

# The Influence of Visual Representations on Learning from Lessons on Functions

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## Introduction

- Interesting, but irrelevant information can distract learners through the *seductive details effect* (Lehman, Schraw, McCrudden, & Hartley, 2007).
- Much of the research on the seductive details effect has been with science textbooks.
- Math textbooks often contain images unrelated to the mathematical concepts being taught (Cooper, Nathan, Clinton, Sidney, & Alibali, 2012).
- Images are often completely irrelevant (decorative) or only relevant to the context of the problem (contextual).
- Decorative images may increase interest, but typically have a negative influence on learning (Durik & Harackiewicz, 2007; Levin, Anglin, & Carney, 1987).
- There is evidence contextual images may assist reading comprehension for some populations (Pike, Barnes, & Barron, 2010).
- The effect of contextual images in learning from mathematics lessons has not been previously examined.

### Research Questions

How are the contextual and decorative images processed while reading?

Does the inclusion of images distract from math-relevant information?

Does the inclusion of images influence memory of and learning from the lessons?

Does the inclusion of images influence learners' opinions of the lessons?

### Methods

#### Participants

41 undergraduate students (6 non-Native speakers of English)

#### Materials

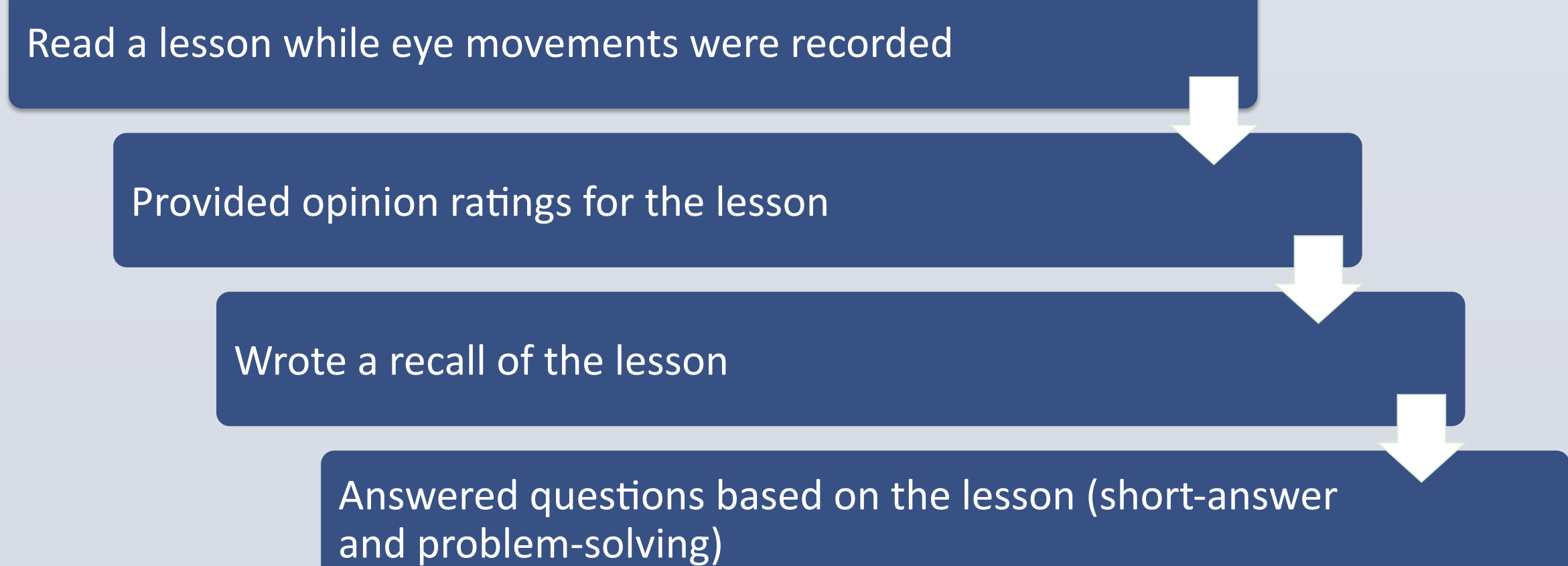
Four lessons on functions in a between (each lesson was presented in all four conditions) and within-subjects (each participant received a lesson in all of the conditions) design

