

**ECE511/PSY511 PSYCHOPHYSICS**  
**A Joint Offering by the School of Electrical and Computer Engineering**  
**And the Department of Psychological Sciences**  
**Purdue University**  
**Fall 2019**

**HW #2**  
**Topic: Method of Limits and Method of Adjustment**

- (1) Define an absolute threshold (AL). Describe how AL can be estimated by the Method of Limits and the Method of Adjustment. Compare the two methods (in terms of Procedure, Theory/Assumptions, and Data Analysis).
- (2) A psychophysics student wishes to design an audio warning system that alerts people to an impending danger. The student wishes to create an audio alarm that is 20 dB below the pain threshold for the general population. Thus, for a class project, the student designed a psychophysics experiment to find the pain threshold for a randomly-selected group of participants. Below are the fictional data for one participant, where Y=Yes (signal is painful), and N=No (signal is not painful).

Sound Intensity (dB)	Descending Series 1	Ascending Series 1	Ascending Series 2	Descending Series 2	Ascending Series 3
140	Y			Y	
138	Y			Y	
136	Y		Y	Y	
134	Y		N	Y	
132	Y	Y	N	Y	
130	Y	N	N	N	
128	Y	N	N		
126	N	N	N		Y
124		N	N		N
122		N	N		N
120		N	N		N

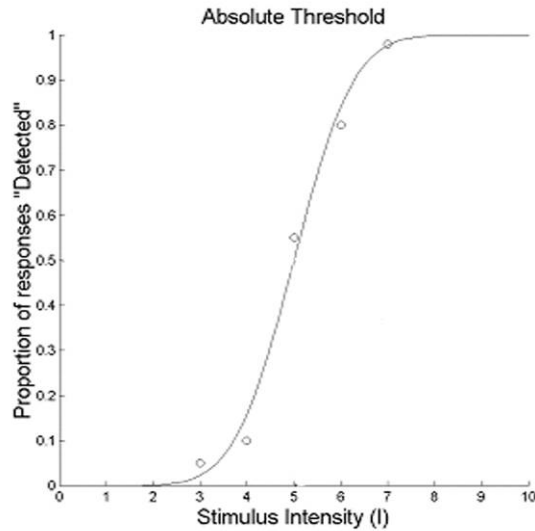
- a. Which psychophysical method was used to determine the pain threshold?
- b. Based on the data, compute the threshold for pain for this participant.
- c. Is the pain threshold an absolute threshold or a difference threshold? Why?
- d. Was this a well-designed experiment? Discuss your answer.

(3) Estimate PSE and DL for line-length discrimination using the FechDeck (Ferwerda 2019). After conducting the experiment during lab, attach a copy of the spreadsheet and data plots (see Fig. 8 of Ferwerda 2019). Discuss your results.

(4) [Note: This is a review problem.]

The Method of Constant Stimuli can be used to measure both AL and DL.

a. The figure below shows hypothetical data from a detection experiment and the corresponding best-fitting psychometric function. Mark AL on this figure.



b. Now consider a symmetric discrimination experiment that estimates DL. Sketch the psychometric function. Your sketch should look similar to the figure above, but with modifications that are necessary for a discrimination experiment. Mark PSE, DL and CE (constant error) on your sketch.