A Test of the 'One Shot' Hypothesis with Font Memory

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Background

Pick your favorite memory. Where were you? Who was with you? What was the weather like? Now imagine that the memory became nothing more than general knowledge, like a theory learned in class. Unless your favorite memory *was* learning a math proof, you no longer have any context to tie it down and create the experience that comes from remembering an episodic memory. The very specific feeling one gets from this type of memory comes from source attributions made by the person remembering it. Without source memory, the overarching memory feels as if it is common knowledge (Johnson, Hashtroudi, & Lindsay 1993).

Source, or context, memory includes information on the environment, physical characteristics, spatial-temporal details, and internal states. The basic framework is a broadened and expanded version of the reality-monitoring framework. Source discriminations can be made either heuristically or systematically and both processes need rules and procedures to assess the activated memory. However, they are usually made in a heuristic fashion because systematic processes are slower and can be disrupted easily (Johnson et al., 1993). Both ways provide checks and balances for each other, that allow an individual to (usually) make an accurate discrimination.

Many memory theories espouse that stronger encoded items are more easily retrieved (better remembered) later. Stronger encoding can be influenced by the study time and the number of times the item was studied. While source monitoring is extremely important in day to day operations, encoding seems to only occur within the first 2 seconds of the experience (Malmberg & Shiffrin, 2005). This is the basis of the One Shot hypothesis. If source information is only encoded within the first 2 seconds, then increased study time should not increase source memory. However, an item studied for a longer duration should have increased recognition memory (possibly familiarity- or recollection-based) because the participant is given additional time to elaborate on the item during encoding. This elaboration should increase recognition memory without affecting memory for specific contextual details.

Predictions and Goals

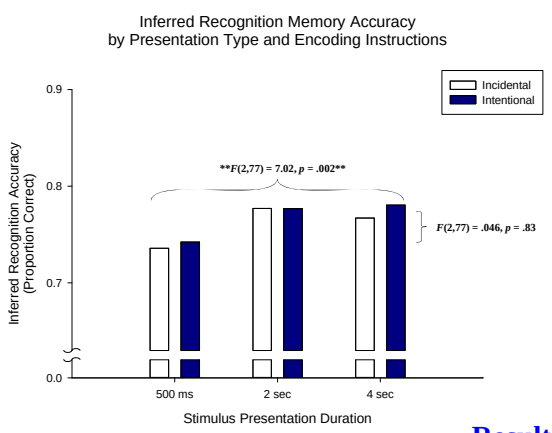
We predicted that longer presentation times would increase inferred recognition memory for words but would not result in any additional gains in source memory (c.f., Malmberg & Shiffrin, 2005). Furthermore, we postulated that knowledge of the nature of the source recognition test should increase source memory.

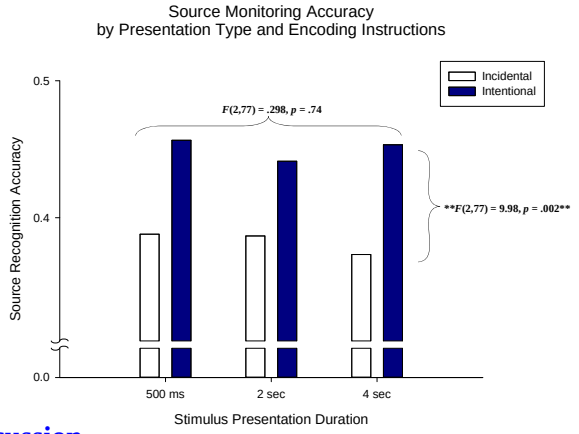
Materials

135 words were presented on a computer in varying font colors (red, blue, or green) and for varying times (500ms, 2s, or 4s), all randomly determined by the computer. There were 45 words in each font color group, further divided by 15 in each study time group (500ms, 2s, 4s). Participants were tested on 180 words, 135 old and 45 new (equal proportions: **RED**, **BLUE**, **GREEN**, & **NEW**).

Procedure

Sixty participants from the University of Michigan - Dearborn were asked to learn135 words for a later memory test. Half of the participants were given *Incidental* instructions emphasizing learning the words. The other half were given *Intentional* instructions emphasizing learning the *source* of the words, or font color. Correct source memory was determined by the average proportion correct for each color. Inferred recognition was determined by the average of words correctly identified as old even if the selected color was incorrect.





Results & Discussion

Overall inferred recognition (old vs. new) was not affected by encoding instructions (p = .83), however participants did recognize more words when given longer to study, $F(2,77) = 7.02$, p = .002 [see left graph]. As is seen in right graph, source monitoring was significantly affected by type of instruction ($F(2,77) = 9.98$, p = .002), however participants did not improve source memory when given longer to study (p = .74).

The current data offer support for the One Shot hypothesis of context storage. That is, words presented for longer durations produced better item recognition without concomitant gains in source. Although our data offer moderate support for the hypothesis, it is worth noting that post-hoc tests revealed the largest gains in recognition memory occurring from 500ms to 2 sec, with little to no increase with 4 sec. Similarly, our data suggest that participants might be able to learn a font color source in as little as 500ms as there were absolutely no differences in source memory across all three study durations.

Current extensions of this work are examining the influence of encoding time on these judgments as separate (between-subjects) tasks so that omnibus tests with both DVs can be conducted without violation of independence assumptions (i.e., inferred recognition is computed as an average of both correct and incorrect source memory, and thus cannot be compared directly to source memory).

Acknowledgments

We would like to thank Samantha Hochstadt and Shilpi Shah for their dedicated assistance in collecting the data. We would also like to thank the University of Michigan- Dearborn and the Behavioral Sciences Department for supporting this research.