Journal of Experimental Psychology:
Learning, Memory, and Cognition

0278-7393/14/$12.00 DOI: 10.1037/xlm0000007

RESEARCH REPORT

Imagining Another Context During Encoding Offsets Context-Dependent Forgetting

E. J. Masicampo
Wake Forest University

Lili Sahakyan
University of North Carolina at Greensboro

We tested whether imagining another context during encoding would offset context-dependent forgetting. All participants studied a list of words in Context A. Participants who remained in Context A during the test recalled more than participants who were tested in another context (Context B), demonstrating the standard context-dependent forgetting effect (e.g., Smith & Vela, 2001). Importantly, some participants imagined another mental context during encoding. Some of these participants imagined Context B during encoding, and when they were later tested in Context B or even in a completely new Context C, they did not show forgetting, confirming our predictions. Other participants imagined a new context during encoding simply by transforming the current context (i.e., by imagining that it was snowing in the room), and this likewise counteracted context-dependent forgetting. These data suggest a moderator of context-dependent forgetting. When the context surrounding a memory is largely mentally generated, context-dependent forgetting is eliminated.

Keywords: memory, environmental effects, forgetting

People encode memories in association with co-occurring contextual details—where they were (Godden & Baddeley, 1975), how they felt (Lewis & Critchley, 2003), and what they were doing (Dijkstra, Kaschak, & Zwaan, 2007). As a result, memory is improved when the contextual features present at encoding match those present at retrieval, a phenomenon known as context-dependent memory. When the encoding and retrieval contexts mismatch, recall suffers, and people experience forgetting (for a review, see Smith & Vela, 2001). Numerous contextual features affect recall, including physical environments (Godden & Baddeley, 1975), emotional states (Beck & Mcbee, 1995; Eich & Metcalfe, 1989), and mental context (e.g., Sahakyan & Kelley, 2002).

One strategy for counteracting forgetting is to facilitate mental reinstatement of the encoding context at retrieval (e.g., Sahakyan & Kelley, 2002; Smith, 1979). This is often done by providing participants with step-by-step instructions to help them mentally reinstate the encoding context during retrieval, and this offsets forgetting. In the present work, we hypothesized another, more indirect strategy for facilitating reinstatement of the encoding context. We speculated that mental reinstatement of the encoding context during recall is easier and likelier when the context at encoding is largely mentally generated. Thus, we hypothesized that imagining another context during encoding would counteract context-dependent forgetting.

Some recent findings by Brinegar, Lehman, and Malmberg (2013) provide tentative support for this hypothesis. They tested people's memory when switching from an encoding context to a new one prior to retrieval, and they instructed some participants to imagine another context during encoding. Specifically, these participants imagined the *future* testing context, and this strategy offset context-dependent forgetting. Although overall memory did not significantly differ across various conditions of their experiment, Brinegar et al. analyzed other measures of memory performance (i.e., intrusions) and concluded that the novel strategy protected memory performance via contextual "preinstatement": People imagined during encoding the environmental cues that would be present during recall. Thus, the imagined context at encoding matched the physical context at retrieval. In this report, we propose a broader explanation that can also account for their results. We suspect that memory was protected not merely due to the anticipation of the *future* retrieval context but largely to the practice of mentally imagining some other context—any context—at encoding. To test this notion, we included three new conditions in the design, in addition to the ones employed by Brinegar et al. Our aim was to find more substantial evidence of their hypothesized results (i.e., by fully replicating context-dependent forgetting and by significantly counteracting it) and to test across the additional conditions our own predicted pattern. Our hypothesis differed from theirs in two ways. First, we predicted that context-dependent forgetting would be offset by imagining *any nonpresent* context during encoding, not only by imagining the

E. J. Masicampo, Department of Psychology, Wake Forest University; Lili Sahakyan, Department of Psychology, University of North Carolina at Greensboro.

Correspondence concerning this article should be addressed to E. J. Masicampo, Department of Psychology, Wake Forest University, Greene Hall 415, P.O. Box 7778 Reynolda Hall, Winston-Salem, NC 27109. E-mail: masicaej@wfu.edu

future retrieval context. Second, we hypothesized that imagining another context during encoding would offset forgetting regardless of where retrieval occurs—whether in the same physical context as during encoding, in the context that was imagined during encoding, or in a new context altogether.

