2020-04-06

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Objective

Get Feedback for Research Hypothesis (for stress project research #2)

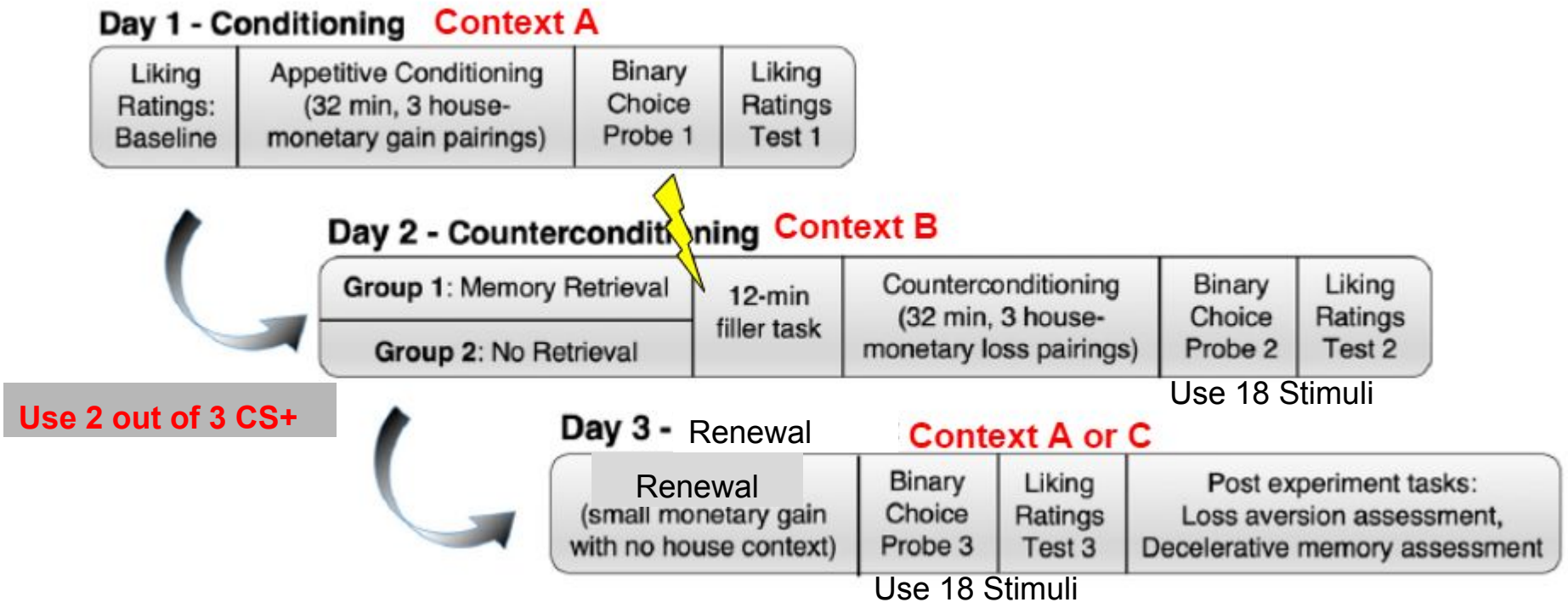
Research Question

How Memory Can be Modified via
(1)Retrieval & Stress Manipulation
(2)and How they Interact

