New insights into how to correct false knowledge

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The abundance of false information available on the Internet, in movies and on TV has created a big challenge for educators.

Students sometimes arrive in classrooms filled with inaccurate knowledge they are confident is correct, indicating it is deeply entrenched in their memory.

According to Duke University researchers, educators might be able to help students overcome their misconceptions by correcting inaccurate information then having the students practice retrieving it from memory.

"Errors that are deeply entrenched in memory are notoriously difficult to correct," said Andrew Butler, a post-doctoral researcher in Duke's Department of Psychology & Neuroscience, who led a recent study of how students correct false knowledge. "Providing students with feedback is the first step because it enables them to identify the error and learn the correct information."

Recent research in cognitive science has shown it is possible to correct false knowledge with feedback -- a phenomenon known as the hypercorrection effect. When students answer a test question wrong, the more confident they are in their original answer, the more likely they are to remember the right answer if corrected.

However, the hypercorrection effect seems to contradict our common experience that it is very difficult to correct deeply entrenched false

knowledge. For example, anyone who has changed phone numbers knows how hard it is to learn the new number because the old number keeps coming to mind.

The Duke-led study helps to resolve this paradox. The study showed that false knowledge held with high confidence is more likely to be corrected in the short-term, but also more likely to come back in the long-term if the correction is forgotten.

"The hypercorrection effect is an interesting new phenomenon that seemed to contradict much of what we know about how people's memory works," Butler said. "The findings from our study show that this apparent contradiction is really just the result how the dynamics of error-correction shift over time."

Along with co-authors Lisa Fazio, a psychologist at Carnegie Mellon University, and Elizabeth Marsh, an associate professor in Duke's Department of Psychology & Neuroscience, Butler wanted to better understand how the relationship between a person's confidence in a response and his ability to correct errors changes over time.

The researchers gave 50 Duke undergraduate students a 120-question test on basic science information, with questions including: What is stored in a camel's hump? How many chromosomes do humans have? What is the driest area on Earth? After answering each question, students rated their confidence in their response, and then received the correct answer as feedback. Half the students were retested six minutes later, while the other half were retested one week later.

Students who were retested immediately corrected 86 percent of their errors. As expected, their responses showed a hypercorrection effect -- they were more likely to correct errors that they had made with high confidence relative to low-confidence errors.

In contrast, students who were retested one-week later also showed a hypercorrection effect. However, these students only corrected 56 percent of their errors, indicating they had forgotten many of the correct answers that they had learned from the feedback.

When students forgot the correct answer over the one-week delay, the opposite of the hypercorrection effect occurred -- the higher their confidence in their initial error, the more likely they were to re-produce that same error on the final test.

"Although high-confidence errors may be easily corrected in the short-run, our findings suggest that one presentation of feedback is not enough to produce a long-lasting correction of deeply entrenched false knowledge," Butler said. "Without further practice, high-confidence errors seem to be more likely to return over time."

Does this finding indicate we are doomed to retain deeply entrenched false knowledge? Perhaps not. The authors suggest we should view the hypercorrection effect as a valuable opportunity.

One idea they propose is to capitalize on the hypercorrection effect by providing students with additional opportunities to retrieve the correct information.

"Giving students repeated practice with retrieving information has been shown to promote long-term retention of that information," said Butler, who has also conducted research on using testing to promote long-term retention of information. "If students practice retrieving the correct information, then they may be able to avoid reverting back to their deeply entrenched false knowledge."

More information: The study, "The Hypercorrection Effect Persists Over a Week, but High-Confidence Errors Return," appeared in the

December print edition of the Psychonomic Bulletin & Review.

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