Supplementary Material

Effortful Processing Reduces the Attraction Effect in Multi-alternative Decision Making: An Electrophysiological Study Using a Task-irrelevant Probe Technique

Takashi Tsuzuki\*, Yuji Takeda, and Itsuki Chiba

**\* Correspondence:** Takashi Tsuzuki: tsuzuki@rikkyo.ac.jp

Table 1 | The trinity choice sets used in the experiment.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 　 | Consumer product | Two attributes | 　 | Set 1 | 　 | 　 | 　 | Set 2 | 　 | 　 |
| 　 | or service |  | A | B | DA | DB |  | A | B | DA | DB | 　 |
| 　 | Athletic shoes  | Quality of design (1–100) | 80 | 65 | 78 | 63 | 　 | 77 | 62 | 75 | 60 | 　 |
| 　 | 　 | Comfort in wearing (1–100) | 65 | 75 | 63 | 73 | 　 | 67 | 77 | 65 | 75 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | School bag  | Weight (Kg) | 0.80 | 1.20 | 0.87 | 1.27 | 　 | 0.70 | 1.10 | 0.77 | 1.17 | 　 |
| 　 | 　 | Quality of design (1–100) | 65 | 80 | 63 | 78 | 　 | 63 | 78 | 61 | 76 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Traveler's bag  | Quality of design (1–100) | 80 | 65 | 78 | 63 | 　 | 78 | 63 | 76 | 61 | 　 |
| 　 | 　 | Weight (Kg) | 1.20 | 0.80 | 1.27 | 0.87 | 　 | 1.10 | 0.70 | 1.17 | 0.77 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Coat  | Quality of design (1–100) | 70 | 80 | 68 | 78 | 　 | 68 | 78 | 66 | 76 | 　 |
| 　 | 　 | Price (thousand Yen)  | 7.0 | 10.0 | 7.5 | 10.5 | 　 | 6.4 | 9.4 | 6.9 | 9.9 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Exercise clothes  | Price (thousand Yen)  | 10.0 | 7.0 | 10.5 | 7.5 | 　 | 9.4 | 6.4 | 9.9 | 6.9 | 　 |
| 　 | 　 | Quality of design (1–100) | 80 | 70 | 78 | 68 | 　 | 78 | 68 | 76 | 66 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Wristwatch  | Quality of design (1–100) | 80 | 70 | 78 | 68 | 　 | 82 | 72 | 80 | 70 | 　 |
| 　 | 　 | Price (thousand Yen)  | 9.00 | 5.00 | 9.67 | 5.67 | 　 | 9.80 | 5.80 | 10.47 | 6.47 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | MP3 Player  | Price (thousand Yen)  | 12.00 | 8.00 | 12.67 | 8.67 | 　 | 10.70 | 6.70 | 11.37 | 7.37 | 　 |
| 　 | 　 | Sound quality (1–100) | 76 | 70 | 75 | 69 | 　 | 74 | 68 | 73 | 67 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Earphones  | Sound quality (1–100) | 84 | 70 | 82 | 68 | 　 | 82 | 68 | 80 | 66 | 　 |
| 　 | 　 | Price (thousand Yen)  | 4.00 | 3.00 | 4.17 | 3.17 | 　 | 3.80 | 2.80 | 3.97 | 2.97 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Electronic dictionary  | Repletion of dictionaries (1-100) | 75 | 65 | 73 | 63 | 　 | 77 | 67 | 75 | 65 | 　 |
| 　 | 　 | Price (thousand Yen)  | 20.0 | 15.0 | 20.8 | 15.8 | 　 | 21.0 | 16.0 | 21.8 | 16.8 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Digital camera  | Image quality (1-100) | 70 | 76 | 69 | 75 | 　 | 72 | 78 | 71 | 77 | 　 |
| 　 | 　 | Repletion of functions (1-100) | 80 | 65 | 78 | 63 | 　 | 75 | 60 | 73 | 58 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Smartphone  | Repletion of functions (1-100) | 60 | 70 | 58 | 68 | 　 | 59 | 69 | 57 | 67 | 　 |
| 　 | 　 | Quality of design (1–100) | 80 | 60 | 77 | 57 | 　 | 82 | 62 | 79 | 59 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Notebook computer  | Repletion of functions (1-100) | 65 | 75 | 63 | 73 | 　 | 67 | 77 | 65 | 75 | 　 |
| 　 | 　 | Price (thousand Yen)  | 60 | 90 | 65 | 95 | 　 | 66 | 96 | 71 | 101 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Tablet personal computer  | Price (thousand Yen)  | 15.0 | 20.0 | 15.8 | 20.8 | 　 | 16.0 | 21.0 | 16.8 | 21.8 | 　 |