	Decorative	No Decorative
Contextual		
No Contextual		

#### Apparatus

Tobii X60 eyetracker

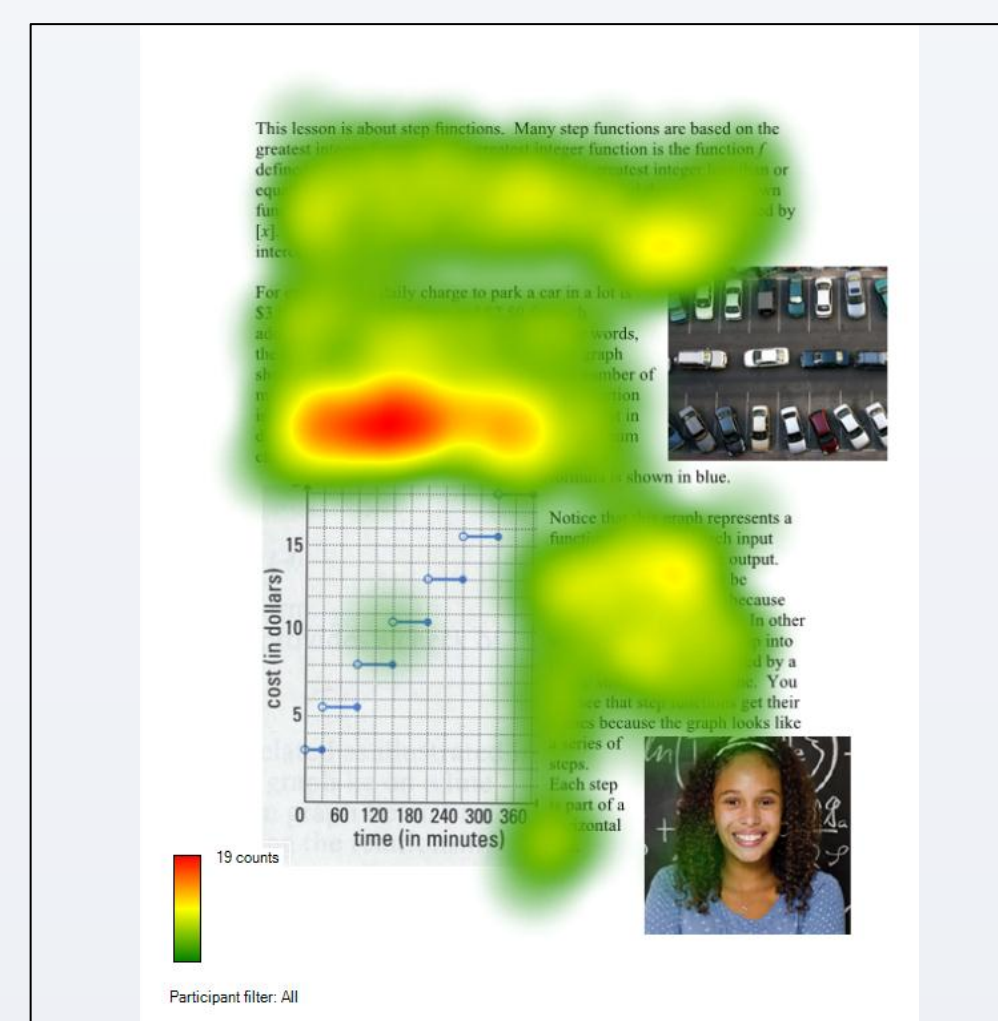
#### Procedure



