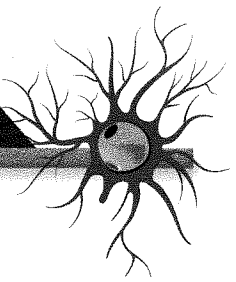

Peak performance

The majority of the literature on peak performance states has focused on elite athletes, musicians and business executives. However, many of the findings from these studies can easily be integrated into counseling sessions for clients looking to "be their best" in whatever matters most to them.

My intent with this article is to broaden the knowledge base of professional counselors about peak performance states. Having this information can help counselors to integrate aspects of peak performance training with a wider range of clients, allowing for improvements in performance at work, at school, or while pursuing creative or athletic hobbies.

Defining peak performance

Peak performance is a state of focused attention in which the person becomes absorbed in the completion of a task. The term *peak performance* is often used interchangeably with the term *flow*. In 1975, psychologist Mihaly Csikszentmihalyi described the concept of flow as enjoyable, effortless and automatic aspects of human performance. In 1983, Gayle Privette described peak performance as the full realization of human potential. Privette considered peak performance and flow to be separate constructs, but she acknowledged that elements of flow often contribute to the achievement of peak performance.

Although these constructs have been researched for several decades, the exact physiological and neurological mechanisms that contribute to peak performance have remained a matter of debate. However, recent advances in cognitive neuroscience, brain imaging using fMRI technology, and burgeoning research using neurofeedback have identified contributing factors involved in peak performance and flow states.

While the majority of early research focused on the psychology of peak performance in the context of elite athletic performance, many of those findings have since been translated and applied to workplace settings to foster peak performance at work. Research from Örjan de Manzano and colleagues in 2010 using brain imaging technology and from Nicole Pacheco in 2016 using neurofeedback identified the specific areas of the brain and brain wave frequencies that contribute to peak performance.

The neurophysiology of peak performance

According to the second edition of Rita Carter's *The Brain Book* (2014), advances in fMRI technology have allowed researchers to study brain activity in specific areas, substantially increasing our knowledge concerning what parts of the brain are key operators in a variety of tasks.

In 2016, Martin Ulrich, Johannes Keller and Georg Grön used fMRI technology to study brain activity during task completion in underaroused, overaroused, and peak performance or flow states. Their research concluded that during peak performance or flow states, increased activity occurs in the anterior insula, inferior frontal gyrus (IFG), thalamus, cerebellum and left basal ganglia. Increased activity in the IFG is associated with enhanced cognitive control, which enables the person to establish a sense of control and self-efficacy when approaching a task. Increased activity in the left basal ganglia has been associated with greater positive outcome probability. This allows the brain to identify that a task can be completed and signals to the person that task achievement is within his or her control.

Ulrich and colleagues concluded that peak performance was also associated with decreased activity in the amygdala, medial prefrontal cortex (mPFC) and default mode network (DMN). Decreased activity in these brain areas may be responsible for reducing self-reflection during task completion. Although self-reflection and self-awareness are critical components of adopting a peak performance mindset, when an individual is actively engaged in task completion, the brain's ability to limit reflection on experience diminishes the occurrence of self-doubt or negative self-talk. In a peak performance state, the brain focuses exclusively on task completion, allowing itself to remain in a state of focused attention by limiting its ability to subjectively evaluate the performance while completing the task.

Decreased activity in the mPFC may seem counterintuitive because many neurocounseling interventions used in peak performance training, such as mindfulness and diaphragmatic breathing, are intended to increase activity in this part of the brain. However, decreased mPFC activity contributes to the effortless and automatic aspects of flow.

According to M.L.R. Meister and E.A. Buffalo's chapter in *Conn's Translational Neuroscience* (2017), increased activity in the cerebellum is also an important component of peak performance, particularly when it comes to athletics and music. The cerebellum is associated with balance, coordination and muscle memory, in addition to other functions. Muscle memory is stored in the brain, not the muscles themselves. Adequate practice not only contributes to self-efficacy in peak performance training by increasing confidence but also stores successful motor memory in the cerebellum.

