For Better or Worse: 
Prior Trial Accuracy Affects Current Trial Accuracy in Visual Search

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Primary Question
Behavior is interrelated from one moment to the next. In the lab, can accuracy on one trial affect performance on the next?

Background
Inter-Trial Effects
- What happens on one trial can affect the next, e.g., task-switching (Fecteau & Munoz, 2003; Monsell, 2003)

Inter-Trial Effects Can Be Stimulus-Driven

Inter-Trial Effects Can Be Performance-Driven
- For example, Priming of Pop-out
  - Feature identification faster after making a mistake on the previous trial. (Maljkovic & Nakayama, 1994, 1996, 2000)

Can Inter-Trial Effects Be Performance-Driven?
- Might accuracy on one search trial affect the likelihood of a correct response on the next?

Current Plan
- Assess performance-driven inter-trial effects
- Test two participant groups
- Assess whether inter-trial effects are malleable and vary with experience
- Non-professional searchers: university population
- Professional searchers: airport security officers

Study Goal
Examine how performance on one visual search trial might affect the next.

Paradigm
- Simple visual search (Biggs et al., 2013)
- Search for the target ‘T’ amongst distractor ‘L’s
- Target present on 50% of trials
- Key-press response for target present/absent
- Set sizes: 8, 16, 24, 32
- 256 experiment trials
- Two samples: professional and non-professional searchers

Methods

Non-Professional Searchers
- Primarily Duke undergraduates
- Received $10 or course credit
- 92 usable participants

Professional Searchers
- Transportation Security Administration (TSA) Officers
- TSA Officers regularly searched luggage
- 265 usable participants

Results

Accuracy Decreases After Incorrect Response

Accuracy Decline Modulated by Prior Response Type

Results Implications

Methodological
- Researchers might want to control for variance caused by inter-trial effects
- It might be possible to adjust experimental designs to enhance or attenuate these effects

Theoretical
- Open Question #1: What are the cognitive mechanisms that give rise to these effects?
- Open Question #2: Why should performance on one search trial affect the next?

Practical
- People’s safety depends on the accuracy of professional searchers, such as radiologists and airport baggage screeners
- Understanding the mechanisms of inter-trial effects could help reduce the occurrence of such errors in professional search settings
- Extensive search practice does not shield one from performance-based inter-trial effects

References


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