A Online Appendix

A.1 Additional Tables and Figures

Table A1: Main Experiment: CA Method vs. Choice Reversals, Risky Tasks

(a) CA diagnosis: Error in one or more tables

		$+1/-1$ **Choice**	
		No Reversal	Reversal
CA	0 Diagnosed	0.777	0.043 $\beta = 0.754$
	≥ 1 Diagnosed	0.165 $\alpha = 0.175$	0.014

$N = 1{,}614$; $t = 1.6$ ($p = 0.12$)

(b) CA diagnosis: Errors in both tables

		$+1/-1$ **Choice**	
		No Reversal	Reversal
CA	< 2 Diagnosed	0.906	0.051 $\beta = 0.895$
	2 Diagnosed	0.036 $\alpha = 0.038$	0.006

$N = 1{,}614$; $t = 2.1$ ($p = 0.04$)

Notes: The tables cross-tabulate objective mistakes with observations diagnosed as improvable by the CA method in Pre-Choice data. Panel (a) relates reversals across $+1$ and -1 versions of a Risky task to cases with errors in at least one of the corresponding characterization tables. Panel (b) restricts to cases with errors in both characterization tables. α denotes the Type-I error rate, i.e., the likelihood of a false positive conditional on "No Reversal," and β the Type-II error rate, i.e., the likelihood of a false negative conditional on "Reversal." The t-statistic corresponds to test of equality in reversal rate for diagnosed and undiagnosed observations.

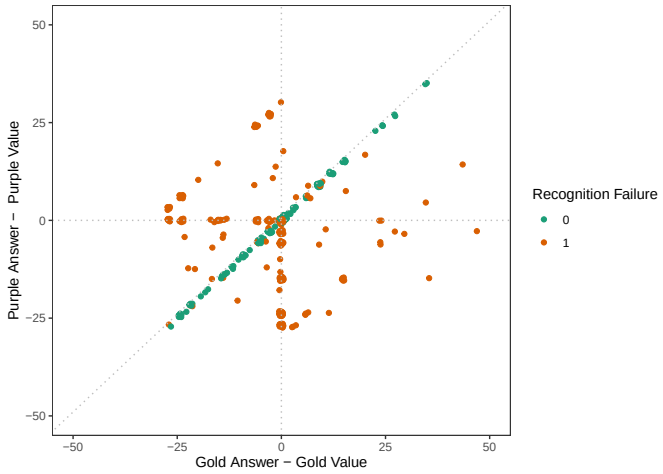


Figure A1: Main Experiment: Recognition and Table Entries Among Characterization Failures, Unmixed Risk-Free Tasks

Notes: Figure A1 shows responses for the values of gold and purple tickets in Option B relative to true values among subjects with characterization failures in Pre-Choice Risk-Free Unmixed tasks. The sample is restricted to cases with positive chances of gold and purple tickets and zero chance of blue tickets, so that distance to equal value corresponds to distance from recognizing the task as Risk-Free (532/637 characterization failures). Orange points denote recognition failures ($N = 293$), and green points denote recognition successes ($N = 239$). Eight extreme observations are excluded. Recognition failures far from the 45-degree line correspond to subjects assigning substantially different values to gold and purple tickets, while points far from $(0, 0)$ indicate large errors in characterizing the task.

Table A2: Overview of Follow-Up Experiments

	Experiment 2	**Experiment 3**	**Experiment 4**	**Experiment 5**	**Experiment 6**	**Experiment 7**
Task structure	5 Risky and 5 Risk-Free tasks in random order	5 Risky and 5 Risk-Free tasks in random order	10 Risky tasks followed by 10 Risk-Free tasks	10 Risky tasks and 10 Risk-Free tasks, block-randomized	10 Risky and 10 Risk-Free tasks in random order	20 tasks among Risky and Risk-Free; three versions of Risk-Free tasks
Characterization tables	Pre- and Post-Choice (unincentivized)	N/A	N/A	N/A	N/A	N/A
Confidence wording	"On a scale from 0 (not confident at all) to 100 (completely confident), how confident do you feel about this choice?"	"How certain are you (in %) that choosing [X] is actually your best decision, given your preferences and the available information?" w/ comprehension check	N/A	N/A	N/A	N/A
Stimuli	different	different	different	identical	different	different
Confidence decomposition	yes	yes	no	no	no	no
Reminders	no	no	yes	in one treatment	no	no
Explicit calculation of y and z	no	no	no	no	yes	yes
Follow-up questions	no	no	Math calculation	Math calculation & shortcuts w/ comprehension checks	no	no

A.2 Behavioral Differences Within Pre-Choice Conditions

We review behavioral differences between the Incentivized and Unincentivized Pre-Choice conditions in Experiment 1. Figure A2, Panels A and B, report the Risky tasks.

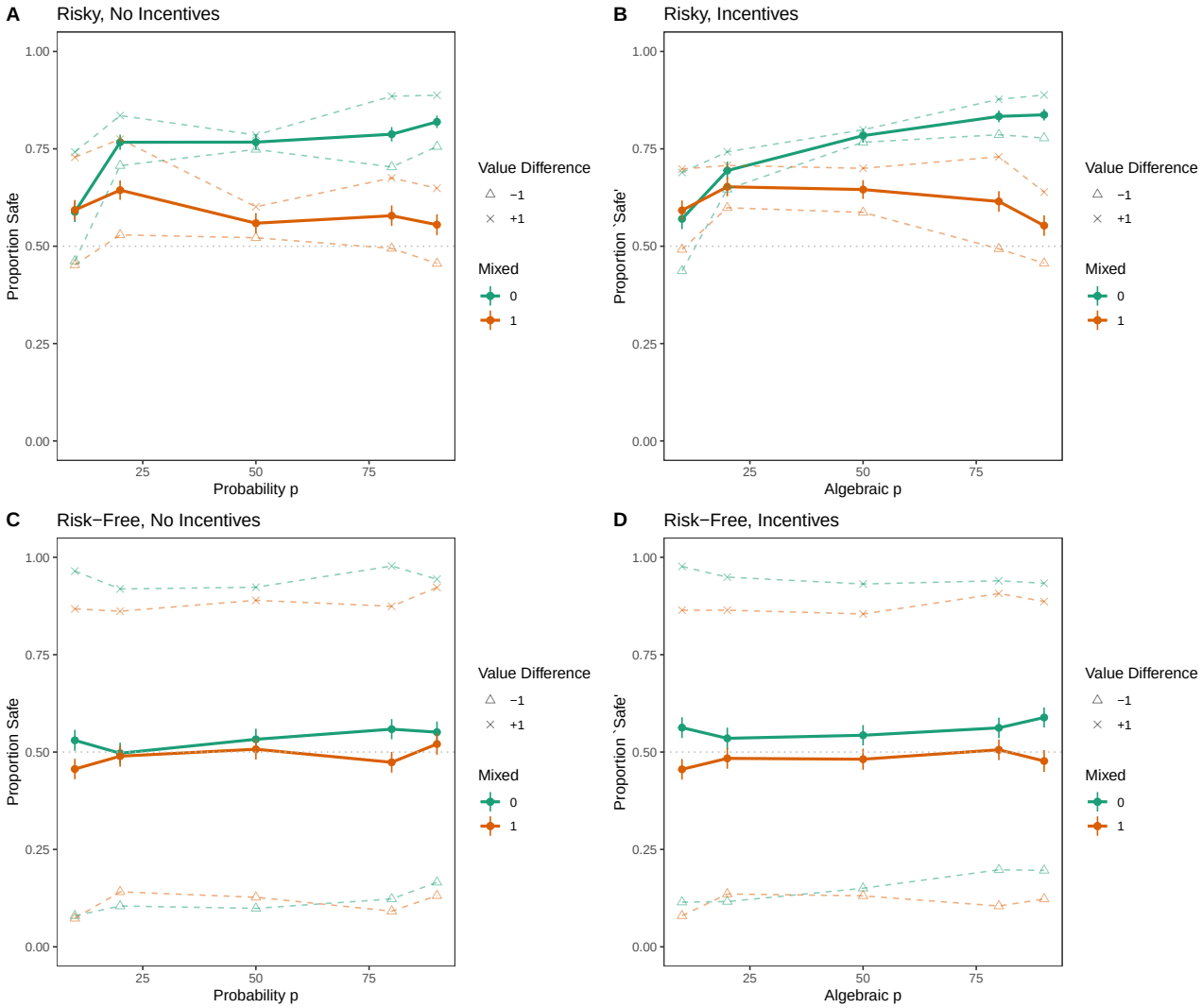


Figure A2: Experiment 1: Pre-Choice, No Incentives vs. Incentives

Notes: Figure A2 shows the proportion of choices for the Safe/"Safe" option in Unmixed tasks (green) and Mixed tasks (orange) under Pre-Choice conditions. Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel A reports Risky tasks without incentives ($N = 3{,}328$), Panel B Risky tasks with incentives ($N = 3{,}346$), Panel C Risk-Free tasks without incentives ($N = 3{,}332$), and Panel D Risk-Free tasks with incentives ($N = 3{,}314$).

Subjects show substantial risk aversion in both: those without incentives choose the safe option in 75% of Unmixed cases and those with incentives in 74% ($t = 0.1,\ p = 0.92$). They also display substantial CRE: 16%-age points without incentives and 13%-age points with incentives ($t = 1.2,\ p = 0.23$). Panels C and D report Risk-Free tasks. Behavior largely accords with

maximization in both: subjects without incentives (with incentives) maximize in 90% (89%) of cases ($t = 1.6,\ p = 0.10$). Maximization errors are similarly unsystematic, with limited evidence of pattern matching to Risky behavior. In Unmixed cases, subjects without incentives (with incentives) choose the "Safe" option in 53% (56%) of cases ($t = 1.4,\ p = 0.16$) and exhibit a CRE of 5%-age (8%-age) points ($t = 1.3,\ p = 0.23$).

The only incentive-related differences appear in characterization. In Risky tasks, subjects without incentives (with incentives) correctly characterized 87% (91%) of cases ($t = 5.4,\ p < 0.01$). In Risk-Free tasks, they did so in 76% (78%) of cases ($t = 2.0,\ p = 0.05$).[66]

A.3 Confidence and Risk-Free Choice

Figure A3 reproduces Figure 4 for Risk-Free Post-Choice tasks in Experiment 1.

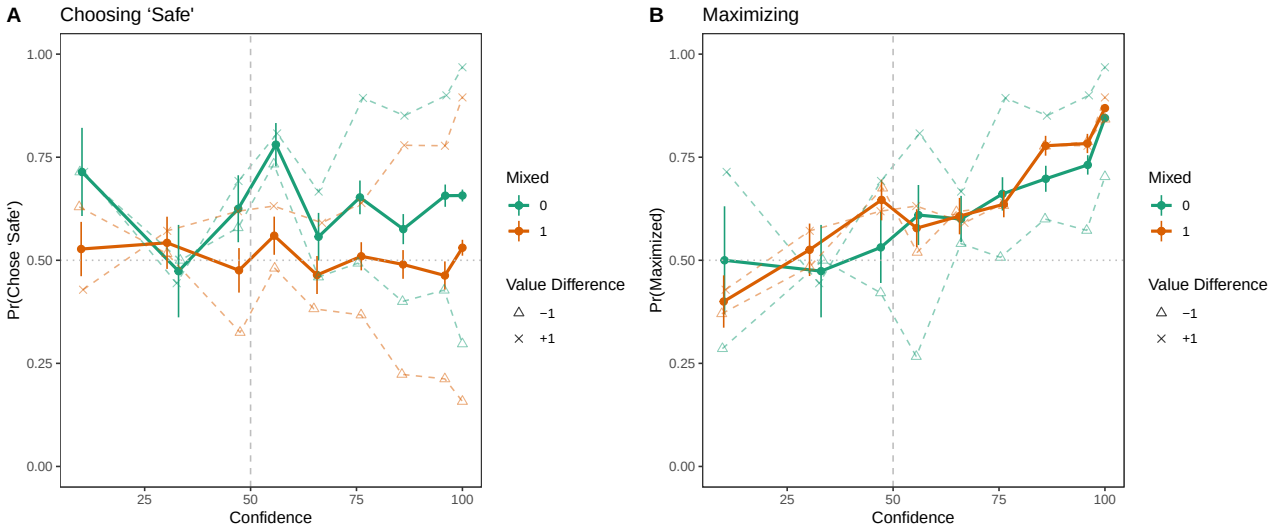


Figure A3: Main Experiment: Risk-Free Tasks and Confidence, Post-Choice Condition

Notes: Figure A3 shows behavior in Risk-Free tasks for subjects in the Post-Choice condition (N = 3,335). Panel A relates choice of the "Safe" option to stated confidence. Confidence is divided into nine bins, and within each bin both average confidence and the share choosing "Safe" are calculated. Results are shown separately for Unmixed tasks (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel B repeats this analysis using the proportion of subjects maximizing value.

Contrary to Risky choice, confidence is essentially uncorrelated with choosing the "Safe" option ($\rho = 0.04$, $p = 0.02$) but strongly correlated with maximizing expected value ($\rho = 0.25$, $p < 0.01$). Finally, confidence is slightly negatively correlated with accurate characterization tables in Risky choice ($\rho = -0.05$, $p < 0.01$) but positively correlated with accurate characterization in Risk-Free choice ($\rho = 0.20$, $p < 0.01$).

[66] This result does not hold once task characteristics and clustered errors are accounted for. Controlling for p, Mixed/Unmixed, and ±1 task features, the incentive coefficient is 0.02 (0.02), $t = 0.8,\ p = 0.41$.

A.4 Decision Confidence and Behavioral Attenuation

Enke and Graeber (2023) and Enke et al. (2024) link decision confidence to responsiveness to changes in problem fundamentals, generally finding that lower confidence is associated with reduced responsiveness ("attenuation"). Our $+1$ and -1 tasks shift fundamentals, allowing us to examine the relationship between confidence and attenuation. Figures 4 and A3 show heterogeneous responses to changes in the value of the Safe/"Safe" alternative: The most confident are the most responsive in Risk-Free tasks but the least responsive in Risky tasks. This latter result for Risky tasks is inconsistent with prior findings on attenuation.

To probe further, we study the link between $+1/-1$ responsiveness (change in choice) and confidence at the individual level in the Post-Choice condition. Figure A4 reports the results.

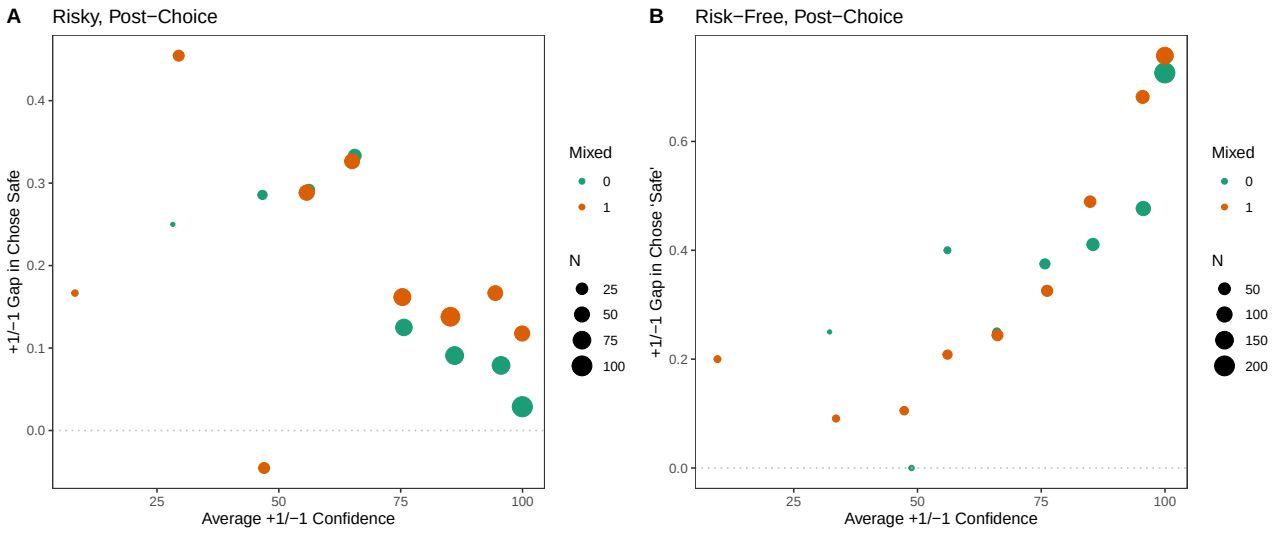


Figure A4: Experiment 1: Confidence and Attenuation, Post-Choice

Notes: Figure A4 shows Post-Choice Unmixed (green) and Mixed (orange) observations in which subjects completed both $+1$ and -1 versions of a task. Average confidence across the two versions is related to responsiveness, measured as the difference in choosing the "Safe" option in Risky (Panel A) and Risk-Free (Panel B) tasks. Confidence is divided into nine bins, with average confidence and responsiveness calculated within each.

Once again, we observe behavioral attenuation in Risk-Free tasks: Unmixed ($N = 417$, $\rho = 0.28$, $p < 0.01$) and Mixed ($N = 393$, $\rho = 0.35$, $p < 0.01$). On the contrary, we observe behavioral amplification in Risky tasks: Unmixed ($N = 396$, $\rho = -0.19$, $p < 0.01$) and Mixed ($N = 405$, $\rho = -0.11$, $p < 0.05$).

An important reason why our results may differ from those in the cognitive-uncertainty agenda is the wording of the confidence question. We assess this in Experiment 3, which adopts the confidence wording of Enke et al. (2024). As in Experiment 1, we find attenuation in Risk-Free tasks: Unmixed ($\rho = 0.31, p < 0.01$) and Mixed ($\rho = 0.26$, $p < 0.01$). We also find amplification in Risky tasks: Unmixed ($\rho = -0.12$, $p < 0.05$) and Mixed ($\rho = -0.02$, $p = 0.67$).

A.5 Evaluating the Effectiveness of Corrective Comprehension Questions

Recent debate in the literature (see, e.g., Banki et al., 2025; Oprea, 2025) focuses on comprehension questions with corrective feedback. For our purposes, the key issue is whether subjects who first err—potentially due to recognition failures—learn from correction and subsequently grasp the distinction between Risky and Risk-Free tasks. To examine this, we analyze evidence from Experiments 1 and 5, the latter using the same comprehension questions as Oprea (2025).

Experiment 1 includes a comprehension exercise with feedback when introducing the characterization tables. Because characterization is measured in every task, we can assess whether subjects who initially erred and were corrected learned from the experience. In the Pre-Choice condition, where the quiz precedes any decisions, 42% of subjects make at least one error (34% in the Risk-Free component, 19% in the Risky component). These errors strongly predict subsequent characterization and recognition failures, as well as choice errors. Subjects with a Risk-Free comprehension error exhibit characterization failures in 42% of Risk-Free tables (vs. 13% without errors, $t = 24.4,\ p < 0.01$), recognition failures in 27% (vs. 5%, $t = 21.9,\ p < 0.01$), and maximization failures in 18% (vs. 7%, $t = 12.9,\ p < 0.01$). They also display greater small-stakes "risk aversion" (60% vs. 52% Safe in Unmixed tasks, $t = 4.2,\ p < 0.01$) and larger "CRE" (11 vs. 4 %-age points, $t = 2.7,\ p < 0.01$) in Risk-Free tasks.

The findings in Experiment 5 are consistent with those in Experiment 1. Comprehension quiz errors in Experiment 5 strongly predict maximization errors in Risk-Free tasks, even though mistakes were corrected. Moreover, subjects who err on the quiz are more likely to invoke risk considerations when asked to describe their decision-making approaches after their choices. Overall, corrective comprehension quizzes of this form seem unlikely to eliminate characterization failures, recognition failures, maximization failures, and the corresponding systematic choice errors that emerge in Risk-Free tasks.

A.6 Additional Results from Experiment 2

In what follows, Appendix A.6.1 reports subjects' behavior in Experiment 2, Appendix A.6.2 links it to recognition failures, Appendix A.6.3 examines its relationship with confidence, and Appendix A.6.4 analyzes the reported rationales for less-than-complete decision confidence.

A.6.1 Experiment 2: Behavioral Patterns

Experiment 2 studies rationales for low confidence using the same Unincentivized Pre-Choice and Post-Choice designs as in Experiment 1, but with 5 Risky and 5 Risk-Free tasks (10 total) instead of 20. Figure A5 shows results by condition and replicates the main behavioral patterns.

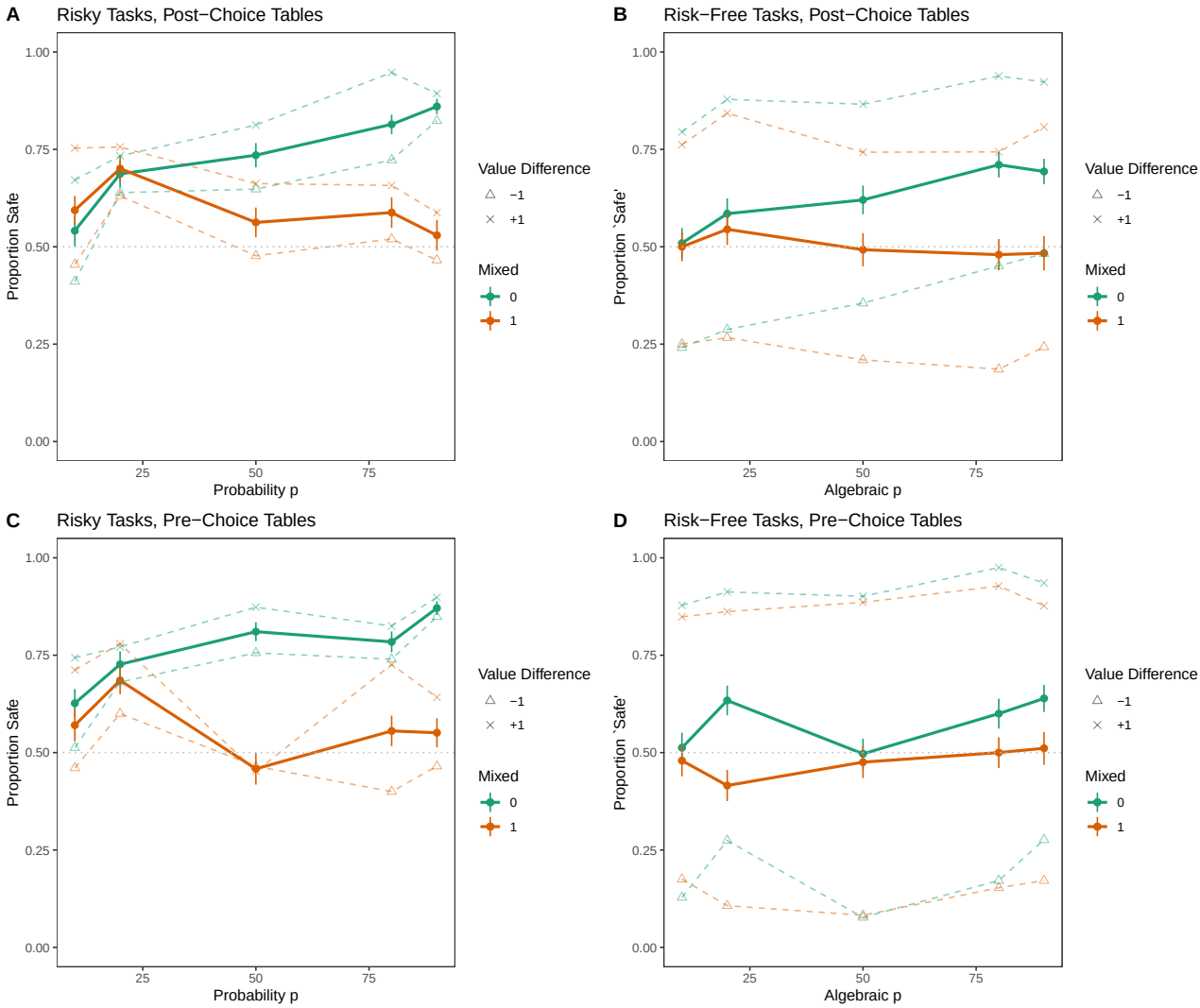


Figure A5: Experiment 2: Post-Choice and Pre-Choice conditions

Notes: Figure A5 shows the proportion of choices for the Safe/"Safe" option in Unmixed tasks (green) and Mixed tasks (orange) in Experiment 2. Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panels A and C report Risky tasks in the Post-Choice and Pre-Choice conditions, respectively; Panels B and D report Risk-Free tasks in the Post-Choice and Pre-Choice conditions, respectively. The sample size in each panel is $N = 1{,}500$.

We find small-stakes risk aversion (73% Safe in Unmixed) and a CRE of 13%-age points in the Post-Choice Risky tasks (Panel A). Panel B shows similar patterns in Risk-Free choice (62% "Safe" in Unmixed; CRE = 12%-age points). As in Experiment 1, Pre-Choice characterization tables substantially affect Risk-Free behavior: Objective maximization failures occur in 23% of Post-Choice vs. 13% of Pre-Choice observations ($t = 7.7$, $p < 0.01$). Accordingly, Pre-Choice observations display less pattern matching. In Risky choice, we again find small-stakes risk aversion (76% Safe in Unmixed; CRE = 20%-age points), but these effects are weaker in

Risk-Free choice (58% "Safe"; CRE = 10%-age points). Panels C and D illustrate these results.

Mean behavioral differences between Pre- and Post-Choice in Risk-Free tasks are modest (4%-age points for "Safe" in Unmixed; 2%-age points for the CRE), but become clearer once we control for task characteristics. Regressing "Safe" choice on condition interacted with Mixed/Unmixed, and controlling for p and ± 1 task features, yields a Post-Choice coefficient of 0.07 (clustered s.e. $= 0.02$; $t = 3.2$, $p < 0.01$). The interaction of Mixed and Post-Choice is -0.06 (clustered s.e. $= 0.03$; $t = 2.2$, $p = 0.03$).

A.6.2 Experiment 2: Recognition Failures

As in Experiment 1, recognition failures remain a key driver of errors in Risk-Free choice in Experiment 2. Figure A6 reproduces Figure 8 using the Pre-Choice tasks of Experiment 2.

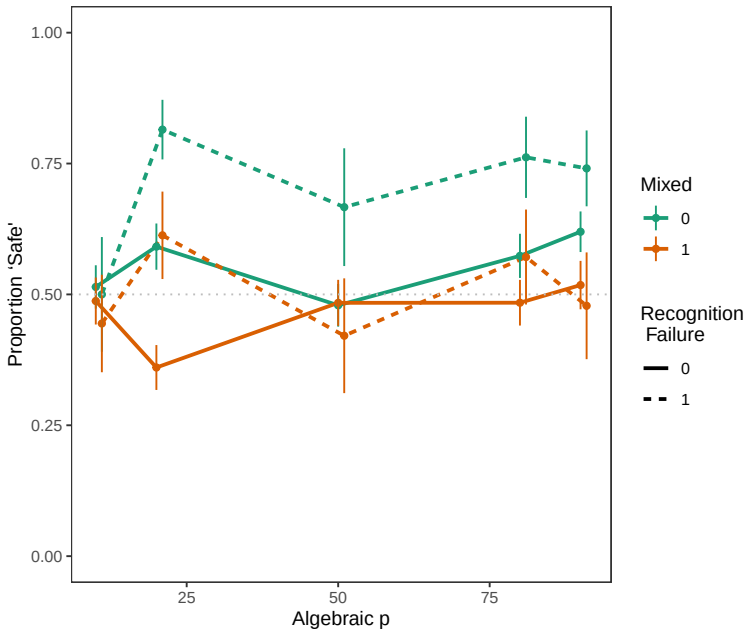


Figure A6: Experiment 2: Risk-Free Tasks and Recognition Failures, Pre-Choice Condition

Notes: Figure A6 shows the proportion of choices for the "Safe" option in Unmixed tasks (green) and Mixed tasks (orange). Bars represent ±1.96 standard errors (95% CIs). Solid and dashed lines indicate averages without and with recognition failures, respectively.

In total, 27% of Risk-Free characterization tables contain errors in Pre-Choice tasks, with 58% of these errors being recognition failures—closely matching Experiment 1. Recognition failures again relate to Risk-Free choice: observations without (with) failures choose the "Safe" option in 55% (71%) of Unmixed tasks ($t = 3.0$, $p < 0.01$), exhibiting a "CRE" of 9%-age points (19%-age points) ($t = 1.5$, $p = 0.13$).[67]

[67]Regressing "Safe" choice on recognition interacted with Mixed/Unmixed, controlling for p and ± 1 task

A.6.3 Experiment 2: Confidence and Behavior

The relationship between confidence and choice in Experiment 2 echoes that in Experiment 1. Figure A7, Panels A and B, reproduce Figure 4 for Post-Choice Risky tasks.

