Supplementary Online Appendix for Testing Models of Belief Bias: An Experiment

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This online appendix is organized as follows. Section A provides a discussion of the results and considers alternative explanations. Section B proves that there are no incentives to distort beliefs in robustness sessions. Section C considers balance tests, while Section D provides additional results and robustness checks. Section E shows examples of HIV campaigns discussed in the paper, while Section F presents the instructions.

A Discussion of Alternative Explanations of Results

The overall results of this paper cast doubt on the general optimism framework. Financial prizes P result in larger belief reports only when accuracy payments were low. At the same time, the observed patterns cannot be explained by a standard rational expectations model, where belief reports are invariant to financial stakes and the elicitation procedures. While not all belief reports are optimistically biased, introducing incentives to distort through the lottery method leads to beliefs that are 13% greater relative to robustness sessions with no incentives for distortion: 9% when moving to an accuracy payment of \$3, and 18% when moving to a payment of \$20.

While the lack of unanimity of effects presents a challenge for the framework, there are a number of useful insights. In the framework, the results suggest that mental costs must be incorporated into the theory of belief bias. Subjects may be able to distort beliefs when stakes are low, but quickly reach the limit of their ability to distort reality. Such behavior is suggestive about the functional form of the mental cost function, though it is difficult to make such attributions without knowing additional features about anticipatory utility. The implications for future empirical work are that one should look at changes from relatively small initial stakes in order to find evidence of optimistic belief formation.

Are there other models that fit the patterns observed in the data? Consider first models of bounded rationality, costly effort, or attention. A simple model of bounded rationality would predict that errors are unrelated to the experiment's parameters a and P. If one adds cognitive effort costs, it will be the case that higher marginal benefits to effort (higher a) should increase effort, and therefore increase accuracy. This is contrary to the observation that $\frac{d\hat{\pi}}{da} > 0$ for upwardly biased events. Similarly for models of inattention, increasing accuracy payments a or prize payments P would be expected to increase attention, and thus decrease bias. This is not what is observed.

Two alternative explanations are "buckling under pressure" or "satisficing". First, it is possible that individuals might make more errors when the stakes are higher, if they do not perform well under pressure. This seems implausible in the current setting as, (i) mistakes would have to be biased upwards, (ii) quiz scores are slightly higher in the \$10 and \$20 sessions relative to the \$3 sessions, and (iii) there were no differences in accuracy for the robustness sessions.

The second explanation is that subjects might only have preferences over earning a minimum amount of money during the experiment, and once this reference level of income is (ex-ante) reached they may no longer find it worthwhile to exert effort. However this does not account for the differences in reported beliefs across regular and robustness sessions for the same accuracy payment level.

Another potential explanation involves disappointment/loss aversion or regret. Individuals prone to regret, might prefer to report higher beliefs in order to avoid a situation where they faced the objective lottery, but found out that the event did occur. To preclude such channels, all counterfactual outcomes were revealed in the followup sessions.[1] Nonetheless, as results from the followup sessions in isolation were not significant, I cannot rule out that regret may have played a role in how individuals formed beliefs in primary sessions. In the case where all outcomes are revealed, the loss function is symmetric, i.e. the expected loss from reporting a higher or lower belief of the same magnitude is identical. This means that models of loss aversion (Tversky and Kahneman (1991)), disappointment aversion (Gul (1991)), or regret (Loomes and Sugden (1982)) would predict no change in decision making as a is varied.

Are there other non expected utility models that might account for the positive comparative static finding, $\frac{\partial\hat{\pi}}{\partial a} > 0$? In fact, because the lottery method is robust to any preferences that satisfy probabilistic sophistication (PS), this implies that $\hat{\pi}$ is invariant to a and P for any such preferences. Thus the result that $\frac{\partial\hat{\pi}}{\partial a} > 0$ necessarily implies that PS is violated. As it turns out, this is not surprising, as PS is violated for certain classes of models when decision makers have preferences regarding uncertainty/ambiguity, i.e. Ellsberg paradox type deviations. The BB model of optimism bias is precisely one such

[1] In the primary sessions the counterfactual outcome of whether the objective lottery paid off was not revealed all of the time. Thus individuals could report higher beliefs in order to be paid for the event more frequently, so as to avoid any regret associated with finding out the event occurred, but the objective lottery did not pay off. The other direction of this argument is that individuals might report lower beliefs, in order to avoid the regret of finding out the objective lottery paid off, but the event did not occur. Because the outcome of the objective lottery was not always revealed, an asymmetry in information existed. I thank an anonymous referee for pointing this out.

model, as it is axiomatically equivalent to a model of ambiguity seeking, i.e. the variational preferences model of Maccheroni et al. (2006) (MMR), with ambiguity seeking replacing ambiguity aversion in axiom 5 of MMR.[2]

A meaningful question is how to distinguish between a world where ambiguity seeking behavior is endogenous, driven by a subconscious desire to optimistically distort beliefs, versus one where it is exogenous, and individuals form correct beliefs but are ambiguity seeking in their choices. While this question is important, if one is solely concerned with modeling how individuals make choices, the source of ambiguity is of secondary importance. In both cases, individuals make choices as if events with some ambiguity are more likely to go in their favor.[3]

B Proof of no Incentives to Distort Beliefs in Robustness Sessions

I here consider the elicitation procedure used in the robustness sessions, and prove that there are no incentives to bias beliefs in the optimism framework.

Proof. The only financial payoff involves being in the correct interval of ± 5 percentage points, regarding the historical frequency that the event occurs. Let $b(\hat{\pi})$ be the belief report $\in [0,1]$. Let the true frequency be equal to $\pi \in [0,1]$. Due to incentive compatibility of this procedure, $b(\hat{\pi}) = \hat{\pi}$.[4] Then the monetary payoffs are:

$$\begin{cases} a & \text{if } \hat{\pi} \in [\pi - 0.05, \pi + 0.05] \\ 0 & \text{otherwise.} \end{cases}$$

Using the optimism framework:

$$\max_{\hat{\pi}\in[0,1]} \; \alpha U\big(a, b(\hat{\pi}); \pi\big) + \gamma U\big(a, b(\hat{\pi}); \hat{\pi}\big) - \beta J\big(\hat{\pi}; \pi\big) \;, \;\; \alpha \in \{0,1\}, \; \gamma \geq 0, \; \beta \in \{0,1\}. \quad \text{(B1)}$$

Subjective expected utility from anticipation is given by $\gamma u(a)$, since individuals believe they hold the correct belief. True expected utility is given by $u(a)$ if $\hat{\pi} \in [\pi - 0.05, \pi + 0.05]$, otherwise $u(0)$. Thus optimal beliefs are given by:

$$\max_{\hat{\pi}\in[0,1]} \; \alpha I[\hat{\pi}] + \gamma u(a) - \beta J\big(\hat{\pi}; \pi\big) \quad \text{(B2)}$$
$$I[\hat{\pi}] = \begin{cases} u(a), & \text{if } \hat{\pi} \in [\pi - 0.05, \pi + 0.05]. \\ u(0), & \text{otherwise .} \end{cases}$$

[2]See Bracha and Brown (2012) Section 4 for a more detailed discussion of this equivalence.

