Supporting Optimal Brain Health and Preventing Neurophysiological Susceptibility

The brain needs certain "essential nutrients" to function optimally. Listed below are eight areas that can contribute to enhanced neuroplasticity (i.e., the brain's ability to change in response to experience) and the prevention of mental distress (i.e., neurophysiological susceptibility). Unhealthy lifestyle habits can cause impairment in the following ways:

- Difficulty concentrating and inattention; forgetfulness and lack of recall
- Fatigue and low energy; sadness and low mood
- Irritability and anger proneness
- Anxiety and rumination/worry
- Susceptibility to cravings

The following core lifestyle habits can help us achieve optimal performance and functioning:

Lifestyle Habit	Components
Sleep time	• Hours per night (most adults need 7-9 hours) • Reduced frequency of disturbances/wakeups • Feeling rested at wake-up, reaching deep sleep (Stage 4)
Physical Time	• Aerobic exercise • Reduced stationary/immobile time • Connection to body through yoga, tai-chi, dance, etc.
Focus Time	• Deep immersion in a single, goal-oriented task
Down Time	• Day dreaming, mind wandering, time without a task focus • Intentionally having no intention ("diffuse mode")
Time-In	• Tuning into yourself in the here-and-now • Mindful awareness and acceptance • Focusing on what is going inside of you may be distressing –thoughts, emotions, sensations that you have been intentionally avoiding.
Play Time	• Doing something new for the first time • Exploratory, spontaneous, fun, and unstructured
Connecting Time	• Engagement in healthy relationships • Time in nature, time with animals • Participation in community events that benefit others
Nutrition	• Healthy intake of daily calories, regular frequency of meals • Balanced food groups, meeting nutritional needs • Avoiding allergic foods, limiting simple sugar intake
Toxin exposure and drug use	• Reducing exposure to lead and other toxins in environment • Reducing use, intoxication, and withdrawal of substances that include prescribed and non-prescribed medication

Core Lifestyle Habits

Sleep time: Most adults need an average of 7-9 hours of sleep. Young children and adolescents often need more sleep, depending on age. It is important to note that biological changes in the body's internal "circadian clock" occur during puberty (e.g., melatonin is released approximately two hours later) resulting in adolescents' biological preference for a later bed time and need to sleep later in the morning.

A number of factors can impact a person's ability to achieve restful sleep. Common factors include psychological stressors (e.g., relationship difficulties, work worries, etc.), medical conditions (e.g., sleep apnea, restless leg syndrome), chronic pain, poor sleep hygiene (e.g., too much caffeine during the day, screen time before going to bed), and environment (e.g., insufficient exposure to natural light), and certain medications and/or substances (e.g., alcohol and drugs). Although medications can be used in treating sleep disorders, research also supports the efficacy of counseling interventions and adjunctive approaches (e.g., neurofeedback). There are also a number of helpful tracking devices available (e.g., Beddit Sleep Tracker) and resource websites (e.g., www.sleepeducation.org) individuals can access and utilize on their own.

Sleep directly impacts the body and mind. Insufficient sleep can result in a *weakened immune system* (i.e., you get sick easier), *heightened emotionality* (e.g., increased irritability, increased emotional sensitivity), and *problems with thinking* (e.g., cloudy mind, trouble focusing). Sleep deprivation can also result in *slower gross motor responding* (e.g., sleep deprivation causes many traffic accidents). Sleep is also a time when your *memories are consolidated*, so if individuals are trying to learn new information or skills, sleep is critical.

Physical time: Humans are not made to be sedentary creatures. There is not currently a consensus on the specific type and frequency of physical time, however, general guidelines suggest somewhere between 30 and 60 minutes of aerobic exercise (e.g., walking, running, cycling, etc.) 3-5 times per week at a moderate to intense pace (e.g., 50 to 85% maximum heart rate -- meaning if you can talk on the phone easily while doing it, it is not intense enough). Resistance training (e.g., traditional weight training, Cross Fit, High Intensity Interval Training – HIIT) is important as well. Physical movement lowers the risk of a number of medical conditions, including heart disease, obesity, diabetes, and cancer, as well as supports optimal mental functioning. For example, research increasingly supports exercise as an effective treatment for mild to moderate depression.