Our participants encoded a list of words while in Context A. They closed their eyes during encoding and imagined themselves either in the same context (Context A) or in another context (Context B) with which they were previously familiarized. Later, memory for the words was tested either in Context A, Context B, or a brand new Context C. There were six conditions in all, which are described as X-Y, where X is the imagined context during encoding and Y is the testing context. In the A-A condition, participants imagined Context A during encoding and were tested in Context A. In the A-B condition, participants imagined Context A during encoding but were tested in Context B. We anticipated that A-A participants would show better recall than A-B participants, who would show context-dependent forgetting. Participants in a third condition imagined Context B at encoding despite being physically in Context A, and they were tested in Context B. We anticipated that these participants would no longer show context-dependent forgetting, as suggested recently (Brinegar et al., 2013). There were three additional conditions. Two imagined Context B during encoding. One of those conditions was tested in Context A (B-A condition) and the other in Context C (B-C condition). In a sixth and final condition (A′-C condition), participants imagined a transformed Context A during encoding (i.e., Context A with falling snow). We anticipated that B-B, B-C, and A′-C participants would do better than A-B participants—that is, we predicted that those three conditions would not show context-dependent forgetting despite switching contexts—because imagining a different context (other than the present one) at encoding would counteract it.

The various conditions enabled comparison of our proposed explanation to two alternatives. Indeed, imagining another context during encoding could have multiple consequences. First, an imagined context at encoding may usurp the physical context as the context to which memories are linked. This *replacement hypothesis* assumes that an imagined context and a physical context operate in a similar manner and that the imagined context simply replaces the physical one. When a context is imagined at encoding, new memories become linked to the imagined context instead of the physical one. If this hypothesis is correct, then participants in the A-B, B-A, B-C, and A′-C conditions, in which the imagined context at encoding and later testing contexts mismatch, should show worse recall than participants in the A-A and B-B conditions, in which the imagined context at encoding and later testing context match.

Second, an imagined context at encoding may not replace the physical context but rather may operate in parallel with it. This *enriched-context hypothesis* assumes that imagining another context at encoding provides a second layer of cues with which to associate new memories. Thus, newly encoded information is linked both to the physical context and the imagined mental context. If this hypothesis is correct, then memory should be better among participants in the B-A and B-B groups compared to participants in the B-C and A′-C groups, because testing participants in contexts other than A and B should hurt recall.

Third, as we hypothesized, an imagined context at encoding may facilitate later reinstatement of that context during the test regardless of where memory is tested. This *facilitated-reinstatement hypothesis* suggests that when one imagines another context during encoding, later reinstatement of that context becomes easier because people practice retrieval of that context during learning. When people are asked to imagine their current physical context (e.g., Context A), it requires very little active mental generation of that context since people are already in it and can retrieve it from immediate memory. In contrast, if people in one context are told to imagine a different context to which they were previously exposed (e.g., Context B) or to imagine the current context transformed (e.g., Context A′), then they must retrieve it from long-term memory (e.g., B) or actively generate that new image (e.g., A′). This may promote better integration of learned information with the imagined context because people may effectively link the words with the retrieved contextual cues. During the test, they may spontaneously engage in retrieval of the context because they would have had practice with retrieving it during encoding. If the facilitated-reinstatement hypothesis is correct, then regardless of where memory is tested, imagining Context B or Context A′ (i.e., anything but Context A) at encoding should counteract forgetting. That is, no context-dependent forgetting should be observed in the B-A, B-B, B-C, and A′-C conditions.

Method

Participants were 120 undergraduates (66 females; $M_{\text{age}} = 19.0$, $SD_{\text{age}} = 0.96$). The first 100 participants were randomly assigned to one of five conditions: A-A (imagine A; test in A), A-B (imagine A; test in B), B-A (imagine B; test in A), B-B (imagine B; test in B), or B-C (imagine B; test in C). Twenty additional participants were later assigned to the A′-C condition (imagine A transformed; test in C) in response to reviewer feedback.