[3]While the literature typically distinguishes ambiguous risk as precluding objective risk with known (but difficult to calculate) probabilities, here I allow for the possibility that such risk may be treated as ambiguous. If not, the results more strongly suggest belief distortion, rather than ambiguity seeking.

[4]I assume for simplicity that individuals report exactly their belief. In fact one could report any $b(\hat{\pi}) \in [\hat{\pi} - 0.05, \hat{\pi} + 0.05]$.

When $\beta \neq 0$, the optimum is given by $\hat{\pi}^* = \pi$. When $\beta = 0$, any belief $\hat{\pi}^* \in [\pi - 0.05, \pi + 0.05]$ is optimal. Thus there are no incentives to distort beliefs (beyond the interval permitted, though there is no motive for a positive vs negative bias within this interval). □

C Balance Tests

By design the randomization of the prize stake of $80 is balanced across events, as the randomization was done by drawing from a number of poker chips equal to the number of subjects in the room (plus one for an odd number of subjects). Table C1 examines summary statistics for subjects in primary sessions, broken down by the number of events out of four they held a prize stake of $80, to check covariate balance.

The variable "Optimism Index" comes from the post-experiment questionnaire, where subjects were asked four questions taken from the Life Orientation Test - Revised (LOT-R) a revised version of a test used in psychology to distinguish generalized optimism versus pessimism. This revised version was developed and subsequently published by Scheier et al. (1994). Their original test involves 10 questions, however 4 are "fillers" which are not considered when constructing an index. The variable is transformed into percentiles with each of the four questions receiving equal weight. The variable should be interpreted with some caution, as the outcome of the experiment may alter reports for these questions.

From Table C1 there do not appear to be significant differences across subjects in the allocation of the $80 prize state.

Table C1: Summary Statistics: Randomization of $P \in \{\$0, \$80\}$ (By Subject-Event)

Proportion with $P = \$80$:	*0/4*	*1/4*	*2/4*	*3/4*	*4/4*	All	P-Value
Male	0.286	0.403	0.423	0.386	0.500	0.407	0.798
Age	20.929	20.987	20.674	20.451	20.714	20.714	0.414
Test Score	4.447	4.259	3.831	3.301	3.763	3.848	0.173
Econ/Math Major	0.158	0.177	0.147	0.247	0.211	0.181	0.557
Optimism Index	0.581	0.429	0.463	0.459	0.511	0.461	0.502
Risk Averse	0.357	0.299	0.303	0.282	0.214	0.295	0.935
$N^{\dagger}$	14	77	132	71	14	308	

Difference is significant at * 0.1; ** 0.05; *** 0.01. P-Value for multiple sample test of means (allows heterogeneous covariance). † N varies slightly by demographic variable.

Table C2 examines these same summary statistics grouped according to the accuracy payments at the session level for all sessions, excluding robustness. The final column tests for equality of means across all three accuracy payment groups. The difference in test "Test Score" is significant at the 10% level, which may be driven by a lower level of effort exerted for the lowest accuracy payment sessions.

Table C2: Summary Statistics: Randomization of Accuracy Payments

Accuracy:	*$3*	*$10*	*$20*	All	P-Value
Male	0.471	0.354	0.476	0.443	0.117
Age	21.196	20.753	21.076	21.037	0.229
Test Score	3.281	4.030	3.757	3.659	0.065*
Econ/Math Major	0.166	0.174	0.153	0.163	0.897
Optimism Index	0.442	0.496	0.442	0.456	0.283
Risk Averse	0.319	0.320	0.250	0.293	0.345
Observations	138	97	144	379	

Difference is significant at * 0.1; ** 0.05; *** 0.01. P-Value for multiple sample test of means (allows heterogeneous covariance). † N varies slightly by demographic variable.

Finally Table C3 examines whether there are any significant differences between the robustness sessions and the regular followup sessions. There do not appear to be any other significant differences between individuals in the robustness and regular sessions.

Table C3: Summary Statistics: Randomization of Followup Sessions

Session	Regular Followup	Robustness	All	P-Value
Male	0.600	0.558	0.582	0.644
Age	22.437	21.769	22.154	0.124
Test Score	2.923	3.163	3.015	0.579
Econ/Math Major	0.095	0.154	0.118	0.331
Optimism Index	0.432	0.480	0.453	0.370
Risk Averse	0.282	0.308	0.293	0.758
$N^{\dagger}$	71	52	123	

Difference is significant at * 0.1; ** 0.05; *** 0.01. P-Value for multiple sample test of means (allows heterogeneous covariance). $^{\dagger}N$ varies slightly by demographic variable. 1 session missing from Regular Followup due to z-Tree questionnaire error.

D Additional Results and Robustness Checks

D.1 Examining Differences Between Primary and Followup Sessions

The primary tables of interest in the main paper, Table 3 and Table 4 use pooled data from both the primary and followup sessions. A valid concern is that the absence of the prize state in followup sessions may alter belief reports. Particularly, the prize state involves a guaranteed payment of $\bar{a}$ which is not present in the followup sessions. Note that the concern is primarily with Table 4, as session fixed effects are used in Table 3.

To investigate the extent to which this is a concern I conduct a regression of belief reports, and examine an indicator variable for whether the session was a followup session. In Table D1 I compare only the $P = \$0$ treatment, since when $P = \$80$ it is expected (given the results) that there may be effects from the potential to earn the $80 prize. One can see from the table that while beliefs are slightly lower in followup sessions, the difference is not statistically significantly different. Adding further controls for the value of the accuracy payment a does not alter this finding.

