# Appendices of Paper "Modeling Temporal Target Selection: A Perspective from Its Spatial Correspondence"

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## 1 STUDY 1

### 1.1 Normality Assumption of RM-ANOVA

Dependent variables ($\mu$, $\sigma$, and error rate) were determined to be approximately normally distributed based on the following Q-Q plots. We, therefore, apply parametric analysis (repeated-measures ANOVA) for significance tests.
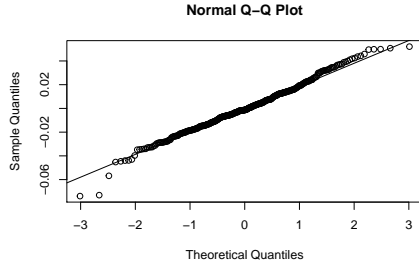


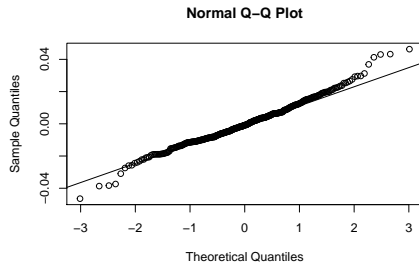Figure 1: Q-Q plot with $\mu$ as the dependent variable.



Figure 2: Q-Q plot with $\sigma$ as the dependent variable.

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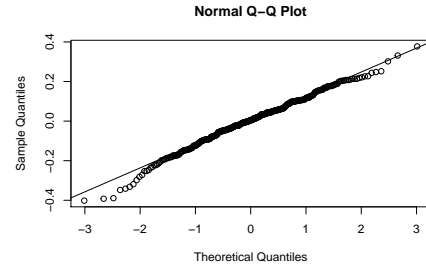
Figure 3: Q-Q plot with error rate as the dependent variable.

### 1.2 RM-ANOVA for Error Rate

Table 1: Statistical effects of factors on error rates.

| Factor | $df_{\text{effect}}$ | $df_{\text{error}}$ | $F$ | $p$ | $\eta_G^2$ | Sig? |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| $D_t$ | 1.374 | 20.603 | 30.617 | .000 | .225 | **yes** |
| $W_t$ | 1 | 15 | 622.711 | .000 | .636 | **yes** |
| $R_t$ | 3 | 45 | 43.991 | .000 | .295 | **yes** |
| $D_t \times W_t$ | 1.437 | 21.553 | 93.692 | .000 | .253 | **yes** |
| $D_t \times R_t$ | 6 | 90 | 20.317 | .000 | .216 | **yes** |
| $W_t \times R_t$ | 3 | 45 | 7.489 | .000 | .047 | **yes** |
| $D_t \times W_t \times R_t$ | 6 | 90 | 4.550 | .000 | .057 | **yes** |

### 1.3 Post-Hoc Analysis of RM-ANOVA

Bonferroni-adjusted pairwise comparisons were applied for post-hoc analysis.

```
# Pairwise comparison of $D_t$ regarding $\mu$.
contrast   estimate      SE  df t.ratio p.value
0.4 - 0.5    0.0596 0.00258 360  23.099  <.0001
0.4 - 0.6    0.0978 0.00258 360  37.902  <.0001
0.5 - 0.6    0.0382 0.00258 360  14.803  <.0001

# Pairwise comparison of $W_t$ regarding $\mu$.
contrast   estimate      SE  df t.ratio p.value
0.1 - 0.2   -0.0144 0.00211 360  -6.860  <.0001

# Pairwise comparison of $R_t$ regarding $\mu$.
contrast      estimate      SE  df t.ratio p.value
0.05 - 0.1   -0.000273 0.00298 360  -0.092  1.0000
0.05 - 0.15  -0.015706 0.00298 360  -5.273  <.0001
```

```
0.05 - 0.2   -0.019363 0.00298 360 -6.501   <.0001
0.1 - 0.15   -0.015433 0.00298 360 -5.181   <.0001
0.1 - 0.2    -0.019090 0.00298 360 -6.409   <.0001
0.15 - 0.2   -0.003657 0.00298 360 -1.228   1.0000
```

