

Instructions

CheckDisplaySettings.m

We want to make sure that stimuli are displayed in the same size. There are three types of stimuli. This script will present one at a time with a desired length/size.

1. Smiley face (shown before each trial):

The diameter should be around 1.8 cm on the screen. If it's too small, please use 'smiley2_big.jpg' instead.

CheckDisplaySettings.m @ line 49

linebisection.m @ line 63: `Img_smile = imread('smiley2_big.jpg');`

2. Pre-bisected line (main stimulus):

The horizontal line should be 10.5 cm and the vertical line should be 1 cm on the screen.

If this is not what appears on the screen, please adjust the following screen variables to match the lengths.

CheckDisplaySettings.m @ line 11-12

linebisection.m @ line 11-12:

`param.mon_width = 31.4; param.v_dist = 30;`

3. Mask:

The desirable size for the mask image is ~14.3 x 10.8 cm on the screen. If it's too small, please adjust pixel values here:

CheckDisplaySettings.m @ line 37-38

linebisection.m @ line 49-50:

`Scene_imagesizeh = 640; Scene_imagesizev = 480;`

(For example, PC users in our team have used the following values)

`Scene_imagesizeh = 960; Scene_imagesizev = 750;`

Running experiment

- In order to avoid confusion, we provide one type of question (either "Which side is longer?" or "Which side is shorter?") to each subject.
- Decide which type of question you will run for the subject and run the following scripts
 - o "Which side is shorter?": practice_short.m & linebisection_short.m
 - o "Which side is longer?": practice_long.m & linebisection_long.m
- We included a sample script for verbal instructions (see "Line Bisection Study - Script for Instructions.docx")
- Participants will use "A" and "L" keys on the keyboard. Locating response keys could be tricky for younger children, so we put blue and yellow stickers on those buttons.
- We recorded each child's grade in school on a separate document, as we split our data by school grade (from 1st to 8th grades) in our analyses.

- As you run ‘practice1’, subject ID, age, gender, handedness information will be saved in the output file.

Practice

If you use practice_short.m (or practice_long.m), it will automatically run 3 types of practice in the right order. For older children, you can simply run these scripts. For younger children (age 6-7), however, we often had to repeat the same practice until they felt more comfortable. You can run each script separately in that case.

When you run practice_short.m (or practice_long.m), it will first ask you to type the subject ID (in letter string), age (in number), gender (male or female), and handedness (right, left, or ambi).

There are three levels of practice. We recommend running practices in the following order:

1. **practice1** – slowest and easiest version. Each trial will wait for the participant to respond.
2. **practice2b** – slightly harder version. The pre-bisected line will disappear after 1 second of presentation. It will move on to the next trial after the participant responds.
3. **practice3** – hardest version, similar to the actual task. The pre-bisected line will be presented only for 200 milliseconds (same as the actual task) and followed by a mask file. The participant needs to get used to the speed. Although the line will disappear quickly, participants should know that they don’t have to rush in their response. In our experience, younger children tended to struggle and make a number of mistakes, because they felt that they were supposed to respond very quickly as well. In this case, we told them they had more time (2-3 seconds) to respond.

To run practice1 separately:

practice1(subjectID, block number, block type, age, gender, handedness)

for example: `practice1('subject01', 1, 1, 7, 'f', 'r')`

To run practice 3 separately:

practice3(subjectID, block number, block type)

for example: `practice3('subject03', 1, 2)`

block number = run number

block type = type of question (1 = ‘Which side is shorter?’; 2 = ‘Which side is longer?’)

Running the task

Similar to the practice scripts, you will need to decide which version ('which side is shorter?' or 'which side is longer?') to run.

If you use linebisection_short.m (or linebisection_long.m), it will automatically run 4 blocks of task.

Or you can run manually:

```
linebisection(subject ID, block number, block type)
```

At the end of each block, it will save the subject's response (and other information) into an output file, under the 'log' folder. The output files will be named "[subject ID]_block1_results.mat" for block 1, "[subject ID]_block2_results.mat" for block 2, etc.

Visualize each individual's data at the end

At the end of each session (4 blocks), it will run another script 'visualize_data'. This script basically analyzes data from the subject's data and plots the results. It will draw a psychometric curve with the estimated spatial bias in the title. We have included this because it is sometimes helpful to know the quality of data at the end of the session. It is up to you – you can turn off this script by deleting (or commenting out) line22 of linebisection_short.m (and linebisection_long.m).