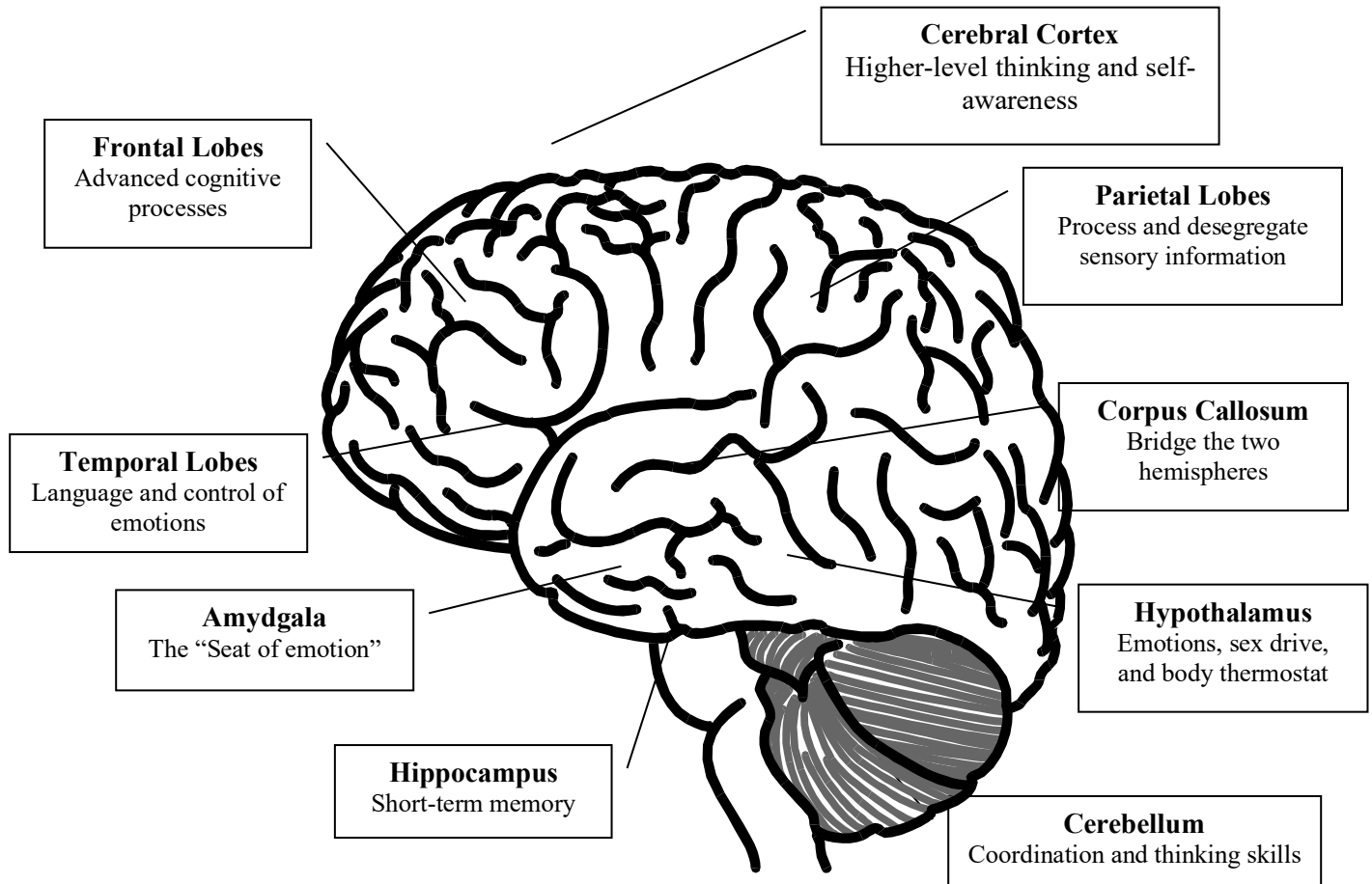


ETHOLOGY OF INTERNET COMPULSIONS

Neuropsychological Model (“It’s a Brain-thing.”)



The brain is composed of two types of cells, glial and neurons. Glial cells are the “glue” that binds cells together; they compose 90% of the cells in the brain. Neuron cells are associated with learning. They are the body’s communicators and constantly strike up conversations all over the brain.

Each neuron can have a thousand or more dendrites extending from it. The dendrites send and receive information from other neurons. The brain selectively strengthens or prunes neurons based on activity. The more dendrite receptors there are, the better the brain cells’ ability to network with one another. Choices made during adolescence can affect a person’s brain for the rest of their life.

Myelin – a fatty substance made of glial – is produced to insulate the neurons. Myelin covers the axons of neurons and enables information to travel efficiently. Myelinated tissue is referred to as white matter.

The male brain has a greater proportion of white matter than the female brain. The female brain has a greater proportion of gray matter. It is speculated that the additional white matter enable men to transfer information easily to all regions of the brain – enhancing their spatial abilities and giving them an advantage in matters of navigation, mathematical problem-solving and aiming at targets. The abundance of gray matter in women might allow for more efficiency of thought processes and a greater ability to process information, which perhaps explains the female’s strong language skills and the ability to multitask.

“It’s a Brain-thing!”

