

The Way Eye See It

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History of Eye Tracking

- Eye tracking is based on Just and Carpenter's (1976) "eye-mind" hypothesis, which stated the location of a person's gaze directly corresponds to the most immediate thought in a person's mind.
- Researchers have used eye-tracking technology for several decades to reveal covert perceptual and cognitive processes that inspire the perception and aesthetic evaluation of art (Lochner, 2006).
- In 2001, Miall and Tchalenko performed the first thorough examination of a painter and observed the rhythm between fixations on the model and fixations on the drawing.



Eye Tracking for Education

- Eye tracking can aid in improving learning environments and help educators better understand the knowledge process (Matos, 2016).
- Data from eye tracking studies can be used to provide insight for educators during the curriculum development process (Matos, 2016).
 - e.g., By studying the eye patterns of consumers, educators should become more aware of the most effective way to design an advertisement. This can lead to more relevant graphic design curriculum.



Conceptual Framework: Scanpath Theory

- Noton and Stark (1971) studied eye movements and devised the observed patterns known as “scanpaths.”
 - Determined that even without questions for the viewers to consider before viewing, participants tend to fixate on identifiable areas of interests.
 - Scanpaths showed the order of eye movements over areas of interest is significantly variable.



Problem & Purpose

- Research suggests advertisement eye-tracking data is difficult to obtain (Duchowski, 2007).
- Examining the way consumers view print advertisements may provide insight about this phenomenon.
- Therefore, this study sought to examine the eye movements of average consumers viewing livestock-based advertisements.



Research Questions

- Three research questions guided this study:
 - What scanpath pattern did the participants follow when viewing the advertisements?
 - On which elements of the advertisements did the participants fixate?
 - How many times did participants fixate on that element?



Methods & Procedures

- Participants' visual attention was collected using eye-tracking technology.
 - Tobii T60 screen-based eye tracker was used to collect the data.
- Target Population
 - Census of students ages 18-21 studying Agricultural Communications at Oklahoma State University and enrolled in an entry-level graphic design course ($N = 29$).
 - Subjects were solicited through face-to-face recruitment during a scheduled class period.
 - 100% response rate for the population
- Limitations
 - The results may be transferrable but should not be generalized.



Data Collection & Analysis

- Prior to the eye-tracking exercise, participants were asked to complete a brief questionnaire to help the researchers gain more insight on the population.
- To begin the eye-tracking exercise, the machine was calibrated to each participant.
- Participants viewed eight advertisements for five seconds each.
- Eye-tracking data was recorded and analyzed through statistical data, heat maps and gaze plots.




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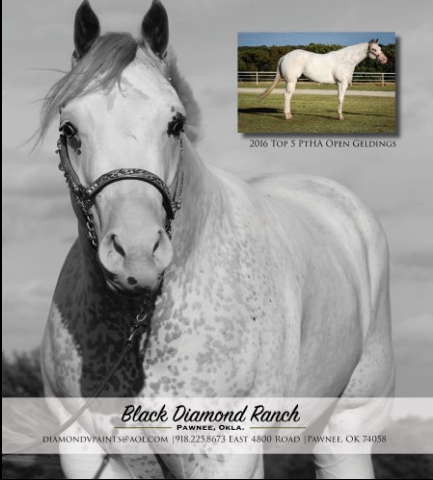

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Findings – Heat Maps

HeatMap
Draw: 62396µs
FPS: 16
0 11.04
counts




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HeatMap
Draw: 62396µs
FPS: 16
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counts



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Conclusions

- Participants took an average of 0.66 seconds to view the first fixated element.
- Participants used an additional 3.15 seconds to reach the last fixated element.
- Participants first fixated area of interest (AOI) was the dominant image.
- Participants final fixated AOI was the contact information on the advertisement.
- The data also shows the advertisements containing more color had a higher level of fixations and a more defined gaze pattern.



Recommendations for Industry and Education

- Future graphic designers should be mindful when including a dominant element in their designs, such as a large image or graphic.
- Current designers should have an understanding of consumer eye behavior to best market their product or service to college-aged students.
- Educators should examine the eye-tracking data and consider the results when developing graphic design-related curriculum.



Recommendations for Future Research

- Future research should examine if trained graphic designers look at designs differently than the average consumer.
- This study should be replicated with a larger, more diverse population.



References

- Duchowski, A.T. (2007). *Eye Tracking Methodology: Theory and Practice*. New York: Springer-Verlag London Limited.
- Just M.A., & Carpenter, P.A. (1976). Eye fixations and cognitive processes. *Cognitive Psychology*, 8, 441-480.
- Lochner, P.J. (2006). The usefulness of eye movement recording to subject an aesthetic episode with visual art to empirical scrutiny. *Psychology Science*, 2, 106-114.
- Matos, R. (2016). Eye tracking essentials. Retrieved March 8, 2017, from <http://www.tobiipro.com/learn-and-support/learn/eye-tracking-essentials/>
- Miall, R.C., & Tchalenko, J. (2001). A painter's eye movements: A study of eye and hand movement during portrait drawing. *Leonardo*, 34(1), 35-40.
- Noton, D., & Stark, L. (1971a). Eye Movements and Visual Perception. *Scientific American*, 224, 34-43.

