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OBSERVATIONS

Does Recoding Interfering Material Improve Recall?

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In 4 experiments, the authors attempted to replicate an improvement in recall of target memories produced by a post-learning clue enabling participants to reorganize and segregate interfering material, as shown by G. H. Bower and T. Mann (1992). The 1st three experiments studied retroactive interference (RI) in free recall of an initial word list after participants were informed post-learning of a way to categorize a second, interfering list. In each case, the reorganizing clue failed to reduce RI. In the 4th experiment, interference during serial recall of an initial list of letters from a 2nd list was examined. Again, the reorganizing clue given after learning failed to reduce RI. Clearly, if the post-information effect is genuine, then better experimental arrangements will be required to demonstrate it more reliably.

The experiments reported in this article were undertaken in an attempt to replicate and extend earlier findings reported by Zimmerman (1954) and Bower and Mann (1992). Zimmerman found in a two-list interference paradigm that informing participants after learning of a way to reorganize and simplify List 2 enhanced their recall of List 1. The learning materials were lists of 21 apparently random letters. Unknown to the learner, List 2 was composed of the phrase *wealthy bankers holiday* spelled backwards without spaces. Telling participants this fact after they had learned List 2 presumably enabled them to reorganize and simplify the List-2 letter series. This reorganization of List 2, even after learning it as an arbitrary letter series, apparently enabled recallers to segregate it and reduce its interference with recall of List 1. This was dubbed the *post-information effect* in reducing interference.

Bower and Mann (1992) extended Zimmerman's (1954) results. Using serial recall of a reorganized letter series, their first two experiments replicated, with minor procedural variations, Zimmerman's post-information effect. In two further experiments, Bower and Mann found a post-information effect with free recall of lists of names of United States' cities. The reorganizing clue in this case—told to some participants after they had learned List 2 and just prior to recalling List 1—was that List-2 cities (such as Madison, Wisconsin; Jackson, Mississippi) were also names of American presidents. This post-information clue improved recall of List 1 for the informed participants above that for uninformed participants. Moreover, the improvement occurred even in a modified–modified free recall (MMFR) test that supposedly minimized any impact of list discrimination in reducing List-1 recall.

If it is reliable, this post-information effect poses serious problems for extant theories of memory and recall. Except for improved editing (which the MMFR test attempted to rule out), no extant theory could explain why a post-learning clue referring to interfering material should enhance recall of target memories (see the *Discussion* section in Bower & Mann, 1992). The importance of the result on theoretical grounds, then, justifies its further exploration.

Unfortunately, there are several reasons to question the size and robustness of the post-information effect, and some of these were mentioned in Bower and Mann's (1992) article. First, in an experiment noted only briefly (an editorial decision relegated it to footnote 2, p. 1314), Bower and Mann reported that the post-information effect failed to appear in a serial-recall experiment that varied the method of learning and testing (using a computer for programming presentations and taking keyboard responses). The absence of the effect there was ascribed to participants' possibly encoding List 1 as a motor series of key presses. Nonetheless, as the authors wrote, "the absence of the [post-information] effect here does suggest the delicate nature of the effect using serial-recall procedures" (p. 1314). A second reason for replication is that the post-information effect in the Bower and Mann experiments was quite variable, with effect-sizes ranging from .59 to over 1.06.

A third doubt was raised by a vexing problem with the cities–presidents materials, namely, 70% of Bower and Mann's (1992) participants in the uninformed condition reported that

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they had noticed during study that List-2 cities were presidents' names. Bower and Mann reported that these aware uninformed participants recalled more than unaware uninformed participants and about the same as post-informed participants. This effect of awareness during List-2 study is consistent with theoretical analyses (e.g., "presidents" provides a discriminating cue for List-2 storage and retrieval, thus preventing overloading of the List-1 "cities" cue). However, the novelty of the post-information phenomenon hinges on the fact that participants apparently could reorganize interfering material after it was learned. Therefore, that so many uninformed participants noticed during learning that the cities were also presidents raises doubts about the methodology.

Because of these concerns, we conducted experiments designed to replicate and extend the findings of Bower and Mann (1992). All the experiments had the following three standard groups. *Rest controls* learned List 1 and then performed an unrelated distractor task for several minutes prior to the retention test for List-1 recall. *Interference* participants learned Lists 1 and 2 and then were tested for recall of List 1. After learning List 2 and just prior to recalling List 1, participants in the *informed* condition were told that List 2 had a specific categorical structure. This clue was not provided in the *uninformed* condition. The question is whether this post-informative clue would reduce the retroactive interference (RI) usually observed when comparing participants in the uninformed condition to those in the rest control. Specific details of the experiments follow.

