076)	(0.505)
Controls	N	Y
Observations	383	382
R-squared	0.034	0.057

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. We define the congruence effect in choices (belief) as the difference between the number of CF in choices (beliefs) in congruent scenarios and in incongruent scenarios. Regression results report significant positive correlations between the congruence effect in choices and in beliefs. We control for individual characteristics including gender, age, education level, marital status, race, whether the individual has voted in a U.S. presidential election, performance on conjunction fallacy questions, and understanding of the questions in columns (2).

Table A9. Regression of CF in choices on CF in beliefs at the individual level by excluding individuals whose sum of probability estimates for complementary election events and economic events fall in the top or bottom 5 percent of the distribution.

	CF in choices					
	Elec+			Elec-		
	(1)	(2)	(3)	(4)	(5)	(6)
Congruence	0.112***	0.064**	0.065**	0.087***	0.047*	0.048*
	(0.026)	(0.027)	(0.027)	(0.027)	(0.027)	(0.028)
CF in beliefs		0.154***	0.143***		0.141***	0.136***
		(0.032)	(0.032)		(0.032)	(0.032)
Constant	0.327***	0.280***	0.165	0.322***	0.288***	0.555***
	(0.021)	(0.023)	(0.111)	(0.022)	(0.024)	(0.120)
Control	N	N	Y	N	N	Y
Observations	1216	1216	1212	1216	1216	1212
R-squared	0.013	0.036	0.069	0.008	0.027	0.050

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. CF in choices is defined as in Section 4.1 and CF in beliefs as in Section 4.2. Congruence equals 1 for congruent scenarios, 0 otherwise. Elec+ (Elec–) denotes own-party (opposing) candidate wins. Standard errors are clustered at the individual level. Columns (1) and (4) include only the congruence indicator. Columns (2) and (5) add CF in beliefs. Columns (3) and (6) further control for demographics and task-performance measures. We exclude individuals whose sum of probability estimates for complementary election events and economic events fall in the top or bottom 5 percent of the distribution.

Online Appendix B: Experiment Instructions

1. Main Treatment Instructions

Part I: Lottery Choices

In this part, you will make choices between lotteries and sure amounts of money. The lotteries are based on the following three key events.

1. **2024 U.S. Presidential Election (November 5, 2024)**
Two possible outcomes: **Kamala Harris wins** or **Donald Trump wins**.

2. **U.S. Unemployment Rate Change (from September 2024 to September 2025)**
According to the Bureau of Labor Statistics, the unemployment rate in September 2024 was 4.1%.
Two possible outcomes: **Unemployment rate increases** or **Unemployment rate decreases**.

3. **U.S. Public Health Care System Ranking Change (from September 2024 to September 2025)**
According to US News and World Report, United States ranks 3rd with the most developed public health care systems in September 2024.
Two possible outcomes: **Healthcare ranking improves** or **Healthcare ranking declines**.

You will evaluate how much you value bets based on the outcomes of these three events. There are two types of lotteries:

- **Single event lotteries:** Based on one outcome (e.g., "Receive $5 if Kamala Harris wins")
- **Combined event lotteries**: Based on two outcomes (e.g., "Receive $5 if Donald Trump wins AND unemployment rate decreases")

  Note: For combined event lotteries, you receive money only when both specified outcomes happen. If either outcome doesn't happen, you receive nothing.

Your Choice

You will complete 14 list of questions. Each list has the same structure: there are 21 choices between a fixed lottery and different sure amounts:

- The lottery will be based on the outcomes mentioned above.
- The sure amounts will increase as you progress down the list.

We will show you one example list in the figure below.

If you choose the lottery, Option A, you receive $5 if Donald Trump wins the election, and $0 if Kamala Harris wins. Option A is fixed in the list.

If you choose the sure amount, Option B, you get the stated amount of money with certainty. Option B always becomes more attractive as you go down the list: receive "$0" in Question 1, "$0.25" in Question 2, so on and so forth, to "$4.75" in Question 20, and " $5" in Question 21.

Question #	Option A		Option B
Q1	If Trump wins, receive $5; otherwise, $0.	○ ○	$0.00
Q2		○ ○	$0.25
Q3		○ ○	$0.50
Q4		○ ○	$0.75
Q5		○ ○	$1.00
Q6		○ ○	$1.25
Q7		○ ○	$1.50
Q8		○ ○	$1.75
Q9		○ ○	$2.00
Q10		○ ○	$2.25
Q11		○ ○	$2.50
Q12		○ ○	$2.75
Q13		○ ○	$3.00
Q14		○ ○	$3.25
Q15		○ ○	$3.50
Q16		○ ○	$3.75
Q17		○ ○	$4.00
Q18		○ ○	$4.25
Q19		○ ○	$4.50
Q20		○ ○	$4.75
Q21		○ ○	$5.00

Summary: For the first [ ] question(s), I choose the lottery; for the remaining questions, I choose Option B.

