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**Lab in Psychology (PSY310)**

**EXPERIMENT 1**

**Lab Report**

USING A STAIRCASE PROCEDURE TO DETERMINE THE ABSOLUTE THRESHOLD CONTRAST OF VISUAL GRATINGS



**Introduction:**

A staircase procedure, often referred to as an up-and-down or adaptive staircase method, is a methodical strategy used in many disciplines, such as psychology, neurology, and sensory perception research, to establish a subject's threshold or sensitivity to a particular stimulus. When accurate measurements are required or when it is difficult to regulate the stimulus intensity, this approach is especially helpful. The method is referred to as a "staircase" because it includes stepping-by-stepping incremental adjustments to the stimulus level with the aim of precisely convergent on the threshold.

A staircase procedure's main goal is to determine the stimulus intensity at which a person can only barely detect or distinguish the stimulus from the background noise. The detection threshold, or discrimination threshold, is a common name for this intensity.

Whenever exact measurements of a person's sensitivity or threshold to a particular stimulus are needed, adaptive staircase processes are employed in a wide range of fields and research areas. These techniques are especially helpful when it is difficult to adjust the stimulus intensity or when researchers wish to quickly reach a precise threshold with the fewest number of repetitions.

There are other alternatives also instead of adaptive staircase These options could be chosen based on elements including the stimulus type, the equipment that is available, the participant characteristics, and the amount of precision that is needed.These choices could be made depending on factors like the type of stimulus, the equipment at hand, the participant characteristics, and the amount of precision necessary.

Method of limits-

In this technique, the stimulus intensity is progressively raised or lowered in predetermined stages until the participant can detect the stimulus or cannot. The crossover points—the points at which a participant switches from detection to non-detection or vice versa—from ascending and descending trials are averaged to determine the threshold.

Method of constant stimuli-

This strategy, in contrast to adaptive methods, uses a fixed set of stimulus intensities that are presented in random order and cover a wide range from subthreshold to obviously suprathreshold values. The threshold is calculated statistically depending on the participant's performance after recording their responses.

**Method:**

The aim of this experiment is to find the absolute threshold and accuracy of the participant's ability to detect the contrast change in visual gratings, through a staircase procedure.

By identifying whether a visual grating appeared on the right or left side of the fixation point on the screen, and whether it did so randomly across trials, participants in the Tutorial 1.0/ Visual Grating Task were able to determine the threshold at which they had to press the right or left arrow key on the keyboard.

In the fixation the time 0.5 seconds was selected. A cross sign was used as a fixation for the eyes of the participant to gain attention before the experiment was started.

We used the keyboard option in replies, entered "left" and "right" in the box for allowed keys, and left the timer at 2.0 seconds to allow the participants to answer. In the data tab, choose the store's correct checkbox and enter "ScorrAns" in the right answer field.

It is very necessary to save the file of the psychopy experiment to start the experiment. To specify when the grating must show on the right or left side of the fixation, enter a code now. Select code function from the Custom tab by clicking. The 'if' condition function of the code is based on the idea that it will generate a random number between 0 and I with an equal chance of being less than or greater than 0.5.

Add an Excel file conditions box and a loop with 100 repetitions to finish. It will specify the variables needed to execute the stairwell operation. The initial value is going to be its minimum and maximum value, step sizes, and contrast value, as well as alter the

options for interleaved staircases, from loop size.

**Participant:**

The test was performed by the experimenter herself as a part of the Lab in Psychology course at Ahmedabad University.

**Result:**

After running the experiment and analyzing the data, the absolute threshold was the average of the last 10 values from the tilt section. The absolute threshold of my experiment was 14.5.

**Discussion:**

Since the observer or participants have been found to detect a value lower than their reported threshold value, their observations and detections are unreliable and biased, which is also true for the current participant's case in this particular experiment. This is one of the limitations of the staircase procedure.

Participant fatigue can become a major limitation factor in the staircase procedure as this includes doing lot of responses, which can lead to the participant feel bordom, fatigue and inattentive.

**References:**

Samples given on the LMS.