Materials

The word list comprised 40 nouns from the Toronto word pool (Friendly, Franklin, Hoffman, & Rubin, 1982; see Appendix). The words were high in both concreteness ($M = 604$, $SD = 18.8$) and imageability ($M = 599$, $SD = 25.9$), so that participants could visualize them easily, and they were low to moderate in frequency ($M = 19.7$, $SD = 28.8$; based on Kucera & Francis, 1967).

The experiment employed three physical contexts: Contexts A, B, and C. Context A was a small lab room with table, credenza, and folding picnic chair in which participants sat. The table, which was covered in a green tablecloth, supported a record player. The credenza supported a joystick, a vase with fake flowers, a box of facial tissues, two small globes, and a stack of red cups. A photograph of a lighthouse decorated the wall. Before each session, the room was sprayed with apple-cinnamon potpourri, and the lights were dimmed. Context B was a small lawn adjacent to the lab and all sessions were run during daylight hours. A yoga mat was placed in the grass for participants to sit on, giving participants a view of an academic building, sidewalk, benches, bike rack, and trees. Context C was a small alley on the other side of the psychology building. Participants stood facing a corner of the alley, giving participants a view of a large brick wall and garbage bins. Each session employed two experimenters: an inside experimenter and an outside experimenter, who interacted with participants for all indoor activities and all outdoor activities, respectively.

Procedure

Participants arrived individually. The experiment comprised three phases. First, participants were familiarized with Context B, to facilitate imagining it during the learning phase. Second was the learning phase, which involved memorizing the 40 words while in Context A. Third, memory for the words was tested in one of the three contexts.

In the first phase, the inside experimenter greeted participants and explained that they would complete an outside exercise on sensory experiences. The inside experimenter introduced participants to the outside experimenter, who took participants to Context B. While seated in Context B, participants were instructed to focus on various aspects of their visual, auditory, and somatosensory experience. Participants did this for approximately 2 min.

In the second phase, participants were taken to Context A, where they met with the inside experimenter. The inside experimenter explained that participants would engage in an imagery exercise. Additional instructions varied by condition. In the A-A and A-B conditions, participants were told to familiarize themselves closely with their current environment (Context A) so that they could close their eyes and imagine the context clearly. Participants did this for approximately 2 min. They then closed their eyes and imagined the room as vividly as they could. In the B-A, B-B, and B-C conditions, participants closed their eyes and imagined as vividly as they could that they were seated in Context B. In the A′-C condition, participants were told to familiarize themselves with the current environment (as in the A-A and A-B conditions). They were then told to close their eyes and imagine the room as vividly as they could. They were told furthermore to imagine that the room was open to the sky, it was cold and with a soft breeze, and snow was falling steadily into the room. All participants were told to keep their eyes closed and to continue imagining their assigned mental contexts as vividly as they could.

The inside experimenter then read aloud a series of 40 objects. Participants were told to imagine each object in front of them as vividly as they could. Each word was spaced 5 s apart. Throughout encoding, participants kept their eyes closed. Halfway through the list, the inside experimenter reminded participants to keep imagining that they were in Context A (in the A-A, A-B, and A′-C conditions) or Context B (in the B-A, B-B, and B-C conditions) while visualizing the objects.

In the third phase, participants' memory was tested. In the A-A and B-A conditions, the inside experimenter tested participants in Context A. The inside experimenter told these participants to open their eyes and remain seated while he or she left the room for 90s. This delay was included to match the time delay in the other conditions. After the delay, the inside experimenter gave participants 3 min to recall as many words as they could. Recall was done orally with the experimenter recording responses. In the A-B and B-B conditions, the outside experimenter brought participants back to Context B. Participants sat on the yoga mat as before. The outside experimenter commenced the recall test 90 s after the participants left Context A. In the B-C and A′-C conditions, the outside experimenter brought participants to Context C and commenced the recall test 90 s after participants left Context A.

