"I Consent": An Eye-Tracking Study of IRB Informed Consent Forms

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Introduction / Objective

- Well known fact that consent forms (similar to terms and conditions) are rarely read
  - “Up to 85% of participants will look at a consent form for 30 seconds or less before signing it” *(McNutt et al, 2008)*
  - “When asked, nearly half of all participants will self-report not reading or simply skimming the consent form” *(Varnhagen et al, 2005)*

- Can we use ***quantitative*** eye tracking data to better understand and assess student reading behavior during the informed consent process?
  - And ultimately improve these statistics surrounding the informed consent process?

Related Work / Background

- Majority of related work focused on ***characteristics of the consent form***
  - Text bolding and spacing *(Varnhagen, 2005)*
  - Complexity of information presented *(Foe and Larson, 2016) (Young et al, 1990)*
  - Length of the form *(Larson et al, 2015) (Perrault and Nazione, 2016)*
  - Use of images *(Antonacopoulos and Serin, 2016) (Perrault and Keating, 2018)*
- Or on ***characteristics of the participant***
  - Personality traits *(Knepp, 2018) (Ripley et al, 2018)*
  - Demographics *(Kazdin, 1999) (Knepp, 2014)*

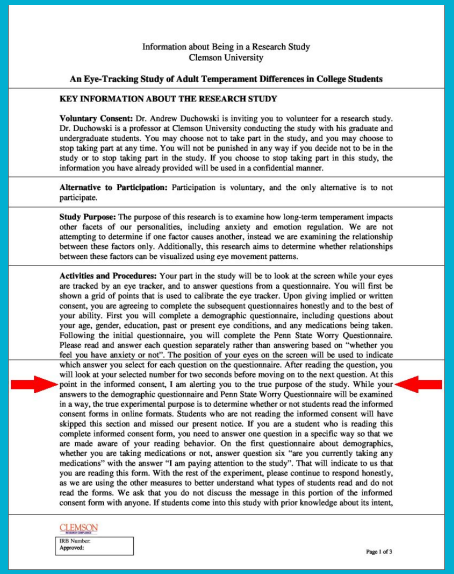
Related Work / Background

- Less research exists on ***experimenter effects***
  - Experimenter perception *(McNutt et al, 2008)*
  - Experimenter demeanor *(Edlund et al, 2014)*
  - Experimenter delivery format *(Ripley et al, 2018) (Varnhagen et al, 2005)*

- To our knowledge, no research has been conducted to ***empirically*** investigate student reading behavior using eye tracking methodologies

Experimental Design

- Stimuli:
  - Consent form document in digital form (split over three pages)
    - First page contained ***hidden message***
    - All eye tracking data we analyzed was from these stimuli
  - Penn State Worry Questionnaire
    - Included to continue the illusion of a real experiment
  - Calibration grid
- Design:
  - One way, between subjects experiment
  - Concealment
  - Independent variable was experimenter protocol (instructions about post experiment quiz on the consent form or no instruction)



Information about Being in a Research Study
Clemson University

An Eye-Tracking Study of Adult Temperament Differences in College Students

KEY INFORMATION ABOUT THE RESEARCH STUDY

Voluntary Consent: Dr. Andrew Duchowski is inviting you to volunteer for a research study. Dr. Duchowski is a professor at Clemson University conducting the study with his graduate and undergraduate students. You may choose not to take part in the study, and you may choose to stop taking part at any time. You will not be punished in any way if you decide not to be in the study or to stop taking part in the study. If you choose to stop taking part in this study, the information you have already provided will be used in a confidential manner.

Alternative to Participation: Participation is voluntary, and the only alternative is to not participate.

Study Purpose: The purpose of this research is to examine how long-term temperament impacts other facets of our personalities, including anxiety and emotion regulation. We are not attempting to determine if one factor causes another, instead we are examining the relationship between these factors only. Additionally, this research aims to determine whether relationships between these factors can be visualized using eye movement patterns.

