A Comment on "People Are More Moral in Uncertain Environments"*

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Abstract

Chen and Zhong (2025) provide experimental evidence that individuals behave more morally in uncertain environments compared to deterministic ones. In their design, participants make a single decision that simultaneously carries moral implications and determines their uncertain payoff. While there is no logical connection between the uncertain outcomes and the moral choices, this direct link may act as a strong behavioral cue, potentially limiting the generalizability of their findings. We complement their experiment with a modified design that decouples moral decisions from uncertain outcomes. We successfully replicate their findings using their original design. However, when we remove the direct connection between moral decisions and uncertain outcomes, we find no evidence that uncertainty increases moral behavior. Our findings suggest that the causal influence of uncertainty on moral behavior may be limited to contexts where the two are directly related.

Keywords: Uncertainty, morality, experiment

JEL Codes: C91, D81, D91

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1 Introduction

In a series of experiments, Chen and Zhong (2025) document an intriguing finding incompatible with standard models: individuals behave more morally in uncertain environments than in deterministic ones. This paper replicates this result and conducts additional experiments with a slightly modified design to assess the generalizability of their findings.

A key feature of Chen and Zhong's design is that moral choice is directly intertwined with the resolution of uncertainty, as participants report a single choice that reflects their morality and determines an uncertain payoff. Specifically, the choice context in their experiment involves *a single set of boxes* that determine two payoff components: one is a lottery with random payments distributed across the boxes, and the other is a bonus payment involving a moral tradeoff. In their main experiment (referred to as the "dice game experiment"), participants mentally roll a die to select one of six boxes, each containing a possible lottery payoff. They are then informed that one specific box also contains an additional bonus. Participants are then instructed to report the box they chose initially, receiving the corresponding lottery payoff in that box as well as the additional bonus if it coincides with the selected box. By misreporting their original choice, participants can obtain the additional bonus and thereby increase their earnings without affecting the distribution of lottery outcomes. Chen and Zhong's primary finding is that participants are less likely to report that they've selected the box containing the additional payoff when faced with uncertainty – where lottery payoffs vary across boxes – than when there is no uncertainty and all boxes contain the same payoff.

Even though participants are explicitly informed that the determination of the lottery payment and the box containing the additional bonus are independent, the design creates a direct and salient connection between the moral choice and the resolution of uncertainty. As a result, Chen and Zhong's experimental results are primarily informative about whether uncertainty affects moral behavior *when the moral or immoral action is directly connected with the uncertain outcomes*. It is less informative about instances where individuals face a moral choice that is unrelated to the resolution of uncertainty. Hence, their findings may

apply to certain contexts, such as aversion to investing in sin stocks, but may be less relevant for scenarios like increased generosity under the COVID-19 threat (Fridman et al., 2022) or the association between higher income uncertainty and increased religious donations (Liu et al., 2022). Chen and Zhong's study leaves open the question of whether uncertainty influences moral behavior in such scenarios, *when moral behavior and the uncertain outcomes are not connected*.

We address this open question by conducting two experiments. First, we run a Replication Experiment employing the exact same design, instructions, payment scheme, and subject pool as the main experiment in Chen and Zhong (2025). Next, we conduct a Separation Experiment, in which we disentangle the moral decision from the choice under uncertainty, while preserving the payoff structure and keeping the instructions as close as possible to the original design. In this experiment, uncertain lottery payments and the bonus linked to the moral decision are contained in two separate sets of objects. Lottery payments are represented by random payouts concealed behind *bricks*, while payments related to moral decisions are contained in a separate set of *boxes*. Participants first choose a brick, which determines their lottery payout. Then, they mentally roll a die to select one of the six boxes, after which they are informed about which box contains an additional bonus. Finally, they make a moral decision of whether to truthfully report their initially selected box or to misreport their selection. This design eliminates the direct connection between moral behavior and uncertain outcomes present in Chen and Zhong's original setup.

We report two main results. First, we successfully replicate the results of Chen and Zhong (2025). The proportion of participants reporting the box containing the additional bonus payment is approximately 18 percentage points lower under uncertainty than under certainty. These findings closely align with those of Chen and Zhong, both in overall patterns and specific statistics across conditions. Our replication provides valuable evidence of the replicability of important experimental findings (Camerer et al., 2016) and contribute to our understanding of the robustness of moral behaviors influenced by uncertainty. Second, we do

not observe the same effect in the Separation Experiment. The proportion of participants reporting the box with the additional bonus is 68.9 percent under uncertainty compared with 69.9 percent under certainty. This suggests that while uncertainty can increase moral behavior in cases where there is a direct, even if irrelevant, link between a moral act and the resolution of uncertain outcomes, this behavior pattern does not extend to situations where such a link is absent.

2 Experimental Design

To make our results comparable to those of Chen and Zhong (2025) and to study the robustness of their results, we first conduct a direct replication of their main experiment (referred to as the Replication Experiment). We then run a Separation Experiment, to investigate whether the relationship between uncertainty and morality persists when the moral decisions and the resolution of uncertainty are not directly linked.

2.1 Replication Experiment

We use the same design, instructions [1], payment scheme, and subject pool as Chen and Zhong (2025). The study consists of 21 rounds. We manipulate uncertainty across rounds and measure how this impacts participants' moral decisions.

In each round, a participant receives a lottery, $(h, \frac{n}{6}; l)$, represented by six boxes numbered 1 to 6. These boxes contain one of two possible payoffs, referred to as "Bonus 1" in the experiment. Specifically, n boxes contain the high payoff h, and $6-n$ boxes contain the low payoff l. Participants know the distribution of amounts across the boxes, but they do not know which boxes contain h or l.

There are three configurations of h and l that vary the spread between the payoffs (in RMB) and, therefore, the importance of the uncertainty faced by a participant: $(40, \frac{n}{6}; 0)$,

[1] The experiment is conducted in Chinese, as in Chen and Zhong (2025). We translated the English instructions from their appendix back into Chinese.

$(30, \frac{n}{6}; 10)$, $(22, \frac{n}{6}; 18)$. There are seven levels of the winning probability, $p = \frac{n}{6} \in \{0, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}, 1\}$. Uncertainty in payoffs arises whenever $n \notin \{0, 6\}$, while the cases $n = 0$ and $n = 6$ correspond to situations in which the participant faces no uncertainty.

Participants first select a box and record their choice on a piece of paper[2]. Afterward, they are informed that an additional RMB 4 (approximately \$0.55), referred to as "Bonus 2," has been placed in one of the boxes. Importantly, they are told which box contains Bonus 2.[3] Following this, participants are asked to report their initial box selection. Their payoff in a round is the corresponding payoff in that box, which includes both Bonus 1 and, if applicable, Bonus 2. By reporting that they selected the box that contains Bonus 2, participants can guarantee receiving an additional RMB 4 without affecting the distribution of outcomes they face in the lottery.

For each participant, one decision round is randomly selected to determine their final payoff. The experimenter then rolls a die in front of the participants to decide which boxes contain the high payoffs, while the remaining boxes contain low payoffs.

After explaining the instructions, participants answer eight comprehension questions, with feedback and explanations provided. These ensure they are familiar with the tasks and understand that the experimenter cannot manipulate the randomization process based on their moral choices. We use the same questions as Chen and Zhong (2025).