How to Make Your Choices

Typically, participants start by preferring the lottery (Option A) and switch to the sure amount (Option B) as it becomes more appealing.

To make your choices more effectively, identify the row where you would prefer to switch to Option B. Once you select Option B in that row, the computer will automatically fill in your choices for the remaining rows.

A summary at the bottom will show how many times you chose the lottery. You can review and adjust your choices at any time before submitting. There are no right or wrong answers---choose based on your preferences.

Payment

At the end of the experiment, the computer will randomly select one list and one question to determine your payment. Since each choice has an equal chance of being selected, please consider each decision carefully.

Example

Suppose you choose the lottery in Questions 1-4 and Option B in Questions 5-21, your choices for all questions are shown below:

Each question is equally likely to be chosen for payment. So, for example,

- If Question 4 is selected for payment, you have chosen the lottery, and your payment will be determined by the election outcome.
- If Question 7 is selected for payment, you have chosen Option B, and you will receive "$1.5".

Question #	Option A		Option B
Q1	If Trump wins, receive $5; otherwise, $0.	● ○	$0.00
Q2		● ○	$0.25
Q3		● ○	$0.50
Q4		● ○	$0.75
Q5		○ ●	$1.00
Q6		○ ●	$1.25
Q7		○ ●	$1.50
Q8		○ ●	$1.75
Q9		○ ●	$2.00
Q10		○ ●	$2.25
Q11		○ ●	$2.50
Q12		○ ●	$2.75
Q13		○ ●	$3.00
Q14		○ ●	$3.25
Q15		○ ●	$3.50
Q16		○ ●	$3.75
Q17		○ ●	$4.00
Q18		○ ●	$4.25
Q19		○ ●	$4.50
Q20		○ ●	$4.75
Q21		○ ●	$5.00

Summary: For the first [4] question(s), I choose the lottery; for the remaining questions, I choose Option B.

Quiz

Next you will answer two questions to check your understanding of the instructions. You will receive $0.1 for each correct answer. Please select the correct options to fill in the gaps.

Question #	Option A		Option B
Q1	If Trump wins, receive $5; otherwise, $0.	● ○	$0.00
Q2		● ○	$0.25
Q3		● ○	$0.50
Q4		● ○	$0.75
Q5		○ ●	$1.00
Q6		○ ●	$1.25
Q7		○ ●	$1.50
Q8		○ ●	$1.75
Q9		○ ●	$2.00
Q10		○ ●	$2.25
Q11		○ ●	$2.50
Q12		○ ●	$2.75
Q13		○ ●	$3.00
Q14		○ ●	$3.25
Q15		○ ●	$3.50
Q16		○ ●	$3.75
Q17		○ ●	$4.00
Q18		○ ●	$4.25
Q19		○ ●	$4.50
Q20		○ ●	$4.75
Q21		○ ●	$5.00

Summary: For the first [4] question(s), I choose the lottery; for the remaining questions, I choose Option B.

Suppose you have made the decisions shown above.

1. If Question 2 is selected for payment, you will receive___;

- ○ A. the lottery
- ○ B. $0.25
- ○ C. $1
- ○ D. $0
- ○ E. I don't know

Your answer above was incorrect. Please pay close attention to the explanation below to make sure you understand the instructions.

For Question 2, you choose Option A and your payment would be determined by the election outcome.

2. If Question 15 is selected for payment, you will receive____ ;

- ○ A. the lottery
- ○ B. $3.5
- ○ C. $1
- ○ D. $0
- ○ E. I don't know

Your answer above was incorrect. Please pay close attention to the explanation below to make sure you understand the instructions.

For Question 15, you choose Option B and your payment would be the sure amount $3.5.

If you have any further questions on the procedure, please email the experimenter to address your question. If not, you may now begin making decisions.

Choice list example:

List 8/14

In this decision, the event to bet on is

Donald Trump wins the 2024 presidential election

AND

U.S. unemployment rate decreases in 12 months

Please click to confirm:

Confirm

Question #	Option A		Option B
Q1	If Trump wins and unemployment decreases, receive $5; otherwise, $0.	○ ○	$0.00
Q2		○ ○	$0.25
Q3		○ ○	$0.50
Q4		○ ○	$0.75
Q5		○ ○	$1.00
Q6		○ ○	$1.25
Q7		○ ○	$1.50
Q8		○ ○	$1.75
Q9		○ ○	$2.00
Q10		○ ○	$2.25
Q11		○ ○	$2.50
Q12		○ ○	$2.75
Q13		○ ○	$3.00
Q14		○ ○	$3.25
Q15		○ ○	$3.50
Q16		○ ○	$3.75
Q17		○ ○	$4.00
Q18		○ ○	$4.25
Q19		○ ○	$4.50
Q20		○ ○	$4.75
Q21		○ ○	$5.00

Summary: For the first [ ] question(s), I choose the lottery; for the remaining questions, I choose Option B.

