

PNAS



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2 **Supporting Information for**

3 **The Emergence of Economic Rationality of GPT**

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8 Supporting text

9 Figs. S1 to S24

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12 Supporting Information Text

13 1. Method: GPT Experiment.

14 In the section, we display the method to prompt GPT to make decisions. In *GPT-3.5-turbo*, the input prompt must be an
15 array of message objects, each with a role (“system”, “assistant”, or “user”) and content (the message’s content). First, we
16 input the system’s message to set the behavior. Next, we input the assistant’s message to store information about tasks. We
17 use the previous two messages to establish the background, and finally, we use the user’s message to ask understanding testing
18 questions and to give decision tasks.* In each preference domain, the system’s message is fixed, while the assistant’s and users’
19 messages change across the baseline, price framing, and discrete choice conditions.

20 A. Risk Preference.

21 **System’s Message.** I want you to act as a human decision maker. You will be given 25 rounds of decision-making tasks and
22 will be responsible for making decisions. You should use your best judgment to come up with solutions that you like most. My
23 first request is “You must provide your answers in every round.” If you do not provide an answer, I will assume that you make
24 a random choice.†

25 A.1. Baseline Condition.

26 **Assistant’s Message.** In every round, the decision maker has 100 points that need to be invested between Asset A and Asset B.
27 The decision maker has a 50% chance to get the return from Asset A or the other 50% chance to get the return from Asset B.
28 First please only tell me the number of points for investing Asset A, then please only tell me the number of points for investing
29 Asset B.

30 **User’s Message: Understanding Testing Question 1.** What is the probability you will get a return from Asset A?

- 31 • Example of GPT’s responses: *“The probability of getting a return from asset A is 50%, and the probability of getting a*
32 *return from asset B is also 50%.”*

33 **User’s Message: Understanding Testing Question 2.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In
34 this round, investing every 1 point for Asset A returns 0.8 dollars, and investing every 1 point for Asset B returns 0.2 dollars.
35 What return will you get?

- 36 • Example of GPT’s responses: *“The total return from Asset A would be $90 \times 0.8 = 72$ dollars, while the total return from*
37 *Asset B would be $10 \times 0.2 = 2$ dollars. Since there is a 50% chance of getting the return from Asset A, and a 50% chance*
38 *of getting the return from Asset B, the expected return would be $(0.5 \times 72) + (0.5 \times 2) = 37$. Therefore, the expected return*
39 *would be 37 dollars.”*

40 **User’s Message: Understanding Testing Question 3.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In
41 this round, investing every 1 point for Asset A returns 0.8 dollars, and investing every 1 point for Asset B returns 0.2 dollars.
42 Is there a chance to get 72 dollars?

- 43 • Example of GPT’s responses: *“Yes, there is a chance to get 72 dollars. Investing 90 points in Asset A would give a return*
44 *of 72 dollars since investing every 1 point in Asset A returns 0.8 dollars. Investing 10 points in Asset B would give a*
45 *return of 2 dollars since investing every 1 point in Asset B returns 0.2 dollars. So, there is a 50% chance that the return*
46 *will come from Asset A and a 50% chance that it will come from Asset B. So, there is a chance that the decision maker*
47 *will get a return of 72 dollars.”*

48 **User’s Message: Decision Task.** In this round, investing every 1 point for Asset A returns M dollars, and investing every 1 point
49 for Asset B returns N dollars. What is your allocation?‡

50 A.2. Price Framing Condition.

51 **Assistant’s Message.** In every round, the decision maker has 100 points that need to be invested between Asset A and Asset B.
52 The decision maker has a 50% chance to get the return from Asset A or the other 50% chance to get the return from Asset B.
53 First please only tell me the number of points for investing Asset A, then please only tell me the number of points for investing
54 Asset B.

55 **User’s Message: Understanding Testing Question 1.** What is the probability you will get a return from Asset A?

- 56 • Example of GPT’s responses: *“The probability of getting a return from asset A is 50%”*

*To confirm that GPT has truly understood our previous instructions, we first ask questions related to the task itself. Based on GPT’s responses, it appears that GPT has understood our instructions. In each preference domain and in each condition, with 25 simulations, we do not encounter any misunderstanding in the testing questions.

†We assign the role of “human decision maker”. In particular, to prevent the possibility that the model returns answers such as “As an AI language model, I am not capable of making decisions on my own...”, we impose the request to provide an answer in every round. In practice, we do encounter cases in which the system refuses to provide an answer, and we simply do not include this outcome in the analyses.

‡We repeat the text of the decision task 25 times, where the parameters used in the text differ across rounds, that is $M, N \in [0.1, 1]$ and $\max\{M, N\} \geq 0.5$. We keep two decimals. To maximize the replicability of our findings and minimize variance in the model’s responses, we send the 25 rounds of questions to the model continuously, without interruption. This method is applicable for the remaining three preference domains under the baseline condition.

57 **User's Message: Understanding Testing Question 2.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In
58 this round, investing every 1.25 points for Asset A returns 1 dollar, and investing every 5 points for Asset B returns 1 dollar.
59 What return will you get?

60 • Example of GPT's responses: "To determine the return, we need to calculate the total return for Asset A and Asset
61 B separately. For Asset A, if investing 1.25 points returns 1 dollar, then investing 90 points would result in a return
62 of $90/1.25=72$ dollars. For Asset B, if investing 5 points returns 1 dollar, then investing 10 points would result in a
63 return of $10/5=2$ dollars. Therefore, the decision maker will receive a return from either Asset A or Asset B with 50%
64 probability each. The return would be 72 dollars for Asset A or 2 dollars for Asset B."

65 **User's Message: Understanding Testing Question 3.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In
66 this round, investing every 1.25 points for Asset A returns 1 dollar, and investing every 5 points for Asset B returns 1 dollar. Is
67 there a chance to get 72 dollars?

68 • Example of GPT's responses: "In this round, since you have invested 90 points in Asset A and 10 points in Asset B, your
69 total investment is 100 points. For Asset A, every 1.25 points invested returns 1 dollar. So, with 90 points invested, you
70 will get a return of $90/1.25=72$ dollars from Asset A. For Asset B, every 5 points invested returns 1 dollar. With 10
71 points invested, you will get a return of $10/5=2$ dollars from Asset B. Since you have a 50% chance of getting the return
72 from either Asset A or Asset B, I will receive \$72 from Asset A with 50% probability."

73 **User's Message: Decision Task.** In this round, investing every $1/M$ points for Asset A returns 1 dollar, and investing every $1/N$
74 points for Asset B returns 1 dollar. What is your allocation? [§]

75 **A.3. Discrete Choice Condition.**

76 **Assistant's Message.** In every round, the decision maker will be presented with 11 options, each represented in the form (\$M,
77 \$N). The decision maker has a 50% chance to get M from Asset A or the other 50% chance to get N from Asset B. Please only
78 tell me about your best option in every round.

79 **User's Message: Understanding Testing Question 1.** What is the probability you will get a return from Asset A?

80 • Example of GPT's responses: "The probability of getting a return from Asset A is 50% in every round."

81 **User's Message: Understanding Testing Question 2.** If you choose the option (\$72, \$2), what return will you get?

82 • Example of GPT's responses: "If I choose the option (\$72, \$2), there is a 50% chance of getting \$72 from Asset A and a
83 50% chance of getting \$2 from Asset B. Therefore, the expected return would be the average of the two options, which is
84 $(\$72 + \$2) / 2 = \$37$."

85 **User's Message: Understanding Testing Question 3.** If you choose the option (\$72, \$2), is there a chance to get 72 dollars?

86 • Example of GPT's responses: "Yes, if the option (\$72, \$2) is chosen, there is a 50% chance of receiving \$72 from Asset
87 A."

88 **User's Message: Decision Task.** In this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3), (\$M4,\$N4),
89 (\$M5,\$N5), (\$M6,\$N6), (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best? [¶]

90 **B. Time Preference.**

91 **System's Message.** I want you to act as a human decision maker. You will be given 25 rounds of decision-making tasks and
92 will be responsible for making decisions. You should use your best judgment to come up with solutions that you like most. My
93 first request is "You must provide your answers in every round." If you do not provide an answer, I will assume that you make
94 a random choice.

95 **B.1. Baseline Condition.**

96 **Assistant's Message.** In every round, the decision maker has 100 points that need to be invested between today and one month
97 later. The decision maker will get dollars today from the points invested today and will get check that can be cashed in one
98 month later from the points invested one month later. Please first only tell me the number of points for investing today, then
99 please only tell me the number of points for investing one month later.

[§]We repeat the text of the decision task 25 times, where the parameters used in the text differ across rounds, that is $M, N \in [0.1, 1]$ and $\max\{M, N\} \geq 0.5$. We display the numbers $1/M$ and $1/N$ directly, and we keep two decimals. To maximize the replicability of our findings and minimize variance in the model's responses, we send the 25 rounds of questions to the model continuously, without interruption. This method is applicable for the remaining three preference domains under the price framing condition.

[¶]We repeat the text of the decision task 25 times, where the parameters used in the text differ across rounds, that is $M, N \in [0.1, 1]$ and $\max\{M, N\} \geq 0.5$. We keep two decimals. The numbers are determined by $M_i = (i - 1) \times 10 \times M$ and $N_i = 100 - (i - 1) \times 10 \times N$, for $i = 1, 2, \dots, 11$. To maximize the replicability of our findings and minimize variance in the model's responses, we send the 25 rounds of questions to the model continuously, without interruption. This method is applicable for the remaining three preference domains under the discrete choice condition.

100 **User's Message: Understanding Testing Question 1.** Suppose that you invest 90 points to today, and 10 points to one month later.
101 In this round, investing every 1 point for today returns 0.8 dollars cash today, and investing every 1 point for one month later
102 returns 0.2 dollars check which can be cashed one month later. What return will you get?

- 103 • Example of GPT's responses: *"If I invest 90 points today and 10 points one month later, I will get an immediate return
104 of 0.8 dollars for every point invested today, which will be 72 dollars in total (90×0.8 dollars). For the investment of 10
105 points one month later, I'll get 0.2 dollars in return for each point invested one month later, that will be a total of 2
106 dollars (10×0.2 dollars). So, the total return I'll get if I invest 90 points today and 10 points one month later will be 74
107 dollars (72 dollars from today's investment, and 2 dollars from one month later investment)."*

108 **User's Message: Understanding Testing Question 2.** Suppose that you invest 90 points to today, and 10 points to one month later.
109 In this round, investing every 1 point for today returns 0.8 dollars cash today, and investing every 1 point for one month later
110 returns 0.2 dollars check which can be cashed one month later. When can you get just the 2 dollars cash?

- 111 • Example of GPT's responses: *"If investing 1 point for today return 0.8 dollars, then investing 90 points for today will
112 return 72 dollars immediately. If investing 1 point for one month later return 0.2 dollars, then investing 10 points for one
113 month later will return 2 dollars check that can be cashed one month later. So, I have a total of 74 dollars (72 dollars
114 from today and 2 dollars after one month). To get just the 2 dollars cash, I will have to wait for one month and then
115 cash the check."*

116 **User's Message: Understanding Testing Question 3.** In this round, investing every 1 point for today returns 0.8 dollars cash today,
117 and investing every 1 point for one month later returns 0.2 dollars check which can be cashed one month later. What is your
118 allocation? Why?

- 119 • Example of GPT's responses: *"I would allocate 75 points for the today return and 25 points for the one-month later return.
120 This allocation would give me an immediate return of 60 dollars ($75 \text{ points} \times 0.8 \text{ dollars/point}$) and a future return of 5
121 dollars ($25 \text{ points} \times 0.2 \text{ dollars/point}$) one month later. I believe this allocation is a good balance between immediate and
122 future returns. Although the return for investing in the one-month later option is lower, it's still a guaranteed future
123 return. On the other hand, the higher return for the today option is immediate and allows for more flexibility in case of
124 unexpected expenses or emergencies."*

125 **User's Message: Decision Task.** In this round, investing every 1 point for today returns M dollars today, and investing every 1
126 point for one month later returns N dollars check which can be cashed in one month later. What is your allocation?

127 **B.2. Price Framing Condition.**

128 **Assistant's Message.** In every round, the decision maker has 100 points that need to be invested between today and one month
129 later. The decision maker will get dollars today from the points invested today and will get check that can be cashed in one
130 month later from the points invested one month later. Please first only tell me the number of points for investing today, then
131 please only tell me the number of points for investing one month later.

132 **User's Message: Understanding Testing Question 1.** Suppose that you invest 90 points to today, and 10 points to one month later.
133 In this round, investing every 1.25 points for today returns 1 dollar cash today, and investing every 5 points for one month
134 later returns 1 dollar check which can be cashed one month later. What return will you get?

- 135 • Example of GPT's responses: *"Suppose that you invest 90 points to today, and 10 points to one month later. In this
136 round, investing every 1.25 points for today returns 1 dollar cash today, and investing every 5 points for one month later
137 returns 1 dollar check which can be cashed one month later. Based on the given information, if you invest 90 points today,
138 each point will yield $1/1.25 = 0.8$ dollars cash today. Therefore, 90 points will yield $0.8 * 90 = 72$ dollars cash today. If
139 you invest 10 points one month later, each point will yield $1/5 = 0.2$ dollars check. Therefore, 10 points will yield $0.2 *
140 10 = 2$ dollars check that can be cashed one month later. So, in total, the investment will yield 72 dollars cash today and
141 2 dollars check one month later."*

142 **User's Message: Understanding Testing Question 2.** Suppose that you invest 90 points to today, and 10 points to one month later.
143 In this round, investing every 1.25 points for today returns 1 dollar cash today, and investing every 5 points for one month
144 later returns 1 dollar check which can be cashed one month later. When can you get just the 2 dollars cash?

- 145 • Example of GPT's responses: *"For the 90 points invested today, 1.25 points give 1 dollar cash today. So, 90 points
146 divided by 1.25 equals 72. Hence, I will receive 72 dollars cash today from the investment made today. For the 10 points
147 invested one month later, 5 points give 1 dollar check that can be cashed one month later. So, 10 points divided by 5
148 equals 2. Therefore, I will receive 2 dollars check one month later from the investment made one month later. To answer
149 your question, I will get the 2 dollars one month later."*

150 **User's Message: Understanding Testing Question 3.** In this round, investing every 1.25 points for today returns 1 dollar cash
151 today, and investing every 5 points for one month later returns 1 dollar check which can be cashed one month later. What is
152 your allocation? Why?

153 • Example of GPT’s responses: *“In this round, I will allocate 40 points for investing today and 60 points for investing one*
154 *month later. For investing today, it takes 1.25 points to get 1 dollar cash. Therefore, by investing 40 points today, I would*
155 *receive $40 / 1.25 = 32$ dollars in cash. For investing one month later, it takes 5 points to get 1 dollar check. By investing*
156 *60 points one month later, I would receive $60 / 5 = 12$ dollars in a check that can be cashed in one month. By allocating*
157 *more points for investing one month later, I am betting on the potential to earn more returns in the future. However, I*
158 *am also ensuring some immediate cash by allocating a portion of the points for investing today. This allocation strategy*
159 *aims to balance the need for immediate liquidity with the opportunity for future gains.”*

160 **User’s Message: Decision Task.** In this round, investing every $1/M$ points for today returns 1 dollar today, and investing every
161 $1/N$ points for one month later returns 1 dollar check which can be cashed in one month later. What is your allocation?

162 **B.3. Discrete Choice Condition.**

163 **Assistant’s Message.** In every round, the decision maker will be presented with 11 options, each represented in the form ($\$M,$
164 $\$N$). The decision maker will get M dollars today and will get a N dollars check that can be cashed in one month later. Please
165 only tell me about your best option in every round.

166 **User’s Message: Understanding Testing Question 1.** If you choose the option ($\$72, \2), what return will you get?

167 • Example of GPT’s responses: *“If I choose the option ($\$72, \2), I will receive $\$72$ immediately and an additional $\$2$ after*
168 *one month.”*

169 **User’s Message: Understanding Testing Question 2.** If you choose the option ($\$72, \2), when can you get just the 2 dollars cash?

170 • Example of GPT’s responses: *“If I choose the option ($\$72, \2), I can get just the 2 dollars cash in one month.”*

171 **User’s Message: Understanding Testing Question 3.** If you face the options ($\$40, \10) and ($\$72, \2), which option will you select?
172 Why?

173 • Example of GPT’s responses: *“I would prefer the option ($\$40, \10) in this case. While the immediate reward is lower*
174 *compared to ($\$72, \2), the $\$10$ received after a month adds value to the overall outcome. The additional $\$10$ compensates*
175 *for the initial lower amount and makes the total reward more attractive in the long run.”*

176 **User’s Message: Decision Task.** In this round, there are 11 options, which are ($\$M1, \$N1$), ($\$M2, \$N2$), ($\$M3, \$N3$), ($\$M4, \$N4$),
177 ($\$M5, \$N5$), ($\$M6, \$N6$), ($\$M7, \$N7$), ($\$M8, \$N8$), ($\$M9, \$N9$), ($\$M10, \$N10$), ($\$M11, \$N11$). Which is the best?

178 **C. Social Preference.**

179 **System’s Message.** I want you to act as a human decision maker. You will be given 25 rounds of decision-making tasks and
180 will be responsible for making decisions. You should use your best judgment to come up with solutions that you like most. My
181 first request is “You must provide your answers in every round.” If you do not provide an answer, I will assume that you make
182 a random choice.”

183 **C.1. Baseline Condition.**

184 **Assistant’s Message.** In every round, the decision maker is randomly matched with a new anonymous subject and there is no
185 feedback across rounds. The decision maker has 100 points that need to be allocated between him/herself and the other one.
186 The decision maker will get return from the points allocated to him/herself and the other one will get return from the points
187 allocated to him/her. First please only tell me the number of points you want to allocate to yourself, then please only tell me
188 the number of points you want to allocate to the other.

