**Food-scheduling assessment instructions**

'On each go, a green box and a blue box will appear side-by-side on the screen. Touching either of them will produce your favourite treat in the plastic tray here.

You may need to wait a while for the treat to be delivered. Sometimes the green box will appear on the left and the blue box on the right; sometimes the boxes will appear the other way around. But this will be random. Once you've eaten (and enjoyed) the treat, the green and blue boxes will reappear and you can then obtain another treat.

That's all you have to do. At the end we'll ask you some questions. But for now, enjoy.'

**Experiment 1**

**Data analysis – Model sequence**

In Model 1, we tested an initial set of binary ′control′ or 'nuisance' predictors that included (i) colour assigned as the variable delay box ('blue' as the referent); (ii) side of the display that the variable delay box appeared on each selection (with 'right' as the referent); (iii) time of day ('afternoon' as the referent); (iv) food type (i.e. 'savoury' with 'sweet' treat as the referent); (v) the interaction between (iii) the time of day and (iv) the food type; and finally (vi) state hunger state (measured with Likert-ratings immediately before the completion of the food-scheduling assessment).

In Model 2, we added a predictor for (vii) the delay before the treat was delivered on the previous selection (with 0s and 30s entered as categorical predictors and 15s as the ′referent′; from here on, ′last delay′). In Model 4, we added (viii) BMI. Then, finally, in Model 4, we added the interactions between (ix) the last delay and BMI.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | Model 1 | Model 2 | Model 3 | Model 4 |
| Intercept | -0.72 (0.61) | 0.20 (0.14) | 0.56 (0.99) | 1.97 (1.07) |
| Side of variable delay option | 0.15 (0.09) | - | - | - |
| Colour of variable delay option | -0.13 (0.27) | - | - | - |
| Time of day | 0.19 (0.37) | - | - | - |
| Treat type | -0.14 (0.39) | - | - | - |
| Time of day \* treat type | 0.11 (0.54) | ~~-~~ | ~~-~~ | ~~-~~ |
| Hunger | 0.19 (0.11) | ~~-~~ | ~~-~~ | ~~-~~ |
| Last delay 0s | - | 0.23 (0.11)\* | 0.23 (0.11)\* | -2.68 (0.84)\*\* |
| Last delay 30s | - | -0.27 (0.12)\* | -0.27 (0.12)\* | -2.65 (0.89)\*\* |
| BMI | - | - | -0.02 (0.04) | -0.07 (0.05) |
| Last delay 0s\*BMI | - | - | - | 0.12 (0.03)\*\* |
| Last delay 30s\*BMI | - | - | - | 0.10 (0.04)\* |

**Table S1.** Experiment 1/*β*-coefficients (and standard errors) for 4 binomial regression models of proportionate selections of variable delay option (0s vs 30s) over fixed delay option (15s) for preferred (high-value) food rewards in 60 healthy female adults. Dividing the *β*-coefficients by the standard errors yielded Z-scores tested against standard normal distributions. \*p< .05; \*\*< p. 01.

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| --- | --- | --- | --- | --- |
| Predictor | Model 1 | Model 2 | Model 3 | Model 4 |
| Intercept | 2.87 (0.80)\*\* | 2.54 (0.18)\*\* | 2.47 (1.25)\* | 2.83 (1.36)\* |
| Side of variable delay option | 0.13 (0.14) | - | - | - |
| Colour of variable delay option | 0.13 (0.36) | - | - | - |
| Time of day | 0.19 (0.48) | - | - | - |
| Treat type | -0.22 (0.51) | - | - | - |
| Time of day \* treat type | -0.12 (0.71) | - | - | - |
| Hunger | -0.12 (0.15) | - | - | - |
| Last delay 0s | - | -0.44 (0.16)\*\* | -0.44 (0.16)\*\* | -1.28 (1.22) |
| Last delay 30s | - | -0.09 (0.18) | -0.09 (0.18) | -0.58 (1.32) |
| BMI | - | - | 0.00 (0.05) | -0.01 (0.06) |
| Last delay 0s\*BMI | - | - | - | 0.04 (0.05) |
| Last delay\*BMI | - | - | - | 0.02 (0.06) |

**Table S2.** Experiment 1/*β*-coefficients (and standard errors) for 4 binomial regression models of selection times (s) between variable delay options (0s vs 30s) and fixed delay options (15s) for preferred (high-value) food rewards in 60 healthy female adult volunteers. *β*-coefficients were tested as t-statistics against estimated degrees of freedom; see main text. \*p< .05; \*\*< p. 01.

