

Research on human senses

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Research on human senses,(),? The density of receptors for each sensory system is related to the level of necessity for the stimulation to evoke sensation. As a consequence, different body parts have different levels of skin sensitivity. To test which part of our skin is more sensible than others, we used the method of limits in an experiment among a group of year one students at the University of Southampton to find out the sensory threshold of the five body parts: middle finger, forehead, cheek, forearm and calf. In the experiment, we made use of the ascending series and descending series of the method of limits to determine the threshold of sensory (distance between two points of compass) at which two points of the skin can be detected. From data of the experiment, we conclude that finger have higher sensitivity than other parts of skin. When we touch our skin, different part of skin have different level of sensitivity. Some part of skin is dull, while some part of skin is sensitive.

It is because different region of brain receive information from different part of body. Martin, Carlson, and Buskist (2013) explained that Some parts of the brain are disproportionately involved in certain bodily movements, such as those involving the lips and hands(P126). How can we measure the sensitivity of skin? We choose some students from a year 1 practical class as participants randomly, and each was designated a body part, finger, calf, cheek, forearm, and forehead.

In the experiment, we use method of limits, which is used to determine the threshold of sensory feeling by either gradually increasing and/or decreasing the magnitude of the stimulus in discrete steps until the stimulus becomes noticeable or unnoticeable by the participant. Martin, Carlson, and Buskist

(2013) think that the most common measure of the tactile discrimination of a region of skin is the two-point discrimination threshold. To determine this measure, an experimenter touches a person with one or both legs of a pair of dividers and asks the person to say whether the sensation is coming from one or two points (P179).

According to the theory above, we touched the participant with two or one point to test the discrimination of different part of skin. To insure the accuracy of the result, we set a high standard of answering (3 out of 4 trials correct). Besides, we control the variable of gender and age to make sure that the difference of threshold is not because of the two variable.

Participants in the study were recruited by convenience sampling, as there were 120 year one students who study the module Empirical Studies at University of Southampton. The average age of 120 participants in the group was about 19.98, and there was a high female to male ratio (97: 23).

Participants were then separated into groups of four or five depending on where they happened to sit next to or close to and within themselves, they decided what area of the body part they wanted to be assigned to. Then the tester will start the experiment. Independent measure was used in the experiment as different participants were used in each condition of the independent variable. Independent variables (IV) were body parts that the participants were assigned to (Calf, forearm, cheek, middle finger and forehead) while the dependent variable (DV) was the sensitivity (Threshold at which two points of the skin can be detected) The DV was measured using the method of limits, which is used to determine the threshold of sensory

feeling by either gradually increasing (Ascending series) and/or decreasing (Descending series) the magnitude of the stimulus in discrete steps until the stimulus becomes noticeable or unnoticeable by the participant. Ascending series is to set the distance between divider points to 2mm and increase the distance to 12mm until two points are detected, while descending series is to set distance started at 12mm and decrease the distance until two points can no longer be detect. The procedures of ascending series and descending series were both performed four times, two with 2 points, two with 1 point.

Compared to practice¹, only when the participant was correct on 3 out of the 4 trials can the procedure stopped. Ruler was used to measure the distance between the points of the compass (cleaned by antibacterial wipes before use) before the simulations. A Results sheet for each body part was used for each body part and each participant while a Small Group Results Summary sheet was used to collect results from each group (all 5 body parts).

According to table 1, calf has the highest mean threshold of sensitivity of 7.52 while finger has the lowest mean threshold of sensitivity of 2.36. And , the mean threshold of sensitivity of forearm, forehead, calf and cheek are all relatively close (ranging from 6 to 7); besides, the mean threshold of the finger is comparatively low and is further away from that range. In addition, the highest standard deviation of the body part is 2.73 of calf while the lowest is 1.15 of finger.

Therefore, we can conclude that, calf has the greatest deviation to the data of thresholds, whilst finger contribute least. And, the data of distribution of threshold in the calf group is positively skewed while the data from the other

body part groups tend to be more normally distributed. As shown in figure 1 to figure 5, When tester touches the skin of participants, the skin on finger is more sensible compared to skin on other parts, which maybe mean that finger and cheek has more relevance with brain. And the distance between two points people can feel ranging from 2.0" 3.9.

As you know, when brain of people suffers from some damage, some function of body may lose to varying degrees. From the experiment, we may have an assumption that , the function of finger is influenced most by the brain. Besides, we have verified control variables of gender and age. In the table 2 and table 3, both number of sig is higher than 0.05. Therefore, we can conclude that variables of gender and age have no relevance with threshold in a significant level of 0.05.

The experiment has devoted some data for me, and I also conclude some conclusions. The standard deviation of finger group, forearm group and forehead group are both low, which means the reliability of the data of the three group is higher than the others. The data of finger group is a good proof that finger has the highest sensitivity among the five parts of skin, which further explains some part of brain controlling the sense of skin involves more in finger's movements. But whether the experiment is efficiently measuring the relevance between brain and different parts of skin still need our more attention, and we have to improve our method of measuring. As far as I can see, to enhance the reliability and validity, except for increasing the standard of measuring threshold, we can rely on increasing the number of sample, introducing more control variable and

decreasing the incremental distance between two point as well as increasing the frequency of testing procedure.

As for control variables, I have excluded gender and age. In my opinion, we can introduce variables of physical condition and psychologic status into experiment, which may have great influence on the results. As for age, we must considerate that the participants in the experiment are of similar age. And due to the similar age, the result we have concluded may be incorrect. Besides, the sex ratio of the participants in the sample is too lopsided. And due to the small sample we based, the conclusion that gender has no relevance with threshold is not so convictive.

Therefore, in the following experiment, size of sample, the control variable and age as well as the condition of participants should be taken great attention. Martin, Carlson, and Buskist(2013) think the three regions of primary sensory cortex in each hemisphere receive information from the opposite side of the body(P124). From the experiment, we can see that different part of skin have different sensitivity, but we can not obtain more tight relevance between body and brain. To test the connection between body and brain further, we may test the different sensitivity between left arm and right arm as well as left cheek and right cheek, or touching different part of skin at the same time. What™s more, we can set interference factor when we do research, we can let participants listening wonderful music or smelling the perfume while we are touching his/her skin. If a mean of somewhere of body is lower than other parts, it shows that brain has very tight relevance with the part of skin.

Martin, Carlson, and Buskist (2013) think that sensitivity to subtle difference in touch and pressure varies widely across the surface of the body (P179). But what is the most subtle difference touch our different part of skin can detect. We can use different level of strength to touch different part of skin until we can not notice the touch in our skin to measure the sensitivity of different part of skin. What I have expounded is not full, we can develop more efficient and scientific method of measurement to measure sensory threshold and the relevance between different part of body ;, [-Z]