Supplementary Information for

"*Correlation neglect for a threshold signal*"

This PDF file includes:

S1. Instructions used for the experiment

S2. Pre- and Post-Game Questionnaires

S3. Comprehensive post-questionnaire

S4. The Additional explanation to enhance participants' understanding of probability calculations (Study 2 only)

S5. Screen shot of the game

S1. Instructions used for the experiment

This slide is a flowchart of the entire experiment shown to the participants. The differences between Study 1 and Study 2 are the number of games played (Study 1 had two games, while Study 2 had one) and the presence of a lecture video (only Study 2 included one).

Study 1

Flowchart of the experiment (Study 1)

- Stage 1: Consent Form Review and General Overview
- Stage 2 *[Game 1]*: Game explanation → Pre-questionnaire 1→ Participation in the game 1 (20 rounds) → Post-questionnaire 1
- Stage 3 *[Game 2]*: Game explanation → Pre-questionnaire 2→ Participation in the game 2 (20 rounds) → Post-questionnaire 2
- Stage 4: Comprehensive post-questionnaire
- Stage 5: Determining the reward payment round

Study 2

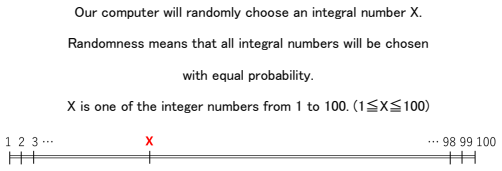
Flowchart of the experiment (Study 2)

- Stage 1: Consent Form Review and General Overview
- Stage 2: Watching a lecture video
- Stage 3 *[Game]*: Game explanation → Pre-questionnaire → Participation in the game (20 rounds) → Post-questionnaire
- Stage 4: Comprehensive post-questionnaires
- Stage 5: Determining the reward payment round

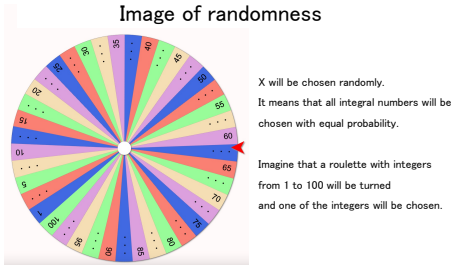
S1-1. Instruction for the game (Study 1 and 2)[1]

The following passage is the explanation of the experimental task given to the participants.

Instruction for the game

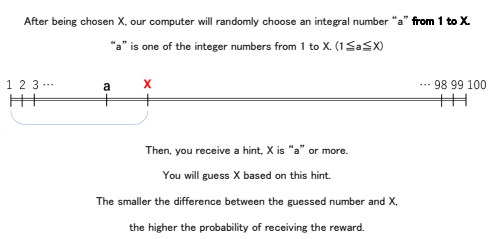
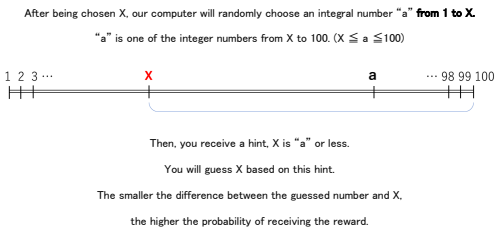
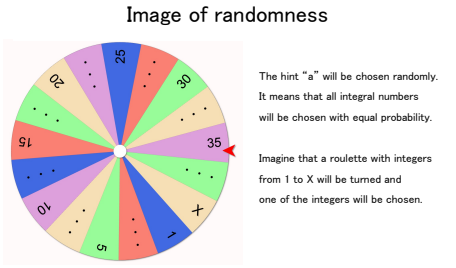
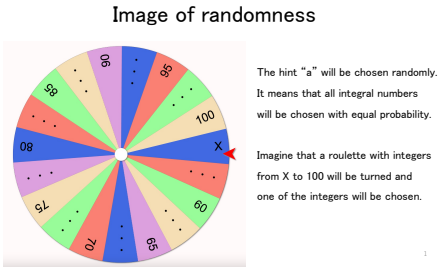
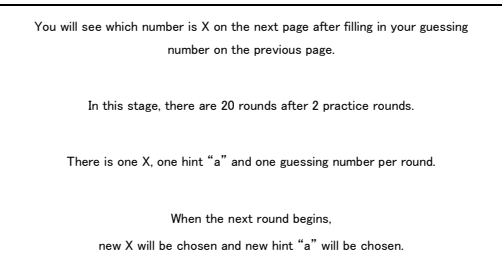


1. In this task, our computer will randomly choose an integral number X. Randomness means that all integral numbers will be chosen with equal probability. X is one of the integer numbers from 1 to 100. You will guess this X based on a hint.



