Detecting 3D location change in the presence of grouping cues
Luise Gootjes-Dreesbach, Peter Scarfe & Andrew Glennerster
School of Psychology and Clinical Language Sciences
Contact: E.L.Gootjes-Dreesbach@reading.ac.uk

Introduction

Task: Detect movement of one sphere (Fig. 3 & 4). Result: Remarkably poor performance [1], especially when task-irrelevant connecting lines (dipoles) change (Fig. 1).

Is this caused by
• image change?
• grouping change?

Power Analysis

How many participants are needed to detect an effect of a similar size?

<table>
<thead>
<tr>
<th>Effect</th>
<th>DFn</th>
<th>DFd</th>
<th>F</th>
<th>$\Delta \eta^2$</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dipoles</td>
<td>2</td>
<td>4</td>
<td>8.18</td>
<td>.8</td>
<td>.039*</td>
</tr>
<tr>
<td>colour (2 groups)</td>
<td>2</td>
<td>4</td>
<td>0.35</td>
<td>.14</td>
<td>.725 (n.s.)</td>
</tr>
<tr>
<td>colour (paired spheres)</td>
<td>2</td>
<td>4</td>
<td>3.27</td>
<td>.62</td>
<td>.144 (n.s.)</td>
</tr>
</tbody>
</table>

Table 3: Group level effects.

At the individual participant level, all Holm-Bonferroni corrected $\chi^2$ tests (n=300) were significant for the dipole conditions and non-significant across both sets of color conditions.

Conclusions

• Replication of the original effect of lower performance on trials where connecting lines between objects switched position (“switching dipoles”).
• Image change alone does not cause disruption similar to the switching dipoles effect.
• The same is true for grouping change.
• Findings for colour grouping in 3D scenes are compatible with the 2D literature [2, 3].

References