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Testing the fSAM Model of False Recall: Association Strengths and True-False Correlations

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Introduction

In the Deese-Roediger-McDermott (DRM) (Deese, 1959; Roediger & McDermott, 1995) paradigm, participants frequently intrude unstudied critical words while recalling lists comprising their strongest semantic associates. We used the fSAM model of false recall (Kimball, Smith, & Kahana, in press) to examine the effects of mean forward association strength (FAS), backward association strength (BAS), and intra-list association strength (connectivity) on veridical recall, critical word intrusions, and the correlation between veridical and false recall (true-false correlation).

The fSAM Model of False Recall

The fSAM model extends the Search of Associative Memory framework (Raaijmakers & Shiffrin, 1981) by incorporating the pre-experimental semantic associations in encoding and retrieval processes and by using multiple previously recalled items as retrieval cues. During encoding, the unstudied words' associations to list context are strengthened in proportion to their strength of semantic association to co-rehearsed words. During retrieval, words receive preference in proportion to their strength of semantic association to a subset of the most recently recalled words. The fSAM theory explains false recall of the critical word and other semantically-induced intrusions as being due to semantic processes operating at both encoding and at retrieval.

Simulation Method

We derived a set of parameters by fitting the fSAM model to data from experiments involving recall of DRM lists and lists of unrelated words (see Kimball, Smith, & Kahana, in press). We then used these parameters to simulate a typical delayed recall DRM experiment with semantic matrices that factorially varied mean FAS, BAS, and connectivity for Simulation 1 and mean BAS, mean connectivity, and the number of studied words associated to the critical word (3, 6, 9, 12, or 15) for Simulation 2.

Simulation Results

The predictions of the fSAM model in Simulation 1 (Table 1) are consistent with key empirical findings in the literature (e.g., Roediger, Watson, McDermott, & Gallo, 2001).

Table 1: Correlations for Simulation 1.

	Studied Words	Critical Words
Studied Words	---	−.52
FAS	+.01	0.00
BAS	−.07	+.73
Connectivity	+.98	−.47

In Simulation 2, fSAM made a novel prediction that the true-false correlation should shift from negative to positive as the level of critical word intrusions increases (Table 2). This prediction is consistent with a re-evaluation of the data from Roediger, et al. (2001) but has not been made by any other model of false memory.

Table 2: True-False Correlations in Simulation 2, Conditionalized on Critical Word Intrusion Rates.

Range of Critical Word Intrusions	fSAM Prediction	Roediger, et al. (2001)
$0 < CI \leq .70$	−.29	−.43
$0 < CI \leq .20$	−.16	−.29
$.20 < CI \leq .40$	−.04	+.21
$.40 < CI \leq .70$	+.07	+.19

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