**Experiment 2**

**Data analysis – Model sequence**

We used a set of preliminary models to assess how selections of the variable delay and fixed delay options varied by gender and state hunger. Model 1 Gender included predictors for (i) gender (with male as the referent); (ii) last delay (as the delay before the food reward was delivered on the previous selection; and then (iii) the interaction between gender and last delay. Model 2 Gender added (iv) group ('scent-primed' with 'scent-absent' as the referent) and (v) the interaction between gender and group. Finally, Model 3 Gender included (vi) the interaction between gender, last delay and group. Next, we replaced gender with state hunger to be three equivalent models: Model 1 Hunger; Model 2 Hunger; and Model 3 Hunger).

In the full sequence of models, initial predictors entered into Model 1 were (i) side of the variable box (right as the referent); (ii) colour assigned to the variable option (blue as referent); (iii) time of day (lunchtime, and afternoon (after 3pm) with 11am as the referent); (iv) state hunger; (v) gender (male as referent), and (vi) chocolate habit score (Model 1). Of these, (i) only side of the variable box was retained in all subsequent models. Next, in model 2, we added the main effects of (vii) delay before food delivery on the previous selection (last delay; fixed/15s as referent). In Model 3, we added (viii) group (′scent-primed′ vs ′scent-absent′/control as referent) and (ix) BMI. In Model 4, we added (x) the interaction between last delay and group; and (xi) the interaction between last delay and BMI. Finally, in Model 5, we added the (xii) interaction between group and BMI; and (xiii) between last delay, group and BMI.

|  |  |  |  |
| --- | --- | --- | --- |
|   | Scent-absent control group | Scent-primed group | Total |
| Chocolate | 16 | 25 | 41 |
| Haribo | 7 | 3 | 10 |
| Toffee | 7 | 4 | 11 |
| Cinnamon | 5 | 3 | 8 |
| Total | 35 | 35 | 70 |

**Table S3**. Experiment 2/Manipulation check: number of participants in the scent-primed group (n=35) and scent-absent/control group (n=35) identifying a chocolate aroma as either chocolate, Haribo confectionary, toffee or cinnamon.

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| --- | --- | --- | --- |
|  | Scent-absent/control group | Scent-primed group | Overall |
|  | Male | Female | Male | Female | Male | Female |
| 0s delay | 0.60 (0.08) | 0.61 (0.05) | 0.62 (0.07) | 0.58 (0.06) | 0.61 (0.06) | 0.59 (0.04) |
| 15s delay | 0.51 (0.06) | 0.57 (0.04) | 0.54 (0.08) | 0.50 (0.06) | 0.52 (0.05) | 0.53 (0.04) |
| 30s delay | 0.44 (0.06) | 0.42 (0.05) | 0.49 (0.06) | 0.53 (0.06) | 0.46 (0.04) | 0.48 (0.04) |
| Overall | 0.51 (0.05) | 0.55 (0.03) | 0.52 (0.05) | 0.52 (0.04) | 0.52 (0.04) | 0.53 (0.03) |

**Table S4**. Experiment 2/Mean proportion (and standard errors) of variable delay against fixed delay selections following delays of 0s, 15s and 30s delays on the previous selection for male and female participants in the scent-primed group (n=35) and scent-absent/control groups (n= 35).

