Supplement A

**Supplement A-1**

Table A showed a list of the shortest recorded response times in the behavioral experiments and the non-decision times calculated based on these values. From the results, it is clear that there is very little possibility of finding clear individual differences in the non-decision time, and that it is almost constant regardless of the forced decision time. This suggests that our assumption that the shortest response time in the experimental environment for each forced decision time is the sum of the forced decision time and the non-decision time (Figure 2(i)), and that the non-decision time is almost constant in general, was reasonable.

In Experiment 2, the value of non-decision time was large only when t = 6. It is because the forced decision time was long and the cognitive workload was high in this condition, participants who gave spam responses dropped out, suggesting the possibility that there were no spam responses. We have to note that the experimental group with a forced decision time of 0.1 s, which is the minimum value for our experimental system, is considered to be a group without a forced decision time. We called the group as "without intervention.”

Table A： Results of non-decision time of each experiment.

|  |  |  |
| --- | --- | --- |
| Forced decision time | The shortest recorded response time | Non-decision time |
|  | | |
| Experiment 1 | | |
| w/o (0.1) | 0.28 | 0.18 |
|  | | |
| Experiment 2 | | |
| w/o (0.1) | 0.29 | 0.19 |
| 1 | 1.20 | 0.20 |
| 2 | 2.18 | 0.18 |
| 3 | 3.17 | 0.17 |
| 4 | 4.18 | 0.18 |
| 5 | 5.22 | 0.22 |
| 6 | 6.31 | 0.31 |

**Supplement A-2**

Since the non-decision time is about 0.2 seconds, stimulus encoding (2) is shorter than 0.2 seconds. The length of stimulus encoding (1) may be the same as that of stimulus encoding (2), or it may be shorter than stimulus encoding (2), taking into account that the operator's attention is directed to the screen by the fixation point. Considering that the purpose of the discussion based on the total decision time in this study was not to grasp the difference in the unit of 0.1 second, we judged that it was no problem to interpret stimulus encoding (1) as almost zero.

We explained the handling of the forced decision times for the calculations of decision time.

The illustrated model of total decision time and recorded response time with the setting of a forced decision time t (second) was shown in Fig. W.

The shortest recorded response time is considered as spam response also in Experiment 2. We defined that the shortest recorded response time in the experimental results for each forced decision time group was the sum of the forced decision time and non-decision time (Fig. W(i)). Based on this definition and the assumption that non-decision time was constant (same as Experiment 1), non-decision time for each response was calculated.

Moreover, we have to mention that there were two stimuli: stimulus of presenting the new task, and stimulus of thinking to click the answer button. In other words, the time used for stimulus encoding exists immediately after the task is presented (stimulus encoding (a) in Figure W) and immediately after deciding the answer in one's mind and thinking about answering it (stimulus encoding (b) in Figure W). In this study, however, the time used for stimulus encoding was considered to be zero because it was extremely short (Supplement A-1).

Based on these assumptions, the same formulation (Eq. 4) was used for calculation of total decision time.

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Fig. A: Illustratedmodel of the decision time and recorded response time: (left) Experiment 1, and (right)Experiment 2.

**Supplement B**

**B-1. The correct answer rate for each second of the total decision time (Experiment 1)**

Table B-1: Results of the one-sample t-test for the null hypothesis that the correct answer rate for all the total decision time (0.671) and the correct answer rate for each second of the total decision time were equal (Experiment 1).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Total decision time (second) | **0–1** | **1–2** | **2–3** | **3–4** | **4–5** | **5–6** | **6–7** |
| correct answer rate  P-value  Effect size | 0.54 ± (0.14)  **1.3e-12**  -0.94 | 0.7 ± (0.054)  **4.5e-07**  0.54 | 0.69 ± (0.072)  0.005  0.28 | 0.66 ± (0.11)  0.53  -0.064 | 0.68 ± (0.13)  0.32  0.1 | 0.65 ± (0.23)  0.37  -0.09 | 0.63 ± (0.27)  0.16  -0.14 |
| Total decision time (second) | **7–8** | **8–9** | **9–10** | **10–11** | **11–12** | **12–13** | **13–14** | **14–15** |
| correct answer rate  P-value  Effect size | 0.65 ± (0.31)  0.45  -0.077 | 0.64 ± (0.35)  0.34  -0.099 | 0.64 ± (0.38)  0.53  -0.07 | 0.7 ± (0.38)  0.6  0.065 | 0.76 ± (0.37)  0.053  0.24 | 0.7 ± (0.43)  0.59  0.072 | 0.66 ± (0.44)  0.84  -0.029 | 0.58 ± (0.46)  0.25  -0.2 |

**B-2. total decision time and correct answer rate**

We conducted a one-sample t-test to determine whether the correct answer rate of each second of total decision time was different from the average of the correct answer rate of all total decision times without intervention (68.50% in Experiment 2) for total decision times of less than 10 seconds (Table B-2). In both Experiments 2, the mean correct answer rate at total decision time between 0 and 1 second was significantly smaller than the mean of the correct answer rate at all total decision times without intervention. There were no other total decision times that showed a similar trend for all forced decision time.