189 **User’s Message: Understanding Testing Question 1.** Suppose that you allocate 90 points to yourself, and 10 points to the other.
190 In this round, allocating every 1 point to yourself returns 0.8 dollars for yourself, and allocating every 1 point to the other
191 returns 0.2 dollars for the other. What return will you get?

192 • Example of GPT’s responses: *“If I invest 90 points to myself and 10 points to the other, I will get a return of 0.8 dollars*
193 *for each point invested in myself, which is $90 \times 0.8 = 72$ dollars. The other person will get a return of 0.2 dollars for*
194 *each point invested in them, which is $10 \times 0.2 = 2$ dollars.”*

195 **User’s Message: Understanding Testing Question 2.** Suppose that you allocate 90 points to yourself, and 10 points to the other.
196 In this round, allocating every 1 point for yourself returns 0.8 dollars for yourself, and allocating every 1 point for the other
197 returns 0.2 dollars for the other. Who will get just 2 dollars?

198 • Example of GPT’s responses: *“If I invest 90 points to myself and 10 points to the other, I will get a return of 0.8 dollars*
199 *for every point invested in myself, which is 72 dollars. The other person will get a return of 0.2 dollars for every point*
200 *invested in them, which is 2 dollars. Therefore, the other person will get just 2 dollars.”*

201 **User's Message: Understanding Testing Question 3.** In this round, allocating every 1 point for yourself returns 0.8 dollars for
202 yourself, and allocating every 1 point for the other returns 0.2 dollars for the other. Will you allocate to the other? Why?

- 203 • Example of GPT's responses: *"In this scenario, I would allocate 80 points to myself and 20 points to the other person.
204 Allocating 1 point to myself returns 0.8 dollars, which is a higher return compared to allocating 1 point to the other
205 person, which only returns 0.2 dollars. Therefore, it is in my best interest to allocate more points to myself in order to
206 maximize my return."*

207 **User's Message: Decision Task.** In this round, allocating every 1 point for yourself returns M dollars for yourself, and allocating
208 every 1 point for the other one returns N dollars for him/her. What is your allocation?

209 C.2. Price Framing Condition.

210 **Assistant's Message.** In every round, the decision maker is randomly matched with a new anonymous subject and there is no
211 feedback across rounds. The decision maker has 100 points that need to be allocated between him/herself and the other one.
212 The decision maker will get return from the points allocated to him/herself and the other one will get return from the points
213 allocated to him/her. First please only tell me the number of points you want to allocate to yourself, then please only tell me
214 the number of points you want to allocate to the other.

215 **User's Message: Understanding Testing Question 1.** Suppose that you allocate 90 points to yourself, and 10 points to the other.
216 In this round, every 1.25 points to yourself returns 1 dollar for yourself, allocating every 5 points to the other returns 1 dollar
217 for the other. What return will you get?

- 218 • Example of GPT's responses: *"If I allocate 90 points to myself and 10 points to the other person, I will get a return of 72
219 dollars for myself. This is calculated by dividing the points allocated to myself (90) by the conversion rate (1.25) which
220 gives me 72 dollars."*

221 **User's Message: Understanding Testing Question 2.** Suppose that you allocate 90 points to yourself, and 10 points to the other.
222 In this round, allocating every 1.25 points for yourself returns 1 dollar for yourself, and allocating every 5 points for the other
223 returns 1 dollar for the other. Who will get just 2 dollars?

- 224 • Example of GPT's responses: *"To determine who will get just 2 dollars, we need to calculate the return for each allocation.
225 Allocating 90 points to myself at a rate of 1.25 points per dollar would result in a return of 72 dollars for myself (90
226 points / 1.25 points per dollar = 72 dollars). Allocating 10 points to the other at a rate of 5 points per dollar would
227 result in a return of 2 dollars for the other (10 points / 5 points per dollar = 2 dollars). Therefore, in this scenario, the
228 other will get just 2 dollars."*

229 **User's Message: Understanding Testing Question 3.** In this round, allocating every 1.25 points for yourself returns 1 dollar for
230 yourself, and allocating every 5 points for the other returns 1 dollar for the other. Will you allocate to the other? Why?

- 231 • Example of GPT's responses: *"In this round, I will allocate 0 points to the other person. Since allocating 1.25 points to
232 myself returns 1 dollar, it is more beneficial for me to allocate all the points to myself. "*

233 **User's Message: Decision Task.** In this round, allocating every 1/M points for yourself returns 1 dollar for yourself, and
234 allocating every 1/N points for the other one returns 1 dollar for him/her. What is your allocation?

235 C.3. Discrete Choice Condition.

236 **Assistant's Message.** In every round, the decision maker is randomly matched with a new anonymous subject and there is no
237 feedback across rounds. The decision maker will be presented with 11 options, each represented in the form (\$M, \$N). The
238 decision maker will get M dollars and the other will get N dollars. Please only tell me about your best option in every round.

239 **User's Message: Understanding Testing Question 1.** If you choose the option (\$72, \$2), what return will you get?

- 240 • Example of GPT's responses: *"If I choose the option (\$72, \$2), I will receive \$72."*

241 **User's Message: Understanding Testing Question 2.** If you choose the option (\$72, \$2), who will get just 2 dollars?

- 242 • Example of GPT's responses: *"If I choose the option (\$72, \$2), the other person will receive just 2 dollars."*

243 **User's Message: Understanding Testing Question 3.** If you face the options (\$40, \$10) and (\$72, \$2), which option will you select?
244 Why?

- 245 • Example of GPT's responses: *"In this scenario, I would prefer the option (\$40, \$10) over (\$72, \$2). While the second
246 option offers a higher payout for me (\$72), it also provides a significantly lower payout for the other person (\$2). I believe
247 in fairness and equality, and I would feel uncomfortable benefiting greatly at the expense of someone else receiving such a
248 small amount. Therefore, I would choose the option that provides a more balanced distribution of wealth, even if it means
249 receiving a lower payout myself."*

250 **User's Message: Decision Task.** In this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3), (\$M4,\$N4),
251 (\$M5,\$N5), (\$M6,\$N6), (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best?

252 **D. Food Preference.**

253 **System's Message.** I want you to act as a human decision maker. You will be given 25 rounds of decision-making tasks and
254 will be responsible for making decisions. You should use your best judgment to come up with solutions that you like most. My
255 first request is "You must provide your answers in every round." If you do not provide an answer, I will assume that you make
256 a random choice."

257 **D.1. Baseline Condition.**

258 **Assistant's Message.** In every round, the decision maker has 100 points that need to be spent between ham meat and tomato.
259 The decision maker will get the amount of meat and tomato he/she spends on. First please only tell me the number of points
260 for meat, then please only tell me the number of points for tomato.

261 **User's Message: Understanding Testing Question 1.** What goods can you get from decisions?

- 262 • Example of GPT's responses: *"In this particular decision-making task, the decision maker can get meat and tomatoes.
263 The amount of meat and tomatoes received will depend on how the 100 points are allocated between the two options."*

264 **User's Message: Understanding Testing Question 2.** Suppose that you spend 90 points to meat, and 10 points to tomato. In this
265 round, spending every 1 point for meat will get 0.8 Kg meat, and spending every 1 point for tomato will get 0.2 Kg tomato,
266 what will you get?

- 267 • Example of GPT's responses: *"If I spend 90 points on meat, I will get 72 kg of meat (90×0.8). If I spend 10 points on
268 tomatoes, I will get 2 kg of tomatoes (10×0.2)."*

269 **User's Message: Understanding Testing Question 3.** In this round, spending every 1 point for meat will get 0.8 Kg meat, and
270 spending every 1 point for tomato will get 0.2 Kg tomato. What is your allocation? Why?

- 271 • Example of GPT's responses: *"I would allocate 70 points for meat and 30 points for tomatoes. This is because meat is
272 more expensive and provides more nutritional value than tomatoes. Additionally, 70 points for meat would give me 56 kg
273 of meat, which is a substantial amount and can be stored for a longer period of time compared to tomatoes. The 30 points
274 for tomatoes would give me 6 kg of tomatoes, which is enough for immediate consumption and can be used for cooking."*

275 **User's Message: Decision Task.** In this round, spending every 1 point on meat will get M Kg meat, and spending every 1 point
276 on tomato will get N Kg tomato. What is your allocation?

277 **D.2. Price Framing Condition.**

278 **Assistant's Message.** In every round, the decision maker has 100 points that need to be spent between ham meat and tomato.
279 The decision maker will get the amount of meat and tomato he/she spends on. First please only tell me the number of points
280 for meat, then please only tell me the number of points for tomato.

281 **User's Message: Understanding Testing Question 1.** What goods can you get from decisions?

- 282 • Example of GPT's responses: *"In this decision-making task, the goods that can be obtained are meat and tomatoes. The
283 amount of meat and tomatoes obtained will depend on the number of points allocated to each."*

284 **User's Message: Understanding Testing Question 2.** Suppose that you spend 90 points to meat, and 10 points to tomato. In this
285 round, spending every 1.25 point for meat will get 1 Kg meat, and spending every 5 points for tomato will get 1 Kg tomato,
286 what will you get?

- 287 • Example of GPT's responses: *"If I spend 90 points on meat, and every 1.25 points gets me 1 kg of meat, then I will get
288 $90 / 1.25 = 72$ kg of meat. If I spend 10 points on tomatoes, and every 5 points gets me 1 kg of tomatoes, then I will get
289 $10 / 5 = 2$ kg of tomatoes. So, in this round, I will get 72 kg of meat and 2 kg of tomatoes."*

290 **User's Message: Understanding Testing Question 3.** In this round, spending every 1.25 points for meat will get 1 Kg meat, and
291 spending every 5 points for tomato will get 1 Kg tomato. What is your allocation? Why?

- 292 • Example of GPT's responses: *"In this round, I will allocate 80 points for meat and 20 points for tomatoes. I choose to
293 allocate more points to meat because I personally enjoy meat and find it to be a versatile ingredient in various dishes.
294 Additionally, the conversion rate of 1.25 points for 1 Kg of meat seems more favorable compared to the conversion rate of
295 5 points for 1 Kg of tomatoes."*

296 **User's Message: Decision Task.** In this round, spending every 1/M points on meat will get 1 Kg meat, and spending every 1/N
297 points on tomato will get 1 Kg tomato. What is your allocation?

298 **D.3. Discrete Choice Condition.**

299 **Assistant's Message.** In every round, the decision maker will be presented with 11 options, each represented in the form (M
300 Kg, N Kg). The decision maker will get M Kg of meat and get N Kg of tomato. Please only tell me about your best option in
301 every round.

302 **User's Message: Understanding Testing Question 1.** What goods can you get from decisions?

303 • Example of GPT's responses: *"The goods that can be obtained from the decisions are meat and tomatoes. Each decision*

304 *will determine the specific quantities of meat and tomatoes that can be acquired."*

305 **User's Message: Understanding Testing Question 2.** Suppose you choose the option (72 Kg, 2 Kg), what will you get?

306 • Example of GPT's responses: *"If I choose the option (72 Kg, 2 Kg), I will get 72 Kg of meat and 2 Kg of tomato."*

307 **User's Message: Understanding Testing Question 3.** Suppose you face the options (40 Kg, 10 Kg) and (72 Kg, 2 Kg), which option

308 will you select? Why?

309 • Example of GPT's responses: *"I would select the option (40 Kg, 10 Kg) because it provides a balanced amount of meat*

310 *and tomatoes. While the option (72 Kg, 2 Kg) offers more meat, the lower quantity of tomatoes may not be sufficient for*

311 *my needs. Therefore, I believe the first option provides a better balance between the two ingredients."*

312 **User's Message: Decision Task.** In this round, there are 11 options, which are (M1 Kg,N1 Kg), (M2 Kg,N2 Kg), (M3 Kg,N3

313 Kg), (M4 Kg,N4 Kg), (M5 Kg,N5 Kg), (M6 Kg,N6 Kg), (M7 Kg,N7 Kg), (M8 Kg,N8 Kg), (M9 Kg,N9 Kg), (M10 Kg,N10 Kg),

314 (M11 Kg,N11 Kg). Which is the best?

315 2. Method: Human Experiment.

316 **A. Design.** Subjects in the human experiment are randomly assigned to three conditions: baseline, price framing, and discrete
317 choice, which are parallel to those in the GPT experiment. For each condition, subjects conduct four sections of decision
318 making about risk preference, time preference, social preference, and food preference. The order of these four sections is
319 randomized at the individual level. In each preference domain, there are 25 decision tasks, and the decision tasks follow one
320 format with randomly generated parameters. The text of the decision tasks and the method to generate random parameters
321 are identical to those in the GPT experiment.

322 Each subject received \$6 as a participation fee. We randomly drew 1 out of every 30 subjects to receive a bonus. The
323 amount of bonus depended on both subjects' decisions and chance. For the chosen subject, we randomly drew one of his or
324 her 100 decisions. If the chosen decision was in the domain of risk, time, or social preferences, we implemented the decision as
325 described in the task. If the chosen decision was in the domain of food preference, we gave the subject a fixed amount of \$50 as
326 a bonus.

327 We pre-registered the human experiment (AEARCTR-0011750) and conducted the experiment in July 2023. We recruited a
328 representative US sample from Prolific. The experiment comprised 347 unique subjects, with above 110 subjects per condition.
329 The median duration of the entire experiment was 30.5 minutes.

330 **B. General Instruction.** *[This part is identical in baseline, price framing, and discrete choice conditions.]*

- 331 • Please enter your Prolific ID.
- 332 • Welcome to our study.
- 333 • Contact Information
 - 334 – This study is conducted by a research team in the School of Economics, Xiamen University. If you have any questions,
335 concerns, or complaints about this study, its procedures, risks, and benefits, please write to yitingchen@xmu.edu.cn.
- 336 • Confidentiality
 - 337 – This study is anonymous. The data collected in this study do not include any personally identifiable information
338 about you. By participating, you understand and agree that the data collected in this study will be used by our
339 research team and aggregated results will be published.
- 340 • Duration
 - 341 – This study lasts approximately 40 minutes.
 - 342 – You may choose to stop participating in this study at any time.
- 343 • Qualification
 - 344 – A set of instructions will be given at the start. Please read the instructions carefully.
 - 345 – There will be simple questions to check your understanding. You may not be able to continue the study if you make
346 mistakes.
- 347 • Payment
 - 348 – This study consists of 4 sections of decision-making tasks.
 - 349 – You will receive \$6 as participation fee if you finish all 4 sections.
 - 350 – We will randomly select 1 out of every 30 subjects to receive additional bonuses. For each of the selected subjects,
351 we will randomly select one section to realize to determine his or her additional bonuses. The transfer of bonuses
352 will take up a week.
- 353 • By ticking the following box, you indicate that you understand and accept the rules, and you would like to participate in
354 this study.
 - 355 – I understand and accept the rules, and I would like to participate in this study
 - 356 – I am above 18 years old

357 **C. Risk Preference.**

358 **Section Instruction.** In this section, you will be given 25 rounds of decision-making tasks and will be responsible for making
359 decisions. You should use your best judgment to come up with solutions that you like most. My first request is “You must
360 provide your answers in every round.” If this section is selected to be realized, we will randomly choose one of your 25 decisions
361 to determine your bonus as described in the task, which will be explained in detail at the end of the study.

362 **C.1. Baseline Condition.**

363 **Task Instruction.** In every round, the decision maker has 100 points that need to be invested between Asset A and Asset B.
364 The decision maker has a 50% chance to get the return from Asset A or the other 50% chance to get the return from Asset B.
365 First please only tell me the number of points for investing Asset A, then please only tell me the number of points for investing
366 Asset B.

367 **Understanding Testing Question 1.** What is the probability you will get a return from Asset A? [MCQ; A: 0%; B: 25%; C: 50%;
368 D: 100%]

369 **Understanding Testing Question 2.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In this round,
370 investing every 1 point for Asset A returns 0.8 dollars, and investing every 1 point for Asset B returns 0.2 dollars. What return
371 will you get? [MCQ; A: 50% to win 90×0.8 dollars, 50% to win 10×0.2 dollars; B: 50% to win 90 dollars, 50% to win 10
372 dollars; C: 50% to win 0.8 dollars, 50% to win 0.2 dollars; D: 100% earn 100 dollars]

373 **Understanding Testing Question 3.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In this round,
374 investing every 1 point for Asset A returns 0.8 dollars, and investing every 1 point for Asset B returns 0.2 dollars. Is there a
375 chance to get 72 dollars? [MCQ; A: Yes; B: No]

376 **Decision Task.** In this round, investing every 1 point for Asset A returns M dollars, and investing every 1 point for Asset B
377 returns N dollars. What is your allocation?[†]

378 **C.2. Price Framing Condition.**

379 **Section Instruction.** In every round, the decision maker has 100 points that need to be invested between Asset A and Asset B.
380 The decision maker has a 50% chance to get the return from Asset A or the other 50% chance to get the return from Asset B.
381 First please only tell me the number of points for investing Asset A, then please only tell me the number of points for investing
382 Asset B.