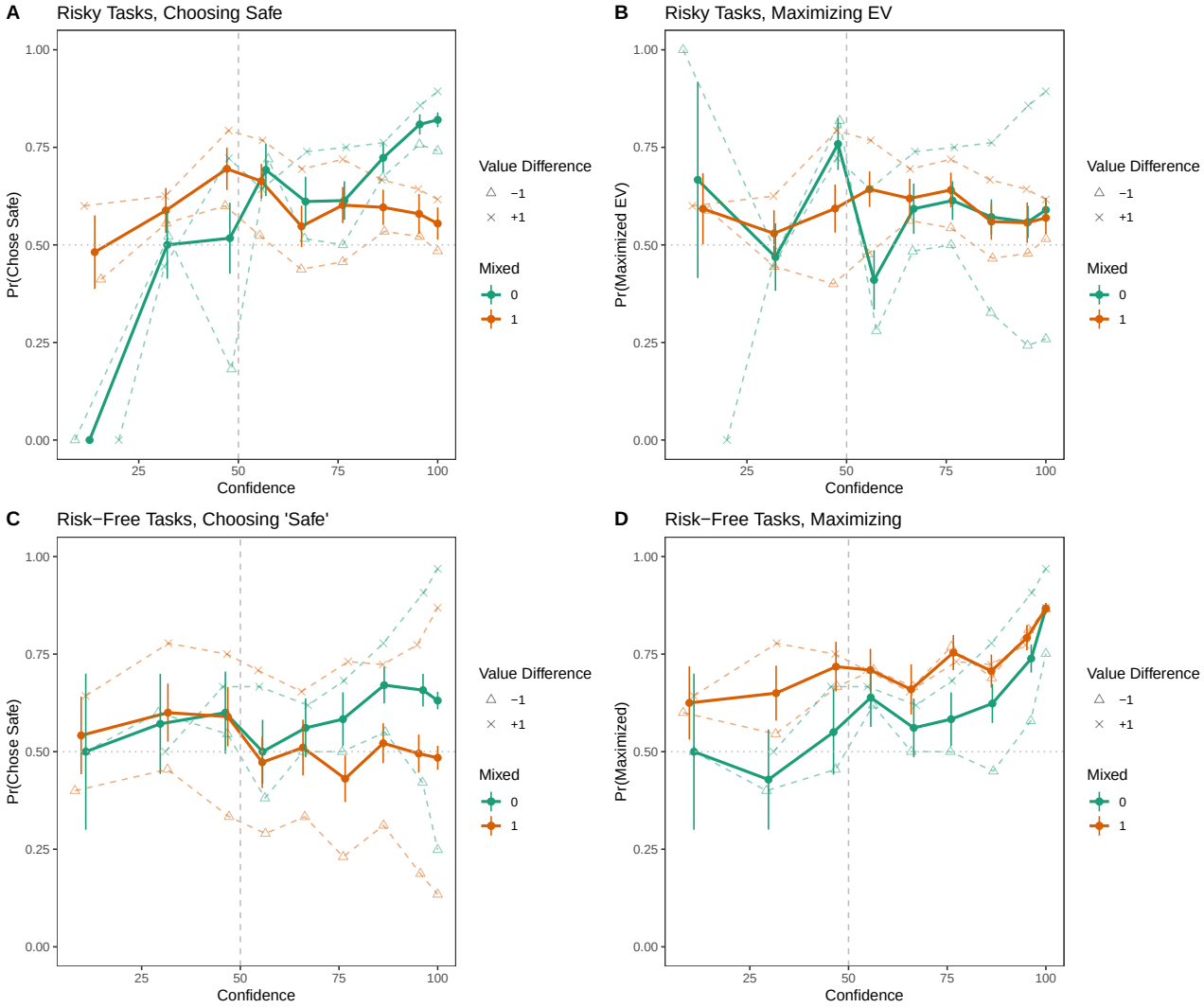


Figure A7: Experiment 2: Confidence and Behavior, Risky and Risk-Free Post-Choice Tasks

Notes: Figure A7 shows behavior in Risky tasks ($N = 1{,}500$) and Risk-Free tasks ($N = 1{,}500$) for subjects in the Post-Choice condition. Panels A and C relate choice of the Safe/"Safe" option to stated confidence in Risky and Risk-Free tasks, respectively. Confidence is divided into nine bins, with average confidence and the share choosing Safe computed within each. Results are shown separately for Unmixed tasks (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panels B and D repeat the analysis of Panels A and C using the proportions of subjects maximizing expected value.

Confidence correlates positively with choosing the Safe option in Unmixed tasks ($\rho = 0.24$,

features, the recognition coefficient is -0.16 (clustered s.e.=0.05; $t = 3.0$, $p < 0.01$). The Mixed×recognition interaction is 0.12 (s.e.=0.07; $t = 1.7$, $p = 0.10$).

$p < 0.01$) but not in Mixed tasks ($\rho = -0.03$, $p = 0.44$). By contrast, expected value maximization is uncorrelated with confidence in both Unmixed tasks ($\rho = 0.02$, $p = 0.62$) and Mixed tasks ($\rho = -0.01$, $p = 0.73$). Figure A7, Panels C and D, reproduce Figure A3 for Risk-Free tasks in the Post-Choice condition. Relative to Risky choice, the correlations with confidence reverse: in Risk-Free choice, confidence is essentially uncorrelated with choosing the "Safe" option ($\rho = 0.02$, $p = 0.44$) but strongly correlated with maximizing value ($\rho = 0.19$, $p < 0.01$).

A.6.4 Experiment 2: Rationales for less-than-complete confidence

The results in the main text for Experiment 2 on rationales for less-than-complete confidence hold for the 83% of subjects who passed the classification test on these rationales. Figure A8 replicates Figure 6 for this subsample, showing that improvable rationales are ranked as most important in 49% of cases in Risk-Free choice, but only 19% of cases in Risky choice.

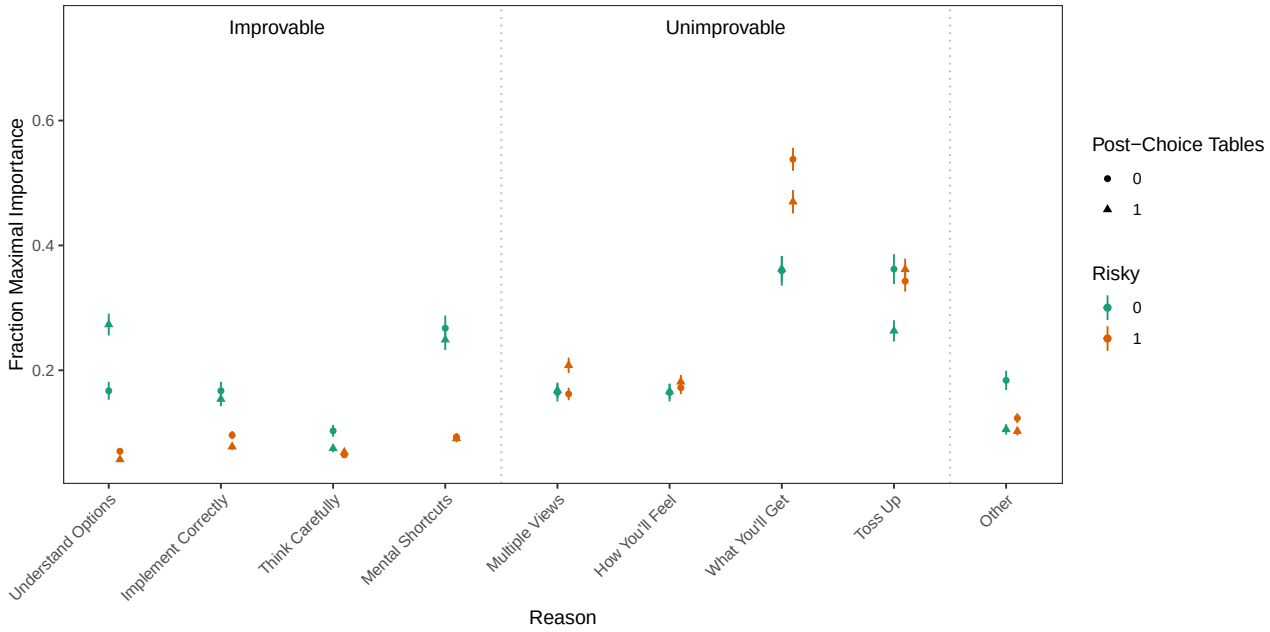


Figure A8: Experiment 2: Confidence Decomposition, Passed Classification Test

Notes: Figure A8 shows how frequently rationales for less-than-complete confidence are rated most important by subjects in the rationalization sample of Experiment 2 who passed the related quiz. Results are shown separately for Risky (orange, $N = 1{,}380$) and Risk-Free (green, $N = 853$) choices, and for Post-Choice (triangles, $N = 1{,}364$) and Pre-Choice (circles, $N = 1{,}184$) conditions; bars represent ± 1.96 standard errors (95% CIs). Unbalanced subsamples reflect complete confidence being more frequent in Risk-Free than in Risky choices.

A.7 Additional Results from Experiment 3

Experiment 3 followed the design of Experiment 2 in eliciting rationales for less-than-complete confidence, but adopted the confidence wording and the comprehension question on the purpose

of confidence elicitation from Enke et al. (2024). Because it excluded characterization tables, it is most comparable to the Post-Choice condition of Experiments 1 and 2. Figure A9 reproduces pattern-matching across Risky and Risk-Free tasks: Subjects choose the safe option in 68% of Unmixed cases and exhibit a CRE of 15%-age points; in Risk-Free tasks, they choose "Safe" in 61% of Unmixed cases and exhibit a CRE of 12%-age points.

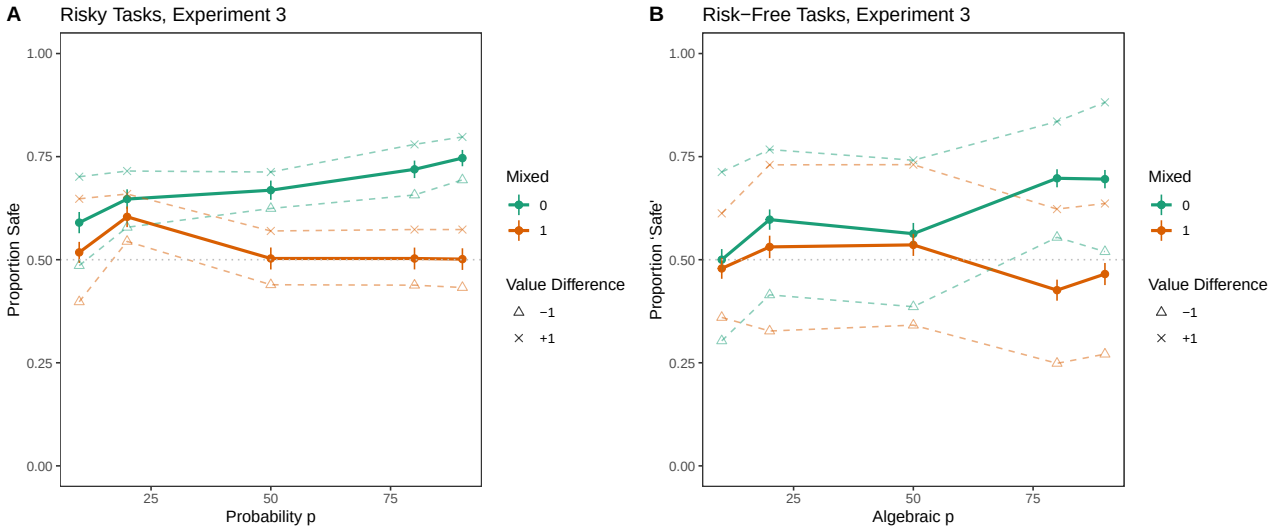


Figure A9: Experiment 3: Risky and Risk-Free Tasks

Notes: Figure A9 shows the proportion of choices for the Safe/"Safe" option in Unmixed tasks (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel A reports Risky tasks (N = 3,490) and Panel B Risk-Free tasks (N = 3,490) for subjects in Experiment 3.

Figure A10 relates the alternative confidence measure to choice. As in Experiments 1 and 2, correlations differ between by task type. In Risky tasks, confidence correlates with choosing the Safe option in Unmixed tasks ($\rho = 0.21$, $p < 0.01$) but not in Mixed tasks ($\rho = 0.02$, $p = 0.46$), and the correlation with expected value maximization is negligible in both Unmixed ($\rho = 0.0001$, $p = 0.97$) and Mixed tasks ($\rho = 0.002$, $p = 0.92$). In Risk-Free tasks, by contrast, confidence is only weakly correlated with choosing "Safe" ($\rho = 0.05$, $p < 0.01$) but strongly correlated with maximizing expected value ($\rho = 0.20$, $p < 0.01$).

Figure A11 reproduces Figure 6 for Experiment 3, presenting the confidence decomposition. As in Experiment 2, subjects often attribute less-than-complete confidence in Risky choice to unimprovable rationales; even with the Enke et al. (2024) training question clarifying that confidence should not reflect payment likelihood (97% passed on the first attempt), they frequently cite "Can't Know For Sure What You'll Get" as the most important rationale, selecting it in 45% of such tasks (closely paralleling Experiment 2).

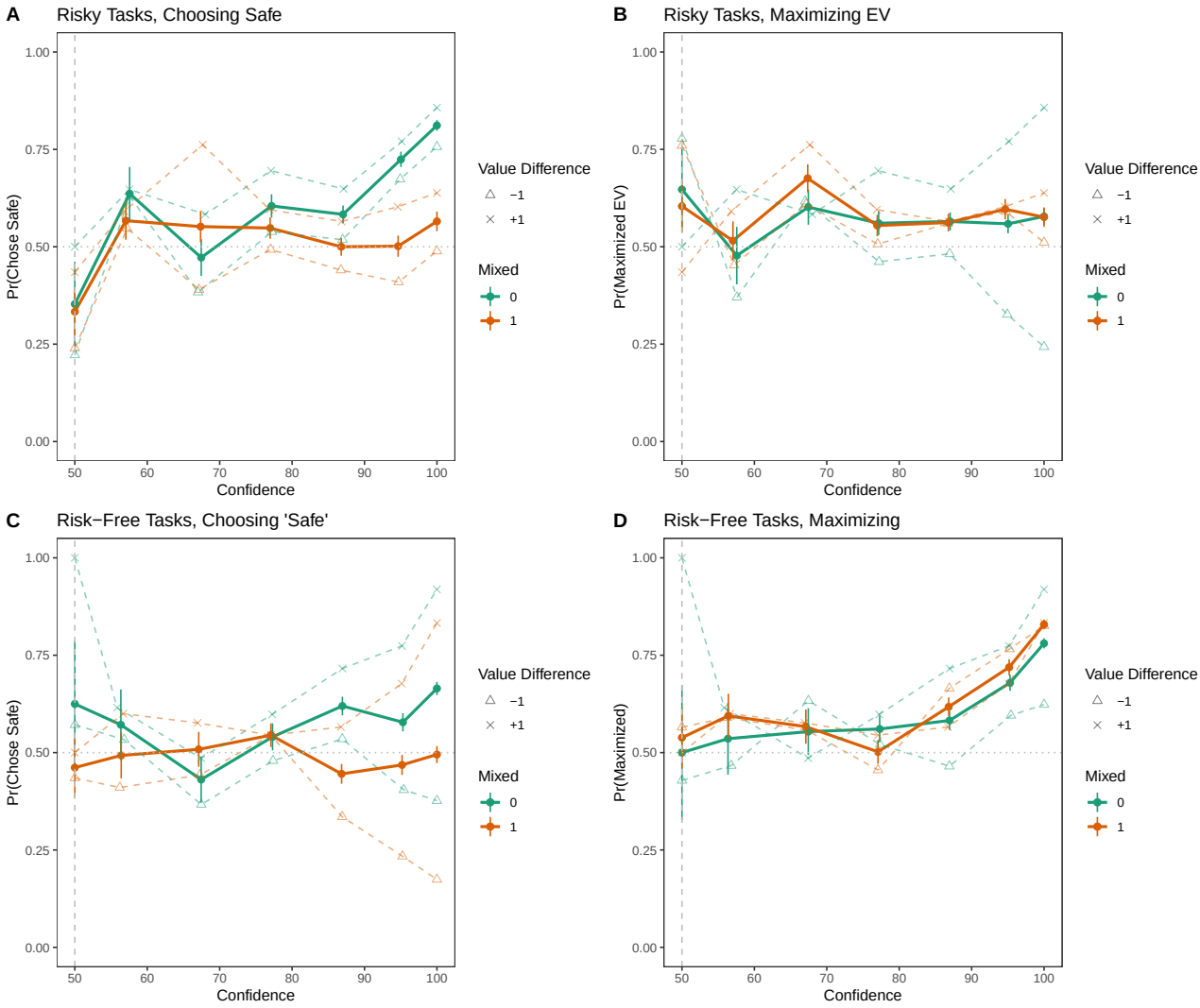


Figure A10: Experiment 3: Confidence and Behavior, Risky and Risk-Free Post-Choice Tasks

Notes: Figure A10 shows Experiment 3 behavior in Risky and Risk-Free tasks (each $N = 3{,}490$). Panels A and C relate choice of the Safe/"Safe" option to stated confidence in Risky and Risk-Free tasks, respectively. Confidence is binned into nine intervals; within-bin averages of confidence and the Safe share are shown separately for Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles denote $+1$ and -1 tasks, while dark shaded circles indicate sample averages. Bars represent ± 1.96 standard errors (95% CIs). Panels B and D repeat the analysis of Panels A and C using the proportion of subjects maximizing expected value.

A.8 Additional Results from Experiment 4

Experiment 4 used a blocked design (10 Risky tasks, then 10 Risk-Free tasks) and explicitly distinguished Risk-Free tasks by stating that there was no risk and all tickets paid the same amount. Figure A12 reports the basic pattern-matching results (described in the main text)

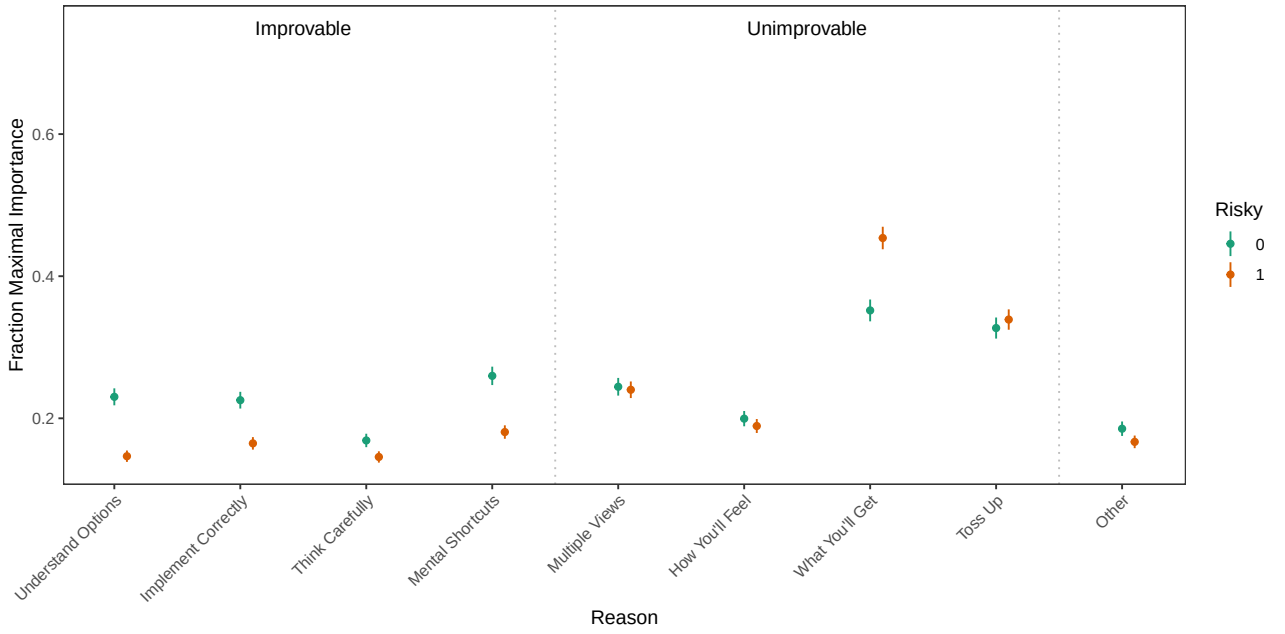


Figure A11: Experiment 3: Confidence Decomposition

Notes: Figure A11 shows the most important rationales for less-than-complete confidence in subjects' three least confident Risky choices (orange, $N = 941$) and Risk-Free choices (green, $N = 847$). Unbalanced subsamples reflect complete confidence being more frequent in Risk-Free than in Risky choices. Bars represent ± 1.96 standard errors (95% CIs).

and shows notably less pattern matching than Experiment 1's Post-Choice condition.[68]

After each block, subjects indicated whether they used mathematical calculations and, if not, why not. Figure A13 shows that the 245 subjects (82% of the sample) reporting calculations in Risk-Free tasks exhibit no anomalous Risk-Free pattern, while their Risky choices display the familiar small-stakes risk aversion and CRE observed in our other studies.

Of the 55 subjects reporting no calculations, 29 (10% of the sample) viewed them as unnecessary in Risk-Free tasks (consistent with recognition failure) and 22 (7% of the sample) as too effortful. Figure A14, Panels A and B, show behavior in Risky and Risk-Free tasks for the first subgroup, and Panels C and D for the second. In both subgroups, we observe evidence of anomalous choice patterns in Risk-Free tasks alongside pattern matching in Risky tasks.

A.9 Additional Results from Experiment 5

In what follows, Appendix A.9.1 reports behavior in the first block of Experiment 5 and contrasts the enhanced recognition and baseline treatments. Appendix A.9.2 analyzes answers to calculation questions and their correlation with choice. Appendix A.9.3 examines self-reported

[68] Experiment 4 did not collect confidence judgments, so we cannot study the relationship between confidence and Risky/Risk-Free choice as in Experiments 1, 2 and 3.

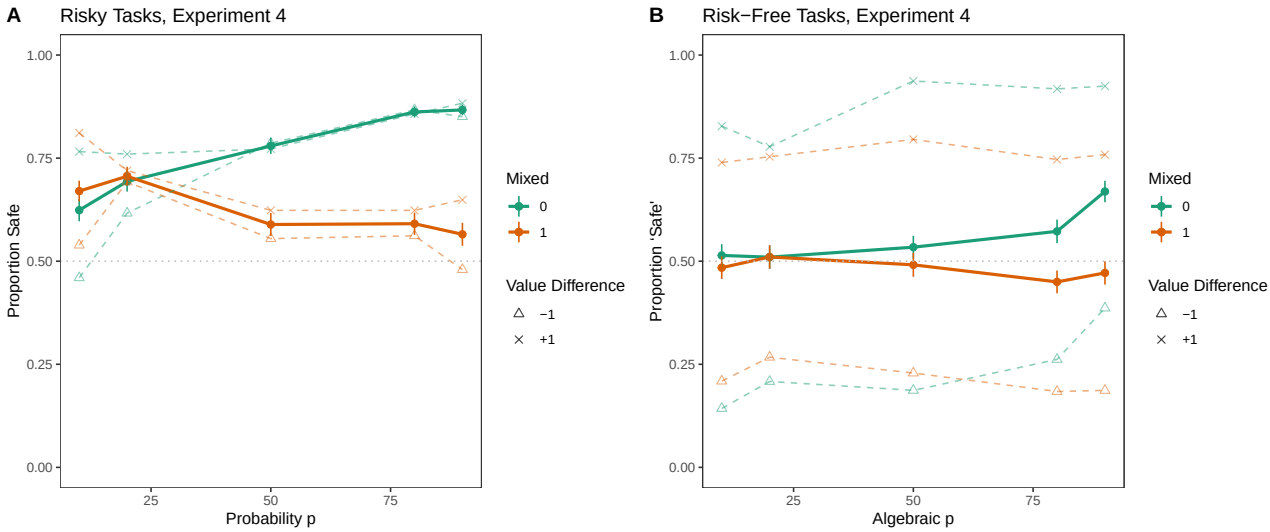


Figure A12: Experiment 4: Risky and Risk-Free Tasks

Notes: Figure A12 shows the proportion of choices for the Safe/"Safe" option in Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, respectively; dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panels A and B show Risky and Risk-Free tasks (each $N = 3{,}000$) for Experiment 4 subjects.

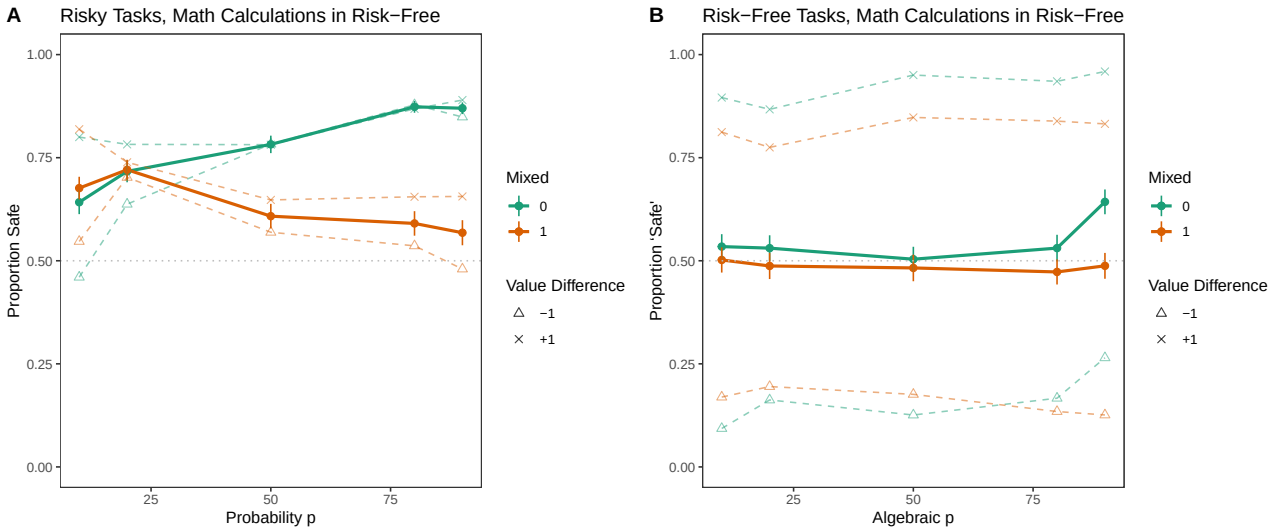


Figure A13: Experiment 4: Subjects Reporting Math Calculations in Risk-Free Tasks

Notes: Figure A13 shows the proportion of choices for the Safe/'Safe' option for Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles correspond to +1 and −1 tasks, respectively; dark shaded circles correspond to sample averages. Bars represent ±1.96 standard errors (95% CIs). Panels A and B show Risky and Risk-Free tasks (each $N = 2{,}450$) for Experiment 4 subjects reporting calculations in Risk-Free tasks.

reliance on shortcuts and its correlation with choice. Appendix A.9.4 explores whether subjects' shortcut descriptions reveal risk-preferences considerations in Risk-Free tasks. Appendix A.9.5 reports behavior in the second block of Experiment 5, highlighting potential order effects.

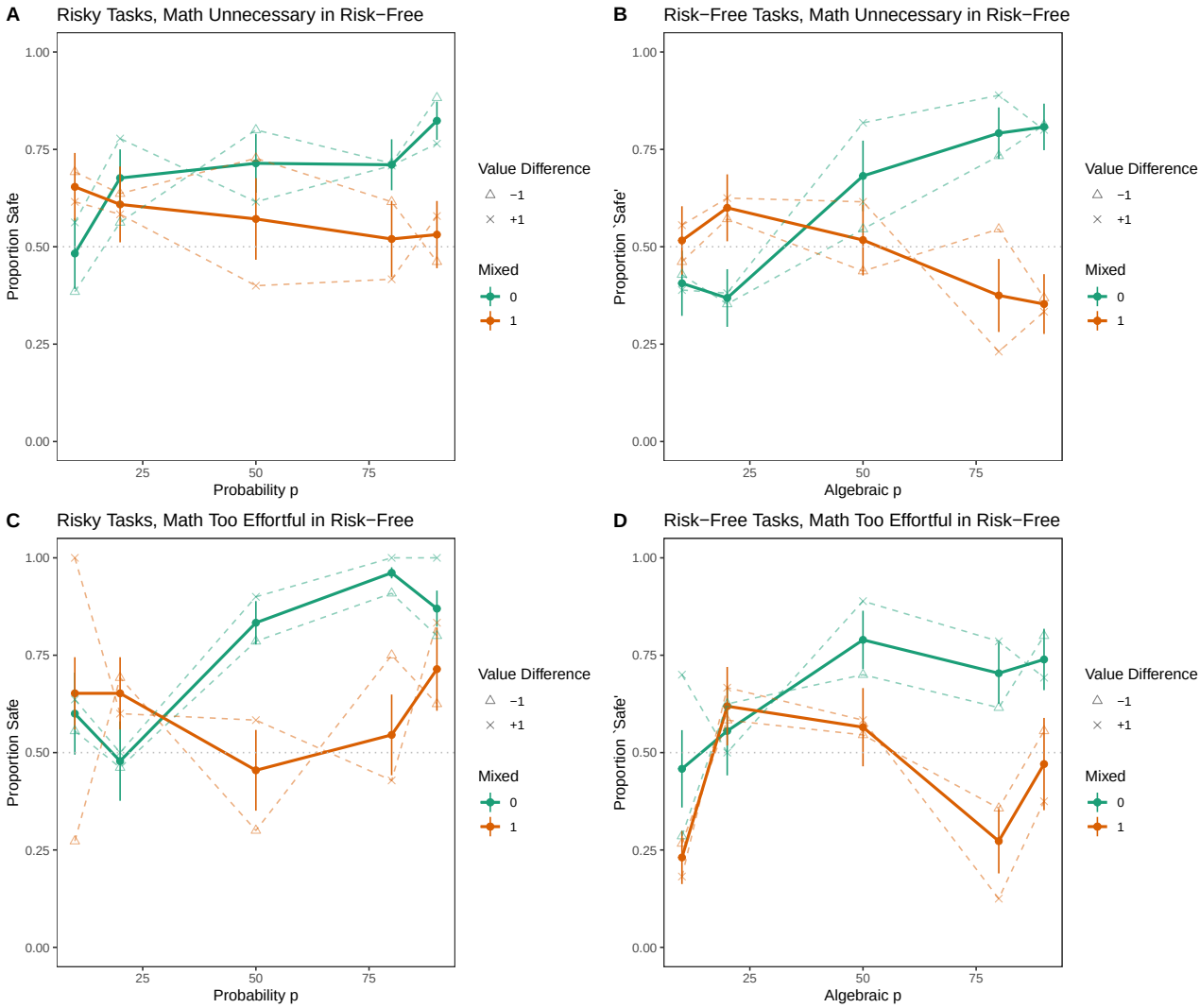


Figure A14: Experiment 4: No Calculations in Risk-Free Tasks

Notes: Figure A14 shows the proportion of choices for the Safe/"Safe" option in Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks; dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panels A and B show Risky and Risk-Free tasks (each $N = 290$) for subjects reporting no calculations in Risk-Free tasks because unnecessary. Panels C and D show Risky and Risk-Free tasks (each $N = 220$) for subjects reporting no calculations because too effortful.

