

Supplement Materials for:

Drawings reveal changes in object memory, but not spatial memory, across time

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Supplemental Table 1.1*Model statistics for the seven Experiment 1 linear regression models*

| Model, designated by dependent variable | <i>Encoding Time</i> β estimate | <i>Adjusted R²</i> | <i>p-value</i> | <i>Akaike</i> <i>Information</i> <i>Criterion (AIC)</i> |
|--|--|-------------------------------|----------------|---|
| Proportion of objects recalled | 1.05 x 10 ⁻⁵ | 0.34 | <0.001*** | -796 |
| Number of false objects | -1.10 x 10 ⁻⁵ | 0.13 | 0.027* | 270 |
| Displacement of objects in <i>x</i> - direction location | 3.05 x 10 ⁻⁸ | 0.02 | 0.980 | -721 |
| Displacement of objects in <i>y</i> - direction location | -2.30 x 10 ⁻⁶ | 0.04 | 0.035* | -791 |
| Displacement of object <i>width</i> | -9.26 x 10 ⁻⁷ | 0.06 | 0.206 | -1053 |
| Displacement of object <i>height</i> | -1.43 x 10 ⁻⁶ | 0.11 | 0.037* | -1049 |

Note. β values are low because of the scale difference between the dependent (range: 0 – 1) and independent variables (range: 100 msec – 10000 msec).

Formulas for the seven Experiment 1 linear regression models

Proportion of objects recalled:

$$\text{proportion of objects recall} \sim \beta_0 + \beta_1(\text{encoding time}) + (\text{encoding time} \mid \text{participant})$$

Number of false objects:

$$\text{number of false objects} \sim \beta_0 + \beta_1(\text{encoding time}) + (\text{encoding time} \mid \text{participant})$$

Displacement of objects in x-direction:

$$\begin{aligned} \text{displacement of objects in x-direction} &\sim \beta_0 + \beta_1(\text{encoding time}) \\ &+ (\text{encoding time} \mid \text{participant}) \end{aligned}$$

Displacement of objects in y-direction:

$$\begin{aligned} \text{displacement of objects in y-direction} &\sim \beta_0 + \beta_1(\text{encoding time}) \\ &+ (\text{encoding time} \mid \text{participant}) \end{aligned}$$

Displacement of object width:

$$\begin{aligned} \text{displacement of object width} &\sim \beta_0 + \beta_1(\text{encoding time}) \\ &+ (\text{encoding time} \mid \text{participant}) \end{aligned}$$

Displacement of object height:

$$\begin{aligned} \text{displacement of object height} &\sim \beta_0 + \beta_1(\text{encoding time}) \\ &+ (\text{encoding time} \mid \text{participant}) \end{aligned}$$

Supplemental Table 1.2*Model statistics for the Experiment 1 logistic regression model*

| Statistic | <i>Encoding Time</i> | <i>Object Meaning</i> | <i>Object Saliency</i> | <i>Encoding Time : Object Meaning</i> | <i>Encoding Time : Object Saliency</i> |
|---------------------------|----------------------|-----------------------|-------------------------------|---------------------------------------|--|
| β Estimate | 0.37 | 0.38 | 0.52 | -0.14 | -0.01 |
| <i>p-value</i> | <0.001*** | <0.001*** | <0.001*** | 0.008** | 0.781 |
| | | | <i>Adjusted R²</i> | <i>p-value</i> | <i>AIC</i> |
| Overall Model Statistics: | | | 0.05 | <0.001*** | 51578 |

Note. AIC stands for Akaike information criteria.

Model formula:

$$\begin{aligned} \text{object recalled} \sim & \beta_0 + \beta_1(\text{encoding time}) + \beta_2(\text{object meaning}) + \beta_3(\text{object saliency}) \\ & + \beta_4(\text{encoding time: object meaning}) \\ & + \beta_5(\text{encoding time: object saliency}) + (1 \mid \text{Drawing}) \end{aligned}$$

* Note that because the meaning and saliency values were correlated, we residualized these values before using them in the model.

