Scene Context Can Cue Source Memory for Words

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Introduction

- Episodic memories of past events are made up of disparate elements bound together, such as people, places, objects, actions.

- Are these multiple elements always recalled together? At test, partial cues are thought to trigger pattern completion with **holistic recollection** of all elements of an episode together (Horner & Burgess, 2013). This is supported by findings of **dependency** in recall of different elements. But dependency is incomplete, often less than 10% (see Starns and Hicks, 2015, for review).

- Dependency in source memory can be probed with **cross-dimensional cueing**. Contrary to holistic recollection, externally cueing one element of an episode (face gender) did not enhance memory for another element (face location) (Hicks & Starns, 2016).

- We 1) assessed cross-dimensional cueing of source memory for objects with scene context (Experiments 1a-b) and 2) explored whether dependency in memory for two uncued event elements would be effected by a cue (Experiment 2).

Methods

**Experiments 1a** (N = 23), and **1b** (N = 33)   **Experiment 2** (N = 60)
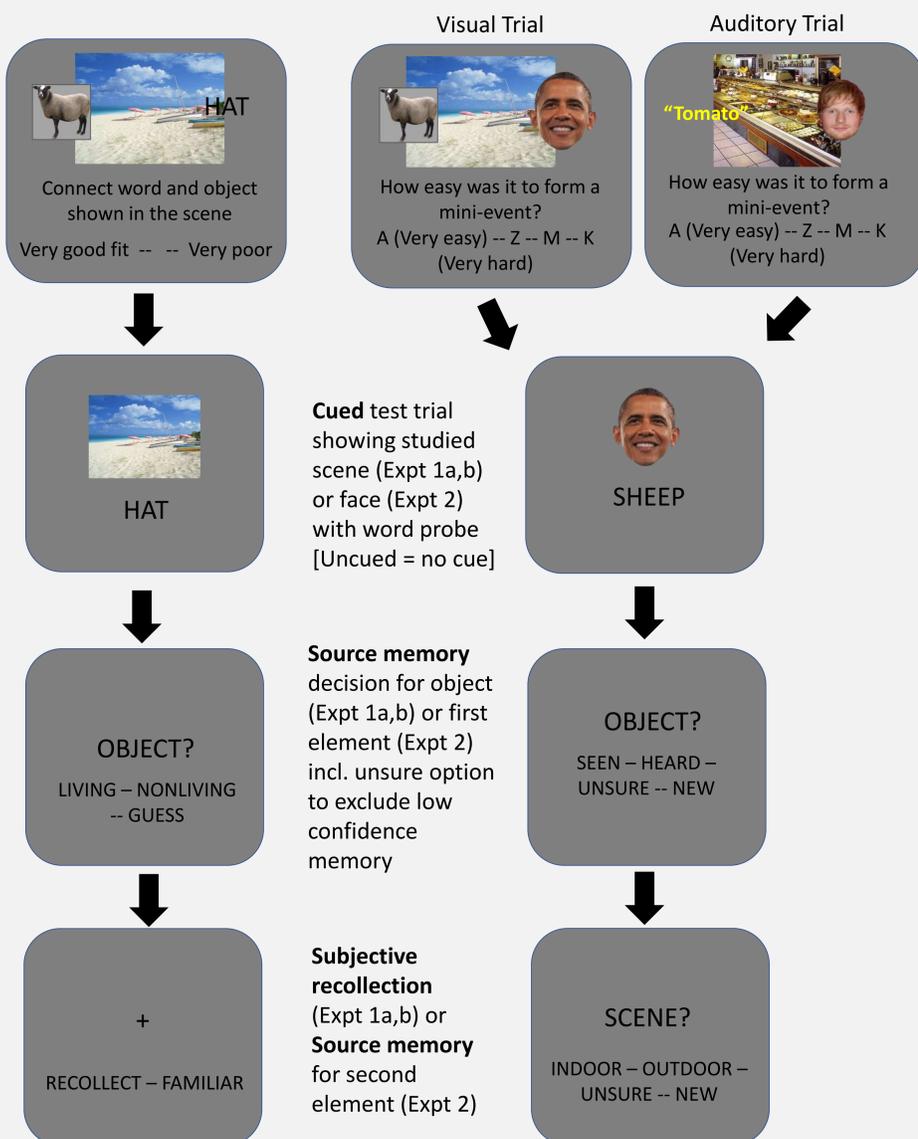
- Data for **Experiments 1a-b** each from one of 3 study-test cycles
- Studied 72 trials including 12 scenes, self-paced study (cue overload = 6)
- Test 72 trials at 5 sec SOA