A.9.1 Experiment 5: Treatment Comparison

Experiment 5 included two dimensions of randomization: subjects were assigned either Risky or Risk-Free tasks in their first block and, independently, to an enhanced recognition treatment and a baseline treatment. In the main text, we reported results from first block observations in these two conditions, showing limited evidence of pattern matching in a between-subjects analysis. Figures A16 and A15 report the corresponding pattern matching figures.

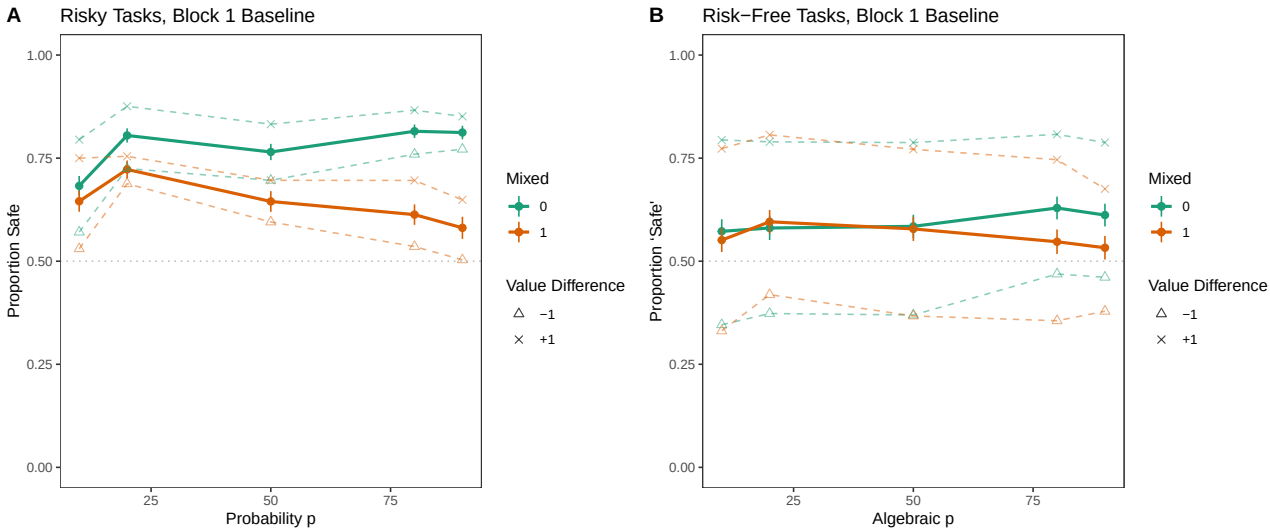


Figure A15: Experiment 5, Block 1 Baseline: Risky and Risk-Free Tasks

Notes: Figure A15 shows the proportion of choices for the Safe/"Safe" option for Unmixed (green), and Mixed tasks (orange). Light shaded exes and triangles correspond to +1 and −1 tasks; dark shaded circles correspond to sample averages. Bars represent ±1.96 standard errors (95% CIs). Panels A and B show Risky ($N = 2{,}760$) and Risk-Free ($N = 3{,}240$) Block 1 tasks for subjects in the baseline condition of Experiment 5.

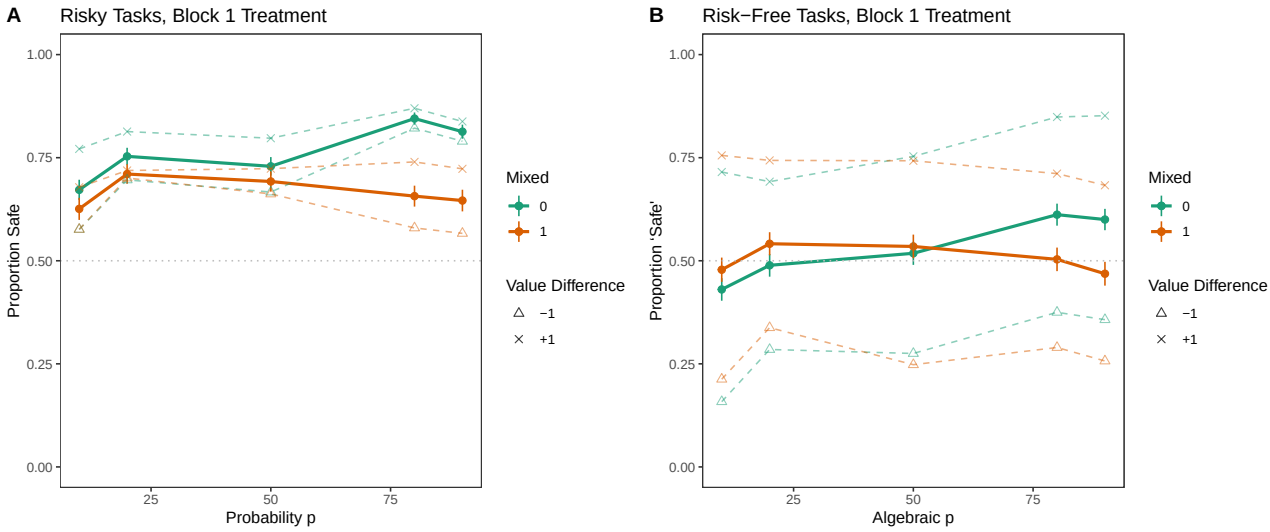


Figure A16: Experiment 5, Block 1 Enhanced Recognition: Risky and Risk-Free Tasks

Notes: Figure A16 shows the proportion of choices for the Safe/'Safe' option for Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles correspond to +1 and −1 tasks; dark shaded circles correspond to sample averages. Bars represent ±1.96 standard errors (95% CIs). Panels A and B show Risky ($N = 2{,}990$) and Risk-Free ($N = 3{,}010$) tasks for Block 1 subjects in the enhanced recognition condition of Experiment 5.

A.9.2 Experiment 5: Mathematical Calculations

As in Experiment 4, after each block of tasks in Experiment 5 we asked subjects whether they engaged in mathematical calculations and, if not, why not. Figure A17 presents Risk-Free Block 1 data for the 70% of subjects who reported engaging in calculations (404/577), the 18% who reported not engaging because calculations were unnecessary (101/577), and the 10% who reported not engaging because they required too much effort (58/577).

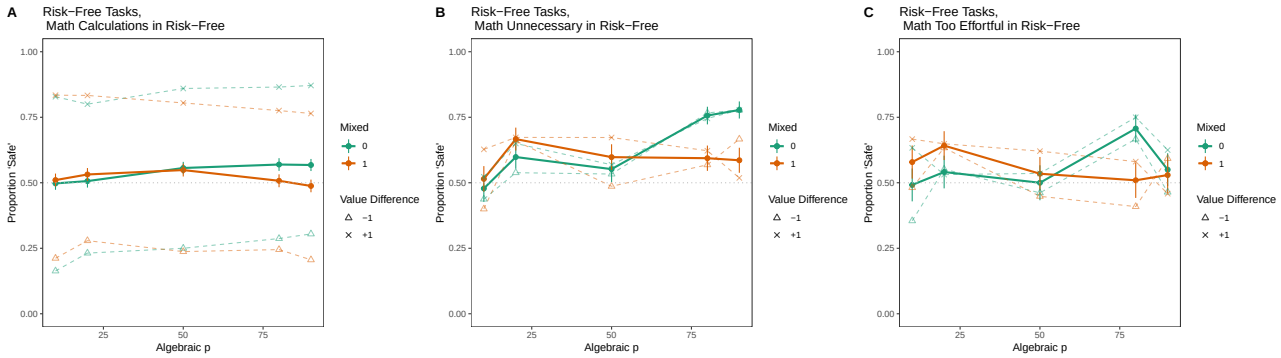


Figure A17: Experiment 5: Risk-Free Tasks and Mathematical Calculations, Block 1

Notes: Figure A17 shows the proportion of choices for the "Safe" option in Unmixed tasks (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel A reports subjects who engaged in mathematical calculations in Block 1 Risk-Free tasks of Experiment 5 (N = 4,040). Panel B reports subjects who did not calculate because they considered it unnecessary (N = 1,010). Panel C reports subjects who did not calculate because it was too effortful (N = 580).

Subjects who reported making calculations in Risk-Free tasks do not exhibit anomalous patterns: they chose "Safe" in 54% of Unmixed tasks and exhibited a CRE of 2%-age points. Subjects who reported not making calculations because they were unnecessary exhibit more errors and systematic anomalies: they chose "Safe" in 64% of Unmixed tasks and exhibited a CRE of 5%-age points. Subjects who reported not making calculations because they required too much effort often erred in their Risk-Free choices, but the errors were not systematic: they chose "Safe" in 56% of Unmixed tasks and exhibited a CRE of –0.5%-age points.

A.9.3 Experiment 5: Shortcuts

In Experiment 5, after each block subjects also reported whether they had used mental shortcuts. In Block 1 Risk-Free tasks, 26% (151/577) reported doing so. Figure A18 presents the Risk-Free data separately for those who did and did not report shortcut use.

Subjects who did not report shortcuts show no anomalies: they choose "Safe" in 54% of Unmixed tasks and exhibit a CRE of 1%-age point. By contrast, subjects who reported shortcuts make more errors and display systematic anomalies: they choose "Safe" in 61%

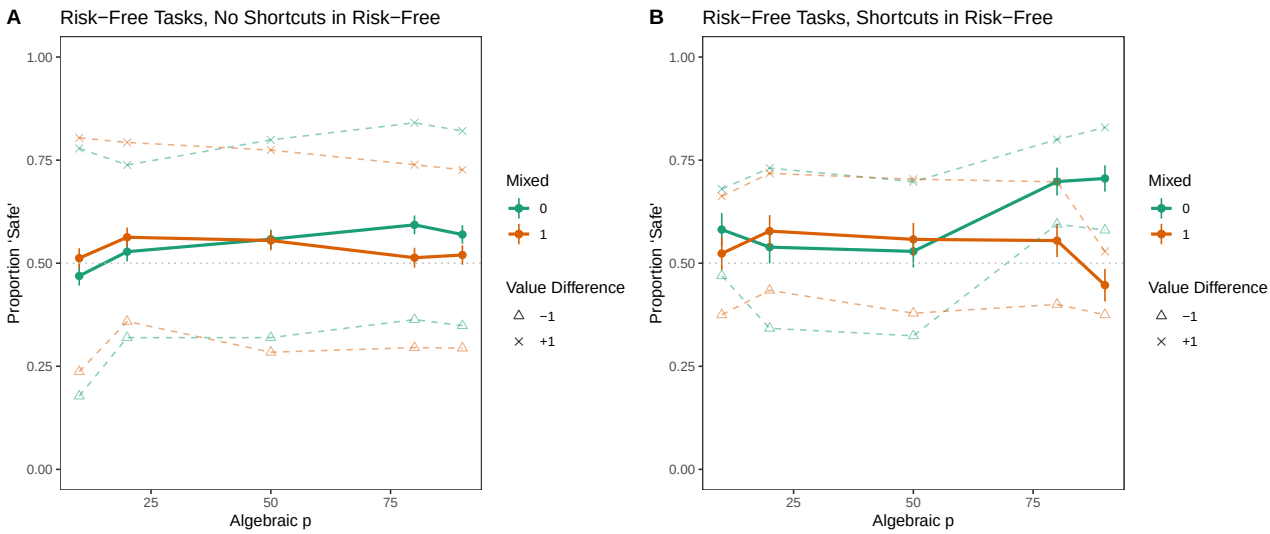


Figure A18: Experiment 5: Risk-Free Tasks and Mental Shortcuts, Block 1

Notes: Figure A18 shows the proportion of choices for the "Safe" option in Unmixed tasks (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel A reports subjects who did not use mental shortcuts in Block 1 Risk-Free tasks of Experiment 5 (N = 4,260), and Panel B reports subjects who did (N = 1,510).

of Unmixed tasks and exhibit a CRE of 8%-age points. These subjects are thus plausible candidates for pattern matching. However, as noted in the text, they do not exhibit similar patterns in their Block 2 Risky behavior.

A.9.4 Experiment 5: Text Analysis of Subjects' Descriptions of their Shortcuts

In Experiment 5, when subjects reported using shortcuts, we asked them to describe their shortcuts using an example task.[69] To explore the nature of these shortcuts, we examined subjects' explanations. A striking feature of the text data for Risk-Free tasks is that subjects often referred to their attitudes toward risk when describing their shortcuts—either by characterizing the options as lotteries or by expressing uncertainty about the guaranteed payment. We refer to such descriptions in Risk-Free tasks as "risky shortcuts."

To identify risky shortcuts, we provided ChatGPT-5 Pro with the description of each shortcut reported after Block 1 and asked whether perceived risk or uncertainty in Risk-Free tasks affected subjects' decision-making.[70] ChatGPT-5 Pro could respond "Yes," "Uncertain," or "No," and we coded a shortcut as risky whenever the response was "Yes." Using this strategy,

[69] We had intended the example task to be one the subject had previously completed, but due to a coding error all subjects saw the same fixed task. As a result, for about half the sample the example task was one they had completed, and for the other half it was not.

[70] Appendix B.2.2 provides the prompt used to classify the 151 shortcuts reported in Block 1 Risk-Free tasks.

we find that 36% of subjects who described shortcuts in Block 1 Risk-Free tasks had risky shortcuts. In the main text, we show that subjects with inferred risky shortcuts are more likely to fail to maximize expected value in Risk-Free tasks, and more likely to exhibit small-stakes risk aversion and CRE. Figure A19 illustrates these results.

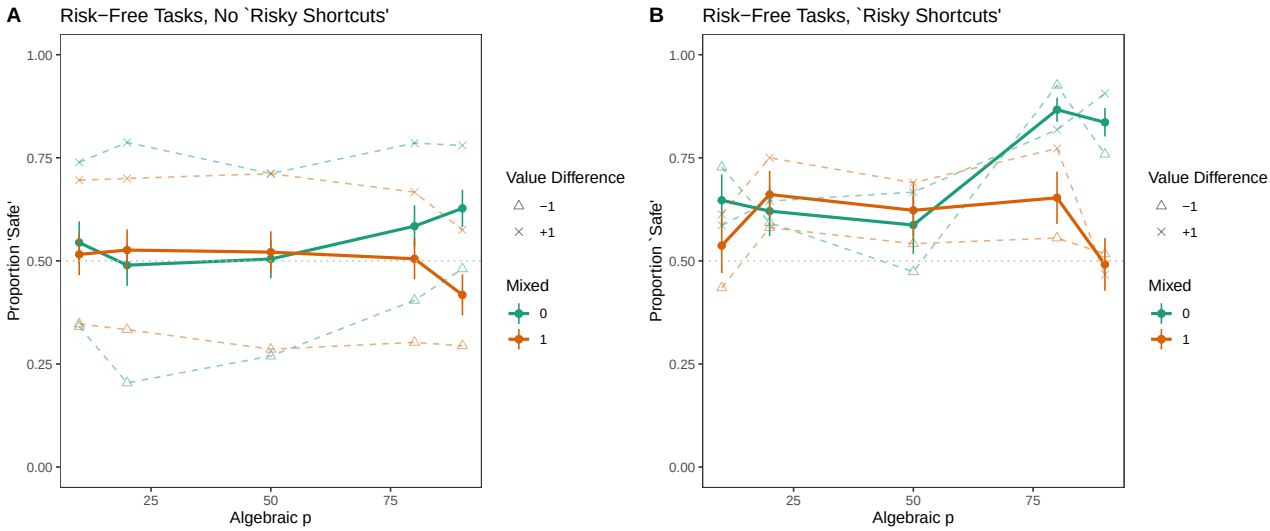


Figure A19: Experiment 5: Risk-Free Behavior and "Risky Shortcuts," Block 1

Notes: Figure A19 shows the proportion of choices for the "Safe" option in Unmixed (green) and Mixed tasks (orange). Light-shaded Xs and triangles denote +1 and −1 tasks, while dark-shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel A reports subjects without an inferred "risky shortcut" from their Block 1 descriptions ($N = 960$), and Panel B reports subjects with an inferred "risky shortcut" ($N = 550$) in Experiment 5.

A.9.5 Experiment 5: Order Effects

Turning to behavior in the second block of Experiment 5, we find substantial order effects: completing Risky tasks in Block 1 influences subsequent Risk-Free behavior in Block 2, and vice versa. Figure A20 presents Block 2 results. Risky choice differs markedly by order. In Block 1, subjects show the standard patterns of small-stakes risk aversion and the CRE, but in Block 2 these behaviors are much less prevalent: subjects choose the Safe option in 66% of Unmixed tasks and exhibit a CRE of only 0.7%-age points. Risk-Free choice is also strongly affected by order. While subjects make objective errors in 29% of Block 1 Risk-Free tasks, the error rate rises to 50% in Block 2 ($t = 24.1$, $p < 0.01$). Despite the higher frequency of mistakes, Block 2 Risk-Free errors are largely unsystematic: subjects choose Safe in 55% of Unmixed tasks and exhibit a CRE of 3%-age points. These order effects suggest possible roles for decision fatigue and task contamination in blocked experimental designs.

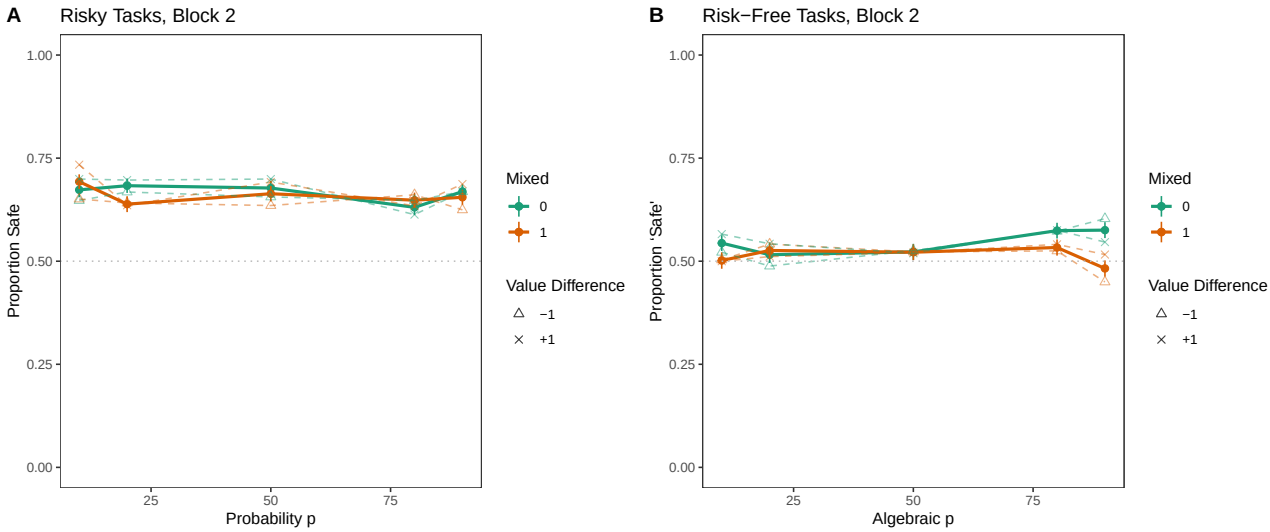


Figure A20: Experiment 5: Risky and Risk-Free Tasks, Block 2

Notes: Figure A20 shows the proportion of choices for the Safe/"Safe" option in Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles denote $+1$ and -1 tasks, while dark shaded circles indicate sample averages. Bars represent ± 1.96 standard errors (95% CIs). Panel A reports Risky tasks ($N = 5{,}770$), and Panel B reports Risk-Free tasks ($N = 6{,}230$) for subjects in Block 2 of Experiment 5.

A.10 Additional Results from Experiment 6

We recruited 300 new subjects for Experiment 6. The design followed our Post-Choice condition except that, for every Risk-Free task, we explicitly asked subjects to calculate y and z (the latter for Mixed tasks).[71] This elicitation allows us to evaluate directly whether lack of mathematical proficiency can potentially account for pattern matching, and to do so for all subjects without conditioning on successful task recognition. Although we did not include characterization tables or reminders that Risk-Free tasks were risk-free, requiring calculations *only* in Risk-Free tasks may have both distinguished them from Risky tasks and clarified their risk-free nature.[72]

Figure A21 shows behavioral data from Experiment 6. In Risky tasks, subjects display standard patterns, choosing the Safe option in 70% of Unmixed cases and exhibiting a CRE of 10%-age points. In Risk-Free tasks, we find only limited evidence of pattern matching: Subjects choose Safe in 60% of Unmixed cases and exhibit a CRE of 7%-age points.

Subjects calculate y correctly in 91% of Unmixed tasks, and they calculate both y and z correctly in 85% of Mixed tasks. These findings confirm that calculation errors are relatively uncommon. Moreover, contrary to hypothesis IIIa, when calculations are incorrect, they do

[71] Each subject received a \$4 completion payment. Twenty percent of subjects, chosen at random, also received a bonus payment following the same procedures as in our main study. The median completion time for Experiment 6 was 15.2 minutes. Full instructions appear in Appendices B.1.5 and B.1.19.

[72] Experiment 6 did not collect confidence judgments, so we cannot examine the relationship between confidence and Risky/Risk-Free choice as in the main experiment and Experiments 2 and 3.

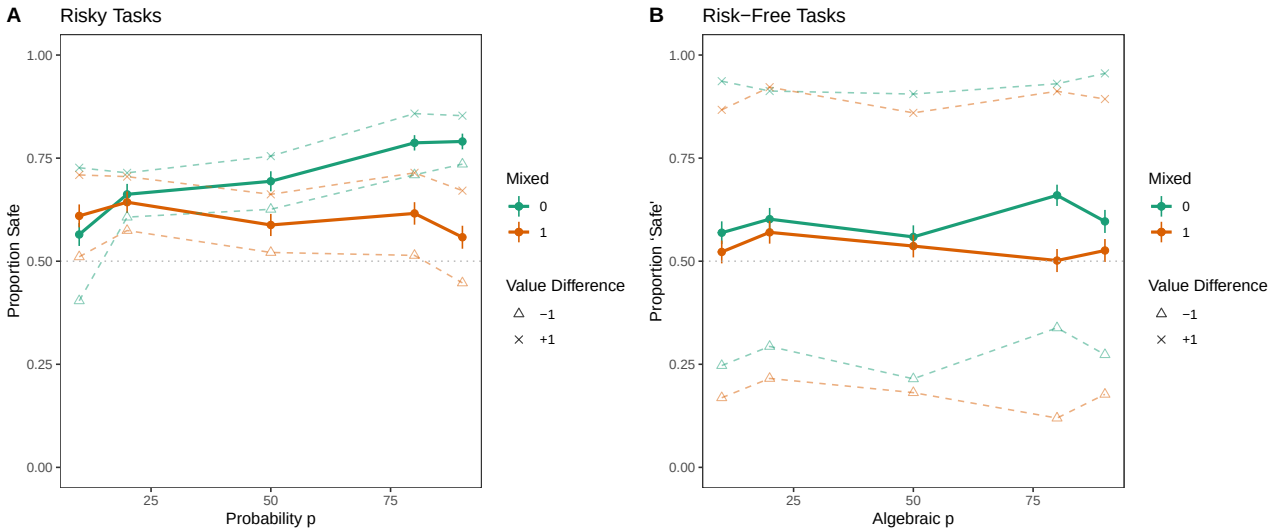


Figure A21: Experiment 6: Risky and Risk-Free Tasks

Notes: Figure A21 shows the proportion of choices for the Safe/"Safe" option in Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel A reports Risky tasks (N = 2,977) and Panel B Risk-Free tasks (N = 3,023) for subjects in Experiment 6.

not exhibit a systematic bias that accounts for the patterns of interest. We again use subjects' calculated values to simulate the Risk-Free choices of hypothetical subjects who make the same errors and always choose the option with the higher calculated value. We find no evidence of small-stakes "risk aversion" (45% "Safe" selections in Unmixed tasks; $t = 1.2$, $p = 0.23$ versus 50%) or a significant "CRE" (2%-age points; $t = 0.35$, $p = 0.73$ versus 0) in the simulated Risk-Free choices for which subjects committed calculation errors.

Subjects choose the option with the lower calculated value in 13% of all Risk-Free tasks, Unmixed and Mixed. Furthermore, the departures from calculated-value maximization exhibit a modest but systematic bias toward the "Safe" option in Unmixed Risk-Free tasks: When subjects' calculations show that Option A (which requires no calculation) has a higher value than Option B, the frequency with which they choose Option A is 94%. In contrast, when their calculations show that Option B has a higher value than Option A, the frequency with which they choose Option B is only 74% ($t = 11.1$, $p < 0.01$, test for equality). This differential creates the appearance of small-stakes "risk aversion." Additionally, while the same bias is present for Mixed Risk-Free tasks, it is smaller: The corresponding frequencies are 93% and 86% ($t = 4.6$, $p < 0.01$, test for equality). This differential creates the appearance of a "CRE." Figure A22 separates Risk-Free choice for these two groups. When subjects followed their calculations (87% of cases), errors and anomalous patterns are rare: Subjects chose "Safe" in 55% of Unmixed tasks and exhibited a CRE of 4%-age points. In contrast, when subjects did

not follow their calculations (13%), errors are frequent, proportions for +1 and −1 tasks are inverted, and anomalous patterns are evident: Subjects chose "Safe" in 82% of Unmixed tasks and exhibited a CRE of 15%-age points.

The patterns discussed above are plainly not attributable to calculation errors. Moreover, because this treatment forces subjects to incur the cognitive costs of calculating y and z, it removes the reason for deploying shortcuts.[73] Consequently, neither hypothesis II nor hypothesis III provides a plausible explanation for the resulting pattern matching. In contrast, hypothesis IVa, which posits aversion to the subjective uncertainty that calculations entail, easily rationalizes these patterns. Hypothesis Ia may also play a role if subjects continue to commit recognition failures despite performing the calculations needed for characterization.

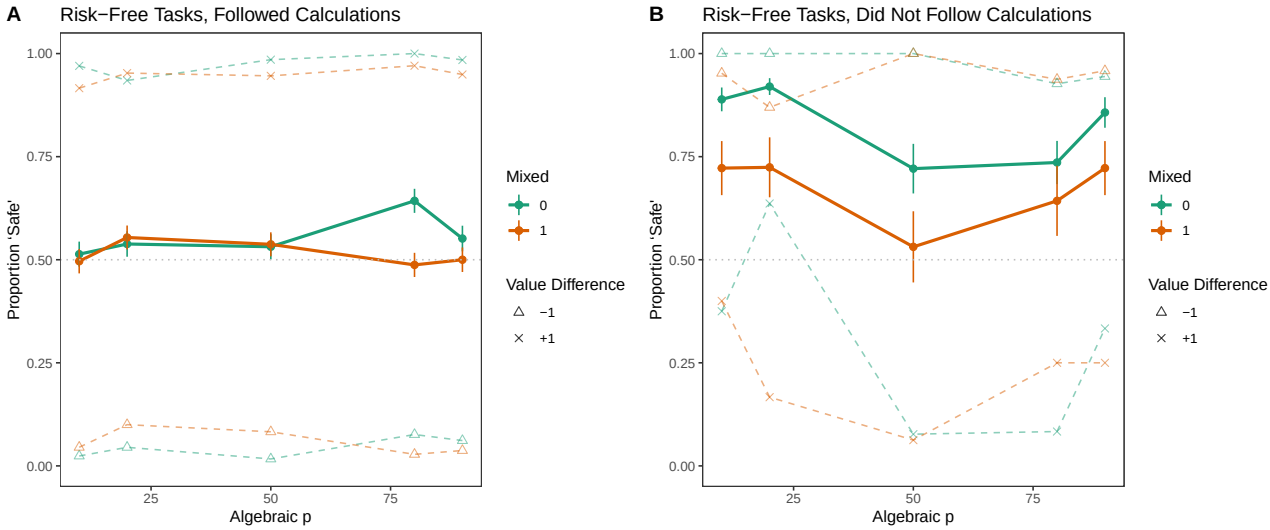


Figure A22: Experiment 6: Risk-Free Tasks and Following Calculations

Notes: Figure A22 shows the proportion of choices for the "Safe" option in Unmixed (green) and Mixed tasks (orange). Light shaded exes and triangles denote +1 and −1 tasks, while dark shaded circles indicate sample averages. Bars represent ±1.96 standard errors (95% CIs). Panel A reports observations that followed their calculations by choosing the higher calculated value (N = 2,629), and Panel B reports observations that did not follow their calculations (N = 394) in Experiment 6.