383 **Understanding Testing Question 1.** What is the probability you will get a return from Asset A? [MCQ; A: 0%; B: 25%; C: 50%;
384 D: 100%]

385 **Understanding Testing Question 2.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In this round,
386 investing every 1.25 points for Asset A returns 1 dollar, and investing every 5 points for Asset B returns 1 dollar. What return
387 will you get? [MCQ; A: 50% to win $90/1.25$ dollars, 50% to win $10/5$ dollars; B: 50% to win 90 dollars, 50% to win 10 dollars;
388 C: 50% to win 1.25 dollars, 50% to win 5 dollars; D: 100% earn 100 dollars]

389 **Understanding Testing Question 3.** Suppose that you invest 90 points to Asset A, and 10 points to Asset B. In this round,
390 investing every 1.25 points for Asset A returns 1 dollar, and investing every 5 points for Asset B returns 1 dollar. Is there a
391 chance to get 72 dollars? [MCQ; A: Yes; B: No]

392 **Decision Task.** In this round, investing every $1/M$ points for Asset A returns 1 dollar, and investing every $1/N$ points for Asset
393 B returns 1 dollar. What is your allocation? **

394 **C.3. Discrete Choice Condition.**

395 **Task Instruction.** In every round, the decision maker will be presented with 11 options, each represented in the form (\$M, \$N).
396 The decision maker has a 50% chance to get M from Asset A or the other 50% chance to get N from Asset B. Please only tell
397 me about your best option in every round.

398 **Understanding Testing Question 1.** What is the probability you will get a return from Asset A? [MCQ; A: 0%; B: 25%; C: 50%;
399 D: 100%]

400 **Understanding Testing Question 2.** If you choose the option (\$72, \$2), what return will you get? [MCQ; A: 50% to win 72
401 dollars, 50% to win 2 dollars; B: 80% to win 72 dollars, 20% to win 2 dollars; C: 100% earn 100 dollars]

402 **Understanding Testing Question 3.** If you choose the option (\$72, \$2), is there a chance to get 72 dollars? [MCQ; A: Yes; B: No]

403 **Decision Task.** In this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3), (\$M4,\$N4), (\$M5,\$N5),
404 (\$M6,\$N6), (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best? ††

405 **D. Time Preference.**

[†]We repeat the text of the decision task 25 times, where the parameters used in the text differ across rounds, that is $M, N \in [0.1, 1]$ and $\max\{M, N\} \geq 0.5$. We keep two decimals. This method is applicable for the remaining three preference domains under the baseline condition.

**We repeat the text of the decision task 25 times, where the parameters used in the text differ across rounds, that is $M, N \in [0.1, 1]$ and $\max\{M, N\} \geq 0.5$. We display the numbers $1/M$ and $1/N$ directly, and we keep two decimals. This method is applicable for the remaining three preference domains under the price framing condition.

††We repeat the text of the decision task 25 times, where the parameters used in the text differ across rounds, that is $M, N \in [0.1, 1]$ and $\max\{M, N\} \geq 0.5$. We keep two decimals. The numbers are determined by $M_i = (i - 1) \times 10 \times M$ and $N_i = 100 - (i - 1) \times 10 \times N$, for $i = 1, 2, \dots, 11$. This method is applicable for the remaining three preference domains under the discrete choice condition.

406 **Section Instruction.** In this section, you will be given 25 rounds of decision-making tasks and will be responsible for making
407 decisions. You should use your best judgment to come up with solutions that you like most. My first request is “You must
408 provide your answers in every round.” If this section is selected to be realized, we will randomly choose one of your 25 decisions
409 to determine your bonus as described in the task, which will be explained in detail at the end of the study.

410 **D.1. Baseline Condition.**

411 **Task Instruction.** In every round, the decision maker has 100 points that need to be invested between today and one month
412 later. The decision maker will get dollars today from the points invested today and will get check that can be cashed in one
413 month later from the points invested one month later. Please first only tell me the number of points for investing today, then
414 please only tell me the number of points for investing one month later.

415 **Understanding Testing Question 1.** Suppose that you invest 90 points to today, and 10 points to one month later. In this round,
416 investing every 1 point for today returns 0.8 dollars cash today, and investing every 1 point for one month later returns 0.2
417 dollars check which can be cashed one month later. What return will you get? [MCQ; A: 90×0.8 dollars today and 10×0.2
418 dollars one month later; B: 90 dollars today and 10 dollars one month later; C: 0.8 dollars today and 0.2 dollars one month
419 later; D: 100 dollars today]

420 **Understanding Testing Question 2.** Suppose that you invest 90 points to today, and 10 points to one month later. In this round,
421 investing every 1 point for today returns 0.8 dollars cash today, and investing every 1 point for one month later returns 0.2
422 dollars check which can be cashed one month later. When can you get just the 2 dollars cash? [MCQ; A: Today; B: One month
423 later]

424 **Understanding Testing Question 3.** In this round, investing every 1 point for today returns 0.8 dollars cash today, and investing
425 every 1 point for one month later returns 0.2 dollars check which can be cashed one month later. What is your allocation?
426 Why? [Text Input]

427 **Decision Task.** In this round, investing every 1 point for today returns M dollars today, and investing every 1 point for one
428 month later returns N dollars check which can be cashed in one month later. What is your allocation?

429 **D.2. Price Framing Condition.**

430 **Task Instruction.** In every round, the decision maker has 100 points that need to be invested between today and one month
431 later. The decision maker will get dollars today from the points invested today and will get check that can be cashed in one
432 month later from the points invested one month later. Please first only tell me the number of points for investing today, then
433 please only tell me the number of points for investing one month later.

434 **Understanding Testing Question 1.** Suppose that you invest 90 points to today, and 10 points to one month later. In this round,
435 investing every 1.25 points for today returns 1 dollar cash today, and investing every 5 points for one month later returns
436 1 dollar check which can be cashed one month later. What return will you get? [MCQ; A: $90/1.25$ dollars today and $10/5$
437 dollars one month later; B: 90 dollars today and 10 dollars one month later; C: 1.25 dollars today and 5 dollars one month
438 later; D: 100 dollars today]

439 **Understanding Testing Question 2.** Suppose that you invest 90 points to today, and 10 points to one month later. In this round,
440 investing every 1.25 points for today returns 1 dollar cash today, and investing every 5 points for one month later returns 1
441 dollar check which can be cashed one month later. When can you get just the 2 dollars cash? [MCQ; A: Today; B: One month
442 later]

443 **Understanding Testing Question 3.** In this round, investing every 1.25 points for today returns 1 dollar cash today, and investing
444 every 5 points for one month later returns 1 dollar check which can be cashed one month later. What is your allocation? Why?
445 [Text Input]

446 **Decision Task.** In this round, investing every $1/M$ points for today returns 1 dollar today, and investing every $1/N$ points for
447 one month later returns 1 dollar check which can be cashed in one month later. What is your allocation?

448 **D.3. Discrete Choice Condition.**

449 **Task Instruction.** In every round, the decision maker will be presented with 11 options, each represented in the form ($\$M$, $\$N$).
450 The decision maker will get M dollars today and will get a N dollars check that can be cashed in one month later. Please only
451 tell me about your best option in every round.

452 **Understanding Testing Question 1.** If you choose the option ($\$72$, $\$2$), what return will you get? [MCQ; A: 72 dollars today and
453 2 dollars one month later; B: 2 dollars today and 72 dollars one month later; C: 72 dollars today and 0 dollar one month later;
454 D: 100 dollars today]

455 **Understanding Testing Question 2.** If you choose the option ($\$72$, $\$2$), when can you get just the 2 dollars cash? [MCQ; A:
456 Today; B: One month later]

457 **Understanding Testing Question 3.** If you face the options ($\$40$, $\$10$) and ($\72, $\$2$), which option will you select? Why? [Text
458 Input]

459 **Decision Task.** In this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3), (\$M4,\$N4), (\$M5,\$N5),
460 (\$M6,\$N6), (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best?

461 **E. Social Preference.**

462 **Section Instruction.** In this section, you will be given 25 rounds of decision-making tasks and will be responsible for making
463 decisions. You should use your best judgment to come up with solutions that you like most. My first request is “You must
464 provide your answers in every round.” If this section is selected to be realized, we will randomly choose one of your 25 decisions
465 to determine your bonus as described in the task, which will be explained in detail at the end of the study.

466 **E.1. Baseline Condition.**

467 **Task Instruction.** In every round, the decision maker is randomly matched with a new anonymous subject and there is no
468 feedback across rounds. The decision maker has 100 points that need to be allocated between him/herself and the other one.
469 The decision maker will get return from the points allocated to him/herself and the other one will get return from the points
470 allocated to him/her. First please only tell me the number of points you want to allocate to yourself, then please only tell me
471 the number of points you want to allocate to the other.

472 **Understanding Testing Question 1.** Suppose that you allocate 90 points to yourself, and 10 points to the other. In this round,
473 allocating every 1 point to yourself returns 0.8 dollars for yourself, and allocating every 1 point to the other returns 0.2 dollars
474 for the other. What return will you get? [MCQ; A: I receive 90×0.8 dollars. The other person receives 10×0.2 dollars; B: I
475 receive 90 dollars. The other person receives 10 dollars; C: I receive 0.8 dollars. The other person receives 0.2 dollars; D: I
476 receive 100 dollars.]

477 **Understanding Testing Question 2.** Suppose that you allocate 90 points to yourself, and 10 points to the other. In this round,
478 allocating every 1 point for yourself returns 0.8 dollars for yourself, and allocating every 1 point for the other returns 0.2 dollars
479 for the other. Who will get just 2 dollars? [MCQ; A: Me; B: The other person]

480 **Understanding Testing Question 3.** In this round, allocating every 1 point for yourself returns 0.8 dollars for yourself, and
481 allocating every 1 point for the other returns 0.2 dollars for the other. Will you allocate to the other? Why? [Text Input]

482 **Decision Task.** In this round, allocating every 1 point for yourself returns M dollars for yourself, and allocating every 1 point
483 for the other one returns N dollars for him/her. What is your allocation?

484 **E.2. Price Framing Condition.**

485 **Task Instruction.** In every round, the decision maker is randomly matched with a new anonymous subject and there is no
486 feedback across rounds. The decision maker has 100 points that need to be allocated between him/herself and the other one.
487 The decision maker will get return from the points allocated to him/herself and the other one will get return from the points
488 allocated to him/her. First please only tell me the number of points you want to allocate to yourself, then please only tell me
489 the number of points you want to allocate to the other.

490 **Understanding Testing Question 1.** Suppose that you allocate 90 points to yourself, and 10 points to the other. In this round,
491 every 1.25 points to yourself returns 1 dollar for yourself, allocating every 1 point to the other returns 0.2 dollars for the other.
492 What return will you get? [MCQ; A: I receive $90/1.25$ dollars. The other person receives $10/5$ dollars; B: I receive 90 dollars.
493 The other person receives 10 dollars; C: I receive 1.25 dollars. The other person receives 5 dollars; D: I receive 100 dollars.]

494 **Understanding Testing Question 2.** Suppose that you allocate 90 points to yourself, and 10 points to the other. In this round,
495 allocating every 1.25 points for yourself returns 1 dollar for yourself, and allocating every 5 points for the other returns 1 dollar
496 for the other. Who will get just 2 dollars? [MCQ; A: Me; B: The other person]

497 **Understanding Testing Question 3.** In this round, allocating every 1.25 points for yourself returns 1 dollar for yourself, and
498 allocating every 5 points for the other returns 1 dollar for the other. Will you allocate to the other? Why? [Text Input]

499 **Decision Task.** In this round, allocating every $1/M$ points for yourself returns 1 dollar for yourself, and allocating every $1/N$
500 points for the other one returns 1 dollar for him/her. What is your allocation?

501 **E.3. Discrete Choice Condition.**

502 **Task Instruction.** In every round, the decision maker is randomly matched with a new anonymous subject and there is no
503 feedback across rounds. The decision maker will be presented with 11 options, each represented in the form (\$M, \$N). The
504 decision maker will get M dollars and the other will get N dollars. Please only tell me about your best option in every round.

505 **Understanding Testing Question 1.** If you choose the option (\$72, \$2), what return will you get? [MCQ; A: I receive 72 dollars.
506 The other person receives 2 dollars; B: I receive 2 dollars. The other person receives 72 dollars; C: I receive 72 dollars. The
507 other person receives 0 dollar; D: I receive 100 dollars.]

508 **Understanding Testing Question 2.** If you choose the option (\$72, \$2), who will get just 2 dollars? [MCQ; A: Me; B: The other
509 person]

510 **Understanding Testing Question 3.** If you face the options (\$40, \$10) and (\$72, \$2), which option will you select? Why? [Text
511 Input]

512 **Decision Task.** In this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3), (\$M4,\$N4), (\$M5,\$N5),
513 (\$M6,\$N6), (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best?

514 **F. Food Preference.**

515 **Section Instruction.** In this section, you will be given 25 rounds of decision-making tasks and will be responsible for making
516 decisions. You should use your best judgment to come up with solutions that you like most. My first request is “You must
517 provide your answers in every round.” Tasks in this section are hypothetical. If this section is selected to be realized, we will
518 pay you a fixed amount \$50 as bonus.

519 **F.1. Baseline Condition.**

520 **Task Instruction.** In every round, the decision maker has 100 points that need to be spent between ham meat and tomato. The
521 decision maker will get the amount of meat and tomato he/she spends on. First please only tell me the number of points for
522 meat, then please only tell me the number of points for tomato.

523 **Understanding Testing Question 1.** What goods can you get from decisions? [MCQ; A: Meat and tomato; B: Meat only; C:
524 Tomato only]

525 **Understanding Testing Question 2.** Suppose that you spend 90 points to meat, and 10 points to tomato. In this round, spending
526 every 1 point for meat will get 0.8 Kg meat, and spending every 1 point for tomato will get 0.2 Kg tomato, what will you get?
527 [MCQ; A: 90*0.8 Kg meat and 10*0.2 Kg tomato; B: 90 Kg meat and 10 Kg tomato; C: 0.8 Kg meat and 0.2 Kg tomato; D:
528 100 Kg meat]

529 **Understanding Testing Question 3.** In this round, spending every 1 point for meat will get 0.8 Kg meat, and spending every 1
530 point for tomato will get 0.2 Kg tomato. What is your allocation? Why? [Text Input]

531 **Decision Task.** In this round, spending every 1 point on meat will get M Kg meat, and spending every 1 point on tomato will
532 get N Kg tomato. What is your allocation?

533 **F.2. Price Framing Condition.**

534 **Task Instruction.** In every round, the decision maker has 100 points that need to be spent between ham meat and tomato. The
535 decision maker will get the amount of meat and tomato he/she spends on. First please only tell me the number of points for
536 meat, then please only tell me the number of points for tomato.

537 **Understanding Testing Question 1.** What goods can you get from decisions? [MCQ; A: Meat and tomato; B: Meat only; C:
538 Tomato only]

539 **Understanding Testing Question 2.** Suppose that you spend 90 points to meat, and 10 points to tomato. In this round, spending
540 every 1.25 point for meat will get 1 Kg meat, and spending every 5 points for tomato will get 1 Kg tomato, what will you get?
541 [MCQ; A: 90/1.25 Kg meat and 10/5 Kg tomato; B: 90 Kg meat and 10 Kg tomato; C: 1.25 Kg meat and 5 Kg tomato; D: 100
542 Kg meat]

543 **Understanding Testing Question 3.** In this round, spending every 1.25 points for meat will get 1 Kg meat, and spending every 5
544 points for tomato will get 1 Kg tomato. What is your allocation? Why? [Text Input]

545 **Decision Task.** In this round, spending every 1/M points on meat will get 1 Kg meat, and spending every 1/N points on
546 tomato will get 1 Kg tomato. What is your allocation?

547 **F.3. Discrete Choice Condition.**

548 **Task Instruction.** In every round, the decision maker will be presented with 11 options, each represented in the form (M Kg, N
549 Kg). The decision maker will get M Kg of meat and get N Kg of tomato. Please only tell me about your best option in every
550 round.

551 **Understanding Testing Question 1.** What goods can you get from decisions? [MCQ; A: Meat and tomato; B: Meat only; C:
552 Tomato only]

553 **Understanding Testing Question 2.** If you choose the option (72 Kg, 2 Kg), what will you get? [MCQ; A: 72 Kg meat and 2 Kg
554 tomato; B: 2 Kg meat and 72 Kg tomato; C: 72 Kg meat and 0 Kg tomato; D: 100 Kg meat]

555 **Understanding Testing Question 3.** If you face the options (40 Kg, 10 Kg) and (72 Kg, 2 Kg), which option will you select?
556 Why? [Text Input]

557 **Decision Task.** In this round, there are 11 options, which are (M1 Kg,N1 Kg), (M2 Kg,N2 Kg), (M3 Kg,N3 Kg), (M4 Kg,N4
558 Kg), (M5 Kg,N5 Kg), (M6 Kg,N6 Kg), (M7 Kg,N7 Kg), (M8 Kg,N8 Kg), (M9 Kg,N9 Kg), (M10 Kg,N10 Kg), (M11 Kg, N11
559 Kg). Which is the best?

560 **G. Explanations on Incentive Implementation.** [This section varies across baseline, price framing, and discrete choice condition.
561 This section is presented at the end of the study.]

562 **G.1. Baseline.** You have finished the questionnaire. The followings are the explanations on how we will decide the bonuses. First,
563 we will randomly select 1 out of every 30 subjects to receive the additional bonuses. For each of the selected subjects, we will
564 randomly choose one of his/her decisions to implement. Suppose that you are selected to receive bonuses.

- 565 • Suppose that the chosen decision is “In this round, investing every 1 point for Asset A returns M dollars, and investing
566 every 1 point for Asset B returns N dollars. What is your allocation?”
 - 567 – We will randomly draw a number between 0 and 1. If the number drawn is less than or equal to 0.5, you will get
568 the return from Asset A; If the number drawn is greater than 0.5, you will get the return from Asset B.
- 569 • Suppose that the chosen decision is “In this round, investing every 1 point for today returns M dollars today, and
570 investing every 1 point for one month later returns N dollars check which can be cashed in one month later. What is your
571 allocation?”
 - 572 – After we confirm your submission, we will pay you the bonus you receive today immediately and pay you the bonus
573 you receive in one month after 30 days.
- 574 • Suppose that the chosen decision is “In this round, allocating every 1 point for yourself returns M dollars for yourself,
575 and allocating every 1 point for the other one returns N dollars for him/her. What is your allocation?”
 - 576 – You will be randomly matched with a new anonymous subject, who does not participate in this study. We will
577 randomly select this subject from a representative sample recruited in Prolific. Your decision determines bonuses for
578 both you and this subject. You will get the return allocated to you and the selected subject will get the return
579 allocated to him/her.
- 580 • Suppose that the chosen decision is “In this round, spending every 1 point on meat will get M Kg meat, and spending
581 every 1 point on tomato will get N Kg tomato. What is your allocation?”
 - 582 – This task is a hypothetical task. We will pay you the fixed amount of \$50 as a bonus.
- 583 • We will record the process of randomization in a video. The video is available upon request (yitingchen@xmu.edu.cn).

