

Discussion of Patel  
“Constructive Memory and Belief Formations”

Neil Stewart

# Today

- Nostalgia about stimulus sampling theory
- Main effects as well as interactions
- Rain and the Queen
- Measuring what you care about
- Maybe some priming

# TOWARD A STATISTICAL THEORY OF LEARNING \*

BY WILLIAM K. ESTES

*Indiana University*

- A stimulus is actually collection of many discrete “stimulus elements”
- On each trial a random sample of elements are active
- All or none conditioning of these elements
- Generalization between stimuli is given by overlap between elements
- Forgetting is due to difficulty in sampling elements

## “Schema Abstraction” in a Multiple-Trace Memory Model

Douglas L. Hintzman  
University of Oregon

A simulation model of episodic memory, MINERVA 2, is applied to the learning of concepts, as represented by the schema-abstraction task. The model assumes that each experience produces a separate memory trace and that knowledge of abstract concepts is derived from the pool of episodic traces at the time of retrieval. A retrieval cue contacts all traces simultaneously, activating each according to its similarity to the cue, and the information retrieved from memory reflects the summed content of all activated traces responding in parallel. The MINERVA 2 model is able to retrieve an abstracted prototype of the category when cued with the category name and to retrieve and disambiguate a category name when cued with a category exemplar. The model successfully predicts basic findings from the schema-abstraction literature (e.g., differential forgetting of prototypes and old instances, typicality, and category size effects), including some that have been cited as evidence against exemplar theories of concepts. The model is compared to other classification models, and its implications regarding the abstraction problem are discussed.

MINERVA 2, a multiple-trace model where memories are stored as vectors of features. Retrieval involves a global matching process that produces an “echo” representing a weighted average of stored traces, demonstrating pattern completion and the inference of missing elements

# Psychological Review

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VOLUME 88 NUMBER 2 MARCH 1981

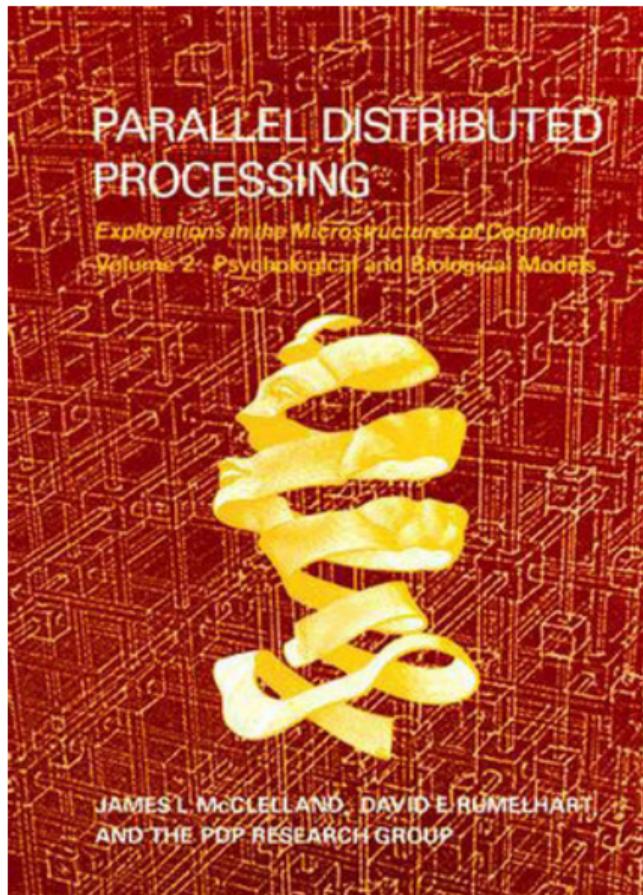
## Search of Associative Memory

Jeroen G. W. Raaijmakers  
University of Nijmegen  
Nijmegen, The Netherlands

Richard M. Shiffrin  
Indiana University

A general theory of retrieval from long-term memory combines features of associative network models and random search models. It posits cue-dependent probabilistic sampling and recovery from an associative network, but the network is specified as a *retrieval structure* rather than a storage structure. The theory is labeled SAM, meaning *Search of Associative Memory*. A quantitative simulation of SAM is developed and applied to the part-list cuing paradigm. When free recall of a list of words is cued by a random subset of words from that list, the probability of recalling one of the remaining words is less than if no cues are provided at all. SAM predicts this effect in all its variations by making extensive use of interword associations in retrieval, a process that previous theorizing has dismissed.