A.11 Additional Details for Experiment 7

For Experiment 7 we recruited 375 subjects to make choices in four different types of tasks: 1) Unmixed Risky tasks following our main design; 2) Unmixed Risk-Free tasks where only Option B required calculation; 3) Unmixed Risk-Free tasks where only Option A required calculation;

[73] Technically, we only remove the reason for deploying shortcuts if subjects try to perform the calculation correctly. It is therefore notable that the same patterns are present for Risk-Free tasks with correctly calculated values.

and 4) Unmixed Risk-Free tasks where both Option A and Option B required calculation. For task types 2, 3, and 4, Table A3 presents the potential calculations required. The tasks were designed such that for every one-calculation task, there was a corresponding two-calculation task with the same required calculation for the same option.

Subjects faced a random selection of 20 tasks from a question bank of 50 tasks including the 40 tasks noted in Table A3 and the 10 Unmixed Risky tasks from our main design. Given that most of the tasks faced by subjects are Risk-Free, it is relevant to ensure that Risky behavior continues to deliver evidence of small stakes risk aversion. Indeed, 76% of Unmixed Risky choices are for the Safe alternative Option A, closely reproducing our prior results. Figure A23 presents the behavioral results for Experiment 7. Risky and Risk-Free choice data differ substantially; overall, subjects choose Option A in only 53% of Risk-Free tasks.

As discussed in the text, in Figure A23 one can see that options requiring calculation are modestly penalized: when only Option A needs to be calculated, subjects choose Option A in 52% of cases; and when only Option B needs to be calculated, subjects choose Option A in 55% of cases. The difference is more substantial when considering -1 tasks in isolation. There, when only Option A needs to be calculated, subjects choose Option A in 8% of cases; and when only Option B needs to be calculated, subjects choose Option A in 16% of cases.

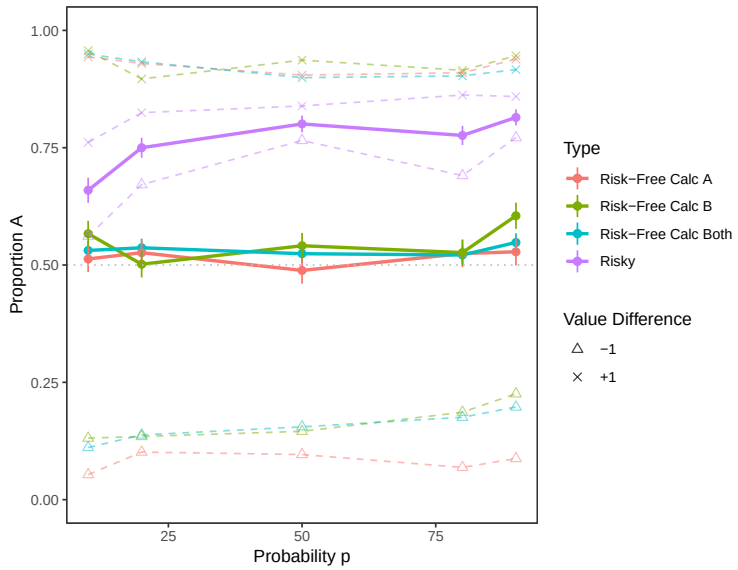


Figure A23: Experiment 7: Risky and Risk-Free Tasks

Notes: Figure A23 shows the proportion of choices for Option A in Unmixed tasks for Risky choice (purple) (N = 1,463), and Risk-Free choice with calculation required for Option A (pink) (N = 1,487), calculation required for Option B (green) (N = 1,507), or calculation required for both options (teal) (N = 3,043) for subjects in Experiment 7. Light shaded exes and triangles denote +1 and -1 tasks, while dark shaded circles indicate sample averages. Bars represent ± 1.96 standard errors (95% CIs).

Table A3: Experiment 7: Required Calculations for Risk-Free Tasks

Panel A: Option B Requires Calculation

$p = 0.1$		$p = 0.2$		$p = 0.5$		$p = 0.8$		$p = 0.9$	
Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B
2	$0.9 * 0 + 0.1 * 30$	5	$0.8 * 0 + 0.2 * 30$	14	$0.5 * 10 + 0.5 * 20$	23	$0.2 * 40 + 0.8 * 20$	26	$0.1 * 0 + 0.9 * 30$
4	$0.9 * 0 + 0.1 * 30$	7	$0.8 * 0 + 0.2 * 30$	16	$0.5 * 10 + 0.5 * 20$	25	$0.2 * 40 + 0.8 * 20$	28	$0.1 * 0 + 0.9 * 30$

Panel B: Option A Requires Calculation

$p = 0.1$		$p = 0.2$		$p = 0.5$		$p = 0.8$		$p = 0.9$	
Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B
$0.9 * 0 + 0.1 * 30$	2	$0.8 * 0 + 0.2 * 30$	5	$0.5 * 10 + 0.5 * 20$	14	$0.2 * 40 + 0.8 * 20$	23	$0.1 * 0 + 0.9 * 30$	26
$0.9 * 0 + 0.1 * 30$	4	$0.8 * 0 + 0.2 * 30$	7	$0.5 * 10 + 0.5 * 20$	16	$0.2 * 40 + 0.8 * 20$	25	$0.1 * 0 + 0.9 * 30$	28

Panel C: Both Options Require Calculation

$p = 0.1$		$p = 0.2$		$p = 0.5$		$p = 0.8$		$p = 0.9$	
Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B
$0.9 * 0 + 0.1 * 20$	$0.9 * 0 + 0.1 * 30$	$0.8 * 5 + 0.2 * 5$	$0.8 * 0 + 0.2 * 30$	$0.5 * 2 + 0.5 * 26$	$0.5 * 10 + 0.5 * 20$	$0.2 * 75 + 0.8 * 10$	$0.2 * 40 + 0.8 * 20$	$0.1 * 80 + 0.9 * 20$	$0.1 * 0 + 0.9 * 30$
$0.9 * 0 + 0.1 * 40$	$0.9 * 0 + 0.1 * 30$	$0.8 * 5 + 0.2 * 15$	$0.8 * 0 + 0.2 * 30$	$0.5 * 2 + 0.5 * 30$	$0.5 * 10 + 0.5 * 20$	$0.2 * 85 + 0.8 * 10$	$0.2 * 40 + 0.8 * 20$	$0.1 * 100 + 0.9 * 20$	$0.1 * 0 + 0.9 * 30$
$0.9 * 0 + 0.1 * 30$	$0.9 * 0 + 0.1 * 20$	$0.8 * 0 + 0.2 * 30$	$0.8 * 5 + 0.2 * 5$	$0.5 * 10 + 0.5 * 20$	$0.5 * 2 + 0.5 * 26$	$0.2 * 40 + 0.8 * 20$	$0.2 * 75 + 0.8 * 10$	$0.1 * 0 + 0.9 * 30$	$0.1 * 80 + 0.9 * 20$
$0.9 * 0 + 0.1 * 30$	$0.9 * 0 + 0.1 * 40$	$0.8 * 0 + 0.2 * 30$	$0.8 * 5 + 0.2 * 15$	$0.5 * 10 + 0.5 * 20$	$0.5 * 2 + 0.5 * 30$	$0.2 * 40 + 0.8 * 20$	$0.2 * 85 + 0.8 * 10$	$0.1 * 0 + 0.9 * 30$	$0.1 * 100 + 0.9 * 20$

B Supplement: Experimental Instructions and Machine Learning Prompts

B.1 Experimental Instructions

B.1.1 Instructions: All Conditions in the Main Experiment and in Experiment 2

We report the screenshots that apply to all conditions in the main experiment. The instructions for Experiment 2 are identical, except that in the experimental screen titled "This Study," we inform subjects that they will complete 10 rather than 20 tasks.

Hello and Welcome

Welcome, and thanks for your participation!

We are researchers at California Institute of Technology inviting you to participate in a research study. The study should take approximately 37 minutes. Please click to review information about the study and to give your consent to participate.

Next

Prolific ID

You will be paid via Prolific for your participation in this study. In order to pay you, we need your Prolific ID.

Please enter your Prolific ID:

Next

Possible Rewards

You will receive $7.5 if you complete the entire study.

In addition to this payment, you have a 1 in 5 chance of being eligible to receive a bonus payment. The smallest possible bonus payment is $0 and the largest possible bonus payment is $30.

You will be informed of how your decisions will influence your bonus payment if you are eligible to receive one.

Next

This Study

In this study, you will complete 20 tasks, each of which involves your preferences over two options. The first option will always be called **Option A**. The second option will always be called **Option B**.

Option A and Option B refer to the possibility of winning monetary amounts ranging from $0 to $30 with some fixed chances. In each task you are asked to answer a few questions about Option A and Option B, and to decide which option you prefer.

Next

Example Options

We will now introduce you to the types of options that you will see in this study and the choices you will make.

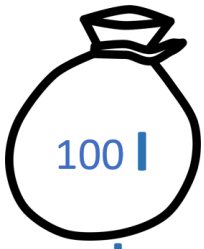
Next

Example Options 1

Consider the following example:

Option A

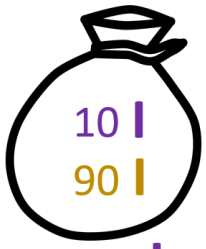
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $4.
- Option B allows you to draw one ticket from a bag containing 10 purple tickets ( ) and 90 gold tickets ( ). Each purple ticket pays $28, and each gold ticket pays $2.

Therefore,

- Option A allows you to win $4 with a 100 in 100 chance.
- Option B allows you to win $28 with a 10 in 100 chance, or $2 with a 90 in 100 chance.

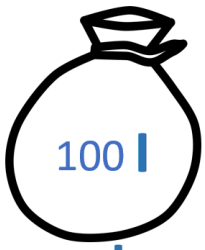
Next

Example Options 2

Consider the following example:

Option A

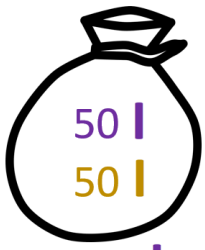
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $13.
- Option B allows you to draw one ticket from a bag containing 50 purple tickets ( ) and 50 gold tickets ( ). Each purple ticket pays $y and each gold ticket pays $y. $y is an amount equal to (0.5 × 2) + (0.5 × 28) that you can calculate. Therefore, in this example, y is equal to 15.

Therefore,

- Option A allows you to win $13 with a 100 in 100 chance.
- Option B allows you to win $y with a 100 in 100 chance.

Next

How will you make choices?

In each task, we will show you two options and will ask you to choose between the following two answer choices:

1. I prefer Option A
2. I prefer Option B

In each decision, after you choose which option you prefer, we will ask you how confident you are about your choice.
You will report your confidence on a scale from 0 to 100, where 0 indicates that you are *not confident at all* and 100 indicates that you are *completely confident*.

Next

B.1.2 Training Tasks: Pre-Choice Incentivized Condition in the Main Experiment and Pre-Choice Unincentivized Conditions in the Main Experiment and in Experiment 2

Familiarize Yourself with the Study

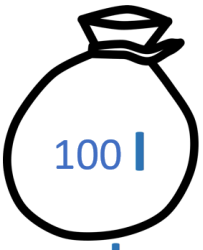
- In each task, before you make your choices, we will also ask several questions to check your understanding of the task.
- We now ask you to complete two training tasks to familiarize yourself with these types of questions and the choices you will make in the study.
- As you will realize from the training tasks, in this study after you confirm an answer *you will not be able to modify it*.
- For this reason, we ask you to think carefully before confirming your answers. After the training, we will explain how your answers in the study will affect your bonus.

Next

Training Task 1 of 2
Familiarize Yourself with Option A

Option A

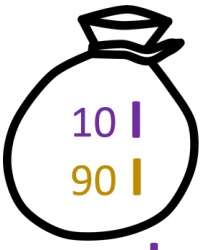
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Assign to each ticket the corresponding chance under **Option A**:

Option A

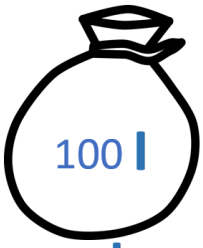
Ticket			
Chance	in 100	in 100	in 100

Next

Training Task 1 of 2
Familiarize Yourself with Option A

Option A

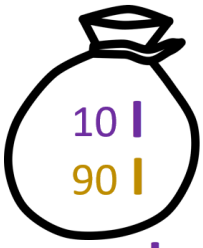
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Assign to each ticket the corresponding value under **Option A**:

Remark: we only ask you to report the values of the tickets that have a positive chance of being drawn *according to your answers*.

Option A

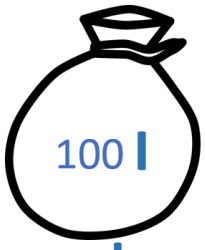
Ticket			
Chance	100 in 100	0 in 100	0 in 100
Value	$	$	$

Next

Training Task 1 of 2
Familiarize Yourself with Option B

Option A

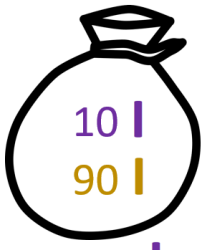
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Assign to each ticket the corresponding chance under **Option B**:

Option B

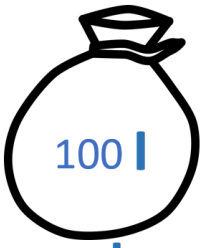
Ticket			
Chance	in 100	in 100	in 100

Next

Training Task 1 of 2
Familiarize Yourself with Option B

Option A

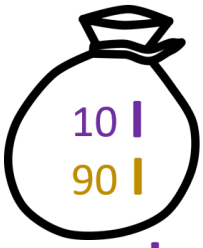
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Assign to each ticket the corresponding value under **Option B**:

Remark: we only ask you to report the values of the tickets that have a positive chance of being drawn *according to your answers*.

Option B

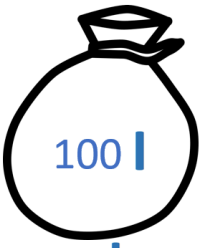
Ticket			
Chance	0 in 100	10 in 100	90 in 100
Value	$	$	$

Next

Training Task 1 of 2
Make your Decision

Option A

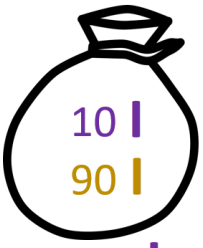
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Your previous answers about chances and values of tickets under Option A and Option B are:

Option A

Ticket			
Chance	100 in 100	0 in 100	0 in 100
Value	$ 4	$	$

Option B

Ticket			
Chance	0 in 100	10 in 100	90 in 100
Value	$	$ 28	$ 2

Which option do you **prefer**?

I prefer Option A ○

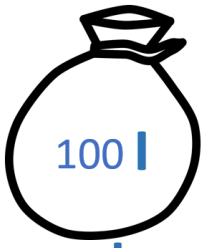
I prefer Option B ○

Next

Training Task 1 of 2
Express your Confidence

Option A

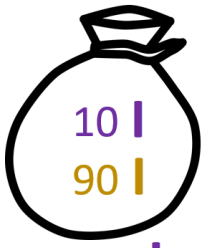
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Your previous answers about chances and values of tickets under Option A and Option B are:

Option A

Ticket			
Chance	100 in 100	0 in 100	0 in 100
Value	$ 4	$	$

Option B

Ticket			
Chance	0 in 100	10 in 100	90 in 100
Value	$	$ 28	$ 2

You chose **Option B**.

On a scale from 0 (not confident at all) to 100 (completely confident), how **confident** do you feel about this choice?

The higher the number, the more confident you are about this choice.

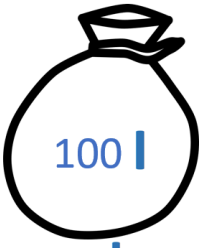
Not Confident At all — Completely Confident

Next

Training Task 2 of 2
Familiarize Yourself with Option A

Option A

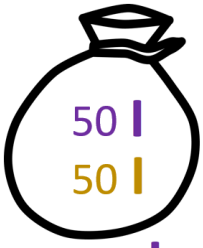
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

Assign to each ticket the corresponding chance under **Option A**:

Option A

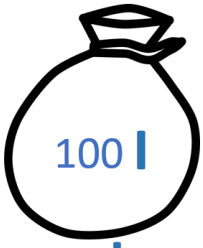
Ticket			
Chance	in 100	in 100	in 100

Next

Training Task 2 of 2
Familiarize Yourself with Option A

Option A

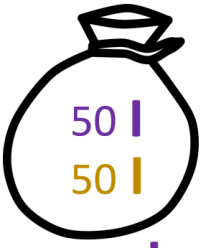
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$y=(0.5\times 2)+(0.5\times 28)$

Assign to each ticket the corresponding value under **Option A**:

Remark: we only ask you to report the values of the tickets that have a positive chance of being drawn *according to your answers*.

Option A

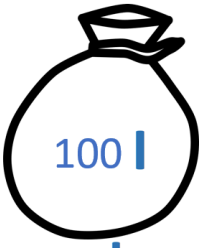
Ticket			
Chance	100 in 100	0 in 100	0 in 100
Value	$	$	$

Next

Training Task 2 of 2
Familiarize Yourself with Option B

Option A

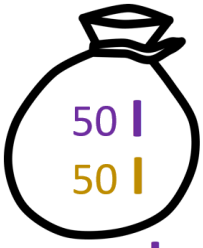
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

Assign to each ticket the corresponding chance under **Option B**:

Option B

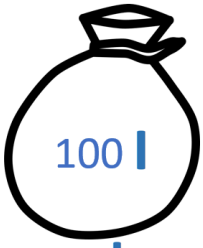
Ticket			
Chance	in 100	in 100	in 100

Next

Training Task 2 of 2
Familiarize Yourself with Option B

Option A

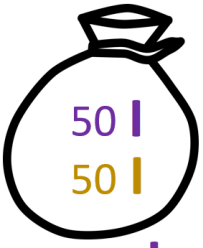
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

Assign to each ticket the corresponding value under **Option B**:

Remark: we only ask you to report the values of the tickets that have a positive chance of being drawn *according to your answers*.

Option B

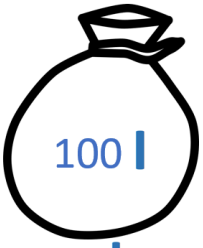
Ticket			
Chance	0 in 100	50 in 100	50 in 100
Value	$	$	$

Next

Training Task 2 of 2
Make your Decision

Option A

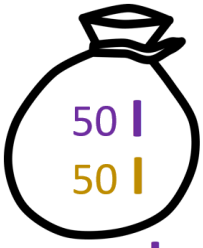
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

y=(0.5×2)+(0.5×28)

Your previous answers about chances and values of tickets under Option A and Option B are:

Option A

Ticket			
Chance	100 in 100	0 in 100	0 in 100
Value	$ 13	$	$

Option B

Ticket			
Chance	0 in 100	50 in 100	50 in 100
Value	$	$ 15	$ 15

Which option do you **prefer**?

I prefer Option A ○

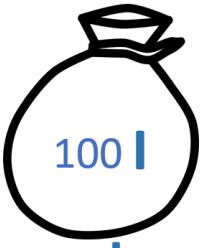
I prefer Option B ○

Next

Training Task 2 of 2
Express your Confidence

Option A

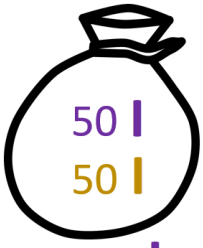
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

y=(0.5×2)+(0.5×28)

Your previous answers about chances and values of tickets under Option A and Option B are:

Option A

Ticket			
Chance	100 in 100	0 in 100	0 in 100
Value	$ 13	$	$

Option B

Ticket			
Chance	0 in 100	50 in 100	50 in 100
Value	$	$ 15	$ 15

You chose **Option B**.

On a scale from 0 (not confident at all) to 100 (completely confident), how **confident** do you feel about this choice?

The higher the number, the more confident you are about this choice.

Not Confident At all — Completely Confident

Next

B.1.3 Training Tasks: Post-Choice Condition in the Main Experiment and in Experiment 2

Familiarize Yourself with the Study

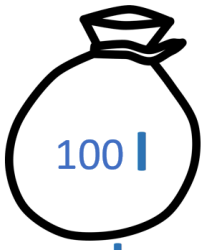
- We now ask you to complete two training tasks to familiarize yourself with the questions and the choices you will make in the study.
- As you will realize from the training task, in this study after you confirm an answer *you will not be able to modify it*.
- For this reason, we ask you to think carefully before confirming your answers. After the training, we will explain how your answers in the study will affect your bonus.

Next

Training Task 1 of 2
Make your Decision

Option A

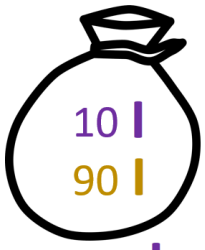
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Which option do you **prefer**?

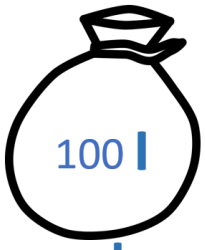
I prefer Option A ○ I prefer Option B ○

Next

Training Task 1 of 2
Express your Confidence

Option A

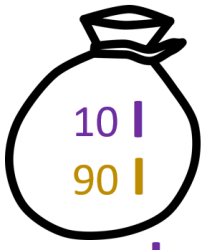
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

You chose **Option A**.

On a scale from 0 (not confident at all) to 100 (completely confident), how **confident** do you feel about this choice?

The higher the number, the more confident you are about this choice.

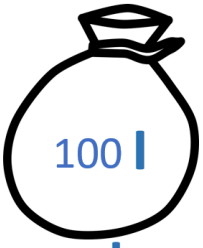
Not Confident At all — Completely Confident

Next

Training Task 2 of 2
Make your Decision

Option A

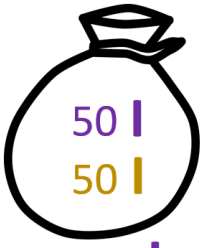
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

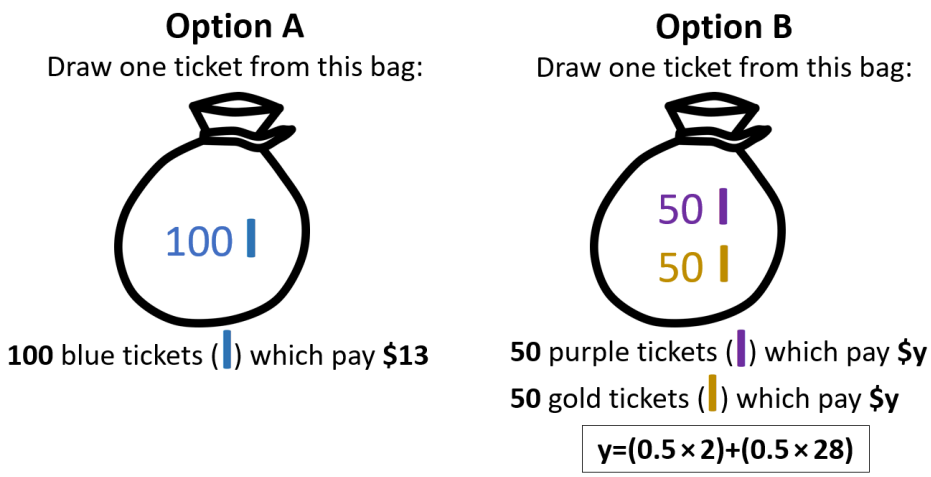
$$y=(0.5\times 2)+(0.5\times 28)$$

Which option do you **prefer**?

I prefer Option A ○

I prefer Option B ○

Next



Screenshots of the choice tasks from the main experiment are omitted, as they are identical to the training tasks.

B.1.4 Bonus Payment Instructions: Pre-Choice Incentivized Condition in the Main Experiment

Bonus Payment

Congratulations, you filled out the tables correctly in the two training tasks! You are now ready to learn more about your potential bonus payment.

We call **potential bonus payment** an additional amount of money that you may receive at the end of the study on top of your participation fee. The potential bonus payment will be paid to you **only** if some conditions are met.

We first explain how the potential bonus payment is computed. Next, we explain the conditions under which you will receive the potential bonus payment.

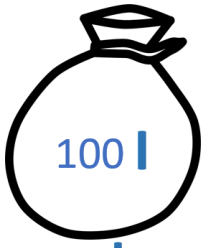
Next

Determining Your Potential Bonus Payment

To determine your potential bonus payment, we will randomly select one of the tasks of the study to be the **task-that-counts**. For example, the task-that-counts could be the one illustrated below.

Option A

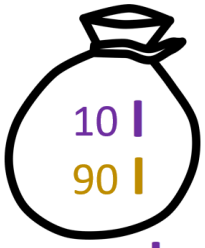
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

If you preferred **Option A** in the task-that-counts, then Option A would be implemented and we would draw a single ticket from that bag.

- A blue ticket would definitely be chosen, so your potential bonus payment would be $4.

If you preferred **Option B** in the task-that-counts, then Option B would be implemented and we would draw a single ticket from that bag.

- If a purple ticket was drawn, then your potential bonus payment would be $28.
- If a gold ticket was drawn, then your potential bonus payment would be $2.

Because every task could be the task-that-counts, you should make each choice as if it is the one that could determine your potential bonus payment.

Next

Conditions for Your Bonus Payment

You will receive your potential bonus payment at the end of the study **only if** two conditions are satisfied:

1. After we compute your potential bonus payment, we will draw a number between 1 and 5. If the drawn number is 1, you will be eligible for the potential bonus payment. Otherwise, you will not receive a bonus payment.
2. If you are eligible for a bonus payment, then we will check your answers about the chances and values of the tickets under Option A and Option B that you filled out in the tables in the task-that-counts. If every one of your answers is correct then you will be paid your potential bonus payment. If any one of your answers is incorrect, then you will not receive a bonus payment.

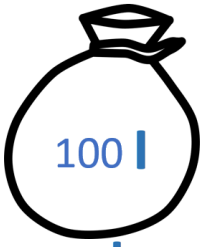
Next

Conditions for Your Bonus Payment - Example

Suppose again that the task-that-counts is the one illustrated below.

Option A

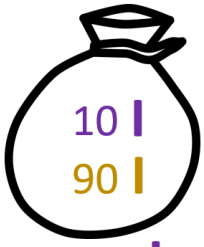
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Imagine that you preferred Option B and a purple ticket is drawn so that your potential bonus payment is $28. Moreover, imagine that you are eligible to receive this potential bonus payment.

As described in the previous pages, you will have reported your answers about chances and values of tickets under Option A and Option B in every task by filling the following tables:

Option A

Ticket			
Chance	in 100	in 100	in 100
Value	$	$	$

Option B

Ticket			
Chance	in 100	in 100	in 100
Value	$	$	$

You will need to have filled out the tables correctly in order to receive your potential bonus payment. Please proceed to learn more about this.

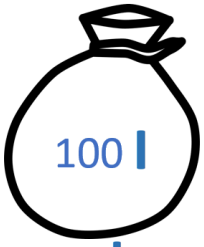
Next

Conditions for Your Bonus Payment - Example

Suppose again that the task-that-counts is the one illustrated below.

Option A

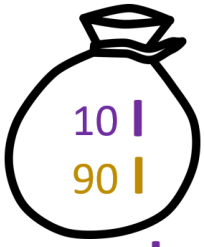
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Imagine that you preferred Option B and a purple ticket is drawn so that your potential bonus payment is $28. Moreover, imagine being eligible to receive this potential bonus payment.

As described in the previous pages, you will report your answers about chances and values of tickets under Option A and Option B in every task by filling the following tables:

Option A

Ticket			
Chance	100 in 100	0 in 100	0 in 100
Value	$ 4	$	$

Option B

Ticket			
Chance	0 in 100	10 in 100	90 in 100
Value	$	$ 28	$ 2

If all your answers are correct as in the two tables above, you will receive your potential bonus payment of $28 at the end of the study. Otherwise, you will not receive a bonus payment.

