neurozone®

White Paper

THEORETICAL CONSTRUCTION – MODEL OF BRAIN PERFORMANCE

JANUARY 2017

EXECUTIVE SUMMARY

Neurozone® has identified 10 domains where we make daily decisions which we discovered through Neuroscience can drastically affect the performance of your brain. We call these 10 domains "Drivers" of brain performance. These Drivers are domains in our lives where we can make decisions to behave in a certain manner which will result in optimum brain performance. **Neurozone®** has furthermore identified four core conditions/core competencies that precede brain performance.

EXERCISE

Exercise [1] [2] [3] [4] [5] [6] [7] [8]: As a foundational driver of brain performance, exercise stimulates the formation of new brain cells in the hippocampus, a brain structure critical for building memory and knowledge. Exercise also moves the brain into a relaxed physiological state and reduces chronic stress through its variety of beneficial effects on the three interconnected structures (hypothalamus, amygdala and hippocampus), as well as the brainstem. It further enhances creative problem solving in the dorsolateral prefrontal cortex.

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NUTRITION

Nutrition [9] [10] [11] [12] [13] [14] [15] [16] [17] [18]: Fueling the brain properly requires continuously available glucose (carbohydrates). The brain constitutes 2% of the body mass yet uses 20% of its energy, underscoring the need for a continuous supply of fuel. The brainstem and hypothalamus regulate cyclical intake of nutrients, while low GI type foods ensure a sustained supply of energy for brain and body.

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SLEEP/WAKE CYCLE

Sleep/Wake Cycle [19] [20] [21] [22] [23] [24] [25] [26] [27] [28]: Sleep is a rhythm as essential as breathing and heartbeat, except that its rhythm is an optimum 7 to 9 hours in 24. But we don't just sleep to rest. Sleep and wake cycles are both highly active brain states regulated by the hypothalamus and brainstem. During sleep the brain builds and consolidates memory via the hippocampus and facilitates challenging problem-solving at the level of the dorsolateral pathways and dorsolateral prefrontal cortex.

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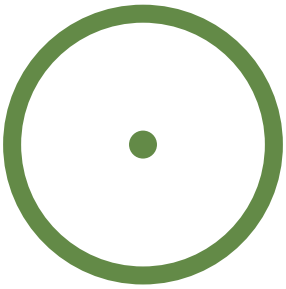

SILENCING THE MIND

Silencing the Mind [29] [30] [31] [32] [33] [34] [35] [36] [37]: With Silencing the Mind we refer to purposeful sessions to enhance focus and/or to allow thoughts without reacting, thereby preventing worrying about the future or regretting the past (mindfulness). If you silence your mind for just 15 minutes daily it will positively affect the whole brain/body system. Among its many benefits, it promotes a relaxed physiological state at the level of the hypothalamus and amygdala and enhances the ability to focus and sustain attention at the level of the dorsolateral prefrontal cortex. It promotes brain cell formation in the hippocampus and reduces the sensitivity of the amygdala, calming it down and promoting clarity of mind through proper activation of the sophisticated prefrontal cortex.

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SOCIAL SAFETY

Social Safety [38] [39] [40] [41] [42] [43] [44] [45] [46] [47]: Bonding, belonging, identity and meaning are four human needs which are varying descriptions of the social brain. Bonding, belonging, identity and meaningful contribution are all essential for safety within a group, for efficient functioning in a system. The four needs are being developed and nourished throughout human development in a sequential fashion, to ensure the group stay alive, survive and thrive. Since these needs are so important for human survival, the brain unconsciously uses these needs as part of the criteria to assign a value to any incoming cue.

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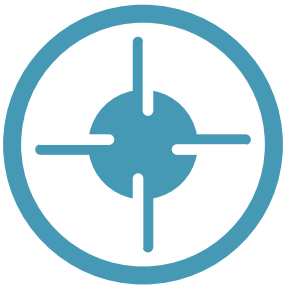

GOAL DIRECTEDNESS

Goal Directedness [48] [49] [50] [51] [52] [53] [54] [55] [56] [57] [58] [59] [60]: Goal directedness is an unconscious brain state essential for goal achievement. This is not the same as goal setting. Simply put, our goal is to stay alive, survive and ultimately to thrive. To achieve this, the brain has developed a system that avoids threats and seeks rewards. The striatum (not shown here) directs our attention to stimuli. In addition, the amygdala, ventromedial pathways and ventromedial prefrontal cortex play an important role in goal-directed behavior.

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COLLECTIVE CREATIVITY

Collective Creativity [61 62 63 64 65 66 67 68 69]: In neuroscience, collective creativity is defined as the ability of a group to solve problems and fashion novel products that are adaptive for the survival and thriving of the group. For the individuals that are part of a collectively creative group, chronic stress is reduced at the level of the amygdala and hypothalamus. At the same time, collective creativity also enhances individual problem-solving ability by putting the dorsolateral prefrontal cortex in control.