584 **G.2. Price Framing.** You have finished the questionnaire. The followings are the explanations on how we will decide the bonuses.
585 First, we will randomly select 1 out of every 30 subjects to receive the additional bonuses. For each of the selected subjects, we
586 will randomly choose one of his/her decisions to implement. Suppose that you are selected to receive bonuses.

- 587 • Suppose that the chosen decision is “In this round, investing every $1/M$ points for Asset A returns 1 dollar, and investing
588 every $1/N$ points for Asset B returns 1 dollar. What is your allocation?”
 - 589 – We will randomly draw a number between 0 and 1. If the number drawn is less than or equal to 0.5, you will get
590 the return from Asset A; If the number drawn is greater than 0.5, you will get the return from Asset B.
- 591 • Suppose that the chosen decision is “In this round, investing every $1/M$ points for today returns 1 dollar today, and
592 investing every $1/N$ points for one month later returns 1 dollar check which can be cashed in one month later. What is
593 your allocation?”
 - 594 – After we confirm your submission, we will pay you the bonus you receive today immediately and pay you the bonus
595 you receive in one month after 30 days.
- 596 • Suppose that the chosen decision is “In this round, allocating every $1/M$ points for yourself returns 1 dollar for yourself,
597 and allocating every $1/N$ points for the other one returns 1 dollar for him/her. What is your allocation?”
 - 598 – You will be randomly matched with a new anonymous subject, who does not participate in this study. We will
599 randomly select this subject from a representative sample recruited in Prolific. Your decision determines bonuses for
600 both you and this subject. You will get the return allocated to you and the selected subject will get the return
601 allocated to him/her.
- 602 • Suppose that the chosen decision is “In this round, spending every $1/M$ points on meat will get 1 kg meat, and spending
603 every $1/N$ points on tomato will get 1 kg tomato. What is your allocation?”
 - 604 – This task is a hypothetical task. We will pay you the fixed amount of \$50 as a bonus.
- 605 • We will record the process of randomization in a video. The video is available upon request (yitingchen@xmu.edu.cn).

606 **G.3. Discrete Choice.** You have finished the questionnaire. The followings are the explanations on how we will decide the bonuses.
607 First, we will randomly select 1 out of every 30 subjects to receive the additional bonuses. For each of the selected subjects, we
608 will randomly choose one of his/her decisions to implement. Suppose that you are selected to receive bonuses.

- 609 • Suppose that the chosen decision is “The decision maker has a 50% chance to get M dollars or the other 50% chance to get
610 N dollars. . . In this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3), (\$M4,\$N4), (\$M5,\$N5),
611 (\$M6,\$N6), (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best?”
 - 612 – We will randomly draw a number between 0 and 1. If the number drawn is less than or equal to 0.5, you will get M
613 dollars; If the number drawn is greater than 0.5, you will get N dollars.
- 614 • Suppose that the chosen decision is “The decision maker will get M dollars today and get N dollars check that can
615 be cashed in one month later. . . In this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3),
616 (\$M4,\$N4), (\$M5,\$N5), (\$M6,\$N6), (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best?”
 - 617 – After we confirm your submission, we will pay you the bonus you receive today immediately and pay you the bonus
618 you receive in one month after 30 days.
- 619 • Suppose that the chosen decision is “The decision maker will get M dollars and the other will get N dollars. . . In
620 this round, there are 11 options, which are (\$M1,\$N1), (\$M2,\$N2), (\$M3,\$N3), (\$M4,\$N4), (\$M5,\$N5), (\$M6,\$N6),
621 (\$M7,\$N7), (\$M8,\$N8), (\$M9,\$N9), (\$M10,\$N10), (\$M11,\$N11). Which is the best?”
 - 622 – You will be randomly matched with a new anonymous subject, who does not participate in this study. We will
623 randomly select this subject from a representative sample recruited in Prolific. Your decision determines bonuses of
624 both you and this subject. You will get the return allocated to you and the selected subject will get the return
625 allocated to him/her.
- 626 • Suppose that the chosen decision is “The decision maker will get M Kg of meat and get N Kg of tomato. In this round,
627 there are 11 options, which are (M1 Kg,N1 Kg), (M2 Kg,N2 Kg), (M3 Kg,N3 Kg), (M4 Kg,N4 Kg), (M5 Kg,N5 Kg) ,
628 (M6 Kg,N6 Kg), (M7 Kg,N7 Kg), (M8 Kg,N8 Kg), (M9 Kg,N9 Kg), (M10 Kg,N10 Kg), (M11 Kg,N11 Kg). Which is the
629 best?”
 - 630 – This task is a hypothetical task. We will pay you the fixed amount of \$50 as a bonus.
- 631 • We will record the process of randomization in a video. The video is available upon request (yitingchen@xmu.edu.cn).

632 **3. Preference Estimation**

Econometric Specification For the utility functions of the four different preferences in the Section of *Structural Estimation for Preferences*, the first-order conditions in the optimal choice (x_1, x_2) , given (p_1, p_2) , can be written as follows.

$$\ln(x_1/x_2) = \frac{1}{\rho - 1} \left[\ln(p_1/p_2) + \ln \frac{1 - \alpha}{\alpha} \right]$$

633 The first-order condition explicitly demonstrates how the logarithm of the relative quantity rate responds to changes in
 634 the logarithm of the relative price rate, conditional on ρ . Consequently, it also reveals the relationship between ρ and the
 635 correlation coefficient of the logarithm of the relative quantity rate and the logarithm of the relative price rate. Within four
 636 specific preferences, how a decision maker adjusts the relative demand between two specific commodities in response to price
 637 changes, given a certain ρ , is illustrated as follows.

638 For risk preference, $\rho_r \rightarrow 1$, the DM allocates all expenditure to the security of the lower price. When ρ_r decreases, the DM
 639 tends to smooth the payment between securities more with price changes, that is, more risk-averse.

640 For time preference, with price changes, $\rho_t \rightarrow 1$, the DM allocates all expenditures to the lower price time period. When ρ_t
 641 decreases, it suggests less fungibility in the allocation between different periods with price changes for the DM.

642 For social preference, with price changes, $\rho_s \rightarrow 1$, the DM simply allocates all expenditures to the subject of the lower price.
 643 When ρ_s decreases, the DM balances the payoff between both with price changes, that is, more toward equality.

644 For food preference, with price changes, $\rho_f \rightarrow 1$, the DM allocates all expenditures to goods of the lower price. When ρ_f
 645 decreases, the DM tends to distribute the amounts of meat and tomatoes more evenly in response to price changes, indicating
 646 a greater tendency toward equality.

Since $\ln(x_1/x_2)$ is not well defined for corner solutions, we estimate the preference parameter using the expenditure share function, referring to the method of (1-6). First, the demand function is given by:

$$x_1 = \left[\frac{g}{(p_1/p_2)^r + g} \right] \frac{E}{p_1}$$

where E is the expenditure, $r = \rho/(1 - \rho)$, and $g = [\alpha/(1 - \alpha)]^{1/(1-\rho)}$. Then this generates the following expenditure share function for the econometric specification:

$$\frac{p_1 x_1}{E} = \frac{g}{(p_1/p_2)^r + g}$$

647 Note that expenditure shares are bounded between zero and one. We can generate estimates of g and r using nonlinear
 648 tobit maximum likelihood (7), and use this to estimate α and ρ in each of the four preference domains.

649 4. GARP Test Power Analyses

650 To establish a benchmark to ensure that our experiment budget sets provide a rigorous test of GARP, GPT observations and
651 human subjects in the baseline condition have a true empirical high rationality. We use the tests below:

652 **Bronars Power** We first use the test designed by (8) to generate the benchmark and confirm the power of our designed budget
653 sets. We employ the choices of a hypothetical subject who chooses uniformly randomly among all allocations on each budget
654 line as a point of comparison. Each of the hypothetical simulated subjects makes 25 choices from randomly generated budget
655 sets in the same way that GPT observations and human subjects do.

656 We find that 99.9% of the hypothetical simulated subjects reject GARP.

657 **Predictive Success** Second, to measure how successful a well-behaved utility function maximization rationalizing GPT
658 observations' choices and human subjects' choices in the baseline condition in comparison to the benchmark, we calculate the
659 predictive success (9, 10), the pass rate for GARP subtracted from (1- Bronars power).

660 We find that GPT observations (human subjects) outperforms a hypothetical simulated subject by 94.9% (60.8%), 88.9%
661 (79.0%), 80.9% (52.1%) and 91.9% (43.4%) in risk, time, social and food preference.

662 **Selten Score** Furthermore, we calculate how much each GPT observation's (human subject's) CCEI outperforms the benchmark
663 (11). We compute each DM's simulated CCEI: the average CCEI of the budget set faced by the DM using the Bronars test.
664 Then we subtract the simulated CCEI from the raw CCEI of each DM, as the Selten score (9, 11).

665 The average Selten score of GPT observations (human subjects) for risk, time, social and food preference is 0.279 (0.262),
666 0.274 (0.266), 0.275 (0.247) and 0.281 (0.244), which is significantly larger than 0 ($p < 0.01$, two-sided two-sample t-test) for all
667 four preference domains.

668 **Bootstrap Power** Although we base most of our analyses on the uniform random choice benchmark, we also perform a robustness
669 check from an ex post perspective, calculating the probability of rejecting GARP by bootstrapping (12, 13). We create a
670 population of 10,000 synthetic subjects of which 25 choices are randomly drawn from the actual budget set of our DMs.

671 The probability of rejecting GARP is 7.9% (95.4%), 26.3% (96.6%), 26.0% (99.8%), and 8.5% (99.8%) in risk, time, social,
672 and time preference for GPT observations (human subjects). This method relies on the heterogeneity of preferences among
673 subjects. When subjects' preferences are indifferent, we may observe a low probability of GARP violation (14–16). The results
674 from the method (12, 13) align with our preference parameter estimation.

675 These results all suggest that the budget sets faced by DMs have the power to detect rationality violations, and GPT
676 observations and human subjects have a high rationality level.

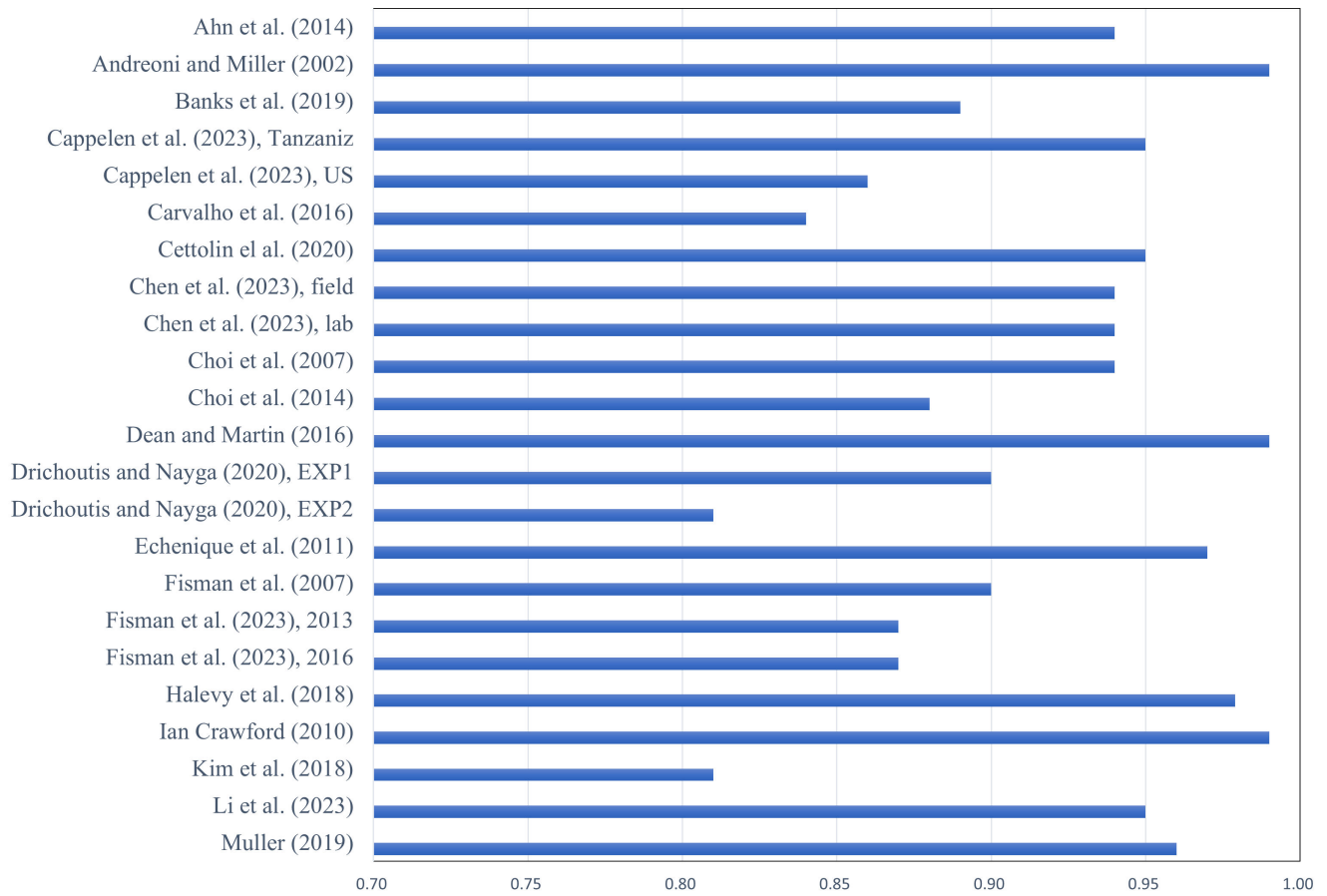


Fig. S1. Rationality Score in Prior Studies with Human Subjects. This figure presents the average CCEI values of human subjects in revealed preference studies (1, 4, 11, 12, 17–31)

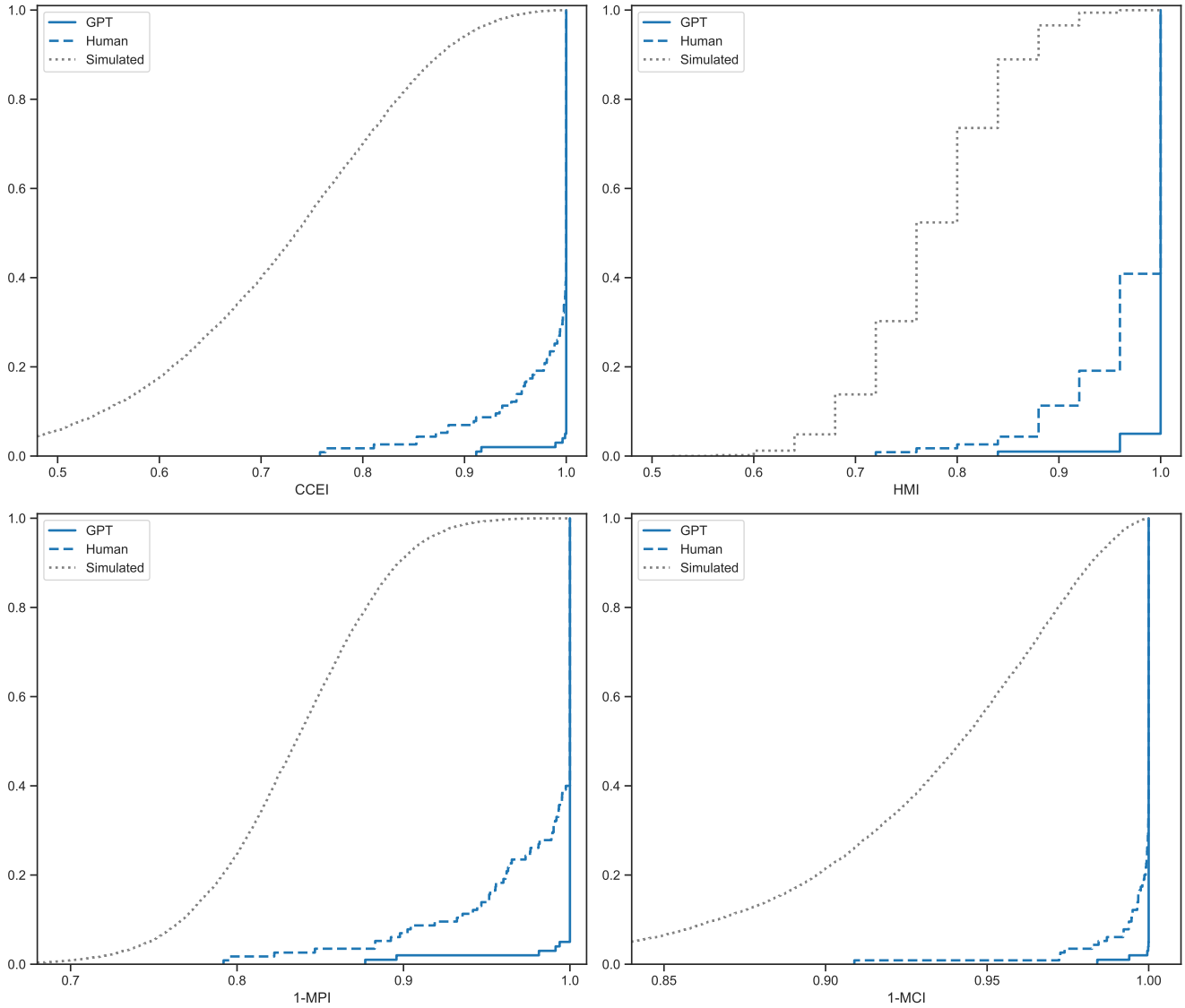


Fig. S2. Cumulative Distributions of Rationality Score for Risk Preference. This figure contains four subplots for four different rationality indexes in risk preference: CCEI, HMI, MPI, and MCI. The light dotted lines represent simulated subjects, the dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.