2. X will be chosen randomly. It means that all integral numbers will be chosen with equal probability. Imagine that a roulette with integers from 1 to 100 will be turned and one of the integers will be chosen.

[1] The underlined text in italics varies depending on the conditions (Lower bound/Upper bound), and with/without feedback conditions).

	3. (*Lower bound condition*) After being chosen X, our computer will randomly choose an integral number "a" from 1 to X. "a" is one of the integer numbers from 1 to X. Then, you receive a hint, X is "a" or more. You will guess X based on this hint. The smaller the difference between the guessed number and X, the higher the probability of receiving the reward.
	3. (*Upper bound condition*) *After being chosen X, our computer will randomly choose an integral number "a" from X to 100. "a" is one of the integer numbers from X to 100. Then, you receive a hint, X is "a" or less. You will guess X based on this hint. The smaller the difference between the guessed number and X, the higher the probability of receiving the reward.*
	4. (*Lower bound condition*) The hint "a" will be chosen randomly. It means that all integral numbers will be chosen with equal probability. Imagine that a roulette with integers from 1 to X will be turned and one of the integers will be chosen.
	4. (*Upper bound condition) The hint "a" will be chosen randomly. It means that all integral numbers will be chosen with equal probability. Imagine that a roulette with integers from X to 100 will be turned and one of the integers will be chosen.*
	5. (*With feedback condition)* You will see which number is X on the next page after filling in your guessing number on the previous page. In this stage, there are 20 rounds after 2 practice rounds. There is one X, one hint "a" and one guessing number per round. When the next round begins, new X will be chosen and new hint "a" will be chosen. That is, X will be chosen 22 times in 2 practice rounds and 20 rounds.

In this stage, there are 20 rounds after 2 practice rounds. There is one X, one hint "a" and one guessing number per round. When the next round begins, new X will be chosen and new hint "a" will be chosen. That is, X will be chosen 22 times in 2 practice rounds and 20 rounds.	5. (*Without feedback condition)* In this stage, there are 20 rounds after 2 practice rounds. There is one X, one hint "a" and one guessing number per round. When the next round begins, new X will be chosen and new hint "a" will be chosen. That is, X will be chosen 22 times in 2 practice rounds and 20 rounds.

S1-2. An explanation of the reward calculation provided to the participants (Study 1 and 2)

The following passage is an explanation of the reward calculation method provided to the participants.

How to calculate your reward

The closer X is to your guess, the more likely you are to receive JPY 1000 as a reward. The probability of receiving JPY1000 varies from approximately 20% to 80%, depending on your choice.
The following formula indicates the value of the probability.

The probability of receiving JPY1000 (%) = $80 - 60 \times \left(\frac{X - your\ guess}{100-a}\right)^2$

(When the hint value "a" is 100, the probability is 80%)

Example: X is 45, your guess is 35, and the hint "a" is 20.
The probability of receiving JPY1000 (%)

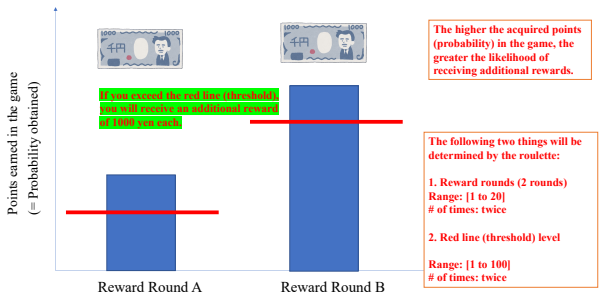
$= 80 - 60 \times \left(\frac{45-35}{100-20}\right)^2 = 80 - 60\left(\frac{10}{80}\right)^2 = 80 - 60 \times 0.015625 = 79.0625$

We round decimals to the nearest whole number. Your probability of receiving JPY1000 is 79%. In other words, you get a 79% chance to win JPY1000.
Whatever the hint "a" is, the closer you guess the X, the higher the probability.

S1-3. An explanation of the method for determining the threshold of reward allocation (Study 1 and 2)

The following passage is an explanation of the method for determining the threshold of reward allocation.

