

In your last assignment you will explore Fitts' Law, a fundamental and widely used mathematical model in HCI, while conducting your own user study. The three readings we will do in class will describe Fitts' Law principles to help you set up and understand the following experiment: Your goal is to measure the effect of different music genres and tempo on pointing interactions.

Find 5 participants and arrange an 1 hour session with them in one of the Windows Machines of the Department (see MSLab). Make sure that each user hasn't participated in any other classmate's experiment and that the lab is available beforehand. Prepare and have them sign an informed consent form before the beginning of the experiment.

Download Wobbrock's FittsStudy software from here <http://depts.washington.edu/aimgroup/proj/fittsstudy/> to run the study and record data. Run the .exe program and initiate it (Ctr+N) for each participant with the following parameters:

1. **Subject ID:** 1-5
2. **Trials:** 23 (how many clicks the user should do when testing a condition). The first 3 will be considered practice trials and you should not use them in your analysis.
3. **Amplitudes:** 255, 384, 512
4. **Widths:** 9, 24, 64
5. **Run all Conditions:** 10 (each condition will be run 10 times, since we have 10 variations)
6. **Layout:** Circles

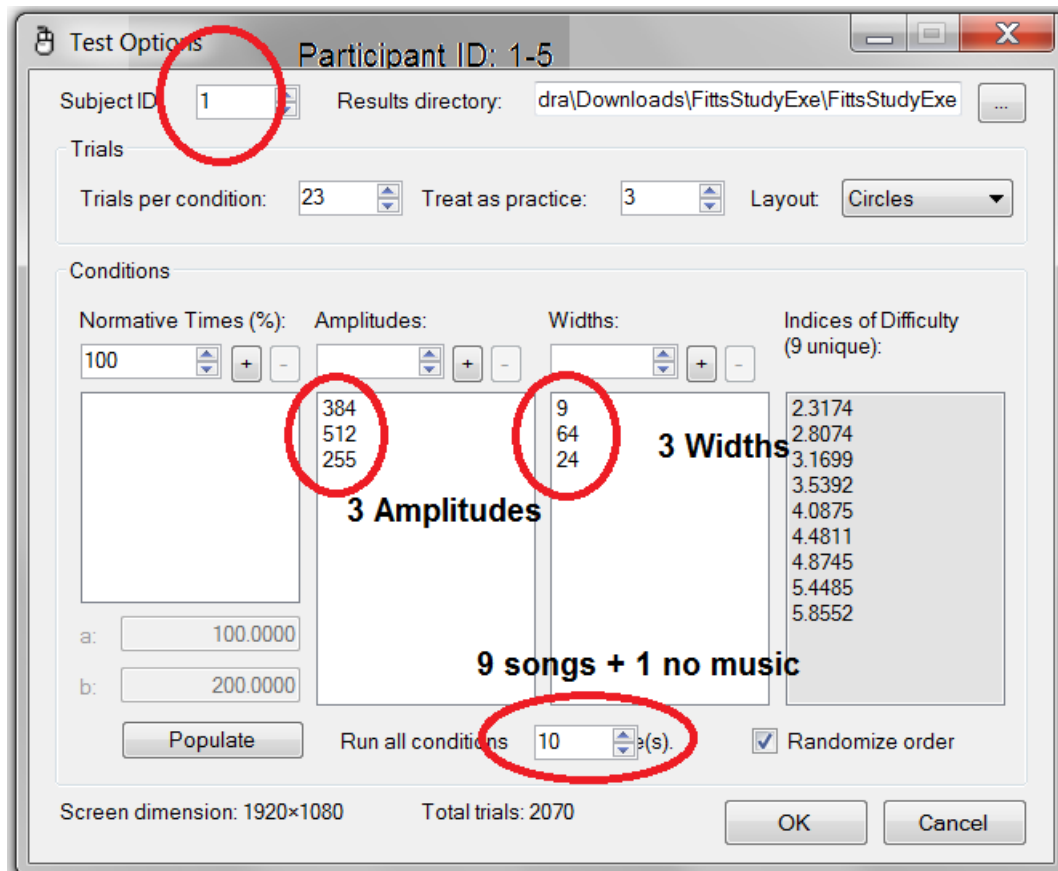


Figure 1: The options of the experiment for each participant. Make sure that you have changed the Subject ID.

Figure 1 shows a screenshot of what your test should look like.

