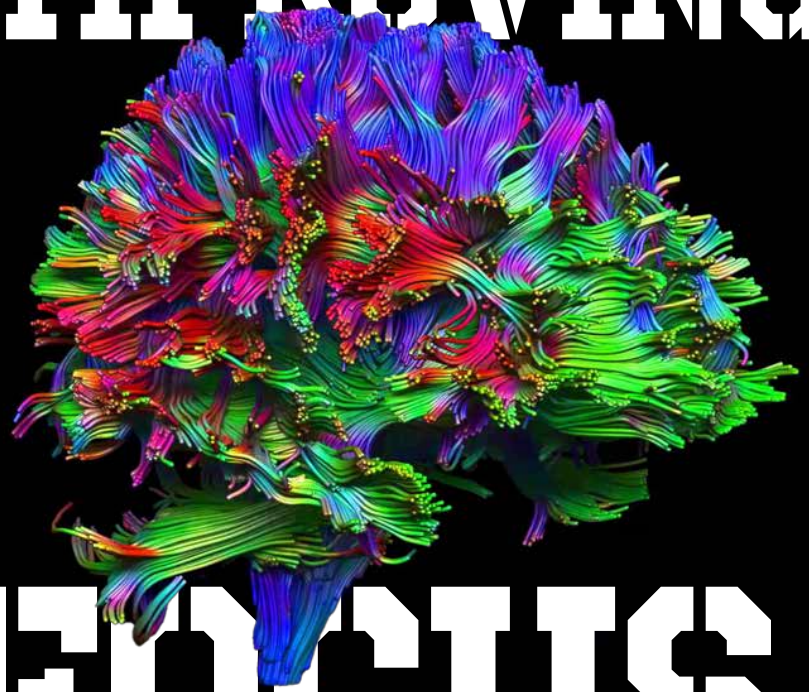
IMPROVING FOCUS



IN HIGH PERFORMANCE ATHLETES

BY KRISTEN WILLEUMIER, PH.D.

Successful performance in sports requires the ability to control the mind and behavior. This means making strategic decisions quickly and anticipating and adapting to dynamic situations on the field. The regulation of our behavior is under the control of the prefrontal cortex (PFC), an area of the brain responsible for our higher-order cognitive abilities. The PFC oversees executive functions, which include focus, attention, forethought, judgment, organization, planning and impulse control.

When the prefrontal cortex is functioning optimally there is a greater capacity for sustained attention, flexible thinking, strategic planning and the ability to block out distractions. To the eliminating mental interference from internal (i.e., stress, anxiety, worry) or external sources (i.e., stadium crowds, media, or weather conditions). Stress impairs PFC abilities and can impact memory and attentional regulation. Research shows that athletes who have better measures of executive function are more likely to excel in their sport.1

The following seven brain health strategies will help enhance prefrontal cortex function, leading to success on and off the athletic field.

HYDRATE WITH WATER

The brain is made up of 75% water. Since the brain has no means of storing water, it must be replenished continually throughout the day to function optimally. Athletes need to remember to consume enough water to replace what is expelled through basic metabolic processes, urination, sweating, and bowel movements, which can be up to 1.8 -2.3 L per day, in addition to water loss during training. Losing 1%-2% body weight to water loss can impact athletic and cognitive performance, interfering with memory, mood, mental energy, and focus. When adequately hydrated, we perform better on the athletic field and have improved memory, motor skills, mental energy, alertness, and concentration.

High Prevalence of Dehydration and Inadequate Nutritional Knowledge among University and Club Athletes
A study published in the International Journal of Sport Nutrition and Exercise Metabolism assessed hydration status among 430 University and Club level athletes across a range of sports (football, soccer, hockey, golf, running, rugby, sprinting, netball, cycling, cadet training, boot camp training, karate, camogie) before and after training.2 The authors report that 31.9% of athletes exercised in a dehydrated state, with 43.6% of participants dehydrated after the competition. The findings suggest a need for the education of athletes around individual fluid requirements and exercise.

DRINK ANTIOXIDANT-RICH GREEN TEA

One of the best beverages to drink in support of attention, alertness and cognitive function is green tea. It helps promote relaxation, improves mental clarity and provides neuroprotection. Green tea contains a high concentration of epigallocatechin-3-gallate, a powerful antioxidant that protects brain cells from free radical damage. L-theanine, a naturally occurring amino acid in green tea, is known for its benefits in lowering anxiety and improving thinking. Green tea has 30mg of caffeine per cup while decaffeinated green tea has 5mg or less, making it a smart choice for those sensitive to caffeine.

CONSUME A HIGH-PROTEIN DIET

An effective strategy to enhance focus is to consume foods high in protein. This helps supply the body with amino acid precursors that lead to dopamine production. Dopamine is an excitatory neurotransmitter that puts the cortex into an awake state which enhances focus and energy. Dopamine neurotransmission in the PFC is critical to attention, working memory, behavioral flexibility, and sustained motivation. Foods that will increase dopamine production include beef, chicken, turkey, fish, eggs, walnuts, almonds, hemp seeds, chia seeds, nut butter, soy, lentils, beans, avocado, bananas, spinach and broccoli.

