With rewards, we remember more than we should

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A new study provides an illustration of the power that reward has over learning and memory. In an experiment reported in the *Proceedings of the National Academy of Sciences*, mere sips of apple juice overcame a well-documented phenomenon in psychology known as "retrieval-induced forgetting"—RIF.

Say you've been presented some simple facts from two different categories: "FISH" and "ANIMALS." Here's what RIF does for you: If you practice some of the facts from the FISH category, later on you'll be worse at remembering the fish facts you didn't practice than you will be at remembering the ANIMAL category facts you didn't practice. Neuroscientists and psychologists believe RIF prevents us from becoming confused between information we've made an effort to learn and closely related information we didn't strive to learn.

In the new study, Brown University brain scientists performed an experiment with 91 volunteers to see what effect reward had on RIF. They presented volunteers with some FISH and ANIMAL facts (e.g., FISH-Salmon, ANIMAL-dog), and asked them to practice a select few of the fish facts (e.g., fill in FISH-Sal_ _ _). In a third phase a little later they asked the volunteers to identify the fish and animal facts they saw from a list that also included ones they did not see.

Some volunteers did these tasks with no reward, but others were able to earn sips of apple juice if they did the practice round correctly (e.g., they correctly filled in the FISH-Sal_ _ _). Would being rewarded erase RIF and improve recall of the unpracticed facts in the category where some facts had been practiced?

Indeed it did. People who got rewards during practice were much better at recalling the unpracticed fish category facts than people who did not get rewards. Moreover, for the rewarded group, their recall of unpracticed fish facts was just as good as their recall of unpracticed animal facts. Reward abolished RIF, undermining its helpful filtering effect.

"Reward overall enhanced memorized items and abolished the suppression of the retrieval of non-learned items," said senior author Takeo Watanabe, The Fred M. Seed Professor of Cognitive, Linguistic

and Psychological Sciences at Brown University. "Attention enhances relevant signals and suppresses irrelevant signals, whereas reward seems to activate anything, whether it is relevant or irrelevant."

More information: Reward eliminates retrieval-induced forgetting, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1404469111

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