Geistesblitz: Repetition priming of indirect attentional sets

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Data and code

Geistesblitz – The Game

Zeimet, J. (2010). *Geistesblitz.* Zoch Verlag.

Find the target as fast as you can!

Card 1

Card 2

Card 1: One of the objects is in the correct color – this is the target – *direct attentional set* (target is teapot)
Card 2: All objects on the card have the wrong color, the target is an object not on the card and of the color that is not on the card – *indirect attentional set* (target is **bus**)

Research Questions

1. Is there **repetition priming** of the **attentional set**?
2. Do participants use the same **template** while looking for an object when the set is direct (card 1) vs. indirect (card 2)?
3. Is there **repetition priming** of target **color**?

Ideal Observer Models

How do real observers play *Geistesblitz* and how do they keep track of objects, sets and colors?
We constructed multiple ideal observer models using different combinations; the processing of attentional set, object, color, and distractors. Models predicted the performance for each trial of the experiment, i.e., the ideal observers replayed the same games as the real ones.

$$RT = RT_{motor} + RT_{set} + RT_{object}$$

Attention Set Processing Mechanism

No effect	Fixed common penalty P_{att}
Fixed set-specific penalty P_{att}^{set}	**Memory-based set-specific penalty** $P_{att} = f(M_{att}), dM_{att} = \lambda_{att} * M_{att}$

Object Processing Mechanism

Common object memory for sets $dM_{obj} = \lambda_{obj} * M_{obj}$	Set-specific object memory $dM_{obj}^{set} = \lambda_{obj} * M_{obj}^{set}$

Color Processing Mechanism

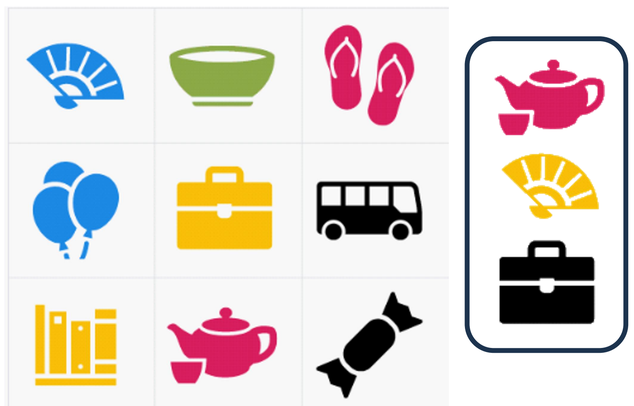
No effect	Priming of color $dM_{color} = \lambda_{obj} * M_{color}$
Common color memory for sets $dM_{color} = \lambda_{color} * M_{color}$	**Set-specific color memory for sets** $dM_{color}^{set} = \lambda_{color} * M_{color}^{set}$

Conclusion

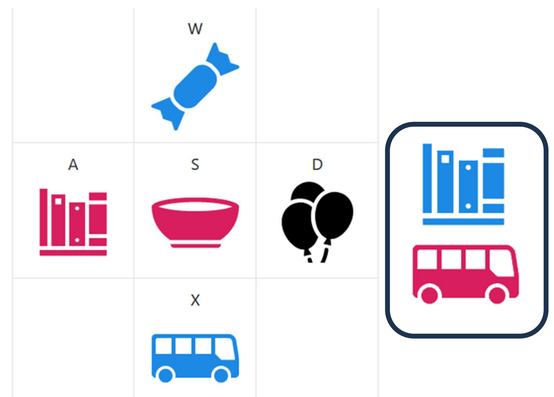
Search performance improves with both direct and indirect sets if observers can stick to the same attentional set on consecutive selections: *priming of attentional set.*
The ideal observer model predicts performance for the direct set, but the process for the indirect set seems to be very different.

Methods

Difficult (Experiment 3):



Medium (Experiment 2):



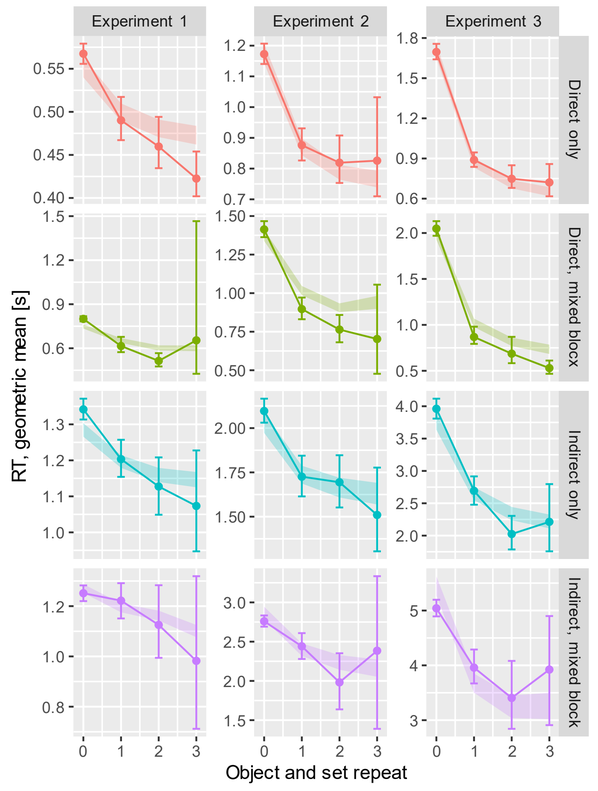
Easy (Experiment 1):

Design:
ABBA block design
1. direct sets only
2. indirect sets only
3.-6. mixed blocks
7. indirect sets only
8. direct sets only

Participants:
10 participants in each experiment

Instructions:
Participants were instructed to respond as quickly and accurately as possible

Results



Plots show model fits for the best models.

mean & 97% CI
(non-parametric bootstrapping)

mean & 97% compatibility interval
(posterior distribution)

Models fit reasonably well for the direct attention set.
The processing of the indirect attention set is clearly very different.
We find repetition priming for the objects and the direct set.
The results for the indirect set are less clear.