Table D1: Differences Between Primary and Followup Sessions

All Events. Dependent Variable: Belief Report		
Regressor		
Followup Session	−2.395	−1.579
	(1.636)	(1.712)
$\{a = 10\}(\beta_2)$		4.298**
		(1.932)
$\{a = 20\}(\beta_3)$		4.841***
		(1.641)
Easy Dice (γ_1)	18.169***	15.117***
	(0.987)	(1.345)
Hard Dice (γ_2)	20.173***	17.141***
	(1.209)	(1.547)
Weather (γ_3)	62.017***	58.902***
	(1.454)	(1.732)
Quiz Self (γ_4)	48.080***	44.935***
	(2.154)	(2.313)
Quiz Other (γ_5)	28.221***	25.366***
	(2.295)	(2.495)
Sum Dice (γ_6)	62.371***	59.307***
	(2.844)	(3.060)
Coins (γ_7)	55.514***	52.450***
	(3.270)	(3.437)
Three Dice (γ_8)	50.049***	46.986***
	(3.213)	(3.387)
Cards (γ_9)	28.942***	25.879***
	(2.604)	(2.843)
Session Fixed Effects	NO	NO
R^2	0.42	0.42
Observations	1318	1318

Analysis uses OLS regression, excluding the $P = \$80$ treatment for comparability. Difference significant from zero at * 0.1; ** 0.05; *** 0.01. Robust standard errors clustered at individual level. R^2 corrected for no-constant.

D.2 Differences in Belief Reports: Regular vs Robustness (Table 2 in Paper)

Table D2 examines whether there are significant differences in average reported beliefs between robustness sessions and regular sessions. The coefficient on an indicator for robustness sessions, and corresponding significance levels, are those that are reported in Table 2 in the main paper.

Because the events are not balanced, and due to potential correlation within individual belief decisions, to test significance I examine a regression of belief reports on an indicator for whether the session was a robustness session (in addition to event level dummies).

In robustness sessions individuals did not estimate the probability their own performance was in the top 15%, hence the event (Quiz - Self, E_4) is not included in the analysis. Further, there is likely to be an issue with comparability of the weather event (E_3), because individuals in robustness sessions estimated the probability that another person correctly estimated the weather, while individuals in regular sessions were estimating the probability their own estimate was correct. Due to overconfidence, these are unlikely to be comparable. Hence Column 2 removes this event from the analysis.

The resulting coefficient on the indicator for robustness sessions indicates that beliefs are on average 4.2 percentage points lower in robustness sessions, significant at the 1% level. In percentage terms this corresponds to reported beliefs being lower by 13% in robustness sessions compared with regular sessions. These coefficients are reported in the final two rows of Table 2 in the main paper.

Table D2: Reported Beliefs Robustness vs Regular Sessions

All Events. Dependent Variable: Belief Report		
Regressor	All	
Robustness Session	-6.347^{***}	-4.246^{***}
	(1.515)	(1.557)
Easy Dice (γ_1)	18.216^{***}	17.975^{***}
	(0.765)	(0.760)
Hard Dice (γ_2)	20.595^{***}	20.354^{***}
	(0.826)	(0.825)
Weather (γ_3)	60.898^{***}	
	(1.076)	
Quiz Other (γ_5)	28.954^{***}	28.323^{***}
	(1.504)	(1.514)
Sum Dice (γ_6)	60.838^{***}	60.035^{***}
	(2.271)	(2.249)
Coins (γ_7)	52.596^{***}	51.793^{***}
	(2.266)	(2.317)
Three Dice (γ_8)	46.449^{***}	45.646^{***}
	(2.320)	(2.346)
Cards (γ_9)	26.669^{***}	25.866^{***}
	(1.802)	(1.835)
Session Fixed Effects	NO	NO
R^2	0.44	0.33
Observations	2087	1625

Analysis uses OLS regression. Difference significant from zero at * 0.1; ** 0.05; *** 0.01. Robust standard errors clustered at individual level. Constant omitted as $\sum_j E_j = 1$. R^2 corrected for no-constant.

D.3 Event Level Interactions

Tables D3 and D4 present the analogue of Tables 3 and 4 respectively, examining event interactions with the treatment of interest. Regarding the effect of the prize on beliefs in Table D3, for $a = 3$ it is positive for all events, though only significant for the hard dice and weather events. In the remaining columns, the interactions are both positive and negative, though never significant.

Regarding the effect of the accuracy payment in beliefs, Table D4 presents a linear specification for accuracy payments for brevity.[5] The coefficient is positive for 7 of 9 events. Overall, it is positive and significant for the hard dice event, and the two quiz events.

Table D3: Impact of Financial Prize on Beliefs - Event Level Interactions

All Events. Dependent Variable: Belief Report				
Regressor	Acc = \$3	Acc = \$10	Acc = \$20	All
$\{P = 80\}$ X Easy Dice (γ_1)	3.130	−0.656	−1.748	0.102
	(3.617)	(2.696)	(2.582)	(1.743)
$\{P = 80\}$ X Hard Dice (γ_2)	5.532*	−4.166	1.705	1.172
	(3.346)	(3.250)	(3.507)	(1.907)
$\{P = 80\}$ X Weather (γ_3)	9.159**	−0.630	−3.724	1.793
	(3.748)	(3.785)	(3.845)	(2.200)
$\{P = 80\}$ X Quiz Self (γ_4)	6.749	3.159	−3.564	2.045
	(5.607)	(6.444)	(5.325)	(3.284)
$\{P = 80\}$ X Quiz Other (γ_5)	0.225	−1.428	−4.561	−2.543
	(5.386)	(4.342)	(6.575)	(3.344)
Event Fixed Effects	YES	YES	YES	YES
Session Fixed Effects	YES	YES	YES	YES
R^2	0.41	0.55	0.45	0.45
Observations	784	436	732	1952

Primary sessions only. Analysis uses OLS regression. Difference significant from zero at * 0.1; ** 0.05; *** 0.01. Robust standard errors clustered at individual level. R^2 corrected for no-constant.

[5] A parametric specification does not alter the pattern of results.

Table D4: Impact of Accuracy Payment on Beliefs - Event Level Interactions

All Events. Dependent Variable: Belief Report			
Regressor	No Stake	Stake = \$80	All
a X Easy Dice (γ_1)	-0.028	-0.177	-0.079
	(0.119)	(0.214)	(0.107)
a X Hard Dice (γ_2)	0.280**	0.232	0.264**
	(0.139)	(0.227)	(0.121)
a X Weather (γ_3)	0.438**	-0.169	0.217
	(0.202)	(0.239)	(0.156)
a X Quiz Self (γ_4)	0.679**	0.236	0.521**
	(0.269)	(0.368)	(0.218)
a X Quiz Other (γ_5)	0.629*	0.431	0.548**
	(0.333)	(0.372)	(0.249)
a X Sum Dice (γ_6)	0.290		0.290
	(0.308)		(0.307)
a X Coins (γ_7)	0.145		0.145
	(0.325)		(0.324)
a X Three Dice (γ_8)	-0.024		-0.024
	(0.348)		(0.347)
a X Cards (γ_9)	0.190		0.190
	(0.256)		(0.255)
Event Fixed Effects	YES	YES	YES
Session Fixed Effects	NO	NO	NO
R^2	0.43	0.47	0.44
Observations	1318	634	1952

Analysis uses OLS regression. Difference significant from zero at * 0.1; ** 0.05; *** 0.01. Robust standard errors clustered at individual level. R^2 corrected for no-constant.

