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Non-Converging Evidence for a Single-Item Focus of Attention in Working Memory

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FNSNF Swiss National Science Foundation

1. Introduction

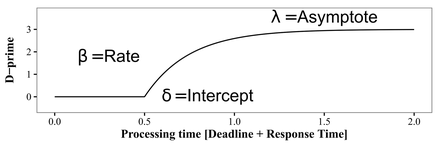
The focus of attention privileges a representation in working memory.[1] This is thought to drive two effects:

1) The most recent item in a Sternberg task has a higher rate of access.[2]

2) Cueing the location of an encoded stimulus during retention improves its subsequent recognition (retro-cue benefit).[3]

A diminished retro-cue benefit should be found for the most recently presented item if both empirical findings are driven by the same mechanism.

2. Response Signal Speed-Accuracy Trade-Off Procedure

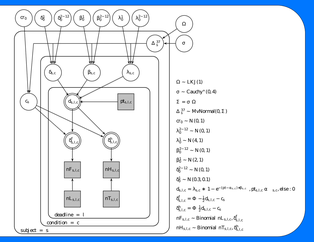


Participants are cued to respond immediately (response time < 270ms) after hearing a tone, which is presented at various times (deadline) after onset of a recognition probe.

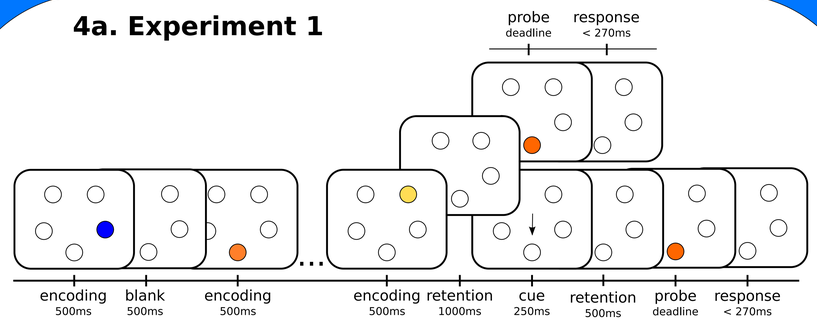
Parameters:
δ: Time when performance departs from chance
β: Rise of information accumulation
λ: Maximum level of performance

3. Hierarchical Bayesian SDT Model

We estimated the group-level parameters δ_0,β_0,λ_0 of the SAT model for each combination of serial position and cue condition in a hierarchical signal detection framework[4] using STAN.[5]



4a. Experiment 1

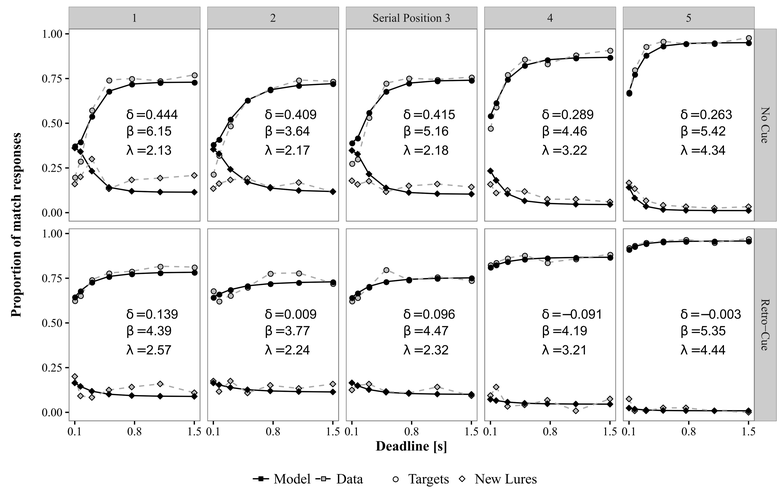


	Sp1	Sp2	Sp3	Sp4	Sp5
δ No Cue	a	a	a	d	cd
δ Retro Cue	bc	b	b	b	b
δ Cue Effect	a	a	a	a	a
β No Cue	a	a	a	a	a
β Retro Cue	a	a	a	a	a
λ No Cue	a	a	a	bc	cd
λ Retro Cue	ab	a	a	bc	d