Individuals' can experience a lot of barriers to engaging in regular physical time, including negative beliefs about self and about exercise resulting in low motivation (e.g., "People will laugh at me." "I can't stand feeling out of breath." "I don't have the time."), environment (e.g., living in a place that is too hot/too cold, living in a dangerous neighborhood), and physical conditions and/or disabilities. Counseling can provide a supportive environment to work through some of the negative beliefs and increase motivation. Community resources can also provide

access to safe and affordable exercise facilities and support. It can also be important to remember that physical movement does not have to take place as part of a formal exercise program or at a gym. It can just be a matter of taking the steps at work instead of the elevator!

Physical activity impacts parts of the brain that are responsible for *emotional regulation and cognitive functioning*. As heart rate increases, more blood, oxygen, hormones, and neurochemicals circulate through the body. Exercise supports the growth of new brain cells and can enhance brain-derived neurotrophic factor (BDNF), important for the production of helpful neurochemicals. Aerobic exercise in particular has been shown to *strengthen your middle prefrontal cortex* that play an important role in 9 very important functions – body regulation, attuned communication, emotional balance, fear modulation, flexibility of response, insight, empathy, morality, and intuition. Research on HIIT exercise is showing similar positive outcomes on the mind.

Focus time: Focus time is about managing your attention to focus entirely on a single goal-oriented task – exerting self-control to block out interferences. Some people have jobs that require regular focus time, whereas other people have to create focus time as part of their leisure activities and/or hobbies.
Focus time supports the prefrontal cortex of the brain, often referred to as the CEO of the brain because of its role in executive functioning (e.g., alerting, orienting, focusing). Strengthening this part of the brain is crucial for inhibiting lower subcortical impulses. Focus time can also result in a sense of mastery and completion that supports feelings of self-efficacy and self-worth.

Down time: Down time is best described as intentionally having no intention. It is the opposite of focus time in which you have a goal directed activity. Examples of down time include day dreaming, listening to music, reading a book (fiction!), doodling, or checking Facebook.
Down time allows the brain to go into "diffuse mode." In diffuse mode, the brain is not inactive, rather different parts of the brain become more active. Diffuse mode can lead to in increased insight and improved decision making. Individuals are often able to think of creative solutions to difficult problems are down time.

Time-in: Time-in is about intentionally tuning into yourself in the here-and-now. The terms reflection and mindfulness – being present to your moment to moment experience in a way that is open, curious, and accepting – are associated with this activity. Regular practice of time-in strengthens the inhibitory functions of your prefrontal cortex resulting in better emotional regulation and attention.

Researchers vary on how much "time-in" is necessary to experience the positive effects. Recommendations range from 5-8 minutes/day to 25+ minutes/day. The best idea is usually to start slow and gradually increase time-in practice over time. Focusing on what is going inside of you may be distressing – perhaps there are thoughts, emotions, sensations that you have been intentionally avoiding. Unfortunately, these things do not go away by avoiding them, in fact, they can get louder or come out in other ways that can be harmful to you or to others. Often people are not aware of the negative impacts of their avoidance, which can be even more

problematic. It may be helpful to have a close friend nearby or a counselor to sit with when you are first practicing time-in, especially if you fall into this “avoider” category.

Play time: When is the last time you did something for the first time? Play time is when you get out of your day to day routine and expose your brain to something new (i.e., novelty). In order to qualify as “play” an activity should be exploratory, spontaneous, fun, and unstructured. Initial research indicates increases in BDNF, essential for growth and maintenance of brain cells, during or immediately after play time. Play time also appears to activate the substantia nigra/ventral tegmental area of the brain (SN/VTA), two dopaminergic areas of the brain (i.g., part of the brain’s “reward system” – dopamine is released).

Connecting time: Connection time is about being known and experienced by another – feeling seen and safe. Humans have an innate need for connection – both to other people and to the world around them (e.g., animals, nature). Included within connecting time is spirituality, defined in this context as awareness of and connection to something bigger than self. Engagement in healthy relationships improves both physical and mental health. The mechanism for this increased health is most likely related to the impact of healthy relationships on the stress response system. Connection is believed to help soothe and balance the autonomic nervous system (ANS), resulting in less hyperarousal. Although the stress response can play an important and adaptive role, frequent or prolonged activation of the stress response system can impair thinking, mood, and physical well-being.

Nutrition: Lack of healthy nutrition can lead to poor cognitive functioning, increased mood swings, and contribute to the development of a number of medical conditions (e.g., diabetes, heart disease, sleep disorders, etc.). Although the types and amounts of food that are best for their bodies can vary, a diet rich in vegetables, fruits, lean meats, and whole grains has the most wide-spread scientific support. Highly processed foods and foods high in sugars tend to have the most consistent negative impact on mental functioning.