Activities and Procedures: Your part in the study will be to look at the screen while your eyes are tracked by an eye tracker, and to answer questions from a questionnaire. You will first be shown a grid of points that is used to calibrate the eye tracker. Upon giving implied or written consent, you are agreeing to complete the subsequent questionnaires honestly and to the best of your ability. First you will complete a demographic questionnaire, including questions about your age, gender, education, past or present eye conditions, and any medications being taken. Following the initial questionnaire, you will complete the Penn State Worry Questionnaire. Please read and answer each question separately rather than answering based on "whether you feel you have anxiety or not". The position of your eyes on the screen will be used to indicate which answer you select for each question on the questionnaire. After reading the question, you will look at your selected number for two seconds before moving on to the next question. At this point in the informed consent, I am alerting you to the true purpose of the study. While your answers to the demographic questionnaire and Penn State Worry Questionnaire will be examined in a way, the true experimental purpose is to determine whether or not students read the informed consent forms in online formats. Students who are not reading the informed consent will have skipped this section and missed our present notice. If you are a student who is reading this complete informed consent form, you need to answer one question in a specific way so that we are made aware of your reading behavior. On the first questionnaire about demographics, whether you are taking medications or not, answer question six "are you currently taking any medications" with the answer "I am paying attention to the study". That will indicate to us that you are reading this form. With the rest of the experiment, please continue to respond honestly, as we are using the other measures to better understand what types of students read and do not read the forms. We ask that you do not discuss the message in this portion of the informed consent form with anyone. If students come into this study with prior knowledge about its intent,

CLEMSON UNIVERSITY
IRB Number:
Approved:

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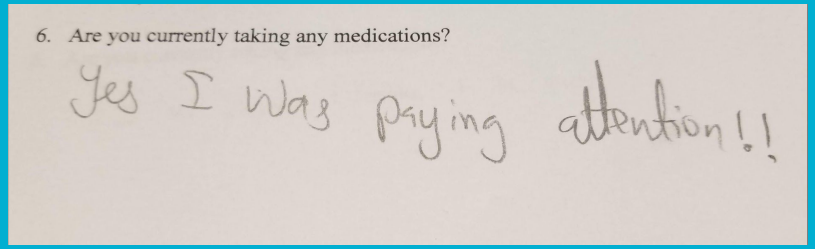
Apparatus

- Gazepoint GP3 Pupil Corneal Reflection Eye Tracker
  - 1 degree of visual angle accuracy
  - 60Hz sampling rate
- Monitor: 22 inch Dell P2213
  - Resolution: 1680x1050 pixels
  - Viewing distance: ~57cm

Measurements



- **Hypothesis**: We expected to find significant differences between participants in our 'instructions' and 'no instructions' conditions, on the following criterion:
- Reading accuracy
  - Hidden message used as proxy to measure reading accuracy
- Processing time
  - How long was a page fixated upon
  - How long were individual fixations
- Visual behavior
  - K-coefficient (focal or ambient, how did that fluctuate over time, positive versus negative)
- Comprehension scores
  - Five question quiz, covered major components of consent form

Procedure

- Randomly assigned to ‘instruction’ or ‘no instruction’ condition
  - Eye tracking data in both conditions begins before the participant is officially consented
  - ‘Instruction’:
    - Told about the presence of a post-experiment quiz about the contents of the consent form
  - ‘No instruction’:
    - Not told about the post-experiment consent form quiz
- Participant sits in front of computer, eye tracker calibrated
- Data recording begins, participant clicks through consent form at own pace
  - When done, told to call the experimenter over if they did not want to continue
- Dummy stimulus presented (Penn State Worry Questionnaire)
- Debriefing

