

Honoring metacognitive control: The spacing of study

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Abstract. After making JOLs, participants chose to *mass* or *space* study of word pairs. A third of their selections were *dishonored*—they got massed when they chose space; spaced when they chose mass. Test results showed that spaced items were remembered better than massed items, but only for items that were *honored*.

Summary. College students were presented with a list of 100 word-synonym pairs (e.g., hirsute-hairy) and made metacognitive judgments of learning each pair. Then, they were given three choices for scheduling subsequent study: *Massing*, *spacing*, or *done*. This procedure was based on that of Son (2004). Participants were told that if they chose to *mass*, they would study the same pair again immediately. If they chose to *space*, then they would study the same pair after a delay. And if they chose *done*, that pair would not be shown again at all. For the *massed* and *spaced* choices, two thirds of their selections were *honored*. That is, when they chose to mass, they got massed study; when they chose to space, they got spaced study. However, the remaining third of their selections was *dishonored*—when they chose to mass, they got spaced; when they chose to space, they got massed. This new change in the procedure—the honor/dishonor variable—was based on the method used in Kornell and Metcalfe (2006). All of the *done* items were honored. After a delay, participants were given a cued-recall test on all of the items. The results show that when people's choices for scheduling were honored, *spaced* items were better recalled than *massed* items. This *spacing effect* was as expected. **For the items that were dishonored, however, the advantage of spacing over massing disappeared.** The data suggest that spacing is not necessarily more beneficial than massing, and that people's own choices during study—their own metacognitive control—are crucial for enhancing learning and should be honored.

Background. Cognitive psychologists have long hailed the benefits of *spacing*. Based on an immense number of data supporting the *spacing effect*, researchers have concluded that distributing study across relatively shorter sessions over longer periods of time leads to better performance than cramming (or massing) their study into one long session (Dempster, 1987; Glenberg, 1976; Melton, 1970). In recent metacognitive research, whether people—including both adults (Son, 2004) and children (Son, 2005)—actually spaced their study sessions was tested. Those data showed that both adults (in some situations) and children (in most situations) preferred to mass, rather than to space, their study. A question that remains is whether it would benefit learners to have others, be it teachers, computers, or other educational implementations, encourage, urge, or force spacing strategies (where they are lacking metacognitively) as a way of receiving benefits from the spacing effect.

Research Question: Should metacognitive decisions during study be dishonored if thought to be ineffective? In particular, if people choose to mass their study, should they be forced instead to space? The current experiment tested the spacing effect against one's own individual metacognitive choices.

Procedure

A - B

Word-synonym pairs were presented for 1 second each.

Presentation

A - ?

Participants made JOLs on a scale from 0 to 100.

Judgment

Mass Space Done

Spacing Choice
Participants chose between massing or spacing the item, or between ceasing study of that item.

A - B L - M

Honored Trials
67% of trials were honored. For massed study, the same pair was presented again for 3 seconds; for spaced study, the list went on to a new presentation. All done items were honored.

Mass Space
A - B L - M

Dishonored Trials
33% of trials were dishonored. For massed study, the list went on to a new presentation; for spaced study, the same pair was presented again for 3 seconds.

U - V

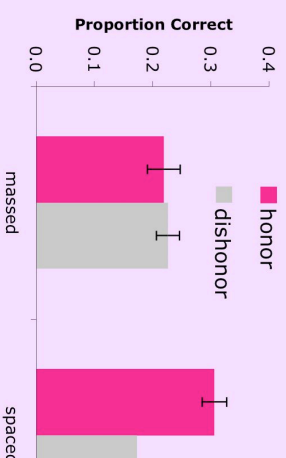
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A - ?

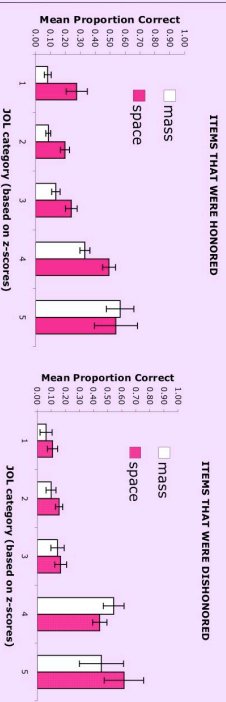
Distractor Task
Following the entire list, participants performed multiplication problems for 5 minutes.

Cued-Recall Test
Participants typed in the synonym given the word for each pair.

Results



Proportion correct of massed and spaced items, broken down into those that were honored, and those that were dishonored. The spacing effect only occurred for the honored items.



The accuracy of the **honored** massed and spaced items at each level of JOL.

The accuracy of the **dishonored** massed and spaced items at each level of JOL.

Conclusion. In this experiment, people made metacognitive decisions about spacing or massing their study. In some of the trials, those decisions were honored. In other trials, however, those decisions were dishonored. The results showed that when people chose to space on their own, the strategy was effective. When people were forced to space, however, the spacing effect disappeared. We conclude that merely spacing holds no advantage over massing—the metacognitive choice of choosing to space seems to be more valuable.

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