MORE strengthens student's knowledge of how words are connected – not just how many words they know

MORE (Model of Reading Engagement) is THE elementary science and social studies program that builds schemas and improves academic achievement – including literacy and math.

A core feature of MORE lessons is teaching **vocabulary in networks** by highlighting connections between word meanings through the use of a *concept map*. This approach differs from traditional approaches that rely on memorizing word lists.

Building **vocabulary networks** helps students connect new learning to what they already know. While prior research has shown that teaching vocabulary networks facilitates improved reading comprehension, whether this occurs because students learn more vocabulary (e.g., overall accuracy) or strengthen the connection between the words (e.g., if I know the meaning of fossil, I also know the meaning of paleontologist) remains an unexplored area.

How does MORE affect student vocabulary learning?

Our study randomly assigned 30 schools to either receive MORE in first and second grade (our "treatment" group) or regular classroom instruction (the "control" group). This helps us understand if MORE changes **vocabulary networks**. An unexpected wrinkle was that the district's ELA curriculum had a unit on dinosaurs - thus all students were exposed to and taught similar vocabulary from the MORE unit during the ELA block.

At the end of second grade, students took a 12-word vocabulary test. Some of these words had been explicitly taught in the MORE lessons, while others were "untaught," but appeared in read alouds and discussion. The test had students pick two related words from a short list (e.g., for fossil, the correct choices were bones and footprint.)

Using a **novel statistical method** we assessed both the size of the vocabulary network (i.e., # known words), but also the strength of the connection between the vocabulary words (i.e.., student correctly answering networks of words; paleontologist, fossil, theory answered correctly)

A prior study found no difference on overall vocabulary accuracy in Grade 2. This was probably because **treatment** and **control** both received ELA lessons on the MORE topic. Yet, **MORE** students outperformed **control** on reading comprehension. Our current study took another step and assessed *how* those words were connected in students' minds. For example, in the image below imagine a net, where each word is a dot, and the lines (in **green**) are the connections between them. The thicker the line, the stronger the connection. **MORE students had much stronger vocabulary *connections*.**

Specifically, students who had participated in MORE were more likely to know *groups* of related words. Knowing one word (i.e., *fossil*) made it much more likely they also understood related words (i.e., *evidence*, *reptile*, or *paleontologist*). This increase in "network strength" means the meaning of each word was supported by a web of related concepts, making knowledge more robust and flexible.
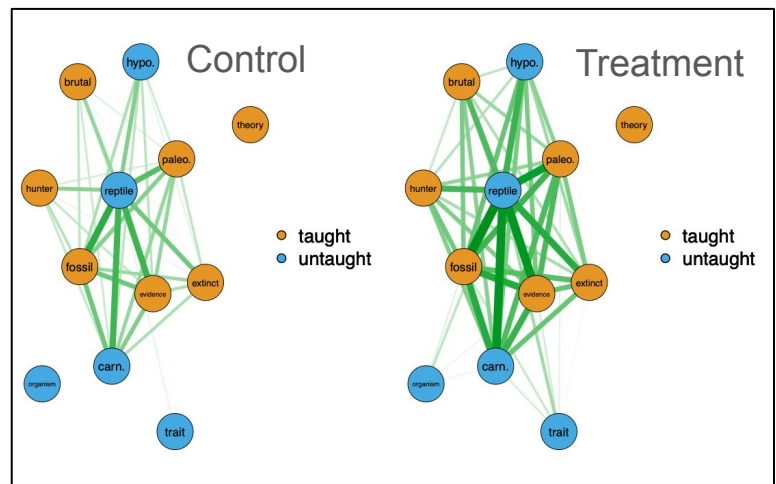
Amazingly, MORE students also connected the "untaught" words to words explicitly taught during the lessons — a powerful sign of learning transfer.

- MORE strengthens vocabulary network connections and this could be a key path to improving reading comprehension

MORE explicitly uses visual representations, *concept maps*, to teach vocabulary. This study shows that even though students were taught the same topic and vocabulary, MORE caused the development of denser and stronger connections between the tested words. These strong connections could be one key ingredient of how MORE improves reading comprehension.

Gilbert, Domingue, & Kim. (2025). Estimating Causal Effects on Psychological Networks Using Item Response Theory. *Psychological Methods*. https://psycnet.apa.org/doi/10.1037/met0000764