

Making ideas harder to read may make them easier to retain

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(PhysOrg.com) -- Publishing ideas in a hard-to-read typeface may make concepts harder to learn but easier to retain, according to a new study by researchers from Princeton University and Indiana University.

Daniel Oppenheimer, an associate professor of [psychology](#) and public affairs at Princeton, along with Connor Diemand-Yauman, a 2010 Princeton graduate, and Erikka Vaughan, a Ph.D. candidate at Indiana, assessed whether changing the font of written material could improve the long-term learning and retention of information presented to students. The study, which was part of Diemand-Yauman's senior thesis at Princeton, will be published in an upcoming volume of *Cognition*.

The authors theorized that by making the font harder to read the information would seem more difficult to learn. Based on the concept of disfluency, the students would concentrate more carefully on learning the material. Disfluency, which occurs when something feels hard to do, has been shown to lead people to process information more deeply. The study notes that making material hard to learn is contrary to the way that many educators teach, and that success often is defined as a student having a relatively easy time learning a new concept or lesson rather than being able to retrieve the information at a later time.

"This study could prove useful for improving educational practices," Oppenheimer said. "Fluency interventions are extremely cost-effective, and font manipulations could be easily integrated into new printed and electronic educational materials at no additional cost to teachers, school

systems or distributors. Moreover, fluency interventions do not require curriculum reform or interfere with teachers' classroom management or teaching styles."

To test their theory, the authors conducted two different experiments.

In the first, 28 participants between the ages of 18 and 40 were brought to a lab at Princeton and asked to learn about extraterrestrials, to limit the amount of already known information that could influence the test. The material was presented in either easy or challenging fonts. The subjects were given 90 seconds to memorize information about the aliens, distracted for 15 minutes and then tested. Those who read about the aliens in an easy-to-read font (16-point Arial pure black) answered correctly 72.8 percent of the time, compared to 86.5 percent of those who reviewed the material in hard-to-read fonts (12-point Comic Sans MS or Bondoni MT in a lighter shade).

The second experiment took the lab findings to the field to test. Two hundred and twenty-two high school students in Diemand-Yauman's hometown of Chesterland, Ohio, were assigned material in easy and difficult fonts across subjects and grades on a randomized basis. In this study, the hard-to-read fonts were Haettenschweiler, Monotype Corsiva or Comic Sans Italicized. The control was whatever the teacher had been using previously -- usually Times New Roman or Arial.

The findings were similar to the Princeton study: Students reviewing material in hard-to-read fonts did better on regular classroom assessment tests than did their randomly selected counterparts reading the same material in easier fonts.

In the study, the authors caution that these findings need to be further investigated. They stress that if the material becomes illegible or otherwise unnecessarily difficult, it would hinder learning. The authors

also suggest that students who are easily discouraged or less able might actually give up with the harder-to-read fonts rather than digging in and really learning the material.

"This is a no-cost policy fix that could really improve students' learning," Oppenheimer said. "While we do need to further test the theory, if we are right, schools across the country could potentially see significant results without making a dent in school budgets. The take home message here is clear: Small interventions can have a big impact."

More information: Oppenheimer's current research focuses on how reasoning affects judgments and decisions in various settings. He is the co-editor, with Chris Olivola, of "The Science of Giving: Experimental Approaches to the Study of Charity," *Psychology Press*, 2010.

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