|  |  |  |  |
| --- | --- | --- | --- |
|   | Scent-absent/control group | Scent-primed group | Overall |
|   | Low hunger | Mid-range hunger | High hunger | Low hunger | Mid-range hunger | High hunger | Low hunger | Mid-range hunger | High hunger |
| 0s delay | 0.61 (0.07) | 0.62 (0.07) | 0.56 (0.07) | 0.48 (0.14) | 0.64 (0.05) | 0.48 (0.16) | 0.57 (0.07) | 0.63 (0.04) | 0.52 (0.09) |
| 15s delay | 0.59 (0.08) | 0.49 (0.05) | 0.66 (0.09) | 0.47 (0.12) | 0.54 (0.06) | 0.43 (0.12) | 0.55 (0.07) | 0.52 (0.04) | 0.54 (0.08) |
| 30s delay | 0.31 (0.05) | 0.47 (0.05) | 0.48 (0.10) | 0.42 (0.09) | 0.51 (0.06) | 0.63 (0.10) | 0.35 (0.04) | 0.49 (0.04) | 0.56 (0.07) |
| Overall  | 0.54 (0.06) | 0.52 (0.04) | 0.57 (0.06) | 0.45 (0.08) | 0.54 (0.04) | 0.49 (0.07) | 0.51 (0.05) | 0.53 (0.03) | 0.53 (0.04) |

**Table S5**. Experiment 2/Mean proportion (and standard errors) of variable delay against fixed delay selections following delays of 0s, 15s and 30s delays on the previous selection as a function of state hunger prior to completion of the food-scheduling assessment for participants in the scent-primed group (n=35) and scent-absent/control groups (n= 35). Statistical analysis was completed with (Likert)-ratings of hunger as a continuous variable but are shown here for convenience as low hunger (lower than 1 SD less than the mean); high hungry (higher than 1SD more than the mean) and then the midrange (higher than 1SD less than the mean but lower than 1SD more than the mean).

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| --- | --- | --- | --- | --- |
| Predictor | Model 1 | Model 2 | Model 3 | Model 4 |
| Intercept | -0.26 (1.15) | -0.09(0.11) | -0.05 (0.30) | 0.24 (0.33) |
| Side of variable delay option | 0.21 (0.08)\* | 0.19(0.09)\* | 0.19 (0.09)\* | 0.20 (0.09)\* |
| Colour of variable delay option | 0.26 (0.22) | - | - | - |
| Time of day - midday | 0.09 (0.26) | - | - | - |
| Time of day – afternoon | -0.08 (0.25) | - | - | - |
| Time of day - evening | 0.80 (0.85) | - | - | - |
| Hunger | -0.03 (0.08) | - | - | - |
| Gender | 0.07 (0.22) | - | - | - |
| Chocolate habits | -0.00 (0.01) | - | - | - |
| BMI | 0.01 (0.04) |  |  |  |
| Last delay 0s | - | 0.47 (0.10)\*\* | 0.47 (0.10)\*\* | 0.22 (0.33) |
| Last delay 30s | - | -0.15 (0.11) | -0.15 (0.11) | -1.08 (0.34)\*\* |
| Group | - | - | -0.03 (0.19) | -0.22 (0.21) |
| Last delay 0s \* group | - | - | - | 0.17 (0.21) |
| Last delay 30s \* group | - | - | - | 0.62 (0.22)\*\* |

**Table S6.** Experiment 2/*β*-coefficients (and standard errors) for 4 binomial regression models of proportionate selections of variable delay option (0s vs 30s) over fixed delay option (15s) for preferred (high-value) food rewards in the scent-primed participants (n= 35) and scent-absent/control participants (n=35). Dividing the *β*-coefficients by the standard errors yielded Z-scores tested against standard normal distributions. \*p< .05; \*\*< p. 01.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | Model 1 | Model 2 | Model 3 | Model 4 |
| Intercept | 6.38 (1.77) .001 | 2.89 (0.17) .001 | 2.58 (047).001 | 2.19 (0.51).001 |
| Side of variable delay option | -0.18 (0.13) | - | - | - |
| Colour of variable delay option | -0.26 (0.34) | - | - | - |
| Time of day - midday | 0.26 (0.39) | - | - | - |
| Time of day – afternoon | 0.17 (0.38) | - | - | - |
| Time of day - evening | -1.38 (1.31) | - | - | - |
| Hunger | -0.08 (0.12) | - | - | - |
| Gender | 0.15 (0.34) | - | - | - |
| Chocolate habits | 0.03 (0,02) | - | - | - |
| BMI | -0.10 (0.06) |  |  |  |
| Last delay 0s | - | -0.54 (0.16)\*\* | -0.53 (0.16).001 | 0.15 (0.50) |
| Last delay 30s | - | -0.39 (0.17)\* | -0.39 (0.17)\* | 0.43 (0.54) |
| Group | - | - | 0.21 (0.29) | 0.47 (0.32) |
| Last delay 0s \* group | - | - | - | -0.46 (0.32) |
| Last delay 30s \* group | - | - | - | -0.55 (0.34) |

