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Background

Objectives
This study is designed to determine whether the coherence of text and the correspondence of graphics with a text influence readers’ comprehension and attitude toward reading in children (2nd, 3rd, and 4th grade). We are also interested in whether the potential effects on comprehension and reading attitude endure over time.

Theoretical Framework

  - Text structure can be divided into four categories: propositions, microstructure, macro-structure, and superstructure.
  - Text coherence can be manipulated at the macro-level to create a high-coherence version of the text.
- **Mayer’s Multimedia Theory** (Mayer, 1997, 2001)
  - Comprehension enhanced when text and relevant graphics are paired.
- **Schnotz’s Theory of Text-Graphic Integration** (Schnotz, 2002, Schnotz & Bannert, 2003)
  - Learners construct mental models through inferential connections between text and the graphic.
  - Different graphics, paired with identical texts, should combine to create unique mental models of text content.
- **Carney and Levin’s Graphical Taxonomy** (Carney & Levin, 2002)
  - Graphics can be representational, organizational, interpretative, transformative, or decorative.

Research Questions

1. Will text comprehension for low prior-knowledge readers be higher with a high-coherent text (McNamara, Kintsch, Songer & Kintsch, 1996, McNamara, 2001, Ozuru, Dempsey, and McNamara, 2009)?
2. Will text comprehension vary with the type of accompanying graphic (Mayer, 2005, Schnotz and Bannert, 2003, Schnotz, 2005)?

Main Hypothesis:
A representational graphic with high correspondence with the text will enhance the comprehension of an explanatory text regardless of text coherence.

Method

Participants (expectations)
108 Elementary students
36 Second Graders
36 Third Graders
36 Fourth Graders

Design
Three factors, 'Text Coherence', 'Graphic-Text Correspondence', and 'Time' will be crossed to yield 6 experimental cells.

The resulting study design is 2-Text Coherence (High vs. Low) x 3-Graphic-Text Correspondence (High vs. Low vs. No Graphic) x 2-Time (Immediate vs. Delay).

Materials

Text type:
- Low Coherence
- High Coherence

Expected Results

- **Text 1: Tsunamis, Low Coherence**
  A tsunami is caused by an earthquake. Under the water there are mountains. When an earthquake shakes them, the water around them moves. When it is a big one, the waves are huge.
  A tsunami is not just one wave. An earthquake in the ocean might move the ocean floor up or down. If it does, it causes a sequence of waves to move out from the center of it. A wave is not just the highest that the water reaches. Between the high points of waves are low points. When a tsunami reaches land, the high points are the water that destroys things. After a high point comes onto the beach, the low point follows it. When the low point of the tsunami wave comes to shore, the water flows back into the ocean. This is the time when it carries people, buildings, and trash into the ocean. Then the next high point hits. One tsunami might have many waves.
  The low points of tsunami waves are dangerous, too. The water is low, so people think the land is safe. They do not know another tsunami wave is coming.

- **Text 2: Tsunamis, High Coherence**
  Tsunamis
  An under water earthquake causes a tsunami. Under the water there are mountains. When an earthquake happens it causes the ground and the mountains under water to shake. As a result the water around the mountains moves. When the earthquake is a big one, the waves are huge.
  A tsunami is not just one wave. An earthquake in the ocean might move the ocean floor up or down. When it does, the earthquake causes a sequence of waves to move out from the center of the earthquake. But a wave is not just the highest point that the water reaches. Between the high points of waves the water is at a lower point. When a tsunami reaches land, the high points are the water that destroys things. After a high point comes onto the beach, the low point follows it. When the low point of the tsunami wave comes to shore, the water from the high point flows back into the ocean. This is the time when it carries people, buildings, and trash into the ocean. Then the next high point hits. One tsunami might have many waves.
  The low points of tsunami waves are dangerous, too. The water is low, so people think the land is safe. They do not know another tsunami wave is coming.

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