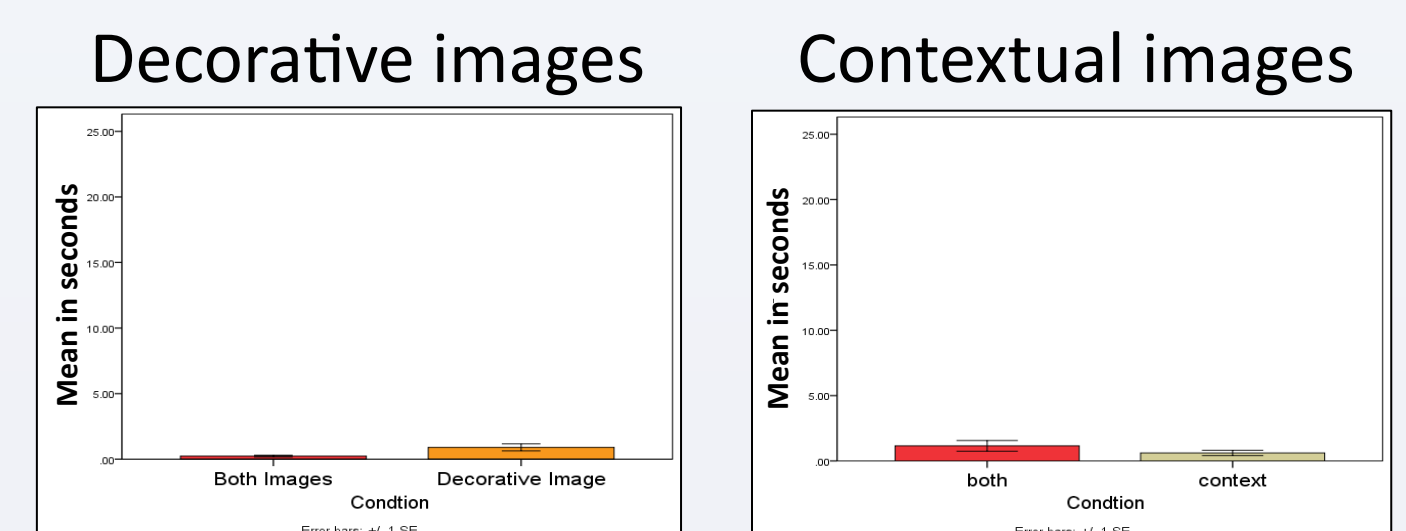
## Results

Visual attention towards the contextual and decorative images

### Heatmap of typical learner's fixation data

