**Maria’s Randolph Discussion**

**Research Methods in Neuroscience**

Throughout the history of neuropsychology, the need for experimentation on the processes of the brain and functions enabling systems within our anatomy to operate. Techniques that fascinate me the most are those providing a glimpse into actual neurological activities and electrical impulse communications, such as transcranial magnetic stimulation (TMS), which is used to activate nerve neurons in the brain to encourage stimulation of less active nerves (Carlson & Birkett, 2017).

Contrary to other methods of recording and stimulating neurological activity, such as the implantation of electrodes or even the use of electroshock therapy, the TMS is a less evasive option that uses coils shaped as the number eight to provoke activity within a specific cortex of the brain. When used to treat depression and PTDS patients, the TMS is positioned to deliver electromagnetic pulses to the dorsolateral prefrontal cortex (Health Quality Ontario, 2016), which is the area of the brain responsible for planning and emotions, to stimulate this region to increase neural activity and decrease symptoms. Creating a change in a patient's mental state or mood temporarily.

In order to prove the effectiveness and safety of transcranial magnetic stimulation, a study was conducted with clinicians reviewing a series of clinical trials involving 1,371 participants. Prior use of TMS per FDA clearance expressly indicated higher frequency application, but it was discovered that use of lower frequencies that best match that of patient frequencies treat depression symptoms more effectively in more sessions than higher frequencies administered in less sessions (Health Quality Ontario, 2016).  This would create a trend aimed at bringing patients to levels of functioning more realistic in expectation for that individual, possibly meaning less need for medications or the ability to lower dosages. However, determining each patient's level of pulse regarding electromagnetic charges is integral to avoid discomfort and risk of seizure. Overall, special care would need be used when dealing with elements that have the potential to produce unpredictable and irreversible results. However, the TMS can be considered an improvement compared to other more evasive methods of behavior modification.

Resources:

Carlson, N. R., & Birkett, M. A. (2017). [*Physiology of behavior*](https://ashford.instructure.com/courses/71460/external_tools/retrieve?display=borderless&url=https%3A%2F%2Fcontent.ashford.edu%2Flti%3Fbookcode%3DCarlson.0505.17.1) (12th ed.) [Custom edition]. Retrieved from [https://content.ashford.edu (Links to an external site.)](https://content.ashford.edu/)

Health Quality Ontario (2016). Repetitive Transcranial Magnetic Stimulation for Treatment-Resistant Depression: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Ontario health technology assessment series*, *16*(5), 1–66.