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LEARNING

Learning [70 71 72 73 74 75 76 77 78 79 80 81]: The brain learns and builds new knowledge by forming memories. The hippocampus is the key structure in this process. It feeds knowledge to the appropriate long-term memory sites where it can be used as the building blocks of innovation. Learning can be enhanced through a process called neuroplasticity (ability to form new brain cells and brain circuits). This happens especially in the hippocampus. We also introduce a novel term: 'Hippocampal Fitness'. This refers to the state of the hippocampus when it is most ready to learn, filled with good nourishing growth factors and budding new circuits.

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ABSTRACTION

Abstraction [82] [83] [84] [85] [86] [87] [88] [89] [90]: Abstraction is the capacity to make novel internal representations of the possible, a result of accurately grouping non-obvious patterns and their relationships. Abstraction draws upon knowledge (the building blocks of innovation) and largely takes place in the dorsolateral pathways. These pathways are sometimes referred to as the 'super highway' en route to the dorsolateral prefrontal cortex, where the most sophisticated problem solving takes place.

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EXECUTIVE FUNCTION

Executive Function [91 92 93 94 95 96 97 98]: Executive function is assigned to the dorsolateral prefrontal cortex (outer top part of the frontal lobe). Regarded as the CEO of the brain, it is where the most sophisticated and enriched thinking takes place.

The dorsolateral prefrontal cortex is interrelated with the ventromedial prefrontal cortex (inner bottom part of the frontal lobe). Important aspects of executive function include working memory, focus and sustained attention.

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LEARNING CAPACITY

Learning Capacity [99] [100] [101] can be viewed as the capacity of the Brain/Body System to register, store & consolidate information as insightful knowledge and to be able to retrieve this useful information when needed. To enable you to achieve this, you need numerous well-functioning components. Two examples are focus and sustained attention and another is a part of the brain called the hippocampus, filled with rich brain connections, ready to receive and consolidate newly learnt materials. We call this 'hippocampal fitness'. From a neuroscience perspective **Neurozone®** helps you to understand how to optimize your Brain/Body System for optimal learning capacity. This forms the platform for the acceleration of the mastery of the competency of learning and development, providing an essential foundation for any development program.

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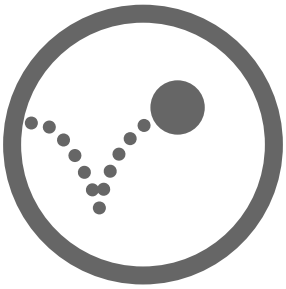

RESILIENCE

Resilience [102] [103] [104] is the capacity of the Brain/Body System to withstand the challenges that threatens its stability. Resilience is an active process and adaptive. For example, the brain actively and continuously adapts at a molecular and neuronal level in the presence of a stressor. This adaptive capability determines the resiliency. Effectively enhanced resilience prevents implosion of the Brain/Body System and sets you up to perform at your best in all conditions. From a neuroscience perspective **Neurozone®** helps you to understand how to optimize your Brain/Body System for optimal resilience. This forms the platform for the acceleration of the mastery of the competency of resilience, providing an essential foundation for any high-performing individual and organization.

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INNOVATION CAPACITY

Innovation Capacity [105] [106] [107] is the collective capacity of your Brain/Body System to solve problems and fashion novel products. Your brain has an astonishingly complex and sophisticated capability to form 'realistic scenarios of the possible' This lies at the heart of innovation. Your solutions and novel products are only deemed 'innovative' if the group also thinks so. Therefore, both the social-emotional and the abstractive thinking brain form part of the brain's problem-solving machine. From a neuroscience perspective **Neurozone®** helps you to understand how to optimize your Brain/Body System for optimal innovation. This forms the platform for the acceleration of the mastery of the competency of innovation, providing an essential foundation for any high-performing individual and organization.

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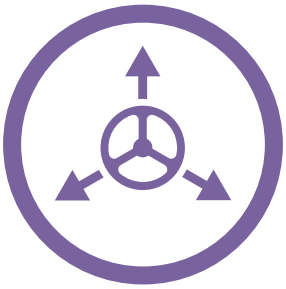

SELF-LEADERSHIP

We view Self-Leadership [108] [109] [110] [111] as the capability to have a clear vision of the goal that needs to be achieved, accurately calculate the strengths and resources available to achieve the goal, provide adequate energy to drive the process and to effectively integrate learning from the process. In this sense, self-leadership is an imperative for leadership of the collective. From a neuroscience perspective **Neurozone®** helps you to understand how to optimize your Brain/Body System for optimal self-leadership. This forms the platform for the acceleration of the mastery of the competencies of leadership, providing an essential foundation for any high-performing individual leader and organization.

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