HIGH-INTENSITY INTERVAL TRAINING

Rigorous high-intensity interval training (HIIT; exercise performed at ≥ 80% of maximal heart rate), or short bursts of vigorous activity followed by rest, increases circulating catecholamines (dopamine, epinephrine, norepinephrine) which enhance energy levels and improve focus. They are essential in regulating functions of the prefrontal cortex and help alertness, memory, and sustained attention. This kind of high-intensity interval training can be achieved through sprinting, cycling, boxing, or martial arts.

VISUALIZATION

Visualization is a powerful way to harness the power of mental imagery to create possible future scenarios. It allows us to deepen our understanding of the world by expanding the perspectives from which we can view a situation. It will enable us to solve problems before they play out in the external world, or develop coping strategies for issues we may struggle with. It's a complex cognitive process involving multiple brain networks associated with retrieving memories, mental stimulation, spatial navigation, and future thinking.

Using visualization techniques and mental imagery is one of the most effective approaches to improve performance in athletic, academic, and work contexts.3 It has been demonstrated to improve focus, confidence, reduce stress, and aid recovery from injury. Functional brain imaging shows that engaging in mental imagery and carrying out the actual activity in real-time involves some of the same brain regions, illustrating that mental imagery may help strengthen the neural pathways involved in those activities.4

MEDITATION

If you want to take your power of focus and attention to the next level, dedicate 20 minutes each day to a meditation practice. While the calming effects of meditation on the mind and body are undeniable, neuroimaging studies prove that this practice changes brain function and structure in areas implicated in the regulation of attention, decision-making, emotional regulation, working memory, and cognitive control. Mindfulness interventions, which include meditation and thought training, have been demonstrated to improve endurance and executive function in athletes.5

How quickly can you see the results? Research out of Wake Forest University shows that a mindfulness meditation practice can improve sustained attention in as quickly as four days,6 while researchers out of Massachusetts General Hospital and Harvard discovered that an eight-week, 30 minute per day mindfulness-based stress reduction program resulted in increased brain volume in the hippocampus, an area of the brain essential to learning and memory.7

What type of meditation to choose? If you want to increase levels of executive function and attention, I recommend starting with a focused attention meditation, where your focus is placed on an object or mantra (i.e., word or sound) during the practice. This has been shown to strengthen the connections between key areas of the brain implicated in the regulation of attention and corticolimbic circuits involved in cognitive control.

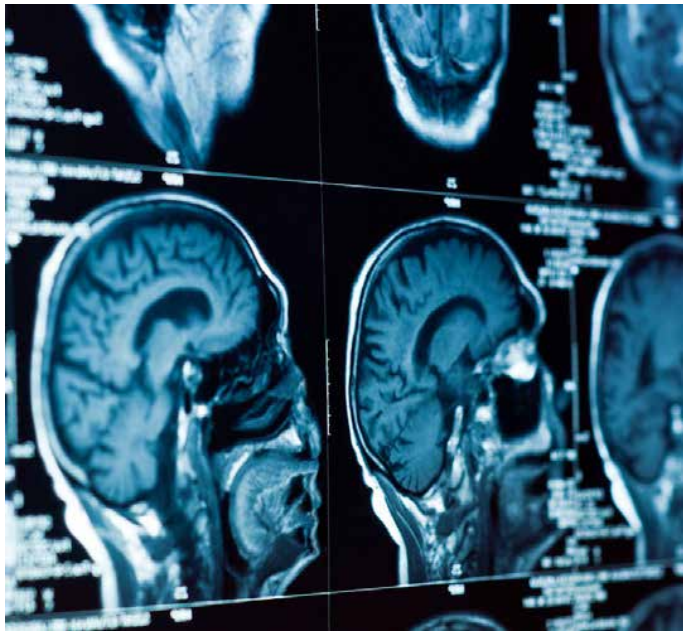
If you prefer technology to give your meditation practice a boost, try audio-visual entrainment with the David Delight Pro. This device uses light and sound to guide the brain into various brainwave states, including alpha (i.e., promotes feeling relaxed and focused) or beta (promotes thinking, sustained attention, mental alertness).

NEUROFEEDBACK

Neurofeedback is a type of biofeedback that uses real-time brain activity, shown through electroencephalography (EEG), to teach the self-regulation of brain function. Sensors are placed on the scalp to measure brain wave activity. Neurofeedback is provided using video or sound, with positive feedback for brain activity that is desirable and negative feedback for brain activity that is undesirable. It has been used to support the brain to address ADD/ADHD, anxiety, depression, brain trauma, headaches, and insomnia. Neurofeedback is a practical, non-pharmacological approach to managing brain issues associated with focus and concentration. This biofeedback modality can help stabilize the brain networks to function efficiently.

Neurofeedback stabilizes mood and emotional perception, which helps athletes cope with stress. Neurofeedback has been demonstrated to significantly activate the prefrontal cortical areas associated with increasing confidence in sports performance.8

A neuroscientist, Dr. Willeumier is the author of *Biohack Your Brain: How to Boost Cognitive Health, Performance & Power.*



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