



# See Figure 1: Examining the Relationship Between Eye Fixation Patterns on PowerPoint Slides and Memory Performance

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## Introduction

The use of slide-based presentations as supplemental teaching aids has been shown to positively impact students' classroom experience (Apperson, Laws, & Scepansky, 2008).

One study using eye tracking technology found that students devote more attention to **complementary images** (images that are referenced in the text and include novel information) than to **decorative images** (images that are not referenced and provide no information) (Slykhuis, Wiebe, & Annetta, 2005).

Our pilot study is designed to extend these findings to explore whether or not these differing levels of attention impact performance on a memory test.

## Study Design

Four current students from Bard College participated in this pilot study.

The contents of the slide-based presentation and the memory test were created by research assistants. Greenland was chosen as a topic after a pilot test confirmed that students had relatively little knowledge of the country.

The first phase of the study consisted of 12 randomized slides, each presented for 30 seconds. Each slide focused on one aspect of Greenland and contained a complementary image, a decorative image, and a block of informative text.

**STUDY  
BLOCKS**

**MEMORY  
TEST**

In the second phase, participants were presented with a multiple choice test containing 12 questions about the complementary image for each slide and 12 questions about the informative text for each slide.

## Results

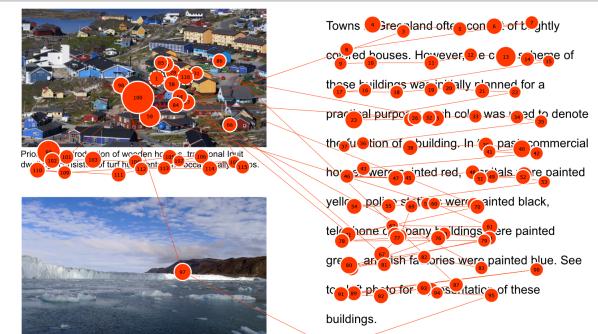


Figure 1. A gazeplot generated from one participant's fixations on Slide 1. The number on each dot represents the order of each gaze point, and the size of the dot indicates the duration of each gaze point.

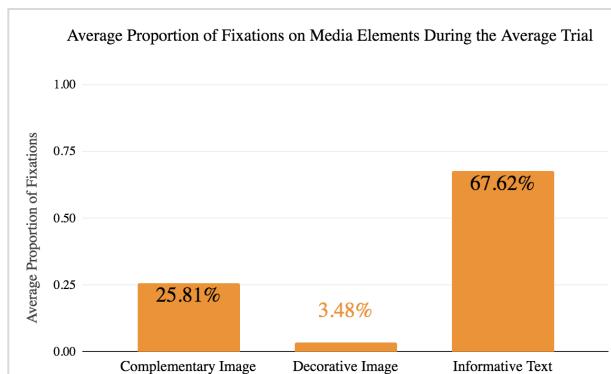


Figure 2. The average proportions of fixations recorded for each type of media element during the average trial. Participants devoted more attention to the complementary image in comparison to the decorative image.

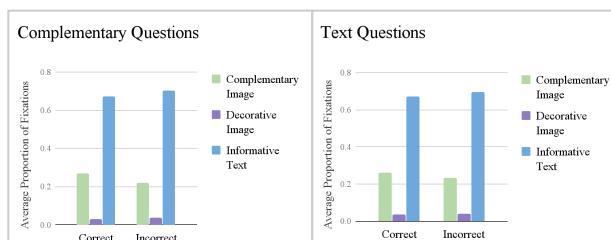


Figure 3. The average proportions of fixations recorded for each type of media element differentiated by type of question and trials associated with correct responses vs. incorrect responses. Participants' fixation patterns did not differ between trials that they later answered questions about correctly vs. incorrectly.

## Discussion

The results of our pilot study indicate that on average, participants spent more time looking at the complementary image in comparison to the decorative image.

This supports the notion that images in slide-based presentations are most beneficial when they are referenced in the text and provide novel information.

Additionally, performance on the memory test was not correlated with fixation pattern; participants devoted attention similarly across all trials, and performance on the memory test did not differ as a result.

In general, these results suggest that participants devote differing levels of attention to different types of media elements in a slide-based presentation.

Acquiring more information about these patterns could enable instructors to create more relevant and beneficial lecture slides.

Future research could examine the impact of additional stimuli (such as spoken lecture material, common classroom distractions, and additional decorative images or other content) on memory performance as well as how fixation patterns change during the course of a trial.

## References

Apperson, J. M., Laws, E. L., & Scepansky, J. A. (2008). An assessment of student preferences for PowerPoint presentation structure in undergraduate courses. *Computers & Education*, 50(1), 148-153.

Slykhuis, D. A., Wiebe, E. N., & Annetta, L. A. (2005). Eye-tracking students' attention to PowerPoint photographs in a science education setting. *Journal of Science Education and Technology*, 14(5), 509-520.