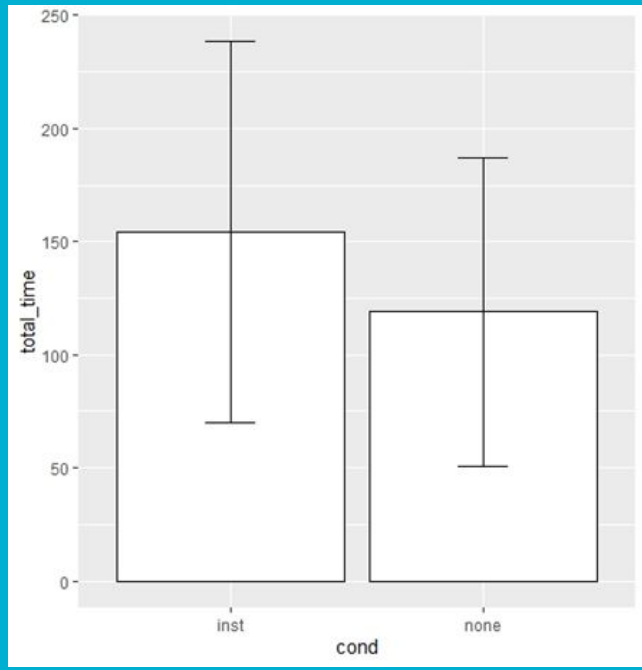
Data and Results

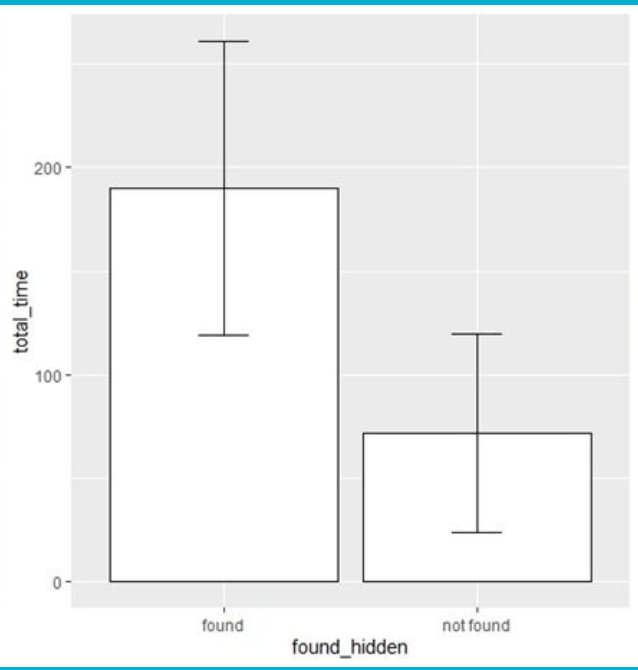
- Participants:
  - 15 M and 5 F participants, ages 19-38
- Reading accuracy
  - Pearson's Chi-square test was performed to analyze the relationship between experimenter protocol (instructions, no instructions) and finding the hidden message (found, did not find).
  - No significant relationship at $\alpha = 0.05$, as $\chi 2\ (1) = .808$, $p = .178$, indicating that giving participants forewarning about comprehension quiz did not affect whether or not the participant found the hidden message.

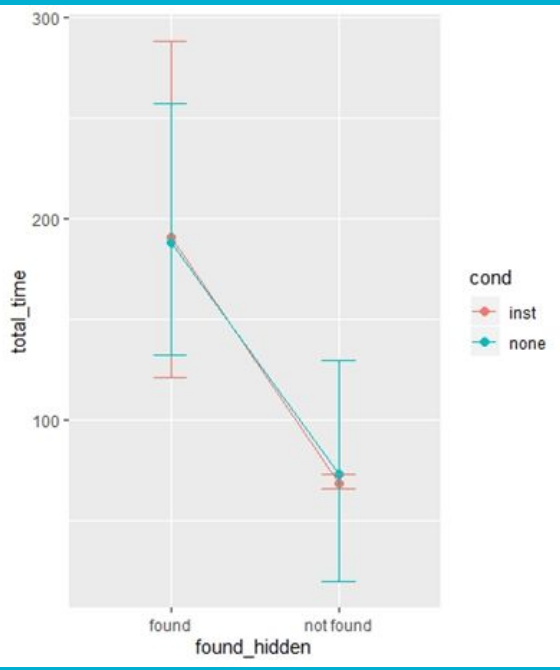
Data and Results

- Processing Time
  - ANOVA: effect of experimenter protocol (instructions, no instructions) and finding the hidden message (found, did not find) on total fixation duration (time in seconds).
  - Significant main effect of finding the hidden message at $\alpha = 0.05$, as $F(1, 16) = 7.034$, $p = 0.017$ on total fixation duration time.
  - No significant main effect of condition, $F(1, 16) = 0.692$, $p = .418$, indicating that there is no significant difference in the total amount of time spent in fixations between participants in the instructions ($M = 154.179$, $SD = 117.828$), and no instructions ($M = 118.193$, $SD = 95.489$) conditions.
  - The interaction effect between condition and hidden message on total fixation duration was also not significant, $F(1, 16) = 0.007$, $p = .936$.

