**Preliminary Analysis Results: Gaze+ILM Project**

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**Detection Task: Tables & Figures**

**Table 1**

*Reaction time ANOVA for the detection task.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Effect Type | Main Effect | Degrees of Freedom | Mean Squared Error | *F*-statistic | *p*-value |
| Main Effect | Cue Type (Exogenous vs Gaze) | 1, 9 | 3001.23 | 1.65 | .231 |
| Main Effect | Cue Validity (Valid vs Neutral vs Invalid) | 1.89, 17.00 | 1879.91 | 17.25 | < .001\* |
| Interaction | Cue Type X Cue Validity Interaction | 1.98, 17.78 | 2064.35 | 6.68 | .007\* |

*Note.* \* *= statistical significance.*

**Table 2**

*Accuracy ANOVA for the detection task.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Effect Type | Main Effect | Degrees of Freedom | Mean Squared Error | *F*-statistic | *p*-value |
| Main Effect | Cue Type (Exogenous vs Gaze) | 1, 9 | 0.03 | 13.20 | .005\* |
| Main Effect | Cue Validity (Valid vs Neutral vs Invalid) | 1.38, 12.43 | 0.04 | 9.07 | .007\* |
| Interaction | Cue Type X Cue Validity Interaction | 1.70, 15.28 | 0.02 | 8.23 | .005\* |

*Note.* \* *= statistical significance.*

**Figure 1**

*Cuing effect in terms of reaction time, split by cue type (exogenous vs gaze). 95% confidence intervals extracted from the ANOVA in Table 1.*



**Figure 2**

*Cuing effect in terms of accuracy, split by cue type (exogenous vs gaze). 95% confidence intervals extracted from the ANOVA in Table 2.*



**Line Motion Rating Task: Tables & Figures**

**Table 3**

*Line rating intensity ANOVA for the line motion rating task..*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Effect Type | Effect | Degrees of Freedom | Mean Squared Error | *F*-statistic | *p*-value |
| Main Effect | Cue Location (Left vs Neutral vs Right) | 1.36, 12.23 | 0.01 | 15.87 | < .001\* |
| Main Effect | Cue Type (Exogenous vs Gaze) | 1, 9 | 0.00 | 0.76 | .408\* |
| Main Effect | Line Type (Leftward Line Motion vs Rightward Line Motion vs Static Line) | 1.40, 12.60 | 0.04 | 49.31 | < .001\* |
| Interaction | Cue Location X Cue Type | 1.80, 16.23 | 0.01 | 11.53 | < .001\* |
| Interaction | Cue Location X Line Type | 2.90, 26.13 | 0.01 | 6.81 | .002\* |
| Interaction | Cue Type X Line Type | 1.32, 11.85 | 0.01 | 7.84 | .012\* |
| Interaction | Cue Location X Cue Type X Line Type | 3.07, 27.59 | 0.01 | 10.66 | < .001\* |

*Note.* \* *= statistical significance.*

**Figure 3**

*Line motion ratings for the static line (i.e., line drawn all at once), split by cue type (exogenous vs gaze) and cue location (left vs neutral vs right). 95% confidence intervals extracted from the ANOVA in Table* ****

**Figure 4**

*Line motion ratings for real line motion (i.e., lines drawn to the left or to the right), split by cue type (exogenous vs gaze) and cue location (left vs neutral vs right). 95% confidence intervals extracted from the ANOVA in Table 3.*





**Research Questions**

1. Do exogenous cuing and gaze-cuing produce cuing effects?
2. Does gaze-cuing produce illusory line motion, like exogenous cuing? (Assuming exogenous cuing will produce illusory line motion).
3. If gaze-cuing produces illusory line motion, is the illusion as strong as it is for exogenous cuing?

