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Facilitating the Comprehension of Science Articles by Activating General Knowledge

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Introduction

Why is expository text comprehension important?
- It is essential for academic achievement
  - Exposition becomes increasingly important in the 3rd and 4th grades
  - Such comprehension continues to challenge most
- Obstacles to the study of expository text comprehension
  - Complex structures (e.g., Compare/Contrast, Problem Solving, Persuasion, etc.)
  - Readers must activate relevant world/general knowledge
    - Misconceptions may interfere
    - Readers must make evaluative (or "bridging") inferences to relate world knowledge to text information (see Millis and Graesser, 1994; Singer et al., 1997; Noordman et al., 1992; and Singer et al., 1997)
- New approaches required to assess:
  - Recall of explicit information
  - Text-based inferences; and
  - Evaluative inferences

Purpose of Current Study
- Assess college students’ spontaneous generation of text-based and evaluative inferences when reading scientific articles and
- Investigate a method for facilitating evaluative inferences
  - Find the effectiveness of knowledge activation before reading articles

Predictions
- The activation of knowledge prior to reading is necessary for comprehension that depends upon evaluative inferences
- Less effect of knowledge activation will occur for responses to explicit statements and generation of text-based inferences

Participants
- UD students

Materials
- Three science articles (each one is about 650 words) were written for use in these experiments
- A training protocol was written for each article to activate general knowledge
  - The figure below illustrates an aspect of training for the article, Regression Towards the Mean

9 test statements (3 from each category) assess readers’ comprehension of each article, as follows:
- (Statements containing) Explicit information, e.g., “Regression towards the mean occurs when elements of chance influence scores.”
- Text-based inferences, e.g., The top 5% or bottom 5% of scores are generally considered “extreme” scores.”
- Evaluative inferences, e.g., A simple pretest-posttest comparison is sufficient for demonstrating a change due to an intervention strategy* *Note: One item in each of the above sets is a false statement such as this

Experiment 1

Procedure.
Participants were assigned to either the Training Before Reading or No Training condition, using the articles, The Evolution of Bipedal Gait and Hemispheric Asymmetry and Handedness, which were counterbalanced with condition
- Following self-paced reading, participants used a 0-10 scale to rate the clarity of the article
- After reading each test statement they reported “True” or “False”, and used a 1-10 scale to rate their confidence in being correct
- Comprehension scores were derived from the sum of weighted correct responses (+1 times the corresponding confidence rating) and weighted incorrect responses (-1 times the corresponding confidence rating)

Experiment 2

Experiment 2 is similar to Experiment 1, but we added one more article Regression Towards the Mean. Therefore, each participant was required to read three articles in total
- We also added the condition Training After Reading
- The procedure and measures are the same as Experiment 1

References