

Attention is a fleeting phenomenon. When you are trying to focus on a certain task at hand, it seems as if everything is a distraction. Sometimes your attention is so great it drowns out all things happening around you. Why is it so difficult to control your attention?

Commandeering your attention and focus is a skill. Most of the time, we don't even realize we are distracted from what we are supposed to be doing (Wetzel, Scharf, & Widmann, 2019). But even if we're not conscious of what's happening in our brains, technology is. A device called an electroencephalogram (EEG) can measure the electrical signals that neurons send to each other. Based on where the electric activity is topologically, researchers are able to make a reasonable estimate as to what our brains are doing.

Studies using an EEG can reveal a lot about how the brain maintains attention, and what happens when we lose focus. The peak of electrical activity directly after introducing a distracting stimulus is called an Event-Related Potential, because the action potential in the neuron is what the EEG nodes record. This way, each relevant "event" induced in an experimental setting can be associated with a specific measurement that is consistent across a group of people.

One study by Justo-Guillén et. al (2019) identified three key ERPs that correspond to three stages of being distracted: detecting the change in stimulus, directing attention towards the stimulus, and deciding whether to continue focusing on the stimulus or reorient towards the initial task.

The reason that finding recognizable ERPs is beneficial is that they can be used in a more natural setting. You wouldn't be able to pinpoint the exact second you became distracted working on an essay in a busy coffee shop the way you would if you were in the research lab. Thus, a neuroscientist looking at your EEG patterns without manually inducing a stimulus could tell when you become distracted; i.e., when your EEG matches with the pattern of an ERP, they could infer that you are experiencing that event.

Obviously, if you only had one graph measuring voltage, it would be pretty difficult to distinguish one ERP from the next. That's why many EEGs use a number of different electrodes, placed strategically over the scalp, to decrease the chance of mis-identifying

an ERP. Once you get up to 100 electrodes there is very little margin of error, but most portable EEG devices only have a few to ensure comfort for the wearer.

However, even four electrodes are enough to do some analysis -- namely, making a reasonable guess as to when a person becomes distracted. This is what we aim to do with FocusPocus. By reminding you when you are becoming distracted, it allows you to readjust your focus to the task at hand. The data we collect can be a useful resource to let you know what times of day you are most productive at, and which times to give your brain a break. Moreover, once you are continually notified of your state of attention, it becomes easier for you to monitor your focus without an EEG device.