

WORKSHOP: ADOLESCENT BRAIN

INFORMATION SHEET

Literature study compiled and presented by Dr Micki Pistorius

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Aim and theme of this training.

Neuroscience has proved that not only has the human brain evolved from simple reptilian reactions, to the emotional responses of the limbic system, to the intricate and complicated rational functions of the neo cortex, but it has also established that the teenage brain differs from the adult brain. By grasping this developmental process of brain maturation, we can understand why teenagers are so extremely self-conscious, why they take impossible risks, why they act so impulsively and cannot consider long term consequences of their actions. By comprehending the role and functions of certain neurotransmitters and hormones we can supplement these chemicals towards optimal brain functioning.

By incorporating the concept that the brain rules the cognition, the body and the emotions and that these three are interlinked, we can manipulate positive outcomes in teenagers by changing any one of the three and influencing the other two.

The field of neuropsychology provides us tools to develop an insight into what motivates teenagers to achieve and to become successful students. By being aware of the importance of socialising, peer pressure and self concept, we may combat the devastating effects of low self-esteem, being ostracised and bullied. We endeavour to empower teenagers to become self-motivated achievers and masters of their individual talents.

Memory is an essential element of learning and therefore we need to be familiar with the brain's different memory systems and what enhances memory.

Lastly, the brain cannot function optimally and produce neurotransmitters if it lacks nutrients and if it is being poisoned by bad diet. There is a direct link between poor nutrition and delinquency.

Module 1 EVOLUTION OF THE HUMAN BRAIN

Outcomes: Introduction to the evolutionary process of the human and the functions of the three strata, as well as the mechanism of the neurons. Focusing on the typical slow development of the teenage brain, we spotlight the medial prefrontal cortex – responsible for self-scrutiny; the dorsal-lateral prefrontal cortex - responsible for considering long term consequences; and the orbito frontal cortex - responsible for inhibiting impulsive risk taking behaviour. We also investigate the nucleus accumbens or so called thrill centre, to determine what motivates teenagers to achieve and which neurotransmitters and hormones aid them in achieving success. Lastly we look at the cingulate cortex which can explain bullying behaviour and how to address it.

Research: Universities: Osaka; Harvard, Cambridge, Yale, California, Wisconsin, National Institute for Psychological Studies Japan.

- 1.1 Reptilian, Limbic brain and Neo-cortex rational brain
- 1.2 Neurons and neuropaths
- 1.3 Childhood brain development
- 1.4 Teenage brain development
 - 1.4.1 Medial prefrontal cortex – self scrutiny
 - 1.4.2 Orbito pfc – impulsivity
 - 1.4.3 Dorso-lateral pfc – long term consequences
- 1.5 Risk taking and reward
 - 1.5.1 Nucleus accumbens thrill centre
 - 1.5.2 Intrinsic vs Extrinsic motivation
 - 1.5.3 Achievement motivation
 - 1.5.4 Testosterone - Achilles
 - 1.5.5 Dopamine – Aphrodite
- 1.6 Cingulate cortex
 - 1.6.1 Cognitive dissonance and bullying

Module 2: EMPOWERED TEENAGER

Outcomes: The brain controls the body, mind and emotions, which are all three interlinked. We learn how the vagus nerve switches between the sympathetic and parasympathetic nervous systems; how simple muscle movements such as smiling and posture, have an influence on empowering our emotions. Regarding the mind connection, we focus on the value of positive talk in embedding positive self esteem and creating winners. On the emotional level we touch on subconscious implicit motivation, the impact of the perception of control and the debilitating effect of powerlessness. We explore cortisol – the Wild Dog stress hormone and its fatal attacks on the body and mind and how to counter it.

We also explore the positive and negative outcomes that Socializing has on teenagers. Social evaluative threat, peer pressure and positive achievement based self concept are discussed. We look at oxytocin, the socializing hormone.

Research: Universities: Michigan, Free University Amsterdam, Columbia, Harvard, NorthWestern, Radbound, California, Dr M Emoto, BBC LAB.

2.1 Empowered teenager:

2.1.1 Body connection

2.1.2 Mind connection

2.1.3 Emotional connection

2.2 Cortisol: stress hormone debilitating empowerment

2.3 Empowerment: Socializing

2.3.1 Oxytocin: socializing hormone

Module 3: INTELLIGENCE

Outcomes: Is intelligence inherited or incremental and what is the effect of such a belief on an individual's performance? How do we change Helpless orientated into Masterly orientated students?

Research: Universities California, Pennsylvania, Beacon Hospital Dublin, Virginia Crandall Institute Ohio,

3.1 Inherited vs Incremental

3.2 Masterly orientated vs Helplessly orientated

Module 4: MEMORY

Outcome: Memory is a key element to learning. We explore the brain's memory systems regarding sensory, short term, working memory – use-it-or-lose-it principle, and long term memory incorporating explicit conscious, implicit subconscious, declarative, procedural, episodic and semantic memory. How does the hippocampus – memory centre - function and store memory?

Under the heading: brain fitness, we look at best methods to encode, incorporate and bank information in long term memory. Anxiety and exam blocks are related to sympathetic nervous system activation and how do we teach students to counter this phenomenon?

Research: University of Toronto, Liverpool, Montreal Neurological Institute, Dr S Truter.

- 4.1 Sensory memory
- 4.2 Short term memory
- 4.3 Working memory
- 4.4 Long term memory
- 4.5 Hippocampus memory centre
- 4.6 Brain fitness

Module 5: BRAIN NUTRITION

Outcome: Which foods are precursors for specific neurotransmitters enhancing optimal brain functioning? Sugar is as addictive and damaging to the brain as cocaine. What is the impact of certain food deficiencies upon the personality, academic achievement and general brain functioning of children? How is delinquency directly related to diet deficiencies? Deficiencies of folate, vitamin B6, undermethylation and pyrrole are linked to ADHD, Intermittent explosive disorder, Oppositional defiant disorder, Conduct disorder and Anti-social personality disorder. We also investigate the effects of drugs and alcohol on the brain and neurotransmitters.

Research: Universities Harvard, Dr W Walsh.

- 5.1 Brain Food
- 5.2 Diet & Deficiencies
- 5.3 Diet & Delinquency
- 5.4 Effects of drugs on the brain
- 5.5 Effects of alcohol on the brain

Recommended Additional related short seminars:

- Workplace Violence, and how to combat this within a school environment.
- Protocol on implementing discipline according to civil and criminal principles and involving the children and getting children to commit to this process.
- Unique Study methods

BRAIN BASICS SERIES:

- Brain basics
- Psychodietics / Brain Nutrition
- Stress

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