- **Experiment 2** used 1 study-test cycle, 3 element design
- Studied 96 trials including 16 faces, 10 second study time (cue overload = 6)
- Test 96 trials at 3 sec SOA
- Source memory test order counterbalanced across participants

- **Data analysis** with R 4.0.2 version and Tidyverse packages
- Measured discrimination between 2 sources at test using d' and source memory dependency following Horner and Burgess (2013)

Results

- In Experiments 1a and 1b accuracy (d') was higher and recollection more likely when the scene was included as an external cue relative to no-cue trials. (Experiment 1a: $t(23) = 3.14$, d = 0.93, p = .003; Experiment 1b: $t(33) = 5.68$, d = 0.82, p = < .001).

- These cross-dimensional cue effects were larger for Recollected items taken alone. (Experiment 1a: $t(23) = 6.95$, d = 1.95, p < .001; Experiment 1b: $t(33) = 6.36$, d = 1.11, p < .001).

- But in Experiment 2, cues did not improve source memory for objects (seen/ heard) or scenes (indoor/ outdoor) relative to no-cue trials. ($t(60) = -0.41$, d = 0.05, p = 0.687, BF for null = 0.20).

- Furthermore, in Experiment 2, cues did not improve source memory for the first source question asked. (objects seen/heard asked first: $t(30) = -1.69$, d = 0.24, p = .101; scene indoor/outdoor asked first: $t(30) = 0.09$, d = 0.00, p = .930)

Figure 1: Error bars: Means and 95% CI
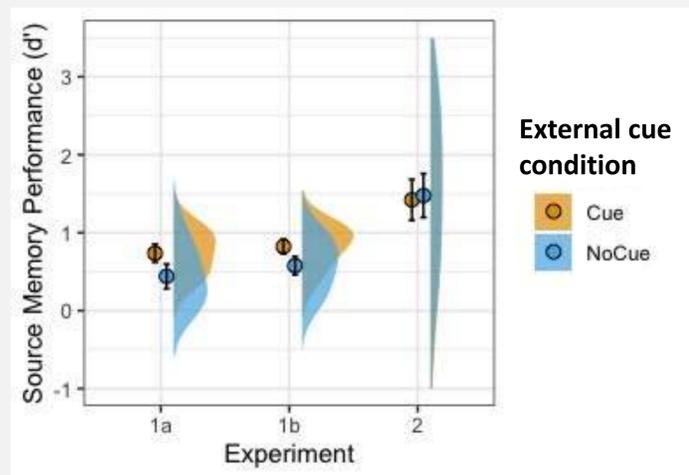
Conclusions

- **Strong cross-dimensional cueing in Experiments 1a and 1b:** representing a studied scene improved source memory for objects that had been studied with probe words. As large or larger cueing effects for recollected items taken alone.

- These data support holistic recollection, showing that cross-element links can be powerful.

- But: **no cross-dimensional cueing in Experiment 2** where representing a studied face did not improve source memory for the objects or scenes, when probed with the object names.

- Note: we also found significant dependency between object and scene source memory in Experiment 2 but could not assess cue effects on dependency in light of null cue effects on memory for individual dimensions.

- A strong version of holistic recollection predicts that cueing will not modify dependency.

- Taken together, findings may suggest that spatial context plays a special role in the way episodic memories are represented, stored and retrieved (see Smith and Vela, 2001).

- We are currently testing these hypotheses.

References

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