Investigating the relationship between blinks, saccades, and bistable percepts during a structure-from-motion task in patients with psychosis

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Are differences in bi-stable switch rates in people with psychosis related to differences in ocular events?

Structure From Motion Task  
Respond when you see a change in the direction of rotation.

Real Switch Task  
Bi-stable Task

People with psychosis show faster switch rates compared to healthy controls.

Previous work in controls indicates that blink rates decrease prior and increase after bi-stable switches (Einhauer, Stout, Koch, Carter, 2008). Pupil size also increases after switches (Brych, Murali, Händel, 2021).

Conclusions

Fixation stability was comparable across participant groups. Participants show increased blink probabilities ~850ms before a switch. Participants also show decreased blink and saccade probabilities ~400ms before a switch. All groups show similar blink and saccade probabilities during bi-stable perception. This indicates that differences in switch rates are not due to blinks or saccades. Patients with psychosis show smaller changes in pupil size during bi-stable perception compared with healthy controls. Smaller changes in pupil size after a switch correlate with faster switch rates during bi-stable perception. Attention might attenuate pupil size changes and switch rate in people with psychosis.

Demographics

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean (SD)</th>
<th>Median (IQR)</th>
<th>Min-Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>19</td>
<td>4.6 (1.1)</td>
<td>4.0 (1.0)</td>
<td>0.3-12.0</td>
</tr>
<tr>
<td>Relatives</td>
<td>34</td>
<td>4.5 (1.0)</td>
<td>4.0 (1.0)</td>
<td>1.0-9.0</td>
</tr>
<tr>
<td>Psychosis</td>
<td>39</td>
<td>4.5 (1.0)</td>
<td>4.0 (1.0)</td>
<td>1.0-9.0</td>
</tr>
</tbody>
</table>

Eye tracking stability over time

Pupil size and switch rate

Key References

Einhauer, Stout, Koch, Carter, 2008  
Brych, Murali, Händel, 2021