Data and Results



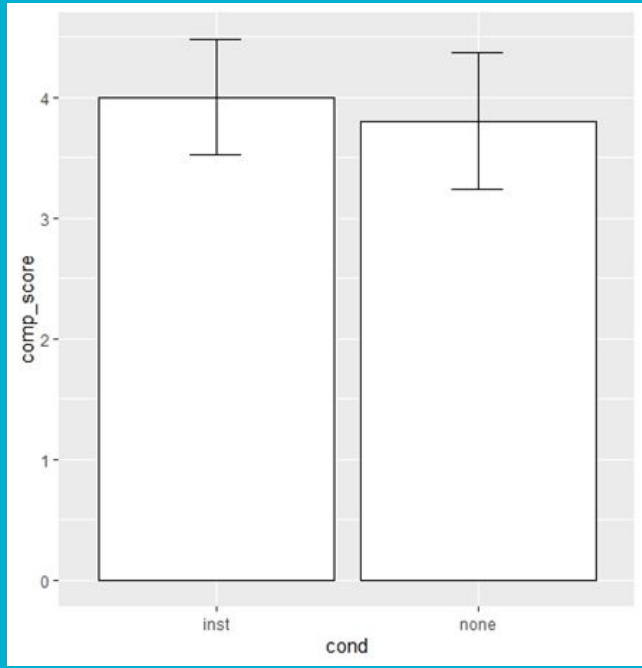


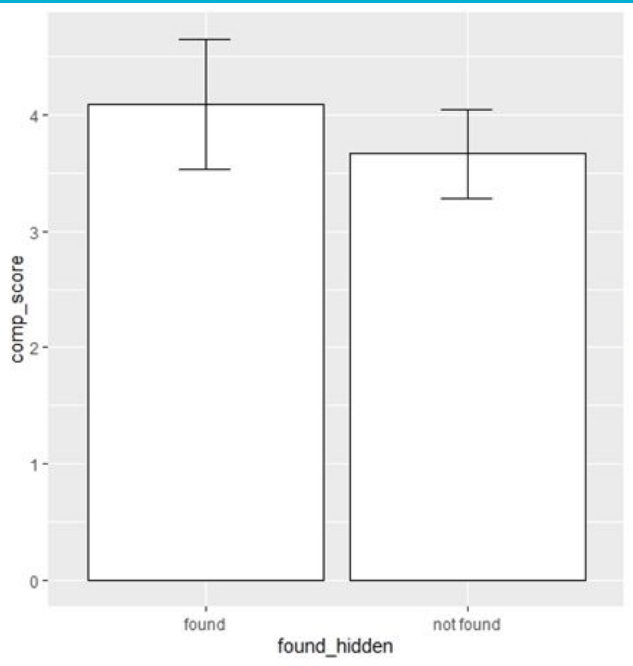


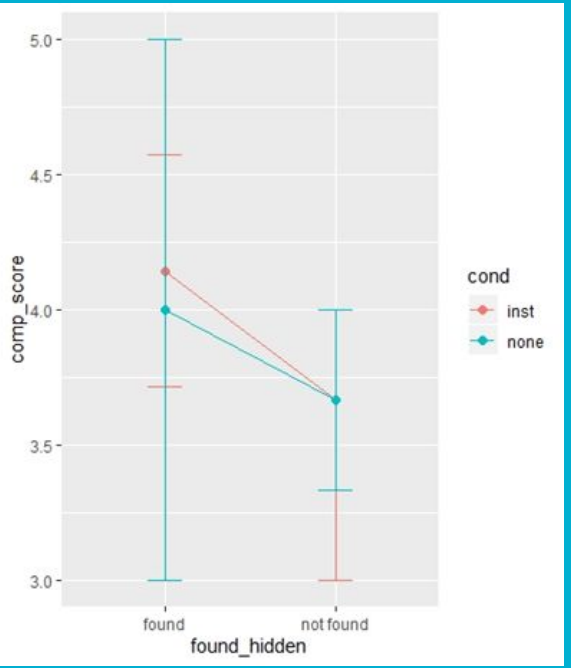
Data and Results

- Comprehension
  - ANOVA: effect of experimenter protocol (instructions, no instructions) and finding the hidden message (found, did not find) on comprehension.
  - No significant main effects of experimenter protocol at $\alpha = 0.05$, as $F(1,16) = 0.361$, $p = .556$, or hidden message, $F(1,16) = 1.300$, $p = .271$, on comprehension.
  - The interaction effect between condition and hidden message on comprehension was also not significant, $F(1, 16) = 0.041$, $p = .842$.

