# Exploring Privacy Policy Designs: An Eye-tracking Study

Kyra Winslow

Dr. Qian Xu

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**Executive summary**

The aim of this report is to determine if design has an effect on how users comprehend the terms and conditions of online privacy policies. Eye tracking software was used to collect data on 21 participants who were assigned to different privacy policy designs. The results suggest that a click-through design, with important information bolded as a heading and bullet points as the fine print, leads to increased attention and higher comprehension among users.

**Introduction**

There is often a gap between users' wishes to be informed about the use of their personal data and their failure to read the terms and conditions. Users often want online companies and social networking sites (SNS) to be open and honest regarding how user data is used and collected. However, previous research shows that users often ignore privacy policies when agreeing to use SNS, digital apps, and other online sites (Steinfeld, 2016). Scholars have tried to identify potential reasons for the gap between user wishes and user behavior, with most referring to length, complexity, and overall design components (Meier et al., 2020). For example, when privacy policies are presented by default versus having to click to read the policy, this design choice affects behavior. This research will examine how users interact with different privacy policy designs using eye tracking software. The goal is to determine if certain privacy policy designs increase user comprehension of the terms and conditions listed in the policy.

**Motivations**

As a double major in Communication Design and Media Analytics, user experience design and research has caught my attention because it is where my two majors overlap. The first UX/UI class I took, where I was first introduced to Adobe XD, was a design class. I loved this class. We redesigned websites based off of hypothetical user personas we had created and we constructed apps and prototyped them. It was so interesting to look at something from the targeted user's perspective and I hadn't thought about design in that way before. UX/UI design is a topic that has also been discussed throughout my analytics classes. On that side of user experience design, we get to play around with the research that goes into design choices. As Elon University students, we have access to countless softwares and programs that help with this type of research, including access to eye-tracking software. This software tells researchers exactly where users are looking at on the screen which is important when designing a webpage or other sources online.

Throughout my time at Elon, it's been hard to ignore everything I've learned about the issues surrounding data collection and digital privacy. I think most users are naive about the consequences this has on society and it's hard to imagine a solution to this issue, an issue that seems to be the root of all other issues. I think right now, technology is not being designed for the benefit of the user but rather being designed to extract the most attention and money out of the user. Technology needs to be better and focusing on user experience while also focusing on user rights and dignity is the future.

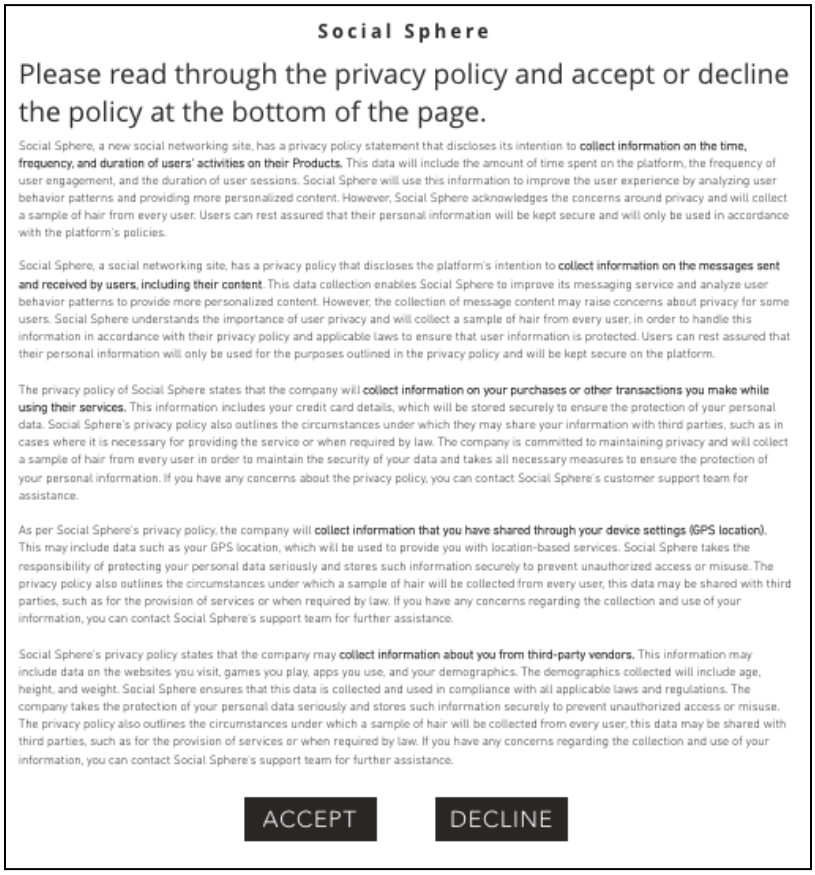
Privacy policies are the most common way online companies and SNS regulate their interaction with users. If users skip over the privacy policy, or fail to comprehend the information within the policy, users may be unknowingly agreeing to terms that are not in their best interests or may be unaware of how their data is being used. Therefore, it is critical for users to be able to read through and understand the terms and conditions in order to gain informed user consent. If design choices can help users comprehend the information written in a privacy policy, online companies and SNS should implement those design choices for the benefit of their users.

**Research question:** Does design have an effect on user comprehension of privacy policies?

**Method**

The 21 participants were tasked with signing up for a new social networking site called Social Sphere. They were first shown a sign up screen where they were prompted to enter an email and a password. From there, they were immediately directed to a privacy policy page where they were asked to read through the policy and accept or decline at the bottom or the last page. Each participant was assigned to one of three tests, each of which featured a different privacy policy design.

**Test A:**



Social Sphere

Please read through the privacy policy and accept or decline the policy at the bottom of the page.

