# Preview Benefits and Deficits in Visual Selective Attention

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In the Eriksen flanker paradigm, peripheral flankers can help or harm performance depending on whether they indicate the correct or incorrect response of a central target. With this paradigm it has been observed that immediate preview of the flankers reduces flanker effects. The reported experiments investigated this phenomenon, establishing the separate contributions of identity preview and response preview. Participants made CV judgments on the middle letter of a five-letter string and different durations of preview were examined. The results indicate that response preview effects are small, and apply similarly across location. In contrast, identity preview is location specific, producing results that reverse depending on flanker preview versus target preview. We explain these effects in terms of perceptual discounting that accrues over time as a function of preview durations. Depending on which locations and items are previewed, this can result in a "repetition blindness" for flankers, which reduces flanker interference, or a repetition blindness for the target, which greatly harms performance. This theory is implemented in a model with dynamic neural accommodation (Huber & O'Reilly, 2003) within spatially specific identity detectors and spatially non-specific evidence accumulators (response units).

## Experiments

Participants were seated in front of a computer and instructed to respond only to the middle letter of a five-letter string, as quickly and accurately as possible. Feedback was provided on every trial and between blocks. The letters displayed were B, K, A, and E and formed three types of flanker conditions: stimulus-congruent (CC: AAAAA), response-congruent (IC: EEAEE), or response-incongruent (II: BBABB). The participant saw a four-letter string with a space between the second and third letter (in Experiment 1 and 2) or a five-letter string. The preview stimulus always contained four or five identical letters. The duration of the preview stimulus was 100ms (Experiment 1), 800ms (Experiments 1 and 2) or 1000ms (Experiment 3). Table 1 reveals both identity (CC < IC) and response (IC < II) response time benefits for the brief flanker preview duration. At longer flanker preview durations, the identity effect remained, but response interference disappeared. Table 2 reveals that previewing at only flanker locations resulted in performance benefits for both response and identity, but that previewing at all locations (including the target location) resulted in performance benefits for response effects, but performance deficits for preview of the target identity at the target location.

Table 1: Results of Experiment 1 in which flankers were previewed for 100ms or 800ms (*** $p < .001$).

| | No preview | 100ms preview | 800ms preview |
|---|---|---|---|
| CC | 473 | 429 | 427 |
| IC | 475 | 449 | 446 |
| II | 498 | 483 | 448 |
| Identity effect | 2 | 20*** | 18*** |
| Response effect | 23*** | 34*** | 3 |

Table 2: Results of Experiment 2 and 3 in which flankers or the target were previewed for 800ms or 1000ms and the preview stimulus did or did not cover the location of the target (* $p < .05$, ** $p < .005$, *** $p < .001$). Experiment 2 also has a brief 200ms empty gap between preview and response frame.

| | Preview only flanker locations | | Preview all locations | |
|---|---|---|---|---|
| | Preview flankers | Preview target | Preview flankers | Preview target |
| CC | 428 | | 609 | |
| IC | 439 | 448 | 571 | 581 |
| II | 478 | 485 | 581 | 617 |
| Identity effect | 12 | 19*** | -38** | -27** |
| Response effect | 38*** | 37*** | 10* | 36*** |

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## References

Huber, D. E., & O'Reilly, R. C. (2003). Persistence and accommodation in short-term priming and other perceptual paradigms: temporal segregation through synaptic depression. *Cognitive Science*, *27*, 403-430.