Teaching Argument Analysis and Representation with an Online Course

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Motivation

Argument Analysis:

- A major learning goal at any school is the development of students' critical thinking skills, but there are no clear definitions of "critical thinking"
- Educators can agree that one aspect of critical thinking involves argument analysis.

Visual Representations:

- Evidence from many domains indicates that visual representations aid various forms of cognition.
- Recent research on argument visualization (particularly computer-supported argument visualization) has shown that the use of software programs specifically designed to help students construct argument diagrams can significantly improve students' critical thinking abilities over the course of a semester-long college-level course

Online Instruction:

- A basic principle of learning is that students learn to do well only what they practice doing.
- Online instruction can include practice opportunities within the expository text
- Best practices indicate that frequent practice with targeted, immediate feedback are most likely to enhance learning

OLI Argument Diagramming Course:

- A central feature of the OLI platform is the ability to create a wide variety of practice exercises throughout the course
- Additionally, we developed an integrated argument diagramming tool so students can practice diagramming
- After using the first version of the course for several years, we created an updated version that incorporated the same text but with more and different practice opportunities.
- We wanted to determine whether it was worth all of the hard work put in to update the course
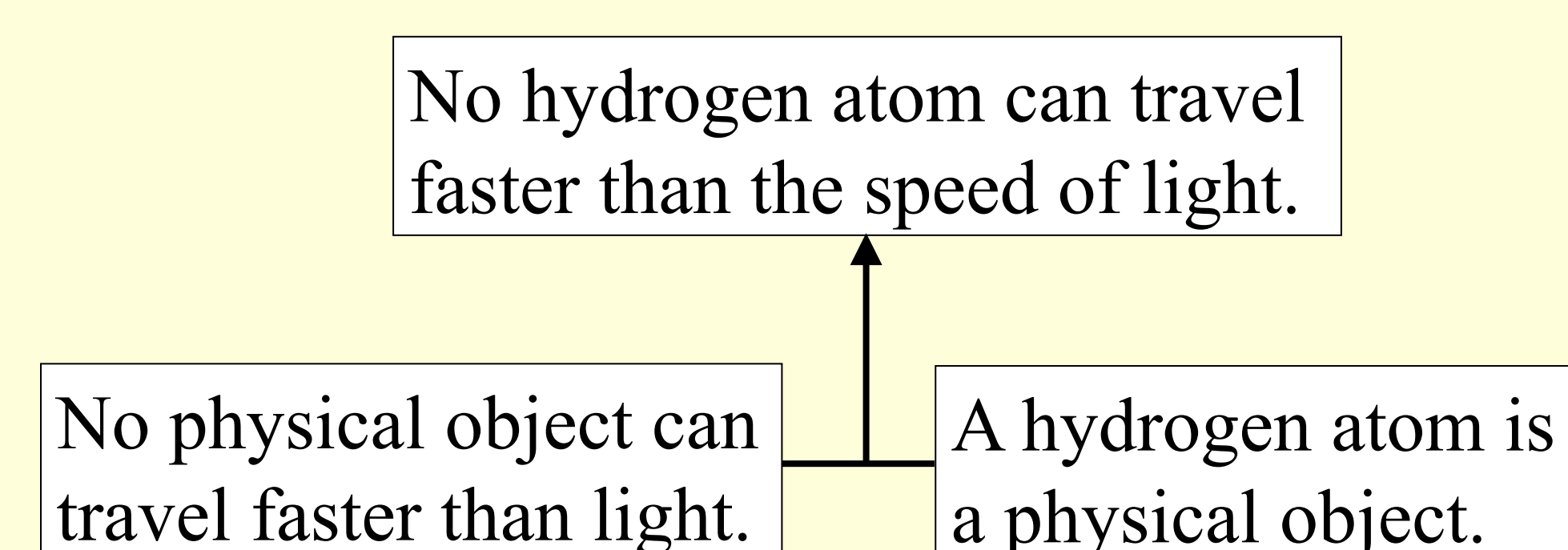
Example of a diagram for a simple argument

Hypothesis

Students who take the long version of the course will improve in performance on argument analysis tasks significantly more than students who take the short version of the course.

Method

Participants: 136 Carnegie Mellon students enrolled in 76-101 Interpretation and Argument in Fall 2011.

Materials: Two versions of an online argument diagramming course on CMU's OLI platform designed to teach students argument analysis and representation skills. Each version included two tests, one before the course and one after. Each test consisted of 10 questions drawn randomly from a test bank of questions.