The nervous system also plays a significant role in achieving peak performance states. Research from de Manzano and others in 2010 concluded that deep breathing contributed to a musician's ability to experience flow. The researchers attributed the benefits of deep breathing to enhanced oxygenation in the circulatory system, which increases the amount of oxygen-rich blood that reaches the brain and enhances overall brain efficiency. Deep breathing was also attributed with modulating the parasympathetic branch of the autonomic nervous system (ANS) during a task requiring sympathetic nervous system functioning. The study asserted that deep breathing's impact on ANS modulation was similar to what occurs during

meditative states, when positive arousal is coupled with high attention.

Brain wave states help attain and maintain states of peak performance. Ted Chapin and Lori Russell-Chapin indicate that brain wave activity during peak performance occurs when alpha waves reach a frequency greater than 10 Hz. Their 2014 book, *Neurotherapy and Neurofeedback: Brain-Based Treatment for Psychological and Behavioral Problems*, asserts that alpha wave frequency in this range has been associated with increased cognitive performance and calm focus. Increased gamma waves may also play a role in peak performance because gamma activity is associated with increased energy, focus, creativity and insight.

From a neurophysiological perspective, peak performance does not occur in a vacuum. The research indicates that several areas of the brain and nervous system are involved in peak performance states. As Ulrich, Keller and Grön concluded, "Peak performance is not a single process, but rather effective interaction between multiple areas of the brain."

Components of peak performance

In 2014, Matthew Hallett and Bobby Hoffman provided a useful framework for understanding peak performance that has been translated for use in business and industry. Their framework includes three components: cognitive factors, emotional factors and physiological factors. Similar to the idea that peak performance requires collaboration between multiple areas of the brain and nervous system, the three components of peak performance are highly interconnected, meaning that concerted action must occur among these factors to achieve peak performance.

Cognitive factors include the role of attention, focus, concentration, and positive views of the ability to complete the task at hand. While focused attention is central to the conceptualization of peak performance, the ability to think positively regarding the self-efficacy of task completion is also important. This is where positive self-talk can be critical to high performance. Pacheco concluded in 2016 that negative self-talk and negative thoughts regarding task completion ultimately disrupt the neurological processes required to reach and maintain a peak performance state.

Hallett and Hoffman's emotional factors include confidence, interest and emotional regulation. Confidence helps increase self-efficacy and positive emotions regarding the task. Similar to building muscle memory through practice, rehearsing the required steps to complete a task helps build confidence in workplace settings. Interest in a task is necessary so that the optimal arousal level can be reached to achieve a peak performance state. Emotional regulation is required to foster a sense of control over the emotions experienced both prior to and during task completion.

Physiological factors are emphasized for their contributions to peak performance in Hallett and Hoffman's framework. Breathing, nutrition, rest, recovery, fitness and energy regulation are all important factors for achieving peak performance. Hallett and Hoffman mention the importance of adequate rest and recovery because of their ability to foster better emotional regulation, which is a key aspect of peak performance in any capacity.

Although the aforementioned factors are important contributors to peak performance states, Hallett, Hoffman and Pacheco all indicate that an optimal level of arousal is required to activate the processes that lead to these states. An optimal level of arousal is a balanced midpoint between overarousal and underarousal. Overarousal can result in worry, anxiety and nervous emotional states, leading to suboptimal performance. Underarousal can lead to boredom and a lack of motivation, making a task less attractive. When approaching a task using a peak performance mindset, individuals must possess the self-awareness to identify their arousal state and the emotional regulation skills to then regulate their arousal levels up or down as needed.

In their research, Hallett and Hoffman presented two models of stress: hindrance stress and challenge stress. Hindrance stress was associated with negative appraisal, whereby a task was viewed as being either too difficult or too easy to justify expending the time and effort required to complete it. Challenge stress was linked to hopeful and positive outcomes that promote personal growth. Challenge stress enables individuals to rise to the challenge because they believe they can complete the task even though it may not be easy.

Hallett and Hoffman's framework for peak performance requires several attributes, including a strong sense of self, the ability to focus attention in a positive manner, self-efficacy, and the emotional regulation skills required to moderate any potential adverse situation or emotion that may arise without compromising performance.