Table B-2：Total decision time and average correct answer rate for each forced decision time for Experiment 2. (top) average correct answer rate, (middle) p-value of one-sample t test, (bottom) effect size.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Forced decision time | Total Decision time (second) | | | | |
| **0-1** | **1-2** | **2-3** | **3-4** | **4-5** |
| **0** | 0.566 ± (0.192)  **p = 2.8e-07**  0.623 | 0.721 ± (0.0882)  **p = 8.68e-05**  0.409 | 0.706 ± (0.145)  p = 0.149  0.146 | 0.723 ± (0.246)  p = 0.123  0.155 | 0.679 ± (0.342)  p = 0.861  0.0185 |
| **1** | ― | 0.756 ± (0.135)  **p = 2.38e-06**  0.525 | 0.69 ± (0.114)  p = 0.642  0.0466 | 0.738 ± (0.169)  p = 0.00214  0.315 | 0.705 ± (0.246)  p = 0.425  0.0805 |
| **2** | ― | ― | 0.709 ± (0.216)  p = 0.29  0.112 | 0.725 ± (0.126)  p = 0.00232  0.313 | 0.704 ± (0.208)  p = 0.355  0.0929 |
| **3** | ― | ― | ― | 0.748 ± (0.172)  p = 0.000917  0.366 | 0.686 ± (0.123)  p = 0.961  0.00487 |
| **4** | ― | ― | ― | ― | 0.72 ± (0.162)  p = 0.0531  0.213 |
| **5** | ― | ― | ― | ― | ― |
| **6** | ― | ― | ― | ― | ― |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Forced decision time | Total Decision time (second) | | | | |
| **5-6** | **6-7** | **7-8** | **8-9** | **9-10** |
| **0** | 0.635 ± (0.398)  p = 0.267  0.125 | 0.682 ± (0.403)  p = 0.952  0.00716 | 0.798 ± (0.376)  p = 0.0269  0.301 | 0.668 ± (0.441)  p = 0.802  0.0375 | 0.586 ± (0.477)  p = 0.227  0.208 |
| **1** | 0.731 ± (0.304)  p = 0.16  0.15 | 0.638 ± (0.376)  p = 0.253  0.125 | 0.622 ± (0.429)  p = 0.226  0.147 | 0.693 ± (0.406)  p = 0.88  0.0201 | 0.686 ± (0.426)  p = 0.989  0.00185 |
| **2** | 0.691 ± (0.294)  p = 0.839  0.021 | 0.761 ± (0.34)  p = 0.0461  0.222 | 0.709 ± (0.401)  p = 0.766  0.0419 | 0.703 ± (0.423)  p = 0.766  0.0419 | 0.67 ± (0.428)  p = 0.806  0.0346 |
| **3** | 0.671 ± (0.226)  p = 0.522  0.0642 | 0.698 ± (0.3)  p = 0.66  0.0448 | 0.756 ± (0.327)  p = 0.0515  0.217 | 0.682 ± (0.371)  p = 0.941  0.00835 | 0.712 ± (0.407)  p = 0.595  0.0667 |
| **4** | 0.713 ± (0.107)  p = 0.0101  0.262 | 0.712 ± (0.181)  p = 0.136  0.15 | 0.654 ± (0.315)  p = 0.338  0.0969 | 0.647 ± (0.366)  p = 0.313  0.105 | 0.673 ± (0.354)  p = 0.753  0.0351 |
| **5** | 0.767 ± (0.16)  **p = 4.18e-06**  0.514 | 0.718 ± (0.12)  p = 0.00667  0.277 | 0.731 ± (0.211)  p = 0.033  0.216 | 0.69 ± (0.321)  p = 0.891  0.0145 | 0.682 ± (0.393)  p = 0.943  0.00787 |
| **6** | ― | 0.771 ± (0.168)  **p = 1.49e-05**  0.513 | 0.708 ± (0.132)  p = 0.0798  0.177 | 0.676 ± (0.221)  p = 0.681  0.0414 | 0.669 ± (0.274)  p = 0.575  0.0571 |

Supplement C

Participants could drop out at any time, therefore, the number of participants for each answer order was different. Of course, the correct answer rate differed for each order.

For example, when the order of tasks was one, if 100 participants responded the first task and the correct answer rate about the first tasks for the 100 participants was 0.7, the Ability for the first tasks was 100 × 0.7 = 70. When the order of tasks was two, if 99 participants responded the second task (i.e., one participant was dropped out before response to the second task) and the correct answer rate about the first tasks for the 99 participants was 0.68, the Ability for the second tasks was 99 × 0.68 = 67.32. We repeated such process from 1 to 100 for the order of tasks.