Experiment 1

In an attempt to avoid problems raised by participants' noticing the special nature of the List-2 words, Experiment 1 was designed as a modest extension of Bower and Mann's (1992) Experiments 3 and 4. The idea was to compose List 2 from category items that belonged to a restricted (but nonobvious) subset of the categories exemplified in List 1. By this means we hoped to prevent participants from noticing the common feature while learning these particular subsets. This would enable us to inform participants in one condition of these restrictions after they had learned List 2 and prior to recall of List 1, thus consigning participants to informed and uninformed groups.

Method

Participants. Eighty-two San Jose State University undergraduates were randomly assigned, 29 to the rest control, 26 to the informed interference, and 27 to the uninformed interference conditions.

Procedure. Participants were tested in small groups of 5–10, with materials presented by means of an overhead projector. All participants received one study-then-free recall trial on List 1 consisting of 24 words—8 each from the categories flowers, animals, and United States cities. The words were presented in a random order (not blocked by category) during study at a rate of one every 3 s. During learning trials, participants had 2 min for written free recall. The interference groups then had an identical study–recall trial with List 2, which consisted of 8 words each from a subset of flowers (that were also women's names), animals (stereotypic zoo animals), and cities (with major-league baseball teams). None of the items in List 1 belonged to the List-2 subcategories. Instead of a List-2 study–recall trial, the rest controls rated (on a 10-point scale) the humor of *Far Side* cartoons (Larson, 1984) for an equivalent time (4 min). Following List-2 learning or cartoon rating, all participants then rated cartoons for 5 min and then were tested for List-1 cued recall using the category cues of flowers, animals, and cities. Participants had 3 min to write their recalls on a sheet containing the three category labels with 8 recall slots below each label. Immediately before recall, participants in the informed group were told (and they also read) the clue that the List-2 items belonged to distinct subsets, namely, that the cities were cities that have professional baseball teams, that the animals were stereotypical zoo animals, and that the flowers were also the names of women. Following the removal of these clues, informed participants recalled List 1. Uninformed participants, after completion of List-1 recall, were asked to describe anything unusual they might have noticed about the List-2 items. Then, both interference groups were asked to free recall List-2 items for 3 min, given the initial category labels (cities, animals, and flowers). After this recall, participants in the informed condition were asked whether they knew about the baseball teams that were located in the List-2 cities. This information led to our dropping 4 of the 26 participants in the informed condition.

Results

The nonobvious subcategories in List 2 largely prevented participants from detecting its organization. Only 4 of 27 uninformed participants reported noticing the nature of at least one of the three subcategories. Their data were excluded from the subsequent analyses.

The main results, collapsed across categories and displayed in Table 1, are the proportions of List-1 items recalled initially and during the later retention test. As expected, the groups did not differ in initial learning, $F(2, 71) = .73, p > .10$. On the retention test, the rest controls recalled significantly more than either of the other two groups ($p < .001$ in each case), thus demonstrating RI.

Despite significant RI, there was no post-information effect. On the retention test, the informed and uninformed participants did not differ in List-1 recall, $t(43) = 0.96, p > .10$. Nor did these groups differ in their forgetting from initial to final recall (forgetting of 23% and 22% for the two groups). This pattern of null results was also consistent across categories. Retention loss scores (initial minus final recall percentages) for flowers, animals, and cities for the informed (and uninformed) participants were 18% (17%), 21% (21%), and 31% (29%), respectively. None of these pairs differed significantly, all ts < 0.32.

To determine whether this failure to reject the null hypothesis of no group difference was due to lack of experimental power, we computed the power based on the comparable Experiment 4 of Bower and Mann (1992; see Cohen, 1988, 1990). In that experiment, final List-1 recall comparing informed versus unaware uninformed participants yielded an effect size of 1.06. Given that effect size and the Ns of 22 and 23 in the present experiment, Experiment 1's power to detect a true difference is .95, which seems suitably large.