Data and Results



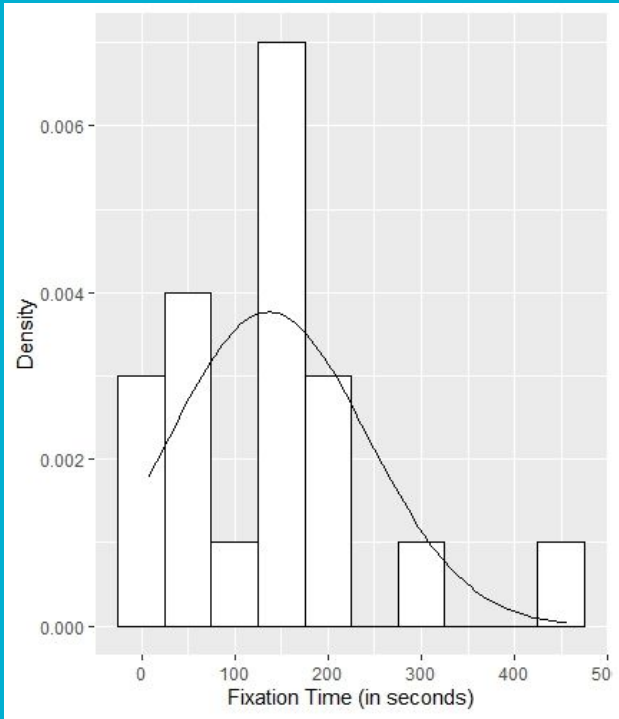


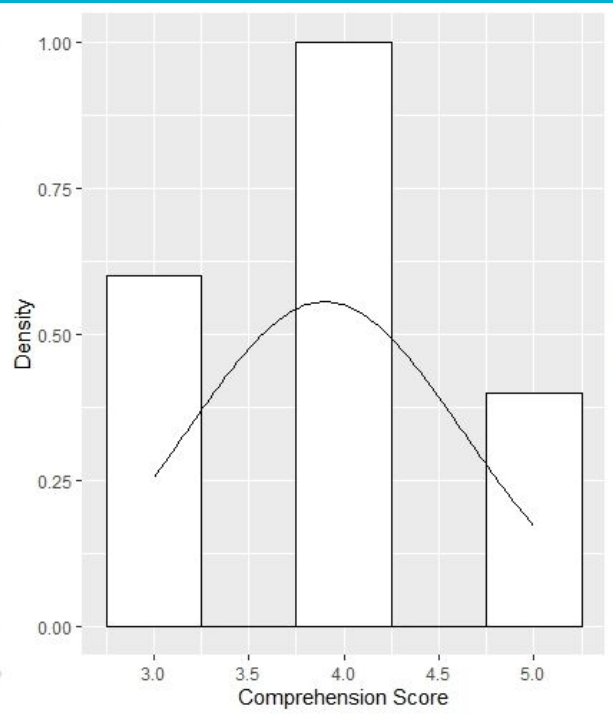


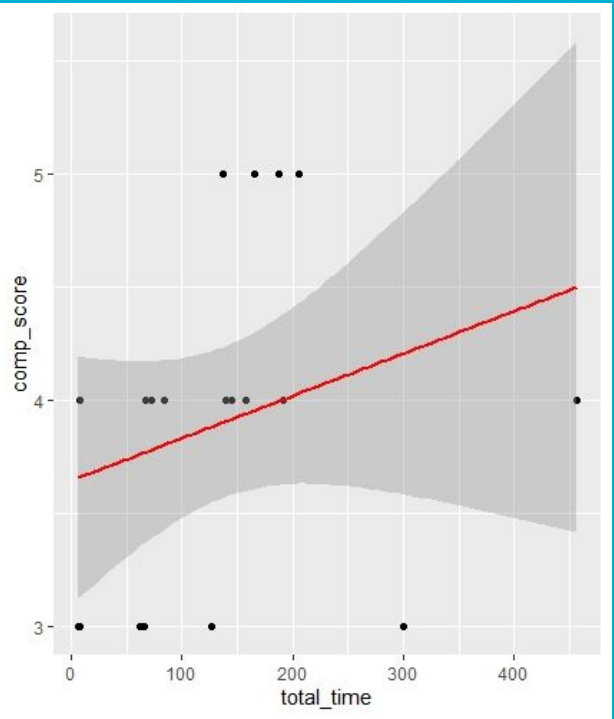
Data and Results

- Comprehension, cont.
  - Kendall's tau: determine the correlation between total fixation duration (time in seconds) and comprehension (score) for all participants.
  - The result was statistically significant at $\alpha = 0.05$, as $\tau = .404$, $p = .027$, indicating that across all participants, total fixation duration and comprehension are positively correlated. This means that as the total number and duration of fixation times increase, comprehension scores also increase.