Supplemental Table 1.3*Model statistics for the seven Experiment 2 linear regression models*

| Model, designated by dependent variable | <i>Delay Time</i> β <i>estimate</i> | <i>Adjusted R</i> ² | <i>p-value</i> | <i>Akaike</i> <i>Information</i> <i>Criterion (AIC)</i> |
|--|--|--------------------------------|----------------|---|
| Proportion of objects recalled | -0.0006 | 0.06 | <0.001*** | -418 |
| Number of false objects | 0.0012 | 0.02 | <0.001*** | 624 |
| Displacement of objects in <i>x</i> - direction location | 0.0001 | 0.02 | 0.003** | -1306 |
| Displacement of objects in <i>y</i> - direction location | -8.57 x 10 ⁻⁵ | <0.01 | 0.143 | -1068 |
| Displacement of object <i>width</i> | 4.10 x 10 ⁻⁶ | <-0.01 | 0.865 | -1829 |
| Displacement of object <i>height</i> | -3.20 x 10 ⁻⁶ | <-0.01 | 0.901 | -1772 |

Note. β values are low because of the scale difference between the dependent (range: 0 – 1) and independent variables (range: 0 hr –168 hr).

Note II. Formulas for these seven linear regression models are shown below.

Proportion of objects recalled:

$$\text{proportion of objects recall} \sim \beta_0 + \beta_1(\text{delay time})$$

Number of false objects:

$$\text{number of false objects} \sim \beta_0 + \beta_1(\text{delay time})$$

Displacement of objects in x-direction:

$$\text{displacement of objects in x-direction} \sim \beta_0 + \beta_1(\text{delay time})$$

Displacement of objects in y-direction:

$$\text{displacement of objects in y-direction} \sim \beta_0 + \beta_1(\text{delay time})$$

Displacement of object *width*:

$$\text{displacement of object width} \sim \beta_0 + \beta_1(\text{delay time})$$

Displacement of object *height*:

$$\text{displacement of object height} \sim \beta_0 + \beta_1(\text{delay time})$$

Supplemental Table 1.4*Model statistics for the Experiment 2 multiple linear regression*

| Statistic | Base model | Interaction model |
|---|------------|-------------------|
| <i>Delay Time</i> β Estimate | -0.29*** | -0.29*** |
| <i>Object Score</i> β Estimate | 0.10* | 0.10* |
| <i>Delay Time : Object Score</i> β Estimate | — | 0.02 |
| <i>Adjusted R</i> ² | 0.09 | 0.09 |
| <i>p-value</i> | <0.001*** | <0.001*** |
| <i>Akaike Information Criterion</i> (AIC) | 1058 | 1060 |

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.**Base model formula:**

$$\text{proportion of objects recall} \sim \beta_0 + \beta_1(\text{delay time}) + \beta_2(\text{objectScore})$$

Interaction model formula:

$$\text{proportion of objects recall} \sim \beta_0 + \beta_1(\text{delay time}) + \beta_2(\text{objectScore}) + \beta_3(\text{delay time} : \text{objectScore})$$

Supplemental Table 1.5*Model statistics for the Experiment 2 logistic regression model*

| <i>Statistic</i> | <i>Delay Time</i> | <i>Object Meaning</i> | <i>Object Saliency</i> | <i>Delay Time : Object Meaning</i> | <i>Delay Time : Object Saliency</i> |
|---------------------------|-------------------|-----------------------|-------------------------------|------------------------------------|-------------------------------------|
| β Estimate | -0.21 | 0.09 | 0.28 | -0.03 | -0.09 |
| <i>p-value</i> | <0.001*** | 0.0163* | <0.001*** | 0.484 | 0.023* |
| | | | <i>Adjusted R²</i> | <i>p-value</i> | <i>AIC</i> |
| Overall Model Statistics: | | | 0.02 | <0.001*** | 47376 |

Note. AIC stands for Akaike information criteria.

Model formula:

$$\begin{aligned} \text{object recalled} \sim & \beta_0 + \beta_1(\text{delay time}) + \beta_2(\text{object meaning}) + \beta_3(\text{object saliency}) \\ & + \beta_4(\text{delay time: object meaning}) + \beta_5(\text{delay time: object saliency}) \end{aligned}$$

* Note that because the meaning and saliency values were correlated, we residualized these values before using them in the model.