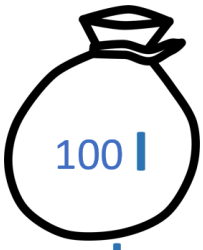
Next

Test your Understanding

Suppose that this is the task-that-counts:

Option A

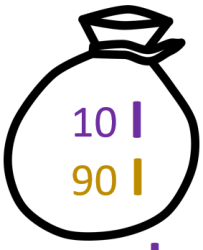
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Here are a few questions to test your understanding:

How do we determine your potential bonus payment?

- ○ Draw a ticket from the bag corresponding to the option that you preferred
- ○ Always draw a ticket from the bag corresponding to Option A
- ○ Always draw a ticket from the bag corresponding to Option B
- ○ Draw a ticket from the bag corresponding to Option A with a 50 in 100 chance or from the bag corresponding to Option B with a 50 in 100 chance

What is your potential bonus payment if you preferred Option B and a purple ticket is drawn?

- ○ 2
- ○ 28
- ○ 15
- ○ 4

Under what condition will you receive the potential bonus payment at the end of the experiment?

- ○ I will receive the potential bonus payment only if I am eligible
- ○ I will receive the potential bonus payment only if all my answers in the tables of chances and values for the task-that-counts are correct
- ○ I will receive the potential bonus payment only if I am eligible and all my answers in the tables of chances and values for the task-that-counts are correct
- ○ I will always receive the potential bonus payment

What is the chance that you are eligible for a potential bonus payment?

- ○ 1 in 4
- ○ 1 in 2
- ○ 1 in 3
- ○ 1 in 5

B.1.5 Bonus Payment Instructions: Experiment 2, Experiment 3, Experiment 6, Experiment 7 and Pre-Choice Unincentivized and Post-Choice Conditions in the Main Experiment

Bonus Payment

Congratulations, you completed the two training tasks! You are now ready to learn more about your potential bonus payment.

We call **potential bonus payment** an additional amount of money that you may receive at the end of the study on top of your participation fee. The potential bonus payment will be paid to you **only** if some conditions are met.

We first explain how the potential bonus payment is computed. Next, we explain the conditions under which you will receive the potential bonus payment.

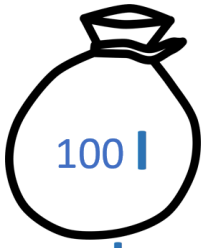
Next

Determining Your Potential Bonus Payment

To determine your potential bonus payment, we will randomly select one of the tasks of the study to be the **task-that-counts**. For example, the task-that-counts could be the one illustrated below.

Option A

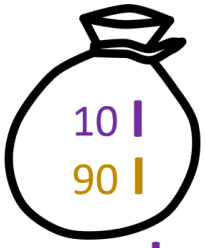
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

If you preferred **Option A** in the task-that-counts, then Option A would be implemented and we would draw a single ticket from that bag.

- A blue ticket would definitely be chosen, so your potential bonus payment would be $4.

If you preferred **Option B** in the task-that-counts, then Option B would be implemented and we would draw a single ticket from that bag.

- If a purple ticket was drawn, then your potential bonus payment would be $28.
- If a gold ticket was drawn, then your potential bonus payment would be $2.

Because every task could be the task-that-counts, you should make each choice as if it is the one that could determine your potential bonus payment.

Next

Conditions for Your Bonus Payment

- You will receive your potential bonus payment at the end of the study **only if** you are eligible to receive one.
- To determine whether you are eligible, we will draw a number between 1 and 5.
- If the drawn number is 1, you will be paid your potential bonus payment.
- Otherwise, you will not receive a bonus payment.

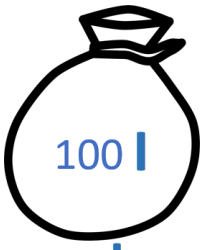
Next

Test your Understanding

Suppose that this is the task-that-counts:

Option A

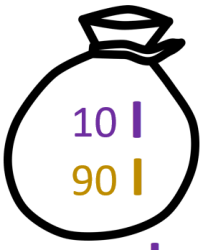
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Here are a few questions to test your understanding:

How do we determine your potential bonus payment?

- ○ Draw a ticket from the bag corresponding to the option that you preferred
- ○ Always draw a ticket from the bag corresponding to Option A
- ○ Always draw a ticket from the bag corresponding to Option B
- ○ Draw a ticket from the bag corresponding to Option A with a 50 in 100 chance or from the bag corresponding to Option B with a 50 in 100 chance

What is your potential bonus payment if you preferred Option B and a purple ticket is drawn?

- ○ 2
- ○ 28
- ○ 15
- ○ 4

Under what condition will you receive the potential bonus payment at the end of the experiment?

- ○ I will receive the potential bonus payment only if I am eligible. I have a 1 in 4 chance of being eligible.
- ○ I will receive the potential bonus payment only if I am eligible. I have a 1 in 2 chance of being eligible.
- ○ I will receive the potential bonus payment only if I am eligible. I have a 1 in 5 chance of being eligible.
- ○ I will receive the potential bonus payment only if I am eligible. I have a 1 in 3 chance of being eligible.

Next

B.1.6 Additional Instructions and Tasks for Experiment 2 (All Conditions)

Understanding your Overall Confidence

We asked you to report your overall confidence in each of the ten choices you made in this study so far. In some of your choices, you reported a confidence level of less than 100, indicating that you had less-than-complete confidence. Next, we will ask you to explain some of the possible reasons for your less-than-complete overall confidence level in 6 choices.

Next

Understanding your Overall Confidence

In the next pages, we list nine possible reasons for having less-than-complete confidence in your decisions. For each reason, we also provide an illustration. It's important to keep in mind that these are just illustrations. In a few minutes we will ask you to classify similar examples, so please review these reasons carefully.

All these examples concern an individual named Chris who must choose between attending two social events with two different groups of friends.

Next

Understanding your Overall Confidence

1. Not Sure What Each Option Means: You lack confidence in your decision because you're not sure you interpreted the available options correctly or understood their consequences.

Here's an example of why Chris might report less than complete confidence for this reason:

Chris was told weeks ago which friends were attending which event, but he found some of their messages confusing and isn't sure he understood them properly. He might express less-than-complete confidence in his decision because he isn't sure he understands the consequences of choosing to attend one event vs. the other.

Next

Understanding your Overall Confidence

2. Multiple Views About What You Want: You lack confidence in your decision because, in your view, there's probably more than one right way to think about what you want to achieve.

Here's an example of why Chris might report less than complete confidence for this reason:

Chris values experiences with different friends for different reasons and, after careful consideration, doesn't think one set of reasons is necessarily more or less important than another. He might express less-than-complete confidence in his decision because he doesn't think there's just one right way to think about what he wants from either social event.

Next

Understanding your Overall Confidence

3. Don't Know How You'll Feel: You lack confidence in your decision because you aren't sure how you will feel about each of the possible outcomes.

Here's an example of why Chris might report less than complete confidence for this reason:

Chris enjoys different friends in different moods and is uncertain what his mood will be when the event arrives. He might express less-than-complete confidence in his decision because he isn't sure how he will feel about being with each group of friends.

Next

Understanding your Overall Confidence

4. Didn't Apply Your Decision Criterion Correctly: You lack confidence in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.

Here's an example of why Chris might report less than complete confidence for this reason:

To simplify his choice, Chris assumed he would have the most fun at the event with the largest number of friends, so he listed the friends planning to attend each event and counted them. Right after committing to the event with the larger count, he worried that he might have miscounted. He might express less-than-complete confidence in his decision because he now thinks the criterion he decided to use and the simplifying assumption he made might actually favor an alternative other than the one he chose.

Next

Understanding your Overall Confidence

5. Didn't Think Carefully About What You Want: You lack confidence in your decision because you haven't thought through what you want to achieve as carefully as you could.

Here's an example of why Chris might report less than complete confidence for this reason:

Chris values experiences with different friends for different reasons but hasn't seriously considered whether one set of reasons is more important than another. He might express less-than-complete confidence in his decision because he hasn't carefully thought through what he wants from this social event.

Next

Understanding your Overall Confidence

6. It's Nearly a Toss-Up: You lack confidence in your decision because you think the choice is close to a toss-up.

Here's an example of why Chris might report less than complete confidence for this reason:

After assessing the desirability of each event, Chris concludes that he would enjoy them about the same. However, because he is slightly unsure about each assessment, either one might be slightly better. He might express less-than-complete confidence in his decision because he thinks it is nearly a toss-up.

Next

Understanding your Overall Confidence

7. Worried About Mental Shortcuts: You lack confidence in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Here's an example of why Chris might report less than complete confidence for this reason:

Chris' enjoyment of social events depends on who else is there, but it's hard for him to think through the pluses and minuses of being with one large group of friends rather than another. Instead, he makes his decision based entirely on which event his friend Parker plans to attend. He might express less-than-complete confidence in his decision because he's worried that the mental shortcut he used — to only think about Parker — isn't a good one.

Next

Understanding your Overall Confidence

8. Can't Know For Sure What You'll Get: You lack confidence in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.

Here's an example of why Chris might report less than complete confidence for this reason:

Some of Chris's friends told him they might attend his chosen event or they might just stay home. He might express less-than-complete confidence in his decision because he can't be sure what his chosen option will yield since he doesn't know which friends will actually turn up to the event.

Next

Understanding your Overall Confidence

9. Other Reasons: You lack confidence in your decision for other reasons.

Here's an example of why Chris might report less than complete confidence for this reason:

Chris may have other reasons for expressing less-than-complete confidence in his decision that we haven't mentioned.

Next

Explaining the Reasons for your Overall Confidence

When you reported your overall confidence in each choice, any answer below 100 indicated that you had less than complete confidence. We want to understand your reasons for reporting less-than-complete confidence.

For each reason on the previous screens, you will indicate the degree to which it accounted for your less-than-complete confidence. For example, if you rated your confidence as 60, we want to know the extent to which each reason was responsible for you answering 60 rather than 100. In each case, you will answer on a scale of **1 (Very Little)** to **7 (Very Much)**. So if you rated your overall confidence as 60, you would give a 1 for a particular reason if it had very little to do with saying your confidence was 60 rather than 100, and you would give a 7 if it had a great deal to do with saying your confidence was 60 rather than 100.

Please proceed to see an example of how the questions will look.

Next

Example

Imagine your overall confidence in a choice was 60 rather than 100. You would then face the following question:

Your overall confidence was 60 rather than 100. For each reason listed below, please indicate the degree to which it accounted for your less-than-complete confidence (in other words, the fact that you reported 60 rather than 100). In each case, select a number from **1 (Very Little)** to **7 (Very Much)**.

1. Not Sure What Each Option Means: You lack confidence in your decision because you're not sure you interpreted the available options correctly or understood their consequences.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

2. Multiple Views About What You Want: You lack confidence in your decision because, in your view, there's probably more than one right way to think about what you want to achieve.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

3. Don't Know How You'll Feel: You lack confidence in your decision because you aren't sure how you will feel about each of the possible outcomes.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

4. Didn't Apply Your Decision Criterion Correctly: You lack confidence in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

5. Didn't Think Carefully About What You Want: You lack confidence in your decision because you haven't thought through what you want to achieve as carefully as you could.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

6. It's Nearly a Toss-Up: You lack confidence in your decision because you think the choice is close to a toss-up.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

7. Worried About Mental Shortcuts: You lack confidence in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

8. Can't Know For Sure What You'll Get: You lack confidence in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

9. Other Reasons: You lack confidence in your decision for other reasons.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Next

Check your Understanding

We will now check your understanding of the different reasons for expressing less-than-complete confidence, and of how you should report the importance of different reasons. **If you answer at least 3 of 4 questions correctly, you will receive an extra $1 payment, so it's in your interests to take them seriously!**

Next

Test your Understanding

Question 1: Susan is deciding between two options. Option A is an apple. Option B is either a pear or an orange depending on whether Yellow comes before Blue on the color spectrum (i.e., the order of the rainbow). If Yellow comes before Blue then Option B is definitely a pear. If Yellow comes after Blue then Option B is definitely an orange. Susan doesn't recall the color spectrum precisely but remembers learning the acronym "ROY G BIV" for the colors of the rainbow. She thinks the "Y" stands for Yellow and the "B" stands for Blue, which would imply that Yellow comes before Blue, but she really isn't sure. She makes her decision as if Option B is a pear. She likes pears much more than apples so she chooses the pear. However, she reports overall confidence less than 100 because she is not that sure about the accuracy of the "ROY G BIV" acronym she used when making her choice.

Which of the following reasons should Susan mark as contributing "Very Much" to her less-than-complete confidence?

- ○ **Didn't Think Carefully About What You Want**: You lack confidence in your decision because you haven't thought through what you want to achieve as carefully as you could.
- ○ **It's Nearly a Toss-Up**: You lack confidence in your decision because you think the choice is close to a toss-up.
- ○ **Worried About Mental Shortcuts**: You lack confidence in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Next

Test your Understanding

Question 2: Edward is deciding between two options. Option A is a box of oatmeal cookies, while Option B is a box of assorted chocolates. For Option B, he won't know which types of chocolates are in the box until he opens it. He knows he likes all types of chocolate more than oatmeal cookies, so he chooses Option B. He expresses overall confidence less than 100 because there's no way for him to know which chocolates are in the box.

Which of the following reasons should Edward mark as contributing "Very Much" to his less-than-complete confidence?

- ○ **Can't Know For Sure What You'll Get**: You lack confidence in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.
- ○ **Didn't Apply Your Decision Criterion Correctly**: You lack confidence in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.
- ○ **Worried About Mental Shortcuts**: You lack confidence in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Next

Test your Understanding

Question 3: Samantha is deciding between two boxes. Box A contains either an apple or a pear, while Box B contains either one dollar or ten cents. The boxes are labeled with their exact contents, but the labels are written in a foreign language that Samantha has not studied. She does her best to guess what the words mean based on similarities to words in languages she knows. She concludes that Box A probably contains an apple while Box B probably contains one dollar. She chooses Box A because she prefers an apple to one dollar. She expresses overall confidence less than 100 because she's not sure she correctly translated the labels on the boxes.

Which of the following reasons should Samantha mark as contributing "Very Much" to her less-than-complete confidence?

- ○ **Didn't Think Carefully About What You Want**: You lack confidence in your decision because you haven't thought through what you want to achieve as carefully as you could.
- ○ **Not Sure What Each Option Means**: You lack confidence in your decision because you're not sure you interpreted the available options correctly or understood their consequences.
- ○ **Worried About Mental Shortcuts**: You lack confidence in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Next

Test your Understanding

Question 4: Jude is deciding between the same two boxes as Samantha in the previous problem. Box A contains either an apple or a pear, while Box B contains either one dollar or ten cents. The boxes are labeled with their exact contents but the labels are written in a foreign language. Unlike Samantha, Jude can read the language and is fairly certain Box A contains an apple while Box B contains one dollar. An apple is worth more than a dollar to him, so he intends to select Box A. But after making his choice, he thinks he may have accidentally recorded his selection as Box B, containing the dollar. For that reason, he expresses overall confidence less than 100.

Which of the following reasons should Jude mark as contributing "Very Much" to his less-than-complete confidence?

- ○ **Not Sure What Each Option Means**: You lack confidence in your decision because you're not sure you interpreted the available options correctly or understood their consequences.
- ○ **Didn't Apply Your Decision Criterion Correctly**: You lack confidence in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.
- ○ **It's Nearly a Toss-Up**: You lack confidence in your decision because you think the choice is close to a toss-up.

Next

Explaining the Reasons for your Overall Confidence

We will now ask you to provide the reasons for your overall confidence in 6 decisions that you made in this study.

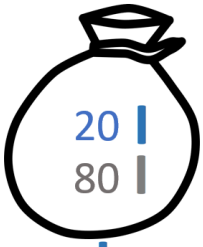
Next

Explaining the Reasons for your Overall Confidence: Task 1

In a previous task you decided between the following two options:

Option A

Draw one ticket from this bag:

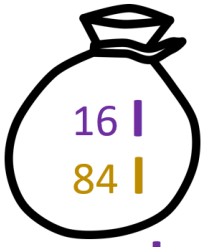


20 blue tickets ( ) which pay **$25**

80 grey tickets ( ) which pay **$0**

Option B

Draw one ticket from this bag:



16 purple tickets ( ) which pay **$30**

84 gold tickets ( ) which pay **$0**

You selected **Option B** and reported a **51 out of 100** confidence in your choice.

For each reason listed below, please indicate the degree to which it accounted for your less-than-complete confidence (in other words, the fact that you reported 51 rather than 100). In each case, select a number from **1 (Very Little)** to **7 (Very Much)**.

Didn't Think Carefully About What You Want: You lack confidence in your decision because you haven't thought through what you want to achieve as carefully as you could.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Don't Know How You'll Feel: You lack confidence in your decision because you aren't sure how you will feel about each of the possible outcomes.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Worried About Mental Shortcuts: You lack confidence in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Didn't Apply Your Decision Criterion Correctly: You lack confidence in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Multiple Views About What You Want: You lack confidence in your decision because, in your view, there's probably more than one right way to think about what you want to achieve.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Can't Know For Sure What You'll Get: You lack confidence in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Not Sure What Each Option Means: You lack confidence in your decision because you're not sure you interpreted the available options correctly or understood their consequences.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

It's Nearly a Toss-Up: You lack confidence in your decision because you think the choice is close to a toss-up.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Other Reasons: You lack confidence in your decision for other reasons.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Next

B.1.7 Instructions and Training Tasks: Experiment 3

Hello and Welcome

Welcome, and thanks for your participation!

We are researchers from Caltech, Stanford, and The Ohio State University, inviting you to participate in a research study. The study should take roughly 30 to 35 minutes. Please click to review information about the study and to give your consent to participate.

Next

Prolific ID

You will be paid via Prolific for your participation in this study. In order to pay you, we need your Prolific ID.

Please enter your Prolific ID:

Next

Possible Rewards

You will receive $7.00 if you complete the entire study.

In addition to this payment, you have a 1 in 5 chance of being eligible to receive a bonus payment. The smallest possible bonus payment is $0 and the largest possible bonus payment is $30.

You will be informed of how your decisions will influence your bonus payment if you are eligible to receive one.

Next

This Study

In this study, you will complete 20 tasks, each of which involves your preferences over two options. The first option will always be called **Option A**. The second option will always be called **Option B**.

Option A and Option B refer to the possibility of winning monetary amounts ranging from $0 to $30 with some fixed chances. In each task you are asked to answer a few questions about Option A and Option B, and to choose between them.

Next

Example Options

We will now introduce you to the types of options that you will see in this study and the choices you will make.

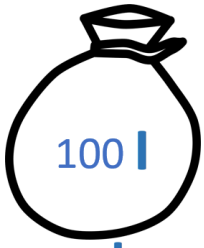
Next

Example Options 1

Consider the following example:

Option A

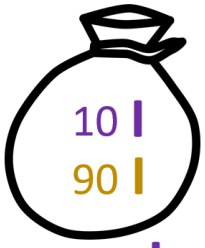
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $4.
- Option B allows you to draw one ticket from a bag containing 10 purple tickets ( ) and 90 gold tickets ( ). Each purple ticket pays $28, and each gold ticket pays $2.

Therefore,

- Option A allows you to win $4 with a 100 in 100 chance.
- Option B allows you to win $28 with a 10 in 100 chance, or $2 with a 90 in 100 chance.

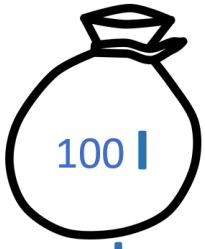
Next

Example Options 2

Consider the following example:

Option A

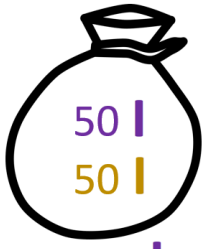
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $13.
- Option B allows you to draw one ticket from a bag containing 50 purple tickets ( ) and 50 gold tickets ( ). Each purple ticket pays $y and each gold ticket pays $y. $y is an amount equal to (0.5 × 2) + (0.5 × 28) that you can calculate. In this example, y is equal to 15.

Therefore,

- Option A allows you to win $13 with a 100 in 100 chance.
- Option B allows you to win $15 with a 100 in 100 chance.

Next

How will you make choices?

In each task, we will ask you two questions:

1. You will make a choice between Option A or Option B.
2. We will ask you **how certain** you are about your choice. Specifically, we are interested in how likely you think it is (in percentage terms) that the decision you made is actually your best decision, given your personal preferences and the available information.

Next

Comprehension check

Which one of the following statements is true?

- ○ When I am asked to indicate my certainty about my decision, the people running this study are interested in how certain I am that the decision I made is actually my best decision, given my personal preferences and the available information.
- ○ When I am asked to indicate my certainty about my decision, the people running this study are interested in how certain I am that I will actually receive the money from the options.

Next

Familiarize Yourself with the Study

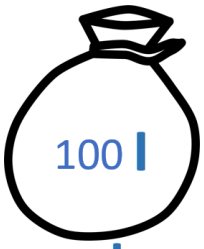
- We now ask you to complete two training tasks to familiarize yourself with the questions and the choices you will make in the study.
- As you will realize from the training task, in this study after you confirm an answer *you will not be able to modify it*.
- For this reason, we ask you to think carefully before confirming your answers. After the training, we will explain how your answers in the study will affect your bonus.

Next

Training Task 1 of 2

Option A

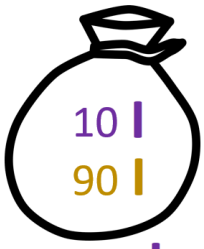
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Please make a choice.

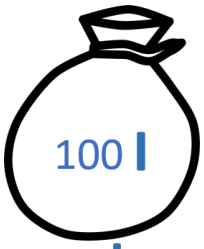
Option A ○ Option B ○

Next

Training Task 1 of 2

Option A

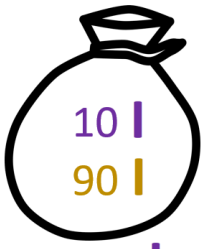
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

You chose **Option A**.

How certain are you that **choosing Option A** is actually your best decision, given your preferences and the available information?

50% 60% 70% 80% 90% 100%

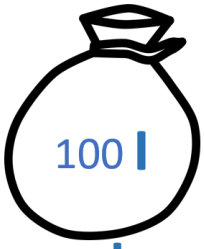
Very Uncertain — Completely Certain

Next

Training Task 2 of 2

Option A

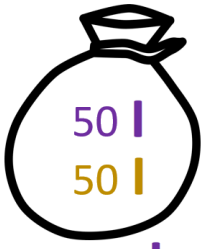
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

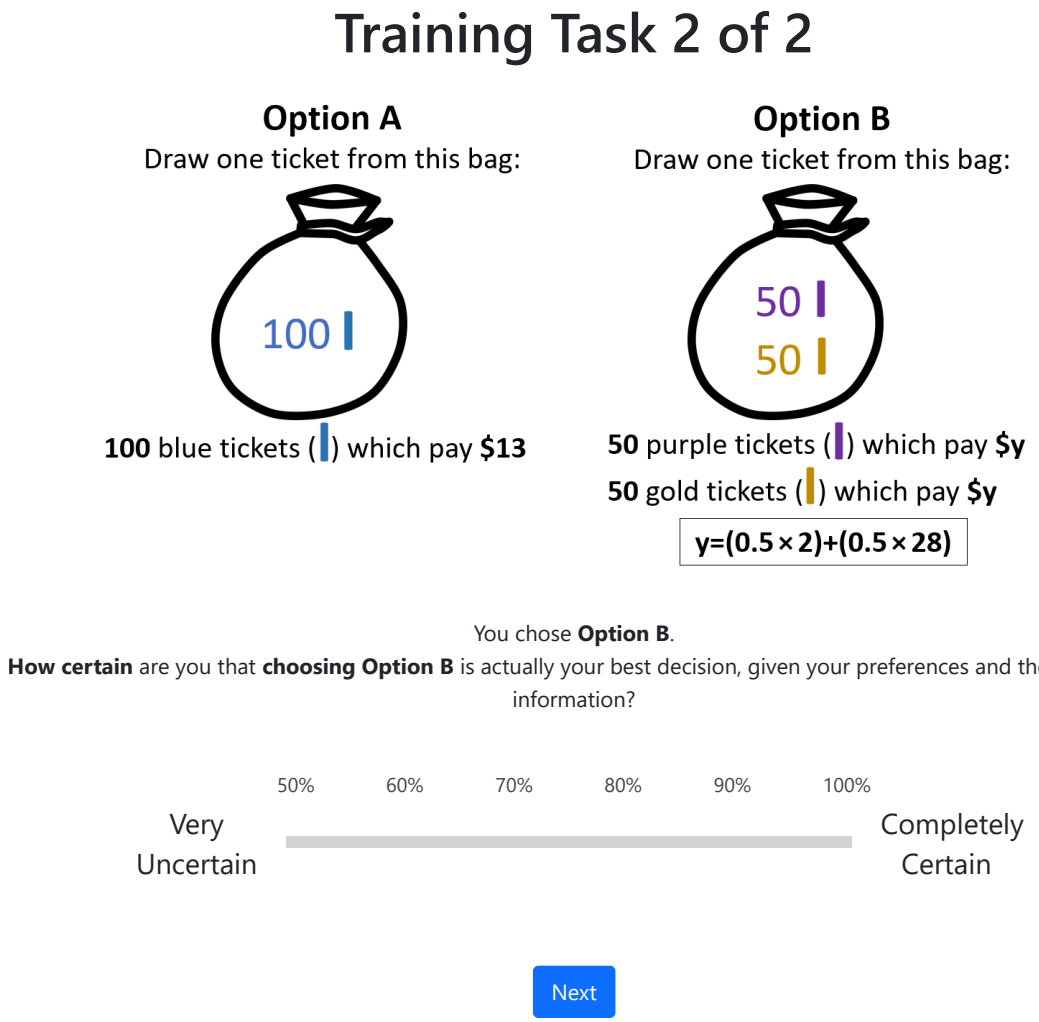
50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

Please make a choice.

Option A ○ Option B ○

Next



Screenshots of the choice tasks from Experiment 3 are omitted, as they are identical to the training tasks.

B.1.8 Additional Instructions and Tasks for Experiment 3

Understanding your overall Certainty

We asked you to report your level of certainty in each of the twenty tasks you have completed so far in this study. In some tasks, you reported a certainty level of less than 100%, indicating less-than-complete certainty in your decisions. Next, we will ask you to explain some possible reasons for your less-than-complete certainty in 6 previous choices.

Next

Understanding your overall Certainty

In the next pages, we list nine possible reasons for having less-than-complete certainty in your decisions. For each reason, we also provide an illustration. It's important to keep in mind that these are just illustrations. In a few minutes we will ask you to classify similar examples, so please review these reasons carefully.

All these examples concern an individual named Chris who must choose between attending two social events with two different groups of friends.

Next

Understanding your Overall Certainty

1. Can't Know For Sure What You'll Get: You lack certainty in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.

Here's an example of why Chris might report less-than-complete certainty for this reason:

Some of Chris's friends told him they might attend his chosen event or they might just stay home. He might express less-than-complete certainty in his decision because he can't be sure what his chosen option will yield since he doesn't know which friends will actually turn up to the event.

Next

Understanding your Overall Certainty

2. Didn't Think Carefully About What You Want: You lack certainty in your decision because you haven't thought through what you want to achieve as carefully as you could.

Here's an example of why Chris might report less-than-complete certainty for this reason:

Chris values experiences with different friends for different reasons but hasn't seriously considered whether one set of reasons is more important than another. He might express less-than-complete certainty in his decision because he hasn't carefully thought through what he wants from this social event.

Next

Understanding your Overall Certainty

3. Not Sure What Each Option Means: You lack certainty in your decision because you're not sure you interpreted the available options correctly or understood their consequences.

Here's an example of why Chris might report less-than-complete certainty for this reason:

Chris was told weeks ago which friends were attending which event, but he found some of their messages confusing and isn't sure he understood them properly. He might express less-than-complete certainty in his decision because he isn't sure he understands the consequences of choosing to attend one event vs. the other.

Next

Understanding your Overall Certainty

4. Worried About Mental Shortcuts: You lack certainty in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Here's an example of why Chris might report less-than-complete certainty for this reason:

Chris' enjoyment of social events depends on who else is there, but it's hard for him to think through the pluses and minuses of being with one large group of friends rather than another. Instead, he makes his decision based entirely on which event his friend Parker plans to attend. He might express less-than-complete certainty in his decision because he's worried that the mental shortcut he used — to only think about Parker — isn't a good one.

Next

Understanding your Overall Certainty

5. Didn't Apply Your Decision Criterion Correctly: You lack certainty in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.

Here's an example of why Chris might report less-than-complete certainty for this reason:

To simplify his choice, Chris assumed he would have the most fun at the event with the largest number of friends, so he listed the friends planning to attend each event and counted them. Right after committing to the event with the larger count, he worried that he might have miscounted. He might express less-than-complete certainty in his decision because he now thinks the criterion he decided to use and the simplifying assumption he made might actually favor an alternative other than the one he chose.

Next

Understanding your Overall Certainty

6. Multiple Views About What You Want: You lack certainty in your decision because, in your view, there's probably more than one right way to think about what you want to achieve.