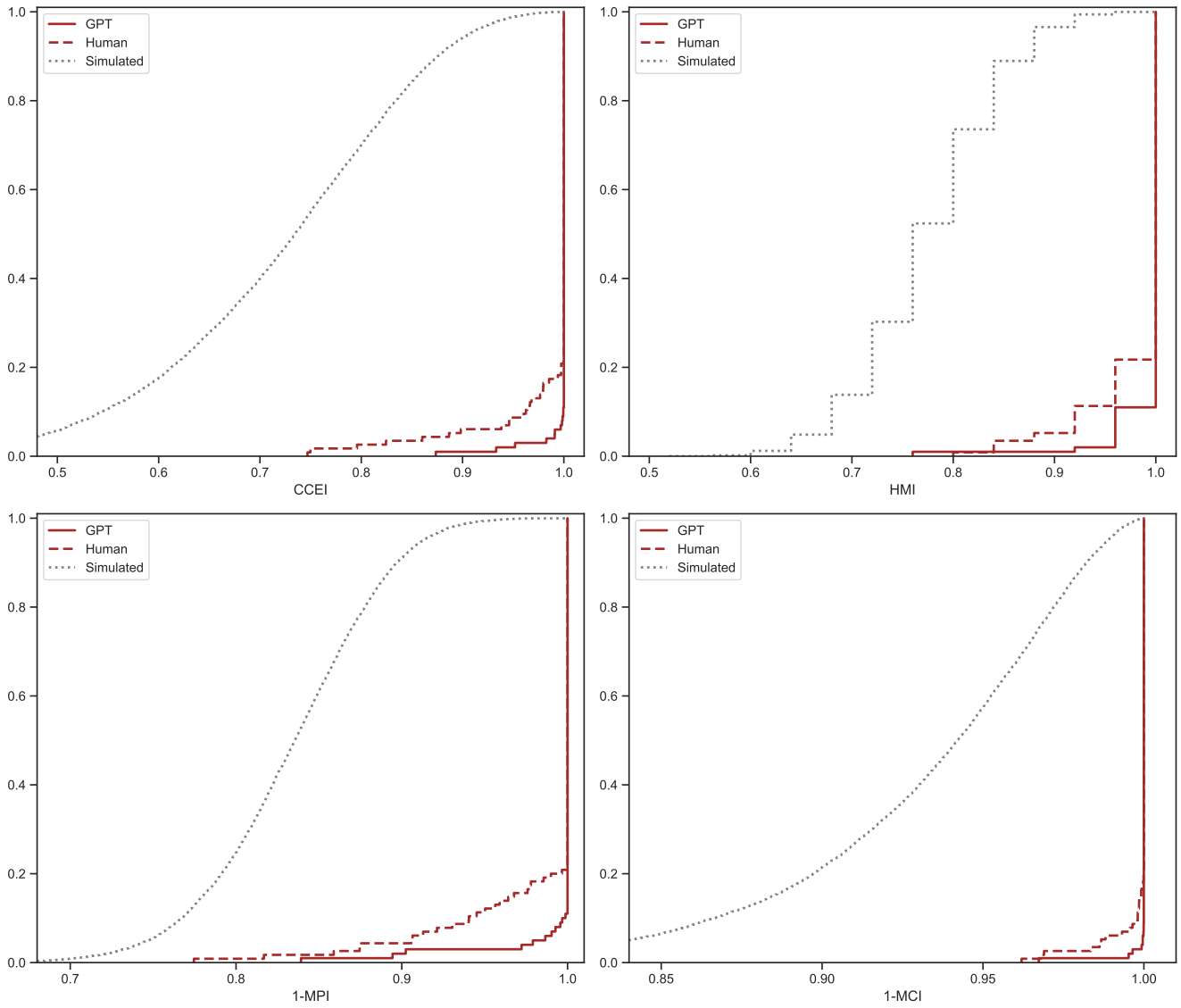


Fig. S3. Cumulative Distributions of Rationality Score for Time Preference. This figure contains four subplots for four different rationality indexes in risk preference: CCEI, HMI, MPI, and MCI. The light dotted lines represent simulated subjects, the dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.

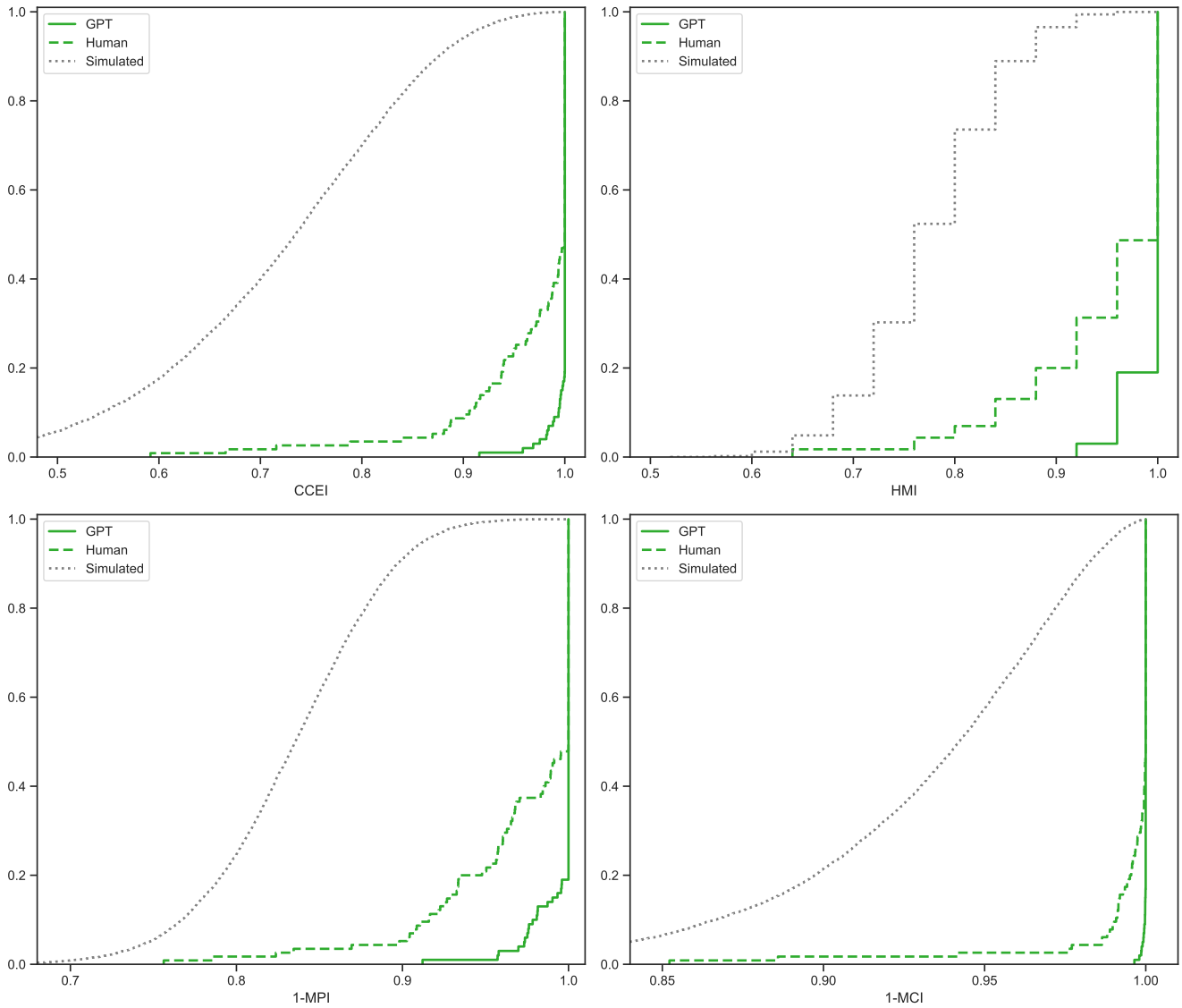


Fig. S4. Cumulative Distributions of Rationality Score for Social Preference. This figure contains four subplots for four different rationality indexes in risk preference: CCEI, HMI, MPI, and MCI. The light dotted lines represent simulated subjects, the dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.

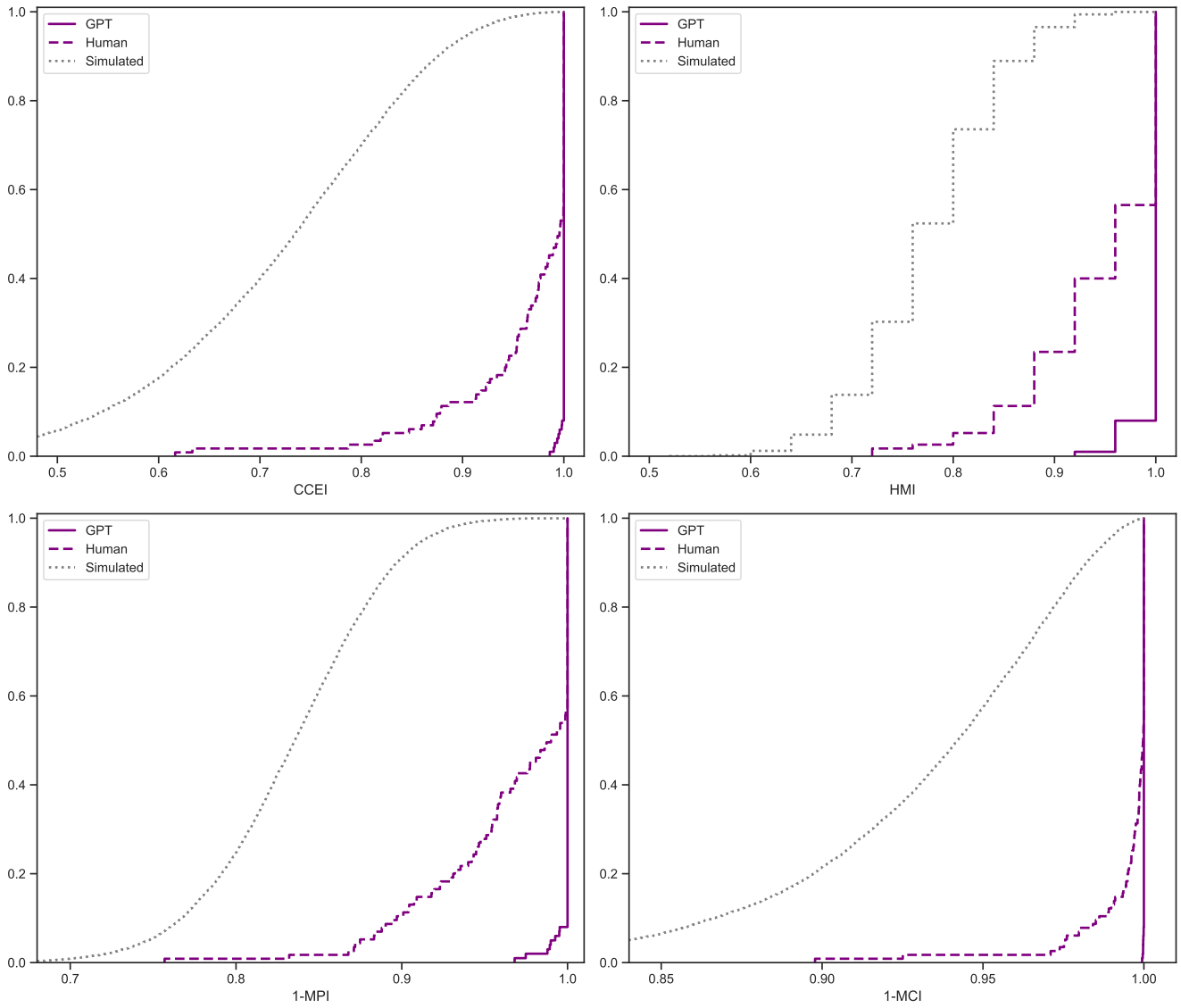


Fig. S5. Cumulative Distributions of Rationality Score for Food Preference. This figure contains four subplots for four different rationality indexes in risk preference: CCEI, HMI, MPI, and MCI. The light dotted lines represent simulated subjects, the dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.

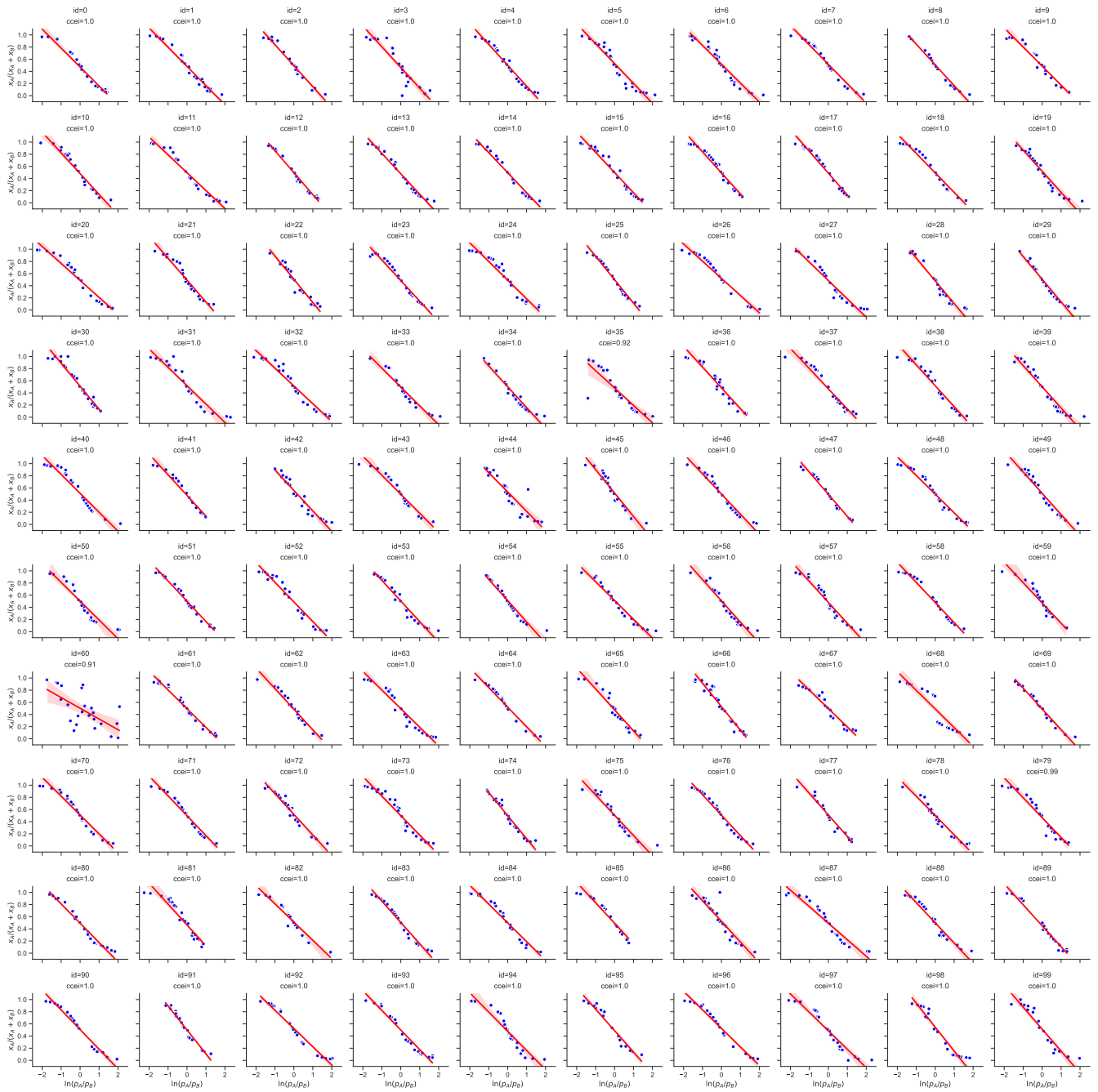


Fig. S6. The Relationship of $x_A/(x_A + x_B)$ and $\ln(p_A/p_B)$ for GPT Observations in Risk Preference. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in risk preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points and a corresponding fitted line.