The **hypothalamus** is responsible for emotions, sexual desire and controlling the body’s thermostat. It is larger and thicker in men than in women. Love and pleasure are particularly affected by the chemical dopamine – the all-time feel-good neurotransmitter.

The **temporal lobes** process language and emotional behavior. They do not finish growing gray matter or begin the process of pruning and myelination until the age of sixteen.

The **frontal lobes** are responsible for cognitive processes (abstract thinking, speaking, reading, writing, math, music, the ability to analyze, apply and evaluate.). It is one of the last parts of the brain to receive myelin. The frontal lobes are in charge of taming the beast within us. Until the frontal lobes are completely formed, teens rely overmuch on their **amygdala**.

The **cerebral cortex** (or neocortex) is the wrinkled outer covering of the brain, the site of higher-level thinking and self-awareness. It is the most developed part of the brain and allows us to problem solve, think critically, and make decisions.

The **parietal lobes** process and desegregate sensory information like sights, sounds and smells. The parietal lobes do not complete the creation of gray matter until about the age of twelve, and only then do they start pruning.

Attention Deficit Disorder / Hyperactivity Disorder involves a compromise of the frontal lobes which interferes with the ability to inhibit **limbic system** impulses.

Paying attention serves two primary purposes, the first is survival and the second is maintaining pleasurable feelings. The brain is fascinated by novelty and emotion. However, the brain also craves discernible patterns.

Incentive Saliency:

The Incentive Saliency Circuitry craves feel-good chemicals. These include Dopamine, Norepinephrine, Serotonin, Endorphins, Adrenaline, Oxytocin and Vasopressin

“The underlying physiological mechanism of incentive saliency is postulated to involve mesocorticolimbic brain systems that involve dopamine activation. The relationship to brain dopamine states makes incentive saliency vulnerable to enhancement by psychostimulant drugs that activate dopamine systems. Enduring neural sensitization of dopamine-related mesolimbic systems induced by repeated exposures to drugs is the basis for the incentive-sensitization theory of drug addiction. Sensitization of dopamine-related systems by binging on drugs such as heroin and cocaine is thought to produce long-lasting hyper-excitability of the brain’s mesocorticolimbic system and to result in compulsive ‘wanting’ to take drugs and in cue-triggered relapse. Sensitized ‘wanting’ may effectively trigger relapse even when addicts may not derive much pleasure from the drugs, nor expect to derive much pleasure, and even long after the addict is free of withdrawal symptoms.”
(Zang, et.al., 2009,)

Dopamine *“is one of a number of neurotransmitters found in the central nervous system. Dopamine has received special attention from psychopharmacologists because of its apparent role in the regulation of mood and affect and because of its role in motivation and reward processes. Although there are several dopamine systems in the brain, the mesolimbic dopamine system appears to be the most important for motivational processes. Some addictive drugs produce their*

potent effects on behavior by enhancing mesolimbic dopamine activity (Di Chiara, 2000). The neurochemical connection to behavioral addiction such as gambling or food have yet to be made, but early studies have suggested that neurochemical processes play a role in all addiction, whether to substances or to behaviors. (Di Chirara, 2000).

The proposed model of brain reward circuitry in addiction involves the increased dopamine when certain areas of the brain are stimulated. The brain has specialized pathways that mediate reward and motivation. Direct electrical stimulation of the medial forebrain bundle (MFB) produces intensely rewarding effects. Psychomotor stimulants and opiates can also activate this reward system by their pharmacological actions in the nucleus accumbens and ventral tegmental area, respectively. The ventral tegmental action of opiates probably involves an endogenous opioid peptide system (ENK), but the anatomical location of that system has not yet been identified. Natural rewards (e.g., food, sex) and other substances (e.g., caffeine, ethanol, nicotine) may also activate this brain reward system.” (Young & Nabuco de Abreu, 2011, p. 10)

Emotions: Proceedings of the National Academy of Sciences

- Emotions linked to our moral sense awaken slowly in the mind. Brain imaging shows a person needs six to eight seconds to fully respond to stories of virtue or social pain.
- *“The study raises questions about the emotional cost - particularly for the developing brain - of heavy reliance on a rapid stream of news snippets obtained through television, online feeds or social networks such as Twitter.”*
- The lead researcher notes, *“If things are happening too fast, you may not ever fully experience emotions about other people’s psychological states and that would have implications for your morality.”* (Immordino-Yang, May 2009; and media release by Carl Marziali on April 14, 2009. *Nobler Instincts Take Time*. National Institutes on Health, the Mathers Foundation and the Brain and Creativity Institute.)

Flow Phenomenon. *Flow* is a form of trance that usually involves a complex activity requiring a certain level of skill and effort. The activity blends with one's consciousness. For instance, an online gamer focuses only on the game and nothing else. In this trance state, the game feels "smooth." During flow, other sensations are usually suppressed or completely ignored. A typical indicator is an altered perception of time; the activity feels like several minutes long, where in reality it could have been several hours long. (Chou & Ting, 2003; Rau, Peng, & Yang, 2006; Wan & Chiou, 2006a).

Inexperienced and experienced players have difficulty leaving the game due to the flow effect and the related alteration of time perception. (Rau, Peng, & Yang, 2006). Inexperienced players can enter flow faster (already in the first hour of play), whereas more experienced players need more time. This is one of the signs of addiction – increasing tolerance. A player needs an ever-increasing amount of time in the game to achieve the sought after flow sensation.