| 　 | 　 | Repletion of functions (1-100) | 65 | 75 | 63 | 73 | 　 | 67 | 77 | 61 | 71 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Electronic keyboard  | Number of distinctive functions | 13 | 7 | 12 | 6 | 　 | 14 | 8 | 13 | 7 | 　 |
| 　 | 　 | Sound quality (1–100) | 70 | 80 | 68 | 78 | 　 | 68 | 78 | 66 | 76 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Liquid crystal display  | Screen size (inch)  | 19 | 26 | 18 | 25 | 　 | 20 | 27 | 19 | 26 | 　 |
| 　 | television | Image quality (1-100) | 80 | 70 | 78 | 68 | 　 | 78 | 68 | 76 | 66 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Single sofa  | Price (thousand Yen)  | 14.00 | 10.00 | 14.67 | 10.67 | 　 | 13.20 | 9.20 | 13.87 | 9.87 | 　 |
| 　 | 　 | Comfort in seating (1–100) | 75 | 65 | 73 | 63 | 　 | 73 | 63 | 71 | 61 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Office chair  | Comfort in seating (1–100) | 65 | 75 | 63 | 73 | 　 | 63 | 73 | 61 | 71 | 　 |
| 　 | 　 | Price (thousand Yen)  | 10.00 | 14.00 | 10.67 | 14.67 | 　 | 9.20 | 13.20 | 9.87 | 13.87 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Bed  | Quality of design (1–100) | 60 | 79 | 57 | 76 | 　 | 62 | 81 | 59 | 78 | 　 |
| 　 | 　 | Price (thousand Yen)  | 17.0 | 24.0 | 18.2 | 25.2 | 　 | 17.7 | 24.7 | 18.9 | 25.9 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Bicycle  | Price (thousand Yen)  | 20.0 | 15.0 | 20.8 | 15.8 | 　 | 21.0 | 16.0 | 21.8 | 16.8 | 　 |
| 　 | 　 | Quality of design (1–100) | 70 | 60 | 68 | 58 | 　 | 72 | 62 | 70 | 60 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Gas scooter  | Quality of design (1–100) | 75 | 60 | 73 | 58 | 　 | 77 | 62 | 75 | 60 | 　 |
| 　 | 　 | Gas mileage (km per liter) | 60 | 70 | 58 | 68 | 　 | 59 | 69 | 67 | 67 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Hair salon  | Magazine’s rating of skill (1–100) | 80 | 70 | 78 | 68 | 　 | 78 | 68 | 76 | 66 | 　 |
| 　 | 　 | Time taken to reach there from  | 37 | 19 | 40 | 22 | 　 | 33 | 15 | 36 | 18 | 　 |
| 　 | 　 | 　home (min) | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Fitness club | Repletion of equipment (1–100) | 80 | 65 | 78 | 63 | 　 | 78 | 63 | 76 | 61 | 　 |
| 　 | 　 | Time taken to reach the club from | 28 | 15 | 30 | 17 | 　 | 26 | 13 | 28 | 15 | 　 |
| 　 | 　 | 　home (min)  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Rental apartment  | Monthly rent (thousand Yen)  | 55.0 | 60.0 | 55.8 | 60.8 | 　 | 53.9 | 58.9 | 54.7 | 59.7 | 　 |
| 　 | 　 | Walking distance from the station  | 19 | 10 | 21 | 12 | 　 | 21 | 12 | 23 | 14 | 　 |
| 　 | 　 | 　to the apartment (min) | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 　 | Restaurant | Magazine’s rating of skill (1–100) | 75 | 65 | 73 | 63 | 　 | 73 | 63 | 71 | 61 | 　 |
| 　 | 　 | Time taken to reach the restaurant | 19 | 10 | 20 | 11 | 　 | 17 | 8 | 18 | 9 | 　 |
| 　 | 　 | 　from school (min)  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |

Note: Choice sets 1 and 2 consisted of 24 consumer products or services, their two attributes, and three alternatives (the target, competitor, and decoy), which also had two attribute values. “A” was a target when “A,” “B,” and “DA” were presented as alternatives, whereas “B” was a target when “A,” “B,” and “DB” were presented as alternatives.