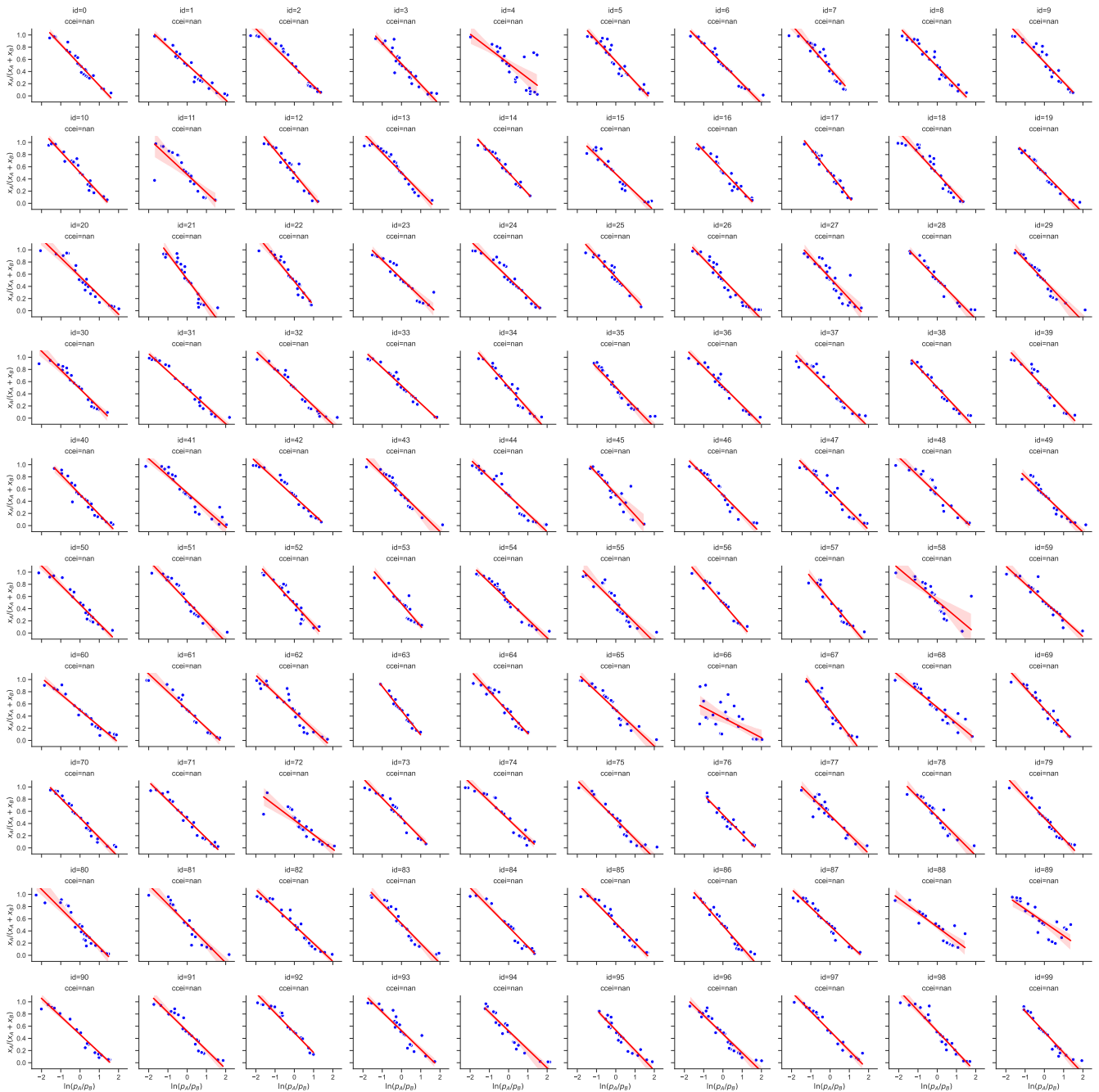


Fig. S7. The Relationship of $x_A/(x_A + x_B)$ and $\ln(p_A/p_B)$ for GPT Observations in Time Preference. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in time preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points and a corresponding fitted line.



Fig. S8. The Relationship of $x_A/(x_A + x_B)$ and $\ln(p_A/p_B)$ for GPT Observations in Social Preference. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in social preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points and a corresponding fitted line.

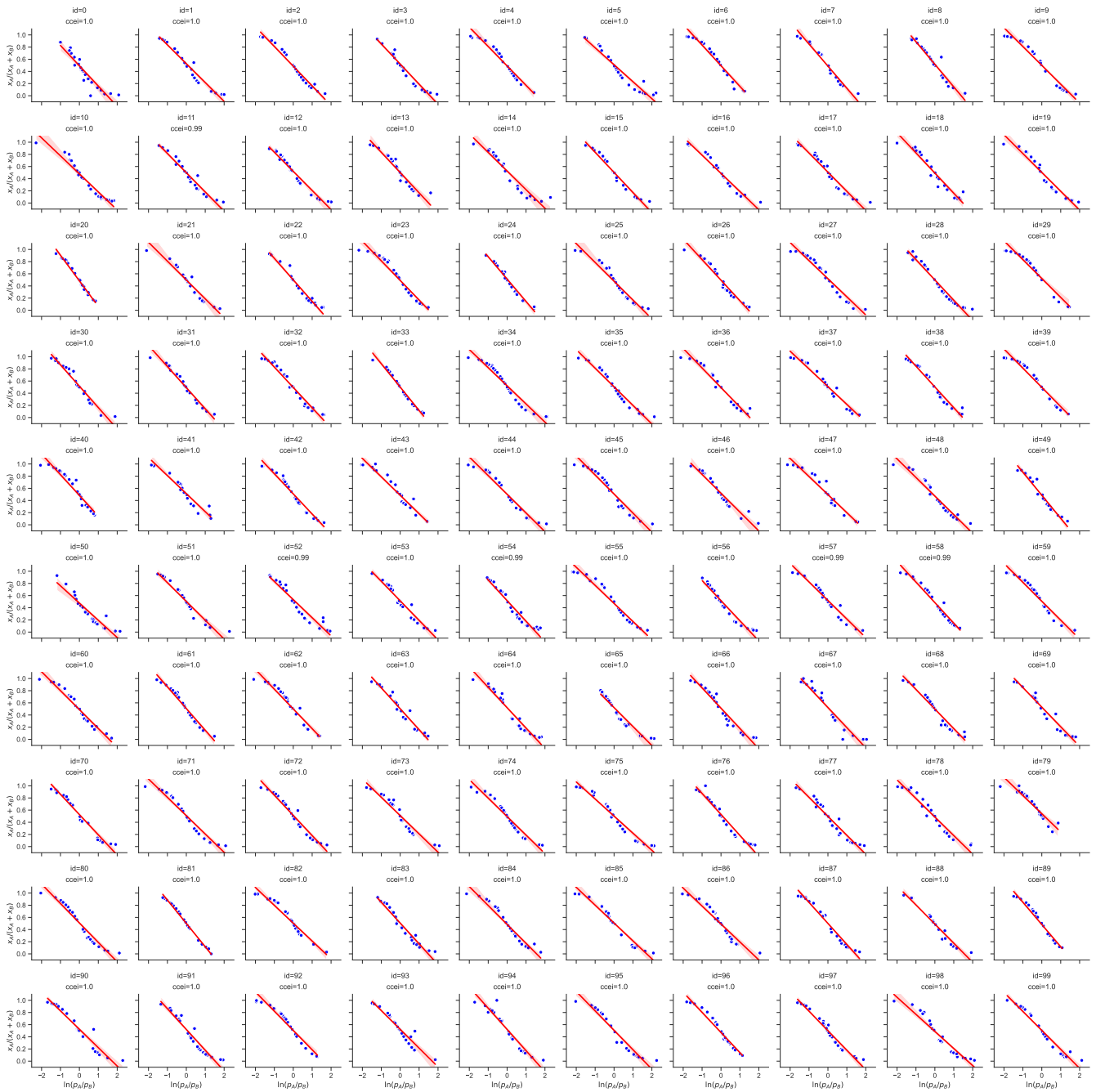


Fig. S9. The Relationship of $x_A/(x_A + x_B)$ and $\ln(p_A/p_B)$ for GPT Observations in Food Preference. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in food preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points and a corresponding fitted line.

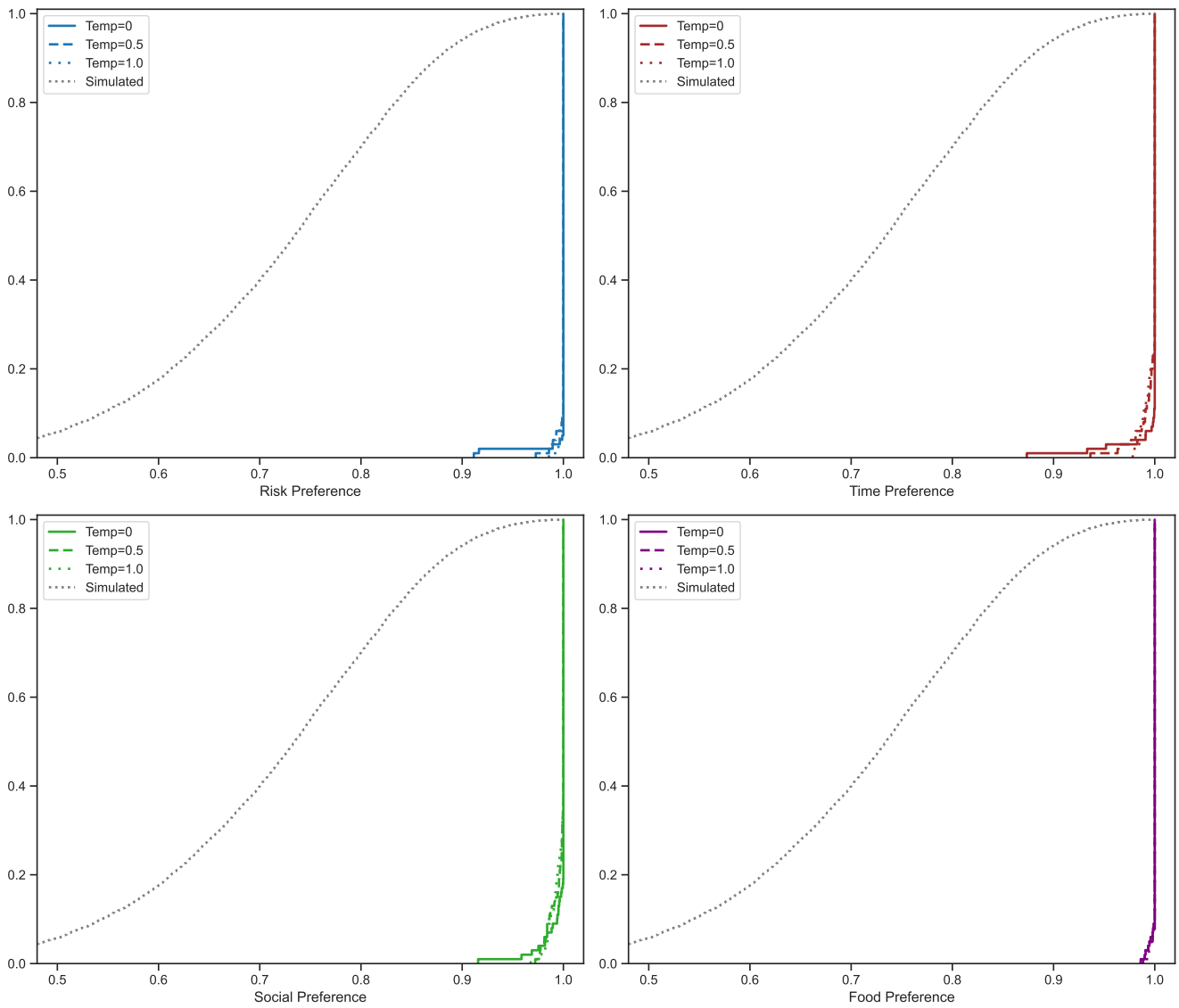


Fig. S10. Cumulative Distributions of GPT CCEI with Temperature Variations. This figure contains four subplots, and each represents a different preference domain: risk, time, social or food preference.

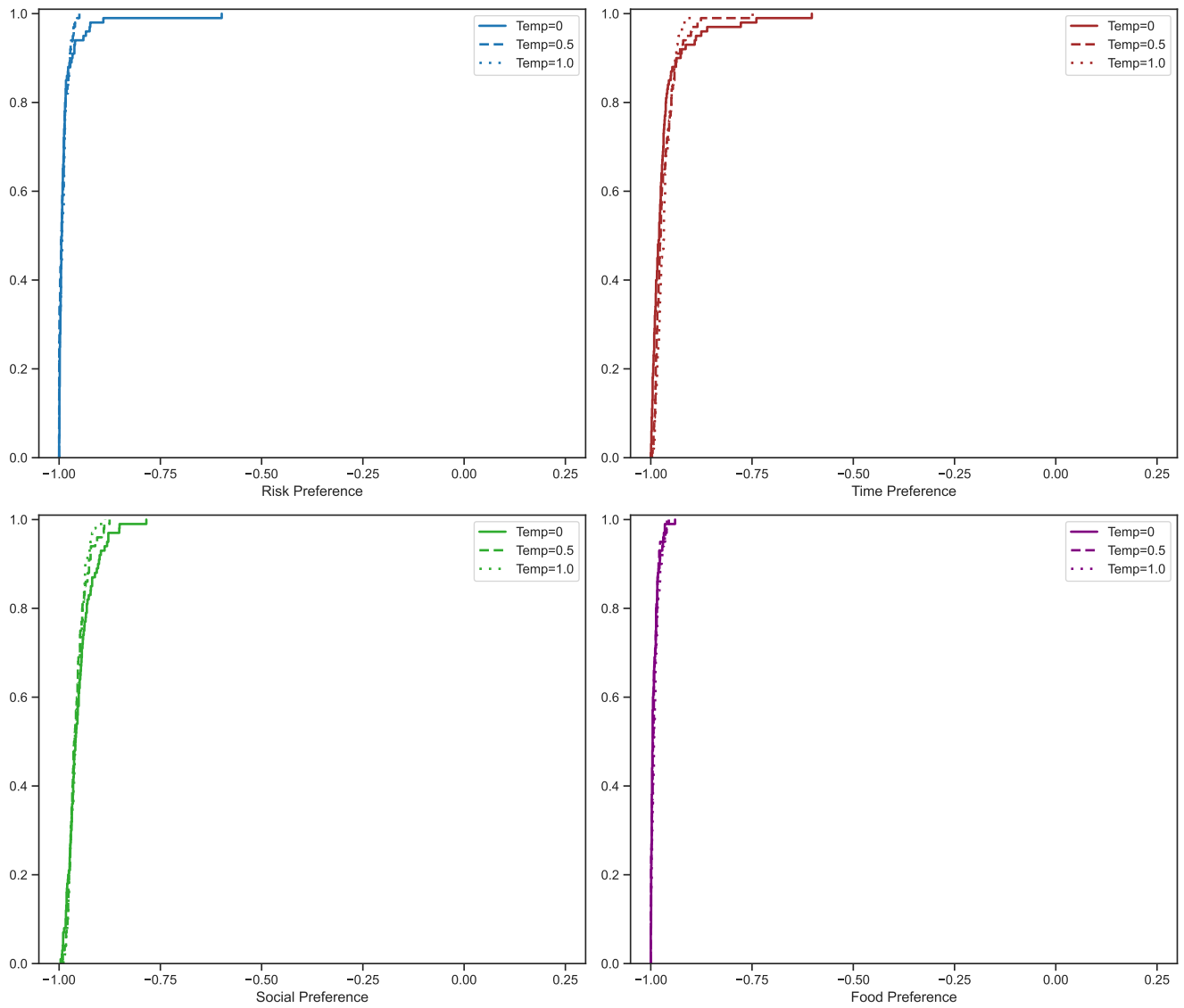


Fig. S11. Cumulative Distributions of GPT Spearman's Correlation Coefficients of $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$ with Temperature Variations, which serves as a proxy for the degree of downward-sloping demand. This figure contains four subplots, and each represents a different preference domain: risk, time, social or food preference.



Fig. S12. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in risk preference with price framing. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in risk preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.



Fig. S13. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in time preference with price framing. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in time preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.

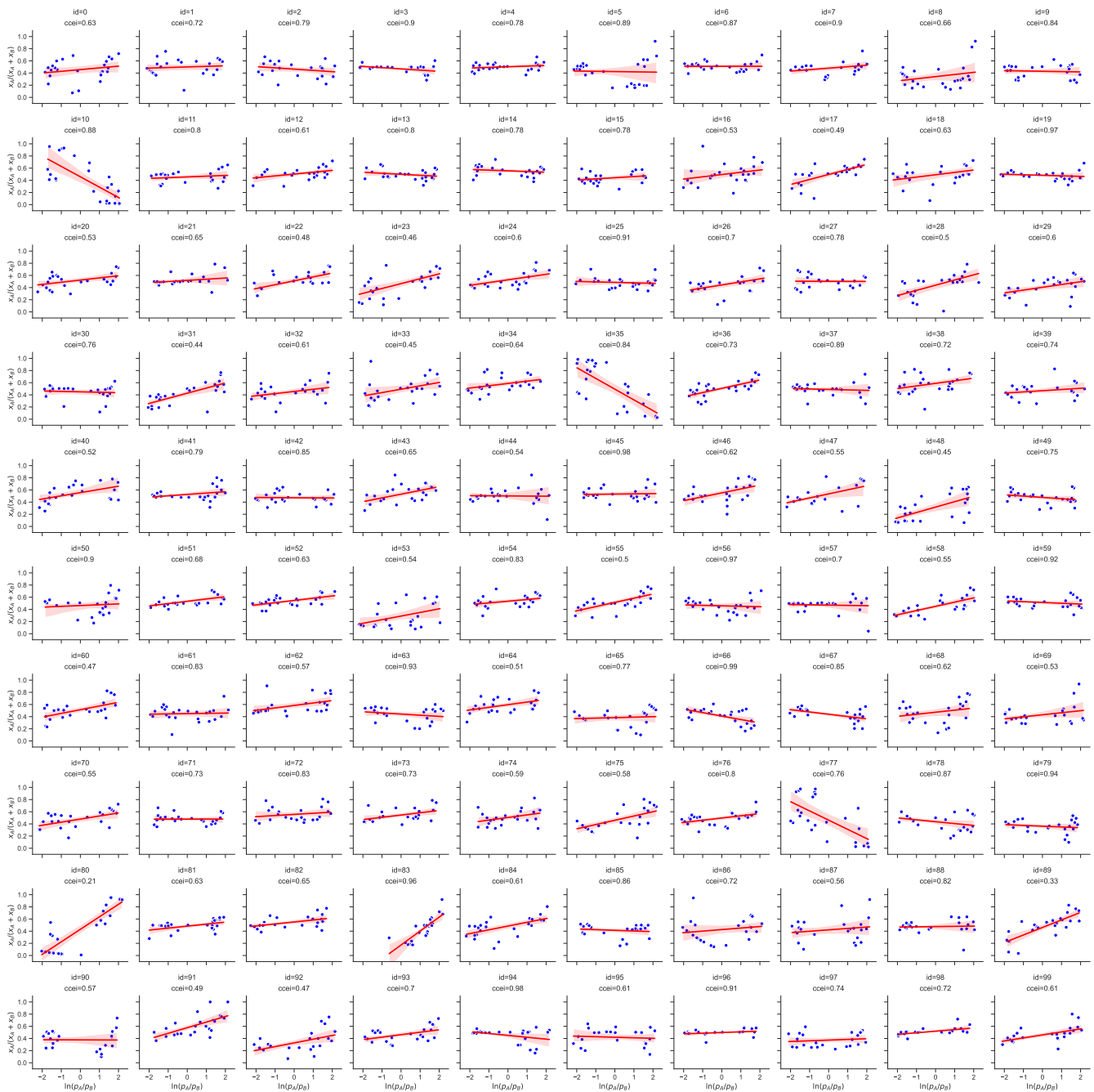


Fig. S14. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in social preference with price framing. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in social preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.



