

BAR-ILAN UNIVERSITY

The Combined Influence of Reward and Curiosity on Memory

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Abstract

Motivation is the power that drives us. The current work distinguishes between extrinsic motivation and intrinsic motivation. Extrinsic motivation exists whenever an activity is done in order to attain some external outcome (e.g. monetary reward, grade, procuring an approval of a parent or a teacher, admission to a top university, or avoiding a punishment). In contrast, intrinsic motivation is based on internal desires for enjoyment, challenge, satisfaction, interest or curiosity to find out the answers to unknown questions. (Ryan & Deci, 2000).

Numrious studies examined the effect of extrinsic motivation or intrinsic motivation on memory, separately, and demonstrated their contribution to memory performance. However, only few studies examined the combined effect of those two motivations on memory performance, even though both motivations coexist in daily life and educational settings.

Motivations studies suggest that extrinsic motivation for performing a task (e.g. performance-contingent monetary reward) can impair intrinsic motivation to do the task. This finding is known as the "undermining effect" (Deci, Koestner, & Ryan, 1999). A recent study examined the effect of extrinsic motivation (reward) and intrinsic motivation (curiosity) on memory performance, and observed results that were consistent with the undermining effect (Murayama & Kuhbandner, 2011) in the context of incidental learning. Specifically, participants who were offered rewards for providing the correct answers to trivia questions remembered these answers better in an unexpected

memory test a week later, compared to participants who were not offered rewards, but this effect was limited for uninteresting questions.

The current research was designed to examine the combine effect of monetary reward and curiosity on delayed memory performance in the context of intentional learning. Fifty university students rated their curiosity to know the answers to the trivia questions that were presented to them, studied the answers for a subsequent memory test, and then rated their interest level in the answer that was presented. During the study phase, for half of the questions a monetary reward was offered for correctly remembering answers on the subsequent test. A week later, a memory test for the answers was administered.

The first study hypothesis was that curiosity and interest will enhance memory, such that memory performance will be higher for high curiosity and interest questions, than for low curiosity and interest questions. Consist with this hypothesis, participants' remembered significantly more high interest and curiosity questions than low interest and curiosity questions.

Two further hypotheses were based on the undermining effect and the results of Murayama and Kuhbandner (2011). The second hypothesis was that the effect of monetary reward on memory performance will depend on the level of curiosity. Specifically, we predicted better memory in the reward than in the no-reward condition for low curiosity questions, but no effect of reward condition for high curiosity questions. Results of the current research did not support this hypothesis. Monetary reward improved memory performance regardless of curiosity level.

The third hypothesis was that interest ratings for the answers (after being presented) will be higher in the no-reward than in the reward condition. Results were opposite to the hypothesis: The interest level was higher in the reward condition than in the no-reward condition.

To sum, the results of the current research suggest that for intentional learning, both monetary reward and curiosity for the study material contribute to memory performance, independently. These findings are inconsistent with the undermining effect of monetary reward that was demonstrated in other contexts. Furthermore, results suggest that monetary reward may enhance, not impair, intrinsic motivation (in terms of interest).

The current research has implications for educational settings. The results suggest that interest enhances long-term memory, hence teachers and curriculum developers should try to enhance students' curiosity, for example by developing materials that elicit high curiosity. Furthermore, the results suggest that offering rewards can increase the students' interest in the learning materials and hence improve long term memory. Finally, results of the current research suggest that interventions that are aimed at increasing both intrinsic motivation to study (curiosity, interest) and reward, might be more effective in improving students' achievements than interventions that are aimed at increasing just one of these two factors, and that offering rewards for study should not impair learning.