Results and Discussion

The results from a one-way analysis of variance revealed significant differences in the proportion of words recalled across conditions, $F(5, 114) = 6.68$, $p < .001$, $\eta_p^2 = .23$ (see Figure 1). Consistent with the context-dependent forgetting effect, A-A participants remembered more words than A-B participants, $t(36) = 2.24$, $p = .032$, $d = 0.67$. We also tested whether imagining Context B at encoding buffered against context-dependent forgetting, consistent with recent work (Brinegar et al., 2013). Indeed, B-B participants remembered significantly more words than A-B participants, $F(1, 114) = 18.4$, $p < .001$, $\eta_p^2 = .14$. Thus, among participants who moved from Context A to Context B for testing, those who imagined Context B during encoding remembered more words than those who did not imagine it. Interestingly, B-B participants remembered significantly more words than A-A participants, $F(1, 114) = 7.19$, $p = .008$, $\eta_p^2 = .06$. Thus, imagining Context B during encoded eliminated context-dependent forgetting, and it increased memory performance above that of participants for whom context never changed (i.e., who encoded in Context A, imagined Context A during encoding, and were tested in Context A). A similar pattern was observed by Brinegar et al. (2013).

The pattern seen among the A-A, A-B, and B-B conditions thus replicated what has been found in prior work. Further comparisons tested for evidence in support of the various theoretical explanations for this pattern. Comparing the B-A and A-A conditions revealed that B-A participants recalled more words than A-A participants, $F(1, 114) = 10.8$, $p = .001$, $\eta_p^2 = .09$, but the B-A and B-B groups did not differ, $F(1, 114) = 0.29$, $p = .60$. This pattern rejects the replacement hypothesis because if imagined context at encoding simply replaced the physical one as the primary context to which memories become linked, then the B-A condition should have performed worse, not better, than the A-A and B-B conditions. This is because the B-A group's imagined context at encoding (Context B) did not match their context at retrieval (Context A), whereas in the B-B and the A-A groups, imagined context at encoding matched their context at retrieval.

The superior recall in the B-A group and B-B groups, in comparison with the A-A group, is consistent with the enriched-context

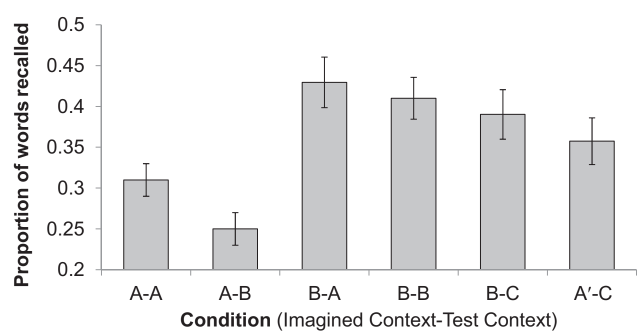

Figure 1. Mean proportion of words recalled by condition. Error bars represent standard error.

hypothesis. Specifically, according to the enriched-context hypothesis, the B-A and the B-B groups may have performed better than the A-A group because the context at encoding provided a richer set of cues to which people could link newly learned information (a combination of physical Context A cues and mental Context B cues as opposed to a single set of cues as in the A-A group). Thus, imagining another context at encoding enriches rather than replaces the current physical context, allowing the new memories to become linked to both types of contexts. The absence of context-dependent forgetting in the B-A group, in comparison with the B-B group, could also be accommodated by the enriched context hypothesis, because if memories become linked both to Context A and Context B, then either of those contexts during the test could provide a retrieval route to those items. In contrast, testing people in a brand new context (e.g., Context C, as in the B-C and A′-C conditions) should hurt recall because of the mismatch between the test and study contexts. Comparing B-C participants to B-B participants revealed no difference between the two groups, $F(1, 114) = 0.27$, $p = .61$. In fact, like the B-B group, the B-C group recalled more words than the A-A group, $F(1, 114) = 4.39$, $p = .038$, $\eta_p^2 = .04$. Furthermore, comparing A′-C participants to A-A participants revealed no difference between those groups, $F(1, 114) = 1.62$, $p = .21$. In addition, A′-C participants recalled more words than A-B participants, $F(1, 114) = 8.31$, $p = .005$, $\eta_p^2 = .07$. Participants in the A′-C condition were no different than participants in the B-C condition, $F(1, 114) = 0.73$, $p = .39$.

