Expectation-based blindness: Predictions about object categories gate awareness of focally attended objects
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Introduction

Inattentional blindness (IB): When observers engage in an attentionally demanding primary task, they often fail to notice clearly visible but unexpected objects. Expectations are not believed to cause IB directly, but only by preventing the allocation of attention to the unexpected object (Jensen et al., 2011).

Do expectations gate access to conscious awareness even when an object is FULLY attended? We examined whether expectations about the target’s response feature (identity) affect reporting accuracy when the target’s selection feature (surrounding cue) remains constant, SO THAT ATTENTION IS FULLY ALLOCATED TO THIS TARGET OBJECT.

We manipulated expectations by repeating the response feature’s category for 19 trials. On the 20th trial, the category changed, and remained the same for 5 more trials.

Hypothesis: Expectation based blindness (EBB): Accuracy will be lower on the surprise trial than on the preceding (S-) and following trials (S+).

Experiment 1 (N=128)

Method
Task: Report the identity of the cued target (digit or letter) among distractor digits and letters.

Expectation manipulation: The target was a digit/letter and changed to a letter/digit on trial S.

Results

5 vs. S-: Z = 2.89, p < .004
5 vs. S+: Z = 2.85, p = .004

Conclusion: EBB emerged even when the cue guided attention before the target’s appearance.

Experiment 2 (N=150)

Question: Is EBB related to novelty of the target on trial S?

Method
Expectation manipulation: The target was one of three letters and changed to either three digits (letters to digits) or a different set of three letters (letters to letters) on trial S.

Results

Letters to digits:
Z = 3.79, p < .001
Z = 2.98, p = .003
Letters to letters: both Zs < 1

Discussion: EBB is contingent on expected category, not a change in response features (novelty)

Experiment 3 (N=150)

Question: Is EBB related to differences in attentional guidance?

Method
Task: Report the identity of the target after the cue.

Results

Letters to digits: Both Zs > 6.49, p < .001
Letters to letters: Z = 1.14, p = .26

Conclusion: EBB emerged when the cue guided attention before the target’s appearance.

Experiment 4 (N=335)

Question: Can EBB be generalized to naturalistic real-world images?

Method
Task: Report the identity of the face inside the red cue.

Expectation manipulation: The target was one of 10 human faces or animal faces. Animal faces changed to humans on trial 5 (animals to humans, n = 111). Human faces changed on trial 5 to animals (humans to animals, n = 116) or another set of humans (humans to humans, n = 108).

Results

Category switch: Both ps < .001
Category repeat: Both Zs < 1

Discussion: EBB is not caused by attention being diverted to an unrelated task (IB) or change in the task (attribute amnesia, Chen & Wyble, 2015).

Expectations might activate long-term memory representations of category-matching objects. This would facilitate their encoding and impair the encoding of unexpected non-matching objects (e.g., Oberauer, 2009).

General Discussion

Observers were less likely to report target objects when their category changed unexpectedly. EBB is not caused by attention being diverted to an unrelated task (IB) or change in the task (attribute amnesia, Chen & Wyble, 2015).

Expectations might activate long-term memory representations of category-matching objects. This would facilitate their encoding and impair the encoding of unexpected non-matching objects (e.g., Oberauer, 2009).

References