Central fixation bias: The role of sudden image onset and early gist extraction

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Introduction

- The Central Fixation Bias (CFB) shapes early viewing behavior in scene viewing experiments. Participants make the first saccade towards the center of the image. The effect persists through experimental changes in monitor and fixation cross position, as well as feature distribution.
- CFB can be significantly reduced when participants view the image from predetermined positions for as little as 125 ms before exploration.

Research Question

Is the CFB reduction caused by...
1. early gist extraction during the first forced fixation?
2. experimental prohibition of saccades in reaction to a sudden luminance change at target onset?

Method

Eye tracking experiment (Eyelink 1000, SR research)
- 32 participants
- 20 images for each of 6 conditions in a blocked 2x3 design
- Preview types:
  - valid (same as target)
  - invalid (different from target)
  - phase scrambled (only spatial statistics are preserved)
- Image onset types:
  - flash (regular appearance of an image)
  - fade (image gradually increases in visibility)

Results

- Significant effect of the preview type ($p=0.009$)
  - Valid preview conditions elicited a less pronounced CFB than invalid or scrambled previews.
- Onset type ($p=0.323$) and interaction ($p=0.951$) were not significant
- Overall the CFB was smaller than in previous experiments, possibly caused by different presentation sequence

Conclusion

The CFB is primarily caused by early gist extraction with the image center as the optimal fixation location. We were able to significantly reduce the central fixation bias by giving subjects a 250 ms preview of the target image compared to invalid and scrambled previews. Onset type had no determining role in the strength of the bias.

References


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