Global matching model where retrieval involves sampling and recovery based on cue-trace similarity



Chapters on autoassociative memory, connectionist principles, distributed representations and recurrent networks, pattern completion

*Proc. Natl. Acad. Sci. USA*  
Vol. 79, pp. 2554–2558, April 1982  
Biophysics

## **Neural networks and physical systems with emergent collective computational abilities**

(associative memory/parallel processing/categorization/content-addressable memory/fail-soft devices)

J. J. HOPFIELD

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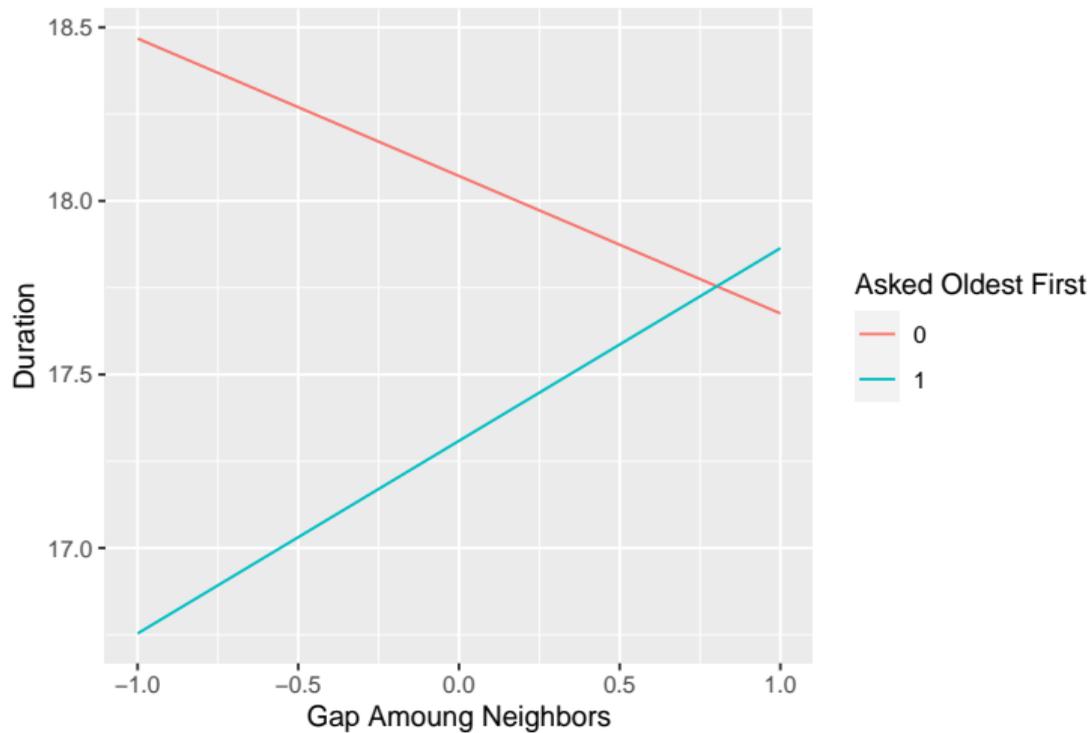
*Contributed by John J. Hopfield, January 15, 1982*

Hopfield network, a type of autoassociative neural network where partial input can settle into a complete, previously stored memory pattern

Table 5: First Flood Memory as Cue

	Duration	Any Crop Damage	Share Crop Damage	Any House Damage
	(1)	(2)	(3)	(4)
Asked Oldest Flood First	-0.763 (0.550)	-0.00416 (0.0171)	-0.0324** (0.0159)	-0.0486* (0.0280)
Oldest vs. Recent Feature Gap Among Neighbors	-0.396*** (0.136)	-0.541*** (0.179)	-0.927*** (0.187)	-0.366*** (0.0983)
Asked Oldest Flood First X Oldest vs. Recent Feature Gap Among Neighbors	0.951*** (0.123)	1.277*** (0.146)	0.795*** (0.200)	0.809*** (0.0810)
Outcome Mean	17.730	0.886	0.857	0.378
Observations	897	893	766	894