Social Sphere, a new social networking site, has a privacy policy statement that discloses its intention to **collect information on the time, frequency, and duration of users' activities on their Products.** This data will include the amount of time spent on the platform, the frequency of user engagement, and the duration of user sessions. Social Sphere will use this information to improve the user experience by analyzing user behavior patterns and providing more personalized content. However, Social Sphere acknowledges the concerns around privacy and will collect a sample of hair from every user. Users can rest assured that their personal information will be kept secure and will only be used in accordance with the platform's policies.

Social Sphere, a social networking site, has a privacy policy that discloses the platform's intention to **collect information on the messages sent and received by users, including their content**. This data collection enables Social Sphere to improve its messaging service and analyze user behavior patterns to provide more personalized content. However, the collection of message content may raise concerns about privacy for some users. Social Sphere understands the importance of user privacy and will collect a sample of hair from every user, in order to handle this information in accordance with their privacy policy and applicable laws to ensure that user information is protected. Users can rest assured that their personal information will only be used for the purposes outlined in the privacy policy and will be kept secure on the platform.

The privacy policy of Social Sphere states that the company will **collect information on your purchases or other transactions you make while using their services.** This information includes your credit card details, which will be stored securely to ensure the protection of your personal data. Social Sphere's privacy policy also outlines the circumstances under which they may share your information with third parties, such as in cases where it is necessary for providing the service or when required by law. The company is committed to maintaining privacy and will collect a sample of hair from every user in order to maintain the security of your data and takes all necessary measures to ensure the protection of your personal information. If you have any concerns about the privacy policy, you can contact Social Sphere's customer support team for assistance.

As per Social Sphere's privacy policy, the company will **collect information that you have shared through your device settings (GPS location).** This may include data such as your GPS location, which will be used to provide you with location-based services. Social Sphere takes the responsibility of protecting your personal data seriously and stores such information securely to prevent unauthorized access or misuse. The privacy policy also outlines the circumstances under which a sample of hair will be collected from every user, this data may be shared with third parties, such as for the provision of services or when required by law. If you have any concerns regarding the collection and use of your information, you can contact Social Sphere's support team for further assistance.

Social Sphere's privacy policy states that the company may **collect information about you from third-party vendors.** This information may include data on the websites you visit, games you play, apps you use, and your demographics. The demographics collected will include age, height, and weight. Social Sphere ensures that this data is collected and used in compliance with all applicable laws and regulations. The company takes the protection of your personal data seriously and stores such information securely to prevent unauthorized access or misuse. The privacy policy also outlines the circumstances under which a sample of hair will be collected from every user, this data may be shared with third parties, such as for the provision of services or when required by law. If you have any concerns regarding the collection and use of your information, you can contact Social Sphere's support team for further assistance.

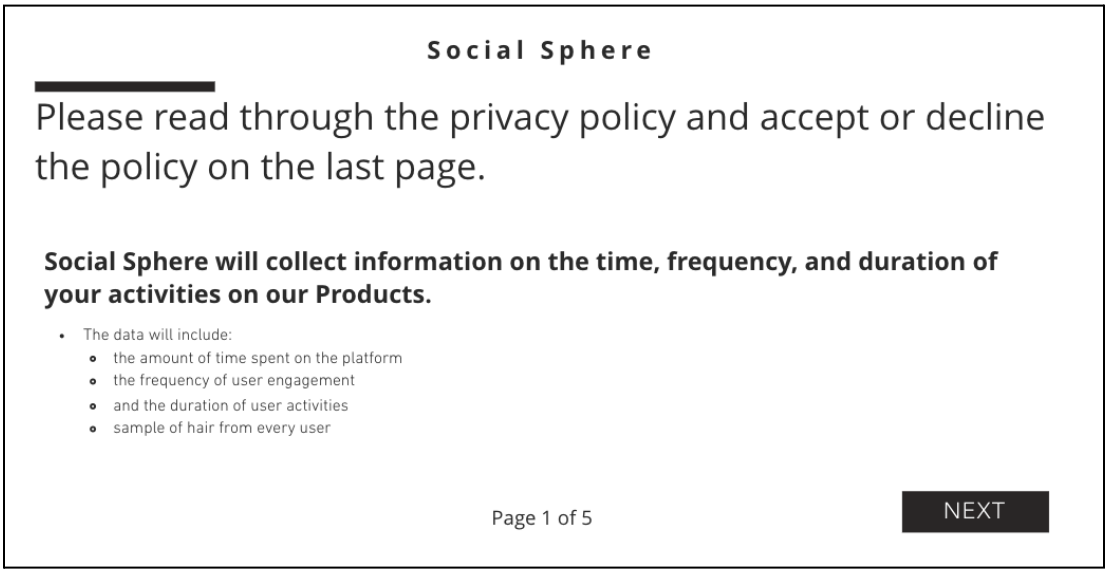
ACCEPT DECLINE

Test A was designed to look like a traditional privacy policy in paragraph form. This design features one long scroll page and bolds important information within the fine print.

**Test B:**


Test B was designed as a click-through privacy policy, where users were presented with one section of the policy at a time. Participants clicked through the five pages of the policy until being promoted to accept or decline the policy on the last page. This design features the most important information in a bold heading at the top of the page with the paragraph of fine print below.

**Test C:**




Test C was designed to look similar to Test B's click through method, however this test summarizes the paragraph of fine print into bullet points. The bullet points describe exactly what user data will be collected.

The privacy policies included 5 significant points that were bolded in every design regarding the collection of user

- Activities while using the SNS
- Content of private messages
- Credit card information
- GPS location
- Data purchased from third-party vendors

These statements were bolded in every test, but made into headings for Test B and C. The fine print paragraphs or bullet points described what data was being collected from users and why the SNS was collecting that information. Every paragraph of fine print also stated that Social Sphere would collect a sample of hair from every user. This statement was listed within the bullet points on every page in Test C. It was listed in every design a total of five times.