D.4 Interaction Between Prize and Accuracy Payments

A different empirical specification can be tested which examines the effects of both accuracy and prize payments simultaneously, including interaction terms.

$$b_{ij} = \beta_1 \cdot 1\{P_{ij} > 0\} + \beta_2 \cdot 1\{a = 10\} + \beta_3 \cdot 1\{a = 10\} + \beta_4 \cdot 1\{a = 20\} \times 1\{P_{ij} > 0\} + \beta_5 \cdot 1\{a = 20\} \times 1\{P_{ij} > 0\} + \sum_{1 \leq j \leq 9} \gamma_j \cdot E_j + \epsilon_{ij} \tag{D1}$$

The BP model predicts a negative comparative static for β_4 and β_5 whenever $P > 0$, while the prediction for the BB model and the more general framework is ambiguous. Table D5 presents results for the specification of Equation D1. The empirical results are consistent with the previous discussion, with the coefficients on the Prize and Accuracy treatments being positive and significant. The interaction terms, β_4 and β_5 are negative, with the former significant at the 5% level.

Table D5: Interaction Between Stakes and Accuracy

All Events. Dependent Variable: Belief Report	
Regressor	All
$\{P = 80\}(\beta_1)$	4.678^{**}
	(2.222)
$\{a = 10\}(\beta_2)$	4.996^{***}
	(1.844)
$\{a = 20\}(\beta_3)$	4.865^{***}
	(1.642)
$\{a = 10\} \times \{P = 80\}(\beta_4)$	-5.722^{**}
	(2.867)
$\{a = 20\} \times \{P = 80\}(\beta_5)$	-4.137
	(2.983)
Easy Dice (γ_1)	14.093^{***}
	(1.202)
Hard Dice (γ_2)	16.543^{***}
	(1.274)
Weather (γ_3)	58.552^{***}
	(1.489)
Quiz Self (γ_4)	44.431^{***}
	(1.888)
Quiz Other (γ_5)	23.635^{***}
	(1.960)
Sum Dice (γ_6)	57.717^{***}
	(2.804)
Coins (γ_7)	50.860^{***}
	(2.920)
Three Dice (γ_8)	45.396^{***}
	(3.104)
Cards (γ_9)	24.289^{***}
	(2.381)
Session Fixed Effects	NO
R^2	0.44
Observations	1952

Analysis uses OLS regression. Difference significant from zero at * 0.1; ** 0.05; *** 0.01. Robust standard errors clustered at individual level. Constant omitted as $\sum_j E_j = 1$. R^2 corrected for no-constant.

D.5 Illusion of Control

As described earlier, 50% of subjects were required to select numbers themselves for three of the events involving rolls of the dice. For example, the hard dice event involved rolling four dice, and occurred when a given number came up in exactly two of the four rolls. Subjects in the control treatment were asked to select this number, while those not in the control treatment had their number selected by the computer. Subjects were only told of their treatment, and were not aware of other subjects' conditions. For the "easy dice" and "three dice" events there were two numbers selected.

Giving subjects a sense of control was intended to examine the "illusion of control", as in Langer (1975). The illusion of control is a tendency to overestimate one's ability to exert influence over events. Here, the hypothesis is that individuals with control will believe that the dice event of interest is more likely than individuals who do not have control over selecting the numbers.

Table D6 investigates potential interactions between control and accuracy or prize payments. From this table it is possible to see that control does not lead to more optimistic estimates of the probability of events.

Table D7 examines the same test of Prediction 1 in Table 3 Column 1 for the sample where the accuracy payment is $3, but restricted only to the two events involving rolls of the dice. One can see that, for the dice events only, the positive effect of having an $80 stake is entirely driven by individuals who have control over selecting numbers of their choice to come up for the dice events. One possibility is that the mental cost function is different when individuals have control. However, due to the relatively small subsample for which the control effect is there, the evidence is only suggestive.

One further finding of interest, not presented here, is that more generally the result for $a = \$3$ is driven by the dice events (with control) as well as the subjective events (where overconfidence may play a role). This suggests that there may be a relationship between overconfidence or control and optimism.

Table D6: Examining the Illusion of Control

All Events. Dependent Variable: Belief Report				
Regressor				
Control X Dice	−1.320	−1.900	−1.295	−0.203
	(1.360)	(1.522)	(1.352)	(2.249)
$\{P = 80\}(\beta_1)$	0.918	0.517		
	(1.211)	(1.376)		
Control X Dice X $\{P = 80\}$		0.021		
		(0.030)		
Accuracy Payment (β_2)			0.215***	0.236***
			(0.080)	(0.091)
Control X Dice X Acc Payment				−0.099
				(0.153)
Easy Dice (γ_1)	10.244***	10.401***	15.964***	15.734***
	(3.583)	(3.593)	(1.420)	(1.498)
Hard Dice (γ_2)	12.684***	12.819***	18.418***	18.191***
	(3.620)	(3.629)	(1.467)	(1.548)
Weather (γ_3)	54.021***	54.196***	59.866***	59.634***
	(3.773)	(3.781)	(1.428)	(1.515)
Quiz Self (γ_4)	39.873***	40.045***	45.702***	45.465***
	(3.890)	(3.903)	(1.879)	(1.949)
Quiz Other (γ_5)	19.381***	19.571***	24.941***	24.718***
	(3.787)	(3.806)	(1.868)	(1.892)
Sum Dice (γ_6)	54.127***	54.160***	57.636***	57.405***
	(4.482)	(4.489)	(2.834)	(2.890)
Coins (γ_7)	47.269***	47.303***	50.779***	50.548***
	(4.760)	(4.763)	(2.949)	(3.003)
Three Dice (γ_8)	42.481***	42.811***	45.978***	45.722***
	(4.806)	(4.826)	(3.214)	(3.281)
Cards (γ_9)	20.698***	20.731***	24.208***	23.976***
	(4.328)	(4.332)	(2.415)	(2.444)
Session Fixed Effects	YES	YES	YES	YES
R^2	0.45	0.45	0.43	0.43
Observations	1952	1952	1952	1952

Analysis uses OLS regression. Difference significant from zero at * 0.1; ** 0.05; *** 0.01. Robust standard errors clustered at individual level. Constant omitted as $\sum_j E_j = 1$. R^2 corrected for no-constant.

