

WORKSHOP: BRAIN BASICS

INFORMATION SHEET

Literature study compiled and presented by Dr Micki Pistorius

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Aim and theme of this training.

Most people want explanations for their behaviour, searching to unravel subconscious motivations, trying to understand their thought processes and struggle to keep their emotions under control. Neuropsychology sounds like a daunting subject, but in this seminar it is simplified in an easy to understand narrative. to illustrate how our thoughts, feelings and behaviours are all inter-linked and controlled by the brain.

Basic brain anatomy will cover the four brain lobes, as well as the right and left hemispheres. Neuroscience has found that the human brain has evolved from simple reptilian reactions, to the emotional responses of the limbic system, to the intricate and complicated rational functions of the neo cortex.

This seminar explores this evolutionary maturation of the brain as three storeys of a building, allocating different rooms on each floor to different functions. The intricate intelligent web of neurons transmits messages, much like pylons conducting electricity at lightning speed. Once we understand how neuropaths form, we are empowered to change them, change our thinking and ridding ourselves of consuming obsessions, self defeating behaviours and bad habits.

This seminar introduces you to the different neurotransmitters, by using the analogy of different fluids flowing into the different rooms of the three storey building, causing different reactions. Characters are assigned to each of the neurotransmitters to facilitate an understanding of their functions. We meet alluring Aphrodite / Dopamine, virile Achilles / Testosterone, and agile cheetah / adrenalin, who team up, when a woman smiles at a man... Each neurotransmitter has a different function and is synthesized by different ingredients, which we obtain from good brain food.

Lastly we look at brain waves, the electric currents our brains emit and how this knowledge can lead to optimal brain functioning.

Module 1: BASIC BRAIN ANATOMY

1.1 The four lobes and hemispheres

Outcomes: A short introduction to the basic functions of the brain's quadrants: the frontal, temporal, parietal and occipital lobes. The brain is also divided into a left and right hemisphere, each with their own strengths. Partners in marriage and business may often not understand each other, simply because they are operating mainly from different hemispheres. Recognising the strengths and weaknesses of each hemisphere can harmonise relations and synthesise powerful cognitive cooperation. Did you know that negative people have larger right brains?

1.2 A topographical structure of brain evolution:

1.2.1 Reptile brain:

Outcomes: The basement of the brain accommodates the boilers, generators and engines, responsible for the smooth running of the establishment. The functions of the medulla oblongata, pons, cerebellum and the locus ceruleus – alarm room – are inspected.

1.2.2 Limbic/ emotional brain.

Outcomes: On ground floor level we visit the rooms of the hypothalamus controlling hormones; the nucleus accumbens or thrill room; the amygdala – an over emotional drama queen; the hippocampus which stores our memories and the thalamus relaying sensory information. Did you know the brain receives 11 million bits of information per second and we are only consciously aware of 40 bits? We hear faster than we see, which is why experienced cricket players hit the ball based on sound and not sight.

1.2.3 Neo-cortex / rational brain:

Outcomes: We tour the top floor offices of the executive management of the corporation, responsible for planning, decision-making, controlling impulses, considering long-term consequences, analytical thinking, sophisticated language skills and other highly evolved human brain activity. We visit the medial prefrontal cortex, orbito prefrontal cortex, dorso-lateral prefrontal cortex and the cingulate cortex, each with their own unique executive functions. We also inspect the consequences of dysfunctions in these regions. People with mature dorso-lateral prefrontal cortex can commit to relationships.

Module 2: NEURONS: THE MECHANICS OF THE BRAIN

Outcomes: Like astronauts we explore brain space ...There are about 100 billion neurons, maintaining about 10 000 connections with other neurons.

A *neuron* is a brain cell consisting of four major parts: the cell; axon – the tube covered in a white sheath; the dendrites - little branches growing from the axon; the synapse or end terminal of the dendrite which contains the factory producing neurotransmitters.

We also look at *neurogenesis*, when new neurons are formed and how stress, depression and radiation can deter the production of new neurons and how brain food, exercise and stimuli and promote neurogenesis.

Inside the *synaptic terminal*, neurotransmitters – the brain chemicals – are produced from different ingredients – obtained from brain food – packed into capsules and blasted into the synaptic cleft.

The *synaptic cleft* is the space where the neurotransmitters float or make their way to dock into the station of the next awaiting neuron, to transmit the message. The synaptic cleft can become gunked up due to starch and sugar, hampering the neurotransmitters from finding their docking stations.

The *receptor neuron* receives the neurotransmitters and relays the message. Alcohol and the stress hormone cortisol may have damaged and shrivelled the dendrites to such an extent that the neurotransmitter cannot dock in.

