Supporting Information

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SI Methods

Participants. Eighty-four undergraduate students from the University of Maryland ($n = 54$) and University of California ($n = 30$) participated for extra credit.

Materials. All independent cue and target words were selected from the USF Free Association Norms database (1) Forty independent cue words were selected, with two associates per cue. One associate was assigned as the studied target in a cue–target pair, and the other was used as the corresponding distractor in the forced-choice phase. For each participant, the assignment of associates to target and distractor was random, as was assignment of words to conditions. The two associate words had a minimum backward association strength (target to cue) of 0.01 and a minimum forward association strength (target to distractor) of at least 0.15. The two forward association strengths did not differ by more than 0.25. The associates were cross-referenced with the MRC Psycholinguistic Database (2) to exclude those that were not four to six letters long, at most two syllables, or did not have a minimum written frequency of 20 (3). Emotive associates and associates that were elicited by two different meanings of the cue word were eliminated. Forty additional words were randomly assigned as cues words in the cue–target pairs used during initial learning. These were three- to eight-letter nouns, at most three syllables, and did not associate to any target/distractor/independent cue words.

Procedure. The study was a within-subjects 2 (initial memory strength: strong or weak) $\times$ 4 (suppression training task: recall, no-think, press-enter, or baseline) design. The study was run entirely by computer and programmed with Revolution (Mirye Software Publishing).

There were four phases to the experiment: initial learning, suppression training, original cue recall, and independent cue recall interleaved with forced-choice recognition. The initial learning phase presented participants with 40 cue–target word pairs at a rate of 5 seconds per pair in the center of the computer screen in an order randomly determined for each participant. Next, participants performed cued-recall testing to assess the degree of initial learning. Participants were tested with each cue word and were informed whether their typed response was correct. If incorrect, they were informed of the appropriate response. This test list was repeated in random order as cue words were progressively eliminated from the test list in accord with the memory strength manipulation: Weak memory item cues were eliminated after the participant correctly recalled the target word once, whereas strong memory item cues were removed after the target was recalled three times.

The second phase was suppression training,* where 10 of the 40 word pairs were randomly assigned to each of the four task types: recall, no-think, press-enter, or baseline. Suppression training consisted of 19 blocked repetitions of the 30 cues assigned to the no-think, press-enter, and recall conditions, with a break after the 10th block. Within each block, the 30 cues were randomized. Participants learned appropriate recall, no-think, and press-enter responses through trial-by-trial feedback. For recall cues, participants attempted to type in the target word when given the cue. Feedback for the recall task was the same as in the initial learning. The no-think cues required participants to not press any key for the 4 seconds that the cue remained on the screen. Participants were informed that they were correct after four seconds of keyboard inactivity, but if they pressed any key, they were told "Incorrect! You need to not press any key and not think about the word's pair!" The press-enter cues required participants to press the enter key within 1.5 seconds of the cue appearing on the screen, and if they did so, they were informed that they were correct. If participants took longer than 1.5 seconds to press the enter key, they were told: "Incorrect! Press Enter Faster!" If participants pressed any other key, they were told: "Incorrect! You need to press Enter and no other key!" Additionally, participants saw a score box that contained their "score" of how well they were doing, with points added or subtracted for each correct or incorrect response, respectively. The points were such that accuracy on recall cues resulted in more points than accuracy for the no-think or press-enter cues.

The third phase was a surprise original cue recall test for all 40 of the cue words from initial learning. Cues were presented one at a time in random order, and the participants were asked to recall the corresponding target words. It was stressed that accuracy was highly desirable, regardless of any previous instructions. To reduce additional learning during testing, no feedback was provided for this or any of the other final tests.

Last was the independent cue recall and forced-choice recognition, which occurred in an interleaved fashion. On each test trial, the participant was presented with a previously unseen word that was semantically associated with one previously studied target word, and he or she was told to use this to guide his or her recall. Next, regardless of what was recalled, the participant saw the correct target and a distractor word that was also an associate of the cue and was told to choose the word that was studied previously. The left/right screen position of the choices was randomized. Each of the 40 original target words was tested both with independent cueing and with forced-choice recognition. During the independent cue recall, if the participant could not think of a word, he or she was instructed to guess. There was a short prompt present on the screen to remind the participant to recall or recognize the word he or she had studied previously that was related to the presented associate word.

1. Nelson DL, McEvoy CL, Schreiber TA (1998). The University of South Florida word association, rhyme, and word fragment norms. Available at http://w3.usf.edu/FreeAssociation/.
2. Coltheart, M (1981) The MRC psycholinguistic database. *Q J Exp Psychol* 33:497–505.
3. Kucera H, Francis WN (1967) *Computational Analysis of Present-Day American English* (Brown Univ Press, Providence, RI).

*Anderson and Green's [Anderson MC, Green C (2001) *Nature* 410:366–369] suppression training had three stages: (*i*) learning which cues should elicit the no-think response; (*ii*) practice to recognize these cues; and (*iii*) repeated suppression training. Our paradigm involves two different classes of nonrecall during suppression training, and pilot work revealed that participants found it too difficult to learn in advance which cues implied which responses. We found that trial-by-trial feedback was needed to achieve high accuracy.