2.2 Separation Experiment

The Separation Experiment retains the general structure and payment scheme of the original experiment but introduces a critical distinction: in each round, participants make two separate and consecutive decisions. The first determines their uncertain payoff (Bonus 1)

[2]Participants are aware that they will never be asked to show the paper with their initial choice to the experimenters, either during or after the experiment. This is emphasized during the instructions.

[3]The distribution of Bonus 1 among the six boxes and the box containing Bonus 2 are determined randomly and independently, which is emphasized during the instructions. The box containing the additional RMB 4 in each round is predetermined before the experiment using a random number generator. The outcome of the lottery to determine Bonus 1 is determined through a die roll after participants have completed all their decisions.

under varying levels of uncertainty, while the second involves a moral decision about whether to lie to receive Bonus 2.

Lottery payments (Bonus 1) are concealed as random payouts hidden behind six bricks. Participants select a brick to receive the bonus behind it, without knowing which bricks hide higher bonuses. The lottery parameters (h, l, p) are identical to those in the original and replication experiments, and participants make their choices in a similar way, by clicking on one of the six bricks.

After choosing a brick, participants are asked to make a moral decision before the payoff associated with their chosen brick is revealed. This task mirrors the format of the original experiment. Participants are presented with six boxes, one of which contains RMB 4 (Bonus 2). They mentally roll a die to select a box and record their choice. Afterward, they are informed of the box that actually contains the bonus and are then asked to report the box they initially selected.

At the end of the experiment, one of the 21 rounds is randomly selected to determine the participant's final payoff. Participants receive the amount hidden behind the brick chosen in that round as Bonus 1 and the amount in the reported box as Bonus 2. The randomization procedure is identical to that used in the Replication Experiment.

2.3 Implementation

We conducted both experiments in May 2024 with 241 student participants from Wuhan University in China. Among the participants, 120 of them completed the Replication Experiment, and 121 of them completed the Separation Experiment. The student participants were recruited through the Weikeyan platform and the experiment was conducted in the lab [4]. The experiment consisted of 8 sessions, with about 30 participants for each session. The average total payment was RMB 46 (USD 6.34) in the Replication Experiment, and RMB 41 (USD 5.65) in the Separation Experiment.

[4] Chen and Zhong (2025) used the same platform and subject pool, but the experiment was conducted online.

3 Results

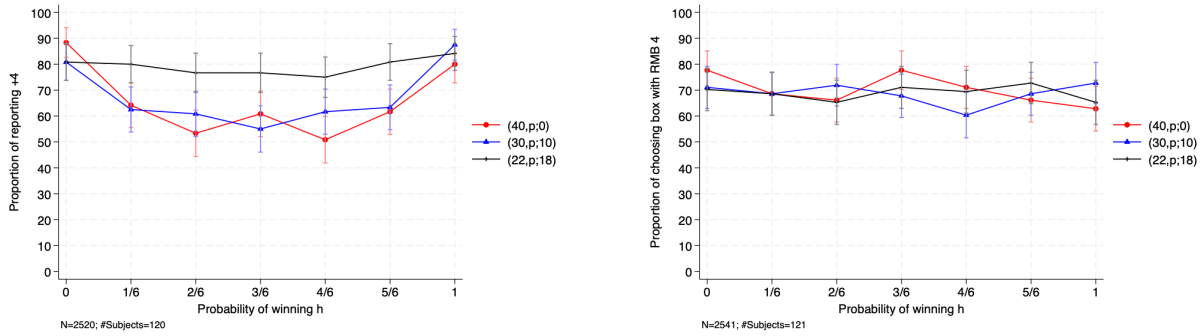
We successfully replicate the main findings of Chen and Zhong (2025), both qualitatively and quantitatively. Our results show that participants are more likely to report having selected the box with the additional bonus (indicating a higher likelihood of lying) when there is no uncertainty about their payoff – specifically, when the probability of winning the lottery is either 0 or 1. Here, we focus on the results from the Separation Experiment.

Figure 1 shows the aggregate behavioral pattern in the Replication Experiment (Figure 1(a)) and the Separation Experiment (Figure 1(b)). In contrast to the results from the Replication Experiment and the results reported by Chen and Zhong (2025) (see Figure 1a in their paper), the Separation Experiment provides no evidence that people behave more morally under uncertainty. The proportion of participants selecting the box containing Bonus 2 does not vary systematically between cases in which there is uncertainty (68.9 percent) or there is no uncertainty (66.9 percent with certain high payment and 73 percent with certain low payment). Additionally, we observe no significant differences in behaviors under lottery conditions with varying spread. [5]

Table 1 shows regression results using the same specifications employed by Chen and Zhong (2025). We are mainly interested in the coefficients for the variables $certainHigh$ and $certainLow$, which are equal to 1 if the lottery in that round is degenerate and pays a high or low payoff for sure. Chen and Zhong find the coefficients for these variables to be positive, large and statistically significant (see Table 2 in their paper), reflecting increased reporting of the box containing the additional bonus under certainty than under uncertainty.

Panel A shows the results for the full sample and for subsamples by payoff pairs (with different spreads between possible high and low payoffs). The results confirm what we observe

[5]Because we used the same experimental platform as Chen and Zhong (2025), a large proportion of subjects on this platform had already participated in one of the treatments in their experiment. While we successfully excluded these subjects in our Replication Experiment, we ran out of available participants for the Separation Experiment. As a result, we had to reuse 33 subjects who had participated in Chen and Zhong (2025)'s study. Although the Separation Experiment differs from any treatment in their original experiment, we conducted an analysis excluding these 33 subjects. The results have almost the same pattern as when these subjects were included.



(a) Replication Experiment

(b) Separation Experiment

Figure 1: Proportion of Choosing Box with RMB 4. This figure shows the relationship between lottery winning probability (x-axis) and the proportion of subjects choosing the box containing RMB 4 (Bonus 2) (y-axis) in the Replication Experiment (panel a) and Separation Experiment (panel b). Panel a is based on 2,520 choices made by 120 participants. Panel b is based on 2,541 choices by 121 participants. Vertical bars indicate 95% confidence intervals.

from Figure 1. The coefficient on $certainHigh$ is never significantly different from zero at a $p < 0.05$ level and is negative in most specifications. The coefficient on $certainLow$ is significant at $p < 0.05$ in the full sample, but the size is much smaller compared with the coefficients in Chen and Zhong (2025). Meanwhile, from the last three columns, we observe that this significant coefficient on $certainLow$ is mainly driven by the significant and larger coefficient in the lottery pair $(40, p; 0)$ subsample. In this lottery, subjects get nothing for sure if $certainLow = 1$. The larger coefficient on $certainLow$ in this lottery might reflect an aversion to a payoff of zero – subjects are more likely to lie to receive RMB 4 as Bonus 2 to avoid zero payoffs. Panel B shows the same regression results for subsamples with different winning probabilities. Again, we observe minimal evidence of people behaving more morally under uncertainty, regardless of the winning probability.