These patterns reject the enriched-context hypothesis, because B-C and A′-C participants are not being tested in either Context A or Context B (the two contexts to which the memories should be linked). Not only is performance unimpaired by this contextual mismatch, it is better than it is in the A-A condition that experienced no shift in context, significantly in the case of the B-C condition and nonsignificantly in the case of the A′-C condition. Furthermore, participants in the A′-C group performed significantly better than participants in the A-B group, even though both of those groups switched contexts before retrieval. Imagining Context A′ (rather than just Context A) thus protected against context-dependent forgetting. Similar performance across B-A, B-B, B-C, and A′-C groups, along with relatively superior performance to the A-A group supports the facilitated-reinstatement hypothesis. Participants who practiced retrieving Context B or a transformed Context A during learning must have spontaneously engaged in retrieval of those contexts to help aid memory regardless of whether they were tested in A, in B, or in C. Overall, these findings suggest that imagining another context during encoding protects against context-dependent forgetting.

General Discussion

When encoding information, one can facilitate remembering simply by imagining another context. We exposed participants to information in an indoor context and asked them to recall it in a different, outdoor context. As prior work has shown, changes in context between encoding and recall induced forgetting (e.g., Godden & Baddeley, 1975). We also found, as recent work partly showed (Brinegar et al., 2013), that if participants imagined the outdoor context while they were learning the information indoors, then context-dependent forgetting was eliminated when participants were tested in the outdoor context. These data are consistent with the notion that imagining future retrieval contexts can counteract context-dependent forgetting. However, we also observed two additional findings, which support an alternative and broader explanation for these results. First, we found that imagining the outdoor context counteracted context-dependent forgetting no matter the testing context: Recall was equally high among people who stayed in the indoor context, people who moved to the previously imagined outdoor context, and people who moved to a context that was entirely new. Thus, imagining another context during encoding can protect against forgetting no matter where memory is tested. Second, we found that imagining a transformed version of the indoor context (i.e., by adding falling snow) also counteracted context-dependent forgetting. It was thus not only imagining the different, outdoor context that was helpful, but simply generating some novel mental context during encoding induced the protective effect.

We interpret the present findings from the perspective of the facilitated-reinstatement hypothesis. The act of imagining some other context (i.e., by imagining a nonpresent context or by transforming the current one) during encoding requires an active generation of that other context. This active retrieval process could have two consequences that benefit memory. First, it could predispose people to reinstate the learning context during retrieval. If people generate some mental context at encoding, then they may be more inclined to generate that context (i.e., mentally reinstate it) spontaneously during recall, thereby aiding memory. Second, it could make people better at reinstating the learning context, due to retrieval practice effects. Thus, mental reinstatement of original context may be better and more effective (rather than simply more likely) due to having practiced reinstatement during encoding. Both the enhanced likelihood of reinstatement and better success at reinstatement could underlie the observed effects.

Although all participants were required to close their eyes during encoding and imagine some context, it is likely that imagining the current context (A) was less effortful and engaged less active generation than imagining a different context (B or A′). First, the current context was immediately available in memory when participants closed their eyes to imagine it. In contrast, those who imagined another context (B) experienced a delay between familiarization and imagining, and hence had to retrieve it from long-term memory rather than immediate memory. For those who imagined the transformed Context A′, the relevant context was likewise not immediately available in memory. Much of the imagined context had to be created from scratch. Second, there was no competition between actual and imagined contexts for participants imagining the present context. In contrast, participants who imagined other contexts had to imagine one kind of context while experiencing a wholly different one (e.g., imagining sitting on a mat outside while actually seated in a chair indoors). Thus, both the immediate availability of the present context in memory and the lack of any competition with that context suggests that imagining the present context (A) required relatively little active generation in participant's minds.

