

Discussion Questions

Chapter 2: Research Methodology

1. When using the method of limits to measure a threshold, the crossover point between detecting vs. not-detecting a threshold may be different for ascending and descending trials. Why do you think this happens? Researchers usually average together the results of ascending and descending trials. Do you think this is valid?

Hints and discussion points: This discussion encourages students to think critically and scientifically about how to study sensory function. Students should center on adaptation and/or habituation as explanations of the differing results. Explain how adaptation results from the sensory organ getting “used” to a high level of stimulation (in the case of descending trials) and thus may not respond to weaker stimuli. Explain how habituation can result in participants giving the same response repeatedly and persisting with the response even when the stimulation has changed. Students can question whether the averaged result reflects a real threshold or only blurs out the real effects of adaptive processes in sensory function.

2. Weber invented the two-point threshold for measuring the smallest distance between two touches that can be reliably identified as two separate points on the skin. This methodology revealed that the ability to discriminate two points is better on the fingertips than on other parts of the body such as the legs or back. Why do you think this is the case?

Hints and discussion points: Students may focus on the functional issues, namely that we touch things with our fingers/hands to obtain information about them, not with our legs or back. But why don't we have an equally sharp sense of touch over the whole body? Discuss in terms of the amount of innervation the fingers require compared to the other body parts.

3. Sensation and perception is a complex process involving all sensory systems working in harmony to accurately receive feedback from your surroundings, process it, and provide you with

information that you can use to navigate your environment. If any of these systems are not functioning, it can be detrimental. When you think about the advancement of neuroscience methodology in testing, what are some of the advantages and changes to using this methodology? Remember that neuroimaging refers to techniques that allows researchers to make detailed maps of the human brain and assign functions to particular regions in the brain. How has the advent of neuroimaging changed medicine? What are scientists and doctors able to do now that they previously were in the dark about? What changes have come about regarding understanding symptoms, diseases, and treatments? For this question, research two neuroimaging modalities, diseases or conditions that can be detected with these modalities, and describe what has changed in treatment due to their invention. For example, think of current events and how deeper understanding of concussions is changing the conversation in the NFL.

Hints and discussion points: This question encourages students to perform research and take a practical application to research methodology. To understand how electroencephalography, magnetoencephalography, functional magnetic resonance imagery, and transcranial magnetic stimulation and the advances in research and treatment since their advent, students will gain a deeper understanding of the impact of disease and/or damage to the brain, the impact to the individual, and possibly to society.