It's Time to Focus

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An important aspect of the brain that everyone deals with on a day to day basis is focus and attention. Some might argue that these are key elements of success and productivity; college students can strongly attest to this. Nowadays, students have their eyes glued to their iPhones, iPads, and iMacs, making focus and attention more difficult to achieve than ever before. When it comes to focus and attention, it's a bit of a hierarchical system; you need the more basic attention present in order to activate the more complex forms of attention. Understanding how focus and attention are conveyed in the brain can help people establish a way of harnessing that power. Luckily, thanks to recent fMRI brain imaging and strong experimental evidence, that may become a reality soon.

Recently, a group of scientists ran a study that attempted to understand focus and attention in a new way: through fMRI brain imaging. No scientists previously used fMRI when studying this specific aspect of neuroscience. Previous research did, however, provide some different information for the scientists. There are two types of attention: simple, stimulus-driven attention and more complex, goal-directed attention. It had been suggested that two different neural networks were at work for these two different types of attention. The ventral attention network (VAN) is at work during the simpler form of attention; more so, it occurs as a response to the environment. It's composed of the ventral parts of the frontal cortex. The dorsal attention network (DAN) is involved in the more complex, goal-oriented attention. It's composed of the superior parietal lobule, the frontal eye fields, and the intraparietal sulcus (Clemens et. al., 2013).

The present study had 32 male, healthy volunteers that had no previous or current mental health issues. In order to fully understand the two different types of attention, 16 participants were randomly assigned to the alertness group while 16 participants were randomly assigned to the focused attention group. Within each group, there were two separate tasks: the test task and the training task. For the alertness test task, the participants had a press a button with their right index finger as soon as they saw a circle. For the alertness training task, the participants had to watch a video of a motorcycle ride from the driver's perspective and press the button as fast as possible whenever they saw an obstacle appear in front of the motorcycle. For the focused attention test task, the participants had to watch a screen with a circle and a rectangle. They had to press the button as fast as they could once they saw the circle change from a dark grey to a light grey color; the rectangle was to be ignored. The focused attention training task involved participants watching a boat ride through a jungle and every time they saw a hippo, flamingo, or leopard, they had to press the button. Any other animals in the scene had to be ignored. The fMRI brain imaging was performed during these tasks using a head coil matrix.

There were many significant results from this study. The mean reaction time for the focused attention test task and training task was significantly higher. Also, the fMRI brain imaging showed that the parts of the brain previously thought to be associated with the different types of attention were correct. Mainly, the researchers found that the brain stem was key in the alertness tasks and the superior lobule was key in the focused attention tasks. Also, the frontal cortex was utilized more during the focused attention tasks. There was also some overlap in the two different types of attention, specifically in the brainstem and and thalamus.

The results of this study are important for attention deficit disorders. This study found that there are specific parts of the brain that can be activated through computer game-like attentional training; this could be useful in rehabilitation for attention deficits. With research results like these, the future looks bright and focused for many people.

References

Clemens, B., Zvyagintsev, M., Sack, A. T., Heinecke, A., Willmes, K., & Sturm, W. (2013). Comparison of fMRI activation patterns for test and training procedures of alertness and focused attention. Restorative Neurology And Neuroscience, 31(3), 311-336.