**Table S7.** Experiment 2/*β*-coefficients (and standard errors) for 4 binomial regression models of selection times between variable delay (0s vs 30s) and fixed delay options (15s) for preferred (high-value) food rewards in the scent-primed participants (n= 35) and the scent-absent/control participants (n=35). *β*-coefficients were tested as t-statistics against estimated degrees of freedom; see main text. \*p< .05; \*\*< p. 01.

**Table S8.** Experiment 2/*β*-coefficients (and standard errors) for 4 binomial regression models of food collection times for selections between variable delay (0s vs 30s) and fixed delay options (15s) for preferred (high-value) food rewards in the scent-primed participants (n= 35) and the scent-absent/control participants (n=35). *β*-coefficients were tested as t-statistics against estimated degrees of freedom; see main text. \*p< .05; \*\*< p. 01.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | Model 1 | Model 2 | Model 3 | Model 4 |
| Intercept | 2.71 (0.97)\*\* | 2.32 (0.14)\*\* | 2.54 (0.36) \*\* | 2.54 (0.27)\*\* |
| Side of variable delay option | -0.06 (0.04) | - | - | - |
| Colour of variable delay option | -0.22 (0.19) | - | - | - |
| Time of day - midday | 0.20 (0.22) | - | - | - |
| Time of day – afternoon | 0.12 (0.21) | - | - | - |
| Time of day - evening | -0.85 (0.65) | - | - | - |
| Hunger | -0.30 (0.07) | - | - | - |
| Gender | 0.48 (0.19)\* | 0.49 (0.17)\*\* | 0.52 (0.17) .01 | 0.52 (0.17)\*\* |
| Chocolate habits | 0.01 (0.01) | - | - | - |
| BMI | -0.03 (0.03) |  |  |  |
| Last delay 0s | - | -0.21 (0.05)\*\* | -0.21 (0.05)\*\* | -0.28 (0.14)\* |
| Last delay 30s | - | -0.06 (0.05) | -0.06 (0.05) | 0.03 (0.15) |
| Group | - | - | -0.17 (0.17) | -0.16 (0.17) |
| Last delay 0s \* group | - | - | - | 0.04 (0.09) |
| Last delay 30s \* group | - | - | - | -0.06 (0.09) |

**Self-reported choice between variable and fixed delay options**

Participants who reported higher proportions of variable delay option selections, or who named it as their favourite option, selected it more frequently than those who reported lower proportions (*β*= 0.02±0.00; Z= 8.50, *p* < .05). Participants who named the variable delay option as their favourite selected it more frequently than those who named the fixed delay as their favourite option (0.60±0.02 vs 0.43±0.03) (*β*= 0.75±0.17; Z= 4.50, *p* < .05) and were less likely to choose the variable delay option following delays of 30s to delivered food rewards compared with delays of 15s (0.48±0.03 vs 0.63±0.03)(*β*= -0.95±0.22; Z= -4.32, *p* < .05). Participants who provided shorter estimates of the combined variable delays (i.e. $\frac{0s+30s}{2}$) selected the variable delay option more frequently than participants who estimated longer delays following immediate rewards (*β*= -0.01±0.00; Z= -2.57, *p* < .05)a and following rewards delivered after 30s (*β*= -0.02±0.01; Z= -2.00, *p* < .05).