Table D7: Examining the Illusion of Control

Dice Events Only. Acc Payment = \$3		
Dependent Variable: Belief Report		
Regressor	No Control	Control
$\{P = 80\}(\beta_1)$	-1.058	8.538**
	(3.255)	(3.783)
Easy Dice (γ_1)	23.614***	4.044
	(4.518)	(3.790)
Hard Dice (γ_2)	22.045***	4.008
	(4.284)	(3.771)
Three Dice (γ_8)	55.149***	33.662***
	(7.805)	(7.690)
Session Fixed Effects	YES	YES
R^2	0.28	0.34
Observations	183	164

Analysis uses OLS regression. Difference significant from zero at * 0.1; ** 0.05; *** 0.01. Robust standard errors clustered at individual level. Constant omitted as $\sum_j E_j = 1$. R^2 corrected for no-constant.

D.6 Estimating Weight on Anticipatory Utility γ in BP

Table D8 estimates γ, the weight on anticipatory utility in the BP model. Replicating Equation C1 shows that optimal beliefs in the BP model are:

$$\hat{\pi}^{BP} = \min\left\{\frac{\pi}{1-\gamma} + \frac{(1-\epsilon)\gamma}{\epsilon(1-\gamma)}\frac{\Delta u_P}{\Delta u_a}, 1\right\}.$$

Thus one can note that when $P = 0$, $\Delta u_P = 0$, and hence $\hat{\pi}^{BP} = \frac{\pi}{1-\gamma}$ for an interior solution. Since this does not depend on the functional form of the utility function, it is straightforward to estimate this parameter using the data. Further, this provides a validation of the assumption that $\gamma \leq 1$.

Table D8 provides event level estimates of γ. Importantly, π is taken as the average reported belief in the robustness sessions, while $\hat{\pi}^{BP}$ is estimated as the average reported belief in the regular sessions when $P = 0$. As such, the Quiz-Self event is excluded since it was not part of robustness sessions.

From the table it is possible to see that the estimates of $\hat{\gamma}$ range from 0.02 (Quiz - other) to 0.28 (Weather). Due to the likelihood of overconfidence affecting the weather event in regular sessions but not robustness, the final row of the table presents the most sensible estimate of the parameter γ. The implication is that the weight on anticipation is approximately 12% of the weight given to actual consumption utility.

Table D8: Estimating γ in BP when $P = 0$

Event	$\mu_{\hat{\pi}}$ (Regular)	$\mu_{\hat{\pi}}$ (Robustness)	$\hat{\gamma}$
(E_1) Easy Dice	17.36	15.92	0.08
(E_2) Hard Dice	19.35	17.67	0.09
(E_3) Weather	61.21	44.17	0.28
(E_5) Quiz Other	27.32	26.71	0.02
(E_6) Sum Dice	59.98	55.88	0.07
(E_7) Coins	53.12	45.40	0.15
(E_8) Three Dice	47.65	38.15	0.20
(E_9) Cards	26.55	20.52	0.23
Average $\hat{\gamma}$			0.14
Average $\hat{\gamma}$ Excluding E_3			0.12

$P = 0$. $\mu_{\hat{\pi}}$ is the mean of the belief report $\hat{\pi}_i$. $\hat{\pi}^{BP} = \frac{\pi}{1-\hat{\gamma}}$. π estimated from robustness sessions, $\hat{\pi}$ from regular sessions. Average $\hat{\gamma}$ is unweighted average of 8 or 7 events respectively.

E HIV Campaigns and Connections with Models of Optimism Bias

This section presents the posters described as motivating examples of different means of de-biasing individuals who might optimistically believe their chances of having HIV are lower than they actually are, shown in Figure E1. The first poster is from the CDC's "HIV Treatment Works" campaign. If such information is novel, it would alter the difference in expected utility from not having HIV vs. having HIV (i.e. it would lower the expected material costs to holding more accurate beliefs). From the campaign website:

"This campaign features people from across the United States who are living with HIV talking about how sticking with care and treatment helps them stay healthy, protect others, and live longer, healthier lives."

The second poster is from a campaign funded by the AIDS Service Foundation of Greater Kansas City. The message appears to contain little in the way of novel information, but rather appears intended to force individuals to confront the reality that they may have HIV. From the website of the director of the campaign:

"In order to infect the young generation with reality and the fear of HIV, I designed a powerful visual campaign consisting of graphic and personal imagery that creates a permanent emotional response."

Figure E1: HIV Campaign Posters

(a) Poster from CDC's "HIV Treatment Works" Campaign. Source: https://www.cdc.gov/actagainstaids/campaigns/hivtreatmentworks/resources/materials.html

(b) Poster produced by the AIDS Service Foundation of Greater Kansas City. Designed and Art Directed by Kyler Huber. Photographed by Cameron Gee Photography. Source: http://www.asenseofhuber.com/collegedesign.html

F Experiment Instructions

Note: Accuracy payments were randomized at the session level $a \in \$\{3, 10, 20\}$. Instructions show \$20 for exposition only.

F.1 Primary Sessions

Instructions (Section 1)

Thank you for your participation in this experiment! This experiment will last approximately 80 minutes. This experiment is about how likely you think an uncertain event is to have occurred. You will consider four such separate events today, which will be presented one at a time. For these events, we want you to think in terms of the percent chance out of 100 that they occurred. For example, you may believe that there is 50% chance that when flipping a coin it will come up TAILS. This experiment has been designed so that you have the greatest chance of earning the most money when you carefully and accurately think about the percent chance of such an event occurring.

You will be awarded a \$10 show-up fee for your participation until the end, in addition to anything you may earn during the experiment. Please also note the following during the experiment:

- Please put away any cell phones/devices. Outside communication or accessing the internet during this experiment is forbidden. Violators will not receive payment and will be blacklisted from the lab.
- Please do not communicate with others in the lab, except to ask questions
- If you have a question please do not hesitate to ask! Questions are encouraged!

We will now introduce the experiment through Instructions 1-3 and three short practice sessions that go with each set of instructions. The practice sessions are to help you get familiar with the experiment's components that will ALL be combined when doing the final experiment for money.

The "Main Event"

In this experiment you are estimating the percent chance that a "main event" occurred. An example of a "main event" is: the average temperature in the contiguous USA was warmer in 2013 than 2012. Your earnings are in part based on the accuracy of your predictions of whether the "main event" occurred. Think about the following: What is the probability the average temperature in the USA was warmer in 2013 than 2012?

How will I record my percent chance estimate?

First we introduce a gumball machine with 100 green and black gumballs. For example, suppose there are 40 green and 60 black gumballs. Most people would agree that the probability of drawing a green gumball is exactly 40%. Now think back to the "main event" about the weather being warmer in 2013 than 2012 in the US. We next give you \$20. But this \$20 must be wagered on one of two scenarios.

