

# Psyc college essay



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Could not form new memories, yet he could recall everything that happened before the operation. Illustrates the power of modular approach Bill – angular gyrus damaged due to stroke injury (discalculced) This region somehow necessary for numerical computational tasks but is not need for other abilities such as SST, language or humor. People with discalculced also have an associated brain disorder called finger agnosia: They can no longer name which finger the neurologist is pointing to or touching.

Chapter 2: “ Knowing Where to Scratch” Tom Sorenson – lost his arm in a car accident; phantom arm Phantom limb – an arm or leg that lingers indefinitely in the minds of patients long after it has been lost In an accident or removed by a surgeon (some patients also experience phantom breasts, phantom erections, phantom face/nose, phantom appendixes and phantom menstrual cramps). Some patients experience excruciating pain In the phantom arm, hand or fingers, so much so that they contemplate suicide. (pain is unrelenting and untreatable) First coined by physician Sill Weir Mitchell after the Civil War.

Theory 1: phantom limbs are merely the result of wishful thinking; similar to recurring dreams (utter nonsense) Theory 2: frayed and curled-up nerve endings In the stump that originally supplied the hand tend to become inflamed and irritated, thereby fooling higher brain centers into thinking that the missing limb is still there. An artist’s whimsical depiction of the manner in which different points on the body surface are mapped onto the surface of the brain.

Tim Pond et al. Found that when they touched the monkeys face, the cells in the brain corresponding to the “ dead” hand started firing vigorously. \*\*This meant that you COULD change the body map n the surface of the brain.

Used magnetoencephalography (MEG), which relies on the principle that if you touch different body parts, the localized electrical activity evoked in the Penciled map can be measured as changes in magnetic fields on the scalp (noninvasive) Showed that brain maps can change, sometimes with astonishing rapidity. Nerves that once supplied the hand begin to innervate the stump and these frayed nerve endings form little clumps of scar tissue called neuroses, which can be painful.

When neuroses are irritated, they send back impulses to the original hand area in the brain, fooling the brain that the hand is still there; hence the phantom limb and the notion that the accompanying pain arises because the neuroses are painful.

When we think of sensations arising from the skin we usually only think of touch. Distinct neural pathways that mediate sensation of warmth, cold and pain also originate on the skin surface. Placed a drop of warm water on Tom’s face Felt it trickling down his face and trickling down his phantom arm. Cross-wiring) Two possibilities 1 .

The reorganization could involve sprouting – the actual growth of new branches room nerve fibers that normally innervate the face area toward cells in the hand area in the cortex. 2. There is in fact a tremendous redundancy of connections in the normal adult brain but that most of them

are nonfunctional or have no obvious function. Like reserve troops, they may be called into action only when needed.

Proof. R believe both mechanisms are at work. Gaze tinnitus When a patient looks to the left (or right), they hear a ringing sound.

When the patient looks straight ahead nothing happens.

Patients who suffered damage to the auditory nerve – the major conduit connecting the inner ear to the brain stem. Once the brain stem the auditory nerve hooks up with the auditory nucleus, which is right next to another structure called the calculator nerve nucleus Axons from the eye movement center in the cortex invade the auditory nucleus brain sends a command to move the eyes -> command is sent to auditory nerve nucleus translated to a ringing sound.

Chapter 3: “ Chasing the Phantom” Penciled homunculus – a map draped across a vertical strip of cortex on the sides of the brain. Memorable Kumar, born without arms, experiences phantom arms The neural circuitry during development. The neural circuitry that generates these command in her arm seems to have survive intact, despite no visual or kinesthesia feedback.

\*\*\*evidence that body image must be laid down at least partly by genes and is not strictly dependent on motor and tactile experience.

Hard-wired image of the body and limbs at birth. Memorable can generate voluntary movements in her phantom arms.

John McGrath, an arm amputee, was asked to reach for a coffee cup placed in front of him. Right as John grabbed the cup with his phantom hand, Proof.