The subset clues were somewhat effective in stimulating recall of List 2: After hearing the subset clues, informed participants recalled 45% of List 2, compared with its 34% recall by uninformed participants. These percentages differ reliably, $F(1, 43) = 10.94, p = .002$.

Table 1
Average Percentage Recall of List 1 at the End of Initial Study and on the Final Retention Test

		% recall			
		Initial test		Final test	
Condition	*n*	*M*	*SD*	*M*	*SD*
		Experiment 1			
Rest	29	50	13	50	13
Informed	22	53	13	30	11
Uninformed	23	48	12	26	15
		Experiment 2			
Rest	50	54	14	56	14
Informed	41	56	15	48	16
Uninformed	53	58	14	49	14
Aware	47	59	14	51	14
Unaware	6	53	9	39	11
		Experiment 3			
Rest	13	42	12	41	8
Informed					
List 1 only	13	45	14	36	17
MMFR	13	36	8	31	7
Uninformed					
List 1 only	13	45	14	38	15
MMFR	13	45	12	37	13
Aware	21	43	14	36	15
Unaware	5	52	5	44	8
		Experjment 4			
Rest	23	68	32	61	31
Informed	28	64	31	35	27
Uninformed	39	69	29	44	37
Unaware	27	73	30	41	37
Aware	12	61	26	52	35

Note. MMFR = modified–modified free recall.

To summarize the findings of Experiment 1, we conclude that the ruse of having List-2 items be subcategories of the List-1 categories was fairly successful in concealing clues to this organization. Moreover, the subcategories were somewhat helpful in improving recall of List 2 and were probably helpful in distinguishing List-1 from List-2 items in memory. Despite these virtues of the organization of List 2, that knowledge when given as post-information caused no facilitation in List-1 recall. Thus, the result is not consistent with the earlier findings by Bower and Mann (1992).

Experiments 2 and 3

Given the failure of this small extension of Bower and Mann's (1992) Experiments 3 and 4, a closer replication of their general procedures was clearly needed to check the reliability of the original outcomes. Experiments 2 and 3 were undertaken at North Carolina State University with that purpose in mind. Experiments 2 and 3 are essentially similar except for the type of recall test taken by some participants. Consequently, they are described together.

Method

Participants. Participants were undergraduate students at North Carolina State University fulfilling a service requirement for their introductory psychology class. Experiment 2 involved 144 participants who were randomly assigned, 50 to the rest-control group, 53 to the uninformed group, and 41 to the informed group. There were 65 participants in Experiment 3, with 13 randomly assigned to each of the five conditions described below.

Lists 1 and 2 consisted of the United States cities used in Bower and Mann's (1992) Experiment 4, with List 2 also being presidents' names. Two different orders of the word lists were used, each for half of the participants in each condition of each experiment.

Procedure. Experiment 2 was conducted with groups of participants. The List-1 city names with their states (e.g., Seattle, Washington) were spoken and displayed one by one on an overhead projector at a rate of one every 5 s. After two exposures, participants attempted free recall, for 3 min, of the city names only (state names were not requested). The List-2 words were studied and recalled in a similar fashion by the interference participants while the rest-control participants spent an equivalent amount of time rating the humor of nine *Far Side* (Larson, 1984) cartoons on a 10-point scale. All participants then rated the same final six cartoons, after which they proceeded to the free recall test for List 1, which lasted 3 min. The retention interval from the completion of the earlier recall of List 1 to the start of the later retention test was 11 min. Just prior to retention testing, informed participants were told that the List-2 cities were also presidents' names. Following List-1 recall, participants in the interference groups were asked to recall List 2 and were given 3 min to do so. Finally, after turning over their recall sheets, participants in the uninformed group answered questions assessing whether they had noticed anything unusual about List 2, and if so, to indicate what it was. Their answers were used to classify uninformed participants as having been aware or unaware of the "presidents" nature of List 2.

The procedure in Experiment 3 was similar to that of Experiment 2, but with the following changes. Participants received one instead of two study trials on each list. The retention interval was 7 min rather than 11 min. Participants were tested individually rather than in groups. *Peanuts* (Schulz, 1962) rather than *Far Side* cartoons were used as distractors. In final recall, half of the informed and half of the uninformed participants were given 2 min to recall List 1 only; the other participants were given 4 min to recall both Lists 1 and 2 in any order (an MMFR test). The five groups thus formed were the rest controls, and the uninformed and informed conditions divided according to whether their retention was assessed by MMFR or by recall of only List 1. The MMFR recall sheet was divided into three columns marked *List-1, List-2,* and *not sure* (in which participants wrote the recalled words). As before, after retention testing, uninformed participants were queried regarding anything unusual about List 2 they might have noticed.