One might be tempted to conclude that imagining some other context during encoding is reminiscent of the method of loci mnemonic, whereby people link to-be-remembered information with a set of locations along a route and later rely on those retrieval cues regardless of where memory is tested. Although the present work suggests that people may facilitate a context retrieval process during the test by imagining some other context during encoding, certain aspects of the present data suggest that we are dealing with a phenomenon that is quite distinct from the method of loci mnemonic. It appears that it was not the use of a location per se that was helpful. Indeed, participants who imagined Context A while in that context and then were tested in Context B (the A-B group) showed a forgetting effect, despite having had associated the list of words with a particular environment. If participants were employing a method of loci, then we should not have observed context-dependent forgetting because during the test, the A-B participants could have relied on those loci as retrieval cues. Moreover, participants who simply mentally transformed Context A by imagining it in a new way (i.e., by adding snow) demonstrated no context-dependent forgetting effect. Thus, it was not the imagined location itself that was helpful in counteracting forgetting, but, rather, the distinction of whether the imagined location was distinct from the current physical context. When it is distinct, it seems that the active generation of that mental context during learning protects against the standard forgetting effects induced by switching contexts.

Future Directions and Limitations

People who imagined Context B (B-A, B-B, and B-C) during encoding performed somewhat better than participants who imagined the transformed Context A (A′-C), even though each of those four conditions ceased to show context-dependent forgetting. This difference was significant in the case of the B-A condition, $F(1, 114) = 3.91$, $p = .05$, $\eta_p^2 = .03$, and nonsignificant in the cases of the B-B and B-C conditions (Fs < 2.0, ps $> .16$). It could be that Context B was more familiar and more detailed than Context A′, which was entirely mentally generated and could have been a subject to large variability in ability to imagine it vividly. In contrast, the remaining participants were familiarized with the same environment (e.g., Context B), which could have been better remembered, more detailed, and less subject to individual differences in ability to imagine it. Future work should further examine whether imagining a different context during encoding (rather than transforming the current one) or whether imagining a specific and well-known context (rather than a hypothetical or unfamiliar one; e.g., Smith, 1979) can boost memory in addition to protecting it against context-dependent forgetting.

To the best of our knowledge, this is the first study demonstrating that mentally transforming the current context during encoding affects subsequent memory. The present data suggest that engaging in such a process (e.g., imagining A′) is more beneficial to memory than imagining the current context untransformed (A) but less beneficial than imagining a familiar context that they were exposed to earlier (B). However, our design included only a single condition, where participants imagined a transformed version of the current context during encoding but during the test were moved to a brand new context (A′-C). There was no condition A′-A condition that would allow testing how the transformation of current context during encoding affects memory when the test is given in the "untransformed," original context (e.g., A). This is an interesting question that is beyond the scope of current report and requires additional investigation.

While our focus has been facilitated reinstatement, there are subtle trends in the data that point to other phenomena worth exploring. (Moreover, these trends may have been statistically significant in a higher powered study.) We refer specifically to the superior memory performance of the B-A and B-B groups over the B-C and A′-C groups. Each of these four groups benefitted from facilitated reinstatement. The B-A and B-B groups, however, appear to have benefitted additionally from matches between encoding and retrieval contexts. The B-A group may have benefitted from a match between physical encoding context and physical retrieval context, while the B-B group may have benefitted from a match between imagined encoding context and physical retrieval context. If so, facilitated reinstatement and matches between encoding and retrieval contexts may offer additive benefits for memory performance. Future work should examine whether this is the case.

Conclusion

We observed that people who imagined another context during encoding were resistant to context-dependent forgetting even when moved to an entirely new retrieval context. This finding is consistent with previous work showing that encoding in multiple contexts can immunize people against context-dependent forgetting (Smith, 1982; Smith, Glenberg, & Bjork, 1978). One conclusion from that prior work was that the association of encoded information with many different contexts can increase the ability to reinstate useful context cues during recall. The present work suggests another means for facilitating later reinstatement of the encoding context—having people generate and imagine some vivid mental context during learning. In everyday life, people often engage in imagination of nonpresent contexts, such as in daydreaming (Klinger, 2009), mind wandering (Smallwood & Schooler, 2006; Kane et al., 2007; Killingsworth & Gilbert, 2010), and mental time travel (Suddendorf, 2006). Our work suggests that if people actively encode information in relation to such inner experiences, the standard context-dependent forgetting pattern can be eliminated.