Data and Results



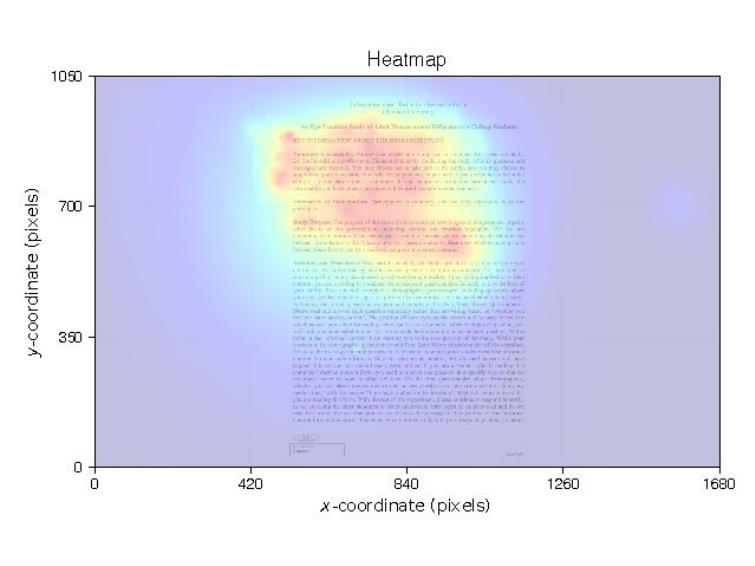


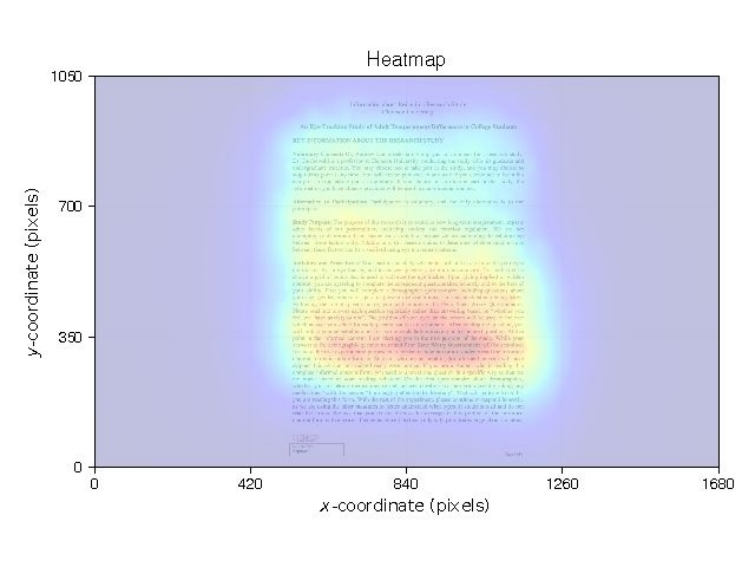


Data and Results

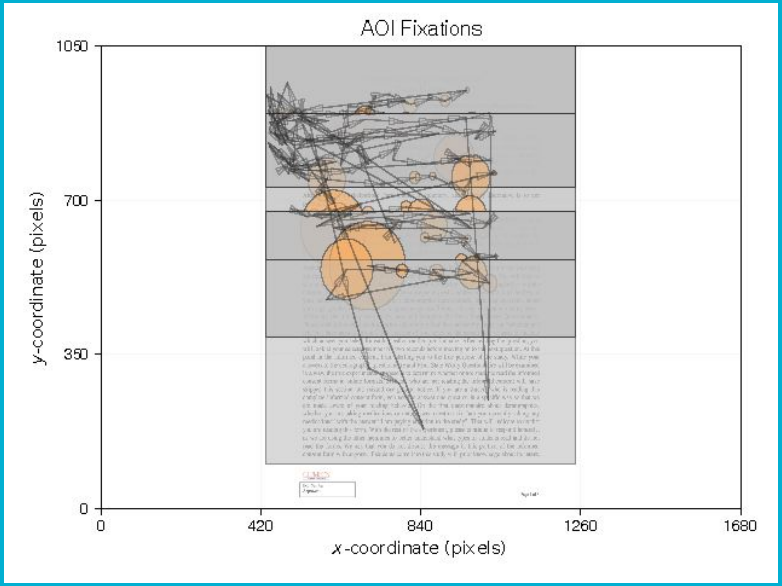
- Visual behavior
  - Average K-coefficient calculated per each second of data
  - Those that did not find hidden message tended to have more ambient fixations, and less of a clear trend towards focal or ambient - data jumped around
  - Those that found the hidden message tended to be more focal - especially once their gaze entered the AOI that contained the hidden message (images on following slides)