Following the approach of Chen and Zhong (2025), we also conduct an individual-level analysis to classify individuals into different types according to how their moral behaviors change under different levels of uncertainty. Table 2 presents the classification results for the Separation Experiment (Panel A), the Replication Experiment (Panel B), and the corresponding experiment by Chen and Zhong (Panel C). The key category is the "More-Moral" group, which consists of individuals who exhibit more moral behavior when faced with un-

Table 1: Separation Experiment: Uncertainty and Moral Behavior

	OLS: Choose box with RMB 4				
	(1)	(2)	(3)	(4)	(5)
Panel A: Full sample and subsamples by payoff pairs					
	All	All	$(40, p; 0)$	$(30, p; 10)$	$(22, p; 18)$
certainHigh	-0.020	-0.020	-0.071	0.053	-0.041
	(0.022)	(0.022)	(0.038)	(0.038)	(0.032)
certainLow	0.041*	0.041*	0.078*	0.036	0.008
	(0.020)	(0.020)	(0.031)	(0.035)	(0.036)
Constant	0.689***	0.689***	0.699***	0.674***	0.694***
	(0.029)	(0.005)	(0.007)	(0.008)	(0.008)
Controls	No	Yes	Yes	Yes	Yes
#Observations	2,541	2,541	847	847	847
#Subjects	121	121	121	121	121
Adj. R^2	0.001	0.431	0.446	0.438	0.416
Panel B: Subsamples by winning probabilities					
	$p = 1/6$	$p = 2/6$	$p = 3/6$	$p = 4/6$	$p = 5/6$
certainHigh	-0.017	-0.008	-0.052	-0.000	-0.022
	(0.028)	(0.028)	(0.031)	(0.024)	(0.025)
certainLow	0.044*	0.052	0.008	0.061*	0.039
	(0.022)	(0.028)	(0.026)	(0.028)	(0.025)
Constant	0.686***	0.678***	0.722***	0.669***	0.691***
	(0.014)	(0.016)	(0.016)	(0.014)	(0.014)
Controls	Yes	Yes	Yes	Yes	Yes
#Observations	1,089	1,089	1,089	1,089	1,089
#Subjects	121	121	121	121	121
Adj. R^2	0.434	0.406	0.414	0.449	0.424

Notes: The dependent variable is a binary indicator that equals 1 if the subject chose the box containing RMB 4 and 0 otherwise. certainHigh (certainLow) is a dummy variable equal to 1 if the condition provides a certain high (low) payoff and 0 otherwise. In Panel A, Column (1) does not include any fixed effects. Column (2) includes individual fixed effects and payoff-pair fixed effects. Columns (3) to (5) report results separately for each payoff pair. In Panel B, each column presents results for a different winning probability, with all regressions including both individual fixed effects and payoff-pair fixed effects. Standard errors are clustered at the individual level in parentheses. $^{*}p < 0.05$,$^{**}p < 0.01$,$^{***}p < 0.001$.

Table 2: Individual Types

Category	Proportion	Certain Low	Uncertain	Certain High
Panel A: Separation Experiment				
More-Moral	22.3%	0.827	0.568	0.790
Less-Moral	9.9%	0.306	0.444	0.278
Increase	9.1%	0.152	0.455	0.636
Decrease	15.7%	0.772	0.582	0.246
Invariant	32.2%	1.000	1.000	1.000
Unclassified	10.7%	0.538	0.590	0.436
Panel B: Replication Experiment				
More-Moral	57.5%	0.874	0.556	0.889
Less-Moral	2.5%	0.333	0.578	0.444
Increase	7.5%	0.296	0.511	0.667
Decrease	5%	0.778	0.611	0.333
Invariant	23.3%	0.964	0.964	0.964
Unclassified	4.2%	0.867	0.667	0.600
Panel C: Dice Game Experiment in Chen and Zhong (2025)				
More-Moral	50.47%	0.877	0.536	0.901
Less-Moral	4.67%	0.133	0.32	0.133
Increase	6.54%	0.19	0.371	0.524
Decrease	11.21%	0.75	0.422	0.139
Invariant	18.69%	1.000	1.000	1.000
Unclassified	8.41%	0.593	0.556	0.593

Notes: Column (1) presents the individual types, and Column (2) reports the proportion of each type. Columns (3) to (5) display the mean probability of choosing the box with RMB 4 under three conditions: receiving a low bonus with certainty, receiving a uncertain bonus, and receiving a high bonus with certainty. Panel A presents results from our Separation Experiment, Panel B from our Replication Experiment, and Panel C from the original Dice Experiment in Chen and Zhong (2025).

certainty. This is the modal category in the original experiment (50.5%) and our direct replication (57.5%). However, it is substantially less common in our Separation Experiment (22.3%), where the largest proportion falls into the "Invariant" type, accounting for 32.2% of the sample.

4 Conclusion and Discussion

In this paper, we successfully replicate the findings of Chen and Zhong (2025) and study the generalizability of their results using a modified experimental design that decouples moral decisions from uncertain outcomes. In the Replication Experiment, our results closely align with Chen and Zhong's findings: participants are more likely to act morally when there is uncertainty associated with their payoff, and this effect is larger under higher uncertainty. However, in the Separation Experiment, where the direct link between moral decisions and resolution process of uncertain outcomes is removed, the same behavioral pattern does not emerge. Participants' truth-telling behavior remains consistent, regardless of the presence of uncertainty.

Our results do not contradict those of Chen and Zhong (2025). Rather, they highlight that the connection between moral behavior and uncertainty is highly context-dependent and influenced by specific cues that explicitly link moral decisions to uncertain outcomes. While uncertainty may influence moral behavior in scenarios where moral decisions and uncertain outcomes are directly connected, this effect may not be as robust in environments where such a direct connection is absent. In these cases, participants may not spontaneously establish a link between moral behavior and uncertain outcomes, as demonstrated in our Separation Experiment.

Chen and Zhong (2025) discussed several applications of their findings, interpreting behaviors such as sin stock aversion and increased donations during COVID-19 through the lens of a behavioral pattern in which individuals act more morally under uncertainty. While their findings closely align with sin stock aversion — a context where moral choices (e.g., avoiding unethical investments) are directly tied to uncertain financial outcomes, the surge in pandemic-related donations presents a less straightforward case. In the latter example, no clear link exists between the act of donating and the uncertain health risks posed by the pandemic. Our results further suggest that policy interventions leveraging uncertainty to encourage moral behavior, such as priming individuals with uncertainty before a moral

decision, may only be effective when a clear connection exists between the moral action and the uncertain outcome.

It remains unclear why the relationship between uncertainty and morality emerges only when the two decisions are explicitly linked. However, we propose several possible explanations. First, narrow bracketing (Tversky and Kahneman, 1981) may play a role. When moral and uncertain decisions are explicitly linked (e.g., framed within the same set of boxes), participants may cognitively bracket these choices together. This bracketing makes their moral behavior more susceptible to the perceived anxiety or complexity associated with uncertainty. Conversely, when decisions involve distinct contexts (e.g., separate containers), participants may compartmentalize them, diluting the impact of uncertain outcomes on moral choices.[6] Second, the law of small numbers may lead participants to believe, subconsciously, that a box already chosen to contain an additional payment is unlikely to be selected again for a high bonus. Consequently, the box with an additional payment may seem less attractive under uncertainty. However, in the Separation Experiment, where the additional bonus and random payments are placed in different containers and no container is selected twice, this bias does not apply. Identifying the precise mechanisms for the changing relationship between uncertainty and morality is beyond the scope of our work, but remains an important question for future research.

[6]We thank Yiting Chen and Songfa Zhong for their valuable comments on this point.

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Appendix

A Replication Results

We successfully replicated Chen and Zhong (2025)'s results. Figure 1(b) shows the aggregate behavioral pattern. The vertical axis shows the proportion of subjects who chose the box that contains the additional RMB 4. Although individual lying behavior can not be observed, the difference between this proportion and $\frac{1}{6}$ provides a statistical indication of the frequency of dishonest reporting. The horizontal axis shows the probability of winning the high bonus (p). Each line corresponds to one set of (h, l) values.

