Perceptual adaptation to continuous versus intermittent spatial distortions

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Adaptation may be stored over repeated exposures to a stimulus

Gimmon et al. (2018), Li et al. (2020), Shelhamer et al. (1992), Yehezkel et al. (2010)
Evidence for adaptation to continuous exposure to spatial distortions

Adams et al. (2001) found partial adaptation to a slant distortion after 1 day of **continuous** exposure. Adaptation was complete after 7 days.
Does adaptation to spatial distortions occur if the exposure is intermittent?

**Hypothesis 1**
- Intermittent exposure
- Adapt just as much as continuous exposure

**Hypothesis 2**
- Intermittent exposure
- Disrupt adaptation
- No adaptation

**Hypothesis 3**
- Intermittent exposure
- Alter the "trustworthiness" of a perceptual cue
- Adaptation through cue reweighting

Cesanek et al. (2020) and Ernst & Banks (2002)
Method: we used a horizontal magnifier over one eye to create a change in perceived depth and shape

Change in Perceived Slant

Actual slant of the book

Perceived slant of the book

Horizontal Magnifier

Adams et al. (2001) and Ogle (1938)
Method: Slant and shape adaptation was measured across groups

Continuous Group (n = 15)

Intermittent Group (n = 15)

Control Group (n = 15)
Results: evidence for cue reweighting only in continuous group

Slant Adaptation
Binocular Disparity Adaptation

No Adaptation

Increase in Texture weight
Increase in Disparity weight

M = 1.00
$ t(14) = 2.38, \ p = 0.17$

M = 0.67
$ t(14) = 1.25, \ p = 0.40$

M = -0.27
$ t(14) = -0.74, \ p = 0.47$

M = -0.0085
$ t(14) = -0.10, \ p = 0.92$

M = -0.23
$ t(14) = -3.36, \ p = 0.022$

M = -0.055
$ t(14) = -0.92, \ p = 0.57$
Summary

- **Disparity adaptation** was inconclusive
- Evidence for cue **rewighting** during continuous rather than intermittent exposure to the spatial distortion
- **Shape adaptation** was not halted by intermittent exposure to the spatial distortion.
Acknowledgements

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Appendix: Significant shape aftereffect in continuous and intermittent group

A monocular horizontal magnifier makes a rectangle be perceived as a trapezoid

**Shape Aftereffect**
Change in Square Judgment

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>t(14)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>0.0060</td>
<td>5.37</td>
<td>0.001</td>
</tr>
<tr>
<td>Intermittent</td>
<td>0.0057</td>
<td>3.17</td>
<td>0.040</td>
</tr>
<tr>
<td>Control</td>
<td>0.0065</td>
<td>2.52</td>
<td>0.099</td>
</tr>
</tbody>
</table>

Difference in shape perceived square quantified as the ratio between the left & right side.