Journal of Memory and Language 92 (2017) 202–216

Contents lists available at ScienceDirect

Journal of Memory and Language

journal homepage: www.elsevier.com/locate/jml

The generation effect revisited: Fewer generation constraints enhances item and context memory

Matthew P. McCurdy, Ryan C. Leach, Eric D. Leshikar *

University of Illinois at Chicago, Department of Psychology, 1007 W Harrison St (M/C 285), Chicago, IL 60607, United States

ARTICLE INFO

Article history:
Received 2 January 2016
revision received 8 June 2016

Keywords:
Generation effect
Generation constraint
Item memory
Context memory
Recognition
Recall

ABSTRACT

Self-generated information is often better remembered than non-self-generated information. This effect has been robust for item memory (i.e., the content of information) across many different experiments, but inconsistent for context memory (e.g., memory for the extraneous details of information, such as source). Previous studies examining the generation effect, however, have often applied constraints on the generation task possibly limiting the memory benefit from self-generation. In three experiments, we compared item and context memory for a lower-constraint generation task (i.e., free response to a cue word) relative to higher-constraint generation tasks (Exp. 1 & 2: scramble; Exp. 3: word fragment). Results showed that participants had better item and context memory in the lower-constraint compared to higher-constraint generation tasks. Overall, these experiments suggest that that the mnemonic benefits of self-generation depend on the level of task constraint. This study further advances the idea that self-generation is a powerful mnemonic that leads to enriched memory representations for both the item and context, especially when fewer generation constraints are imposed.

Introduction

Self-generated material is better remembered than information that is simply read, or otherwise not generated by the self (Slamecka & Graf, 1978). Since this seminal study, the generation effect has been widely replicated (see Bertsch, Pesta, Wiscott, & McDaniel, 2007, for a review). However, in the majority of these studies there are experimental constraints limiting what participants can produce. As an example, in the typical *generate* condition prior studies have used highly-constrained tasks such as unscrambling a word (e.g., open - coesl; Foley & Foley, 2007; Geghman & Multhaup, 2004), or completing a word fragment (e.g., open - cl∗s∗; Clark, 1995; Hirshman & Bjork, 1988), where there is a single "correct" answer to be generated. Memory for generated items is then compared to a control condition where participants read or listen to experimenter provided material (e.g., open – close). Although this paradigm has been informative in understanding the generation effect, little attention has been given to how differences in the level of constraint provided by different generation tasks might influence memory. Therefore, the aim of this study is to assess whether the magnitude of the generation effect on memory differs as a function of generation constraints (lower versus higher). Specifically, we aim to compare memory performance for materials generated in a "lower-constraint" task, that allows participants to generate any word that comes to mind in response to a cue word (i.e., open - _____), relative to some commonly used "higher-constraint" generation tasks (i.e., scramble/word fragment).

Prior work examining the generation effect has often focused on item memory (i.e., memory for the content of information), and this work has consistently shown robust item memory improvements for self-generated versus

* Corresponding author.
E-mail address: leshikar@uic.edu (E.D. Leshikar).

http://dx.doi.org/10.1016/j.jml.2016.06.007
0749-596X/

non-self-generated materials. These effects have been shown across a variety of generation tasks (Bertsch et al., 2007), as well as for both recognition (Graf, 1982; McElroy & Slamecka, 1982; McFarland, Frey, & Rhodes, 1980; Slamecka & Graf, 1978; Slamecka & Katsaiti, 1987) and cued recall memory procedures (Donaldson & Bass, 1980; Jacoby, 1978; Johnson, Raye, Foley, & Foley, 1981). Other work on the generation effect has examined memory for extraneous details of an episode (i.e., context memory), but the results of this work have been mixed. Some have found context memory benefits for generated materials relative to control (Marsh, 2006; Marsh, Edelman, & Bower, 2001), others have found poorer context memory (Mulligan, 2004; Mulligan, Lozito, & Rosner, 2006), while others have found no difference between the two (Mulligan, 2011). Considering item and context memory effects together, researchers have advanced two ways that self-generation may promote memory: The *item-context enhancement* account suggests that encoding for item and context share the same encoding processes, therefore any manipulation that enhances memory for one type should also extend to the other (Geghman & Multhaup, 2004; Marsh, 2006; Marsh et al., 2001). Thus, when item memory improves, context memory should improve as well. In contrast, the *item-context tradeoff* account suggests that encoding item and contextual details requires different processes that may compete for limited cognitive resources at the time of study (Jurica & Shimamura, 1999; Nieznański, 2011). That is, if self-generation recruits more resources for item memory encoding, fewer resources are available to encode peripheral contextual details leading to poorer memory. The present study aims to provide clarity on these accounts.