Our findings are very similar to those observed by Chen and Zhong. First, the overall pattern shows that subjects are more likely to lie when there is no uncertainty about their payoff. They lie more frequently both when they will get a high bonus for sure ($p = 1$) and when they will get a low bonus for sure ($p = 0$). The proportion of reporting the box containing the additional money is 65.6 percent in the uncertainty conditions, which is lower than in certainty conditions with high payoffs (83.8 percent) and low payoffs (83.3 percent). Second, the observed difference between certain and uncertain conditions is larger when the spread between high and low payoffs is larger. For the lotteries $(40, p; 0)$ and $(30, p; 10)$, the differences between the uncertainty condition and the certainty condition (pooling both cases involving certainty) are 26 and 24 percentage points, respectively, while for the lottery $(22, p; 18)$ the difference is only 5 percentage points.

Following Chen and Zhong's analysis, we run the following regression to test the behavioral pattern formally:

$$reportAdditional_{ic} = \beta_0 + \beta_1 certainHigh_{ic} + \beta_2 certainLow_{ic} + \alpha_i + \gamma_p + \epsilon_c \qquad (1)$$

where $reportAdditional_{ic}$ is a dummy equal to 1 if subject i choose the box with Bonus 2 in choice problem c and 0 otherwise; $certainHigh_{ic}$ is a dummy equal to 1 if the choice is under the degenerate lottery that gives a high bonus for sure and 0 otherwise; $certainLow_{ic}$ is a dummy that equals 1 if the choice is under the degenerate lottery that gives a low bonus for sure and 0 otherwise. We include individual fixed effects, α_i, and fixed effects for each payoff pair, γ_l. Standard errors are clustered at individual level.

Table A.1 shows the regression results. Panel A shows the results for the full sample and separately for for subsamples by payoff pairs. In the first two columns, using the full sample, we see positive and statistically significant coefficients for both $certainHigh$ and

certainLow. On average, subjects under uncertainty show an 18 percentage point decrease in the probability of reporting having selected the box corresponding to Bonus 2, relative to cases involving either high or low certainty. The effect sizes are quite similar to those observed by Chen and Zhong. In the last 3 columns, we run the regression separately for each payoff pair. Consistent with Figure 1(b), the effect of uncertainty on morality is higher when the spread between high and low payoff is higher. Panel B shows the same regression results for subsamples with different winning probabilities. The effect is consistent in all the winning probabilities, which again confirms Chen and Zhong's findings.

Following Chen and Zhong (2025), we also classify individuals into different types according to how their moral behaviors change under different levels of uncertainty. Consistent with their results, we find the largest proportion to be the "Uncertainty-motivated" type, which makes up 57.5% of the sample. The proportion is slightly higher than what Chen and Zhong found (50.5%). The types can be found in Panel B of Table 2.

Table A.1: Uncertainty and Moral Behavior

	OLS: Choose box with RMB 4				
	(1)	(2)	(3)	(4)	(5)
Panel A: Full sample and subsamples by payoff pairs					
	All	All	$(40, p; 0)$	$(30, p; 10)$	$(22, p; 18)$
certainHigh	0.183***	0.183***	0.218***	0.268***	0.063*
	(0.022)	(0.022)	(0.038)	(0.038)	(0.029)
certainLow	0.178***	0.178***	0.302***	0.202***	0.030
	(0.023)	(0.023)	(0.036)	(0.041)	(0.030)
Constant	0.656***	0.656***	0.582***	0.607***	0.778***
	(0.026)	(0.006)	(0.009)	(0.010)	(0.007)
Controls	No	Yes	Yes	Yes	Yes
#Observations	2,520	2,520	840	840	840
#Subjects	120	120	120	120	120
Adj. R^2	0.031	0.337	0.341	0.349	0.430
Panel B: Subsamples by winning probabilities					
	$p = 1/6$	$p = 2/6$	$p = 3/6$	$p = 4/6$	$p = 5/6$
certainHigh	0.150***	0.203***	0.197***	0.214***	0.153***
	(0.027)	(0.029)	(0.028)	(0.026)	(0.027)
certainLow	0.144***	0.197***	0.192***	0.208***	0.147***
	(0.026)	(0.029)	(0.028)	(0.029)	(0.027)
Constant	0.689***	0.636***	0.642***	0.625***	0.686***
	(0.016)	(0.018)	(0.018)	(0.017)	(0.017)
Controls	Yes	Yes	Yes	Yes	Yes
#Observations	1,080	1,080	1,080	1,080	1,080
#Subjects	120	120	120	120	120
Adj. R^2	0.308	0.324	0.325	0.340	0.301

Notes: The dependent variable is a binary indicator that equals 1 if the subject chose the box containing RMB 4 and 0 otherwise. certainHigh (certainLow) is a dummy variable equal to 1 if the condition provides a certain high (low) payoff and 0 otherwise. In Panel A, Column (1) does not include any fixed effects. Column (2) includes individual fixed effects and payoff-pair fixed effects. Columns (3) to (5) report results separately for each payoff pair. In Panel B, each column presents results for a different winning probability, with all regressions including both individual fixed effects and payoff-pair fixed effects. Standard errors are clustered at the individual level in parentheses. $^{*}p < 0.05$,$^{**}p < 0.01$,$^{***}p < 0.001$.