An explanation of the method for determining the threshold of reward allocation

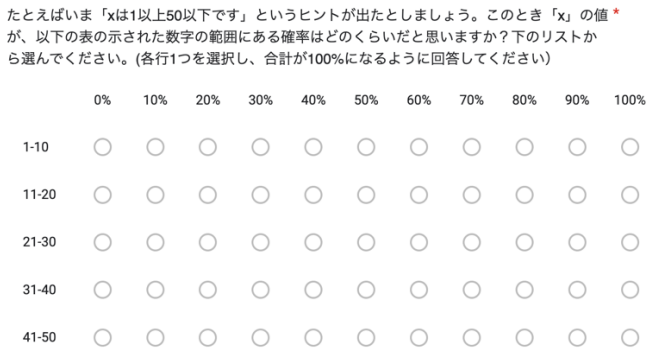
<table>
<tr>
<td> 
</td>
<td>1. The higher the probability of obtaining points in the game, the greater the likelihood of receiving additional rewards. We will spin the roulette to determine the round for potential rewards and the threshold for obtaining additional rewards. Two factors are determined by a roulette wheel:
1. Determination of Payout Rounds: For each stage, the roulette wheel is spun twice (first session and second session) within the range of [1-20].
2. Determination of Threshold Level: For each stage, the roulette wheel is spun twice (first session and second session) within the range of [1-100].</td>
</tr>
<tr>
<td><u>The reward rounds (2 times):</u>
First, we will determine the reward rounds (2 times). The roulette containing numbers from 1 to 20 will be spun to determine the rounds eligible for rewards. For example, if the roulette lands on 5, the outcome of Game Round 5 will be considered as the reward round.

<u>The threshold in each round (2 times):</u>
Second, we will determine the threshold in each round (2 times). The roulette containing numbers from 1 to 100 will be spun to determine the percentage required to receive additional rewards. For example, if the roulette lands on 70, participants whose game results exceed or equal to "70%" will receive an additional reward of 1000 yen. However, participants whose results are below "69%" will not receive any additional rewards.</td>
<td>2. First, we will determine the reward rounds (2 times): The roulette containing numbers from 1 to 20 will be spun to determine the rounds eligible for rewards. For example, if the roulette lands on 5, the outcome of Game Round 5 will be considered as the reward round.
Second, we will determine the threshold in each round (2 times): The roulette containing numbers from 1 to 100 will be spun to determine the percentage required to receive additional rewards. For example, if the roulette lands on 70, participants whose game results exceed or equal to "70%" will receive an additional reward of 1000 yen. However, participants whose results are below "69%" will not receive any additional rewards.</td>
</tr>
</table>

S2. Pre- and Post-Game Questionnaires

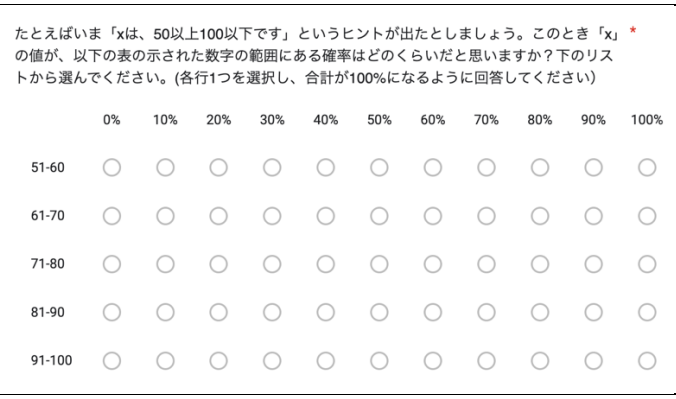
The following are the screens and descriptions for the pre- and post-game questionnaires. These were administered before and after the game in Study 1 (during Stages 2 and 3) and in Study 2 (during Stage 3).

UB (upper bound) condition



Imagine you're given the hint, "x is between 1 and 50, inclusive." What's the probability that the value of "x" falls within each of the following ranges? Please choose from the options below, selecting one for each row to ensure the total probability is 100%.

LB (Lower bound) condition



Imagine you're given the hint, "x is between 50 and 100, inclusive." What's the probability that the value of "x" falls within each of the following ranges? Please choose one from the options below for each row, ensuring the total probability is 100%.