References

Beck, R. C., & McBee, W. (1995). Mood-dependent memory for generated and repeated words: Replication and extension. *Cognition & Emotion, 9,* 289–307. doi:10.1080/02699939508408968

Brinegar, K., Lehman, M., & Malmberg, K. J. (2013). Improving memory after environmental context change: A strategy of "preinstatement." *Psychonomic Bulletin & Review, 20,* 528–533. doi:10.3758/s13423-013-0383-6

Dijkstra, K., Kaschak, M. P., & Zwaan, R. A. (2007). Body posture facilitates retrieval of autobiographical memories. *Cognition, 102,* 139–149. doi:10.1016/j.cognition.2005.12.009

Eich, E., & Metcalfe, J. (1989). Mood dependent memory for internal versus external events. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 15,* 443–455. doi:10.1037/0278-7393.15.3.443

Friendly, M., Franklin, P. E., Hoffman, D., & Rubin, D. C. (1982). The Toronto Word Pool: Norms for imagery, concreteness, orthographic variables, and grammatical usage for 1,080 words. *Behavior Research Methods & Instrumentation, 14,* 375–399. doi:10.3758/BF03203275

Godden, D. R., & Baddeley, A. D. (1975). Context-dependent memory in two natural environments: On land and underwater. *British Journal of Psychology, 66,* 325–331. doi:10.1111/j.2044-8295.1975.tb01468.x

Kane, M. J., Brown, L. H., McVay, J. C., Silvia, P. J., Myin-Germeys, I., & Kwapil, T. R. (2007). For whom the mind wanders, and when: An experience-sampling study of working memory and executive control in daily life. *Psychological Science, 18,* 614–621. doi:10.1111/j.1467-9280.2007.01948.x

Killingsworth, M. A., & Gilbert, D. T. (2010). A wandering mind is an unhappy mind. *Science, 330,* 932. doi:10.1126/science.1192439

Klinger, E. (2009). Daydreaming and fantasizing: Thought flow and motivation. In K. D. Markman, W. M. P. Klein, & J. A. Suhr (Eds.), *Handbook of imagination and mental simulation* (pp. 225–239). New York, NY: Psychology Press.

Kucera, H., & Francis, W. N. (1967). *Computational analysis of present-day American English*. Providence, RI: Brown University Press.

Lewis, P. A., & Critchley, H. D. (2003). Mood-dependent memory. *Trends in Cognitive Sciences, 7,* 431–433. doi:10.1016/j.tics.2003.08.005

Sahakyan, L., & Kelley, C. M. (2002). A contextual change account of the directed forgetting effect. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 28,* 1064–1072. doi:10.1037/0278-7393.28.6.1064

Smallwood, J., & Schooler, J. W. (2006). The restless mind. *Psychological Bulletin, 132,* 946–958. doi:10.1037/0033-2909.132.6.946

Smith, S. M. (1979). Remembering in and out of context. *Journal of Experimental Psychology: Human Learning and Memory, 5,* 460–471. doi:10.1037/0278-7393.5.5.460

Smith, S. M. (1982). Enhancement of recall using multiple environmental contexts during learning. *Memory & Cognition, 10,* 405–412. doi:10.3758/BF03197642

Smith, S. M., Glenberg, A., & Bjork, R. A. (1978). Environmental context and human memory. *Memory & Cognition, 6,* 342–353. doi:10.3758/BF03197465

Smith, S. M., & Vela, E. (2001). Environmental context-dependent memory: A review and meta-analysis. *Psychonomic Bulletin & Review, 8,* 203–220. doi:10.3758/BF03196157

Suddendorf, T. (2006). Foresight and evolution of the human mind. *Science, 312,* 1006–1007. doi:10.1126/science.1129217

Appendix

Word List

candle	needle	rabbit	mirror	honey	perfume	football	squirrel
saddle	compass	coffee	cherry	insect	helmet	lemon	jacket
button	salad	beaver	stocking	sandwich	basket	canvas	kitten
apple	candy	oyster	robin	pistol	olive	ribbon	slipper
eagle	spider	blanket	sugar	paper	marble	diamond	dollar

Received September 18, 2013
Revision received January 6, 2014
Accepted February 2, 2014 ■