Brain Geography Topic:

**Touch in the Brain**

The area which processes touch is located directly behind the area associated with movement (behind the fold called the Central Sulcus) and similar to the motor area, specific parts of it deal with specific parts on the body. As show below.

![Diagram of the brain and homunculus](image)

The similarities with the motor area don’t stop with them being located next to each other. Again, the left side of the brain deals with the right side of the body and visa versa. And similar to motor cortex, the body is represented upside-down – with legs/arms near the top and mouth and face near the bottom.

You might also notice that the hand and mouth are greatly overrepresented compared to the size of them on the body. The figure to the right is an image of a person where the size of each area is proportional to how much is covered in cortex. Interestingly, this size is also proportional to the number of sensory neurons in these areas.

The similarities and close relation between the movement and touch areas of the brain are not coincidental. A sense tied to the touch system that people often ignore is called “proprioception” – literally the sense of knowing where your body is. People who lose this sense of touch have a great deal of trouble with simple tasks like reaching for something on a table or drinking from a cup. Moving their body doesn’t feel “natural” because they don’t get any feedback on where their body is to guide the movements. Although we may forget these connections because they come so naturally, it is debilitating when they’re lost, and reminds us why the motor and touch areas are so intimately related.
Brain Geography Activity:

**Touch in the brain**

Label which areas of the brain will be involved in three different activities.

Left: Eating dinner. Hint: remember to use a knife and fork, and you don’t just chew mechanically – how you chew depends on texture, where you feel the food in your mouth…

Middle: Typing up a school paper.

Right: Receiving a back massage.

---

The sense of touch (somatosensory system) is actually much more complex than we typically realize. There are typically three types of touch communicated to the brain…

**Discriminative touch:** what you typically think of when you think about touch. Feeling objects with your fingertips, the touch of your clothes on your skin, or feeling wind as it blows past you.

**Proprioception:** sensing where your body is without having to see it – these touch receptors tend to be in muscles and joints.

**Pain and Temperature:** this system quickly communicates extreme temperatures and damage to parts of your body.

There are two extreme conditions that can happen to the pain system that often surprise people. Think about what it would really be like to live with these problems…

**CIPA:** a genetic condition where people are unable to feel pain. Although you’d think you’d be a superman in this condition, really it’s quite dangerous. Children with this will eat food that’s scalding hot and don’t notice serious injuries that need tending to. For example, one child died of appendicitis because they didn’t feel it hurt.

**Allodynia:** Touch Allodynia is perhaps the worst curse you could ever imagine putting on someone. Basically, any slight touch – clothing on the skin, brushing against a bush, feeling the wind blowing on your arms or face – will cause extreme pain. With these people, neural “wires” are crossed and light touch fibers stimulate the pain system.