“A one day increase in the reported flood length between oldest and most recent floods among neighbors in the village for instance translates into a .95 increase in flood length among subsequent floods recalled by the farmer when that farmer is asked about oldest floods first”



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# Long term memory for common objects

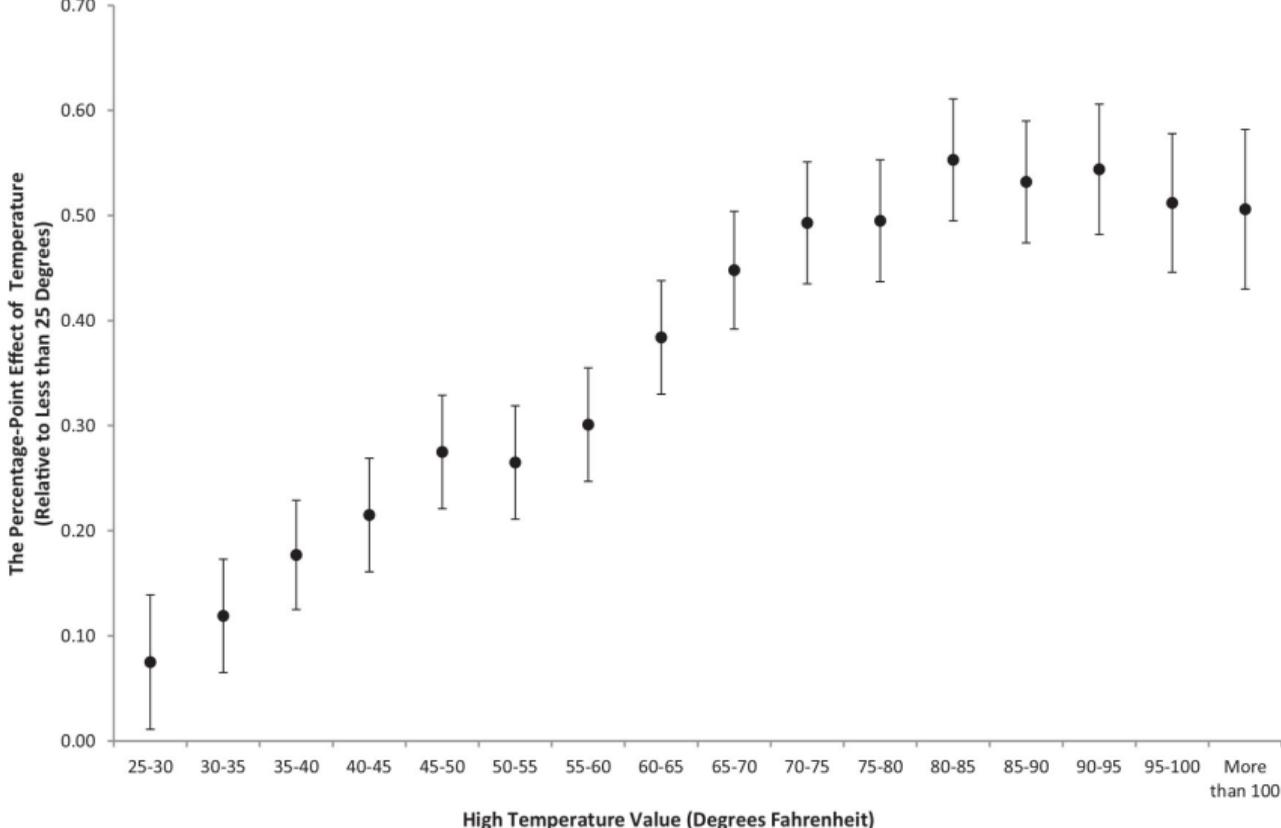


