Effects of the Manner of Deleting Typical Items in a Scene on Memory

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Participants reported false memory of typical items of the scene more than that of atypical items (Lampinen, Copeland, & Neuschatz, 2001). One thing that has not been studied in the previous study is the effects of the conflict between bottom-up information and the top-down information on memory of items in a scene. In this paper, we studied the issue by deleting typical items (e.g., a drawer in a bedroom) in two ways: When the typical item was simply deleted (delete condition), there was not any bottom-up information from the location where the typical item was expected. The typical item was simply missing. However, when the location where the typical item was expected was replaced with an atypical item (substitute condition), there can be conflict between bottom-up information of the atypical item and the top-down expectation of the typical item in the location.

Methods

Sixty four Sungkyunkwan University students attending introductory psychology class participated in the experiment. Thirty two had seen the line drawings of a real-life scene (van Diepen and De Graef, 1994) for 250 ms per drawing, and the remaining thirty two had seen the drawing for 10 seconds. In the twelve drawings the participants saw, six were of the delete version of the original drawings, and the remaining six were of the substitute version. Participants were given 250 ms or 10 seconds to see each drawing, with 5 seconds interval between drawings. After they finish seeing the last of the twelve drawings, they solved arithmetic problem for five minutes. Then recognition memory test of the items in the drawings were administered. Four types of items were tested: old typical item, old atypical item, new typical item, and new-atypical item. All experimental procedures were controlled by a PC. The drawings and the memory test items were presented on the monitor screen.

Results and discussion

The average number of 'old' responses to the four types of test items was presented in Table 1. As the proportion of 'old' responses to the atypical item was low, the proportion of 'old' responses to the three remaining test items was analyzed. Participants made more 'old' response when they saw the drawings for 10 seconds ($F(1, 62) = 22.86$, $p < .01$). The main effect of items ($F(2, 124) = 17.62$, $p < .01$), and the interaction effect between items and exposure duration were significant ($F(2, 124) = 14.22$, $p < .01$). As in previous studies, the rate of 'old' response to new typical item was almost the same between the two exposure conditions. However, the rate of 'old' response to the old typical items and to the old atypical items increased when the participants saw the drawings longer.

More importantly, the interaction effect between manner of deleting and test items, ($F(2, 124) = 7.62$, $p < .01$), and the three factors interaction effect of exposure duration x manner of deleting x items were significant, ($F(2, 124) = 2.58$, $p < .08$). When the drawings were presented briefly, the participants made more 'old' responses to new typical items in the delete condition than in the substitute condition. However, when they saw the drawings for 10 seconds, they made more 'old' responses to the old atypical item in the substitute condition than in the delete condition.

The results suggested that (1) false memory of typical items is more likely when there is not any contradictory bottom-up information, and (2) memory for atypical items got better only when the pictures are sufficiently processed.

Table 1. Average proportion of 'Old' responses to four types of test items

		Old typical	Old atypical	New typical	New atypical
250 ms	Delete	.43	.31	.48	.12
	Substitute	.47	.34	.31	.12
10,000 ms	Delete	.77	.63	.45	.15
	Substitute	.65	.78	.41	.17

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References

Lampinen, J. M., Copeland, S. M., & Neuschatz, J. S. (2001). Recollections of things schematic: Room schemas revisited. *Journal of Experimental Psychology: Learning, Memory, and Cognition. 27*, 1211-1222.

van Diepen, P. M. J., & De Graef, P. (1994). *Line-drawing Library and Software toolbox*. (Psych. Rep. No. 165). Leuven, Belgium: University of Leuven, Laboratory of Experimental Psychology.