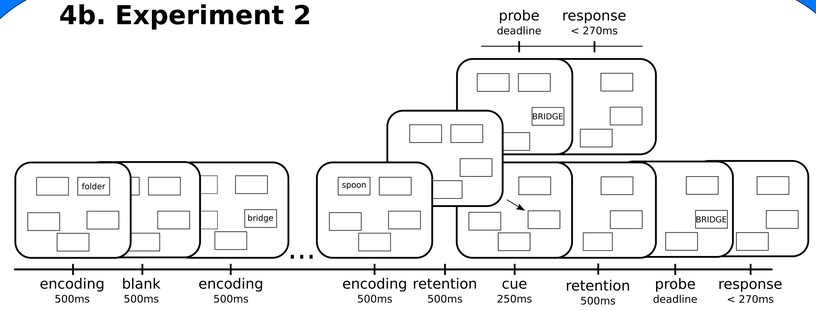
δ No Cue shows recency benefit

All serial positions show a δ retro-cue benefit, which is not diminished for the most recent serial position 5

Compact letter display: Conditions that are credibly different from each other receive different letters



4b. Experiment 2



	Sp1	Sp2	Sp3	Sp4	Sp5
δ No Cue	a	a	a	a	d
δ Retro Cue	bc	d	bd	c	c
δ Cue Effect	a	a	a	a	a
β No Cue	a	a	a	a	a
β Retro Cue	a	a	a	a	a
λ No Cue	ab	a	ab	bc	d
λ Retro Cue	ab	a	ab	b	cd

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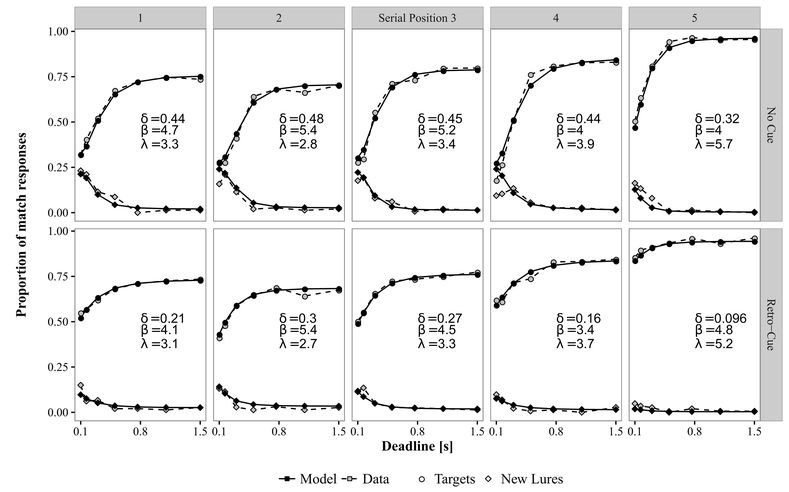

5. Take Home Message

The retro-cue benefit is not diminished for the most recently presented item. The recency and the retro-cue benefit are not solely driven by the same mechanism.

Contact & More Information
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References

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3) Griffin, I. C., . Nobre, A. C. (2003). Orienting attention to locations in internal representations. Journal of Cognitive Neuroscience, 15(8), 1176-1194.
4) Pratte, M. S., . Rouder, J. N. (2011). Hierarchical single-and dual-process models of recognition memory. Journal of Mathematical Psychology, 55(1), 36-46.
5) Carpenter, B., Gelman, A., Hoffman, M., Lee, D., Goodrich, B., Betancourt, M., ... Riddell, A. (2016). Stan: A probabilistic programming language. J Stat Softw.