Treatment: 52 students took the long version of the course, and 84 students took the short version.

Scoring: The tests were scored automatically by the OLI engine.

Conclusions

The results show that, when learning argument diagramming skills, students who encounter more, and more varied exercises in an online course designed to teach argument diagramming skills gain significantly more on argument analysis tasks than students who encounter fewer exercises.

We conclude that the long version of the online argument diagramming course is better for teaching students argument diagramming skills than the short version, and further that incorporating a large number and variety of interactive exercises is good pedagogy in an online course such as this.

Results
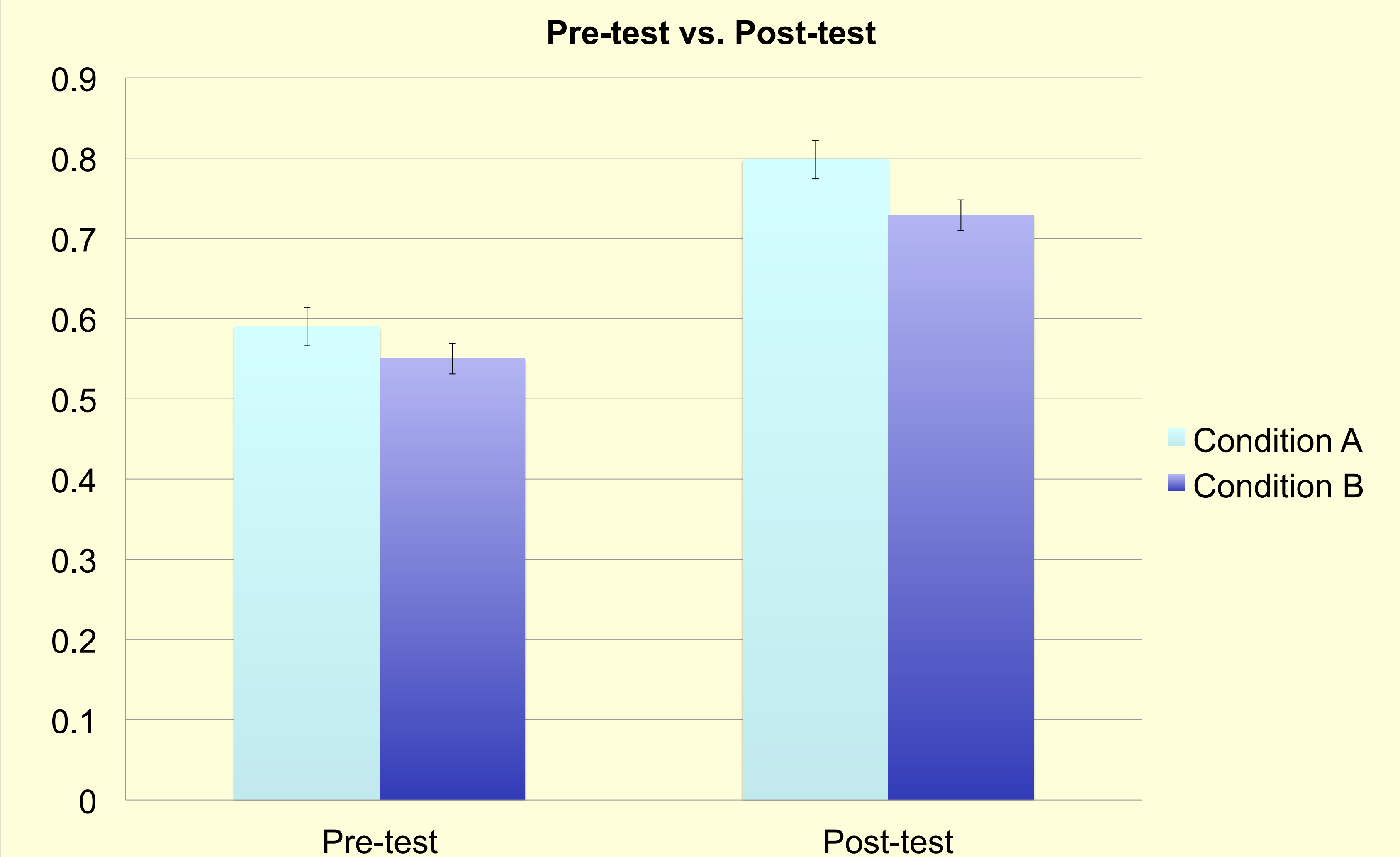
Histograms comparing the average scores indicated with standard error of the mean on the pre-test and post-test of students taking the long version of the argument diagramming course (condition A) to students taking the short version (condition B)
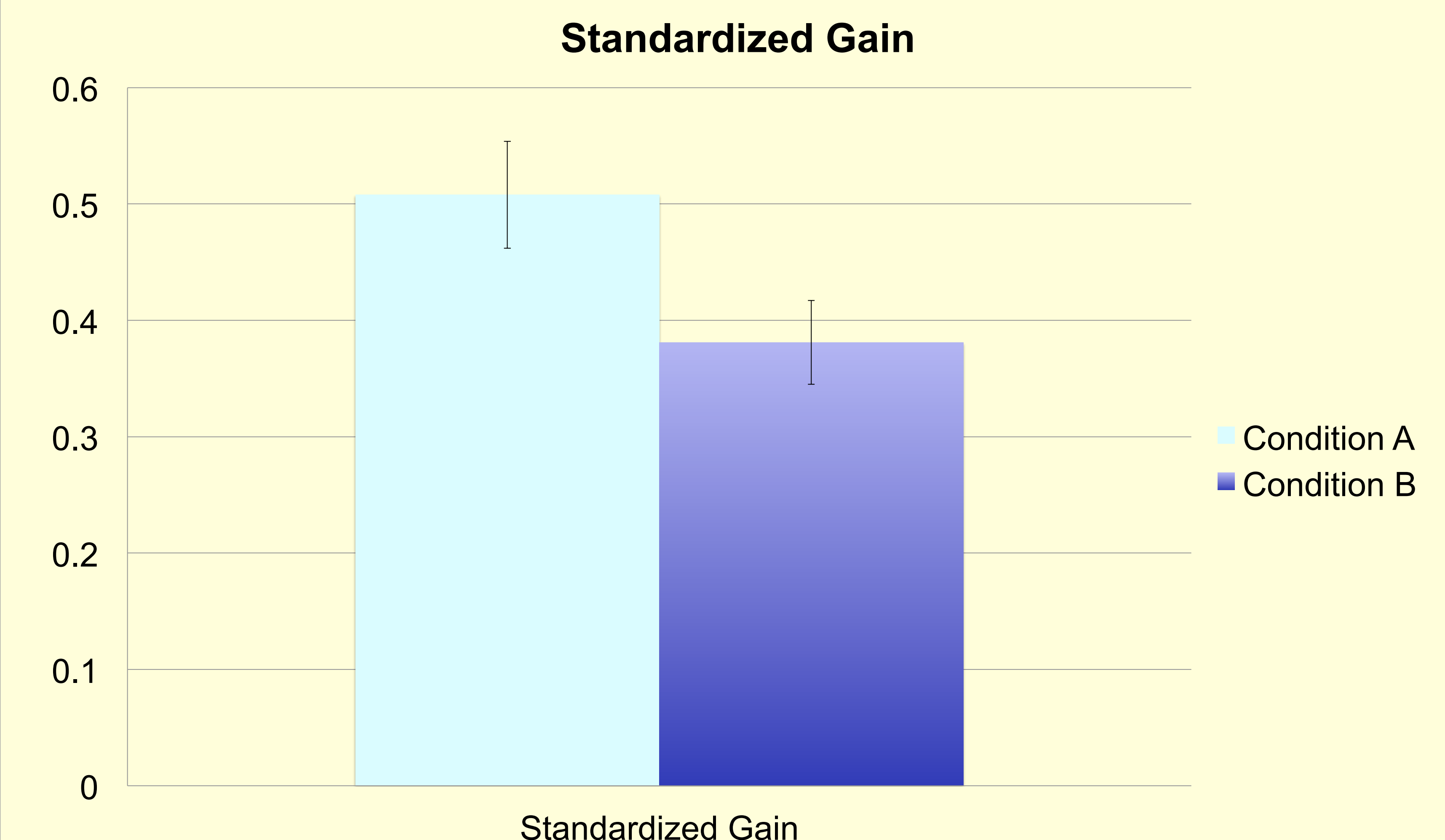
Histograms comparing the average standardized gain indicated with standard error of the mean from pre-test to post-test of of students taking the long version of the argument diagramming course (condition A) to students taking the short version (condition B)