This study is designed to explore the use of a lower-constraint generation task, where participants are allowed to respond freely to a cue word. To our knowledge, only one study has examined item and context memory using a similar lower-constraint task (Jurica & Shimamura, 1999). Jurica and Shimamura (1999) tested item and context memory in a conversational setting where participants were free to answer questions with any response and found an increase in item memory, but a concomitant decrease in context memory for self-generated material compared to control, consistent with the *item-context trade-off* account. However, this study did not include a manipulation of generation constraint to test memory differences between tasks of differing generation constraint (i.e., lower-constraint versus higher-constraint) precluding any conclusions about how the level of constraint might influence the magnitude of the generation effect. Across three experiments, we aimed to compare memory benefits of a lower-constraint generation task against two commonly used higher-constraint generation tasks (Exp. 1 & 2: scramble; Exp. 3: word fragment) and a read control, as measured by item recognition and cued recall, as well as context recognition.

It is worth noting that in prior work, researchers investigating the generation effect have not typically used a task with lower constraints because of the potential loss of control over the to-be-generated materials, and possible item-selection effects (Hirshman & Mulligan, 1991). The logic behind this concern is that words generated freely from a cue word (e.g., open - _____) may be somehow different, and thus more memorable, than words produced in a higher-constraint procedure where there is an expected, correct response (e.g., open – cosle, restricts participants to generate "close"). Specifically, it is possible that generated words that are not the expected target in the lower-constraint task (e.g., producing open - "door", instead of open - "close") may be more memorable than the expected, normed target word. In this study, we took several steps to limit this concern: First, we used a counterbalancing procedure such that each word pair occurs in all three tasks (lower-constraint, higher-constraint, read control) across participants. This counterbalancing procedure allowed us to conduct an item-analysis where we compared memory performance for each word pair when it occurred in the lower-constraint, higher-constraint, and read tasks. Specifically, in this item-analysis we removed any non-normed target responses for the lower-constraint task. For example if a participant produced "door" in response to "open - ____" instead of "close" as was normed, this trial was removed in the item-analysis. Thus, since the word is the same across all tasks, this reduces the possibility that the memory effects in this item-analysis are due to idiosyncratic differences in the to-be-remembered information. We conducted this item-analysis in addition to our primary analyses to address the possibility that item-selection effects may be confounding our primary findings, and report them after the primary analysis in the results of each experiment.

Given that work on the generation effect has shown that self-generated materials are better remembered than non-self-generated materials, it logically follows that tasks that afford more freedom to produce materials (i.e., more "generation") should lead to bigger memory effects. Therefore, we predict a larger memory benefit for items produced in a lower-constraint versus a higher-constraint generation task. Larger item memory effects in the lower-constraint task would suggest that item memory effects are reduced in generation tasks that are more highly constrained. It would also suggest that the level of generation constraint should be taken into account when assessing these memory benefits. In addition, we expect improved item memory for both generation tasks relative to a non-generate (read) control condition consistent with the typical generation effect (Jacoby, 1978; Slamecka & Graf, 1978).

We see two possible outcomes for our context memory measure. First, if the *item-context enhancement* account is correct, we expect to see more accurate context memory judgments in the lower-constraint relative to the higher-constraint and read control conditions, which would suggest that the generation effect is a robust mnemonic effect that improves memory for the item and context. Alternatively, the accuracy of context memory judgments may be reduced when comparing generate tasks with a read control task, which would support the *item-context tradeoff* account. This finding would suggest that the act of generation might only enhance encoding of the item, leaving fewer resources to encode contextual details. If in fact generation improves item memory and reduces context memory, and we find that the lower-constraint generation task