Here's an example of why Chris might report less-than-complete certainty for this reason:

Chris values experiences with different friends for different reasons and, after careful consideration, doesn't think one set of reasons is necessarily more or less important than another. He might express less-than-complete certainty in his decision because he doesn't think there's just one right way to think about what he wants from either social event.

Next

Understanding your Overall Certainty

7. Don't Know How You'll Feel: You lack certainty in your decision because you aren't sure how you will feel about each of the possible outcomes.

Here's an example of why Chris might report less-than-complete certainty for this reason:

Chris enjoys different friends in different moods and is uncertain what his mood will be when the event arrives. He might express less-than-complete certainty in his decision because he isn't sure how he will feel about being with each group of friends.

Next

Understanding your Overall Certainty

8. It's Nearly a Toss-Up: You lack certainty in your decision because you think the choice is close to a toss-up.

Here's an example of why Chris might report less-than-complete certainty for this reason:

After assessing the desirability of each event, Chris concludes that he would enjoy them about the same. However, because he is slightly unsure about each assessment, either one might be slightly better. He might express less-than-complete certainty in his decision because he thinks it is nearly a toss-up.

Next

Understanding your Overall Certainty

9. Other Reasons: You lack certainty in your decision for other reasons.

Here's an example of why Chris might report less-than-complete certainty for this reason:

Chris may have other reasons for expressing less-than-complete certainty in his decision that we haven't mentioned.

Next

Explaining the Reasons for your Overall Certainty

When you reported your overall certainty in each choice, any answer below 100% indicated that you had less-than-complete certainty. We want to understand your reasons for reporting less-than-complete certainty.

For each reason on the previous screens, you will indicate the degree to which it accounted for your less-than-complete certainty. For example, if you rated your certainty as 60%, we want to know the extent to which each reason was responsible for you answering 60% rather than 100%. In each case, you will answer on a scale of **1 (Very Little)** to **7 (Very Much)**. So if you rated your overall certainty as 60%, you would give a 1 for a particular reason if it had very little to do with saying your certainty was 60% rather than 100%, and you would give a 7 if it had a great deal to do with saying your certainty was 60% rather than 100%.

Please proceed to see an example of how the questions will look.

Next

Example

Imagine your overall certainty in a choice was 60% rather than 100%. You would then face the following question:

Your overall certainty was 60% rather than 100%. For each reason listed below, please indicate the degree to which it accounted for your less-than-complete certainty (in other words, the fact that you reported 60% rather than 100%). In each case, select a number from **1 (Very Little)** to **7 (Very Much)**.

1. Can't Know For Sure What You'll Get: You lack certainty in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

2. Didn't Think Carefully About What You Want: You lack certainty in your decision because you haven't thought through what you want to achieve as carefully as you could.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

3. Not Sure What Each Option Means: You lack certainty in your decision because you're not sure you interpreted the available options correctly or understood their consequences.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

4. Worried About Mental Shortcuts: You lack certainty in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

5. Didn't Apply Your Decision Criterion Correctly: You lack certainty in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

6. Multiple Views About What You Want: You lack certainty in your decision because, in your view, there's probably more than one right way to think about what you want to achieve.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

7. Don't Know How You'll Feel: You lack certainty in your decision because you aren't sure how you will feel about each of the possible outcomes.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

8. It's Nearly a Toss-Up: You lack certainty in your decision because you think the choice is close to a toss-up.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

9. Other Reasons: You lack certainty in your decision for other reasons.

Click **here** to reread a clarifying example.

Very Little ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 Very Much

Next

Check your Understanding

We will now check your understanding of the different reasons for expressing less-than-complete certainty, and of how you should report the importance of different reasons. **If you answer at least 3 of 4 questions correctly, you will receive an extra $1 payment, so it's in your interests to take them seriously!**

Next

Test your Understanding

Question 1: Susan is deciding between two options. Option A is an apple. Option B is either a pear or an orange depending on whether Yellow comes before Blue on the color spectrum (i.e., the order of the rainbow). If Yellow comes before Blue then Option B is definitely a pear. If Yellow comes after Blue then Option B is definitely an orange. Susan doesn't recall the color spectrum precisely but remembers learning the acronym "ROY G BIV" for the colors of the rainbow. She thinks the "Y" stands for Yellow and the "B" stands for Blue, which would imply that Yellow comes before Blue, but she really isn't sure. She makes her decision as if Option B is a pear. She likes pears much more than apples so she chooses the pear. However, she reports an overall certainty in her decision of less than 100% because she is not that sure about the accuracy of the "ROY G BIV" acronym she used when making her choice.

Which of the following reasons should Susan mark as contributing "Very Much" to her less-than-complete certainty?

- ○ **Didn't Think Carefully About What You Want**: You lack certainty in your decision because you haven't thought through what you want to achieve as carefully as you could.
- ○ **It's Nearly a Toss-Up**: You lack certainty in your decision because you think the choice is close to a toss-up.
- ○ **Worried About Mental Shortcuts**: You lack certainty in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Next

Test your Understanding

Question 2: Edward is deciding between two options. Option A is a box of oatmeal cookies, while Option B is a box of assorted chocolates. For Option B, he won't know which types of chocolates are in the box until he opens it. He knows he likes all types of chocolate more than oatmeal cookies, so he chooses Option B. He expresses an overall certainty in his decision of less than 100% because there's no way for him to know which chocolates are in the box.

Which of the following reasons should Edward mark as contributing "Very Much" to his less-than-complete certainty?

- ○ **Can't Know For Sure What You'll Get**: You lack certainty in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.
- ○ **Didn't Apply Your Decision Criterion Correctly**: You lack certainty in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.
- ○ **Worried About Mental Shortcuts**: You lack certainty in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Next

Test your Understanding

Question 3: Samantha is deciding between two boxes. Box A contains either an apple or a pear, while Box B contains either one dollar or ten cents. The boxes are labeled with their exact contents, but the labels are written in a foreign language that Samantha has not studied. She does her best to guess what the words mean based on similarities to words in languages she knows. She concludes that Box A probably contains an apple while Box B probably contains one dollar. She chooses Box A because she prefers an apple to one dollar. She expresses an overall certainty in her decision of less than 100% because she's not sure she correctly translated the labels on the boxes.

Which of the following reasons should Samantha mark as contributing "Very Much" to her less-than-complete certainty?

- ○ **Didn't Think Carefully About What You Want**: You lack certainty in your decision because you haven't thought through what you want to achieve as carefully as you could.
- ○ **Not Sure What Each Option Means**: You lack certainty in your decision because you're not sure you interpreted the available options correctly or understood their consequences.
- ○ **Worried About Mental Shortcuts**: You lack certainty in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Next

Test your Understanding

Question 4: Jude is deciding between the same two boxes as Samantha in the previous problem. Box A contains either an apple or a pear, while Box B contains either one dollar or ten cents. The boxes are labeled with their exact contents but the labels are written in a foreign language. Unlike Samantha, Jude can read the language and is fairly certain Box A contains an apple while Box B contains one dollar. An apple is worth more than a dollar to him, so he intends to select Box A. But after making his choice, he thinks he may have accidentally recorded his selection as Box B, containing the dollar. For that reason, he expresses an overall certainty in his decision of less than 100%.

Which of the following reasons should Jude mark as contributing "Very Much" to his less-than-complete certainty?

- ○ **Not Sure What Each Option Means**: You lack certainty in your decision because you're not sure you interpreted the available options correctly or understood their consequences.
- ○ **Didn't Apply Your Decision Criterion Correctly**: You lack certainty in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.
- ○ **It's Nearly a Toss-Up**: You lack certainty in your decision because you think the choice is close to a toss-up.

Next

Explaining the Reasons for your Overall Certainty

We will now ask you to provide the reasons for your overall certainty in 6 decisions that you made in this study.

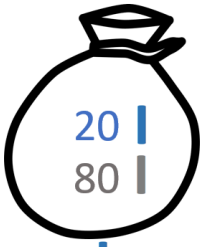
Next

Explaining the Reasons for your Overall Certainty: Task 1

In a previous task you decided between the following two options:

Option A

Draw one ticket from this bag:

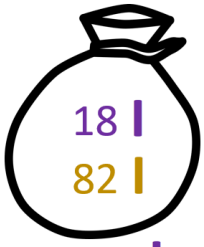


20 blue tickets ( ) which pay **$28**

80 grey tickets ( ) which pay **$0**

Option B

Draw one ticket from this bag:



18 purple tickets ( ) which pay **$30**

82 gold tickets ( ) which pay **$0**

You selected **Option B** and reported a **76%** certainty in your choice.

For each reason listed below, please indicate the degree to which it accounted for your less-than-complete certainty (in other words, the fact that you reported 76% rather than 100%). In each case, select a number from **1 (Very Little)** to **7 (Very Much)**.

Multiple Views About What You Want: You lack certainty in your decision because, in your view, there's probably more than one right way to think about what you want to achieve.

Click **here** to reread a clarifying example.

Very Little ○1 ○2 ○3 ○4 ○5 ○6 ○7 Very Much

Don't Know How You'll Feel: You lack certainty in your decision because you aren't sure how you will feel about each of the possible outcomes.

Click **here** to reread a clarifying example.

Very Little ○1 ○2 ○3 ○4 ○5 ○6 ○7 Very Much

Not Sure What Each Option Means: You lack certainty in your decision because you're not sure you interpreted the available options correctly or understood their consequences.

Click **here** to reread a clarifying example.

Very Little ○1 ○2 ○3 ○4 ○5 ○6 ○7 Very Much

Didn't Apply Your Decision Criterion Correctly: You lack certainty in your decision because you think the criterion you decided to use and any simplifying assumptions you made may actually favor an alternative other than the alternative that you chose.

Click **here** to reread a clarifying example.

Very Little	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	Very Much

It's Nearly a Toss-Up: You lack certainty in your decision because you think the choice is close to a toss-up.

Click **here** to reread a clarifying example.

Very Little	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	Very Much

Worried About Mental Shortcuts: You lack certainty in your decision because you're worried about having used a mental shortcut that might have given the wrong answer.

Click **here** to reread a clarifying example.

Very Little	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	Very Much

Didn't Think Carefully About What You Want: You lack certainty in your decision because you haven't thought through what you want to achieve as carefully as you could.

Click **here** to reread a clarifying example.

Very Little	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	Very Much

Can't Know For Sure What You'll Get: You lack certainty in your decision because, based on the information you've received, you can't be sure what you will receive given your chosen option.

Click **here** to reread a clarifying example.

Very Little	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	Very Much

Other Reasons: You lack certainty in your decision for other reasons.

Click **here** to reread a clarifying example.

Very Little	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	Very Much

Next

B.1.9 Instructions and Training: Risky Tasks in Experiment 4

Hello and Welcome

Welcome, and thanks for your participation!

We are researchers from Caltech, Stanford, and The Ohio State University, inviting you to participate in a research study. The study should take roughly 15 to 20 minutes. Please click to review information about the study and to give your consent to participate.

Next

Prolific ID

You will be paid via Prolific for your participation in this study. In order to pay you, we need your Prolific ID.

Please enter your Prolific ID:

Next

Possible Rewards

You will receive $4.00 if you complete the entire study.

In addition to this payment, you have a 1 in 5 chance of being eligible to receive a bonus payment. The smallest possible bonus payment is $0 and the largest possible bonus payment is $30.

You will be informed of how your decisions will influence your bonus payment if you are eligible to receive one.

Next

This Study

In this study, you will complete tasks in two separate blocks. If you are selected for a bonus payment, one of these blocks will be chosen at random. Within each block, we will explain how your bonus would be determined if that block is selected. Please click to learn about Block 1.

Next

Description of Block 1

In Block 1, you will complete 10 tasks, each of which involves your preferences over two options. The first option will always be called **Option A**. The second option will always be called **Option B**.

Option A and Option B refer to the possibility of winning monetary amounts ranging from $0 to $30 with some fixed chances. In each task, you will decide whether you prefer Option A or Option B.

Next

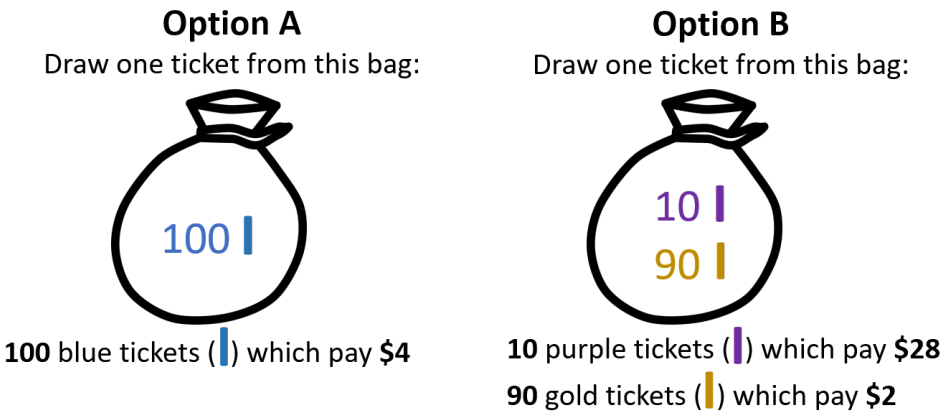
Example Options in Block 1

We will now introduce you to the types of options that you will encounter in Block 1 and the choices you will make.

Next

Example Options in Block 1

Consider the following example:



In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $4.
- Option B allows you to draw one ticket from a bag containing 10 purple tickets ( ) and 90 gold tickets ( ). Each purple ticket pays $28, and each gold ticket pays $2.

Therefore:

- Option A allows you to win $4 with a 100 in 100 chance.
- Option B allows you to win $28 with a 10 in 100 chance, or $2 with a 90 in 100 chance.

Next

How will you make choices in Block 1?

In each task, we will show you two options and will ask you to choose between the following two answers:

1. I prefer Option A
2. I prefer Option B

Next

Familiarize Yourself with Block 1

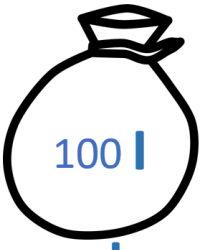
- We now ask you to complete one training task to familiarize yourself with the choices you will make in Block 1.
- As you will notice from the training task, in this study after you confirm an answer *you will not be able to modify it*.
- For this reason, we ask you to think carefully before confirming your answers. After the training, we will explain how your answers in Block 1 may affect your bonus.

Next

Training Task - Block 1

Option A

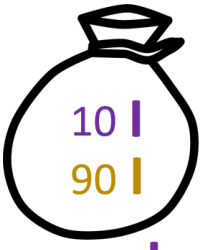
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Which option do you **prefer**?

I prefer Option A ○

I prefer Option B ○

Next

Bonus Payment in Block 1

Congratulations! You have completed your training task! You are now ready to learn more about how your potential bonus payment will be determined if Block 1 is selected.

We call **potential bonus payment in Block 1** an additional amount of money that you may receive at the end of the study, in addition to your participation fee. The potential bonus payment in Block 1 will **only** be paid if certain conditions are met.

First, we will explain how the potential bonus payment in Block 1 is determined. Then, we will describe the conditions under which you may receive it.

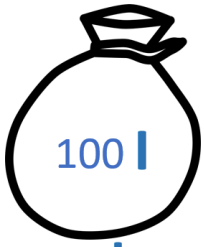
Next

Determining Your Potential Bonus Payment in Block 1

To determine your potential bonus payment in Block 1, we will randomly select one task from Block 1 as the **task-that-counts**. For example, the task-that-counts in Block 1 could be the one illustrated below.

Option A

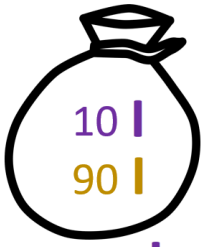
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

If you preferred **Option A** in the task-that-counts, then Option A will be implemented, and we will draw a single ticket from that bag.

- A blue ticket will definitely be chosen, so your potential bonus payment will be $4.

If you preferred **Option B** in the task-that-counts, then Option B will be implemented, and we will draw a single ticket from that bag.

- If a purple ticket is drawn, then your potential bonus payment will be $28.
- If a gold ticket is drawn, then your potential bonus payment will be $2.

Because any task in Block 1 could be selected as the task-that-counts, you should make each choice as if it could determine your potential bonus payment.

Next

Conditions for Your Bonus Payment in Block 1

You will receive your potential bonus payment in Block 1 at the end of the study **only if** two conditions are met:

1. Block 1 is randomly selected to determine your potential bonus payment.
2. After we compute your potential bonus payment from Block 1, we will draw a number between 1 and 5. If the drawn number is 1, you will be eligible to receive the potential bonus payment. Otherwise, you will not receive a bonus payment.

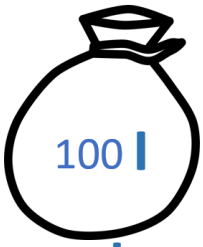
Next

Conditions for Your Bonus Payment in Block 1 - Example

Suppose again that the task-that-counts in Block 1 is the one illustrated below.

Option A

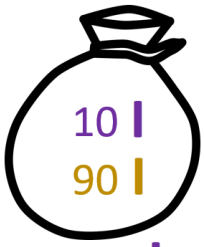
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Imagine that you chose Option B, and a purple ticket was drawn, resulting in a potential bonus payment of $28.

You will receive $28 as your bonus payment at the end of the experiment if both of the following conditions are met:

1. Block 1 is selected to determine your potential bonus payment.
2. You are eligible to receive this potential bonus payment.

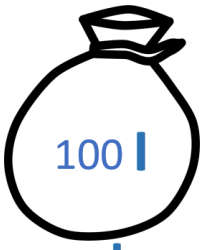
Next

Test your Understanding

Suppose that this is the task-that-counts in Block 1:

Option A

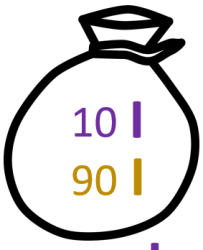
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Here are a few questions to test your understanding:

How is your potential bonus payment in Block 1 determined?

- ○ Draw a ticket from the bag corresponding to the option that you preferred.
- ○ Always draw a ticket from the bag corresponding to Option A.
- ○ Always draw a ticket from the bag corresponding to Option B.
- ○ Draw a ticket from the bag corresponding to Option A with a 50 in 100 chance or from the bag corresponding to Option B with a 50 in 100 chance.

What is your potential bonus payment in Block 1 if you preferred Option B and a purple ticket is drawn?

- ○ $2
- ○ $28
- ○ $15
- ○ $4

Under what condition will you receive the potential bonus payment in Block 1 at the end of the experiment?

- ○ I will receive the potential bonus payment in Block 1 only if I am eligible and Block 1 is selected to determine my potential bonus payment. I have a 1 in 4 chance of being eligible.
- ○ I will receive the potential bonus payment in Block 1 only if I am eligible and Block 1 is selected to determine my potential bonus payment. I have a 1 in 2 chance of being eligible.
- ○ I will receive the potential bonus payment in Block 1 only if I am eligible and Block 1 is selected to determine my potential bonus payment. I have a 1 in 5 chance of being eligible.
- ○ I will receive the potential bonus payment in Block 1 only if I am eligible and Block 1 is selected to determine my potential bonus payment. I have a 1 in 3 chance of being eligible.

Next

Screenshots of the choice tasks from Experiment 4 are omitted, as they are identical to the training tasks.

B.1.10 Final Questions: Risky Tasks in Experiment 4

Congratulations!

You've completed the 10 tasks of Block 1! Before proceeding to Block 2, we ask you to answer a few additional questions about how you made your choices in Block 1.

Your answers to these questions will not affect your potential bonus payment or your chances of receiving it, but they are important for our research. Therefore, we ask you to respond thoughtfully.

Next

The first question presented to all subjects is:

Additional Questions - Block 1

When you were making your decisions in Block 1, did you make any mathematical calculations to arrive at your choices? By "mathematical calculation" we mean any use of mathematical operations such as addition, subtraction, multiplication, or division.

- ○ Yes
- ○ No

Next

If subjects answer "Yes" to the first question, the second question is:

Additional Questions - Block 1

You indicated that you performed a mathematical calculation to arrive at your choices. Did you calculate a mean, an average, or an expected value, or did you calculate something else?

- ○ Mean/average/expected value
- ○ Something else

Next

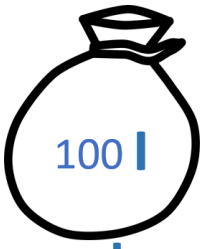
If subjects answer "Yes" to the first question, they are asked to complete the following task regardless of their response to the second question:

Explain your Choices

One of the questions you encountered in Block 1 is shown below. Please describe in detail the mathematical calculation(s) you performed in Block 1 using this question as an example, and please explain how these calculations influenced your choice.

Option A

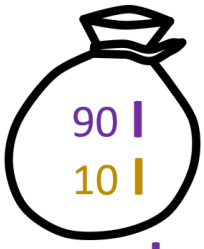
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$26**

Option B

Draw one ticket from this bag:



90 purple tickets ( ) which pay **$30**

10 gold tickets ( ) which pay **$0**

Type your response here...

Next

If subjects answer "No" to the first question, the second question is:

Additional Questions - Block 1

You indicated that you did not perform mathematical calculations to arrive at your choices. Is this because mathematical calculations are not necessary for you to figure out which option you prefer? Or, would mathematical calculations have helped you figure out which option you prefer, but these calculations require too much time/effort/ energy etc.? Or, was it for some other reason?

- ○ Mathematical calculations are not necessary for me to figure out which option I prefer
- ○ Mathematical calculations would have helped me figure out which option I prefer, but these calculations require too much time/effort/ energy etc.
- ○ Other reason

Next

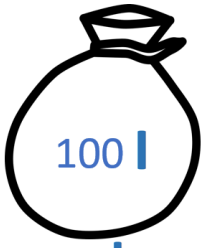
If subjects answer "No" to the first question and select "Mathematical calculations would have helped me figure out which option I prefer, but these calculations require too much time/effort/energy etc." in the second question, they are asked to complete the following task:

Describe your Mathematical Calculation(s)

One of the questions you encountered in Block 1 is shown below. Please describe the mathematical calculation(s) you would need to perform using this question as an example, and please explain how these calculations would influence your choice. You do not need to actually perform the calculation, but please just describe what it would be.

Option A

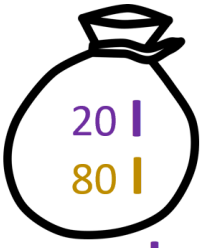
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$7**

Option B

Draw one ticket from this bag:



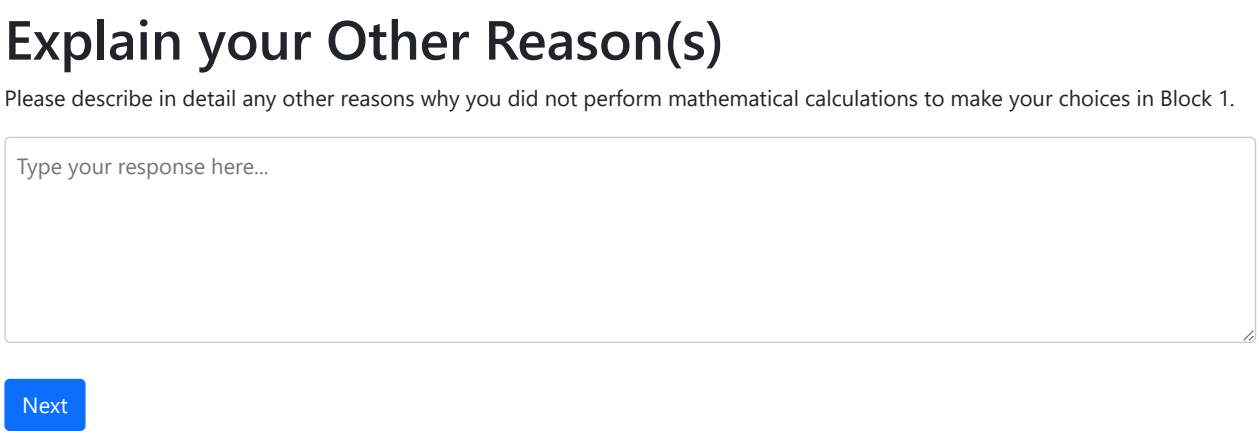
20 purple tickets ( ) which pay **$30**

80 gold tickets ( ) which pay **$0**

Type your response here...

Next

If subjects answer "No" to the first question and select "Other reason" in the second question, they are asked to complete the following task:



B.1.11 Instructions and Training: Risk-Free Tasks in Experiment 4

Description of Block 2

In Block 2, you will complete 10 tasks involving your preferences between two options, each of which **guarantees** a fixed monetary prize **with certainty**. The first option will always be called **Option A**. The second option will always be called **Option B**.

In each task, you will decide whether you prefer Option A or Option B.

Next

Example Options in Block 2

We will now introduce you to the types of options that you will encounter in Block 2 and the choices you will make.

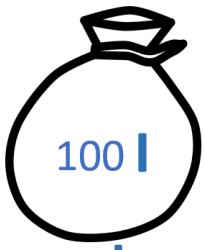
Next

Example Options in Block 2

Consider the following example:

Option A

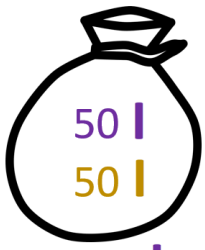
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $13.
- Option B allows you to draw one ticket from a bag containing 50 purple tickets ( ) and 50 gold tickets ( ). Each purple ticket pays $y and each gold ticket pays $y. $y is an amount equal to (0.5 × 2) + (0.5 × 28) that you can calculate. In this example, y is equal to 15.

Therefore, both Option A and Option B **do not involve any risk**:

- Option A allows you to win $13 with a 100 in 100 chance.
- Option B allows you to win $15 with a 100 in 100 chance.

Next

How will you make choices in Block 2?

In each task, we will show you two options and will ask you to choose between the following two answers:

1. I prefer Option A
2. I prefer Option B

Next

Familiarize Yourself with Block 2

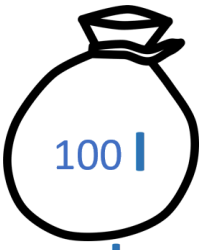
- We now ask you to complete one training task to familiarize yourself with the choices you will make in Block 2.
- As you will notice from the training task, in this study after you confirm an answer *you will not be able to modify it*.
- For this reason, we ask you to think carefully before confirming your answers. After the training, we will explain how your answers in Block 2 may affect your bonus.

Next

Training Task - Block 2

Option A

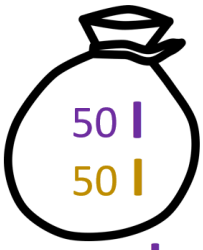
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

Remember, this task **DOES NOT INVOLVE ANY RISK.** When a bag contains tickets of more than one color, all of them give **the same payment**.

Which option do you **prefer**?

I prefer Option A ○

I prefer Option B ○

Next

Bonus Payment in Block 2

Congratulations! You have completed your training task! You are now ready to learn more about your potential bonus payment in Block 2.

We call **potential bonus payment in Block 2** an additional amount of money that you may receive at the end of the study, in addition to your participation fee. The potential bonus payment in Block 2 will **only** be paid if certain conditions are met.

First, we will explain how the potential bonus payment in Block 2 is determined. Then, we will describe the conditions under which you may receive it.

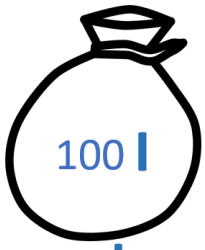
Next

Determining Your Potential Bonus Payment in Block 2

To determine your potential bonus payment in Block 2, we will randomly select one task from Block 2 as the **task-that-counts**. For example, the task-that-counts in Block 2 could be the one illustrated below.

Option A

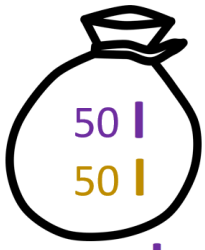
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

If you preferred **Option A** in the task-that-counts, then Option A will be implemented, and we will draw a single ticket from that bag.

- A blue ticket will definitely be chosen, so your potential bonus payment will be $13.

If you preferred **Option B** in the task-that-counts, then Option B will be implemented, and we will draw a single ticket from that bag.

- A purple or gold ticket will be drawn. Regardless of the color of the drawn ticket, your potential bonus payment will be $y. In this example, y is equal to 15.

Because any task in Block 2 could be selected as the task-that-counts, you should make each choice as if it could determine your potential bonus payment.

Next

Conditions for Your Bonus Payment in Block 2

You will receive your potential bonus payment in Block 2 at the end of the study **only if** two conditions are met:

1. Block 2 is randomly selected to determine your potential bonus payment.
2. After we compute your potential bonus payment from Block 2, we will draw a number between 1 and 5. If the drawn number is 1, you will be eligible to receive the potential bonus payment. Otherwise, you will not receive a bonus payment.

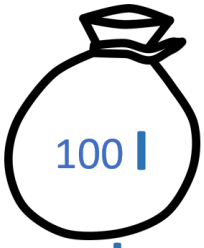
Next

Conditions for Your Bonus Payment in Block 2 - Example

Suppose again that the task-that-counts in Block 2 is the one illustrated below.

