

Method of limits essay



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Sound waves are created when an object vibrates. They have two main components: frequency (pitch; measured in Hertz (Hz)) and amplitude (loudness, intensity; measured in decibels (dB)). The method of limits is a psychophysical method in which a particular dimension of a stimulus, or the difference between two stimuli, is varied incrementally until the participant responds differently. The change in stimulus intensity is orderly and regular; so the changes may become predictable to the participant resulting in two types of bias, expectation or habituation. Expectations is when the participant expects the stimulus to change, and thus reports that it has changed, even if it hasn't.

We can tell if the expectation has occurred when the descending mean is greater than the ascending mean. Habituation occurs when the participant hesitates too long to switch the response, responding with a Y or N, even after detection of the stimulus has changed. We can tell this is habituation if the ascending mean is greater than the descending mean. We conducted two total trials at each frequency (i. e., 2 ascending trials and 2 descending trials) to get our information.

The purpose of this lab is to determine the participant's hearing curve using the method of limits. In addition, determining if habituation or expectation occurred is also a goal. Method This experiment was conducted using a audiometer that tests hearing using ear position, noise, amplitude, and duration. We first turned the audiometer on, made sure both ears were on, turned the noise (amplitude) off and set the duration for 1/2 second.

Then set the frequency (Hz) and the amplitude (db) Levels. The frequencies were pseudo-randomized at the following levels: 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, and 8000 Hz. The participant in this experiment was asked to put on headphones and tell when she could hear a sound using descending and ascending tones. For the ascending trials, we started at a very low dB level and increased by 5 dB's at a time until the participant could hear the tone at 2 dB levels in a row. For the descending trials we started at a very high dB level so the participant could not hear the tone.

We then decreased the dB level by 5 dB's until the participant could not hear the tone 2 dB's in a row. When conducting our experiment, the experimenter concealed the remote switch so that the participant did not know the sound was coming, we made sure to only press the button one time. Results The means for ascending threshold, descending threshold, and the overall threshold were calculated using the universal mean formula. We essentially took A1 and added it with A2 and divided, and did the same with the descending. After the first row of Y's, we started to notice a correlation among them and was easily able to calculate the rest in my head, checking my work after with a calculator.

Among the 250 Hz row, the ascending mean was 55 and the descending mean is 42. 5, the overall calculated mean was discovered to be 48. 75. In the 500 Hz row, the mean of A was 47. 5, and D's mean was 37. 5, averaging out to the total of 42.

5. In the row of Y's for 1000 Hz, 37. 5 was the ascending mean and 32. 5 was the descending, leaving the overall mean of 30. For 2000 Hz, 27.

5 was calculated for the ascending, while 32.5 was calculated for descending, making 30 the overall mean. For 4000 Hz, 47.5 and 42.5

were the ascending and descending means with the overall at 40 decibels. Lastly, the row of Y's for 8000 Hz provided the means of 57.5 for ascending, 62.5 for descending, and 60 for the overall. ?? Discussion The Method of limits was used to come across the data that we did. For this study, the subject was most successful in hearing at the 2000 Hz level with an overall average of 30 for the dB levels.

Results of earlier studies on the auditory range indicate that man is most sensitive to stimuli of 1000 to 4000 (Corso). According to this statement from a previous article, the participant in our experiment was in line with previous results. The method of limits has two limits to it, habituation and expectation. In this particular experiment habituation occurred more than expectation.

At 250 Hz, 500 Hz, 1000 Hz, and 4000 Hz habituation had occurred. In which all cases the ascending mean was larger than the descending mean. This is understandable since people are most sensitive to Hz 1000-4000.

Expectation occurred at 2000 Hz and 8000 Hz.

In which all cases the descending mean was larger than the ascending mean. This could be explained at 8000Hz because it is a very hard tone to hear, and the subject may just be thinking she is hearing a sound instead of actually hearing a sound. The room that this experiment was conducted in was being used by other subjects at the same time, so the sound of other people in the room could have been a distraction to the participant. The

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sound of the clicker being moved was also able to be heard through the headphones, this may have also had some effect on habituation and expectation.