**Hypotheses**

**Detection Task**

1. Exogenous cues will produce a cuing effect, such that participants respond faster and/or more accurately for valid trials than for invalid trials. (RQ1)
2. Gaze cues will produce a cuing effect, such that participants respond faster and/or more accurately for valid trials than for invalid trials. (RQ1)

**Line Motion Rating Task**

1. Exogenous cues will produce illusory line motion in the static line condition, such that when a non-neutral flash appears, participants will report significant line motion in the direction opposite the cued side.
2. Gaze cues will produce illusory line motion in the static line condition, such that when a non-neutral flash appears, participants will report significant line motion in the direction opposite the cued side.
3. Exogenous cues will produce strong illusory line motion, such that when the cued side matches the direction the line was drawn in, participants will report that they did not perceive line motion.
4. Gaze cues will produce strong illusory line motion, such that when the cued side matches the direction the line was drawn in, participants will report that they did not perceive line motion.
5. If (H5) and (H6) are confirmed, then the strength of illusory line motion between exogenous and gaze cues will be equivalent, such that the confidence intervals for each cue type-cue location combination (e.g., exogenous-left and gaze-left) will overlap

**Detection Task: Significance Testing & Interpretation**

**Statistical Reporting**

We performed 2 x 3 ANOVAs on reaction time and accuracies in the detection task, including conditions for cue type (exogenous vs gaze) x cue validity (valid vs neutral vs invalid). The results of these ANOVAs are shown in Table 1 (reaction time) and Table 2 (accuracy); visualized in Figures 1 (reaction time) and 2 (accuracy).

Exogenous cues produced a cuing effect, such that participants responded significantly faster (but not more accurately) to valid trials than to invalid trials [*t*(9) = -3.90, *p* = .04 < .05; *t*(9) = 3.50, *p* = .08 > .05, respectively].

Gaze cues did not produce a significant cuing effect, neither in terms of reaction time [*t*(9) = -3.27, *p* = .10 > .05] nor accuracy [*t*(9) = 1.71, *p* = .60 > .05].

**Interpretation**

Exogenous cues produced a clear cuing effect, such that participants responded significantly faster for valid trials than for invalid trials. Therefore, our first hypothesis is confirmed, and participants’ attention was successfully captured by the flash cues. While the cuing effect for gaze cues was not statistically significant, our sample size is small (*N* = 10). Given there is a clear trend showing a cuing effect for gaze cues in Figure 1, we cautiously conclude the gaze cues produced a cuing effect, but it is too weak (due to our small sample size) to be statistically significant in a *t*-test.

**Static Line Motion Rating Task: Significance Testing & Interpretation**

**Statistical Reporting**

We performed a 2 x 3 x 3 ANOVA on line motion ratings in the line motion task, including conditions for cue type (exogenous vs gaze) x cue location (left vs neutral vs right) x line motion type (static/no motion, leftward motion, rightward motion). The results of this ANOVA are shown in Table 3, and visualized in Figures 3 (static line condition) and 4 (leftward and rightward real line motion conditions).

As shown in Figure 3, the estimates and 95% within-subjects confidence intervals for exogenous cues do not overlap zero: when exogenous cues appear on the right, participants report significant leftward line motion, and when exogenous cues appear on the left, participants report significant rightward line motion. The estimates and confidence intervals for gaze cues also do not overlap zero: regardless of the gaze cue, participants reported significant rightward line motion.

**Interpretation**

Exogenous cues produced clear illusory line motion in the static line condition, such that participants rated non-moving lines as moving in the direction opposite the cued side. This pattern did not hold for gaze cues. Therefore, our third hypothesis is confirmed and our fourth is falsified: exogenous cues produced illusory line motion in the static line condition, but gaze cues did not.

**Real Line Motion Rating Task: Significance Testing & Interpretation**

**Statistical Reporting**

The results for the real line motion rating task (leftward vs rightward real line motion) come from the same ANOVA (see Table 3) as the results reported for the static line motion rating task. The results of the real line motion rating trials are shown in Figure 4.

As shown in Figure 4, the trend for exogenous and gaze cues is globally the same: when lines are drawn leftwards, participants report leftward line motion, regardless of the direction of the cue; when lines are drawn rightwards, participants report rightward line motion.

**Interpretation**

Neither exogenous cues nor gaze cues produced a sufficiently strong line motion illusion in the real motion rating task to cancel out the perceived line motion when the cued direction was congruent with the direction the line was drawn in. Therefore, our fifth, sixth, and seventh hypotheses are falsified: neither cue produced “strong” illusory line motion. Only exogenous cues produced clear illusory line motion in the static line condition.