Hypotheses

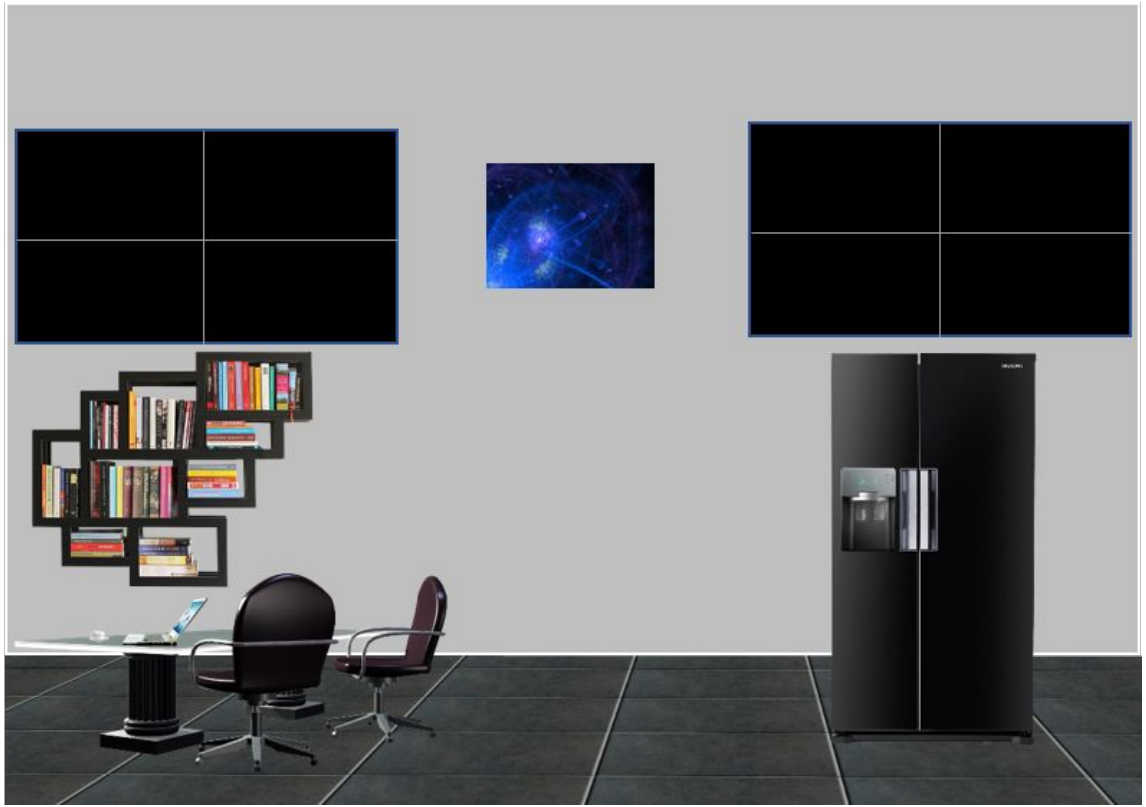
Condition	IV		DV			
	Retrieval	Stress	ABA Renewal	ABC Renewal	Generalize Stimulus	Declarative Memory
1 (60)	O	O	↓	?	?	?
2 (60)	O	X	↓	↑	X	O
3 (60)	X	O	↓	↓	O	X
4 (60)	X	X	↑	↑	X	O

Task Structure



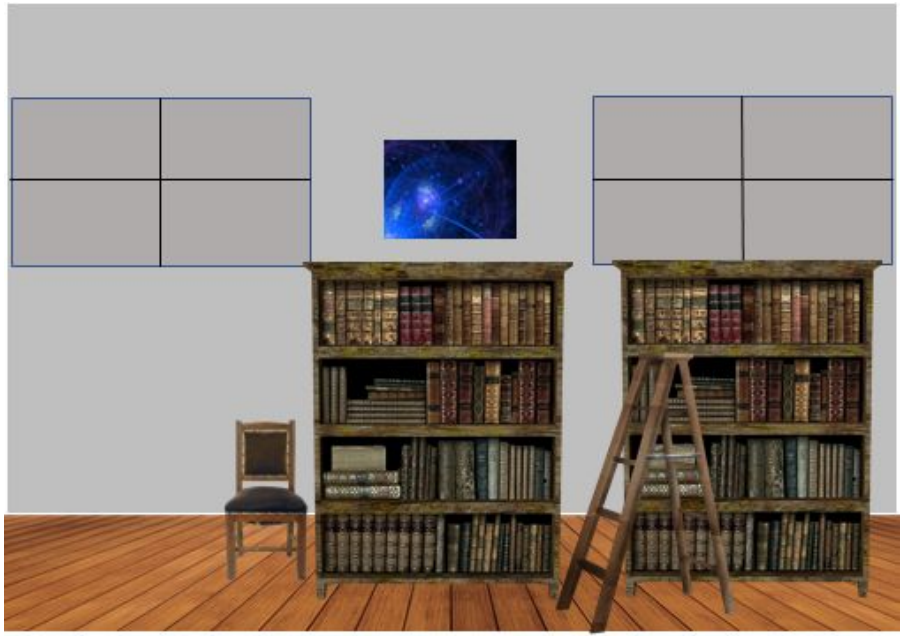
Day 1 - Context A

Day2 - Context B



Day3 - Context A or C

Return to Day 1 (ABA renewal)