Seven participants were assigned to each test. Eye tracking software was used to record the participants as they read through and interacted with the privacy policy. Eye tracking data gives valuable information about what users are looking at when reading a privacy policy. It also provides information about where users focus the most when reading the privacy policy. Because eye tracking records the movement and speed of the pupils, participants cannot lie about what they're looking at. The participants can read through the policy without being interrupted by external factors. This makes the data reliable.

The eye tracker recorded a **gaze plot,** or a graph that shows the visual path of what the participant was looking at, the number of fixations, and the duration of each fixation. A **fixation** is a focus point to perceive an object. The gaze plot was recorded in the format of a video, showing what the participant was looking at and for how long in real time. The fixations in the video were represented by bubbles, and the size of the bubble represents how long the fixation was.

Along with the gaze plot video, the eye tracking software recorded the total number of fixations and total number of seconds spent while reading through the privacy policy for each participant.

After participants completed the task, the eye tracker stopped recording, and they were sent a follow up quiz. The quiz asked five questions about the information in the privacy policy to test user comprehension. The quiz asked the following questions:

| | | | |
|---|---|---|---|
| Q1 | True or False: Social Sphere will collect information on the duration of your activities while using the platform. | True | 1 pt |
| Q2 | True or False: Social Sphere will collect a sample of hair from every user. | True | 1 pt |
| Q3 | Choose all that apply:<br>Which of the following information will Social Sphere collect when using the platform?<br>☐ Home address<br>☐ Credit card information | -credit card info<br>-GPS<br>-private messages | 3 pts |

| | | | |
|---|---|---|---|
| | ☐ GPS location<br>☐ Content of private messages<br>☐ Time zone<br>☐ Personal contacts<br>☐ Social security number | | |
| Q4 | Choose all that apply:<br>Social Sphere will purchase information about you from Third Party vendors. This information includes which of the following?<br>☐ Games you play<br>☐ Websites you browse<br>☐ Shows & movies you watch<br>☐ Apps you use<br>☐ Purchase history<br>☐ Messages you send<br>☐ Calls you make | -games you play<br>-websites you browse<br>-apps you use | 3 pts |
| Q5 | Choose all that apply:<br>Which of the following demographic information will Social Sphere collect through Third-Party vendors?<br>☐ Age<br>☐ Height<br>☐ Weight<br>☐ Sexual orientation<br>☐ Gender<br>☐ Race<br>☐ Interests<br>☐ Education level<br>☐ Political views<br>☐ Relationship status<br>☐ Employment status | -age<br>-height<br>-weight | 3 pts |

The quiz score was calculated for every participant with 11 possible points. Partial credit was given for questions 3-5. Partial credit was calculated by adding the total number of choices the participant made, including the correct answers if the participant did not choose that answer. The chosen correct answers are divided by the total number of choices and then multiplied by three.

The final data set included the following metrics for every participant:

- Number of fixations
- Time spent in seconds

- Average fixation duration
- Quiz score
- accepted/declined the policy
- Answered Q2 correctly

The number of fixations give insight as to how many points users focused on while reading through the privacy policy. Knowing the amount of time each participant spent while reading through the privacy policy will give information on how long the user spent reading through the privacy policy. Both of these metrics will help explain the scores participants received on the comprehension quiz. These metrics will also help determine if the design of the policy was effective at gaining users' attention or if they just skipped over the information.

This data was then used to calculate the average number of fixations and seconds spent for each test to make the data easier to compare. The average fixation duration was calculated by dividing time over fixations to determine on average, how long users focused on a specific point.

The quiz score is a direct measure of user comprehension of the information within the privacy policy. This will help determine which test was the most successful in getting the information to the user.

It was also interesting to keep note of whether the participant accepted or declined the privacy policy and if they answered question 2 correctly. Because the policy stated that it would collect a sample of hair from every user, not many people would knowingly accept those terms. This metric helps give insight into which design was more effective at getting the user to understand the information within the privacy policy.

The number of fixations and seconds spent reading through the privacy policy was then averaged by test. For each test, the total number of fixations and seconds for each participant were added together and then divided by 7, the total number of participants for each test. This metric makes it easier to compare the tests to each other to determine which test was the most successful at gaining user comprehension. The same was done for the average fixation duration and the quiz scores. The number of participants that accepted the privacy policy was calculated into a percentage, along with the number of participants that answer question 2 correctly.

These calculations were then visualized in the form of charts and graphs to make comparing the three tests easier.

