

Supplementary Information for

Gender differences in guilt aversion in Korea and the United Kingdom

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Contents:

Supplemental Results and Discussion

Figure S1. Correlation matrix for the Big Five variables

Figure S2. The results of the Lasso regression of gender differences for inequity

Table S1. Descriptive statistics for the online sample

Table S2. Lasso regression of the gender differences for guilt

Table S3. Lasso regression of the gender differences for inequity

Instructions

Supplemental Results and Discussion

Behavioral results of the gender differences for inequity.

For the inequity-aversion behavioral analysis, we replaced the target variable $\beta(\text{Inequity})$ and performed the same Lasso regression as the one for guilt aversion (see Supplementary Fig. S2 and Table S3). Supplementary Fig. S2a and Table S3(1) present the Lasso regression results to identify the relationship between inequity aversion ($\beta(\text{Inequity})$) and gender under a controlled socioeconomic status. We found that gender had no weight in either the Korean or U.K. populations. However, this result is not consistent with previous empirical studies (for a review, see [1]). For the U.K., openness and education had large positive weights. Supplementary Fig. S2b and Table S3(2) present the Lasso regression results to identify the cognitive mechanisms specific

to gender. We found that the interaction term of gender with personality traits had no weight in the Korea or U.K. populations.

Why were no gender differences for inequity aversion?

Although we found that both countries were inequity averse (see Table 1), we did not observe gender differences in inequity aversion. However, many previous studies have observed differences in inequity aversion, including studies on populations in Korea and the U.K. Those previous studies often used dictator games and social value orientation tasks, which are suitable for focusing on inequity aversion. On the contrary, our trust game was primarily designed to measure guilt aversion. Thus, a potential reason for the inconsistent results is the experimental tasks used. Another potential reason is that the mental concentration of the participants was lower while conducting the task online. Indeed, the withdrawal rate in the present study was higher than in our previous study [2]. In any case, we believe we can remove the effect of inequity aversion from the analysis of guilt aversion using the present task.

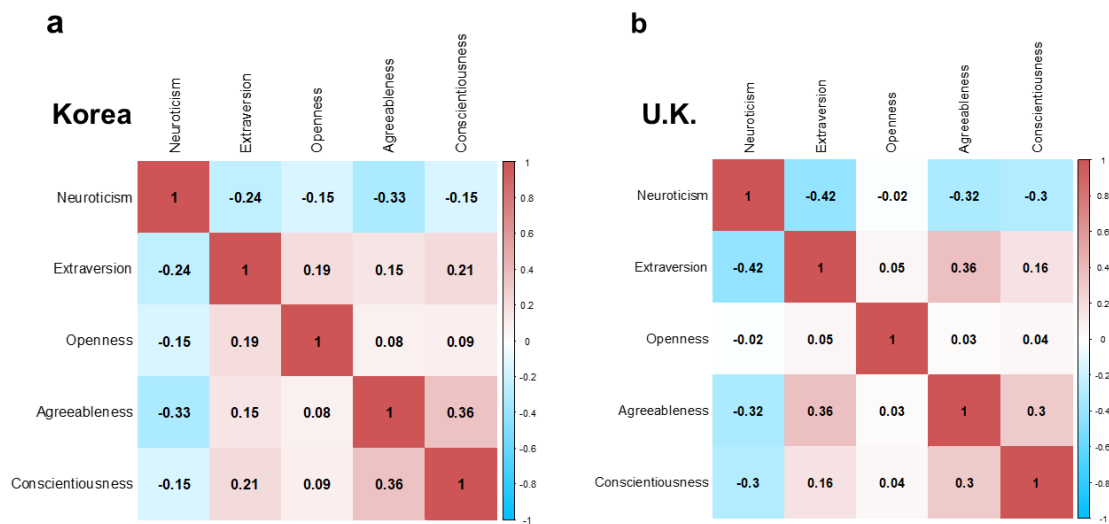


Figure S1. Correlation matrix for the Big Five variables: (a) Korea; (b) U.K.