Peak performance training using neurofeedback

Before other interventions are introduced, a discussion regarding the role of neurofeedback in peak performance training is warranted. Current research presented in Chapin and Russell-Chapin's 2014 book indicates that neurofeedback may provide more direct access to the neurological processes that contribute to peak performance. Although neurofeedback is not a requisite component of one's ability to cultivate and achieve peak performance in any domain, Pacheco asserts that the use of 19-channel QEEG technology, coupled with neurofeedback protocols, offers a customizable and targeted brain training regimen that may train the brain to reach peak performance states more quickly than does general performance training.

Chapin and Russell-Chapin mention the use of neurofeedback for peak performance training in athletics, business and the performing arts. They specifically mention using alpha theta synchrony training (ATS) and gamma wave neurofeedback training. Chapin and Russell-Chapin cite research from John Gruzelier published in *Cognitive Processing* (2009) that ATS is a protocol used to regulate alpha waves in the brain to the frequency of peak performance.

Neurocounseling interventions

Despite the complexity of the neurological and physiological processes involved in peak performance training, much of the information on peak performance can be integrated into counseling and performance coaching using a brain-based approach. At the foundation of peak performance training are general recommendations for optimal brain function and health, including diet, exercise and adequate sleep. In fact, these factors are so central to brain and body

health that they should be included in any counseling relationship in which an increase in functioning in any domain is part of the client's goals.

Chapin and Russell-Chapin give the following basic recommendations for optimal brain health and performance:

- Nutrition: A diet rich in whole foods, including omega-3 fatty acids, which promote neuroplasticity and optimal brain function. The Mayo Clinic recommends a Mediterranean diet for both cardiovascular and brain health. Known allergens should be avoided.
- Exercise: Twenty minutes of intense aerobic exercise five times per week for optimal brain function.
- Sleep: Adequate sleep is required for the brain to regenerate and remove harmful toxins. The amount of sleep required for the brain to function at an optimal level may vary from individual to individual, but the Centers for Disease Control and Prevention recommends seven to nine hours per night for those ages 18 and older.

Based on research from de Manzano and Hallett and Hoffman, and considering the focused attention and emotional regulation required to reach peak performance, diaphragmatic breathing and mindfulness skills should be taught to those interested in this area of training.

Bryan Moore's 2013 research indicates the benefits of developing cognitive flexibility for those looking to achieve peak performance. This can help address negative thought patterns and negative self-talk, which may hinder attainment of peak performance states. Interventions from acceptance and commitment therapy (ACT), developed by Steven Hayes, may also be useful for cultivating a peak performance mindset. ACT integrates mindfulness with counseling interventions designed to promote psychological flexibility, emotional awareness and tolerance.

Counselors can encourage development of self-awareness by helping clients identify arousal states and accompanying emotions in situations in which peak performance is desired. Then, counselors can assist clients in developing adaptive responses to either relax or activate themselves to promote peak performance during task completion.

A promising and less costly neurocounseling intervention (compared with neurofeedback) involves integrating biofeedback to promote peak performance from a neurophysiological perspective. According to Pacheco, heart rate variability training can aid in regulating breathing and fostering positive imagery, both of which are key components of peak performance. Chapin and Russell-Chapin recommend skin temperature control, which can help empower clients to achieve a sense of control over their emotional state. This technique can also provide collateral evidence that a peak performance state has been attained when peripheral skin temperature reaches 91 degrees Fahrenheit.

Peak performance considerations for all

Within every person lies the ability to tap into enhanced performance states. By offering education and behavioral coaching and reframing ideas on food and nutrition as fuel for the body and brain, counselors can help those who want to achieve peak performance. At minimum, clients looking for better performance in any domain should be informed about diet, exercise, sleep, emotional regulation and mindfulness. These are important factors in cultivating and applying a peak performance mindset to any situation. Professional counselors can help clients frame behaviors from the perspective of how they promote (or obstruct) peak brain activity and overall wellness. ❖

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