Janson, Charles H. "Capuchins, space, time and memory: an experimental test of what-where-when memory in wild monkeys." *Proc. R. Soc. B*. Vol. 283. No. 1840. The Royal Society, 2016.

Basic experimental setup: 8 feeding platforms distributed throughout the home range of a single group of capuchins during a time when naturally available fruit is essentially absent. Platforms accumulated resources at two different speeds, with a max availability equivalent to two days of accumulation (resources don’t technically accumulate, the appropriate number of banana slices are placed on the platform when the capuchin group gets close.) Capuchins generally moved in direct lines between the feeding platforms, and models in which they knew the location, regeneration rate, and time since last visit were significantly better at predicting their movement than a variety of null models.

Krebs, J. R., Healy, S. D. & Shettleworth, S. J. Spatial memory of Paridae : comparison of a storing and a non-storing species , the coal tit , Parus ater , and the great tit , P . major. *Anim. Behav.* **39,** 1127–1137 (1990).

Compared two bird species: storing and non-storing to test spatial memory. Found that, in general, performance was no different but that there do exist differences in spatial memory in storing and non-storing species. However, it could be that there are differences in *perceptual discrimination* (storing birds spending more time collecting cues about areas with more food, link to need to remember cache spots?).

General set up of experiment: two most important experiments included blocks in which there are rewards that are visible in the birds lift a cloth cover. Experiment 1 and 2 are similar except that experiment 2 was just increasing the difficulty. The birds are allowed to window shop at the blocks (7 blocks in experiment 1, 60 in experiment 2) and examine where there may be food. They then return to the blocks after an allotted period of time (30 minutes in experiment 1, 2 hours in experiment 2) and their search behavior and foraging success is recorded.

Clayton, N. S. & Dickinson, A. Episodic-like memory during cache recovery by scrub jays. *Nature* **395,** 272–274 (1998).

Paper examines caching behavior. *Degradation trials*: Birds presented with two food types: one that can degrade (worms) and one that cannot (peanuts). Birds allowed to cache food sources. Birds shown to have knowledge of food degradation (this was the degradation trial) because birds exhibited preferential recovery of food in accordance with food degradation. *Pilfering trials:* Birds caches can/will be pilfered by other jays. Birds accounted for this based on the amount of time between caching and retrieval.

Overall, the experiment showed memory of “where”, “what”, and “when” of items stored.

Balda, R. P. & Kamil, A. C. Long-term spatial memory in Clark’s nutcracker , Nucifraga columbiana. *Anim. Behav.* **44,** 761–769 (1992).

Stright forwards. CLNU have a noted spatial memory associated with caching behavior (high montane birds). Experiment included 25 CLNU that were allowed to cache food and then randomly assigned a waiting period before returninng (either 11, 82, 183, and 285 days). Recovery of cached items was a lot higher than random recovery. Recovery at 285 days showed a lot more errors, indicating some forgetting. Should be noted that CLNU can locate cache sties even when food is removed and that the ability to locate cache sites is disreupted by removing landmarks.