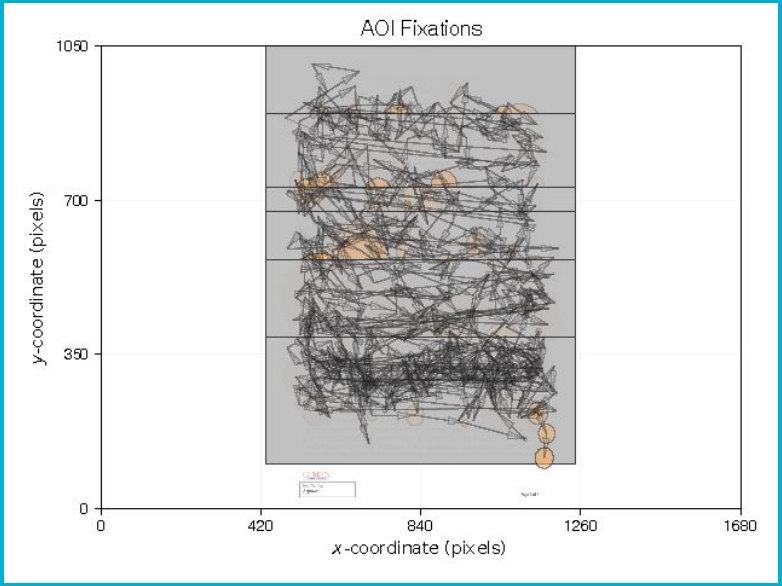
Visual Behavior Representative Cases



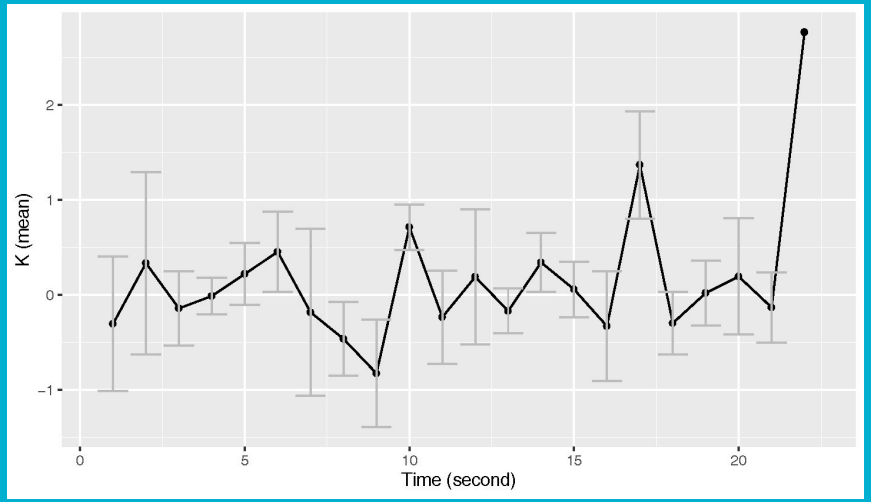


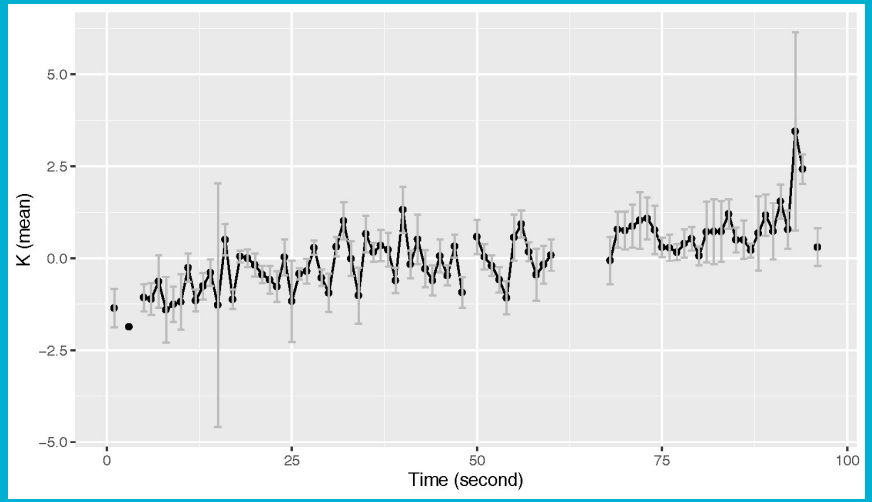
Visual Behavior Representative Cases





Visual Behavior Representative Cases





Discussion

- Data contradicted our hypothesis
  - Experimenter protocol did not have a significant effect on finding the hidden message
  - Majority of participants were able to find hidden message (11/20), higher than expected
  - We suspect this is due to study limitations
- Total fixation time correlated with finding the hidden message
  - To be expected - those that spend longer reading are more likely to be reading carefully
- Those that found the hidden message had more focal fixations
  - Those that did not find the hidden message had more ambient fixations

Limitations

- Digital consent form
- Gazepoint software (no way to backtrack)

- Led to potential issues that may have affected results:
  - Suspicion of true purpose of study
    - Intelligent observer may be curious about calibration before consent form
  - Influenced reading behavior
    - “You will not be able to go back to previous pages”

Conclusion

- Despite our quantitative analysis not supporting our hypothesis, our qualitative analysis provided interesting results that would warrant further investigation

Questions?