Option A

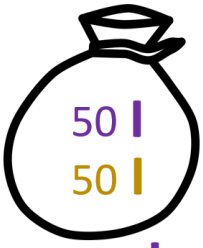
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

Imagine that you chose Option B. Regardless of which ticket will be drawn, your potential bonus payment will be $15.

You will receive $15 as your bonus payment at the end of the experiment if both of the following conditions are met:

1. Block 2 is selected to determine your potential bonus payment.
2. You are eligible to receive this potential bonus payment.

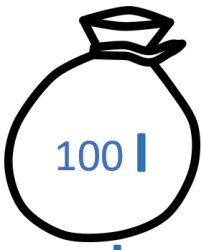
Next

Test your Understanding

Suppose that this is the task-that-counts in Block 2:

Option A

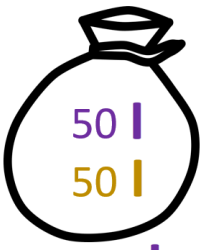
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

Here are a few questions to test your understanding:

How is your potential bonus payment in Block 2 determined?

- ○ Draw a ticket from the bag corresponding to the option that you preferred.
- ○ Always draw a ticket from the bag corresponding to Option A.
- ○ Always draw a ticket from the bag corresponding to Option B.
- ○ Draw a ticket from the bag corresponding to Option A with a 50 in 100 chance or from the bag corresponding to Option B with a 50 in 100 chance.

What is your potential bonus payment in Block 2 if you preferred Option B and a purple ticket is drawn?

- ○ $2 with a 50 in 100 chance, or $28 with a 50 in 100 chance
- ○ $28
- ○ $2
- ○ $15

Under what condition will you receive the potential bonus payment in Block 2 at the end of the experiment?

- ○ I will receive the potential bonus payment in Block 2 only if I am eligible and Block 2 is selected to determine my potential bonus payment. I have a 1 in 5 chance of being eligible.
- ○ I will receive the potential bonus payment in Block 2 only if I am eligible and Block 2 is selected to determine my potential bonus payment. I have a 1 in 2 chance of being eligible.
- ○ I will receive the potential bonus payment in Block 2 only if I am eligible and Block 2 is selected to determine my potential bonus payment. I have a 1 in 4 chance of being eligible.
- ○ I will receive the potential bonus payment in Block 2 only if I am eligible and Block 2 is selected to determine my potential bonus payment. I have a 1 in 3 chance of being eligible.

Next

Screenshots of the choice tasks from Experiment 4 are omitted, as they are identical to the training tasks.

B.1.12 Final Questions: Risk-Free Tasks in Experiment 4

Congratulations!

You've completed the 10 tasks of Block 2! Before learning about your potential bonus payment and if you are eligible to receive it, we ask you to answer a few additional questions about how you made your choices in Block 2.

Your answers to these questions will not affect your potential bonus payment or your chances of receiving it, but they are important for our research. Therefore, we ask you to respond thoughtfully.

Next

The first question presented to all subjects is:

Additional Questions - Block 2

When you were making your decisions in Block 2, did you make any mathematical calculations to arrive at your choices? By "mathematical calculation" we mean any use of mathematical operations such as addition, subtraction, multiplication, or division.

- ○ Yes
- ○ No

Next

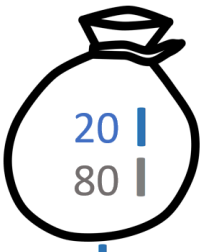
If subjects answer "Yes" to the first question, they are asked to complete the following task:

Explain your Choices

One of the questions you encountered in Block 2 is shown below. Please describe in detail the mathematical calculation(s) you performed in Block 2 using this question as an example, and please explain how these calculations influenced your choice.

Option A

Draw one ticket from this bag:



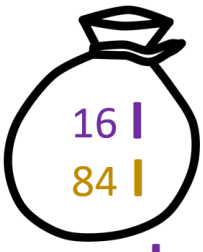
20 blue tickets ( ) which pay **$z**

80 grey tickets ( ) which pay **$z**

$$z=(0.8\times 0)+(0.2\times 23)$$

Option B

Draw one ticket from this bag:



16 purple tickets ( ) which pay **$y**

84 gold tickets ( ) which pay **$y**

$$y=(0.84\times 0)+(0.16\times 30)$$

Type your response here...

Next

If subjects answer "No" to the first question, they are asked to complete the following task:

Additional Questions - Block 2

You indicated that you did not perform mathematical calculations to arrive at your choices. Is this because mathematical calculations are not necessary for you to figure out which option you prefer? Or, would mathematical calculations have helped you figure out which option you prefer, but these calculations require too much time/effort/ energy etc.? Or, was it for some other reason?

- ○ Mathematical calculations are not necessary for me to figure out which option I prefer
- ○ Mathematical calculations would have helped me figure out which option I prefer, but these calculations require too much time/effort/ energy etc.
- ○ Other reason

Next

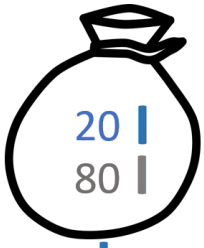
If subjects answer "No" to the first question and select "Mathematical calculations would have helped me figure out which option I prefer, but these calculations require too much time/effort/energy etc." in the second question, they are asked to complete the following task:

Describe your Mathematical Calculation(s)

One of the questions you encountered in Block 2 is shown below. Please describe the mathematical calculation(s) you would need to perform using this question as an example, and please explain how these calculations would influence your choice. You do not need to actually perform the calculation, but please just describe what it would be.

Option A

Draw one ticket from this bag:



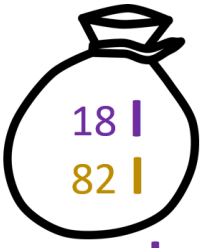
20 blue tickets ( ) which pay **$z**

80 grey tickets ( ) which pay **$z**

z=(0.8×0)+(0.2×28)

Option B

Draw one ticket from this bag:



18 purple tickets ( ) which pay **$y**

82 gold tickets ( ) which pay **$y**

y=(0.82×0)+(0.18×30)

Type your response here...

Next

If subjects answer "No" to the first question and select "Other reason" in the second question, they are asked to complete the following task:

Explain your Other Reason(s)

Please describe in detail any other reasons why you did not perform mathematical calculations to make your choices in Block 2.

Type your response here...

Next

B.1.13 Initial Instructions: All Conditions in Experiment 5

Hello and Welcome

Welcome, and thanks for your participation!

We are researchers from Caltech, Stanford, and The Ohio State University inviting you to participate in a research study. The study should take roughly 20 to 25 minutes. Please click to review information about the study and to give your consent to participate.

Next

Prolific ID

You will be paid via Prolific for your participation in this study. In order to pay you, we need your Prolific ID.

Please enter your Prolific ID:

Next

Possible Rewards

You will receive $5.00 if you complete the entire study.

In addition to this payment, you have a 1 in 5 chance of being eligible to receive a bonus payment. The smallest possible bonus payment is $0 and the largest possible bonus payment is $30.

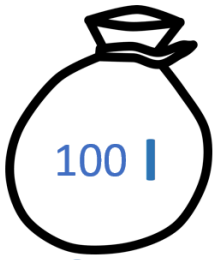
You will be informed of how your decisions will influence your bonus payment if you are eligible to receive one.

Next

This Study

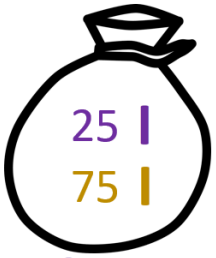
In this study, you will choose between options consisting of sets of TICKETS like the ones below:

Option A



100 blue tickets ( ) which are labeled **$7**

Option B



25 purple tickets ( ) which are labeled **$30**

75 gold tickets ( ) which are labeled **$0**

Each ticket is labeled with an amount of money ranging from $0 to $30. In some cases the computer will select one ticket from your chosen option, and in other cases it will select more than one ticket. The label on the ticket or tickets it selects will be used to determine the payment you will receive according to rules we will explain.

In the example above:

- **Option A** consists of 100 tickets labeled with **$7** each.
- **Option B** consists of 25 tickets labeled with **$30** each, and 75 tickets labeled with **$0** each.

Your job will be to decide which set of tickets (Option A or Option B) you would like the computer to pay you based on.

Next

This Study

In this study, you will complete tasks in two separate blocks. If you are selected for a bonus payment, one of these blocks will be chosen at random. Within each block, we will explain how your bonus would be determined if that block is selected. Please click to learn about Block 1.

Next

B.1.14 Instructions and Comprehension Questions for Risk-Free Tasks: Control Condition in Experiment 5

The order of Risky and Risk-Free tasks is randomized in Experiment 5. In the screenshots below, Block 1 contains Risk-Free tasks. The instructions and comprehension questions remain the same when the Risk-Free tasks are presented in Block 2.

Block 1: Select-All-Tickets

For each task in Block 1, the computer will pay you by calculating the **AVERAGE** amount of money across all 100 ticket labels for **whichever option you've chosen**. That is, it will add up the monetary value of each of the 100 ticket labels and divide that sum by 100.

Note that, because the computer will pay you the **AVERAGE** of all the 100 ticket labels, this means that there is **no risk involved** in any task. There is only one possible payment amount you can receive from a given option, and this amount is determined by the average amount of money across all 100 ticket labels.

Next

Bonus Payment in Block 1

We will refer to the additional amount of money that you may receive at the end of the study, in addition to your participation fee, as the **potential bonus payment in Block 1**. The potential bonus payment in Block 1 will **only** be paid if certain conditions are met.

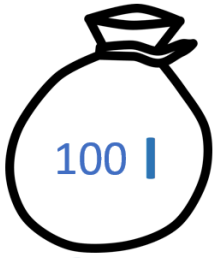
First, we will explain how the potential bonus payment in Block 1 is determined. Then, we will describe the conditions under which you may receive it.

Next

Potential Bonus Payment in Block 1

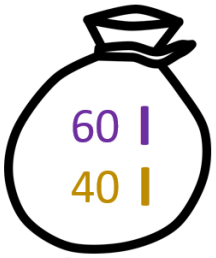
To determine your potential bonus payment in Block 1, we will randomly select one task from Block 1 as the **task-that-counts**. For example, the task-that-counts in Block 1 could be the one illustrated below.

Option A



100 blue tickets ( ) which are labeled **$17**

Option B



60 purple tickets ( ) which are labeled **$30**

40 gold tickets ( ) which are labeled **$0**

If you preferred **Option A** in the task-that-counts, your potential bonus payment will be **(100 × $17) / 100 = $17**.

If you preferred **Option B** in the task-that-counts, your potential bonus payment will be **(60 × $30 + 40 × $0) / 100 = $18**.

Because any task in Block 1 could be selected as the task-that-counts, you should make each choice as if it will determine your potential bonus payment.

Again, note that **there is no risk** in this example task. There is only one amount that you could receive from Option A (you receive $17 with 100% chance), and one amount that you could receive from Option B (you receive $18 with 100% chance).

Next

Conditions for Your Bonus Payment in Block 1

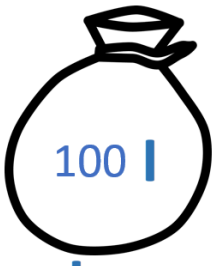
You will receive your potential bonus payment in Block 1 at the end of the study **only if** two conditions are met:

1. Block 1 is randomly selected to determine your potential bonus payment.
2. After we compute your potential bonus payment from Block 1, we will draw a number between 1 and 5. If the drawn number is 1, you will be eligible to receive the potential bonus payment. Otherwise, you will not receive a bonus payment.

Next

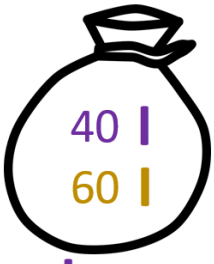
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

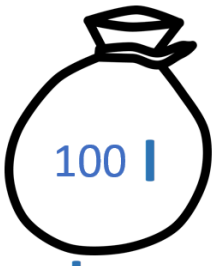
What is the chance that $30 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

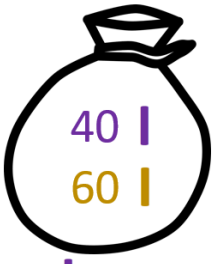
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

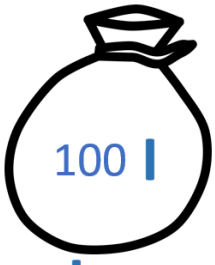
What is the chance that $12 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

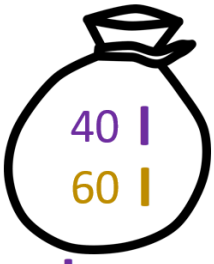
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

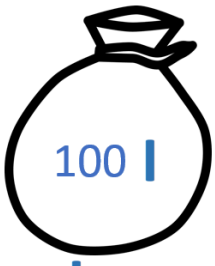
What is the chance that $11 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

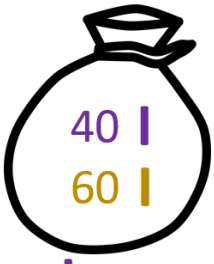
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

What is the chance that $0 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

Begin Block 1

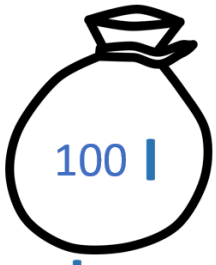
- Congratulations! You answered all the comprehension questions correctly! You are now ready to begin Block 1.
- Remember that your choices in Block 1 may affect your bonus payment if you are selected to receive one.
- Therefore, **it is in your best interest to answer the next questions thoughtfully.**
- If anything is unclear, please let us know through the Prolific anonymized internal messaging service. Otherwise, proceed to begin Block 1.

Next

Select-All-Tickets Tasks: 1 of 10

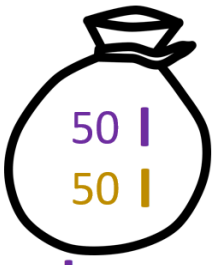
(Reminder of payment procedures)

Option A



100 blue tickets ( ) which are labeled **$14**

Option B



50 purple tickets ( ) which are labeled **$30**

50 gold tickets ( ) which are labeled **$0**

Remember, this task **DOES NOT INVOLVE ANY RISK**. When you choose an option, there is only one possible amount you can receive.

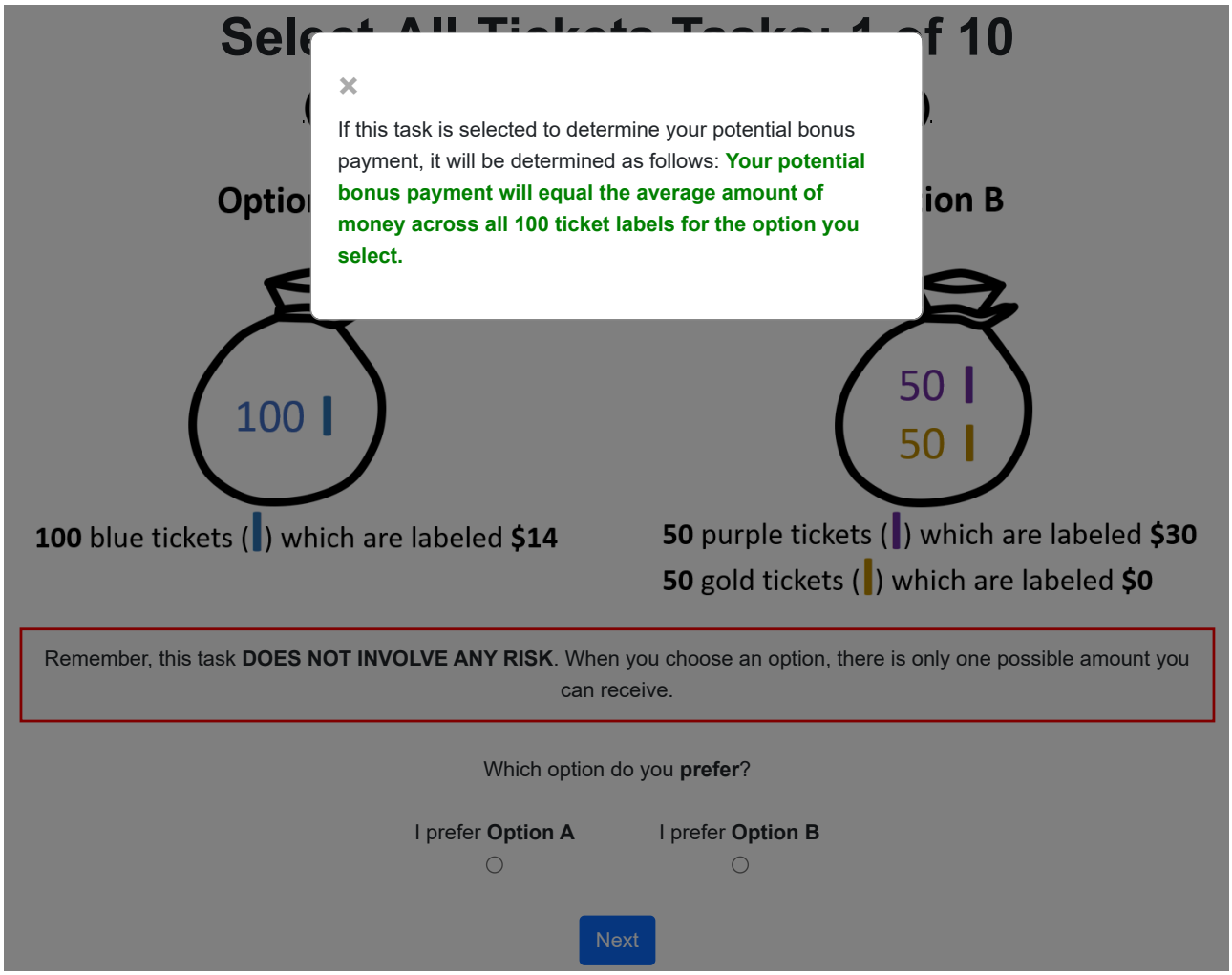
Which option do you **prefer**?

I prefer **Option A** ○

I prefer **Option B** ○

Next

The screenshot below shows the pop-up that appears when subjects click the "Reminder of payment procedures" button in the choice task.



B.1.15 Instructions and Comprehension Questions for Risky Tasks: Control Condition in Experiment 5

The order of Risky and Risk-Free tasks is randomized in Experiment 5. In the screenshots below, Block 1 contains Risky tasks. The instructions and comprehension questions remain the same when the Risky tasks are presented in Block 2.

Block 1: Select-One-Ticket

For each task in Block 1, the computer will **RANDOMLY** select one of the 100 tickets from whichever option you've chosen (each ticket in the option you chose is **EQUALLY** likely to be selected by the computer).

Note that, because the computer will **RANDOMLY** select one of the 100 tickets and pay you the value of that ticket label, there **is risk involved** in each task. There could be multiple possible amounts you can receive, and the amount that you receive would be determined by the ticket label on one randomly-selected ticket.

Next

Bonus Payment in Block 1

We will refer to the additional amount of money that you may receive at the end of the study, in addition to your participation fee, as the **potential bonus payment in Block 1**. The potential bonus payment in Block 1 will **only** be paid if certain conditions are met.

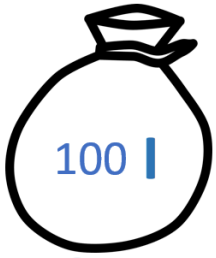
First, we will explain how the potential bonus payment in Block 1 is determined. Then, we will describe the conditions under which you may receive it.

Next

Potential Bonus Payment in Block 1

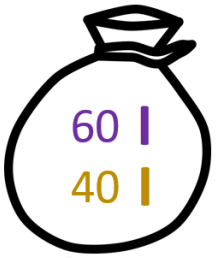
To determine your potential bonus payment in Block 1, we will randomly select one task from Block 1 as the **task-that-counts**. For example, the task-that-counts in Block 1 could be the one illustrated below.

Option A



100 blue tickets ( ) which are labeled **$17**

Option B



60 purple tickets ( ) which are labeled **$30**

40 gold tickets ( ) which are labeled **$0**

If you preferred **Option A** in the task-that-counts, your potential bonus payment will be **$17**.

If you preferred **Option B** in the task-that-counts, your potential bonus payment will be **$30 with a 60 in 100 chance**, or **$0 with a 40 in 100 chance**.

Because any task in Block 1 could be selected as the task-that-counts, you should make each choice as if it will determine your potential bonus payment.

Again, note that **there is risk** involved in this example task. There is only one amount that you could receive from Option A ($17) but there are two possible amounts that you could receive from Option B ($30 with 60% chance or $0 with 40% chance).

Next

Conditions for Your Bonus Payment in Block 1

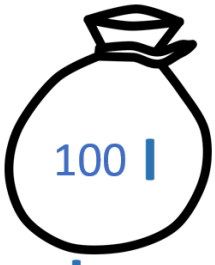
You will receive your potential bonus payment in Block 1 at the end of the study **only if** two conditions are met:

1. Block 1 is randomly selected to determine your potential bonus payment.
2. After we compute your potential bonus payment from Block 1, we will draw a number between 1 and 5. If the drawn number is 1, you will be eligible to receive the potential bonus payment. Otherwise, you will not receive a bonus payment.

Next

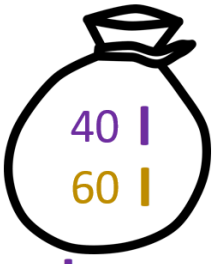
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

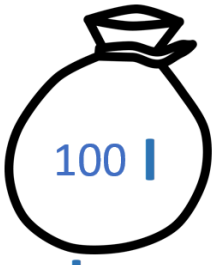
What is the chance that $30 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

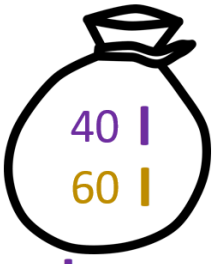
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

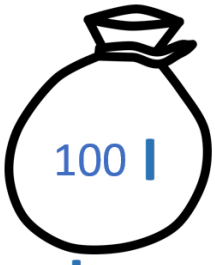
What is the chance that $12 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

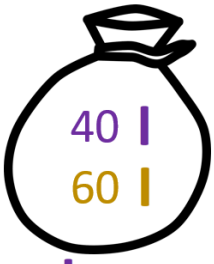
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

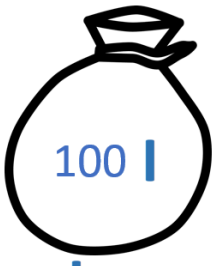
What is the chance that $11 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

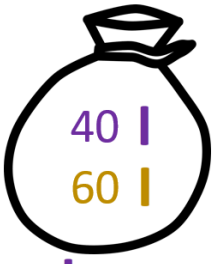
Comprehension Questions

Option A



100 blue tickets ( ) which are labeled **$11**

Option B



40 purple tickets ( ) which are labeled **$30**

60 gold tickets ( ) which are labeled **$0**

Suppose that the task in the example above is the task-that-counts in Block 1, and you chose Option B.

What is the chance that $0 is your potential bonus payment?

- ○ 0 in 100 (0%)
- ○ 40 in 100 (40%)
- ○ 60 in 100 (60%)
- ○ 100 in 100 (100%)

Submit Answer

Begin Block 1

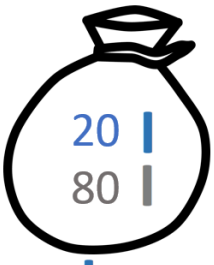
- Congratulations! You answered all the comprehension questions correctly! You are now ready to begin Block 1.
- Remember that your choices in Block 1 may affect your bonus payment if you are selected to receive one.
- Therefore, **it is in your best interest to answer the next questions thoughtfully.**
- If anything is unclear, please let us know through the Prolific anonymized internal messaging service. Otherwise, proceed to begin Block 1.

Next

Select-One-Ticket Tasks: 1 of 10

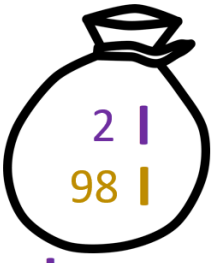
Reminder of payment procedures

Option A



20 purple tickets ( ) which are labeled **$4**
80 gold tickets ( ) which are labeled **$0**

Option B



2 purple tickets ( ) which are labeled **$30**
98 gold tickets ( ) which are labeled **$0**

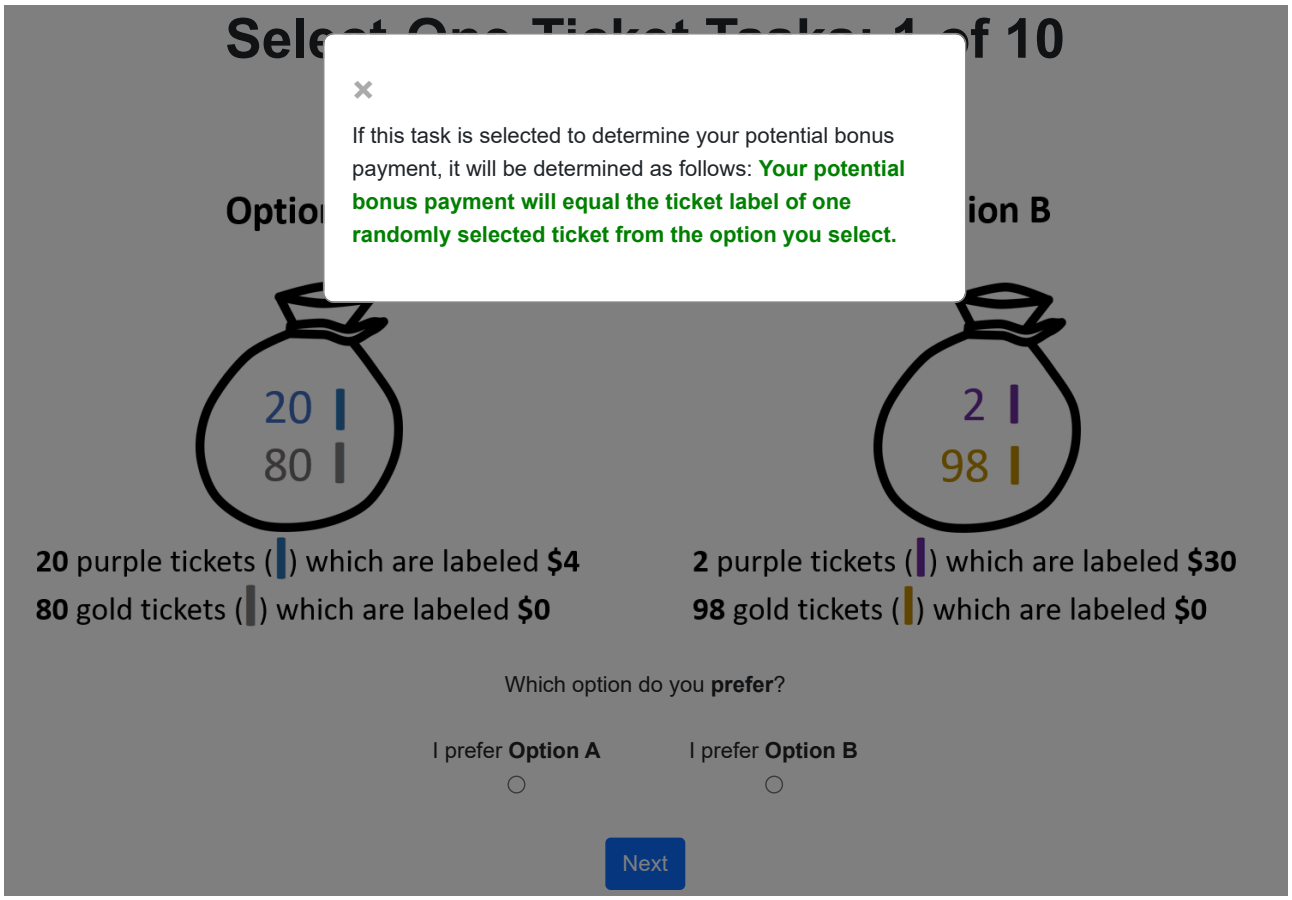
Which option do you **prefer**?

I prefer **Option A** ○

I prefer **Option B** ○

Next

The screenshot below shows the pop-up that appears when subjects click the "Reminder of payment procedures" button in the choice task.



B.1.16 Instructions and Comprehension Questions for Risk-Free Tasks: Treatment Condition in Experiment 5

The order of Risky and Risk-Free tasks is randomized in Experiment 5. In the screenshots below, Block 1 contains Risk-Free tasks. We omit the screenshots for the comprehension questions, since they are identical to those reported for the Control condition of Experiment 5 in Appendix B.1.14. The instructions and comprehension questions remain unchanged when the Risk-Free tasks are presented in Block 2.

Block 1: Select-All-Tickets

For each task in Block 1, the computer will pay you by calculating the **AVERAGE** amount of money across all 100 ticket labels for **whichever option you've chosen**. That is, it will add up the monetary value of each of the 100 ticket labels and divide that sum by 100.

Next

Bonus Payment in Block 1

We will refer to the additional amount of money that you may receive at the end of the study, in addition to your participation fee, as the **potential bonus payment in Block 1**. The potential bonus payment in Block 1 will **only** be paid if certain conditions are met.