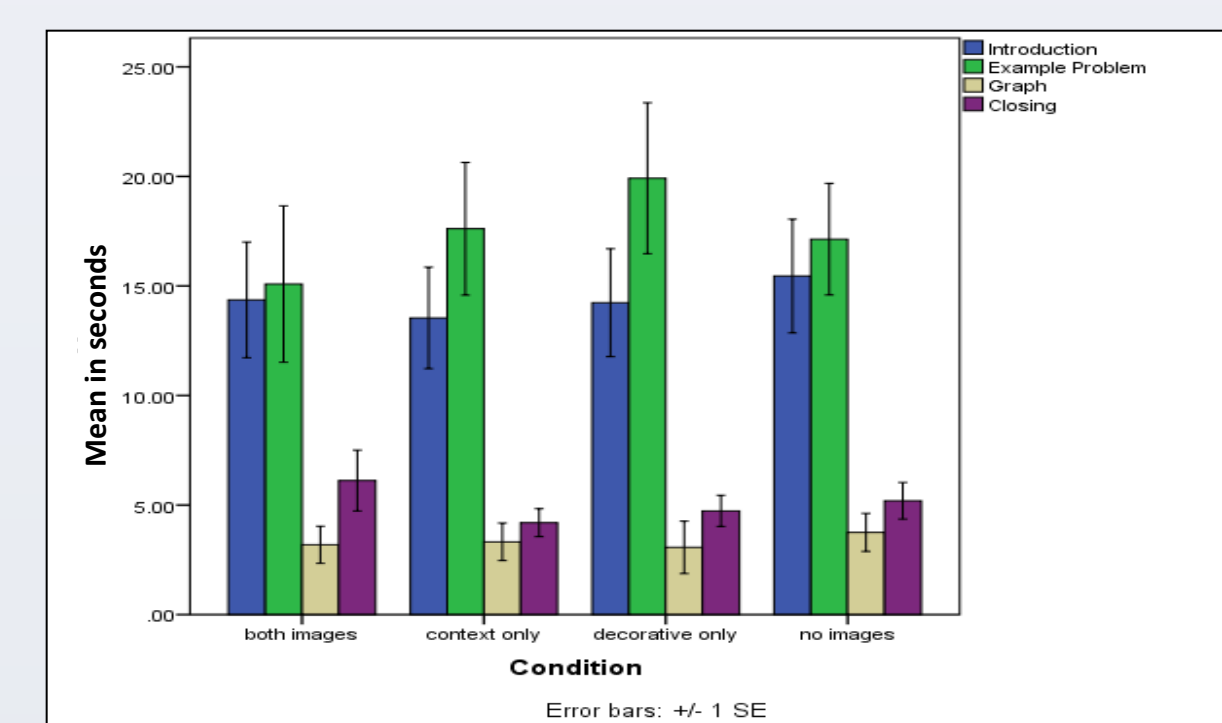


### Total fixation duration on images

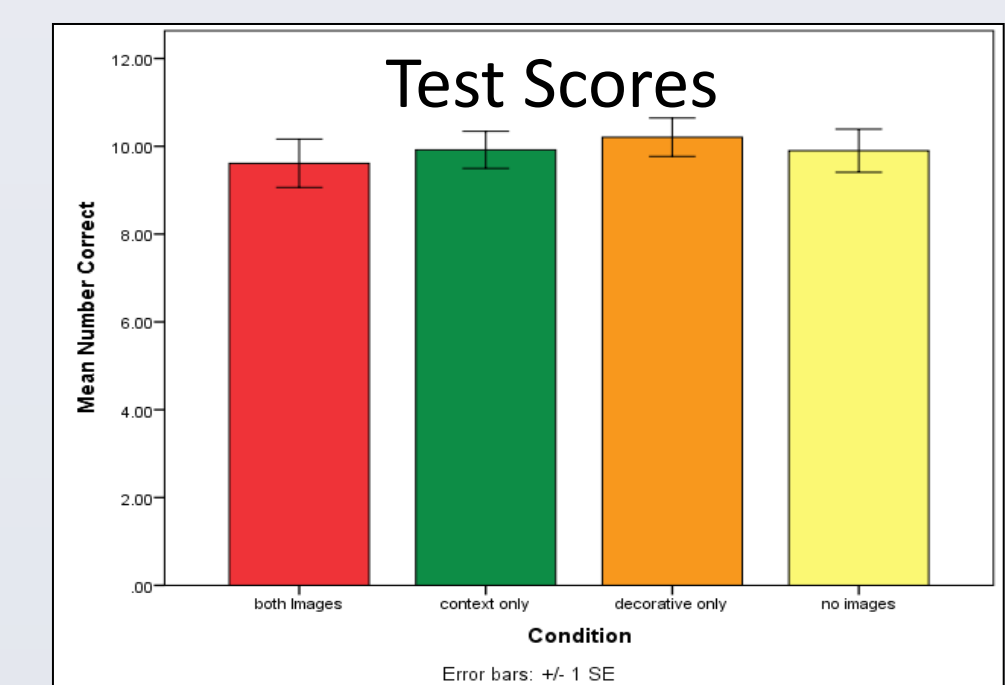
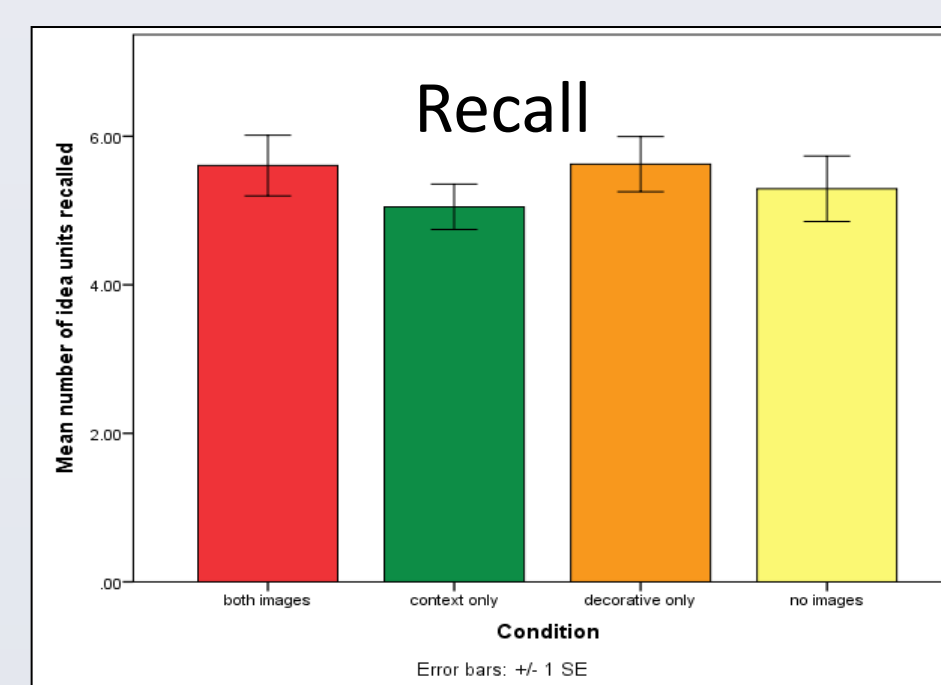