1. The "gumball event": Drawing a green gumball from a machine with 40 out of 100 green, OR
2. The "main event": the average US temperature in 2013 was warmer than it was in 2012.

You have to decide if you think the chance that the weather was warmer in 2013 is greater than 40%, or less than 40%. If you decide to wager the $20 on the "gumball event", the computer randomly draws a gumball from the machine with 40 green (60 black) gumballs. If it's green you win the $20. If black, you get nothing. If you decided to go with the "main event": the climate being warmer in 2013, we check the statistics. If it was warmer, you win the $20. If it was colder, you get nothing.

Consider different numbers of green gumballs:

If the gumball machine has only 2 green gumballs (98 black) would you prefer to wager $20 on the "gumball event" or the "main event"? Most of you probably think the climate being warmer in 2013 than 2012 is more likely than 2% and prefer to wager the $20 on the "main event".

What if the gumball machine has 25 green gumballs? Those who think the "main event" is more likely than 25% would want to wager on the "main event". Now, what if the gumball machine has 90 green gumballs? The "gumball event" now pays off with 90% chance. Probably, almost everyone will prefer to wager the $20 on the gumball machine, except for those that think there is a greater than 90% chance that the weather was warmer in 2013.

Example – You think there is a 35% chance the weather is warmer in 2013 than 2012.

- Case 1: Whenever you see a gumball machine with 34 or less green gumballs, to earn the most money you would want to wager the $20 on the "main event". E.g. if there were 5 green gumballs, 5% is a lower chance than 35% of earning the $20.
- Case 2: If you see a gumball machine with 36 or more green gumballs, you would prefer to wager the $20 on the "gumball event". E.g. If there were 60 green gumballs, this is a 60% chance of drawing green – better than the 35% chance you think the weather would be warmer.
- If there are exactly 35 green gumballs, you probably don't care whether to wager your $20 on the "gumball event" or the "main event". Both give you a 35% chance of earning the $20.

The "Slider"

In this experiment you are going to indicate on a "slider" exactly how many gumballs need to be green before you prefer to wager $20 on the "gumball event" instead of some other "main event". In other words, you will indicate the minimum number of gumballs that have to be green, before you prefer to wager $20 on the gumball machine. To make sure it is in your best financial interest to do this, after you have made your slider choice we are going to randomly fill a gumball machine with 0 to 100 green gumballs and the rest black. Each possible number of green gumballs is equally likely – and your slider choice has no effect on the number chosen. Based on your slider choice, we will then make the $20 wager for you. If there happen to be less green gumballs than the minimum you chose, your $20 is wagered on whatever main event you are predicting. If there happen to be more (or the same) green gumballs than the minimum you indicated in the slider, we will wager your $20 on drawing a green gumball from this machine we randomly filled.

If this is a little confusing, you can just remember, to have the highest chance of earning money, your slider choice should be exactly the probability out of 100 you think the event has of occurring.

Summary of Section 1

- Make selection on the "Slider" for your estimate of the "main event"

- Computer randomly generates an amount (out of 100) of “green gumballs”
- The amount of green gumballs determines how the $20 is wagered in your best interest. 1) The “main event” or 2) The “gumball event”. The outcome of the $20 wager is then revealed.

Are there any questions?

Instructions (Section 2) – “Feedback”

Now we’re going to make things more interesting. Suppose now the “Main event” is that the average temperature in 1998 was warmer than 1997 in the contiguous USA.

Please note – these events are used for practice. The real events may (and will) be different.

You will again adjust the slider to indicate how likely you believe this is to be true. But now, after you adjust the “Slider” the first time, you are going to get some “feedback” about whether or not 1998 was in fact warmer than 1997.

What is “Feedback”?

“Feedback” is information about the main event that gives you additional clues to help you make your selection. Please note that you are provided three rounds of this “feedback” – however each time you are presented with this “feedback” it may or may not be telling you the truth. For our experiment we use gremlins to provide the three rounds of feedback when making your selection. For each round, two gremlins always tell the truth while one of them, Larry, always lies. You will not know which gremlin is talking and after you get this “feedback”, you can adjust your prediction on the ‘Slider” if you choose to use their information. Note: The gremlins are randomly chosen “with replacement”, meaning that every time you get “feedback” it is true with 2/3 probability. This means, that it’s even possible (though unlikely) that all three rounds of feedback come from the gremlin that lied!

Remember: All 3 gremlins always know whether the event happened or not. It’s just that only 2 of these 3 tell the truth. When we determine your earnings, before filling the gumball machine we are going to randomly only pick one of these four slider choices. Are there any questions at this point? Next we proceed to the second practice. In this example please note two additional tools for your use.

1. Calculate Fraction: Pulls up a calculator in case you want to transform a fraction to a decimal.
2. Show History: Shows you your history of feedback from gremlins AND your past slider choices.

Instructions (Section 3) – Payment groups

The last component explains how you might earn additional money during this experiment. This is very important to understand when conducting the final experiment. You will all be in one of two payment groups: “red” or “blue”. NOTE: You will not know which payment group (red or blue) you are in when you make your slider choices. Suppose now the ‘main event” is whether the climate in the USA was warmer in 1990 than 1980.

“The Red Group”

Half of you are going to be in the "red" group. In the "red" group, your payment at the end looks exactly like how we have been practicing so far. We will pick one of your four slider choices incorporating the "feedback", and then fill a gumball machine with a random number of green gumballs. Based on your selection, if the $20 is wagered on the "gumball event" then a gumball would be drawn – if green you earn the $20. If the $20 is wagered on the "main event", then if that event occurred you earn the $20.

"The Blue Group"

The other half of you will be in the "blue" group. The "blue" group automatically gets $20, just for being blue. In this group, the slider choices previously selected do not matter for payment. Instead payment depends on a "blue bonus chip" provided that pays out only if the event you are predicting actually occurs. Taking the example of climate, if 1990 was warmer than 1980, and if you are in the blue group, you would receive $20 automatically, plus whatever amount is on the "blue bonus chip". The amount on the chip is either $0 or $80. Each is equally likely. Example: If you're in the "blue" group you would automatically earn $20, and if the main event you are predicting occurs you would also earn the amount on the blue bonus chip ($0 or $80): for a maximum earnings of $100.

"Blue Bonus chip"

Everyone will get a "blue bonus chip" prior to knowing which group you are in and prior to each of the four events. The experiment coordinator will fill a bag with half $0 chips and half $80 chips. Then, each of you will draw one of these chips from the bag. Note that having a "blue bonus chip" is only significant when you end up in the "blue" group and indicates how much is earned if the event happens AND if you are in the "blue" group.