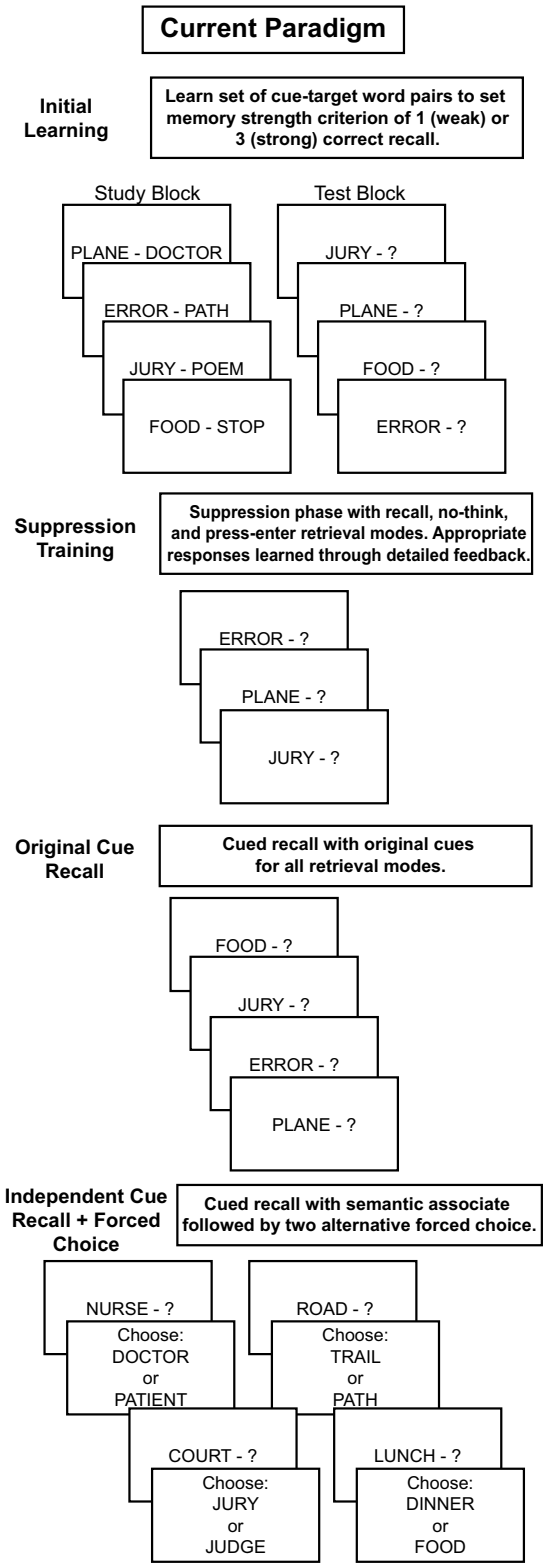

Fig. S1. The current methodology as adapted from the Anderson and Green [Anderson MC, Green C (2001) *Nature* 410:366–369] think/no-think paradigm. There were four experimental phases: initial learning, suppression training, original cue recall, and independent cue recall interleaved with two-alternative forced-choice recognition. The four word conditions (recall, no-think, press-enter, and baseline) are represented in the figure.

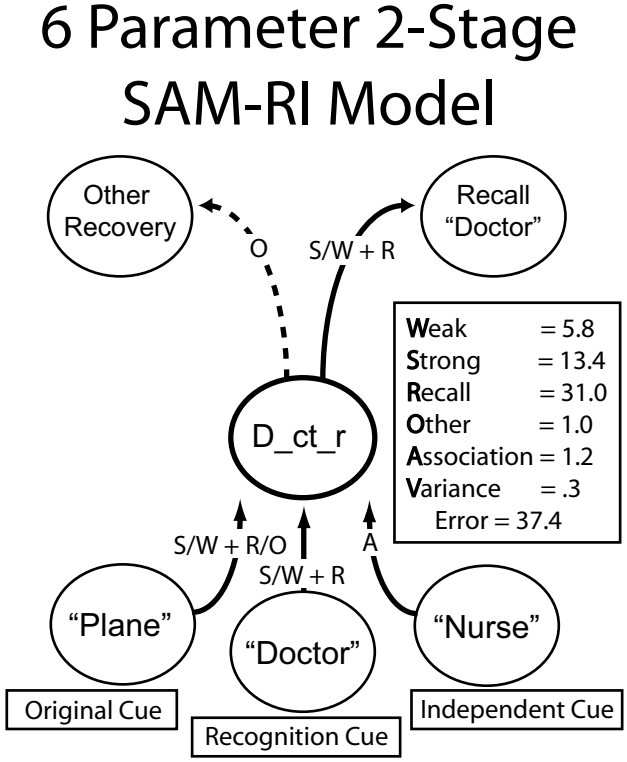

Fig. S2. Different associations required in the SAM model of two-stage recall for original cue recall, recognition, and independent/semantic cue recall. The values in the box show best-fitting parameters and χ^2 goodness of fit (error). As seen in the equations embedded in the figure, the *S* or *W* parameters are applied according to the Strong or Weak condition, and the *R* or *O* parameters are applied according to the Respond or Other (no-think or press-enter) conditions. The *O* parameter does not apply to the self-cue (recognition) because the target is neither recalled nor presented in the no-think and press-enter conditions. See main article text for further model descriptions.

Table S1. Observed mean accuracy by task during suppression training

Training block	Recall	No-think	Press-enter
1	0.34 (0.02)	0.22 (0.01)	0.15 (0.01)
4	0.54 (0.02)	0.26 (0.02)	0.29 (0.02)
19	0.88 (0.01)	0.85 (0.01)	0.79 (0.01)

Accuracy reflects mean percent correct for the three conditions. A trail is correct when: recall, the target is typed; no-think, the target is typed for 4 seconds; and press-enter, the enter key is pressed within 1.5 seconds. The SEM is reported in parentheses.