

INTRODUCTION

- Graphic design has existed since the 1900s and is used in many areas such as advertising, product design, and web design.
- Elements of graphic design include shape, color, space, typography, and value
- Visual attention is the way in which we process and focus on visual information

Objective: establish methods of directing visual attention in order to communicate visual information more effectively

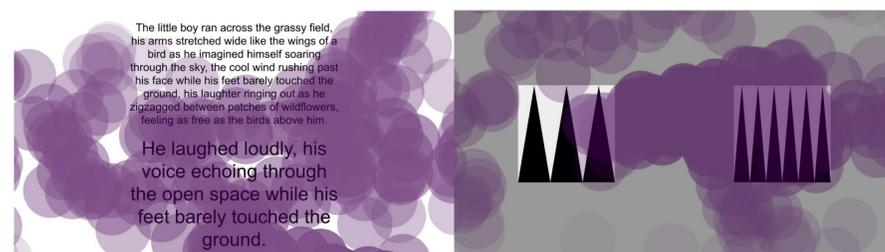
RESEARCH METHODOLOGIES

- A survey was used to collect information on demographics and mood
- A slideshow of images was created to represent different design choices
- Using the webgazer.js library, participants' gazes were tracked while they watched these images
- Hypotheses:
 - a) Certain colors will attract more attention;
 - b) A gradient between contrasting values will draw the eye to one side of the image;
 - c) Larger objects will attract more attention;
 - d) Contrasting hues will attract more attention than similar hues when placed together;
 - e) An image with more detail will attract more attention; and
 - f) There is an attention preference between text of different color, length, size, lexile level, and formatting (e.g. bold, italic, etc.).
- 43 slides total to test these hypotheses, including controls
- Six variants of the slideshow were created, changing the order and orientation of the slides

DATA AND FINDINGS

- 9 participants with 15078 data points (~350 per slide)
 - Each data point consists of an x-coordinate, y-coordinate, and timestamp which is used to get the slide number
- Data points were pooled for each slide
 - Slide order was unscrambled, and flipped slides had their data adjusted
- Data was visualized with opacity maps using numpy (Fig. 1)

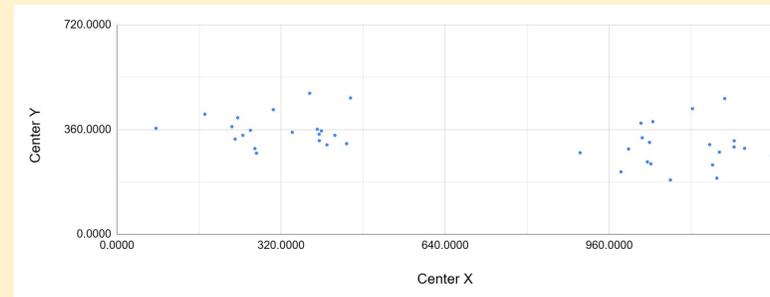
Figure 1: Opacity Maps



DISCUSSION, ANALYSIS, AND EVALUATION

- Mean and standard deviation were calculated for x and y coordinates for each slide
 - The mean of all data points was (756, 327); slightly to the bottom right
- Means gravitated toward either the left or right side

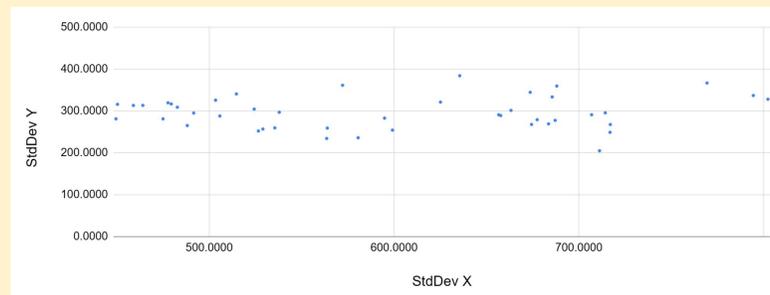
Figure 2: Mean x and y for each slide



The edges of the chart represent the edge of the slideshow that the participants viewed, though the aspect ratio was not preserved.

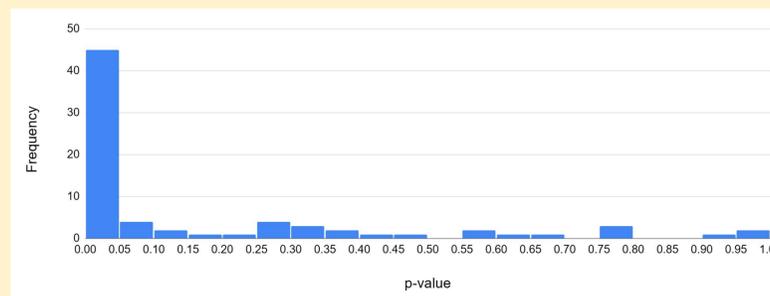
- The standard deviation of y was ~300 for most slides, and the standard deviation for x varied from 449 to 802

Figure 3: Standard deviation of x and y values for each slide



- Significance testing was done to compare between control and experimental slides

Figure 4: Histogram of p-values for each slide



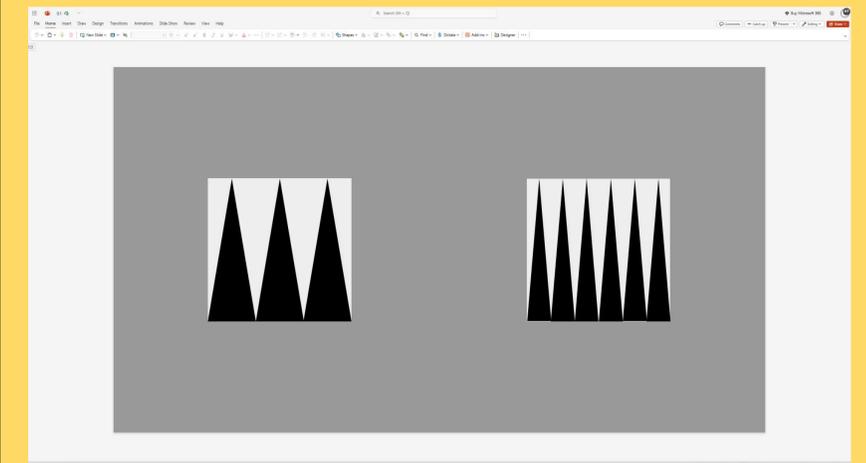
There is a strong right skew, with 45/74 values indicating significance.

- Abnormalities in the means, standard deviations, and p-values made the data unreliable despite much of the data rejecting the null hypothesis

CONCLUSIONS, IMPLICATIONS, AND NEXT STEPS

- Under normal circumstances it would be expected that participants would look more to the center on average, especially considering around half of the participants viewed mirrored versions of the slides
 - The average gaze location for the four blank slides used as controls was far to the right; for this to happen with proper calibration, half the participants would need to look left while the other half would need to look right
- Most likely caused by poor calibration of the eye-tracking software
- Future improvements
 - Larger/more diverse sample size
 - Inclusion of optical disorders such as color blindness
 - More standardization in position/lighting
 - Better way to calibrate gaze
 - Eliminating distractions

Figure 4: View Displayed for Experiment Participants



Due to the limits in the code used, the powerpoint could not be put in fullscreen, resulting in possible distractions being left on screen.

ACKNOWLEDGEMENTS / REFERENCES

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Full Research Paper