Visual attention towards the math relevant information

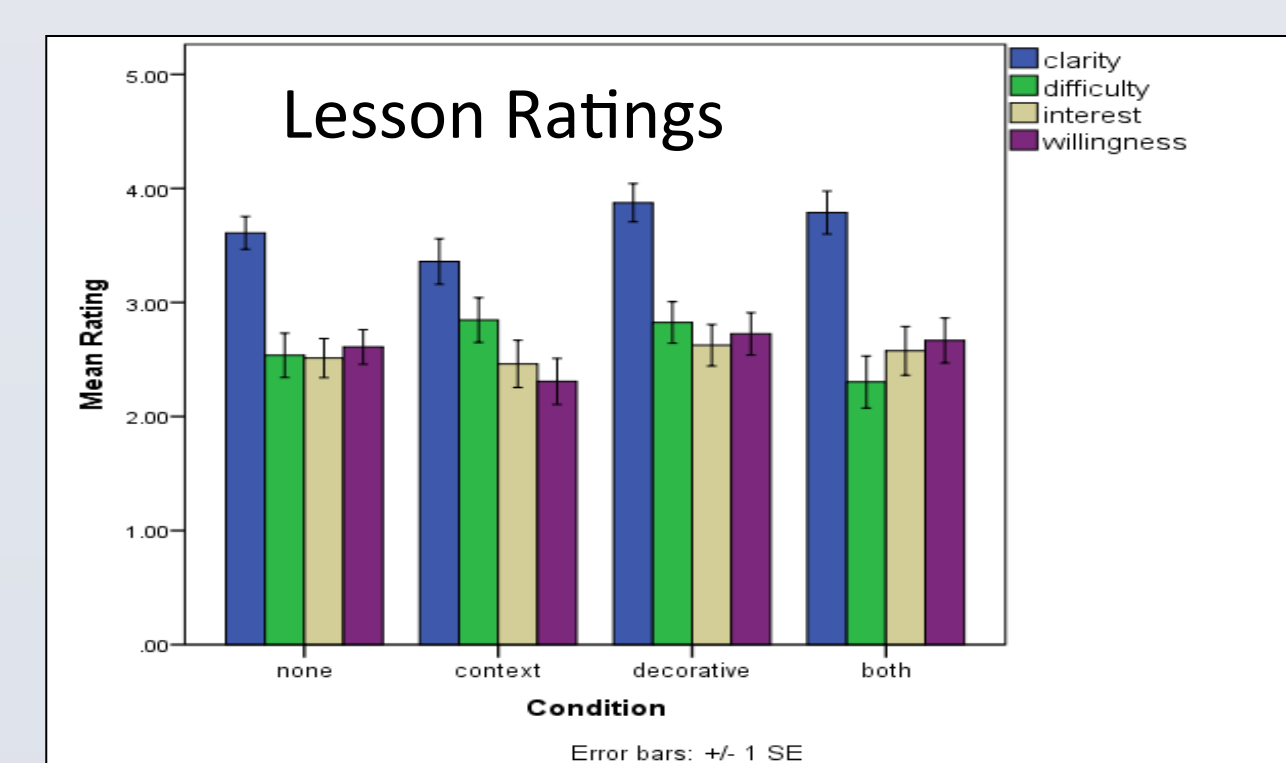
### Total fixation duration for math-relevant information



Influence of images on learning from the lessons



Influence of images on opinions of the lesson



## Discussion

- Purpose was to examine the influence of contextual and decorative images on learning of mathematics.
- Little visual attention was directed towards either types of images.
- Neither type of image influenced learning from or opinions of the lesson.
- Compared to text, little visual attention was directed to the graphs.
- Not uncommon for learners to focus on text when text and visual representations are presented together (Cromley, Snyder-Hogan, Luciw-Dubas, 2010; Schuler, Scheiter, Rummer, & Gerjets, 2012).
- May be useful to find ways to direct learner attention to visual representations.

### Acknowledgements

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