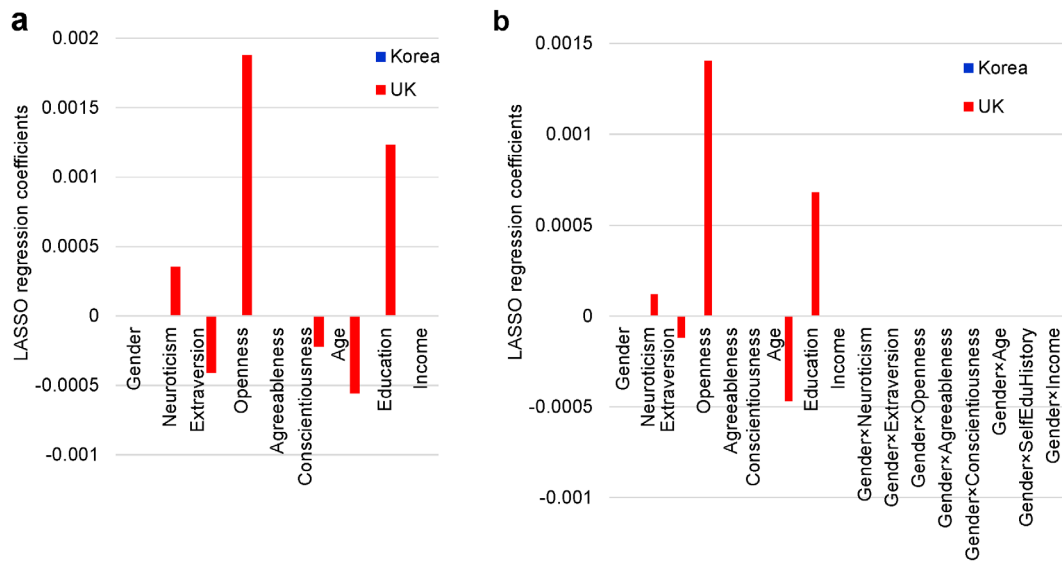


Figure S2. The results of the Lasso regression of gender differences for inequity (except the intercept term for display purposes). Inequity-aversion behavior ($\beta(Inequity)$) was regressed using Lasso regression, with the following variables as regressors: (a) gender, Big Five, and socioeconomic status (age, education, and income); and (b) gender, Big Five, socioeconomic status, and the interaction between gender and Big Five.

Table S1. Descriptive statistics for the online sample

Variables	Korea			U.K.		
	All (<i>n</i> = 294)	Men (<i>n</i> = 119)	Women (<i>n</i> = 175)	All (<i>n</i> = 347)	Men (<i>n</i> = 157)	Women (<i>n</i> = 190)
Neuroticism	5.88 (1.63)	5.39 (1.62)	6.21 (1.55)	6.28 (2.24)	5.69 (2.19)	6.76 (2.16)
Extraversion	5.96 (1.54)	5.83 (1.50)	6.04 (1.56)	5.61 (204)	5.35 (200)	5.83 (206)
Openness	6.76 (1.77)	6.31 (1.83)	7.06 (1.67)	7.15 (1.73)	7.10 (1.66)	7.19 (1.78)
Agreeableness	7.04 (1.31)	7.08 (1.42)	7.01 (1.24)	7.01 (1.81)	6.89 (1.87)	7.11 (1.77)
Conscientiousness	6.99 (1.39)	7.01 (1.46)	6.97 (1.35)	7.75 (1.62)	7.69 (1.68)	7.80 (1.57)
Age	35.29 (8.03)	34.82 (7.95)	35.60 (8.10)	37.09 (8.55)	37.72 (8.29)	36.56 (8.75)
Education	5.65 (0.82)	5.60 (0.87)	5.69 (0.78)	5.10 (1.46)	5.03 (1.54)	5.16 (1.40)
Income	2.57 (1.20)	2.83 (1.28)	2.39 (1.11)	3.00 (1.4)	3.43 (1.44)	2.64 (1.25)

Notes: All of the scores are mean scores. Standard deviations are in parentheses. The Big Five Inventory is a 10-point scale. Education and Income are a 7-point scale.

Table S2. Lasso regression of the gender differences for guilt

Explanatory variable	Dependent variable: $\beta(Guilt)$			
	(1)		(2)	
	Korea	U.K.	Korea	U.K.
Gender	0.00361	0.00949	0	0
Neuroticism	0	0.00135	0	0.00139
Extraversion	0	-0.000069	0	-0.0000335
Openness	0	0	0	0
Agreeableness	0	-0.000723	0	-0.000757
Conscientiousness	0	0.000145	0	0
Age	0	0	0	0
Education	0	0.00104	0	0.00098
Income	0	0	0	0
Gender $\times$ Neuroticism			0.00114694	0
Gender $\times$ Extraversion			0	0
Gender $\times$ Openness			0	0
Gender $\times$ Agreeableness			0	0
Gender $\times$ Conscientiousness			0	0.00132
Gender $\times$ Age			0	0
Gender $\times$ Education			0	0
Gender $\times$ Income			0	0
(Intercept)	0.03135	0.0155	0.03030806	0.0164

Notes: All of the scores are Lasso regression coefficients.

Table S3. Lasso regression of the gender differences for inequity

Explanatory variable	Dependent variable: $\beta(\text{Inequity})$			
	(1)		(2)	
	Korea	U.K.	Korea	U.K.
Gender	0	0	0	0
Neuroticism	0	0.00035137	0	0.000120673
Extraversion	0	-0.0004084	0	-0.00012027
Openness	0	0.00187695	0	0.00140548
Agreeableness	0	0	0	0
Conscientiousness	0	-0.0002229	0	0
Age	0	-0.0005575	0	-0.00046888
Education	0	0.0012337	0	0.000681066
Income	0	0	0	0
Gender $\times$ Neuroticism			0	0
Gender $\times$ Extraversion			0	0
Gender $\times$ Openness			0	0
Gender $\times$ Agreeableness			0	0
Gender $\times$ Conscientiousness			0	0
Gender $\times$ Age			0	0
Gender $\times$ Education			0	0
Gender $\times$ Income			0	0
(Intercept)	0.01378527	0.02084356	0.01378527	0.0218515144

Notes: All of the scores are Lasso regression coefficients.