20 US citizens drew pennies (Nickerson & Adams, 1979)



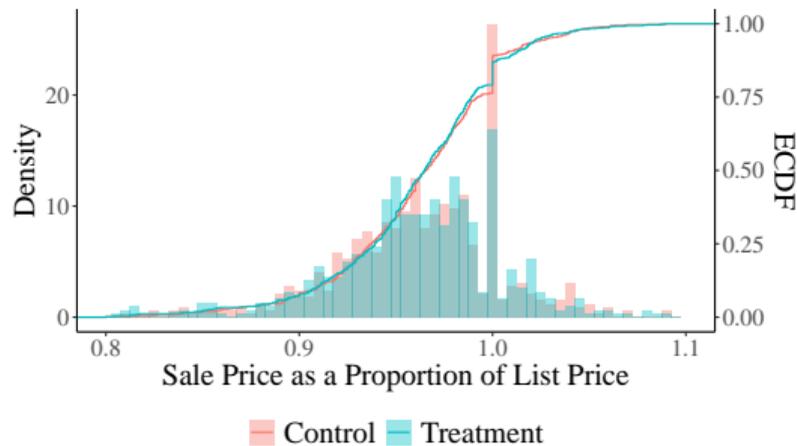
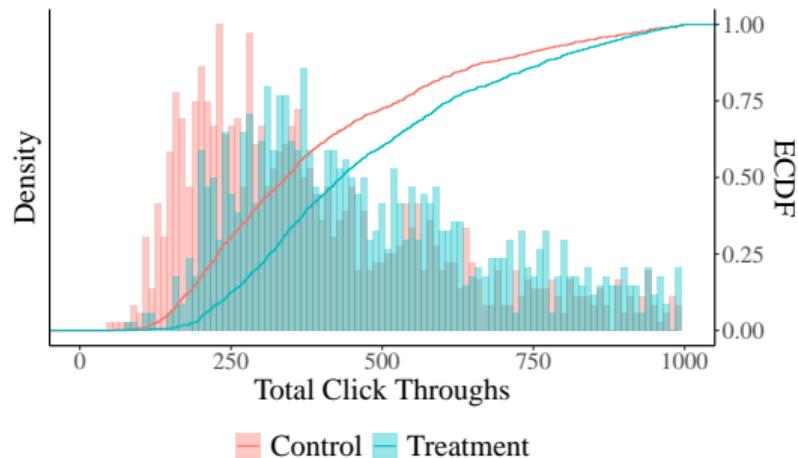
23 of 26 participants incorrectly drew a left-facing Queen (Jones, 1990)

# The psychological effect of weather on car purchases (Busse, Pope, Pope, & Silva, 2015)



# On the importance of measuring what you really care about (I)

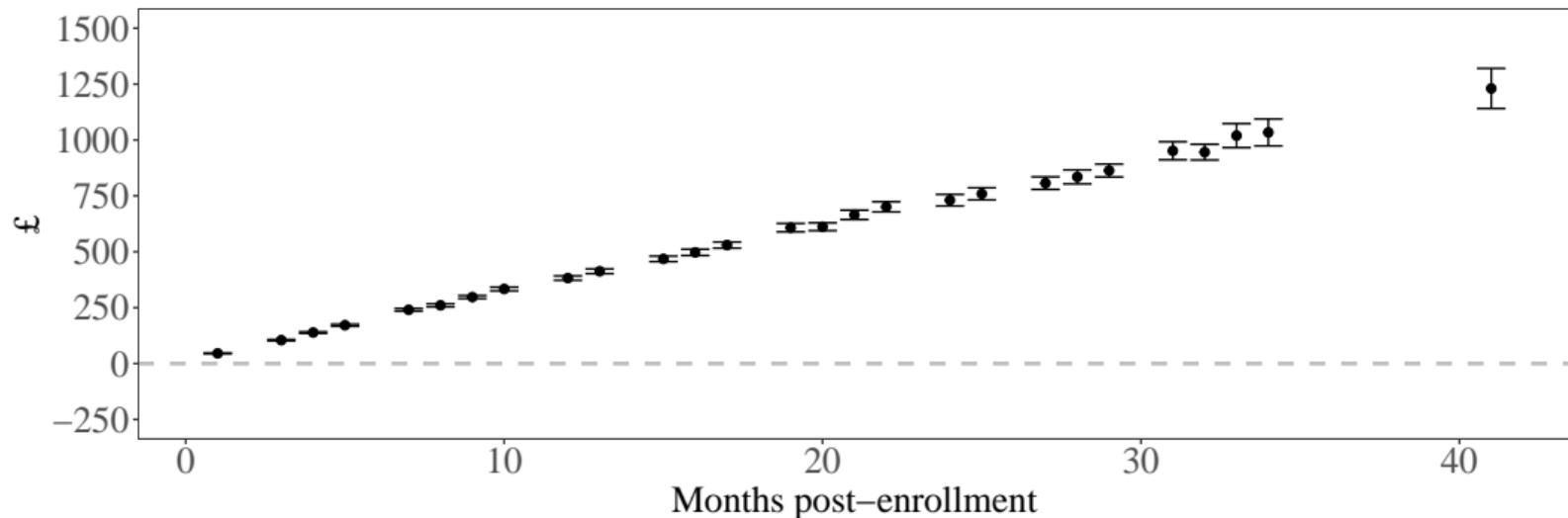
(Hume, Gathergood, & Stewart, 2025)



