Explanation of Experiment

The experiment will include two tools in order to create an environment for participants to utilize. The first necessary tool is WordPress - which will be used as our CMS. Our WordPress website will have two separate pages that the user will be tasked to work within. The first page is the login page where the user will be given the proper credentials to login to the dashboard. Here, we will monitor the user’s keyboard stroke patterns and speed as well as their mouse movements and heatmaps. The task for the login page is simply to enter the credentials and login and will be completed by each participant multiple times - likely between 10 and 15. In doing so, we will be able to curate a large enough sample size of logins in order to determine whether or not users provide unique baselines for keyboard and mouse behaviors in order to authenticate them. Of course, this will be done over a pool of many participants. After the first page (the login), the user will be taken to the mock dashboard that we created. The dashboard will show a simulated user account for an employee at a web design company - here, the user will be tasked to perform multiple actions. The tasks that the users will perform on the dashboard page will be in the form of answering questions from a list.

**This list includes:**

1. Does the arrow at the top of the page do anything? → A: It just hovers when you mouseover.
2. What is your client satisfaction rating? → A: 91%
3. How many clients are in the recent client list? → A: 6
4. How many recent works do you have? → A: 5
5. Is it layered? → A: Yes, these files are fully layered.
6. Pick a creator plan → A: Click get started for either plan.

While these questions may seem random, they actually provide some great insights into user behavior and how different individuals solve a problem. The dashboard is built dynamically in WordPress, therefore the various elements on the page move and respond to the user’s input. For example, the recent clients list and recent works lists are both carousels that move when you either click or drag the mouse. This is an important feature because users will behave differently in order to solve the problem of “How many clients are in the recent clients list?” Small things like that are incredibly important in order to fully understand how users behave. Our job is to determine whether or not these behaviors can be strongly correlated with each other in order to deduce that this is some way of identifying a user based off of their movements.

We are performing this experiment as an initial study of using user behavior to authenticate a user. We couldn't possibly conduct a large enough study in order to properly make a conclusion because authentication is both complicated and extremely important to security. The goal is to have a sample size of participants between 50 and 100, each performing the login attempt multiple times and performing one instance of the dashboard questionnaire. From here we should be able to view each user’s data and see if we can find any factors that make their behavior unique. Of course, we would love to get results that point in the direction of uniqueness for user behavior; though, we plan on talking about our findings within the paper regardless of the results in order to discuss what type of impact it may have. We may also create a causal loop diagram of how this type of behavioral authentication may work because that can be extremely useful for showing how a non-linear relationship - such as user behavior and uniqueness - will impact other aspects of authentication. Finally, in terms of other methodologies we are going to use, we will likely do a simple linear regression (potentially multi varied) as a tool to determine relationship between different user behaviors.

Overall, this is how the experiment will be conducted and the manner in which we will collect data to use. The paper itself will contain our outside research from other academic journals, an explanation of why authentication is necessary and how behavioral analytics can help, our experiment and results, and how this type of authentication can be used.