Results

List identification in MMFR of Experiment 3 was very accurate (averaging 99.7%). Recall of List 1 was scored both strictly and leniently (e.g., wrong list identification in MMFR, or misspellings); because both yielded the same pattern of significance, only the means for strict scoring are reported.

The primary results in terms of percent recalled are displayed in Table 1. The groups in Experiment 2 were equal in initial recall, but differed in final recall, $F(2, 141) = 4.18$, $p < .05$. There was clear RI as shown by the lowered recall of the two interference groups. However, the informed and uninformed participants were nearly equal on initial recall, final recall, and retention loss, dropping 8% versus 9% from their initial recall. Note that 47 of the 53 uninformed participants (89%) reported noticing the "presidents" nature of the

List-2 cities. When the participants were classified according to this criterion of awareness, the results indicated that the aware uninformed participants recalled somewhat more than did the unaware participants at both initial and final tests. However, this performance difference can be explained as a selection artifact: Unaware participants may be less attentive than aware participants. Moreover, the retention losses of the aware and unaware uninformed participants (8% and 14%) did not differ significantly, $t(51) = 1.64, p > .10$.

We conclude from Experiment 2 that the post-information effect did not appear despite the presence of significant RI.[1] That is, the informed participants showed as much RI as did all the uninformed participants combined. When we separated the uninformed group into aware and unaware subgroups, the results showed that the aware subgroup did not differ from the informed group in initial learning, final recall, and retention loss. The unaware uninformed subgroup also did not differ from the informed group on any of these measures. However, the sample size of unaware participants was too small to draw firm conclusions.

As in Experiment 1, an analysis of List-2 recall was conducted to assess the potency of the List-2 cue. The informed participants' final recall of List 2 was 58%, while List-2 recall of the unaware uninformed participants was only 43%. These percentages differ reliably, $t(45) = 2.73, p < .01$, suggesting that the List 2 was potent in facilitating its recall. By implication, the failure of the reorganizing clue to reduce RI for List 1 cannot be attributed to its lack of influence on List-2 recall.

Turning to Experiment 3, the results on recall of List 1 are also shown in Table 1. Initial performance was lower overall than in Experiment 2, because only one study trial (rather than two) was given and the recall period was 2 rather than 3 min. Initial learning was comparable for all groups, $F(4, 60) = 1.29$, $p > .10$, as was final recall on the retention test, $F(4, 60) = 1.08, p > .10$. However, analysis of forgetting scores (initial minus final recall percentages) showed that there was significant RI, relative to rest controls, for the informed group, $t(37) = 3.10, p < .01$. Forgetting averaged 7.0% and 7.5% for the informed and uninformed groups, respectively; thus, the amount of forgetting did not differ significantly between the two groups, $F(1, 50) = .06, p > .10$. Final List-1 recall was slightly higher for participants recalling only List 1 relative to those who recalled by MMFR (37% vs. 34%), but this difference was not significant, $F(1, 50) = 0.29, p > .10$. Forgetting was 8% for participants who recalled only List 1 and 6.5% for those doing MMFR—an insignificant difference.

Twenty-one of 26 uninformed participants in Experiment 3 indicated noticing the "presidents" nature of at least some of the items on List 2. When we separated the data for aware and unaware uninformed participants, we found that the amount of forgetting was comparable, 7% and 8%, respectively, with $F(1, 24) = .07, p > .10$.

The potency of the post-information for enhancing List-2 recall could be assessed only for those participants tested by MMFR. The informed participants recalled 40% of List-2 items on the MMFR. Only one of the 13 uninformed participants tested using MMFR proved to be unaware, and this participant recalled only 15% of the List-2 items.

Because of the small numbers of unaware uninformed participants in each experiment, we combined Experiments 2 and 3 to compare performance of unaware uninformed participants with that of informed participants. The combined mean final List-1 recall was 42% for informed participants and 41% for unaware uninformed participants. This difference is obviously insignificant. On the basis of the effect size ($d = 1.06$) reported in Bower and Mann's (1992) comparable Experiment 4, and the combined *N*s here of 67 and 11 (harmonic mean of 18.9), the power of the combined data to detect a true difference is .92.