B Separation Experiment: Results with new subjects only

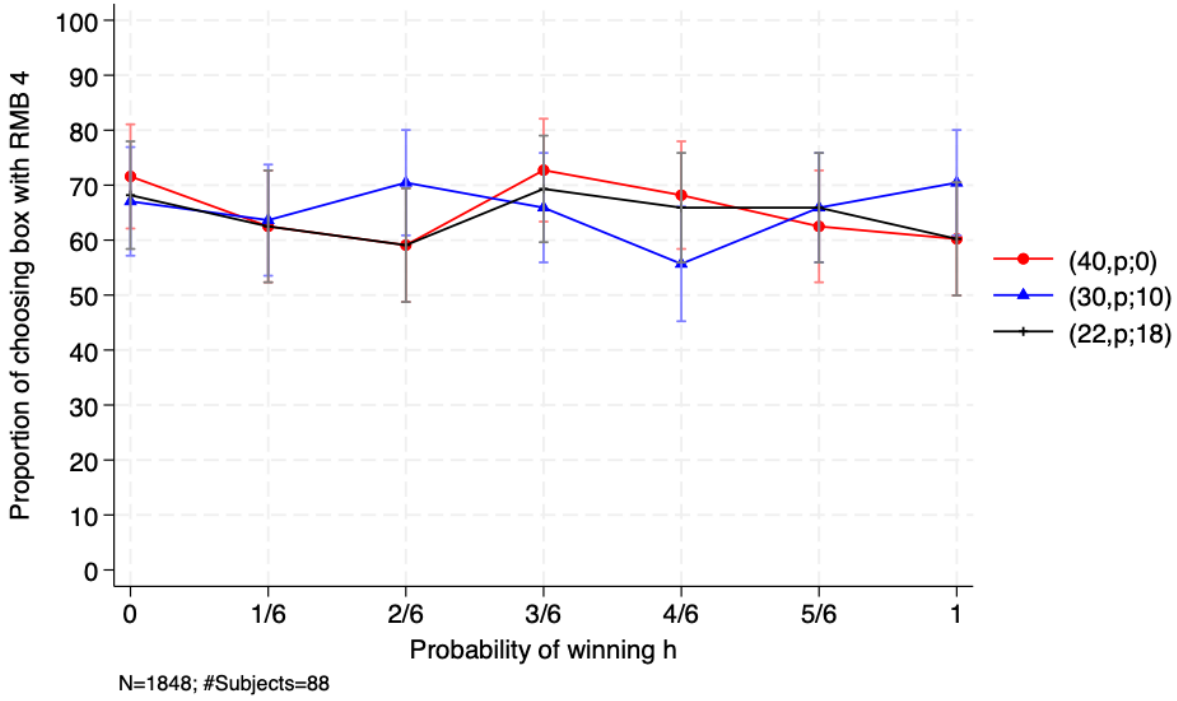

Figure B.1: Separation Experiment: Only include those who did not participate in Chen and Zhong's experiment. This figure displays the relationship between lottery winning probability (x-axis) and the proportion of subjects choosing the box containing RMB 4 (Bonus 2) (y-axis) in the Separation Experiment. The analysis is based on 1,848 choices made by 88 participants. Vertical bars indicate 95% confidence intervals.

C Experimental Instructions for the Separation Experiment

The experiments were conducted in Chinese. In this section, we provide English translations of the experimental instructions.

Welcome!

Welcome to our study on decision-making. In this study, you will be given a participation fee of 20 yuan and a potential bonus. The bonus you earn today depends partly on the decisions you make, and partly on chance. All information provided will be kept confidential and will be used for research purposes only. We will first introduce the experiment. Afterward, we will provide you with the link for the experiment, which you will complete on your computer.

Before introducing our study, there are several things to you should remember:
• Please prepare a piece of paper and a pen
• Cell phones are not allowed
• Please do not use other apps or browse other websites
• Please do not communicate with others during the experiment
• If you have any questions, please contact our experimenters through the chat box in the online meeting room at any time

Once you are ready to start, please click the “Next” button to proceed.

There are 21 rounds in this study. We label each round with a unique string of three random uppercase letters (e.g. "ABC"). In each round, there are two bonuses, Bonus 1 and Bonus 2. Bonus 1 is behind one or more bricks out of 6 bricks, numbered from 1 to 6. Bonus 2 is inside one of the six boxes, numbered from 1 to 6. The following screens describe the bonus scheme and what you should do in each round.

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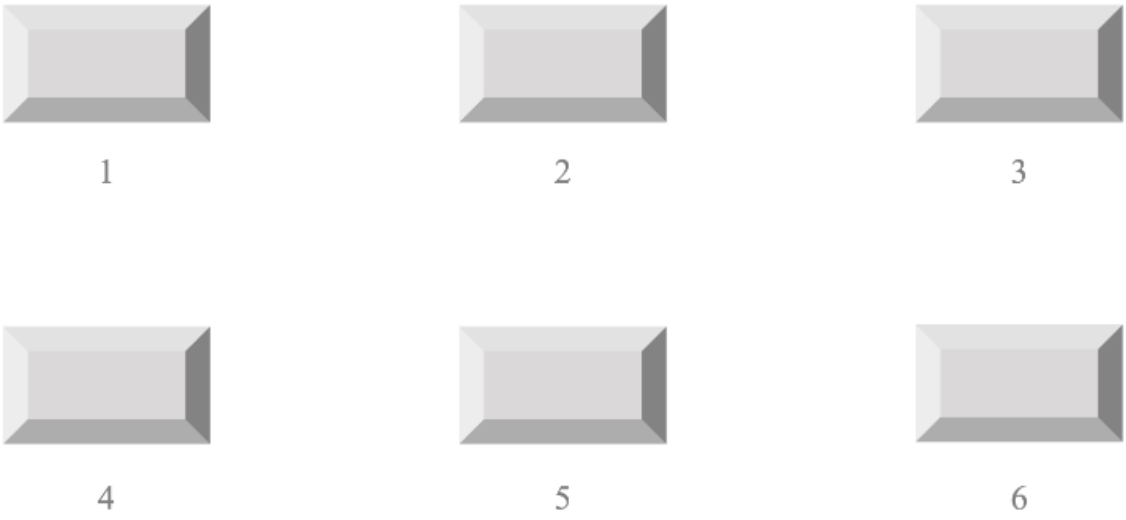
Bonus 1:

There are six bricks. Behind some bricks, you can find H (high amount of Bonus 1), and behind the rest of the bricks you can only find L (low amount of Bonus 1). You know the composition: how many bricks hides H and how many hide L. You do NOT know the exact distribution: behind which bricks you can find H and behind which bricks you can find L.

Example:
Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, behind the other three bricks you can find 0 yuan



In this example, you know in this decision you can find 20 yuan behind three bricks and 0 yuan behind the remaining three bricks, but you do not know behind which bricks you can find 20 yuan or 0 yuan.

Task 1:

After you receive the information about Bonus 1, you need to choose one brick out of the six bricks.

Example:
Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, behind the other three bricks you can find 0 yuan.
Please choose one brick, your payoff will depend on your guess, good luck!

1

2

3

4

5

6

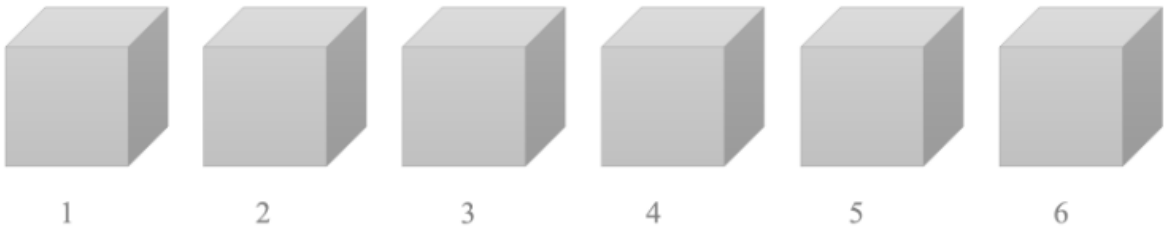
In this example, you need to click the number of the brick that you want to choose.

Bonus 2:

There is 4 yuan given to one of the six boxes. You don't know which box contains the 4 yuan when you make your choice.

Example:

Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, behind the other three bricks you can find 0 yuan.
Bonus 2: There is one box containing the 4 yuan, the rest contains no money.

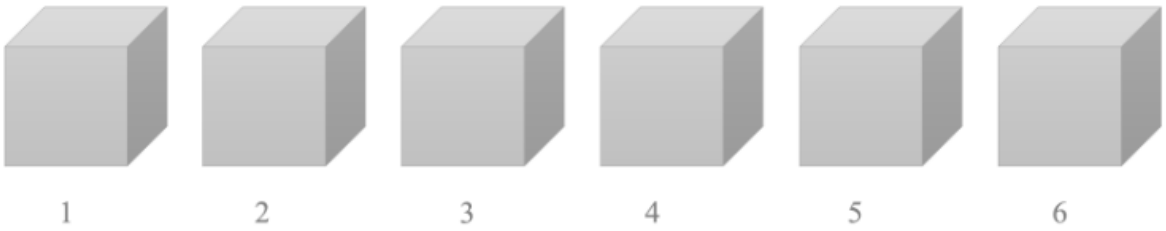


In this example, you know that, in this round, one of the boxes contains 4 yuan. That is, you will have the chance to get 4 yuan in addition to what you get from Bonus 1.