Part II: Probability Estimates

In this section of the study, you will complete **14 estimation tasks** about future events. For each task, you will estimate how likely different outcomes are to occur.

These questions will cover:

Simple predictions
(1) Who will win the 2024 presidential election.
(2) How U.S. unemployment rate will change from Sep 2024 to Sep 2025.
(3) How U.S. public health care system ranking will change from Sep 2024 to Sep 2025.

Combined outcomes
(4) Certain election result and unemployment change happening together.
(5) Certain election result and public health care ranking happening together.

For each question, you will use a slider to show your estimate. You can click anywhere on the slider track to start estimating. After clicking the track, a slider handle will appear that you can drag to adjust your estimate.

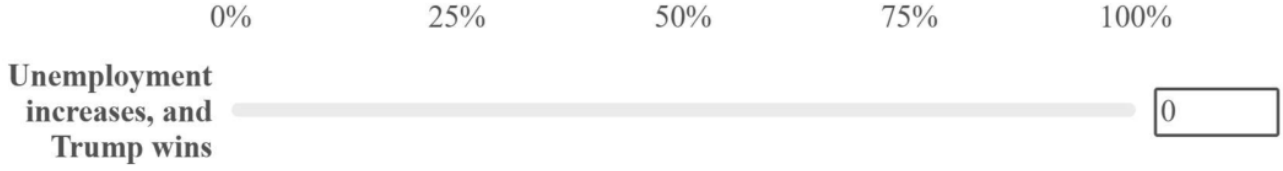
Examples

Here are two different types questions you will see.

Example 1: Simple predictions
Question: What is probability that Kamala Harris wins the 2024 presidential election?

Example 2: Combined outcomes
Question: What is the probability of these two events happening together:

- **U.S. unemployment rate increases from September 2024 (4.1%) to September 2025**
- **Donald Trump wins the election**



Notes:

According to the Bureau of Labor Statistics, the U.S. unemployment rate is 4.1% in September 2024.

According to US News and World Report, United States ranks 3rd with the most developed public health care systems in September 2024.

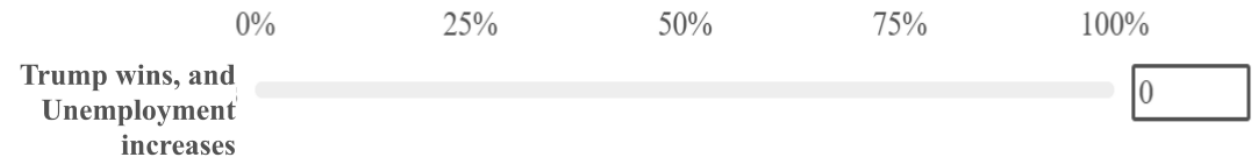
Please take your time to carefully consider each scenario. Your thoughtful estimates are crucial for our research on how individuals perceive future political and economic outcomes.

If you have any further questions on the procedure, please email the experimenter to address your question. If not, you may now begin making estimations.

Probability estimate example:

Question ${e://Field/CountNumber}: What is the probability of these two events happening together:

- **Donald Trump wins the election**
- **U.S. unemployment rate increases from September 2024 (4.1%) to September 2025**



2. Reverse-order Treatment Instructions

We present the instructions that differ from those in the Main treatment.

You will evaluate how much you value bets based on the outcomes of these three events. There are two types of lotteries:

- **Single event lotteries:** Based on one outcome (e.g., "Receive $5 if Kamala Harris wins")
- **Combined event lotteries**: Based on two outcomes (e.g., "Receive $5 if unemployment rate decreases AND Donald Trump wins")

Note: For combined event lotteries, you receive money only when both specified outcomes happen. If either outcome doesn't happen, you receive nothing.

Choice list example:

List 7/14

In this decision, the event to bet on is

U.S. unemployment rate increases in 12 months

AND

Donald Trump wins the 2024 presidential election

Please click to confirm:

Confirm

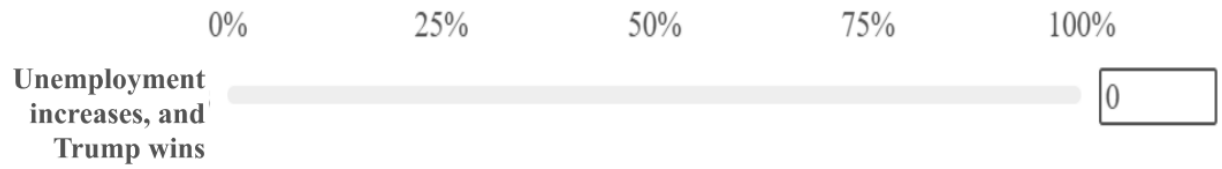
Question #	Option A		Option B
Q1	If unemployment increases and Trump wins, receive $5; otherwise, $0.	○ ○	$0.00
Q2		○ ○	$0.25
Q3		○ ○	$0.50
Q4		○ ○	$0.75
Q5		○ ○	$1.00
Q6		○ ○	$1.25
Q7		○ ○	$1.50
Q8		○ ○	$1.75
Q9		○ ○	$2.00
Q10		○ ○	$2.25
Q11		○ ○	$2.50
Q12		○ ○	$2.75
Q13		○ ○	$3.00
Q14		○ ○	$3.25
Q15		○ ○	$3.50
Q16		○ ○	$3.75
Q17		○ ○	$4.00
Q18		○ ○	$4.25
Q19		○ ○	$4.50
Q20		○ ○	$4.75
Q21		○ ○	$5.00

Summary: For the first [ ] question(s), I choose the lottery; for the remaining questions, I choose Option B.

Probability estimate example:

Question ${e://Field/CountNumber}: What is the probability of these two events happening together:

- **U.S. unemployment rate increases from September 2024 (4.1%) to September 2025**
- **Donald Trump wins the election**



3. Odd/Even Treatment Instructions

Part I: Lottery Choices

In this part, you will make choices between lotteries and sure amounts of money. The lotteries are based on the following three key events.

1. **2024 U.S. Presidential Election (November 5, 2024)**
Two possible outcomes: **Kamala Harris wins**; or **Donald Trump wins**.

2. **The first decimal digit of U.S. unemployment rate in September 2025**
According to the Bureau of Labor Statistics, the unemployment rate in September 2024 was 4.1%.
Two possible outcomes: **Unemployment decimal digit is odd** (1, 3, 5, 7, 9) or **Unemployment decimal digit is even** (0, 2, 4, 6, 8).

3. **U.S. public health care system ranking in September 2025**
According to US News and World Report, United States ranks 3rd with the most developed public health care systems in September 2024.
Two possible outcomes: **Healthcare ranking number is odd** (1st, 3rd, 5th, etc.) or **Healthcare ranking number is even** (2nd, 4th, 6th, etc.).

You will evaluate how much you value bets based on the outcomes of these three events. There are two types of lotteries:

- **Single event lotteries:** Based on one outcome (e.g., “Receive $5 if Kamala Harris wins”)
- **Combined event lotteries**: Based on two outcomes (e.g., “Receive $5 if Donald Trump wins AND Unemployment decimal digit is odd”)

  Note: For combined event lotteries, you receive money only when both specified outcomes happen. If either outcome doesn't happen, you receive nothing.

Choice list example:

List 7/14

In this decision, the event to bet on is

Donald Trump wins the 2024 presidential election

AND

The decimal digit of unemployment in September 2025 is odd

Please click to confirm:

Confirm

Question #	Option A		Option B
Q1	If Trump wins and unemployment decimal is odd, receive $5; otherwise, $0.	○ ○	$0.00
Q2		○ ○	$0.25
Q3		○ ○	$0.50
Q4		○ ○	$0.75
Q5		○ ○	$1.00
Q6		○ ○	$1.25
Q7		○ ○	$1.50
Q8		○ ○	$1.75
Q9		○ ○	$2.00
Q10		○ ○	$2.25
Q11		○ ○	$2.50
Q12		○ ○	$2.75
Q13		○ ○	$3.00
Q14		○ ○	$3.25
Q15		○ ○	$3.50
Q16		○ ○	$3.75
Q17		○ ○	$4.00
Q18		○ ○	$4.25
Q19		○ ○	$4.50
Q20		○ ○	$4.75
Q21		○ ○	$5.00

Summary: For the first [ ] question(s), I choose the lottery; for the remaining questions, I choose Option B.

Part II: Probability Estimates

In this section of the study, you will complete **14 estimation tasks** about future events. For each task, you will estimate how likely different outcomes are to occur.

These questions will cover:

Simple predictions

(1) Who will win the 2024 presidential election.

(2) Whether the first decimal digit of U.S. unemployment rate in September 2025 is odd or even.

(3) Whether the ranking number of U.S. public health care system in September 2025 is odd or even.

Combined outcomes

(4) Certain election result and unemployment first decimal digit (odd or even) happening together.

(5) Certain election result and healthcare ranking number (odd or even) happening together.

For each question, you will use sliders to show your estimates. You can click anywhere on the slider track to start estimating. After clicking the track, a slider handle will appear that you can drag to adjust your estimate.

Probability estimate example:

Question ${e://Field/CountNumber}: What is the probability of these two events happening together:

- **Donald Trump wins the election**
- **The first decimal digit of unemployment rate in September 2025 is even**