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R yanked the cup away. John felt pain in his phantom hand. 1/3 of phantom limb patients are not able to move their phantoms. How can a nonexistent arm be paralyzed? Many of these patients had preexisting pathology in the nerves entering the arm from the spinal cord.

Their arms really had been paralyzed, held in a sling or cast for a few months and later amputated simply because they were getting in the way.

To create and maintain a body image at any give instant, your parietal lobe combine info from the muscles, joints, eyes and motor command centers. When you move your hand = frontal lobes (especially in the vertical strip of cortical tissue called the motor orate. This strip lies in front of the furrow that separates frontal and parietal. Homunculus/motor cortex (contains an upside-down map of the whole body/sends signals to the muscles rather than receiving signals from the skin) are behind the furrow. Primary motor cortex – simple movements (l.

E. Wiggling fingers and smacking lips).

Supplementary motor area – complex skills (l. E.

Waving and grabbing a banister). Every time a “ command” is sent from the supplementary motor area to the motor cortex, it goes to the muscles and they move. “ command” are also sent to two there major “ processing” areas – the cerebellum and the parietal lobes When John decides to move his phantom arm, the front part of his brain still sends out a command message, since this particular part of John’s brain doesn’t “ know’ that his arm is missing even though John “ the person” is unquestionably aware of the fact.

The commands continue to be monitored by the parietal lobe and are felt as movements.

Thus the phantom limb experience depends on at least two sources: 1 .

Remapping – recall that sensory input from the face and upper arm activate brain areas that correspond to the “ hand. ” 2. Each time the motor command center sends signals to the missing arm, info about the commands is also sent to the parietal lobe containing our body image The convergence of info from these two sources results in a dynamic, vibrant image of the phantom arm at any given instant. 3.

The impulses from the Joints, ligaments and muscle spindles of that arm.

Can you unlearn a learned paralysis? Phillip Martinez had a phantom left arm. The mirror box helped Phillip temporarily feel his paralyzed phantom arm move again. It was as though he had some emperors inhibition or block of the neural circuits that would ordinarily move the phantom and the visual feedback had overcome this block. However, the paralyzed After a month, Phillip no longer felt a phantom arm, but he still felt phantom fingers and a palm dangling from his shoulders (overrepresented on the Penciled map? Elbow pain disappeared. Why do patient feel agonizing in the phantom soon after amputation? Scar tissue or neuroses Remapping is ordinarily modality-specific.

But maybe in these patients a slight error might have occurred during the remapping process so that the touch input is hooked p accidentally to pain centers. Abnormal remapping could also cause pain two other ways: 1 . “ Volume Control” mechanisms may have gone awry as a result of remapping

- resulting in an suchlike “ who who” reverberation and amplification of pain  
2.

Touch synapses may not be rewired correctly and their activity may have gone chaotic.

Abnormal pattern of input interpreted as Junk = pain Brain tells hand to make a fist - > feedback from muscles and Joint of your hands are sent back to the brain (slow down or it could hurt) however, the limb is missing so this feedback is not possible > motor output amplified -> experience pain.

Implies that pain is an opinion on the organism’s state of health rather than a mere reflexive response to an injury. Illusory pain) Perception emerge as a result of reverberations of signals between different levels of the sensory hierarchy, indeed even across different senses. Nature & Nurture 1 .

After a surgery in which a patient’s stump was split, the patient’s brain reshaped his body image to include two pincers. 2. A girl used her phantom fingers to calculate and solve arithmetic problems 3. A girl who was born with her right leg two inches shorter than her left leg and who received a below-knee amputation felt four feet 4.

Memorable 5.

Leprosy is still quite common in India. Here, when their limbs are amputated, they do not experience phantoms. Why? Perhaps the gradual loss of the limb or the simultaneous presence of progressive nerve damage caused by the leprosy bacterium is somehow critical. Your own body is a phantom, one that your brain has temporarily constructed purely for convenience. Three

experiments that demonstrate the malleability of your body image and how you can alter it profoundly in just a few seconds.