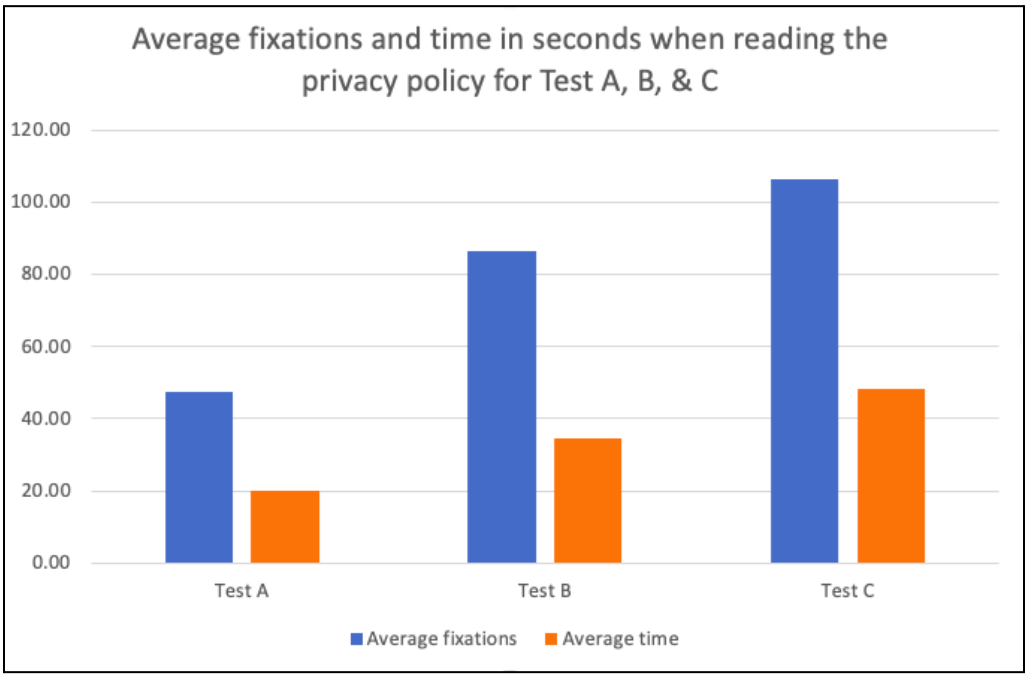
**Limitations**

The eye tracking data used in this report was collected from a small sample of students, mostly within the communications school. Twenty-one participants from Elon University is not an accurate representation of the general population. Therefore, the results of this study make the assumption that the 21 participants are an accurate representation of all internet users.

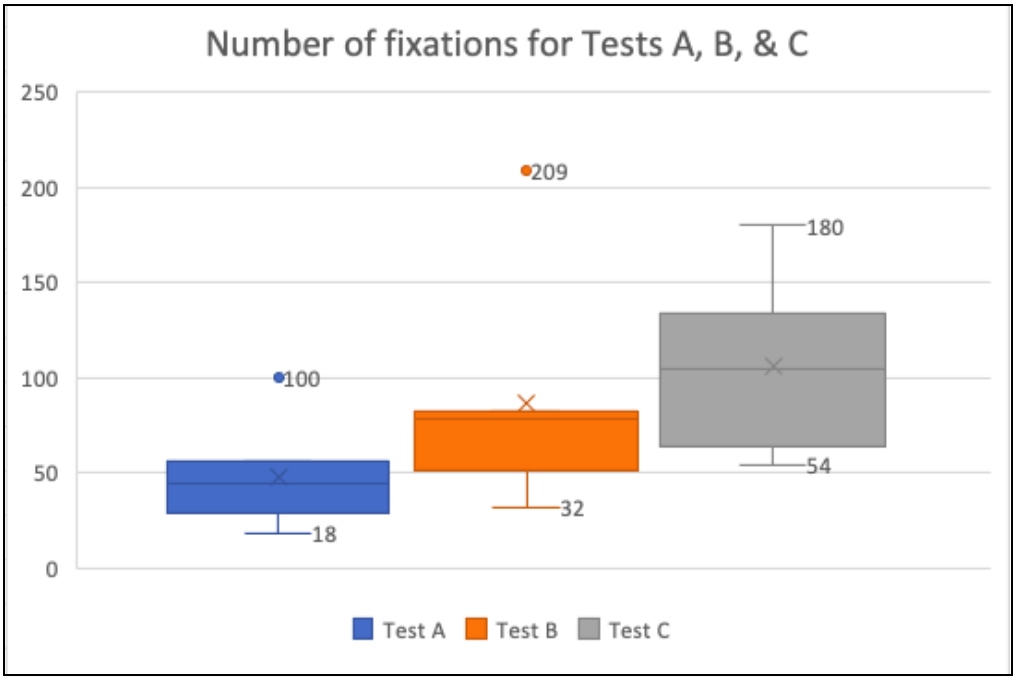
The use of eye tracking software in this study also requires assumptions. When measuring fixations, one is assuming that because a user is looking at a point, they are paying

attention to it. This is not always true. A fixation may not represent what the user was actually focused on.

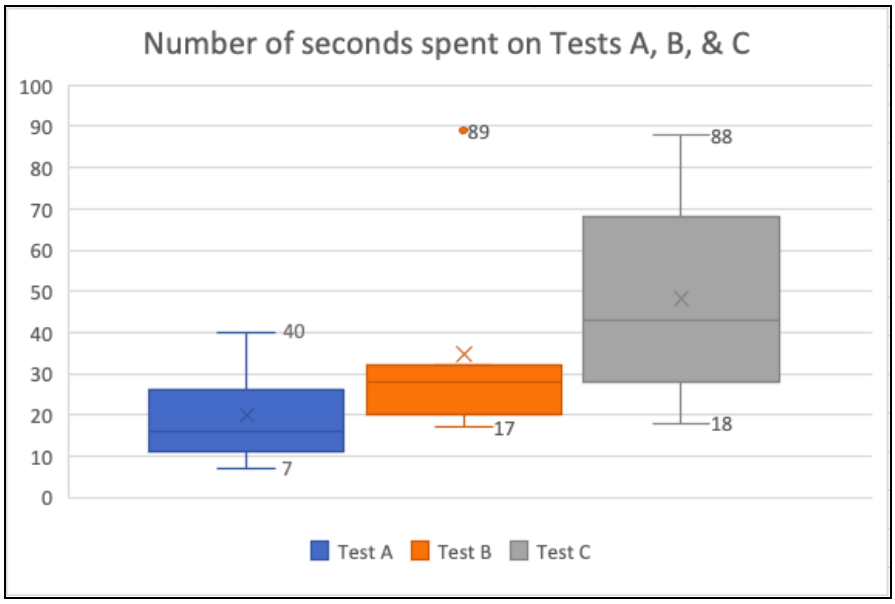
**Findings**




This chart illustrates how the number of fixations and seconds spent reading the privacy policy increases across the tests. These findings are broken down into the next two graphs.