Task 2:

After you receive the information about Bonus 2, you need to choose one box out of the six boxes numbered from 1 to 6, and record the number on the paper you have prepared, in the format of "round number - box number."

Example:
Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, behind the other three bricks you can find 0 yuan.
Bonus 2: There is one box containing 4 yuan, the rest contains no money.
Please choose one box and record the number.



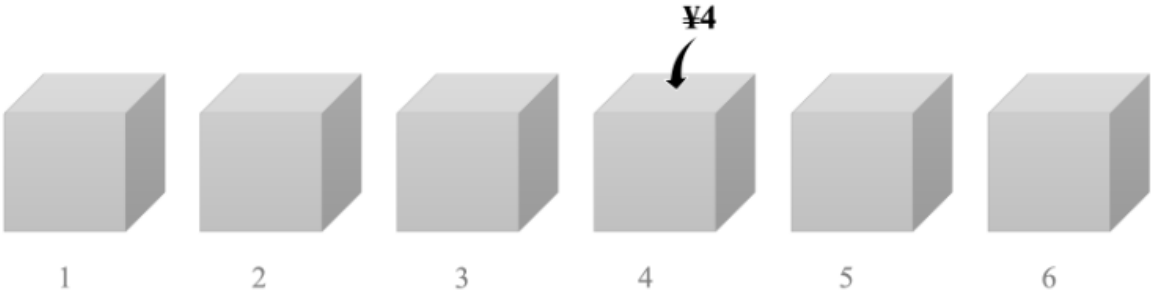
In this example, if you want to choose box 1, you should record "ABC - 1" on your paper; if you want to choose box 2, you should record "ABC - 2"; so on and so forth.

Bonus 2:

After you record your choice, we will provide additional information. You will know exactly which box contains the 4 yuan.

Example:

Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, behind the other three bricks you can find 0 yuan.
Bonus 2: There is one box containing 4 yuan, the rest contains no money.
The box containing the 4 yuan is box 4.



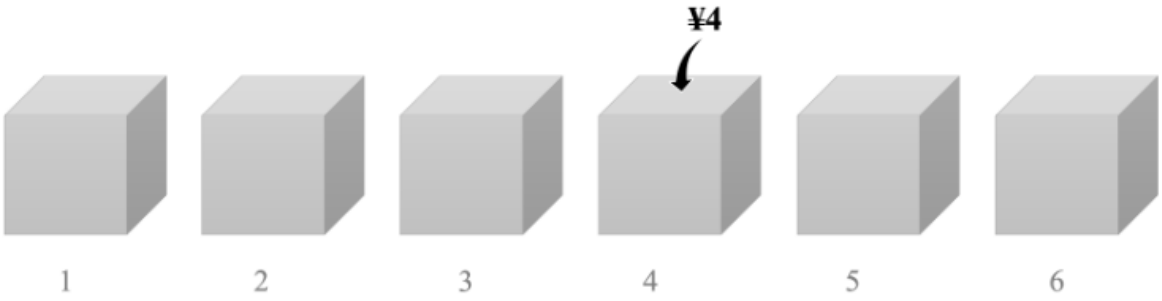
In this example, you know that, in this round, box 4 contains 4 yuan.

Task 3:

After you receive the additional information about Bonus 2, you need to report the box you selected in Task 2 by clicking. Please note that your choice in Task 2 is known only to you. Other people, including experimenters, cannot see the choice you recorded. **At any time during or after the experiment, you do not need to upload or show the record of your choice in Task 2.**

Example:

Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, behind the other three bricks you can find 0 yuan.
Bonus 2: There is one box containing 4 yuan, the rest contains no money.
The box containing the 4 yuan is box 4.
Please select the box according to your previous record, you will get the amount inside the chosen box.



In this example, you need to click on the choice you recorded in Task 2. In Task 2, if you recorded “ABC - 1”, you need to click on box 1; if you recorded “ABC - 2”, you need to click on box 2; and so forth.

Summary:

Each round has six screens as follows.
• First screen: the beginning of a round.
• Second screen: the composition of Bonus 1—behind how many bricks you can find H and behind how many bricks you can find L.
• Third screen: Task 1—choose a brick.
• Fourth screen: the introduction of Bonus 2
• Fifth screen: Task 2—choose a box and record your choice.
• Sixth screen: additional information about the distribution of Bonus 2 — which box contains the 4 yuan. Then Task 3 — Click on the box you selected based on the record from Task 2.

Bonus 1 and Bonus 2 are given randomly and independently. Whether you can find H or L behind a brick is NOT correlated with which box contains the 4 yuan.

Bonus 1: In each round, we specify the composition of Bonus 1, that is, behind how many bricks you can find H and behind how many bricks you can find L. After you finish all decisions, we will roll a standard six-sided die to determine which boxes have H and the remaining boxes have L.

Example: For the composition "behind three bricks you can find 20 yuan, behind the other three bricks you can find 0 yuan", we will roll the die three times to generate three integers between 1 and 6 to determine which three bricks hide 20 yuan. Suppose the numbers are 1, 2, and 5, there will be 20 yuan behind bricks 1, 2, and 5, and 0 yuan behind the other three bricks. Suppose the numbers are 2, 3, and 6, there will be 20 yuan behind bricks 2, 3, and 6, and 0 yuan behind the other three bricks. If the die roll generates duplicate numbers, we will roll the die again until three distinct integers between 1 and 6 are produced.

Bonus 2: In each round, we specify the distribution of Bonus 2. Before we started the experiment, we used the RANDBETWEEN(1,6) function to generate one integer between 1 and 6 to determine which box has the 4 yuan. In each round, you will know which box has the 4 yuan.

Example: If the number drawn is 4, box 4 will have a 4 yuan. If the number drawn is 6, box 6 will have the 4 yuan. We have already completed this random selection before the experiment starts.

Payment Collection

After completing the entire experiment, you need to fill in the mobile phone number you used when registering your account on Weikeyan, so that we can match the data to transfer the payment. We will pay you the reward within 72 hours through the Weikeyan platform, which can be directly withdrawn to your WeChat wallet. Your experiment reward includes a participation fee of 20 yuan and a possible bonus.

After you finish all the decisions, the computer will randomly select one of the 21 rounds of your decisions to determine your bonus. In that round, the amount behind the brick you selected, plus the amount in the box you selected will be your bonus for this experiment. You will see on the screen which round has been drawn for you at the end of the experiment. We will roll a die to determine how Bonus 1 will be distributed in that round. You will receive the amount behind the brick you selected in that round. You only need to pay attention to the number of bricks which hide high payoff in your selected round during the die roll (e.g., if the selected round has 3 high payoff bricks, the first three die rolls will determine the distribution of your Bonus 1). You will also get the amount in the selected box as Bonus 2 if there is any. This experiment uses a random selection of one round to determine the reward. You should treat every round of decision-making as the one that will ultimately determine your reward and make decisions carefully.

The experiment instructions are now complete. If you have any questions, please raise your hand. Thank you!

Before the experiment begins, you need to answer five questions to test your understanding of the experiment. Please answer the questions carefully.