Instructions

1. General introduction

In this experiment, you will be paired with another person. In each pair, one person will be Player A and the other will be Player B. You will be participating in a game, which will be explained later. During this experiment, you will be asked to make a number of decisions, and you will change pairs each time you make a decision so that you are paired with the same person only once. The experiment is strictly anonymous; that is, your identity will not be revealed to others, and others' identities will not be revealed to you.

2. Rules of the game

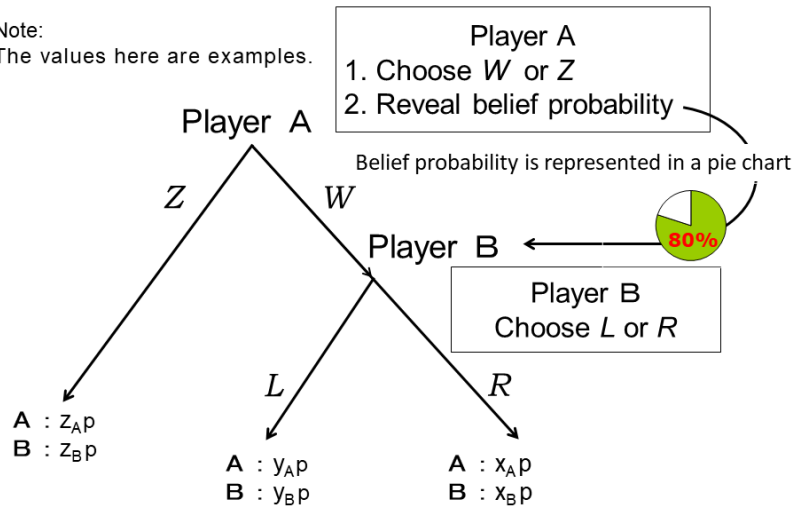
Please review and ensure that you understand the rules of the game by referring to the following figure. Every time you make a decision, a figure similar to the one below will be displayed, but the values in the figure will change.

1. In the first stage, Player A will make two decisions based on the amount of money in the game. For the first decision, Player A must choose W or Z . If Player A chooses Z , Players A and B will receive z_A and z_B pence, respectively. If Player A chooses W , then Player B will make the decision.

For the second decision, Player A must report a belief probability from 0% to 100% in increments of 10% that Player B (partner) will choose R .

2. If Player A chooses W , then given Player A's belief probability, Player B must choose L or R . For example, if Player B chooses L , Player A receives y_A pence and Player B receives y_B pence; if Player B chooses R , then Players A and B will receive x_A and x_B pence, respectively.

Note:
The values here are examples.



3. Procedure of the experiment

Here, we will explain the tasks along the flow of the experiment. You will first make one decision as Player A and then make 45 further decisions as Player B.

1. First, a game will be displayed on your screen, and you (as Player A) will choose W or Z and reveal your belief probability that Player B will choose R based on the amount of money in the game. You will experience one trial as Player A. Your choices will be used when Player B makes their choice in the next stage.

In this experiment, many participants will make decisions as Player A, just as you did; therefore, it is uncertain whether the decision you make as Player A will be used in the next stage. If your choice is used in the next stage, you will receive money according to the choices made by both you and your partner. Therefore, if you choose Z in today's experiment and the earnings are already fixed, you will not be paid if it is not used in the experiment. We will contact you again if we have to pay.

2. Next, another game will be displayed on your screen. In this game, you will make decisions as Player B. Your partner (Player A) is one of the many participants. Player A has already made a decision, but without knowing Player A's choice, you assume that Player A has chosen W and make your own decision. Please choose L or R based on the amount of money and Player A's belief probability that you will choose R . You will play the game as Player B for 45 trials. Each time you make a decision, you will have a new

Player A, and the amount of money and the belief probability will also change. After 45 decisions, the experiment is complete.

Finally, your earnings will be equal to the amount of money you earned from the one decision you made as Player A and the 45 decisions you made as Player B multiplied by 0.07. Since your decisions directly affect you and your partner's earnings, please concentrate on the task during the experiment. This concludes the instructions.

References

1. Croson, R. & Gneezy, U. Gender differences in preferences. *J. Econ. Lit.* **47**, 448-474 (2009).
2. Nihonsugi, T., Numano, S. & Haruno M. Functional connectivity basis and underlying cognitive mechanisms for gender differences in guilt aversion. *eNeuro*, <https://doi.org/10.1523/ENEURO.0226-21.2021> (2021).