Fig. S15. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in food preference with price framing. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in food preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.

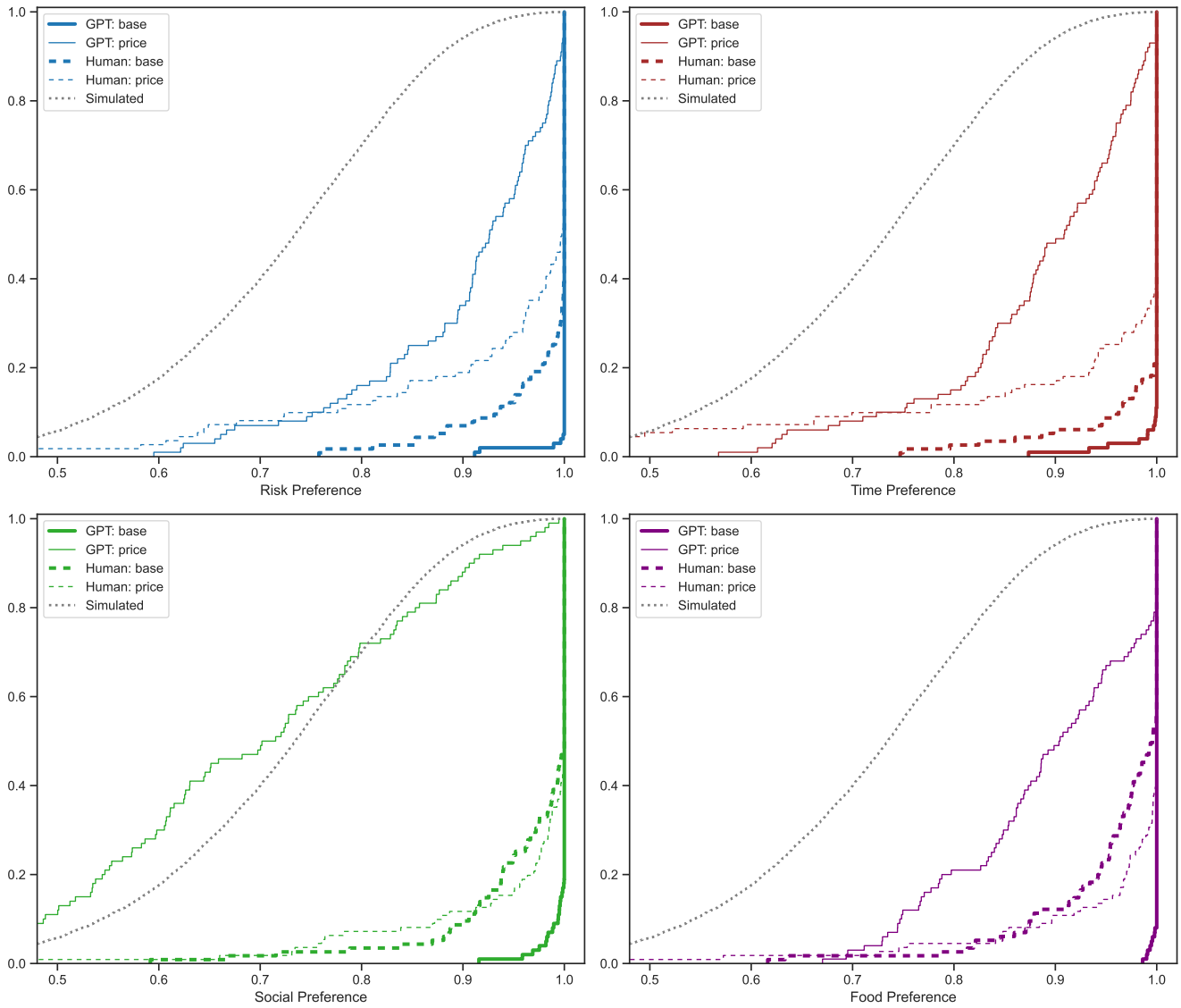


Fig. S16. Cumulative Distributions of the CCEI Values with Price Framing. This figure contains four subplots, and each represent a different preference domain: risk, time, social or food preference. The light dotted lines represent simulated subjects, the dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.

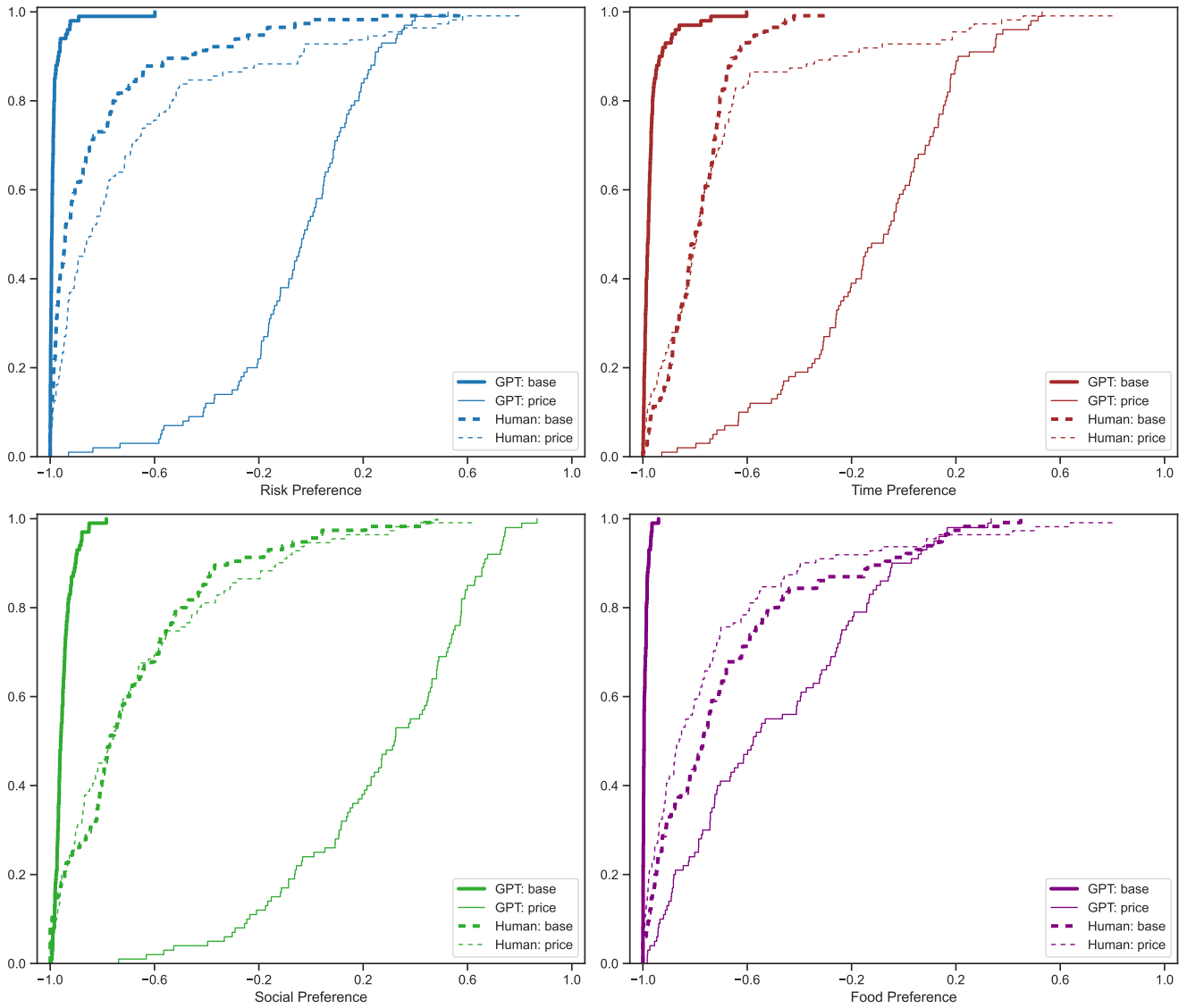


Fig. S17. Cumulative Distributions of Spearman's Correlation Coefficients of $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$ with Price Framing. This figure contains four subplots, and each represents a different preference domain: risk, time, social or food preference. The dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.



Fig. S18. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in risk preference with discrete choice. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in risk preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.



Fig. S19. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in time preference with discrete choice. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in time preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.



Fig. S20. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in social preference with discrete choice. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in social preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.



Fig S21. The relationship of the quantities share $x_A/(x_A + x_B)$ and the log-price ratio $\ln(p_A/p_B)$ for GPT observations in food preference with discrete choice. This figure is composed of 100 subplots, and each represents one of the 100 experimental trials conducted on GPT in risk preference. The x-axis denotes the log-price ratio $\ln(p_A/p_B)$, and the y-axis represents the quantities share $x_A/(x_A + x_B)$. Each subplot contains 25 scatter points, which represent observed decisions, and a corresponding fitted line.

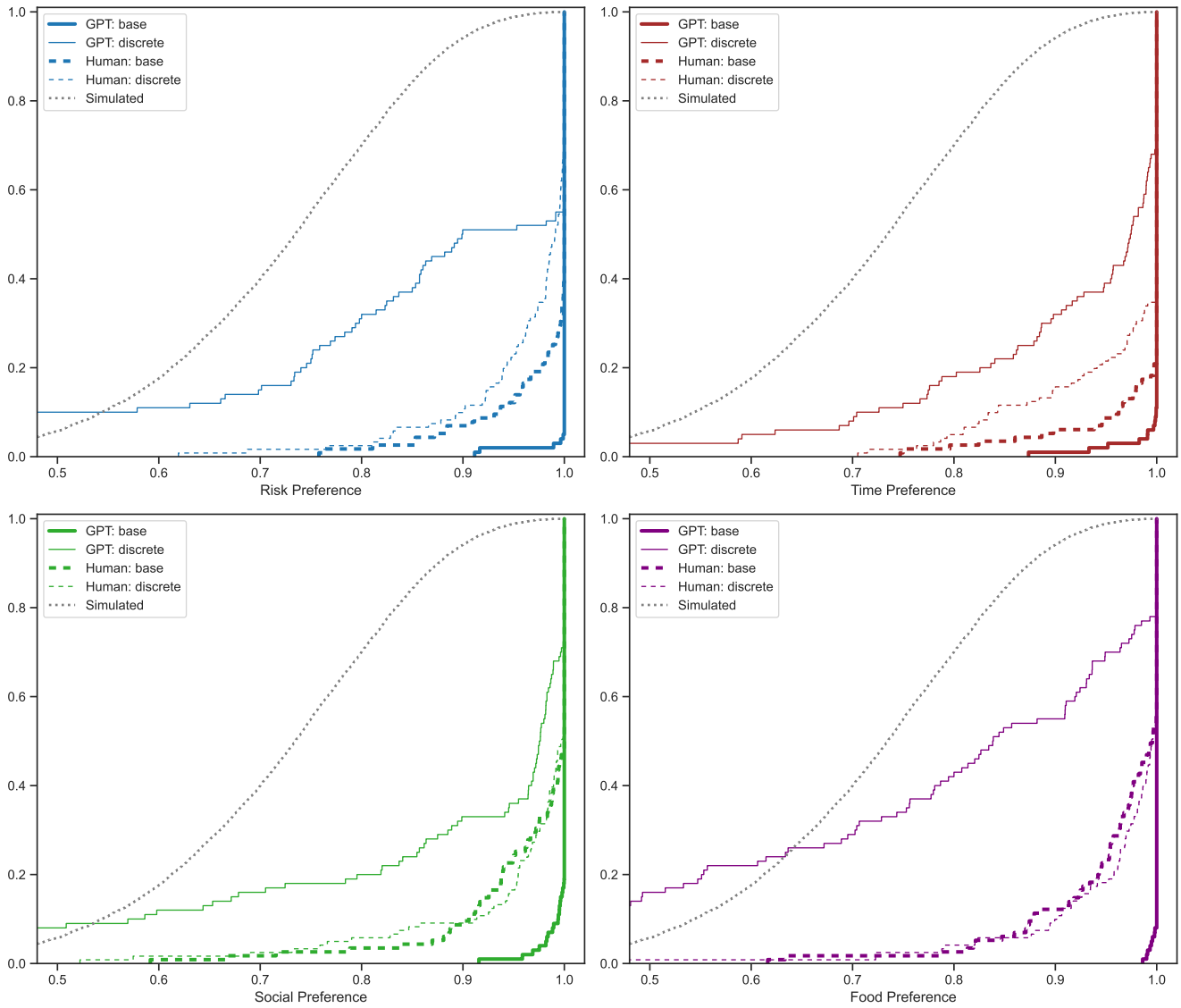


Fig. S22. Cumulative Distributions of the CCEI Values with Discrete Choice. This figure contains four subplots, and each represent a different preference domain: risk, time, social or food preference. The light dotted lines represent simulated subjects, the dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.

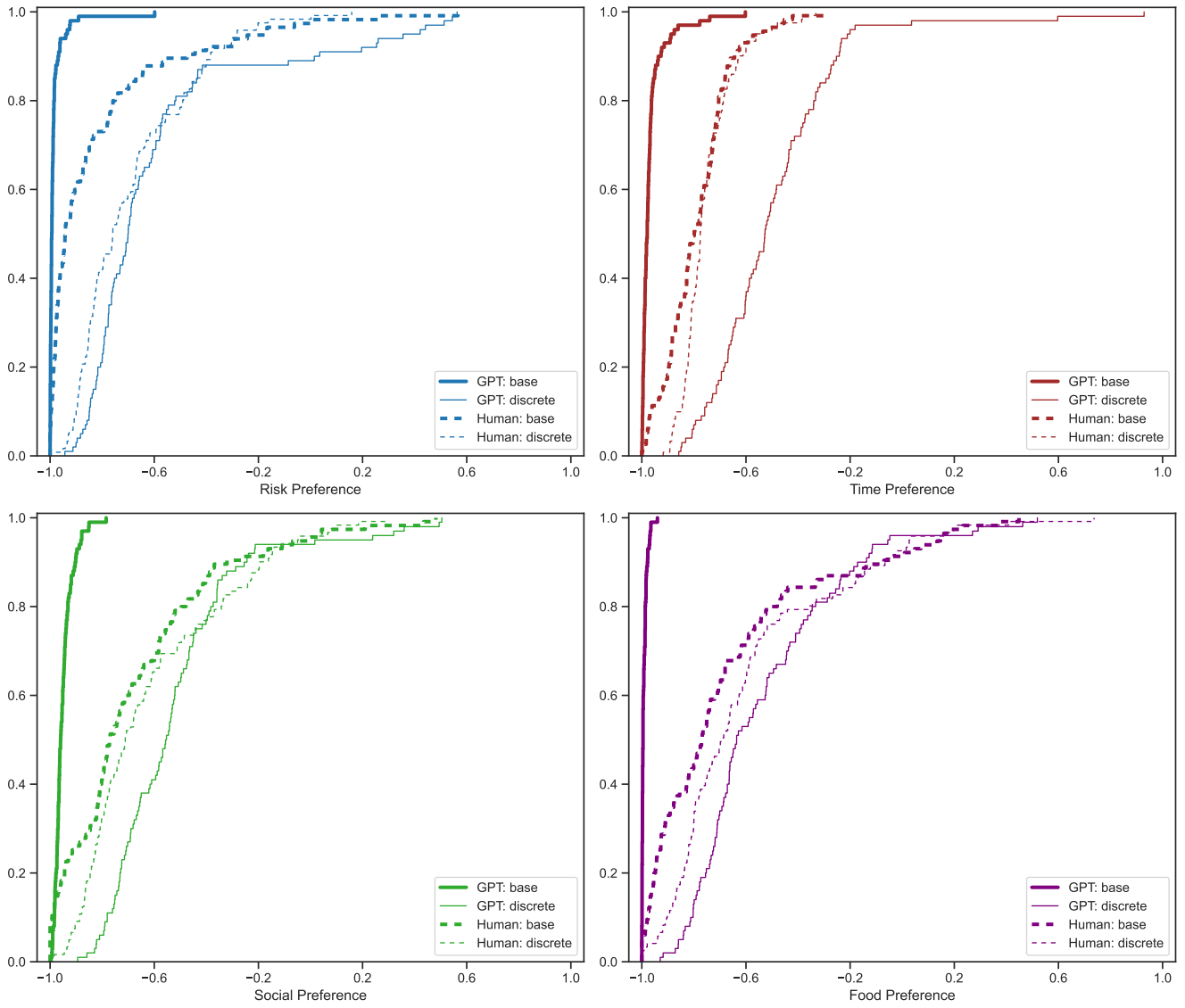


Fig. S23. Cumulative Distributions of Spearman's Correlation Coefficients of $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$ with Discrete Choice. This figure contains four subplots, and each represents a different preference domain: risk, time, social or food preference. The dark dashed lines represent human subjects in the human experiment, and the solid lines represent GPT observations.