S3. Comprehensive post-questionnaire

The following are the descriptions for the Comprehensive post-questionnaire.

*****

Thank you for participating in our economic experiment. Please complete the following post-experiment survey, which is divided into three sections:

Section 1: Questions about yourself

Section 2: Quiz 1

Section 3: Quiz 2

For the quizzes in Sections 2 and 3, please answer based on your own knowledge without searching online. If you don't know an answer, you may skip the question. Once you have completed all the questions, please click the "Submit" button. After submitting, please follow the instructions of the experimenter.

Section 1: About Yourself

Please answer all the following questions.

* Date and time of your participation:
* Your experiment ID for today:
* Your academic year:
* Your faculty/department (Graduate students, please select the faculty related to your graduate school):
* Your gender:
    * Female
    * Male
    * Other / Prefer not to say
* Your age:

Section 2: Quiz 1

Please read the following problem description and refer to the image, then answer the related questions (Q1 to Q6). Please answer based on your own knowledge without searching online. If you don't know an answer, you may skip the question. Please use half-width alphanumeric characters for your answers, such as "1/2" or "3/4".

Problem Description: (Please also refer to the image below.)

This is a lottery game. A bag contains one white box and one black box. The white box contains two red balls and one blue ball. The black box contains one red ball and one blue ball. The boxes and balls are identical in shape and size, and cannot be distinguished by touch. After thoroughly mixing the boxes in the bag and the balls within the boxes, you reach into the bag without looking and first select a box. Then, without looking into the chosen box, you reach in and select a ball (your lottery ticket). (Note: You cannot change the box you initially selected.) If the ball you draw is red, it's a "win." If

it's blue, it's a "loss." Based on this lottery, please answer the following questions.

- Have you read the problem description and reviewed the image? (There are six related questions, Q1-Q6, below.) If so, please check here.

[Yes, I have confirmed]

Q1: In this lottery, what is the probability that a person drawing a lottery ticket selects the white box?

Q2: Suppose a person drawing a lottery ticket has selected the white box. What is the probability that this person wins?

Q3: In this lottery, what is the probability of winning with a ticket from the white box?

Q4: In this lottery, what is the probability that the drawn ball came from the black box?

Q5: In this lottery, what is the overall probability of winning?

Q6: Suppose a person drawing a lottery ticket has won. What is the probability that the winning ticket came from the white box?

Section 3: Quiz 2

Please answer the following problem based on your own knowledge without searching online. If you don't know the answer, you may skip the question. Please use half-width alphanumeric characters for your answers, such as "1/2" or "3/4".

Problem Description:

There is a pair of goat siblings. Their mother goat gives birth to a white or black goat with a 1/2 probability for each. If one of the goat siblings is black, what is the probability that the other sibling is also black?

-Have you read the problem description? (There is one related question below.) If so, please check here.

[Yes, I have confirmed]

Question: If one of the goat siblings is black, what is the probability that the other sibling is also black?

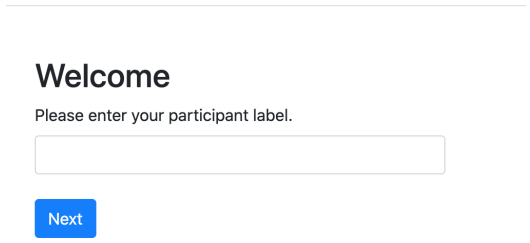
S4. The Additional explanation to enhance participants' understanding of probability calculations (Study 2 only)

In Study 2, in order to enhance participants' understanding of probability calculations, the following instructions were added in addition to the information provided in S1-2. The following passage is the explanatory text presented to the participants.

IMPORTANT

We have designed the formula to make the following condition.
When you express **an expected value of "true value (i.e., X)"** you guess, an expected value of your reward will be the highest.

S5. Screen shot of the game (by oTree)

	This is the screen shot of the initial welcome page. Participants entered their individually assigned experiment IDs to join the game.
	This image displays the participant's game screen (in Japanese). *** A new integer X was chosen from a range of 1 to 100. The hint for X was provided as follows: Hint: "**X is greater than or equal to 1 and less than or equal to 91**." Please predict integer X based on the hint (Please provide your predicted value as a half-width integer).
	In the With-Feedback condition, participants received feedback after each round. *** You received the hint: "**X is greater than or equal to 1 and less than or equal to 91**." You predicted integer X to be "**45**." The actual integer X for this round was "**20**."