Each of you has a fair, 50% chance of drawing an $80 bonus chip. There is no advantage to drawing a chip earlier or later, everyone in this room has the same 50% chance. Even if you are the last to draw, and there is only one chip left, that one chip is $0 with 50% chance and $80 with 50% chance. Since you don't know if you're "red" or "blue" until all slider choices have been made, in order to have the best chance of earning the most money, it pays to be as accurate as possible when making slider choices.

Are there any questions at this point? Next we proceed to the final practice. Note that your "blue bonus chip" has an 8-digit code that you are required to enter into the computer. Your "blue bonus chip" does not affect in any way the event that you will be predicting. The event is the same if you pick a $0 chip or an $80 chip. Forget about the gremlins or "feedback" for this practice, yet they will be in the main experiment.

Summary for the Final experiment

Now we are ready to put ALL the pieces together for the final experiment! There are going to be four main events, however only one will be picked at random for payment.

1. The coordinator will come around with a bag that contains a 50/50 mix of $0 and $80 "blue bonus chips" for the upcoming event.
2. Make a note of your "blue bonus chip" amount. This is what you could earn if the event happens AND if you also happen to be in the blue group.
3. The event will be described to you. Next, indicate on the "Slider" the probability you believe

the event occurred. Your slider choice does not affect how many green gumballs the random gumball machine will have nor does it affect the chances of the "main event".

4. You'll get "Feedback" three times from a random gremlin. Remember there is a 2/3 chance the feedback is true. You can choose to use this information if you want to reassess the probability by indicating this on the slider after each "Feedback".

5. Steps 1 to 4 are repeated for each of the four events.

After making all of your slider choices:

1. The coordinator will come with two bags. The color bag contains 50/50 mix of blue and red chips. The chip you draw determines if your payment group is red or blue. If it is red, the slider choice (1-4) is indicated on the chip.

2. The event bag contains an equal amount of Event #1, #2, #3 and #4 chips. The number on the chip determines what event will be paid.

Suppose you picked the chip for Event #1.

1. IF draw RED: The chip indicates the slider choice. A gumball machine is filled with a random number of green gumballs. Based on your slider choice, $20 is wagered on gumball machine or Event #1, as we practiced.

2. IF draw BLUE: The outcome of Event #1 is revealed. If the event occurred you earn $20 + the amount on your event #1 bonus chip, $80 or $0. If the event did not occur you just earn the $20. After your payment is determined, we will reveal the outcomes of the other three events. This is for your information only, and it does not affect your payment.

Important Notes:

The procedures that will occur today have been approved by the University Committee on Activities Involving Human Subjects (UCAIHS). This experiment complies with UCAIHS requirements (HS# 10-8117), in particular, not to engage in any deception or misinformation about the probabilities presented today.

- When you encounter random chance off the computer (e.g. when drawing chips from the bag) we make every effort to ensure that this is transparent and legitimate. If we state there is a 50-50 chance of drawing a particular chip, we will have at least one participant verify that this is indeed the case. (any participant may ask to verify the bag contents before the draws begin)
- When you encounter random chance on the computer (e.g. drawing a gumball from a hypothetical machine) the computer has been programmed to perform the randomization exactly as is stated in this experiment. For example, if you are told that there are 30 green gumballs and 70 black, the computer is programmed to randomly select a green gumball with exactly 30 chances out of 100.

Before moving forward to the next main event, the computer will wait for everyone to finish the current event. There is no advantage to finishing quickly, as you will end up waiting for other participants.

F.2 Followup Sessions

Instructions

Thank you for your participation in this experiment! This experiment will last approximately 50 minutes. This experiment is about how likely you think an uncertain event is to have occurred. You will consider 8 such separate events today, which will be presented one at a time. For these events, we want you to think in terms of the percent chance out of 100 that they occurred. For example, you may believe that there is 50% chance that when flipping a coin it will come up TAILS. This experiment has been designed so that you have the greatest chance of earning the most money when you carefully and accurately think about the percent chance of such an event occurring.

You will be awarded a $10 show-up fee for your participation until the end, in addition to anything you may earn during the experiment. Please also note the following during the experiment:

- Please put away any cell phones/devices. Outside communication or accessing the internet during this experiment is forbidden. Violators will not receive payment and will be blacklisted from the lab.
- Please do not communicate with others in the lab, except to ask questions
- If you have a question please do not hesitate to ask! Questions are encouraged!

We will now introduce the experiment through these instructions and a short practice. The practice session is to help you get familiar with the experiment.

The "Main Event"

In this experiment you are estimating the percent chance that a "main event" occurred. An example of a "main event" is: the average temperature in the contiguous USA was warmer in 2013 than 2012. Your earnings are in part based on the accuracy of your predictions of whether the "main event" occurred. Think about the following: What is the probability the average temperature in the USA was warmer in 2013 than 2012?

How will I record my percent chance estimate?

First we introduce a gumball machine with 100 green and black gumballs. For example, suppose there are 40 green and 60 black gumballs. Most people would agree that the probability of drawing a green gumball is exactly 40%. Now think back to the "main event" about the weather being warmer in 2013 than 2012 in the US. We next give you $20. But this $20 must be wagered on one of two scenarios.

1. The "gumball event": Drawing a green gumball from a machine with 40 out of 100 green, OR
2. The "main event": the average US temperature in 2013 was warmer than it was in 2012.

You have to decide if you think the chance that the weather was warmer in 2013 is greater than 40%, or less than 40%. If you decide to wager the $20 on the "gumball event", the computer randomly draws a gumball from the machine with 40 green (60 black) gumballs. If it's green you win the $20. If black, you get nothing. If you decided to go with the "main event": the climate being warmer in 2013, we check the statistics. If it was warmer, you win the $20. If it was colder, you get nothing.

Consider different numbers of green gumballs:

If the gumball machine has only 2 green gumballs (98 black) would you prefer to wager $20 on the "gumball event" or the "main event"? Most of you probably think the climate being warmer in 2013 than 2012 is more likely than 2% and prefer to wager the $20 on the "main event".

What if the gumball machine has 25 green gumballs? Those who think the "main event" is more likely than 25% would want to wager on the "main event". Now, what if the gumball machine has 90 green gumballs? The "gumball event" now pays off with 90% chance. Probably, almost everyone will prefer to wager the $20 on the gumball machine, except for those that think there is a greater than 90% chance that the weather was warmer in 2013.

Example – You think there is a 35% chance the weather is warmer in 2013 than 2012.