Novel Context (ABC renewal)
-**<u>Generalization</u>**

Hypotheses

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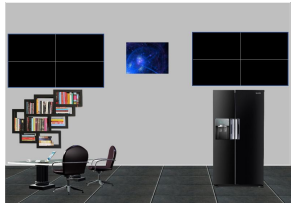
2 (60)	O	X	↓	↑	X	O
3 (60)	X	O	↓	↓	O	X
4 (60)	X	X	↑	↑	X	O

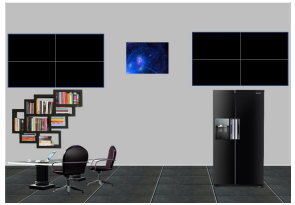
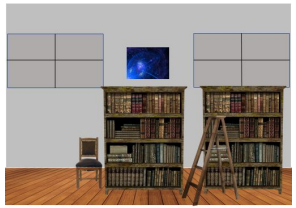
Task Structure - Dependent Variables

<Renewal>

- **ABA** Renewal (Return of Specific Context) : Impact of Stress & Retrieval


- **ABC** Renewal (Generalization) : Impact of Stress

Task Structure - Dependent Variables

<Declarative Memory>

- ‘Was this stimulus used in the task? Was it paired with reward or punishment?’ - **Error Rate**
- Retrieval: Intact Declarative Memory
- Stress: Impaired Declarative Memory

Task Structure - Dependent Variables

<Stimulus Generalization>

- Use only 2 (out of 3) CS+ in retrieval: **Generalization across CS+ color (all 6)**
- Retrieval: Stimulus Specific
- Stress: Stimulus General

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4 (60)	X	X	↑	↑	X	X

Retrieval Effect (Contextual Memory)

- Reconsolidation is **dependent on spatial context** (Hupbach et al., 2008)

- Human Memory Reconsolidation can be **Explained by Temporal Context Model / Latent Cause Model** (Sederberg et al., 2011; Gershman & Niv, 2017; Sinclaire & Barenese, 2019)

Stress Effect (Habitual Memory)

