***Signal Detection Experiment:***

**PSY310: Lab in Psychology**

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**Name: Krishi Mehta**

**Enrolment no. AU2220167**

GitHub link -:

**INTRODUCTION**

Signal Detection Theory (SDT) is a theory that belongs to the field of psychology, with the purpose of studying people’s decisions in contexts that are characterized by vagueness and ambiguity in which it is difficult to identify a signal from background noise. It is in these two fields, engineering and psychology, that the choice of SDT has arisen but today it is used in many fields of study – from medical diagnostics to telecommunications. The theory is also concerned with not only the ability to pick up signals, but also how people ‘define their thresholds for decision making that depends on their sensitivity to the signal and their tendency to be either prudent or reckless. As it has been already pointed out, the SDT highlights both the appropriate and the improper decisions made by people and shed a light on the difficulties of human perception.  
  
 When one tries to detect a signal, they can get one of four outcomes:  
Hit – come across what we were looking for in the outcome. Miss – Do not receive the signal although it is there to be received  
False Positive – It shows that the signal is present but it isn’t.   
Correct Rejection – Did not get a signal it gives a clear picture on how it tends to be right or wrong in cases of decision making in the complex situations

**METHOD**

Participant

The participant is an undergraduate from Ahmedabad university aged 19, Female. The participant was briefed and informed consent was obtained from them before initiating the experiment.

Procedure And Method

The experiment setup was created with on *Psychopy Runner v(2024.1.5)* (Peirce et al., 2019). We used an orientation discrimination task for the experimental setup. Following fixation, a sinusoid with a Gaussian mask was intended to be displayed for about 0.3 seconds with a shifted minor tilt in the trials. Following the figure's display, the participant is asked to use the "up" and "down" arrow keys to indicate whether the figure is absolutely vertical or slanted; the up arrow denotes vertical position and the down arrow denotes tilt. The trial doesn't end until a response has been given.

**RESULTS**

The d' obtained from the experiment was 0.557885, and the criterion (c) was found to be -0.55788

**DISCUSSION**

Thus, D-prime is a measure to determine stimulus sensitivity of a subject, which enables the subject to distinguish signal from noise. It refers to the chance, depending on the participant’s response, of coming across further hits or encountering more misses. It really measures the extent to which a signal deviates from the noise.  
  
On the other hand, the criteria considers the bias which could have been used in arriving in such decision and considers the decision point where one may observe that signal is presence or not. If the criteria is larger, there will be less hits and false alarms meaning that the participant is more careful and requires more evidence before getting involved. This also increases the probability of missing signals compared to situations when the threshold is lower.  
After Swets and Tanner proposed it, the signal detection theory has garnered significant attention.  
It has helped in identifying the essence of possible factors that might influence decision making and also provides some understanding of specific cognition processes. It has been extensively used in neuromarketing and psychology to predict customers, and military uses, safety gears, and forensic cases.

**REFERENCES**

*Green, D. M., & Swets, J. A. (1966). Signal detection theory and psychophysics. Wiley.*

*Swets, J. A., & Tanner, W. P. (1969). Decision processing: Theory and applications. Psychological Bulletin, 72(4), 225-247. https://doi.org/10.1037/h0027857*