Mindfulness meditation is a practice of present-moment awareness and non-judgment (e.g., Kabat-Zinn, 1990).

Theoretically, mindfulness meditation should strengthen executive functions, including sustained attention, flexible switching of attention, and inhibition of elaborative processing (Bishop et al., 2004).

Mindfulness training was found to be associated with increased N2 responses and decreased P3 responses to incongruent stimuli compared to controls during an emotional Stroop task using event-related potentials (ERPs) (Moore et al., 2012).

The current study will extend the literature by using a task that combines both cognitive and emotional control and by comparing mindfulness to deep reading training.

Hypotheses:

- Mindfulness training will be associated with decreased subjective anxiety, as well as increased cognitive and emotional control.
- Deep reading will only impact cognitive control.

**Method**

- Mindfulness Group, N = 18, Education masters students
- Deep Reading Group, N = 19, Education masters students
- 8 weeks of mindfulness-based attention training vs. deep reading training with pre- and post-measurement:
  - Self-report: Spielberger State-Trait Anxiety Inventory (STAI); Penn State Worry Questionnaire (PSWQ); Mood and Anxiety Symptom Questionnaire (MASQ); Emotional Color-Word Stroop task (Kanske & Kotz, 2012)

**Results**

**Variables:**

- Group (Mindfulness Attention, Deep Reading), Time (Pre, Post), Valence (HiNeg, LoNeu), Congruency (Con, Inc)
- Significant Group X Time interaction for PSWQ, F(1,35) = 50.39, p < .001, η² = .59.
- No effects found for STAI or MASQ.

**Behavioral Data:**

- Main effect of congruency, F(1,33) = 16.04, p < .001, η² = .33.
- Significant Time X Valence interaction, F(1,33) = 5.19, p = .03, η² = .14.
- No effects of Group on reaction times.

**ERP Data:**

- P100 – significant Group X Time X Congruency interaction F(1,30) = 4.05, p = .05, η² = .12.
- Interference (incongruent – congruent) scores for the P100 were calculated for each group in the pre- and post-measures.

**Discussion**

- Following an 8-week training procedure, mindfulness attention training was found to reduce trait anxiety and be associated with neural indices of more efficient allocation of early attention resources compared to deep reading training.
- Similar to Moore et al., (2012), no behavioral effects of mindfulness attention training were found.
- These data suggest that within an 8-week timeframe, mindfulness attention training has the largest impact on self-reported anxiety, and secondly, a much smaller impact on early attentional control.
- Interestingly, only the measure of trait anxiety that corresponds with anxious apprehension was reduced by mindfulness attention training. This type of anxiety is characterized by worry.

**Future Directions**

- Samples sizes for both groups are small, and the results found here should be considered pilot data.
- The deep reading group was much more similar to the mindfulness attention training group than expected, thus we are currently running a group of non-active controls.
- Our deep reading training included daily reflections on the participants’ experience of different reading and learning strategies. As such, deep reading may have acted as a form of contemplative practice in this study.
- The Moore et al. (2012) study did not find reliable N2 or P3 ERP effects until 8-16 weeks of mindfulness training. These two ERP components are more indicative of top-down, regulatory cognitive mechanisms. As such, longer training regimens may be needed to find these effects.