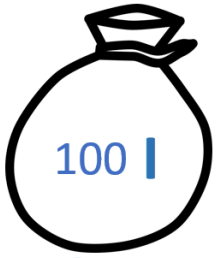
First, we will explain how the potential bonus payment in Block 1 is determined. Then, we will describe the conditions under which you may receive it.

Next

Potential Bonus Payment in Block 1

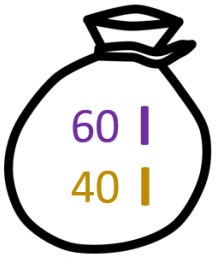
To determine your potential bonus payment in Block 1, we will randomly select one task from Block 1 as the **task-that-counts**. For example, the task-that-counts in Block 1 could be the one illustrated below.

Option A



100 blue tickets ( ) which are labeled **$17**

Option B



60 purple tickets ( ) which are labeled **$30**

40 gold tickets ( ) which are labeled **$0**

If you preferred **Option A** in the task-that-counts, your potential bonus payment will be **(100 × $17) / 100 = $17**.

If you preferred **Option B** in the task-that-counts, your potential bonus payment will be **(60 × $30 + 40 × $0) / 100 = $18**.

Because any task in Block 1 could be selected as the task-that-counts, you should make each choice as if it will determine your potential bonus payment.

Next

Conditions for Your Bonus Payment in Block 1

You will receive your potential bonus payment in Block 1 at the end of the study **only if** two conditions are met:

1. Block 1 is randomly selected to determine your potential bonus payment.
2. After we compute your potential bonus payment from Block 1, we will draw a number between 1 and 5. If the drawn number is 1, you will be eligible to receive the potential bonus payment. Otherwise, you will not receive a bonus payment.

Next

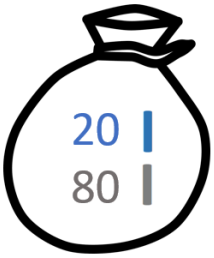
Begin Block 1

- Congratulations! You answered all the comprehension questions correctly! You are now ready to begin Block 1.
- Remember that your choices in Block 1 may affect your bonus payment if you are selected to receive one.
- Therefore, **it is in your best interest to answer the next questions thoughtfully.**
- If anything is unclear, please let us know through the Prolific anonymized internal messaging service. Otherwise, proceed to begin Block 1.

Next

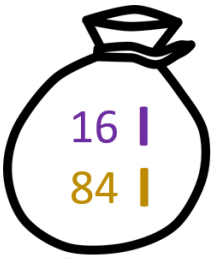
Task 1 of 10 – Block 1

Option A



20 purple tickets ( ) which are labeled **$23**
80 gold tickets ( ) which are labeled **$0**

Option B



16 purple tickets ( ) which are labeled **$30**
84 gold tickets ( ) which are labeled **$0**

Which option do you **prefer**?

I prefer **Option A** ○ I prefer **Option B** ○

Next

B.1.17 Instructions and Comprehension Questions for Risky Tasks: Treatment Condition in Experiment 5

The order of Risky and Risk-Free tasks is randomized in Experiment 5. In the screenshots below, Block 1 contains Risky tasks. We omit the screenshots for the comprehension questions, since they are identical to those reported for the Control condition of Experiment 5 in Appendix B.1.15. The instructions and comprehension questions remain unchanged when the Risk-Free tasks are presented in Block 2.

Block 1: Select-One-Ticket

For each task in Block 1, the computer will **RANDOMLY** select one of the 100 tickets from whichever option you've chosen (each ticket in the option you chose is **EQUALLY** likely to be selected by the computer).

Next

Bonus Payment in Block 1

We will refer to the additional amount of money that you may receive at the end of the study, in addition to your participation fee, as the **potential bonus payment in Block 1**. The potential bonus payment in Block 1 will **only** be paid if certain conditions are met.

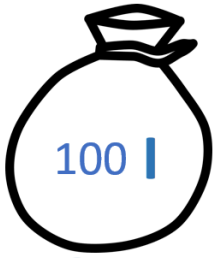
First, we will explain how the potential bonus payment in Block 1 is determined. Then, we will describe the conditions under which you may receive it.

Next

Potential Bonus Payment in Block 1

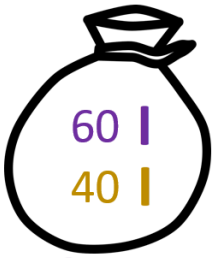
To determine your potential bonus payment in Block 1, we will randomly select one task from Block 1 as the **task-that-counts**. For example, the task-that-counts in Block 1 could be the one illustrated below.

Option A



100 blue tickets ( ) which are labeled **$17**

Option B



60 purple tickets ( ) which are labeled **$30**

40 gold tickets ( ) which are labeled **$0**

If you preferred **Option A** in the task-that-counts, your potential bonus payment will be **$17**.

If you preferred **Option B** in the task-that-counts, your potential bonus payment will be **$30 with a 60 in 100 chance**, or **$0 with a 40 in 100 chance**.

Because any task in Block 1 could be selected as the task-that-counts, you should make each choice as if it will determine your potential bonus payment.

Next

Conditions for Your Bonus Payment in Block 1

You will receive your potential bonus payment in Block 1 at the end of the study **only if** two conditions are met:

1. Block 1 is randomly selected to determine your potential bonus payment.
2. After we compute your potential bonus payment from Block 1, we will draw a number between 1 and 5. If the drawn number is 1, you will be eligible to receive the potential bonus payment. Otherwise, you will not receive a bonus payment.

Next

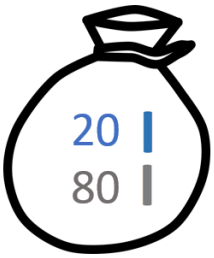
Begin Block 1

- Congratulations! You answered all the comprehension questions correctly! You are now ready to begin Block 1.
- Remember that your choices in Block 1 may affect your bonus payment if you are selected to receive one.
- Therefore, **it is in your best interest to answer the next questions thoughtfully.**
- If anything is unclear, please let us know through the Prolific anonymized internal messaging service. Otherwise, proceed to begin Block 1.

Next

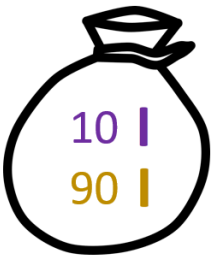
Task 1 of 10 – Block 1

Option A



20 purple tickets ( ) which are labeled **$14**
80 gold tickets ( ) which are labeled **$0**

Option B



10 purple tickets ( ) which are labeled **$30**
90 gold tickets ( ) which are labeled **$0**

Which option do you **prefer**?

I prefer **Option A** ○ I prefer **Option B** ○

Next

B.1.18 Instructions and Follow-up Questions after Block 1 and Block 2: All Conditions in Experiment 5

We omit the follow-up questions on mathematical calculations after each block, as they are identical to those reported in Appendix B.1.10 for the Risky tasks in Experiment 4 and in Appendix B.1.12 for the Risk-Free tasks in Experiment 4. Unlike Experiment 4, however, Experiment 5 includes an example to clarify what it means for subjects to use mathematical calculations, together with two comprehension questions. Both the new example and the comprehension questions are shown in the screenshots below.

We first present the screenshots from Experiment 5 following the completion of the 10 choice tasks in Block 1.

Congratulations!

You've completed the 10 tasks of Block 1! Before proceeding to Block 2, we ask you to answer a few additional questions about how you made your choices in Block 1.

Your answers to these questions will not affect your potential bonus payment or your chances of receiving it, but they are important for our research. Therefore, we ask you to respond thoughtfully.

Next

Mathematical Calculations in Block 1

We are interested in knowing whether you used any **mathematical calculations** when making your decisions in **Block 1**. First, we will explain what we mean by using "mathematical calculations" with an example, and then we will ask whether you used any while making your decisions.

Next

Mathematical Calculations: Example

Example: Jamie is trying to decide between two phone plans. Plan A allows him to keep his old phone number and costs $0.20 per minute. Plan B doesn't allow him to keep his old phone number but costs only $0.10 per minute.

Instead of simply picking the plan that feels better or sticking with the brand he usually chooses, Jamie performs some **mathematical calculations** to guide his decision. He computes his total monthly cost for phone calls under each plan and concludes that Plan B would save him $7 per month. Jamie decides that saving $7 each month is more important than keeping his old phone number, so he chooses Plan B.

Since Jamie used mathematical operations such as multiplication to calculate each plan's monthly cost and subtraction to find the monthly savings with Plan B, we would say that Jamie used mathematical calculations when making his choice.

Next

Check your Understanding about the use of Mathematical Calculations

Before asking whether you used any mathematical calculations in making your decisions, we will ask two comprehension questions to check your understanding of when someone uses mathematical calculations to make a decision.

Next

Comprehension Questions

Question 1: Jordan is choosing between two apartment listings that cost the same. Apartment A is 600 square feet and close to work. Apartment B is 800 square feet but farther from work. Jordan feels that living in a larger apartment is more important than being close to work, so he chooses Apartment B.

Was Jordan using a mathematical calculation to make his decision?

○ Yes

○ No

Submit Answer

Comprehension Questions

Question 2: Emma is choosing between two grocery stores. One store sells a 12-pack of sparkling water for $5.40, and the other sells an 18-pack for $7.20. To decide which store offers the better deal, Emma divides the total price by the number of cans at each store and compares the cost per can.

Was Emma using a mathematical calculation to make her decision?

○ Yes

○ No

Submit Answer

Mental Shortcuts in Block 1

We are interested in knowing whether you used any **mental shortcuts** when making your decisions in **Block 1**. First, we will explain what we mean by "mental shortcuts" with an example, and then we will ask whether you used any while making your decisions.

Next

Mental Shortcuts: Example

Example: Chris must choose between attending two social events with two different groups of friends. Chris' enjoyment of social events depends on who else is there, but it's hard for him to think through the pluses and minuses of being with one large group of friends rather than another.

Instead of thinking through the pluses and minuses of being with one large group of friends rather than another, Chris uses the following **mental shortcut**: he makes his decision based entirely on which event his friend Parker plans to attend.

Since Chris bases his decision entirely on which event his friend Parker plans to attend even though he cares about who else will attend, we would say that Chris used a mental shortcut in making his choice.

Next

Check your Understanding about Mental Shortcuts

Before asking whether you used any mental shortcuts in making your decisions, we will ask two comprehension questions to check your understanding of when someone uses mental shortcuts to make a decision.

Next

Comprehension Questions

Question 1: Susan is deciding between two options. Option A is an apple. Option B is either a pear or an orange depending on whether Yellow comes before Blue on the color spectrum (i.e., the order of the rainbow). If Yellow comes before Blue then Option B is definitely a pear. If Yellow comes after Blue then Option B is definitely an orange. Susan doesn't recall the color spectrum precisely but remembers learning the acronym "ROY G BIV" for the colors of the rainbow. She thinks the "Y" stands for Yellow and the "B" stands for Blue, which would imply that Yellow comes before Blue, but she really isn't sure. She makes her decision as if Option B is a pear. She likes pears much more than apples so she chooses the pear.

Was Susan using a mental shortcut to make her decision?

○ Yes

○ No

Submit Answer

Comprehension Questions

Question 2: Jude is deciding between two boxes: Box A contains either an apple or a pear, while Box B contains either one dollar or ten cents. The boxes are labeled with their exact contents but the labels are written in a foreign language. Jude can read the language and is fairly certain Box A contains an apple while Box B contains one dollar. An apple is worth more than a dollar to him, so he chooses Box A.

Was Jude using a mental shortcut to make his decision?

○ Yes

○ No

Submit Answer

Mental Shortcuts in Block 1: Question

When making your decisions in Block 1, did you rely on any mental shortcuts?

○ Yes

○ No

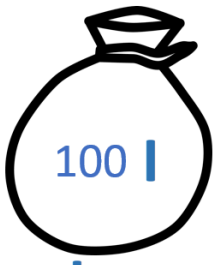
Next

If subjects answer "Yes" to the question about shortcuts, they are asked to complete the following task.

Describe your Shortcut

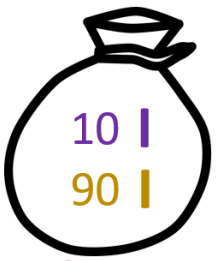
One of the tasks from Block 1 is shown below. Using this task as an example, describe in detail any shortcuts you used in that block.

Option A



100 blue tickets ( ) which are labeled **$4**

Option B



10 purple tickets ( ) which are labeled **$30**

90 gold tickets ( ) which are labeled **$0**

Please describe the shortcut you used.

Type your response here...

Next

Block 1 Completed!

You've completed Block 1! Click to learn about Block 2.

Next

Next, we present the screenshots from Experiment 5 following the completion of the 10 choice tasks in Block 2.

Congratulations!

You've completed the 10 tasks of Block 2! Before learning about your potential bonus payment and if you are eligible to receive it, we ask you to answer a few additional questions about how you made your choices in Block 2.

Your answers to these questions will not affect your potential bonus payment or your chances of receiving it, but they are important for our research. Therefore, we ask you to respond thoughtfully.

Next

Mathematical Calculations in Block 2

We are interested in knowing whether you used any **mathematical calculations** when making your decisions in **Block 2**. You will first review the example to remind yourself what we mean by using "mathematical calculations." After the example, we will ask whether you used any mathematical calculations while making your decisions.

Next

Mathematical Calculations: Example

Example: Jamie is trying to decide between two phone plans. Plan A allows him to keep his old phone number and costs $0.20 per minute. Plan B doesn't allow him to keep his old phone number but costs only $0.10 per minute.

Instead of simply picking the plan that feels better or sticking with the brand he usually chooses, Jamie performs some **mathematical calculations** to guide his decision. He computes his total monthly cost for phone calls under each plan and concludes that Plan B would save him $7 per month. Jamie decides that saving $7 each month is more important than keeping his old phone number, so he chooses Plan B.

Since Jamie used mathematical operations such as multiplication to calculate each plan's monthly cost and subtraction to find the monthly savings with Plan B, we would say that Jamie used mathematical calculations when making his choice.

Next

Mental Shortcuts in Block 2

We are interested in knowing whether you used any **mental shortcuts** when making your decisions in **Block 2**. You will first review the example to remind yourself what we mean by "mental shortcuts." After the example, we will ask whether you used any mental shortcuts while making your decisions.

Next

Mental Shortcuts: Example

Example: Chris must choose between attending two social events with two different groups of friends. Chris' enjoyment of social events depends on who else is there, but it's hard for him to think through the pluses and minuses of being with one large group of friends rather than another.

Instead of thinking through the pluses and minuses of being with one large group of friends rather than another, Chris uses the following **mental shortcut**: he makes his decision based entirely on which event his friend Parker plans to attend.

Since Chris bases his decision entirely on which event his friend Parker plans to attend even though he cares about who else will attend, we would say that Chris used a mental shortcut in making his choice.

Next

Mental Shortcuts in Block 2: Question

When making your decisions in Block 2, did you rely on any mental shortcuts?

- ○ Yes
- ○ No

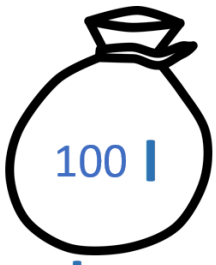
Next

If subjects answer "Yes" to the question about shortcuts, they are asked to complete the following task.

Describe your Shortcut

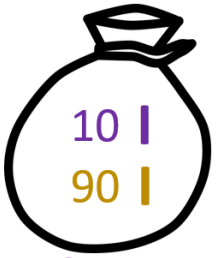
One of the tasks from Block 2 is shown below. Using this task as an example, describe in detail any shortcuts you used in that block.

Option A



100 blue tickets ( ) which are labeled **$4**

Option B



10 purple tickets ( ) which are labeled **$30**

90 gold tickets ( ) which are labeled **$0**

Type your response here...

Next

B.1.19 Instructions and Training Tasks: Experiment 6 and Experiment 7

Hello and Welcome

Welcome, and thanks for your participation!

We are researchers from Caltech, Stanford, and The Ohio State University, inviting you to participate in a research study. The study should take roughly 15 to 20 minutes. Please click to review information about the study and to give your consent to participate.

Next

Prolific ID

You will be paid via Prolific for your participation in this study. In order to pay you, we need your Prolific ID.

Please enter your Prolific ID:

Next

Possible Rewards

You will receive $4.00 if you complete the entire study.

In addition to this payment, you have a 1 in 5 chance of being eligible to receive a bonus payment. The smallest possible bonus payment is $0 and the largest possible bonus payment is $30.

You will be informed of how your decisions will influence your bonus payment if you are eligible to receive one.

Next

This Study

In this study, you will complete 20 tasks, each of which involves your preferences over two options. The first option will always be called **Option A**. The second option will always be called **Option B**.

Option A and Option B refer to the possibility of winning monetary amounts ranging from $0 to $30 with some fixed chances. In each task you are asked to answer a few questions about Option A and Option B, and to decide which option you prefer.

Next

Example Options

We will now introduce you to the types of options that you will see in this study and the choices you will make.

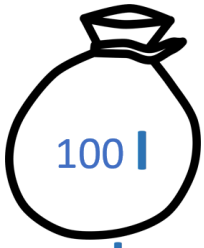
Next

Example Options 1

Consider the following example:

Option A

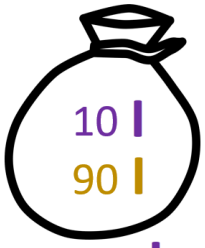
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $4.
- Option B allows you to draw one ticket from a bag containing 10 purple tickets ( ) and 90 gold tickets ( ). Each purple ticket pays $28, and each gold ticket pays $2.

Therefore,

- Option A allows you to win $4 with a 100 in 100 chance.
- Option B allows you to win $28 with a 10 in 100 chance, or $2 with a 90 in 100 chance.

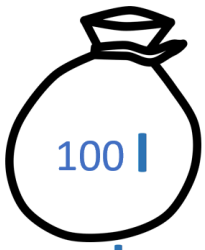
Next

Example Options 2

Consider the following example:

Option A

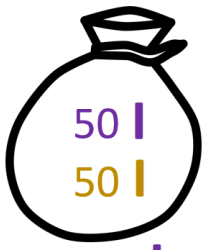
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

In this example:

- Option A allows you to draw one ticket from a bag containing 100 blue tickets ( ). Each blue ticket pays $13.
- Option B allows you to draw one ticket from a bag containing 50 purple tickets ( ) and 50 gold tickets ( ). Each purple ticket pays $y and each gold ticket pays $y. In this example, $y is an amount equal to (0.5 × 2) + (0.5 × 28) that you can calculate.

We will first ask you to compute the value of $y, which is $15 in this example. Then, we will ask you to choose between Option A and Option B.

Therefore,

- Option A allows you to win $13 with a 100 in 100 chance.
- Option B allows you to win $15 with a 100 in 100 chance.

Next

How will you make choices?

In each task, we will present you with two options and ask you to choose between the following two answers:

1. I prefer Option A
2. I prefer Option B

Before making your choice, we may ask you to perform some calculations to determine the possible monetary rewards associated with each option.

Next

Familiarize Yourself with the Study

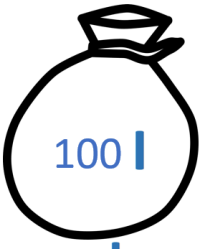
- We now ask you to complete two training tasks to familiarize yourself with the questions and the choices you will make in the study.
- As you will realize from the training taks, in this study after you confirm an answer *you will not be able to modify it*.
- For this reason, we ask you to think carefully before confirming your answers. After the training, we will explain how your answers in the study will affect your bonus.

Next

Training Task 1 of 2
Make your Decision

Option A

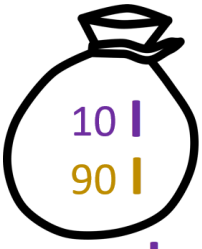
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$4**

Option B

Draw one ticket from this bag:



10 purple tickets ( ) which pay **$28**

90 gold tickets ( ) which pay **$2**

Which option do you **prefer**?

I prefer Option A ○

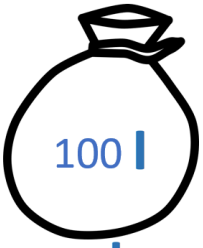
I prefer Option B ○

Next

Training Task 2 of 2
Make your Calculations

Option A

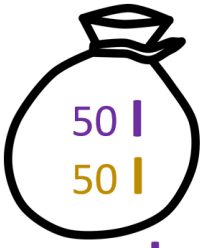
Draw one ticket from this bag:



100 blue tickets ( ) which pay **$13**

Option B

Draw one ticket from this bag:



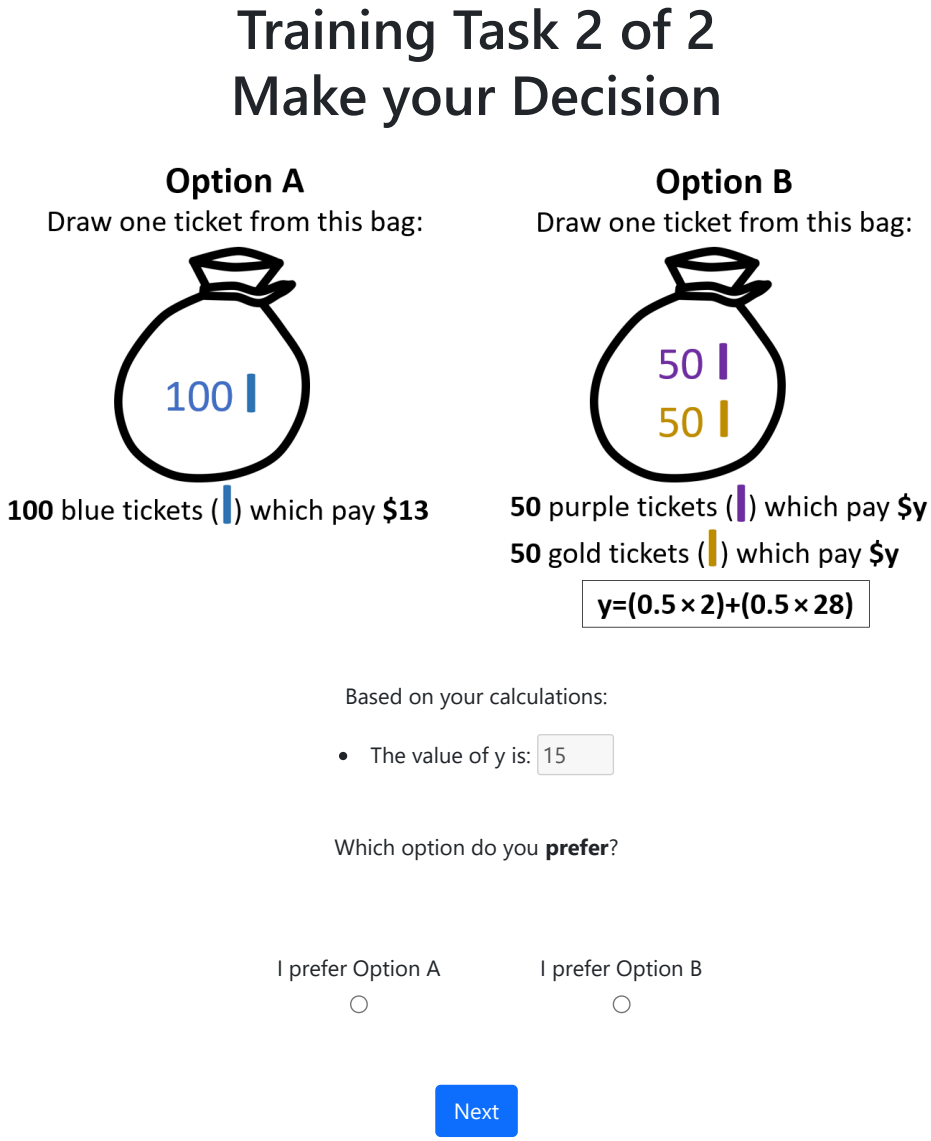
50 purple tickets ( ) which pay **$y**

50 gold tickets ( ) which pay **$y**

$$y=(0.5\times 2)+(0.5\times 28)$$

The value of y is:

Next



B.2 Machine Learning Prompts

B.2.1 Experiment 4: Prompt for ChatGPT-5 Pro

Below we reproduce verbatim the instructions provided to ChatGPT-5 Pro to code subjects' open-ended explanations of their calculations in Experiment 4.

> Use this exact rubric and do not modify it after seeing any items. Treat each item independently. Do not adapt, tune, or calibrate based on examples shown during the session.
>
> You will classify short, free-text descriptions of how subjects made choices between two options (Option A and Option B). Each option is a bag with 100 tickets labeled

with at most two monetary amounts.

Question to answer for each description: Do you think that the subject made any mathematical calculations to arrive at their choice?

Answer format:

- Output exactly one word: Yes, No, or Uncertain
- No punctuation or extra words. One line per item.
- Classify each description independently. Do not use any previous items, frequencies, or patterns to influence your decision.

Decision rules (frozen; do not adapt)

1. Answer Yes only if the subject's description contains any explicit mathematical calculation such as addition, subtraction, multiplication, or division.
2. Answer Uncertain if subjects claim to have made a mathematical calculation without actually describing it.
3. Answer No if the subjects are neither describing nor referencing a mathematical calculation.

Important notes (frozen; do not adapt)

- Treat explicit math words/symbols ("add", "sum", "difference", "times", "×", "/", "*", "=", "divide", "average/mean", "expected value/EV", "computed 20%", "0.2×\$50 + 0.8×\$0") as mathematical calculations.
- Do not infer calculations from qualitative-only reasoning ("gut", "risk-averse", "felt safer", "bigger prize", "higher chance").
- Do not infer calculations from listing or recalling the options or probabilities.
- If the subject says "did some math", "calculated", or "used EV" without showing any operation, numbers, formula, or computed result, output Uncertain.
- Option A is always expressed as a certain prize. Therefore, the fact that a subject knows the value of Option A is not useful for establishing whether a subject made a mathematical calculation.

- If a subject refers to Option B as a certain prize, assume they had to make a calculation to compute it. If they did not explain their calculation explicitly, report Uncertain. Example: If Option B is a bag with 20 tickets labeled $120 and 80 tickets labeled $0, then stating "Option B is $24 for sure" implies computing 0.2 * $120 + 0.8 * $0 = $24; if they do not show this computation, output Uncertain.
- Do not update or recalibrate these rules based on any items you are asked to classify.

B.2.2 Experiment 5: Prompt for ChatGPT-5 Pro

Below we reproduce verbatim the instructions provided to ChatGPT-5 Pro to code subjects' open-ended explanations of their shortcuts in Block 1 of Experiment 5.

> "Use this exact rubric and do not modify it after seeing any items. Treat each item independently. Do not adapt, tune, or calibrate based on examples shown during the session.
>
> You will classify short, free-text descriptions of how subjects made choices between two options (Option A and Option B). Each option is a bag with 100 tickets labeled with at most two monetary amounts.
>
> **Task types (you will not be told which one the description came from):**
>
> - Risky Tasks: After choosing, one ticket is drawn at random and the subject gets that amount.
> - Risk-Free Tasks: After choosing, the subject receives the average value of the 100 tickets.
>
> **Question to answer for each description:** Do you think the subject's preferences over risk and uncertainty impacted their decision-making process?
>
> **Answer format:**
>
> - Output exactly one word: Yes, No, or Uncertain.
> - No punctuation or extra words. One line per item.
> - Classify each description independently. Do not use any previous items, frequencies, or patterns to influence your decision.

Decision rules (frozen; do not adapt)

1. Answer Yes only if the subject's reasoning shows that perceived risk/uncertainty affected the choice. This requires at least one of:
   - They explicitly compare a guaranteed/sure outcome to a chance-based outcome and say that this impacted their choice.
   - They describe post-choice randomness (drawing, chance of getting some amount) and say that this riskiness influenced their choice.
   - They explicitly mention meta-uncertainty about their own calculation that changed their choice (e.g., "I chose Option A because I am not sure that I computed the average of Option B correctly").
2. Answer No if the reasoning is clearly independent of risk preferences, such as:
   - Pure arithmetic/expected-value calculations or tallying (e.g., multiply counts by amounts, add and divide by 100), including "ignoring zeros because 0 adds nothing," with no stated preference about risk.
   - Always choosing the higher average/amount regardless of chances or lotteries (e.g., "I prefer 10 to 5").
   - Deterministic comparisons only, with no mention that riskiness affected the choice.
3. Answer Uncertain if it's ambiguous whether risk preferences played a role, including:
   - Mentions of percentages/odds/chances used as part of a calculation without saying that riskiness influenced the choice (unless it's clear that it was Risk-Free, according to the criteria above).
   - Descriptions compatible with either Risky or Risk-Free tasks without a clear statement that randomness (or perceived randomness) changed their preference.
   - Vague statements like "better odds" or "more likely" without stating that the risk aspect drove the choice.

Important notes (frozen; do not adapt)

- Do not infer risk preference from the mere presence of zeros, percentages, or counts; those may be used to compute averages in Risk-Free tasks.

- Only classify Yes when their preference is shaped by perceived uncertainty (e.g., preferring guaranteed or known outcomes). Otherwise use No (for clearly purely arithmetic) or Uncertain (if ambiguous).
- Do not update or recalibrate these rules based on any items you are asked to classify."