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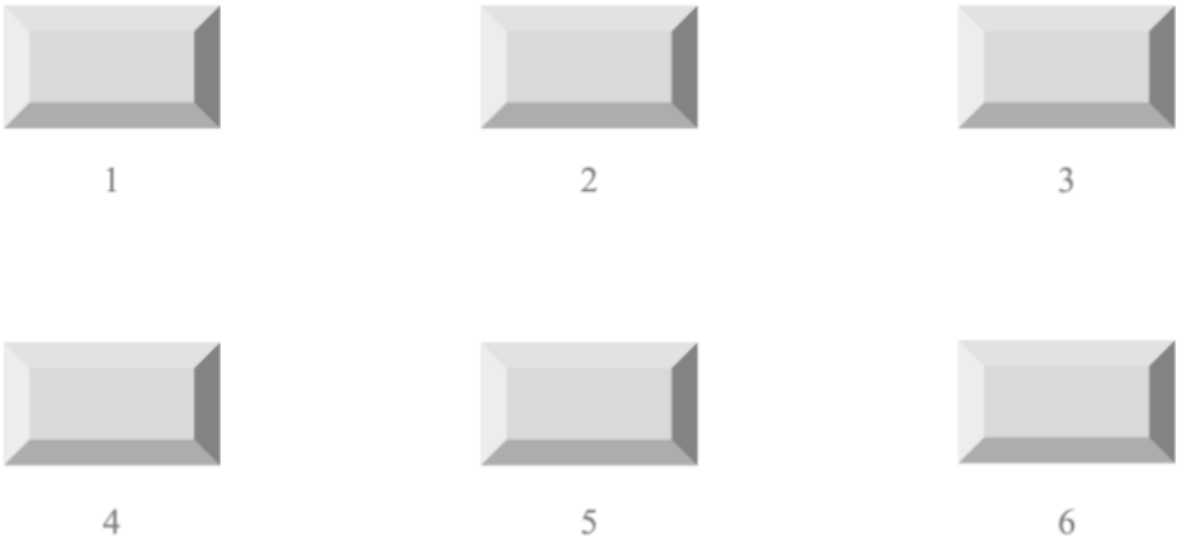
Suppose in one round, you know that "Bonus 1: Behind two bricks you can find 30 yuan, and behind four bricks you can find 0 yuan." Behind which brick has the highest probability of 30 yuan?



Brick 1

Brick 2

Brick 3

Brick 4

Brick 5

Brick 6

The probability of finding 30 yuan behind all the bricks is the same.

Question:
Suppose in one round, you know that "Bonus 1: Behind two bricks you can find 30 yuan, and behind four bricks you can find 0 yuan." Behind which brick has the highest probability of 30 yuan?

Your answer: The probability of finding 30 yuan behind all the bricks is the same.

Your answer is correct. Suppose in one round, among the six bricks, you can find 30 yuan behind two bricks and 0 yuan behind four bricks, the probability of finding 30 yuan behind all the bricks is the same.

Suppose in one round, you know that "Bonus 1: Behind two bricks you can find 30 yuan, and behind four bricks you can find 0 yuan."
What is the probability for you to earn 30 yuan?

- 0
- 1/6
- 1/3
- 1/2
- 2/3
- 5/6
- 1

Question:
Suppose in one round, you know that "Bonus 1: Behind two bricks you can find 30 yuan, and behind four bricks you can find 0 yuan."
What is the probability for you to earn 30 yuan?

Your answer: 1/3

Your answer is correct. Suppose in one round, among the six bricks, you can find 30 yuan behind two bricks and 0 yuan behind four bricks,, the probability for finding 30 yuan behind each brick is 2/6=1/3.

→

Suppose in one round, you know that "Bonus 1: Behind two bricks you can find 30 yuan, and behind four bricks you can find 0 yuan. Bonus 2: there is one box containing 4 yuan, the rest contains no money." Which box has the highest probability of containing Bonus 2 (the 4 yuan)?

- Box 1
- Box 2
- Box 3
- Box 4
- Box 5
- Box 6
- All boxes have the same probability to contain the 4 yuan

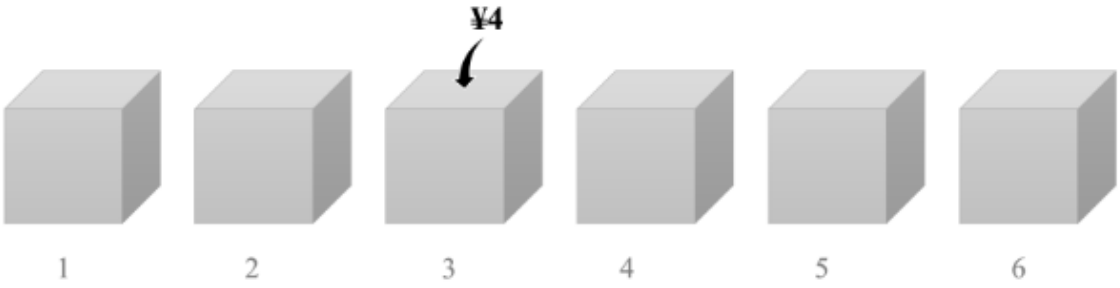
Question:
Suppose in one round, you know that "Bonus 1: Behind two bricks you can find 30 yuan, and behind four bricks you can find 0 yuan. Bonus 2: there is one box containing 4 yuan, the rest contains no money." Which box has the highest probability of containing Bonus 2 (the 4 yuan)?

Your answer: All boxes have the same probability to contain the 4 yuan

Your answer is correct. In each round, all boxes have the same probability to contain Bonus 2 (the 4 yuan).

Suppose in one round, you know that

Round: ABC
Bonus 1: Behind three bricks you can find 30 yuan, and behind the other three bricks you can find 0 yuan.
Please choose one brick, your payoff will depend on your guess, good luck!
Bonus 2: There is one box containing 4 yuan, the rest contains no money.
Please choose one box and record the number.
The box containing the 4 yuan is box 3.
Please select the box according to your previous record, you will get the amount inside the chosen box.



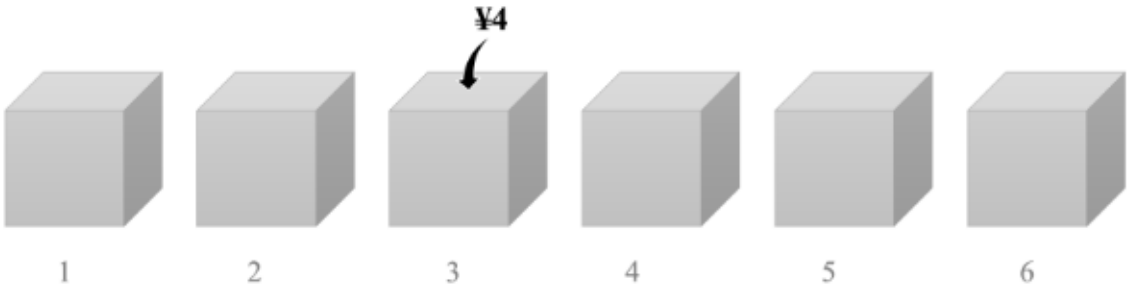
If you record "ABC-6" in Task 2, which box should you select?

- Box 1
- Box 2
- Box 3
- Box 4
- Box 5
- Box 6

Question:

Suppose in one round, you know that

Round: ABC
Bonus 1: Behind three bricks you can find 30 yuan, and behind the other three bricks you can find 0 yuan.
Please choose one brick, your payoff will depend on your guess, good luck!
Bonus 2: There is one box containing 4 yuan, the rest contains no money.
Please choose one box and record the number.
The box containing the 4 yuan is box 3.
Please select the box according to your previous record, you will get the amount inside the chosen box.