and
```
# Pairwise comparison of $D_t$ regarding $\sigma$.
contrast  estimate      SE  df t.ratio p.value
0.4 - 0.5   -0.0145 0.00171 360  -8.516 <.0001
0.4 - 0.6   -0.0341 0.00171 360 -19.967 <.0001
0.5 - 0.6   -0.0195 0.00171 360 -11.451 <.0001
```

```
# Pairwise comparison of $W_t$ regarding $\sigma$.
contrast  estimate      SE  df t.ratio p.value
0.1 - 0.2 -0.00436 0.00139 360 -3.131  0.0019
```

```
# Pairwise comparison of $R_t$ regarding $\sigma$.
contrast      estimate      SE  df t.ratio p.value
0.05 - 0.1   -0.003437 0.00197 360 -1.744  0.4920
0.05 - 0.15  -0.004712 0.00197 360 -2.391  0.1040
0.05 - 0.2   -0.004830 0.00197 360 -2.451  0.0884
0.1 - 0.15   -0.001274 0.00197 360 -0.647  1.0000
```

```
0.1 - 0.2    -0.001393 0.00197 360 -0.707   1.0000
0.15 - 0.2   -0.000118 0.00197 360 -0.060   1.0000
```

and
```
# Pairwise comparison of $D_t$ regarding error rate.
contrast  estimate      SE  df t.ratio p.value
0.4 - 0.5   -0.1146 0.0161 360 -7.132   <.0001
0.4 - 0.6    0.0446 0.0161 360  2.776   0.0174
0.5 - 0.6    0.1593 0.0161 360  9.908   <.0001
```

```
# Pairwise comparison of $W_t$ regarding error rate.
contrast  estimate      SE  df t.ratio p.value
0.1 - 0.2    -0.329 0.0131 360 -25.060 <.0001
```

```
# Pairwise comparison of $R_t$ regarding error rate.
contrast      estimate      SE  df t.ratio p.value
0.05 - 0.1    0.0607 0.0186 360  3.272   0.0070
0.05 - 0.15   0.1420 0.0186 360  7.650   <.0001
0.05 - 0.2    0.2126 0.0186 360 11.453   <.0001
0.1 - 0.15    0.0813 0.0186 360  4.378   0.0001
0.1 - 0.2     0.1518 0.0186 360  8.181   <.0001
0.15 - 0.2    0.0706 0.0186 360  3.803   0.0010
```

**Table 2: Cross-validation (LCO: leave-condition-out; LPO: leave-participant-out) performance results.**

| | Model | Selection Mean ($\mu$) | | Selection Std. ($\sigma$) | | Error Rate | |
|---|---|---|---|---|---|---|---|
| | | $R^2$ | MAE | $R^2$ | MAE | $R^2$ | MAE |
| LCO | Simple model | 0.78 (0.17) | 0.020 (0.005) | 0.90 (0.10) | 0.004 (0.001) | 0.72 (0.20) | 9.18% (3.39%) |
| | Interact model | 0.91 (0.10) | 0.011 (0.003) | 0.90 (0.10) | 0.004 (0.001) | 0.93 (0.06) | 5.33% (1.70%) |
| | Hyp model | 0.78 (0.17) | 0.019 (0.006) | 0.91 (0.07) | 0.004 (0.001) | 0.73 (0.20) | 8.64% (3.27%) |
| LPO | Simple model | 0.79 (0.06) | 0.018 (0.002) | 0.81 (0.06) | 0.006 (0.001) | 0.73 (0.05) | 9.58% (1.17%) |
| | Interact model | 0.92 (0.03) | 0.012 (0.002) | 0.81 (0.06) | 0.006 (0.001) | 0.89 (0.03) | 6.42% (1.18%) |
| | Hyp model | 0.82 (0.05) | 0.017 (0.002) | 0.82 (0.05) | 0.006 (0.001) | 0.76 (0.05) | 8.87% (1.08%) |