Neuropaths are connections between neurons which have become established automatic behavioural and thinking patterns. However some of them may be to our detriment, like smoking, poor self image, anger, etc. We learn how to disconnect these paths and form new paths leading to more rewarding and desired outcomes and a mentally and physically healthier life. Learn how positive thinking actually literally changes the structure of your brain and why it affects your health.

Module 3: NEUROTRANSMITTERS, PEPTIDES AND HORMONES

3.1 *Dopamine*

Meet Aphrodite, the neurotransmitter seducing you to the anticipation of pleasure and motivating you to move towards the reward. She is alluring, captivating desire, but she is also dangerous as she can lead to addictions. A lack of vitality, feeling lethargic, lacking life energy and feeling generally depressed are symptoms of a deficiency of dopamine. Learn which nutrients in foods supply the brain with the ingredients to produce and promote dopamine and find your elixir again.

3.2 *Testosterone*

Meet Achilles, transforming a wimp into a fierce warrior. Research has found that Wall street traders who measured high on testosterone, made more profit that day. Learn how to produce testosterone and the effect it has upon men and women. Lack of testosterone leads to overweight, moody, irritable, depressed, miserable men, who lack motivation, have no libido and develop male breasts. A combination of testosterone, dopamine and adrenalin is a potent cocktail blasting men to reach stellar heights.

3.3 *Adrenalin*

The cheetah hormone preparing the body for action and activating the sympathetic nervous system or fight and flight system.

3.4 *Norepinephrine*

The neurotransmitter equivalent of adrenalin, activating and alerting the brain. It is linked to vigilance, monitoring and response to threats, but too much can cause paranoia and highly irresponsible and impulsive behaviour.

3.5 *Oxytocin*

The cuddle or bonding hormone, released when nurturing takes place. Also floods your system after sex, leading to neo-cortex rational shut down, resulting in impulsive behaviour getting you into trouble.

3.6 *GABA and Glutamate*

Workhorses neurotransmitters exciting or inhibiting transmissions between neurons.

3.7 *Acetylcholine*

Essential for memory, mood, intelligence and muscle movement regulating heartbeat. Which foods improve your memory?

3.8 Oestrogen

Meet Hera, wife of Zeus and womanhood personified. She aids in the development of breasts, lubricates the vagina and strengthens vaginal walls, triggers ovulation and combats breast cancer, increases metabolism, bone formation and effects healthy cholesterol levels. Oestrogen may suppress binge eating.

3.9 Serotonin

The peaceful Harp Player, calming you down, helping you sleep and a powerful anti-depressant. Many foods contain tryptophan, packed with natural anti-depressant ingredients. Serotonin curbs carbohydrate (sugar and starch) cravings, controls pain and regulates digestion. A deficiency in serotonin can cause depression, anxiety disorders, schizophrenia, obsessive-compulsive disorder, violence and feelings of guilt, fear and loneliness.

3.10 Endorphins

The feel-good dolphin of opioids fighting pain and generally making you feel on top of the world.

3.11 Ghrelin and Leptin

Regulating your hunger and satiation levels. Most people suffering from over-weight and obesity have a dysfunctional leptin hormone. Ghrelin tells you: "I am hungry" and leptin tells you "I am satiated." However starch makes leptin go to sleep. So the more bread you eat, the more hungry you feel, the fatter you get.

3.12 Cortisol

A pack of fierce wild dogs, cortisol is released from the same gland as adrenalin. However excess cortisol – the stress hormone – can literally shrink your brain cells, attacks your muscles, turning them into glucose, accelerate your heart rate, pump up your blood pressure and turn you into a paranoid dysfunctional mess. It causes ulcers, strokes and heart attacks and it can kill you.

Module 4: BRAIN WAVES

Outcomes: Learn about High Beta: the brain is in overdrive, working too fast, stressed out, running on norepinephrine and cortisol, affecting your memory, causing paranoia, lethargy and guilt feelings.

The normal conscious functioning beta, where you focus, concentrate, solve problems, communicate effectively and run on adrenalin.

SMR and alpha, the bridge between the conscious and subconscious. The super creative brain waves, where you are "in the zone", your senses are alert and you experience calm quiet thought control.

Theta, that warm fuzzy feeling before you fall asleep or wake up, enter the hypnotic zone, open to suggestions and solve problems in your sleep.

Delta, deep sleep wave, but your instinctive radar is very alert.

Recommended additional related courses:

- Stress management
- Psychodietetics / brain nutrition – eat your brain and life healthy
- Adolescent brain

For a full comprehensive curriculum vitae of Dr Micki Pistorius, and more information on these seminars please refer to www.mickipistorius.co.za