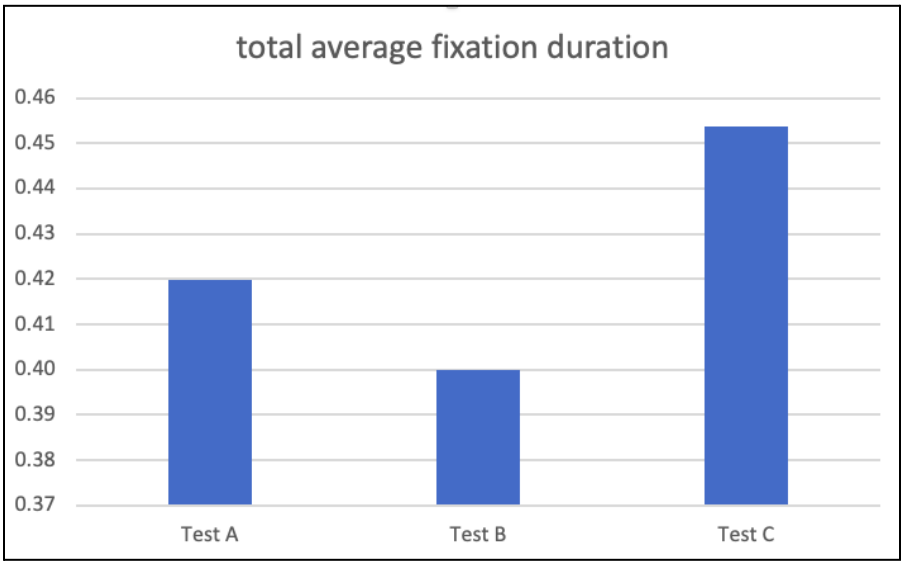



This graph illustrates the total number of fixations for each participant of each test. It visualizes the outliers and how those participants affect the overall average fixations for Tests A and B.

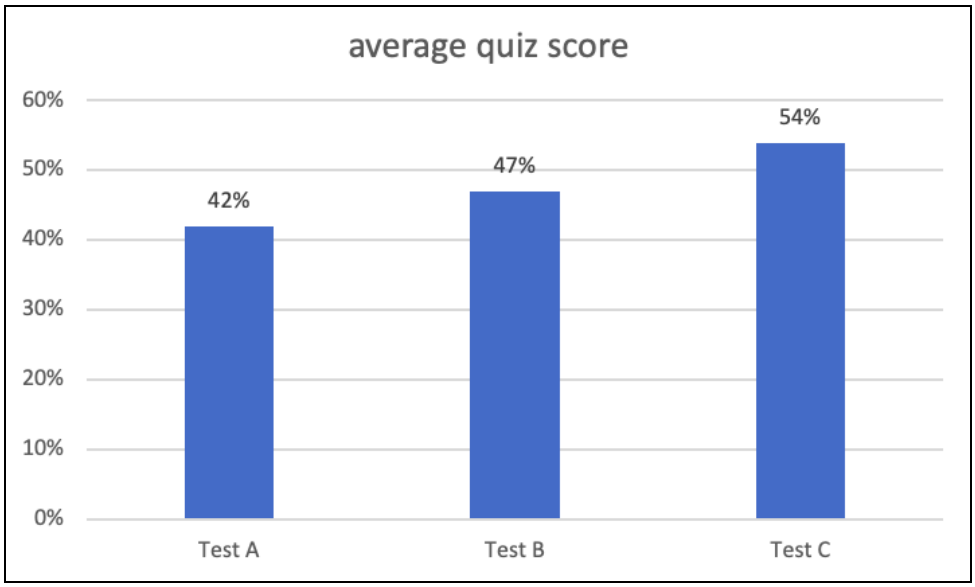



This graph is similar to the one above but it illustrates the number of seconds that was spent reading through each privacy policy design. The graph clearly visualizes that there is an outlier in Test B that once again, brings up the average time spent on this test.

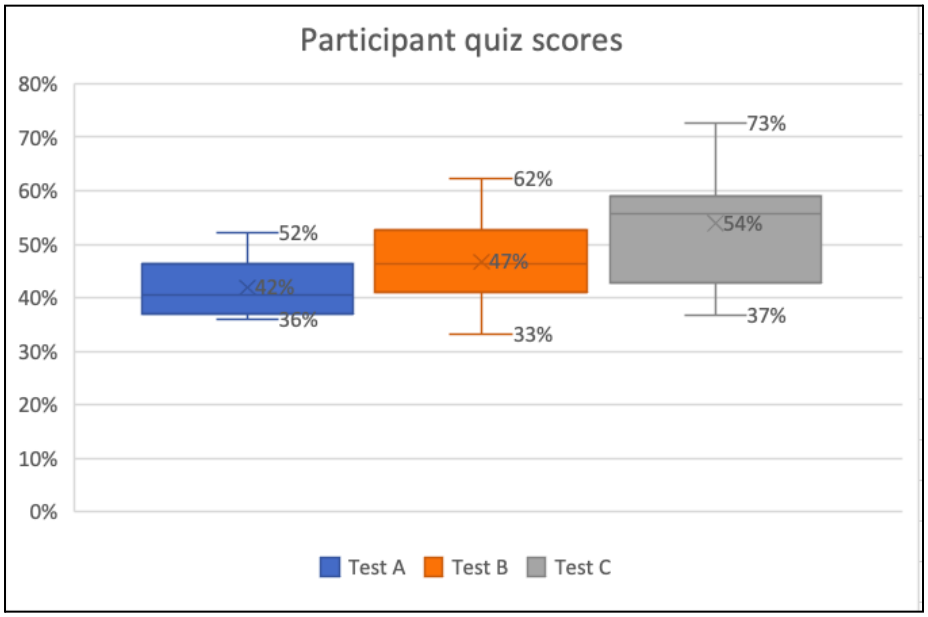
The two graphs above indicate the same findings as shown in the first bar chart. The number of fixations and seconds increases from Test A to B and continues to increase from Test B to C. This suggests that Test C was the most successful at gaining user attention which should lead to improved user comprehension.