# On the importance of measuring what you really care about (II)

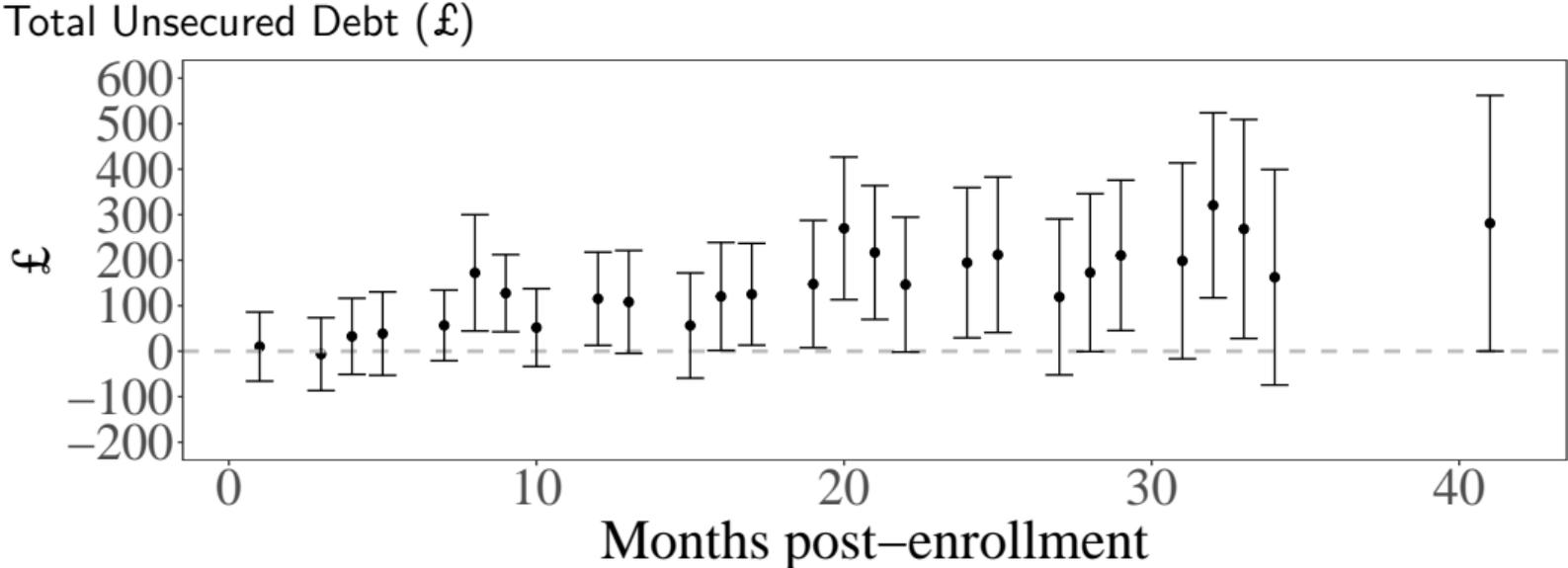
(Beshears et al., 2024)

Cumulative Pension Contributions (£)