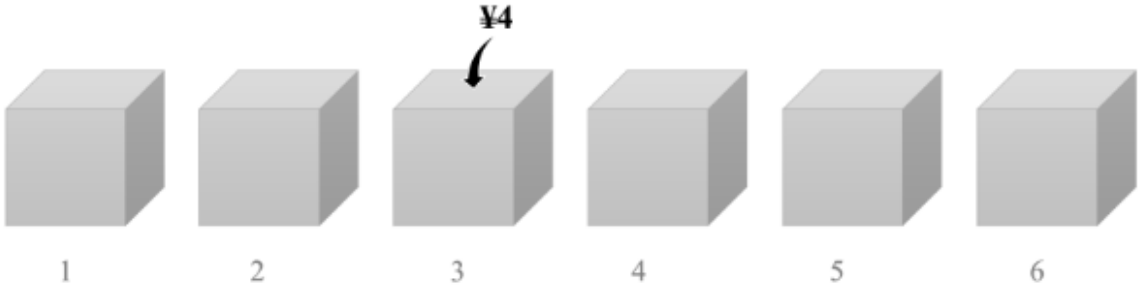
If you record "ABC-6" in Task 2, which box should you select?

Your answer: Box 6

Your answer is correct. If you choose Box 6 in Task 2, you should record "ABC-6", and you should select Box 6 in Task 3 accordingly.

Suppose in one round, you know that

Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, and behind the other three bricks you can find 0 yuan.
Please choose one brick, your payoff will depend on your guess, good luck!
Bonus 2: There is one box containing 4 yuan, the rest contains no money.
Please choose one box and record the number.
The box containing the 4 yuan is box 3.
Please select the box according to your previous record, you will get the amount inside the chosen box.



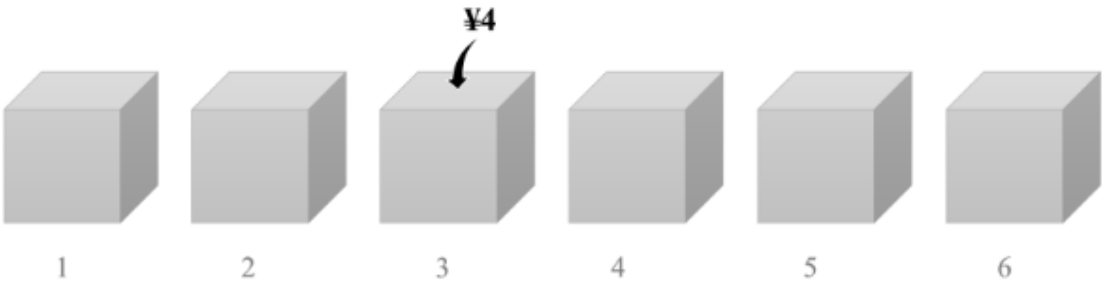
If you record "ABC-3" in Task 2, which box should you select?

- Box 1
- Box 2
- Box 3
- Box 4
- Box 5
- Box 6

Question:

Suppose in one round, you know that

Round: ABC
Bonus 1: Behind three bricks you can find 20 yuan, and behind the other three bricks you can find 0 yuan.
Please choose one brick, your payoff will depend on your guess, good luck!
Bonus 2: There is one box containing 4 yuan, the rest contains no money.
Please choose one box and record the number.
The box containing the 4 yuan is box 3.
Please select the box according to your previous record, you will get the amount inside the chosen box.



If you record "ABC-3" in Task 2, which box should you select?

Your answer: Box 3

Your answer is correct. If you choose Box 3 in Task 2, you should record "ABC-3", and you should select Box 3 in Task 3 accordingly.

Decision 1 of 21

Round: LHV

Bonus 1: Behind all six bricks you can find 30 yuan

1

2

3

4

5

6

→

Decision 1 of 21

Round: LHV

Bonus 1: Behind all six bricks you can find 30 yuan

Please choose one brick, your payoff will depend on your guess, good luck!

1

2

3

4

5

6

Brick 1	Brick 2	Brick 3
Brick 4	Brick 5	Brick 6

Decision 1 of 21

Round: LHV

Bonus 1: Behind all six bricks you can find 30 yuan

Bonus 2: there is one box containing 4 yuan, the rest contains no money.

Decision 1 of 21

Round: LHV

Bonus 1: Behind all six bricks you can find 30 yuan

Bonus 2: there is one box containing 4 yuan, the rest contains no money.

Please choose one box and record the number.

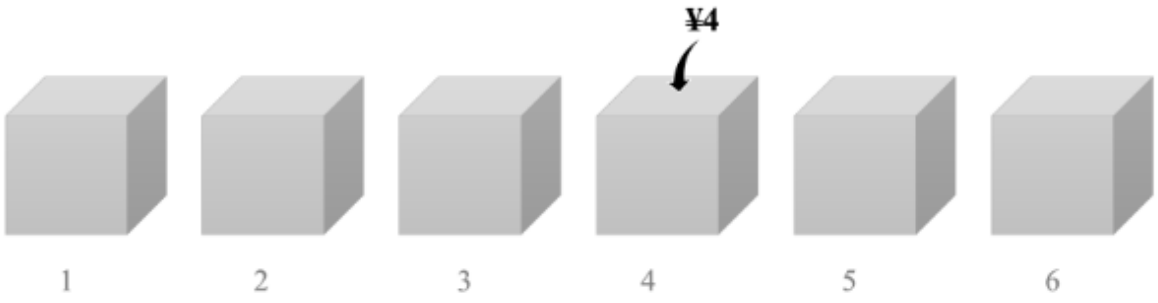
Decision 1 of 21

Round: LHV

Bonus 1: Behind all six bricks you can find 30 yuan

Bonus 2: there is one box containing 4 yuan, the rest contains no money.

The box containing the 4 yuan is box 4.



Decision 1 of 21

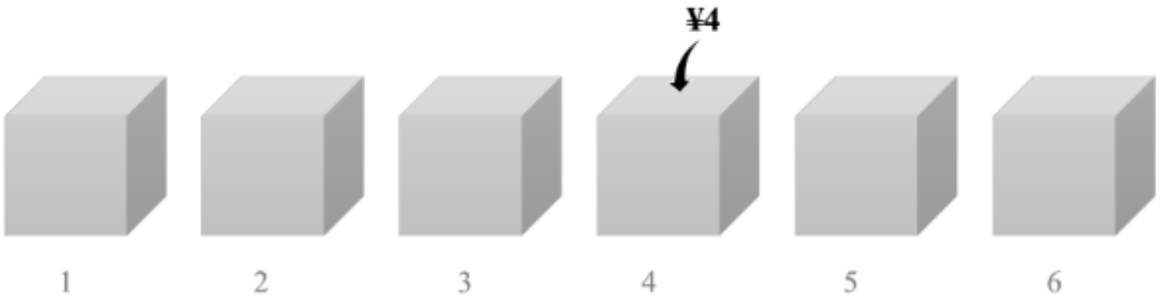
Round: LHV

Bonus 1: Behind all six bricks you can find 30 yuan

Bonus 2: there is one box containing 4 yuan, the rest contains no money.

The box containing the 4 yuan is box 4.

Please select the box according to your previous record, you will get the amount inside the chosen box.



box 1 | box 2 | box 3 | box 4 | box 5 | box 6

Please click the arrow below to proceed to the next round.