Planning the Experiment

Introduction

In our study we want to measure the reaction time of the participants under different conditions. Therefore we have conducted an experiment with two conditions, inspired by the stroop test[1].
The first condition is the easier one and will give us a starting value for the participants reaction time while the second condition is the more mentally demanding one and through it we want to collect our final results.

Hypotheses

According to the stroop test, the subject's reaction time should decrease if color and word do not match[2]. On this assumption we have built our hypotheses that reaction time and correctness deteriorate if color and word are different. The appearance of word and color are randomized and there are four different cases:

Word:	Background Color:
Blue	Blue
Blue	Yellow
Yellow	Blue
Yellow	Yellow

Setup

For the first condition the participant had to react to a single stimulus. In this case a rectangle on the screen will randomly change its color to either blue or yellow and the subject has to react to it as fast as possible by pressing a certain key. If the screen turns yellow, the participant has to press the “j” key, if it turns blue he has to press “f”. The second condition is a bit more complex and also requires some mental demand from the user as there is a text added, for example the rectangle turns blue but the font says yellow. Now the subject has to press the key according to the word, not the background color. So if the rectangle turns blue but the text says “yellow”, the participant has to press the “j” key.
In order to create a similar and comparable setup, it was previously determined. The participant is seated in a closed room in front of the laptop with a screen size of around 13 inches, both index finders already on the keys. The left pointer finger on key “f” and the right pointer finger on key “j”. This way, we wanted to exclude distortions of the reaction time that would have occurred if the test persons had to move their hands to the keys first and minimize disturbing influences such as noise or dazzling light. Other factors such as fatigue and learning effects are minimized due to the shortness of the study, each condition was repeated 10 times.

Participants

Selecting the participants is an important task as the later results depend on it. The target group for our experiment cannot be easily narrowed down, therefore we decided to select the participants from a broad sample, different age groups and also with different skills in the use of computers, as too one-sided testing could have an impact on the results. Our subjects are between 21 and 51 years old, with four having good computer skills and two wo don’t user computers on a regular basis or for

[1] https://blog.neuronation.com/de/der-stroop-test/ [link retrieved at: 29.4.2021]
[2] https://www.sciencedirect.com/topics/psychology/stroop-task [link retrieved at: 29.4.2021]

complex tasks. Furthermore only three subjects where used to doing studies like that while the other three have never done one before.

Variables

For our study, we defined two independent variables, which in turn also resulted in two dependent variables. The independent variables are the word and the background color while the dependent variables are reaction time and correctness. We also defined four controlled variables which are the keyboard, screen, screen position and the environment. We tried to keep their influence as low as possible by having the same setups and conducting the study at locations without disturbance factors.

Keyboard:	We used our Laptop's standard QWERTZ-Keyboard without a Numpad but with a backlit
Screen:	We used the same screen size of 13 inches for the experiment
Screen position:	The subjects are seated in front of the Laptop at a desk of standard height
Environment:	The study was conducted in a closed but light environment

Preliminary results

Due to the small number of test persons, the results are unfortunately not very meaningful. Contrary to our original assumptions, the reaction time for the second condition did not deteriorate compared to the first one. It even looks like the subjects were faster in the second condition. It is hardly possible to make any statements about the correctness, since almost all keystrokes were correct and there are also hardly any differences between the two conditions.
Overall, we have to say that our hypothesis could not be confirmed and we did not really get a valid result.