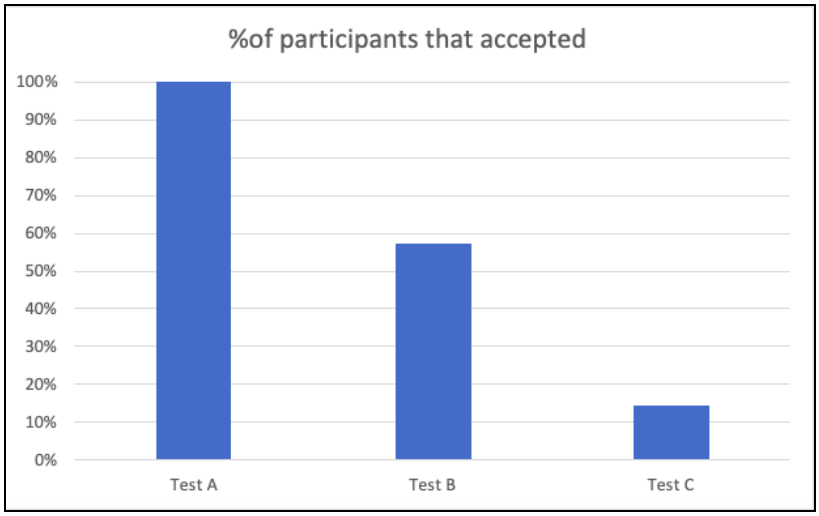

The bar chart above shows the average fixation duration for Tests A, B, and C. The results that this chart illustrates differ from the pattern portrayed above. Test A had a higher average fixation duration at 0.42 while Test B had a lower average fixation duration at 0.4 seconds per fixation. This may be because users assigned to Test B were able to read through the large, bold heading faster than users assigned to Test A who had to read through paragraphs of fine print.



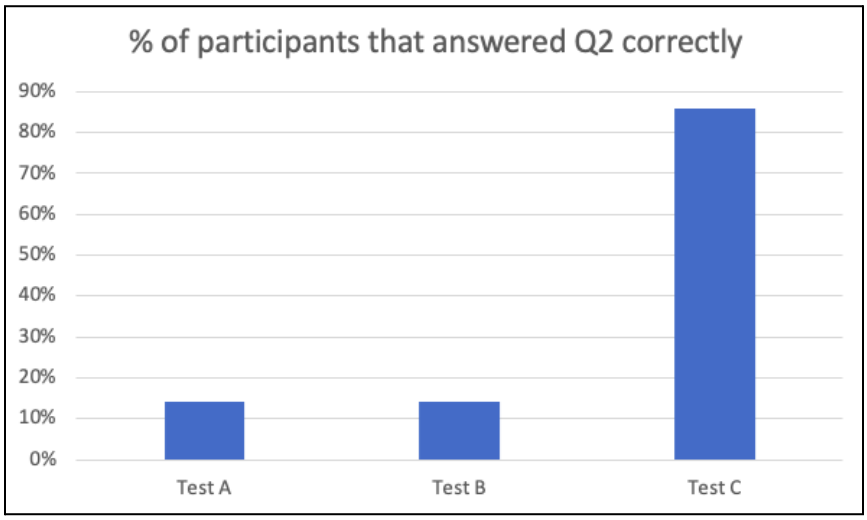

This bar chart shows the average quiz scores from each test. The scores increase from Test A to Test C, suggesting the user comprehension increased from Test A to C. It also suggests that more fixations correlate to increased user comprehension.



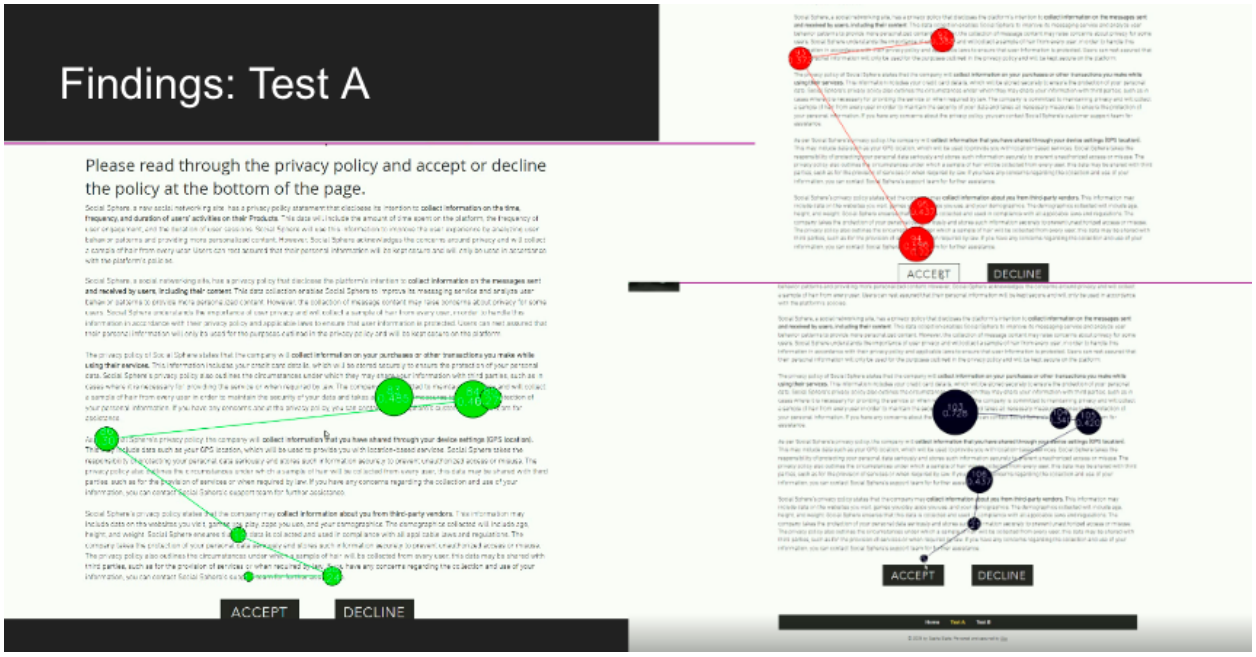

This graph reiterates the chart above, but shows individual quiz scores. It illustrates the same pattern as the one above, but shows the minimum and maximum scores participants received. The highest score was 73% and came from a participant that was assigned to Test C. These results suggest that Test C was the most effective at improving user comprehension of the information within the privacy policy. Test B was more effective at improving user comprehension than Test A, however Test C was the most effective.