In a similar manner, we combined final List-2 recall scores across the two experiments for informed and unaware uninformed participants. The percentages of final List-2 recall were 54% for the informed participants versus 39% for the unaware uninformed participants, yielding $t(59) = 2.43, p < .01$. Thus, while the reorganizing clue was helpful in increasing recall of List 2, it nevertheless failed to reduce RI for List 1.

Given the difficulties in concealing the "presidents" nature of List 2, the resulting loss of uninformed participants, and the weakness of evidence for the post-information effect, we decided to abandon this methodology and, as a last resort, to return to the serial recall task used originally by Zimmerman (1954) and replicated by Bower and Mann (1992, Experiment 1).

Experiment 4

The materials and procedures of Experiment 4 were identical to those of Bower and Mann's (1992) Experiment 1, which closely followed those of Zimmerman's (1954) experiment. In light of the high level of List-2 awareness found in Experiments 1–3, we added several questions inquiring whether participants noticed anything unusual about List 2.

Method

Participants. The participants were 94 San Jose State University undergraduates who took part for course credit in Introductory Psychology. The students were randomly assigned to conditions and were run in single-condition groups that varied in size. There were 23 participants in the rest-control group, 28 in the informed group, and 43 in the uninformed group.

Procedure. All participants studied and recalled List 1 twice. List 1 consisted of the 21 ordered letters SOJFNUGPAHWMSELICBQTA presented in a vertical column on an overhead transparency. Each whole-list study period was 30 s long and participants were given 1 min for each recall. They wrote their recalled letters into 21 slots arranged in a column with spatial position corresponding to that presented at study. Immediately following List-1 learning, participants in the rest-control group were engaged in a distractor task for 6 min while informed and uninformed participants proceeded to study and recall List 2 twice. List 2 consisted of YADILOHSREKNABYHTLAEW typed in a vertical column on an overhead transparency. List 2 spells *wealthy bankers holiday* when read upwards from the bottom of the column. After List-2 learning, the informed and uninformed participants were then engaged in the distractor task, but for only 3 min. The distractor task consisted of counting objects in several displays of complex

[1] In research conducted by Thyra Rauch, as part of her doctoral dissertation under Dr. Newman's supervision, the essentials of Experiment 2 have been repeated, and with the same null outcome (i.e., reliable RI but absence of a post-information effect).

overlapping blocks printed on sheets of paper in a three-dimensional perspective. The retention interval between List-1 learning and final recall was 6 min for all groups.

After the filler task, all groups were given 2 min to recall as many of the letters from List 1 as they could in any temporal order. Again, they were told that they should write the recalled items in their correct spatial location within the recall column. In addition, immediately prior to the retention test, participants in the informed condition were verbally informed that the List-2 letters spelled the phrase *wealthy bankers holiday* when read backwards. Immediately following the unpaced recall of List 1, all participants performed paced recall of List 1. In this task, participants were asked to recall the first letter of List 1 and were given 5 s to do so. If they were unable to recall the requested letter in the 5 s, they were to place a check in that recall slot and then the experimenter presented the correct letter. Participants were then given 5 s to recall the next letter and were shown this next letter after the 5 s. This successive cueing procedure was continued through the rest of List 1. After the retention test, the uninformed participants were asked to record whether they had noticed anything unusual about List 2, and if so, what it was.

Results

Of the 43 participants in the uninformed condition, 12 (or 28%) reported that List 2 consisted of words or a phrase spelled backwards. This high percentage of "noticers" of a very obscure fact about List 2 suggests that some later participants may have been tipped off to the clue by earlier participants from the class. It raises the possibility that similar leakage and awareness might have occurred during learning by participants in Bower and Mann's (1992) Experiment 1 (in which participants' awareness was not quizzed), thus raising some concerns about those results. In the following, the 12 aware uninformed participants are treated separately from the remaining unaware uninformed participants. In addition, 4 unaware uninformed participants are excluded from the analyses as a result of their performance on the final List-1 retention test—3 because they apparently misunderstood the instructions and recalled List 2 rather than List 1, and 1 for not even trying (he wrote the alphabet).

Participants' recall was scored as correct only if an item was recalled in its correct absolute position within the recall sheet. This strict scoring correlates very highly with other, more lenient scoring methods for serial recall.