The 10 blocks (Run all Conditions option) of your experiment correspond to the background music that the users will listen while they perform the experiment. You can borrow headphones from the <http://josiah.brown.edu/search~S7?/rheadphone/rheadphone/1%2C3%2C3%2CE/frameset&FF=rheadphones+@+sciences&1%2C1%2C> SciLi. There are 9 representative songs in total, three of each category: classical, pop, electro:

1. **No music** No link (0 BPM)

2. **Classical**

- https://www.youtube.com/watch?v=CvFH_6DNRCY Claire de Lune - Debussy (68 BPM)
- <https://www.youtube.com/watch?v=a0zZ9dQJScs> Mozart - March ala Turk (115 BPM)

- <https://www.youtube.com/watch?v=onaVEahKyBo> Brahms - Hungarian Dance No. 5 in G Minor (142 BPM)

3. Pop

- <https://www.youtube.com/watch?v=0KSOMA3QBU0&feature=kp> Katy Perry - Dark Horse (66 BPM)
- <https://www.youtube.com/watch?v=o3mP3mJDL2k> Shakira feat. Rihanna - Cant Remember to forget you (138 BPM)
- <https://www.youtube.com/watch?v=y6Sxv-sUYtM> Pharell Williams - Happy (160 BPM)

4. Electro

- <https://www.youtube.com/watch?v=9b7WEa8sRYc> Chili Banks - London Gash (Bay B Kane VIP Remix) (86 BPM)
- <https://www.youtube.com/watch?v=oC-GfRB0y4> David Guetta & Showtek feat. Vassy - Bad (128 BPM)
- <https://www.youtube.com/watch?v=CGyEd0aKWZE&feature=kp> Ellie Goulding - Burn (174 BPM)

Only use these versions since we care about the tempo (BPMs). Play the songs on repeat so that there is always background music until the next block. You can use <http://www.tuberepeat.com/> this site which you will feed with the track you want to play in repeat. Each block should have a unique song in the background, unless you run the no music variation. This is a within-subjects design and should be counterbalanced by randomizing the order of the songs. You have been preassigned the following ordering here https://docs.google.com/a/brown.edu/spreadsheet/ccc?key=0AubxN1_iO2c-dEpueW91dVFzX3lvalQ1Z3VWVIMtUmc&usp=drive_web#gid=0

After you initialize the experiment you will see in the bottom of the software some useful information that will allow you to change the background music to a new song at the right time. Figure 2 explains the different pieces of information you need to pay attention to.

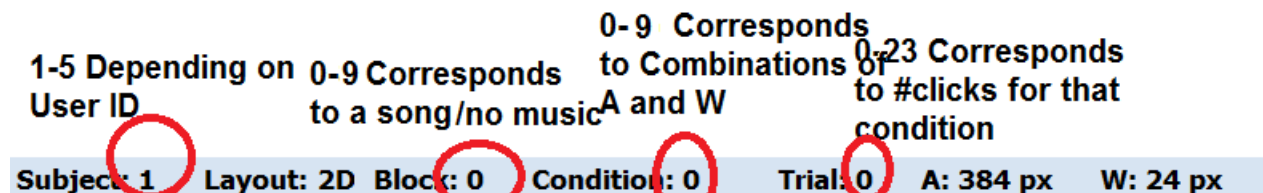


Figure 2: Useful information while you run the experiment. A pop-up window will indicate the end of each block. This is the time to change song.

By the end of each session you should save the log and analyze it (Ctrl+A). This will give you a txt file with all the information you need to do the following calculations: use the *Shannon's formulation* of Fitts' Law to calculate the MT , ID , W_e , a (intercept), b (slope), and error rates. Fit a linear regression to your data in order to create the classic regression plot of ID vs MT for each song. You can use Excel's Trendline to do the plot and compute the squared correlation. Compare the throughput (according to the formulation specified in Soukoreff and MackKenzie) between different genres and beats.

Provide 5 regression plots, one for each user. There should be 10 lines corresponding to each variation. The 9 songs will have 3 colored, 3 dotted lines and the no music a black line.

Make sure that you follow the Fitts' Law study guidelines in Suokeroff and MacKenzie (2nd reading on Fitts' Law), and that you avoid the two pitfalls described in Shoemaker et al. (3rd reading) (i.e. you must not average within ID).

As always keep a journal of your work as you go. Describe the procedure and criteria of finding the participants. Where the regression plots what you expected? Which model fitted Fitts' Law the best? Do you have an explanation for that? What were the percentages of error, average times, velocity, etc? You can use the Graph Trials (Ctrl+G) of the software to get a good insight on the data. Ask your participants if they knew any song in advance and if they felt any change in their mood/performance while they were listening to it, compared to the rest.

Write a final short report by organizing your journal notes and plots and make it public by copying to [//web/cs/web/courses/cs2951-1/\[username\]/fittslaw.html](http://web/cs/web/courses/cs2951-1/[username]/fittslaw.html). This will make it visible online at [http://cs.brown.edu/courses/csci2951-1/\[yourcsid\]/fittslaw.html](http://cs.brown.edu/courses/csci2951-1/[yourcsid]/fittslaw.html) Also, upload the 5 logs you have gathered.

You have three weeks to do this assignment but you have to plan it carefully. It takes time to find unique participants and schedule meetings with them. Run the experiment on your own before you invite the 5 participants. If you want you can use an extra person as a pilot user. On April 14 (midpoint) you should have run the experiment with at least 2 participants and have scheduled the rest. Make sure that you use the same computer and settings for all your sessions to avoid experimental errors.

The assignment grade will be based:

1. 40% correctness of experiment and procedure, avoiding pitfalls
2. 30% good analysis of results
3. 30% quality of the report and conclusions