Neuroscience and Biobehavioral Reviews 98 (2019) 145–153

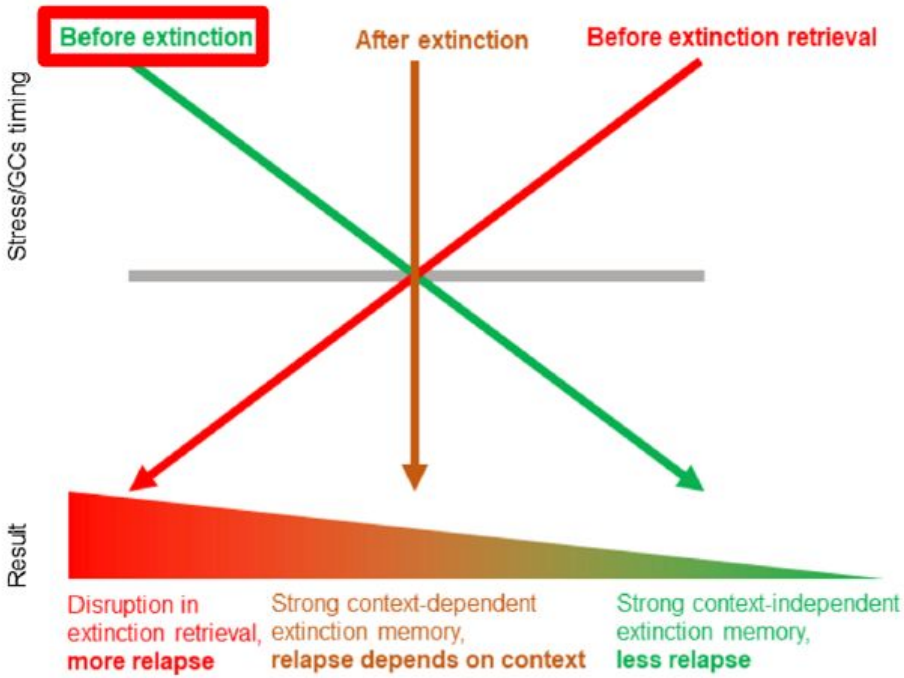
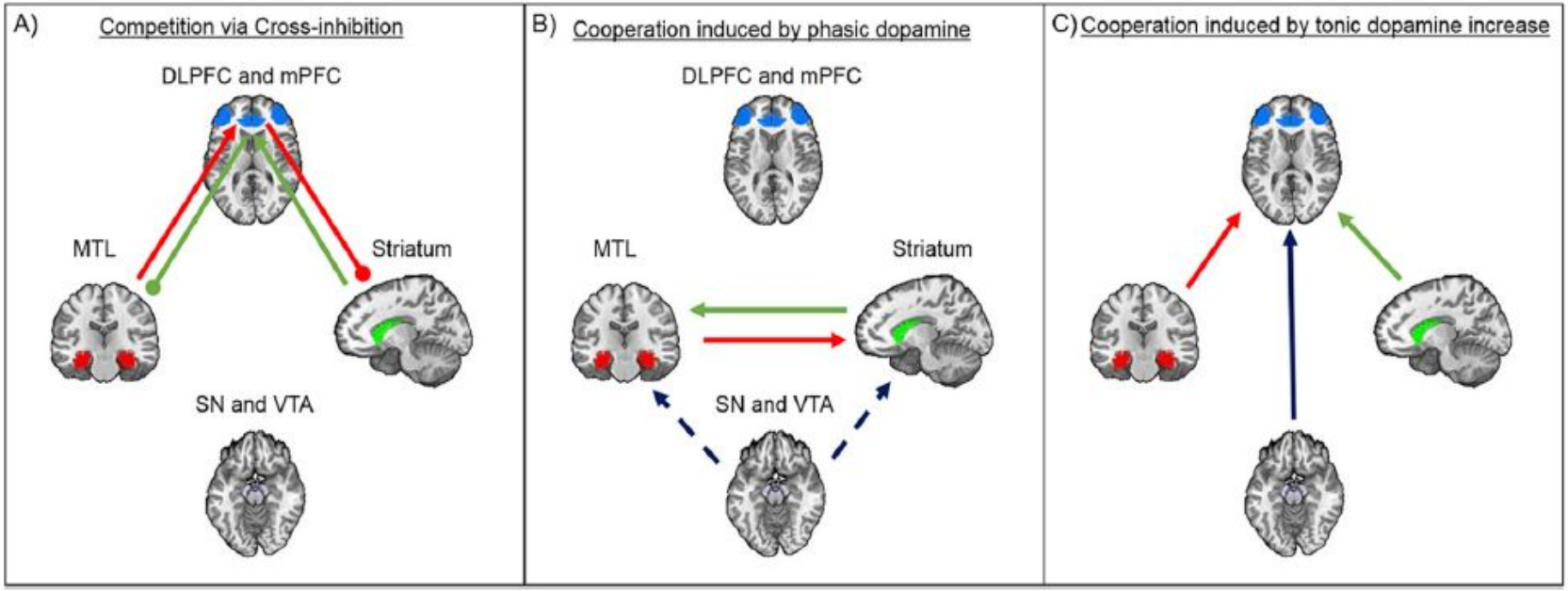


Fig. 1. The STaR (Stress Timing affects Relapse) model represents the timing-dependent modulation of extinction and relapse by stress/glucocorticoids (GCs). Stress/GCs before extinction promote memory consolidation in a context-independent manner, making extinction memory more generalized and thus resistant to relapse following context change. Stress/GCs after extinction also enhance extinction consolidation, but in a context-bound manner, not generalizing to other contexts. Stress/GCs before extinction retrieval test impair extinction retrieval and promote relapse.

Competition? Cooperation?



Freedberg et al. (2020)

Competition? Cooperation?

“..... Memory system cooperation promotes the generalization of learning across contexts, so that learning can be expressed in novel situations.” (Freedberg et al., 2020)

“.....Reward generalization was positively related to

Striatum - MTL (hippocampus) FC (functional connectivity).....”

(Freedberg et al. 2020)

Individual Differences?

- Variability in **<u>Stress Reaction</u>** Measures

  - Cortisol
  - Pupillometry?
  - Self-Report, Survey Results

Explain individual differences in Group 1 (Retrieval + Stress)?

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3 (60)	X	O	↓	↓	↑	↓
4 (60)	X	X	↑	↑	↓	↑

How Memory Can be Modified via

(1)Retrieval & Stress Manipulation

(2)and How Their Interaction is Modulated by Individual Differences in Stress Reaction

Implications

- Existence of two different mechanisms for memory modification
- Their interactive effect on learning/modification
- Cooperation/competition depending on individual differences?