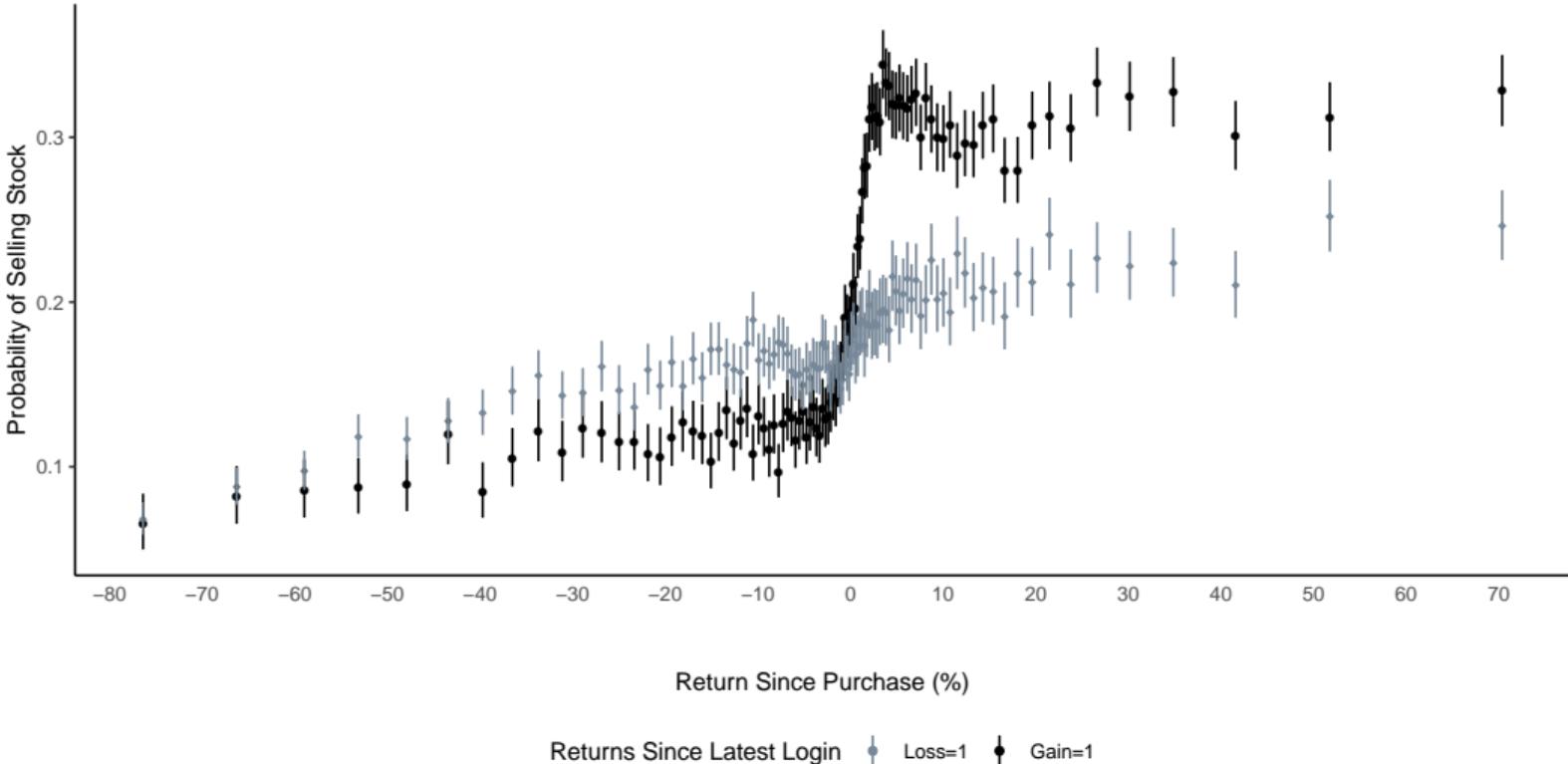


# On the importance of measuring what you really care about (III)

(Beshears et al., 2024)



# Priming can have a big effect (Quispe-Torreblanca, Gathergood, Loewenstein, & Stewart, 2024)



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