Task dependent memory recall performance of naturalistic scenes: 
Incidental memorization during search outperforms intentional scene 
memorization

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Memorizing critical objects and their locations is an essential part of everyday life. In the present 
study, incidental encoding of objects in scenes during search was compared to explicit 
memorization of those scenes. Participants were shown 10 different, indoor scenes. 150 objects 
(15/scene) were preselected. Regions of interest were defined around each object for eye tracking 
analysis. Observers searched for ten objects in each of five scenes (50 trials, mean RT=3550ms). 
For the other five scenes, observers spent 15 seconds memorizing as much as possible of each scene 
for later recall (task order and scenes assignments counterbalanced). We subsequently tested 
explicit scene memory in two ways. Global scene representation / boundary extension was assessed 
by showing observers previously-presented scenes and asking if the scene was closer-up or further 
away than the “original”. Detailed scene memory was assessed by asking participants to redraw 
each of the 10 scenes and their objects. We found no indication of boundary extension for these 
complex, indoor scenes. Inferences about the scene beyond the image border did not become part of 
scene memory. Overall, a rather small percentage of the objects were subsequently drawn. 
Interestingly, even though participants in the search condition were not explicitly asked to 
memorize the scenes, they reproduced a substantially greater number of objects (22%) compared to 
the memory condition (11%). This advantage was produced by 29% recall of search targets, which 
received highest gaze durations (2600ms). Only 9% of all distractors were recalled despite mean 
gaze durations of 1730ms. Objects in the memorize condition were only looked at for 700ms, but 
11% of these objects were recalled suggesting differential, task-dependent encoding strategies. 
Instructions to search for specific objects produced stronger encoding than the general request to 
memorize the scene even though the critical objects were repeatedly fixated in both conditions.

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