The percentage recall results are shown in Table 1. The groups did not differ in initial learning, $F(3, 86) = .65, p > .10$, but they did differ in recall on the unpaced retention test, $F(3, 86) = 3.16, p < .03$. Measuring forgetting by the loss from initial learning to the unpaced retention test, the groups differed reliably, $F(3, 86) = 5.42$, $p < .002$, with the rest controls and aware uninformed participants forgetting reliably less than the informed and unaware uninformed participants. A post-information effect requires that the informed participants forget less than the unaware uninformed participants. However, these two groups did not differ in any of several comparisons—neither in recall on the retention test nor in recall decrement, whether measured absolutely or as percentage losses relative to their initial recall scores (all $ts < 1$). A power analysis was conducted to determine whether the null outcome was due to insufficient power. The effect size in the comparable Bower and Mann (1992) Experiment 1 was moderate ($d = .59$). Given that moderate effect size, the power of the present experiment proved to be .70.

We noticed that a number of participants performed rather poorly in initial learning of List 1, in later recall, or both. To see whether such poor learning was distorting the pattern of results, we eliminated from all groups any participant who did not initially learn at least 8 of the 21 List-1 letters or who recalled less than 2 List-1 letters on the final retention test. These criteria excluded 6 rest controls, 8 informed participants, and 13 uninformed participants. However, the overall pattern of significant group differences was unchanged by these exclusions. Of particular importance, the informed and unaware uninformed conditions in these reduced groups yielded comparable forgetting both in an absolute sense (6.45 vs. 6.70 items lost) or percent retention relative to initial learning (59 vs. 62% retention of initially learned items). Moreover, these two groups were also comparable in the paced recall on the final retention test (12.6 vs. 12.9 letters).

The above comparisons provide no evidence for a statistically reliable post-information effect. In other words, we have failed to replicate the results of Zimmerman (1954) and Bower and Mann (1992, Experiment 1).

General Discussion

Our failures to replicate the post-information effect may be viewed charitably in light of the extraordinary set of conditions required to show any effect, assuming it is genuine. First, the experiment requires robust RI to serve as a baseline against which to gauge a reduction in RI due to post-information, and this was not always strongly in evidence. Second, the organizing principle or clue for List 2 must be so subtle that most learning participants will not notice it; yet it must be sufficiently strong and compelling that information about it (after studying List 2) will persuade participants that it is true and that it in fact would substantially improve their ability to recall List 2. The materials we used in these experiments were compromised attempts to meet these several criteria, but with mixed success. Bower and Mann (1992) speculated on the kinds of List-2 clues that might or might not produce a post-information advantage. We do not recount those speculations here.

The failure to replicate findings of early reports is always a puzzling and disturbing event. It is especially disturbing (not to mention embarrassing to the senior author in this case) because the earlier report of the post-information effect in Bower and Mann (1992) described four separate experiments in which the effect was obtained reliably. Moreover, Bower and Mann were essentially replicating and extending Zimmerman's (1954) findings. Furthermore, power analyses showed that, given the earlier effect sizes, the present experiments had sufficient power to detect a true difference in mean recall. The present negative results illustrate the small, delicate nature of the post-information effect, especially with these experimental arrangements.[2] Perhaps the earlier results were contaminated to varying degrees by post-informed participants becoming aware of the subtle organization of List 2 much earlier, as they were learning List 2. Yet, because their awareness during List-2 learning was not checked, we could not divide post-informed participants into aware and unaware subgroups. To the extent that participants become so aware, they can utilize the organization of List 2 to index it, segregate it from List 1, simplify it, and reduce the number of chunks or effective list length in memory. Such factors are known to reduce the interfering effect of some material on recall of other target material (see Brent, 1965, and the Introduction in Bower & Mann, 1992).

After some 10 experiments on the topic, we have concluded that the present experimental arrangements (the cities–presidents lists and the serial letter lists) are inadequate to demonstrate a robust post-information effect upon retrieval. It is possible that the post-information effect is a mirage. It remains an open question whether more sensitive experimental conditions can be arranged to produce the effect reliably.

[2] Recently, Intons-Peterson (1994; see also Intons-Peterson & Poulakidas, 1995) reported another failure to replicate the post-information effect with the cities–presidents materials and with an alphabetic clue (i.e., words of List 1 and 2 had first letters from different halves of the alphabet).

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