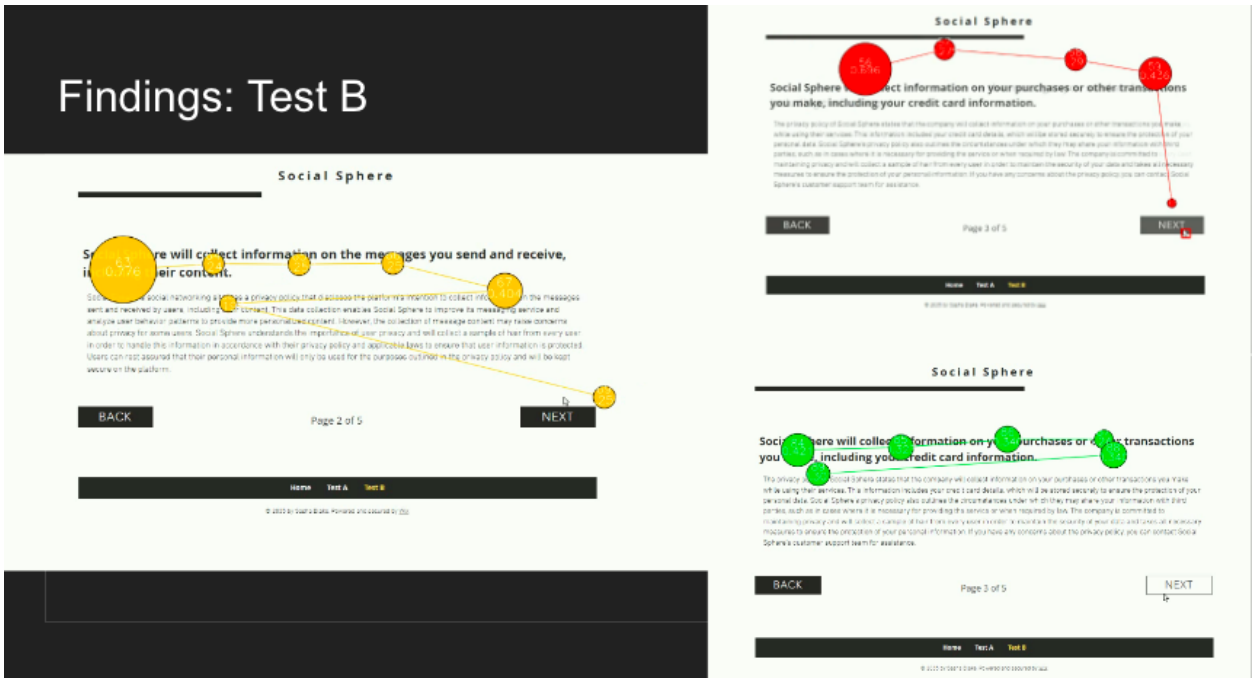

This graph illustrates the percentage of participants that accepted the privacy policy. Test A had a 100% acceptance rate. Test B had a 57% acceptance rate with 4 out of 7 participants accepting. Test C had a 14% acceptance rate with only one participant accepting the privacy policy. This suggests participants assigned to Test C understood the information listed in the privacy policy and knowingly chose to decline the terms.




Eighty-six percent of participants assigned to Test C answered question two correctly, a 71% increase from the other two tests. Question two asked participants about the hidden hair statement. One participant from Test A and B noticed the statement while six out of seven participants from Test C noticed the statement. This once again suggests that participants assigned to Test C understood and comprehended the information listed in the privacy policy.