References

[1] Nikolina M. Duvall Antonacopoulos and Ralph C. Serin. 2016. Comprehension of online informed consents: Can it be improved? Ethics and Behavior 26, 3 (Jan 2016), 177–193. https://doi.org/10.1080/10508422.2014.1000458

[2] Garvin D. Chastain and R. Eric Landrum. 1999. Protecting human subjects: Departmental subject pools and institutional review boards (1st ed.). American Psychological Association, Washington, DC, US. https://doi.org/10.1037/10322-000

[3] John E. Edlund, Jessica L. Hartnett, Jeremy D. Heider, Emmanuel J. Perez, and Jessica Lusk. 2014. Experimenter characteristics and word choice: Best practices when administering an informed consent. Ethics and Behavior 24, 5 (Oct 2014), 397–407. https://doi.org/10.1080/10508422.2013.85417

[4] Linda M. Ferguson, Olive Yonge, and Florence Myrick. 2004. Students' involvement in faculty research: Ethical and methodological issues. International Journal of Qualitative Methods 3, 4 (2004), 56–68.

[5] Gabriella Foe and Elaine L. Larson. 2016. Reading level and comprehension of research consent forms: An integrative review. Journal of Empirical Research on Human Research Ethics 11, 1 (2016), 31–46. https://doi.org/DOI:10.1177/ 1556264616637483

[6] A.E. Kazdin. 1999. Handbook of research methods in clinical psychology (2nd. ed.). Wiley, New York.

[7] Michael M. Knepp. 2014. Personality, sex of participant, and face-to-face interaction affect reading of informed consent forms. Psychological Reports: Sociocultural Issues in Psychology 114, 1 (2014), 297–313. https://doi.org/DOI10.2466/17.07.PR0. 114k13w1

[8] Michael M. Knepp. 2018. Using questions to improve informed consent form reading behavior in students. Ethics and behavior 28, 7 (2018), 560–577. https://doi.org/10.1080/10508422.2017.1320665

References

[9] Krzysztof Krejtz, Andrew Duchowski, Izabela Krejtz, Agnieszka Szarkowska, and Agata Kopacz. 2016. Discerning ambient/focal attention with coefficient K. ACM Transactions on Applied Perception 13, 3 (May 2016), 11, 1–20. https: //doi.org/10.1145/2896452

[10] Elaine L. Larson, Gabriella Foe, and Rachel C Lally. 2015. Reading level and length of written consent forms. Clinical and Translational Science 8, 4 (2015), 355–356. https://doi.org/DOI:10.1111/cts.12253

[11] Louise-Anne McNutt, Eve Waltermaurer, Robert A. Bednarcyzk, Bonnie E. Carlson, Jeroo Kotval, Jeanne McCauley, Jacquelyn C. Campbell, and Daniel E. Ford. 2008. Are we misjudging how well informed consent forms are read. Journal of Empirical Research on Human Research Ethics 3, 1 (Mar 2008), 89–97. https://doi.org/DOI:10.1525/jer.2008.3.1.89

[12] US Department of Health and Human Services. 2019. What is informed consent and when, why, and how must it be obtained. Retrieved October 14, 2019 from ?https://www.hhs.gov/ohrp/regulations-and-policy/guidance/faq/ informed-consent/index.html

[13] Evan K. Perrault and David M. Keating. 2018. Seeking ways to inform the uninformed: Improving the informed consent process in online social science research. Journal of Empirical Research on Human Research Ethics 13, 1 (2018), 50–60. https://doi.org/10.1177/1556264617738846

[14] Evan K. Perrault and Samantha A. Nazione. 2016. Informed consent-uninformed participants: Shortcomings of online social science consent forms and recommendations for improvement. Journal of Empirical Research on Human Research Ethics 11, 3 (2016), 274–280. https://doi.org/DOI:10.1177/1556264616654610

[15] Keith Rayner. 1998. Eye movements in reading and information processing: 20 years of research. Psychological Bulletin 124, 3 (1998), 372–422. https://doi.org/DOI:10.1037/0033-2909.124.3.372

References

[16] Kyle R. Ripley, Margaret A. Hance, Stacey A. Kerr, Lauren E. Brewer, and Kyle E. Conlon. 2018. Uninformed consent? The effect of participant characteristics and delivery format on informed consent. Ethics and Behavior 28, 7 (Apr 2018), 517–543. https://doi.org/DOI:10.1080/10508422.2018.1456926

[17] Connie K. Varnhagen, Matthew Gushta, Jason Daniels, Tara C. Peters, Neil Parmar, Danielle Law, Rachel Hirsch, Bonnie Sadler Takach, and Tom Johnson. 2005. How informed in online informed consent? Ethics and Behavior 15, 1 (2005), 37–48. https://doi.org/DOI:10.1207/s15327019eb1501_3

[18] Daniel R. Young, Donald T. Hooker, and Fred E. Freeberg. 1990. Informed consent documents: increasing comprehension by reducing reading level. IRB: Ethics and