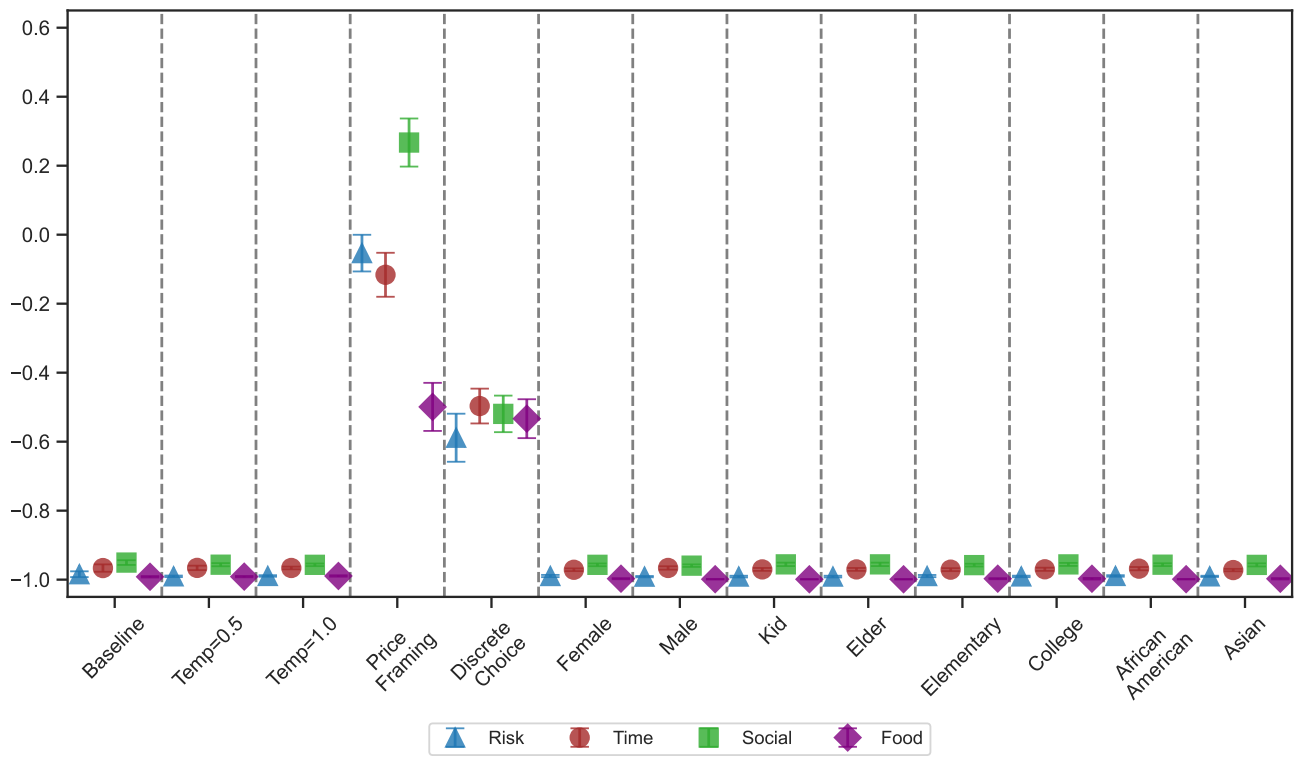


Fig. S24. Mean Spearman's Correlation Coefficients of $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$ of GPT across Different Variations. This figure displays the average of Spearman's correlation coefficient between $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$, and 95% confidence intervals for GPT under different conditions: baseline, temperature of 0.5, temperature of 1, price framing and discrete choices, and various demographic settings.

Table S1. Demographics of Subjects in the Human Experiment (obs=347)

Variable	Definition	Mean
1 _{Female}	=1 if Gender = Female; 0 otherwise	51.3%
1 _{Age<25}	=1 if Age < 25; 0 otherwise	10.7%
1 _{Age>54}	=1 if Age > 54; 0 otherwise	35.2%
1 _{Minority}	=1 if Race \neq White; 0 otherwise	22.8%
1 _{\leqHigh School}	=1 if Education = Elementary school or High school; 0 otherwise	31.4%
1 _{>Bachelor}	=1 if Education = Master's or Ph.D.; 0 otherwise	14.4%

Notes: This table displays the demographic characteristics of the sample in our Human Experiment.

Table S2. Aggregate Preference Parameters (Baseline)

	Risk Preference		Time Preference		Social Preference		Food Preference	
	α_r	ρ_r	α_t	ρ_t	α_s	ρ_s	α_f	ρ_f
<i>Human subjects</i>	0.618 (0.010)	0.335 (0.018)	0.513 (2.849)	0.981 (0.004)	0.735 (0.012)	0.330 (0.028)	0.583 (0.012)	0.386 (0.018)
<i>GPT</i>	0.508 (0.003)	0.488 (0.003)	0.504 (0.003)	0.466 (0.003)	0.512 (0.004)	0.520 (0.004)	0.501 (0.002)	0.491 (0.002)
<i>GPT (Temp=0.5)</i>	0.512 (0.004)	0.483 (0.004)	0.504 (0.003)	0.473 (0.004)	0.516 (0.004)	0.518 (0.004)	0.501 (0.003)	0.492 (0.003)
<i>GPT (Temp=1.0)</i>	0.514 (0.004)	0.482 (0.005)	0.503 (0.003)	0.461 (0.004)	0.513 (0.004)	0.522 (0.004)	0.502 (0.002)	0.487 (0.002)
<i>GPT (Female)</i>	0.510 (0.004)	0.488 (0.004)	0.504 (0.003)	0.470 (0.003)	0.512 (0.004)	0.521 (0.003)	0.501 (0.001)	0.493 (0.001)
<i>GPT (Male)</i>	0.509 (0.003)	0.483 (0.004)	0.503 (0.003)	0.466 (0.003)	0.511 (0.004)	0.525 (0.003)	0.501 (0.001)	0.492 (0.001)
<i>GPT (Kid)</i>	0.510 (0.004)	0.495 (0.004)	0.505 (0.003)	0.472 (0.003)	0.510 (0.004)	0.520 (0.004)	0.501 (0.001)	0.493 (0.001)
<i>GPT (Elder)</i>	0.510 (0.004)	0.493 (0.004)	0.504 (0.003)	0.465 (0.003)	0.514 (0.004)	0.523 (0.004)	0.501 (0.001)	0.489 (0.001)
<i>GPT (Elementary School)</i>	0.513 (0.004)	0.483 (0.004)	0.504 (0.003)	0.469 (0.003)	0.513 (0.004)	0.518 (0.003)	0.502 (0.001)	0.493 (0.001)
<i>GPT (College)</i>	0.514 (0.004)	0.485 (0.004)	0.505 (0.003)	0.469 (0.003)	0.512 (0.004)	0.520 (0.003)	0.502 (0.001)	0.494 (0.001)
<i>GPT (African American)</i>	0.511 (0.004)	0.489 (0.004)	0.505 (0.003)	0.467 (0.003)	0.512 (0.004)	0.522 (0.003)	0.501 (0.001)	0.492 (0.001)
<i>GPT (Asian)</i>	0.514 (0.004)	0.491 (0.004)	0.504 (0.003)	0.472 (0.003)	0.512 (0.004)	0.517 (0.003)	0.501 (0.001)	0.494 (0.001)

Notes: The table presents aggregate parameters estimation in risk, time, social and time preference of GPT and human subjects, respectively. Standard errors in parentheses are calculated via the delta method. For GPT and human subjects, we compare the estimated parameters by performing two-sample two-sided t-tests. All comparisons are statistically significant at 1% level except α_t . For each variation of GPT, we compare the estimated parameters with those estimated from the baseline (GPT) by conducting two-sample two-sided t-tests. None of the comparisons are statistically significant at 10% level.

Table S3. Summary Statistics of Preference Parameters at the Individual Level (Baseline)

	Risk Preference		Time Preference		Social Preference		Food Preference	
	α_r	ρ_r	α_t	ρ_t	α_s	ρ_s	α_f	ρ_f
<i>Human subjects</i>	0.561 (0.120)	-0.712 (4.384)	0.547 (0.103)	0.825 (0.295)	0.751 (0.203)	-0.557 (3.439)	0.595 (0.236)	-0.890 (4.154)
<i>GPT</i>	0.509 (0.024)	0.486 (0.072)	0.504 (0.020)	0.468 (0.072)	0.513 (0.019)	0.525 (0.047)	0.501 (0.005)	0.491 (0.024)
<i>GPT (Temp=0.5)</i>	0.513 (0.037)	0.477 (0.128)	0.504 (0.032)	0.463 (0.102)	0.517 (0.032)	0.519 (0.072)	0.501 (0.011)	0.491 (0.038)
<i>GPT (Temp=1.0)</i>	0.513 (0.029)	0.479 (0.112)	0.503 (0.033)	0.460 (0.093)	0.513 (0.025)	0.521 (0.069)	0.502 (0.009)	0.488 (0.044)
<i>GPT (Female)</i>	0.509 (0.017)	0.488 (0.070)	0.505 (0.015)	0.468 (0.073)	0.513 (0.023)	0.521 (0.049)	0.501 (0.005)	0.493 (0.019)
<i>GPT (Male)</i>	0.509 (0.019)	0.482 (0.078)	0.504 (0.015)	0.464 (0.072)	0.511 (0.022)	0.526 (0.045)	0.502 (0.004)	0.492 (0.020)
<i>GPT (Kid)</i>	0.509 (0.016)	0.494 (0.072)	0.506 (0.017)	0.469 (0.076)	0.511 (0.023)	0.519 (0.051)	0.502 (0.004)	0.493 (0.020)
<i>GPT (Elder)</i>	0.511 (0.020)	0.490 (0.082)	0.504 (0.018)	0.465 (0.068)	0.513 (0.021)	0.522 (0.048)	0.501 (0.005)	0.489 (0.024)
<i>GPT (Elementary School)</i>	0.511 (0.020)	0.484 (0.080)	0.504 (0.015)	0.469 (0.074)	0.513 (0.022)	0.519 (0.048)	0.502 (0.004)	0.492 (0.021)
<i>GPT (College)</i>	0.512 (0.020)	0.488 (0.074)	0.504 (0.016)	0.468 (0.076)	0.513 (0.021)	0.522 (0.046)	0.502 (0.005)	0.493 (0.024)
<i>GPT (African American)</i>	0.510 (0.017)	0.490 (0.077)	0.505 (0.017)	0.460 (0.075)	0.512 (0.021)	0.519 (0.052)	0.501 (0.004)	0.491 (0.021)
<i>GPT (Asian)</i>	0.513 (0.019)	0.491 (0.076)	0.504 (0.017)	0.469 (0.078)	0.512 (0.020)	0.521 (0.049)	0.501 (0.004)	0.494 (0.023)

Notes: The table presents mean values of preference parameters in risk, time, social and time preference of GPT observations and human subjects at the individual level, respectively. Standard deviations are in parentheses. For GPT observations and human subjects, we compare the estimated parameters by performing two-sample two-sided t-tests. All comparisons are statistically significant at 1% level. For each variation of GPT, we compare the estimated parameters with those estimated from the baseline (GPT) by conducting two-sample two-sided t-tests. None of the comparisons are statistically significant at 10% level.

Table S4. OLS Regression Analyses

	Dep.Var: CCEI		Dep.Var: Spearman Correlation Coefficient	
	(1) Baseline+Price Framing	(2) Baseline+Discrete Choice	(3) Baseline+Price Framing	(4) Baseline+Discrete Choice
1_{GPT}	0.024*** (0.007)	0.024*** (0.008)	-0.231*** (0.021)	-0.231*** (0.017)
$1_{\text{Price Framing}}$	-0.027*** (0.007)		0.045** (0.020)	
$1_{\text{GPT}} \times 1_{\text{Price Framing}}$	-0.127*** (0.010)		0.828*** (0.030)	
$1_{\text{Discrete Choice}}$		-0.009 (0.007)		0.079*** (0.016)
$1_{\text{GPT}} \times 1_{\text{Discrete Choice}}$		-0.138*** (0.011)		0.360*** (0.023)
Preference Fixed Effects	Yes	Yes	Yes	Yes
N	1704	1744	1704	1744
R ²	0.268	0.206	0.528	0.299

Notes: In this table, we pool the data of the GPT experiment and the human experiment. Columns 1 and 3 use data from baseline and price framing conditions, while columns 2 and 4 use data from baseline and discrete choice conditions. In columns 1 and 2, the dependent variable is the CCEI values, while in columns 3 and 4, the dependent variable is the Spearman's correlation coefficients of $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$. 1_{GPT} is a binary variable that equals 1 if the data is from the GPT experiment, and 0 otherwise. $1_{\text{Price Framing}}$ is a binary variable that equals 1 if the data is from the price framing condition, and 0 otherwise. $1_{\text{Discrete Choice}}$ is a binary variable that equals 1 if the data is from the discrete choice condition, and 0 otherwise. Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table S5. OLS Regressions Analyses on Demographics

	Dep.Var: CCEI (1)	Dep.Var: Spearman Correlation Coefficient (2)
1_{Female}	-0.005 (0.005)	-0.010 (0.016)
$1_{\text{Age} < 25}$	-0.014* (0.008)	-0.000 (0.027)
$1_{\text{Age} > 54}$	-0.009* (0.005)	0.014 (0.018)
1_{Minority}	-0.031*** (0.006)	0.058*** (0.019)
$1_{\leq \text{High School}}$	-0.003 (0.006)	0.003 (0.018)
$1_{> \text{Bachelor}}$	0.008 (0.007)	-0.019 (0.024)
Preference Fixed Effects	Yes	Yes
Condition Fixed Effects	Yes	Yes
N	1388	1388
R ²	0.039	0.038

Notes: In this table, we use the data of the human experiment. In column 1, the dependent variable is the CCEI values, while in column 2, the dependent variable is the Spearman's correlation coefficients of $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$. 1_{Female} is a binary variable that equals 1 if the subject is female, and 0 otherwise. $1_{\text{Age} < 25}$ and $1_{\text{Age} > 54}$ are the two dummies indexing age, with the group of age between 25 and 55 being the reference group. 1_{Minority} is a binary variable that equals 1 if the subject's race is not white, and 0 otherwise. $1_{\leq \text{High School}}$ and $1_{> \text{Bachelor}}$ are the two dummies indexing education, with the group that receives the medium level of education (Associate's, or Bachelor's) being the reference group. Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table S6. Tobit Regressions Analyses on Demographics

	Dep.Var: α_r (1) Risk Preference	Dep.Var: ρ_r (2)	Dep.Var: α_t (3) Time Preference	Dep.Var: ρ_t (4)	Dep.Var: α_s (5) Social Preference	Dep.Var: ρ_s (6)	Dep.Var: α_f (7) Food Preference	Dep.Var: ρ_f (8)
1_{Female}	0.019 (0.019)	-0.769 (0.625)	0.002 (0.018)	0.016 (0.166)	-0.026 (0.029)	-0.952* (0.558)	-0.029 (0.030)	0.109 (0.499)
$1_{\text{Age}<25}$	-0.033 (0.030)	-0.083 (1.005)	-0.054* (0.031)	0.212 (0.277)	-0.023 (0.048)	0.703 (0.945)	0.026 (0.053)	-0.553 (0.867)
$1_{\text{Age}>54}$	0.025 (0.021)	-0.194 (0.704)	0.019 (0.020)	-0.053 (0.184)	0.016 (0.031)	-0.610 (0.612)	0.025 (0.033)	0.036 (0.546)
1_{Minority}	0.059** (0.023)	-0.625 (0.768)	0.064*** (0.024)	-0.052 (0.212)	-0.002 (0.035)	-0.114 (0.696)	-0.007 (0.039)	-0.270 (0.636)
$1_{\leq \text{High School}}$	0.050** (0.021)	-1.577** (0.710)	0.034 (0.021)	-0.185 (0.190)	-0.001 (0.032)	-0.184 (0.633)	0.097*** (0.034)	0.431 (0.560)
$1_{> \text{Bachelor}}$	-0.015 (0.029)	0.322 (0.958)	-0.018 (0.027)	-0.039 (0.246)	-0.001 (0.042)	1.161 (0.833)	0.051 (0.046)	-1.177 (0.759)
N	275	275	283	283	281	281	283	283

Notes: In this table, we use the data of the human experiment. Columns 1-2, 3-4, 5-6, 7-8 use data of risk preference, time preference, social preference, and food preference with CCEI above 0.95, respectively. In columns 1,3,5,7, the dependent variable is the CCEI values, while in columns 2,4,6,8, the dependent variable is the Spearman's correlation coefficients of $\ln(x_A/x_B)$ and $\ln(p_A/p_B)$. 1_{Female} is a binary variable that equals 1 if the subject is female, and 0 otherwise. $1_{\text{Age}<25}$ and $1_{\text{Age}>54}$ are the two dummies indexing age, with the group of age between 25 and 55 being the reference group. 1_{Minority} is a binary variable that equals 1 if the subject's race is not white, and 0 otherwise. $1_{\leq \text{High School}}$ and $1_{> \text{Bachelor}}$ are the two dummies indexing education, with the group that receives the medium level of education (Associate's, or Bachelor's) being the reference group. Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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