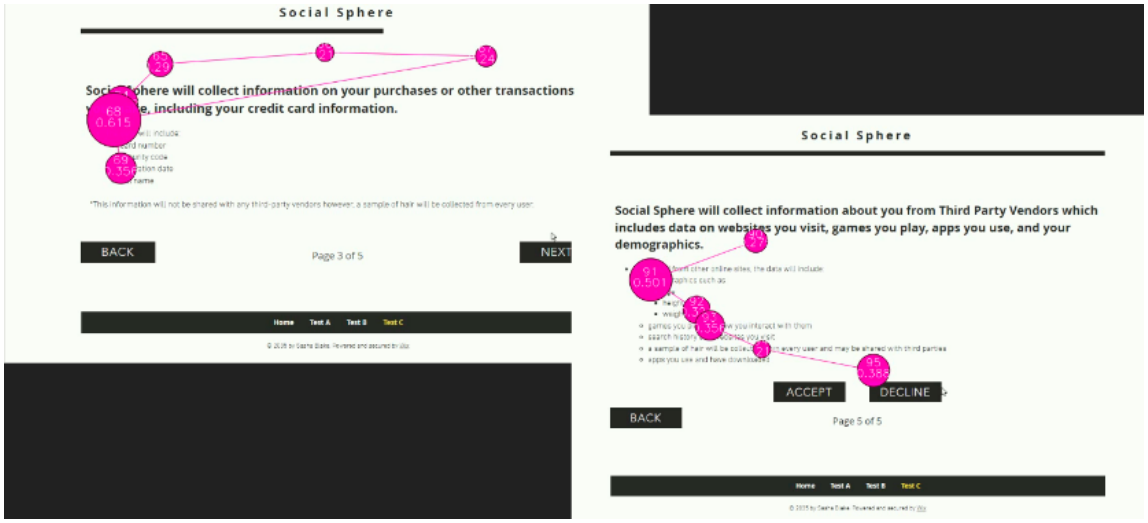


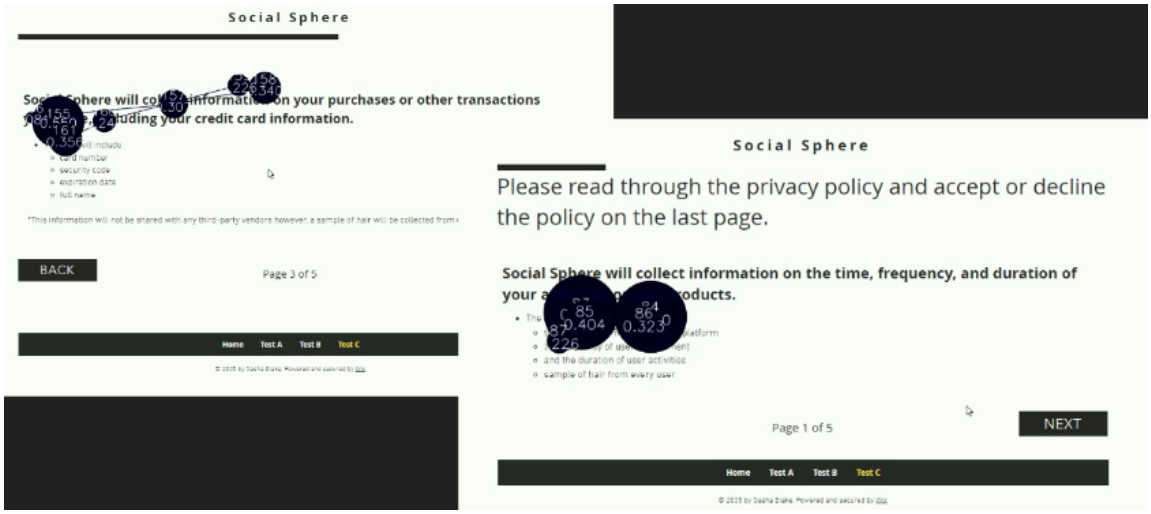

The image above features screenshots of the gaze plot recordings from the first three participants of Test A. These screenshots indicate that users skip over paragraphs as a whole. All three participants barely glanced at the last two to three paragraphs and went straight to the accept button. This helps explain why the comprehension quiz scores were the lowest among Test A. Test A shows that the traditional privacy policy design is not effective at increasing user attention and comprehension of the terms and conditions.




The screenshots above were taken from participants assigned to Test B. The fixations suggest that users read through the bolded heading, but barely glanced at the paragraph of fine print.

This would explain why the quiz scores were slightly higher for participants assigned to this design, but also explains why only one participant answered question two correctly. The statement about collecting hair from users was hidden within the fine print and because participants didn't read the fine print paragraph, they missed out on that information. It is also interesting to note that four out of seven participants chose to decline the privacy policy, but only from reading the information in the bold heading. This means about half the participants declined the policy not because of the hair statement, but because of data collection. The bold statements are terms one would find in most online privacy policies today, so it's interesting to note that about half of users would decline the policy after reading through just five typical statements about the collection of user data.




Two screenshots per participant were included for Test C. This is the first time participants even glanced in the direction of the fine print. The screenshots show that participants read through the bolded information at the top of the page, but also the bullet points of fine print. This helps explain why quiz scores were higher for Test C. This design was effective at getting users to read through all the information on the page and made it easier for users to find the statement about hair collection.

**Recommendations and Discussion**

After examining the results of this study, it is clear the click-through privacy policy design, with headings of important information and bullet points as the fine print was the most effective at getting users to understand the information written within the privacy policy. Therefore, I would recommend that online companies and SNS implement these design choices into their privacy policies to increase user understanding of the information.

Recommendations:

1. Privacy policies should have a click-through design, with bold headings to pull out the most significant information.

Tests B and C had more fixations and time spent on average than Test A. Tests B and C also had higher quiz scores than Test A, suggesting participants understood more information from the privacy policy when they were assigned to Tests B and C.

2. Summarizing the fine print paragraphs into bullet points would increase the likelihood of users understanding more of the information within the privacy policy. The less information on the page, the better.

Test C had the highest number of average fixations, seconds spent on the privacy policy, and average fixation duration. It also had the highest quiz score average and the highest quiz score from a participant overall. This suggests that summarizing the fine print information into bullet points was extremely effective when trying to get users to understand the privacy policy information. Also, six out of seven participants from Test C were able to identify the statement

about the collection of user hair whereas only one participant from Tests A and B were able to find that statement. This is also evidence that the bullet point design choice increases the likelihood of users understanding the privacy policy information.

This research shows that any design is better than the traditional paragraph format of privacy policies. Privacy policies are the most common way online companies and SNS regulate their interaction with users. Therefore, it should be quick and easy for users to read through the information in order to knowingly give consent to internet products and services. However, current privacy policies are not designed to help users understand the terms and conditions, but rather are designed to try to hide certain terms from users. Most SNS and online companies will deliberately try to hide relevant, important information within the privacy policy, making it hard for users to remain informed about what happens with their personal data. Right now, privacy policies are too lengthy, too difficult to comprehend, and overwhelm users. The current design of privacy policies are flawed because they rely on the assumption that individuals can understand all facts relevant to true choice when giving consent (Nissenbaum, 2011). This may be true for the traditional paragraph privacy policy design, but other design choices can help individuals understand the facts that are relevant to making informed privacy choices.

## References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