- Case 1: Whenever you see a gumball machine with 34 or less green gumballs, to earn the most money you would want to wager the $20 on the "main event". E.g. if there were 5 green gumballs, 5% is a lower chance than 35% of earning the $20.
- Case 2: If you see a gumball machine with 36 or more green gumballs, you would prefer to wager the $20 on the "gumball event". E.g. If there were 60 green gumballs, this is a 60% chance of drawing green – better than the 35% chance you think the weather would be warmer.
- If there are exactly 35 green gumballs, you probably don't care whether to wager your $20 on the "gumball event" or the "main event". Both give you a 35% chance of earning the $20.

The "Slider"

In this experiment you are going to indicate on a "slider" exactly how many gumballs need to be green before you prefer to wager $20 on the "gumball event" instead of some other "main event". In other words, you will indicate the minimum number of gumballs that have to be green, before you prefer to wager $20 on the gumball machine. To make sure it is in your best financial interest to do this, after you have made your slider choice we are going to randomly fill a gumball machine with 0 to 100 green gumballs and the rest black. Each possible number of green gumballs is equally likely – and your slider choice has no effect on the number chosen. Based on your slider choice, we will then make the $20 wager for you. If there happen to be less green gumballs than the minimum you chose, your $20 is wagered on whatever main event you are predicting. If there happen to be more (or the same) green gumballs than the minimum you indicated in the slider, we will wager your $20 on drawing a green gumball from this machine we randomly filled.

If this is a little confusing, you can just remember, to have the highest chance of earning money, your slider choice should be exactly the probability out of 100 you think the event has of occurring.

Quick Overview

- Make selection on the "Slider" for your estimate of the "main event"
- Computer randomly generates an amount (out of 100) of "green gumballs"
- The amount of green gumballs determines how the $20 is wagered in your best interest. 1) The "main event" or 2). The "gumball event". The outcome of the $20 wager is then revealed.

Are there any questions?

Summary and Payment

To summarize the experiment, there are going to be 8 main events, however only one will be picked at random for payment.

1. The event will be described to you. Next, indicate on the "Slider" the probability you believe the event occurred. Your slider choice does not affect how many green gumballs the random gumball machine will have nor does it affect the chances of the "main event".
2. This is repeated for all 8 events.
3. After making all of your slider choices the computer will randomly select one event for payment.

After your payment is determined, we will reveal the outcomes of all events, including the counterfactual outcome of the gumball machine. Thus you will find out how much you could have earned for all of the events if they were chosen. Remember, this is for your information only, and it does not affect your payment.

Important Notes:

The procedures that will occur today have been approved by the University Committee on Activities Involving Human Subjects (UCAIHS). This experiment complies with UCAIHS requirements (HS# 10-8117), in particular, not to engage in any deception or misinformation about the probabilities presented today.

- When you encounter random chance on the computer (e.g. drawing a gumball from a hypothetical machine) the computer has been programmed to perform the randomization exactly as is stated in this experiment. For example, if you are told that there are 30 green gumballs and 70 black, the computer is programmed to randomly select a green gumball with exactly 30 chances out of 100.
- Before moving forward to the next main event, the computer will wait for everyone to finish the current event. There is no advantage to finishing quickly, as you will end up waiting for other participants.

F.3 Robustness Sessions

Instructions

Thank you for your participation in this experiment! This experiment will last approximately 50 minutes. This experiment is about how likely you think an uncertain event is to have occurred. You will consider 8 such separate events today, which will be presented one at a time. For these events, we want you to think in terms of the percent chance out of 100 that they occurred. For example, you may believe that there is 50% chance that when flipping a coin it will come up TAILS. This experiment has been designed so that you have the greatest chance of earning the most money when you carefully and accurately think about the percent chance of such an event occurring.

You will be awarded a $10 show-up fee for your participation until the end, in addition to anything you may earn during the experiment. Please also note the following during the experiment:

- Please put away any cell phones/devices. Outside communication or accessing the internet during this experiment is forbidden. Violators will not receive payment and will be blacklisted from the lab.

- Please do not communicate with others in the lab, except to ask questions
- If you have a question please do not hesitate to ask! Questions are encouraged!

We will now introduce the experiment through these instructions and a short practice. The practice session is to help you get familiar with the experiment.

The 'Main Event'

In this experiment you are estimating the percent chance that a 'main event' occurred. An example of a 'main event' is: The computer flips a fair coin two times. The coin comes up HEADS exactly twice. Your earnings are in part based on the accuracy of your predictions of whether the 'main event' occurred. Think about the following: What is the probability the coin comes up HEADS exactly two times in two tosses?

How will I record my percent chance estimate?

In this experiment you are going to indicate on a 'slider' exactly what probability you believe the 'main event' occurred with. To make sure it is in your best financial interest to do this, after you have made your slider choice we are going to compare your answer with how frequently this event occurred in the past. For 4 out of the 8 events, 318 students previously participated in an experiment where their payment depended on whether their individual 'main event' occurred. That is, in our example, each student had the computer flip a coin two times, and that student had a chance to earn money when HEADS in fact came up exactly two times out of the two tosses. For the remaining 4 events, the computer has simulated each 318 times, so it is "as if" these students also participated in these events.

For these 8 events, you will earn a payment of $20 whenever your estimate of the probability is within 5% of the actual number of times the event occurred divided by 318. For example, suppose out of 318 students who had the computer flip the coin for them, 78 times the coin was HEADS both times. 78/318 = 24.5%. You would be correct if your answer was in between 19.5% and 29.5%. That means: 20%, 21%, 22%, 23%, 24%, 25%, 26%, 27%, 28%, or 29%. If this is a little confusing, you can just remember, to have the highest chance of earning money, your slider choice should be exactly the probability out of 100 you think the event has of occurring.

Summary and Payment

To summarize the experiment, there are going to be 8 main events, however only one will be picked at random for payment.

1. The event will be described to you. Next, indicate on the 'Slider' the probability you believe the event occurred. This is repeated for all 8 events.
2. After making all of your slider choices the computer will randomly select one event for payment.

Important Notes:

The procedures that will occur today have been approved by the University Committee on Activities Involving Human Subjects (UCAIHS). This experiment complies with UCAIHS requirements (HS# 10-8117), in particular, not to engage in any deception or misinformation about the probabilities presented today.

- When you encounter random chance on the computer (e.g. simulating a coin toss) the computer has been programmed to perform the randomization exactly as is stated in this experiment. For example, if you are told the computer will flip a coin, the computer is programmed to randomly select Heads with exactly 50 chances out of 100.
- Before moving forward to the next main event, the computer will wait for everyone to finish the current event. There is no advantage to finishing quickly, as you will end up waiting for other participants.

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