Proposed design for CM “conditional probability” experiment:

All memory sets composed of a mixture of CM and VM items -- half CM, half VM in random order

Set sizes 2, 4 and 6, randomly selected on each trial

The CM positive set will be composed of 3 standard CM targets and one special CM target

The CM negative set will be composed of 3 standard CM foils

The VM set will be composed of [4?] standard VM items. {Note: I propose using fewer VM items than CM items to reduce frequency differences between individual VM items and CM targets – see below. For this design, the minimum number of VM items we can use is 4.}

Except for memory sets containing the special CM target, the test probe on each trial is equally likely to be old or new

Regardless of memory set size (2, 4, or 6), with probability .1, the memory set will include the special CM target. On trials in which the memory set contains the special CM target, the test probe will ALWAYS be that special CM target. On trials in which the memory set contains the special CM target, the remaining CM memory-set items will be chosen randomly from the CM (standard) positive set. (Note: when set size is equal to 2, no other CM targets are included in the memory set when the special-CM target is present.)

Regardless of memory set size (2, 4, or 6), with probability .9, the memory set will NOT include the special CM target. The CM items included in the memory set are sampled randomly from among the members of the CM standard positive set.

Regardless of memory set size, and regardless of whether it is a special-CM-target trial, the remaining half of the members of the memory set will be sampled randomly from among the VM set.

As already noted above, for all standard memory sets that do not include the special CM target, the test probe is equally likely to be old or new. If the test probe is chosen to be OLD, then the probability that a CM item from the memory set is selected as the test probe will be equal to 2/3 (regardless of memory set size). Otherwise, a VM item from the memory set is chosen as the test probe. The sampling scheme ensures that each individual CM target item (including the special CM target) is tested on average once every ten trials.

If the test probe is chosen to be NEW, then with probability .5 it will be a CM foil and with probability .5 a VM item not in the memory set. If a CM foil, then one of the CM foils will have a [.5?] probability of being selected and the other two will each have a [.25?] probability of being selected.

An advantage of this design is that all individual CM target items will be presented with the same frequency as test probes. The standard CM targets will have much higher frequencies of presentation in the memory sets (compared to the special CM target); however, the special CM target has a much higher conditional probability of being selected as a test probe given that it occurs in a memory set. A disadvantage of the design is that individual standard CM targets have higher frequencies of presentation than do VM items (in both the memory sets and as test probes). So even if standard CM targets show performance advantages compared to VM targets, it could be due to overall familiarity rather than item-response learning. The key question here is the comparison of the special CM target to the standard CM targets.