Contextual control of attentional sampling: Exploring the role of volition

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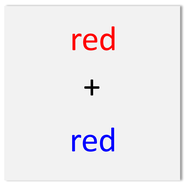
Context-Specific Attentional Control

Environmental cues associated with previous attentional control settings can rapidly and involuntarily adjust attentional priorities

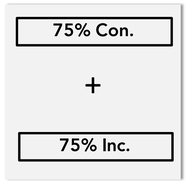
There have been a number of demonstrations of context-dependent attentional control:

Visual Search Tasks
Chun & Jian, 1998
Long-Term Negative Priming
Deschepper & Treisman, 1996
Pop-out effects in attention capture
Thomas & Milliken, 2012, 2013
Proportion Congruency
Logan & Zbrodoff, 1979; ;Corballis & Gratton, 2003; Crump & Milliken, 2006

Stroop



Flanker



Manipulating the proportion of congruent items will cause changes in attentional settings adopted in each location.

What is the role of volition?

Awareness is not required
Awareness of experimental manipulations such as dimensional conflict, proportion of trial-types, and contextual cues, are not required to produce context-specific effects.

The lack of awareness has suggested that contextual control can occur independent of a subject's intent.

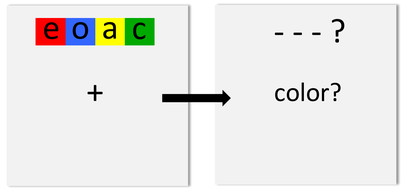
What are the pre-requisites for contextual control?

1. Adaptive-learning theories
- Contextual control is the result of automatic error-driven learning
- Pre-requisites for contextual control: statistical regularities in the environment

2. Memory-based accounts
- Contextual control is the result of automatic retrieval of prior instances
- Pre-requisites for contextual control: a memory record where attentional priorities were modified between contexts

Experimental Design

Stimulus could appear above or below the fixation



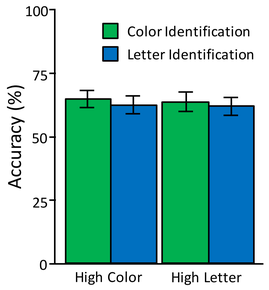
Asked to identify either the color or letter at a particular position

Task proportion is *context-specific*

***If attentional control is context-sensitive, accuracy should be better for each task in its high proportion location (i.e., a significant interaction effect).**

Experiments 1 & 2: Pre-requisites

Exp. 1: Adaptive learning failed to produce contextual control

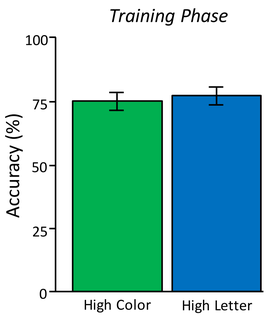


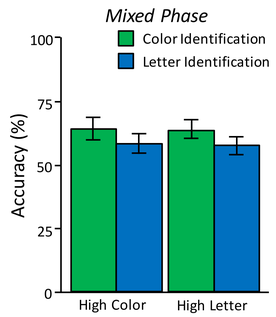
*Location was predictive of the optimal attentional strategy.

Despite ample opportunity for error-driven learning, there was no evidence for contextual control.

Exp. 2: Memory-based account failed to produce contextual control

*Subjects were given blocked practice employing one attentional setting in one location to establish a memory record of differential attentional priorities in each context.

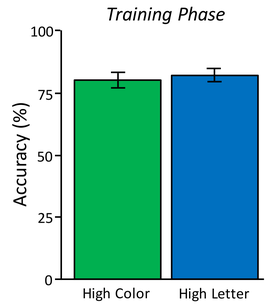


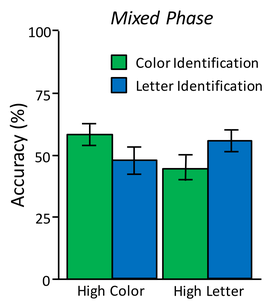


Experiments 3 & 4: The role of volition

Exp. 3: Directing voluntary control succesfully created context-specific effects

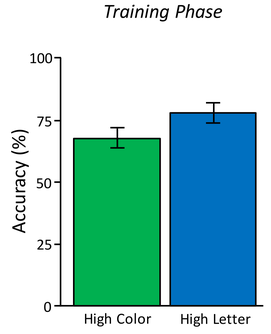
*Identical to Experiment 2, however participants were given explicit instructions to focus on the colors in the color location and letters in the letter location.

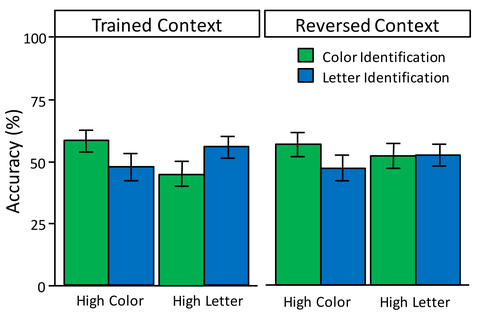




Exp. 4: Dissociating voluntary and involuntary effects

*Blocks of trials alternated between the trained context and reversed context. Reversing the context diminished the context-specific effects, providing evidence for contextual control.





Conclusions

The current study provides a novel demonstartion where contextual control was not possible without intentional shifts of attentional priorities and places constraints on the obligitory nature of contextual control.

Our experiments also show that principles from theories of contextual control such as automatic error-driven learning, and automatic retrieval of prior instances do not necessarily generalize across tasks in a straightforward manner.

Questions?
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