

# sLORETA and psychological functioning impacts from Meditation on Twin Hearts: Differences between novice and experienced meditators

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## ABSTRACT

This study investigated the effects of Meditation on Twin Hearts (MTH) on subjects' self-reported psychological functioning and sLORETA patterns in specified brain regions. Measures of anxiety, mood and coping self-efficacy were completed pre and post meditation. Novice and experienced meditators EEG was collected while engaging in a guided version of Meditation on Twin Hearts meditation.

Psychological functioning variables revealed that the experienced meditators reported significantly less anxiety and higher levels of happiness, calmness and coping self-efficacy than the novice group before the MTH. Pre-post meditation scores for both groups revealed reduced anxiety and increased happiness immediately after MTH with more robust changes observed in the novice group.

Using sLORETA analyses, experienced meditators showed increased gamma activation in regions related to empathy and focused attention. The novice meditators showed patterns of decreased activation.

## HYPOTHESES

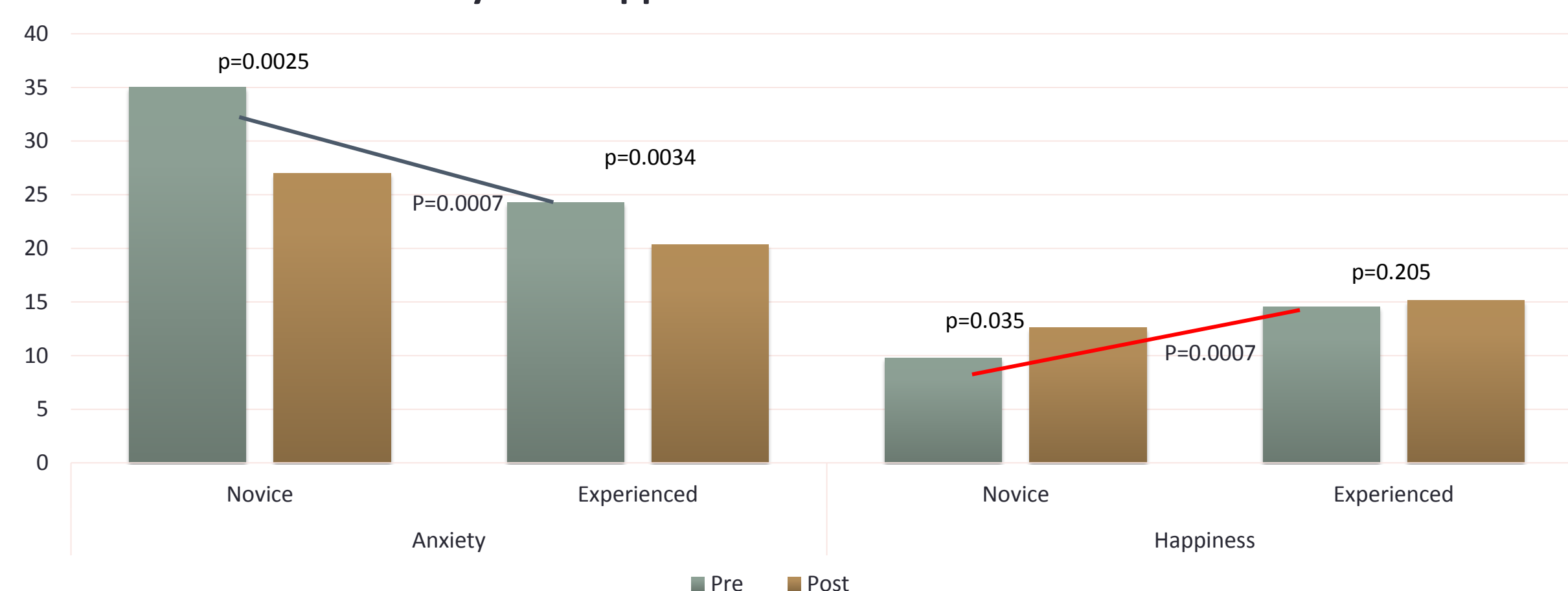
- Experienced meditators will show lower baseline levels of anxiety than novice meditators
- Experienced meditators will show higher levels of positive emotions and lower levels of negative emotions at baseline compared to novice meditators
- Experienced meditators will show higher baseline levels of coping self-efficacy at baseline compared to novice meditators
- All subjects will report decreases in anxiety and increases in happiness immediately following MTH
- All subjects will show increased brain activation in areas of the brain responsible for empathy and focused attention immediately after MTH
- The activation patterns observed will be more pronounced in the experienced meditation group.

## METHODS

- The experienced meditator group was composed of 8 women and 4 men, avg. age 45
- The novice meditation group was composed of 7 women and 5 men, avg. age 39.
- Experienced meditators had at least 1,000 hours experience with Meditation on Twin Hearts (MTH)
- Novice meditators had no previous experience with MTH and no history of consistent meditation or contemplative practice
- Subjects completed questionnaires, Biofield Viewer imaging, P300 Qeeg analysis, and 19 channel EEG recording before, during and after listening to a 30-minute recorded version of the Twin Hearts Meditation for Psychological Self-healing
- For analysis, MTH was divided into 7 segments based on the content of the meditation
- EEG recordings were conducted using a 19-channel fitted electrocap. A Brainmaster Discovery amplifier was used to record the data. Statistics were analyzed using STATA software. All data was artifacted prior to analysis to remove non-EEG influences such as eye blinks and muscle tension.

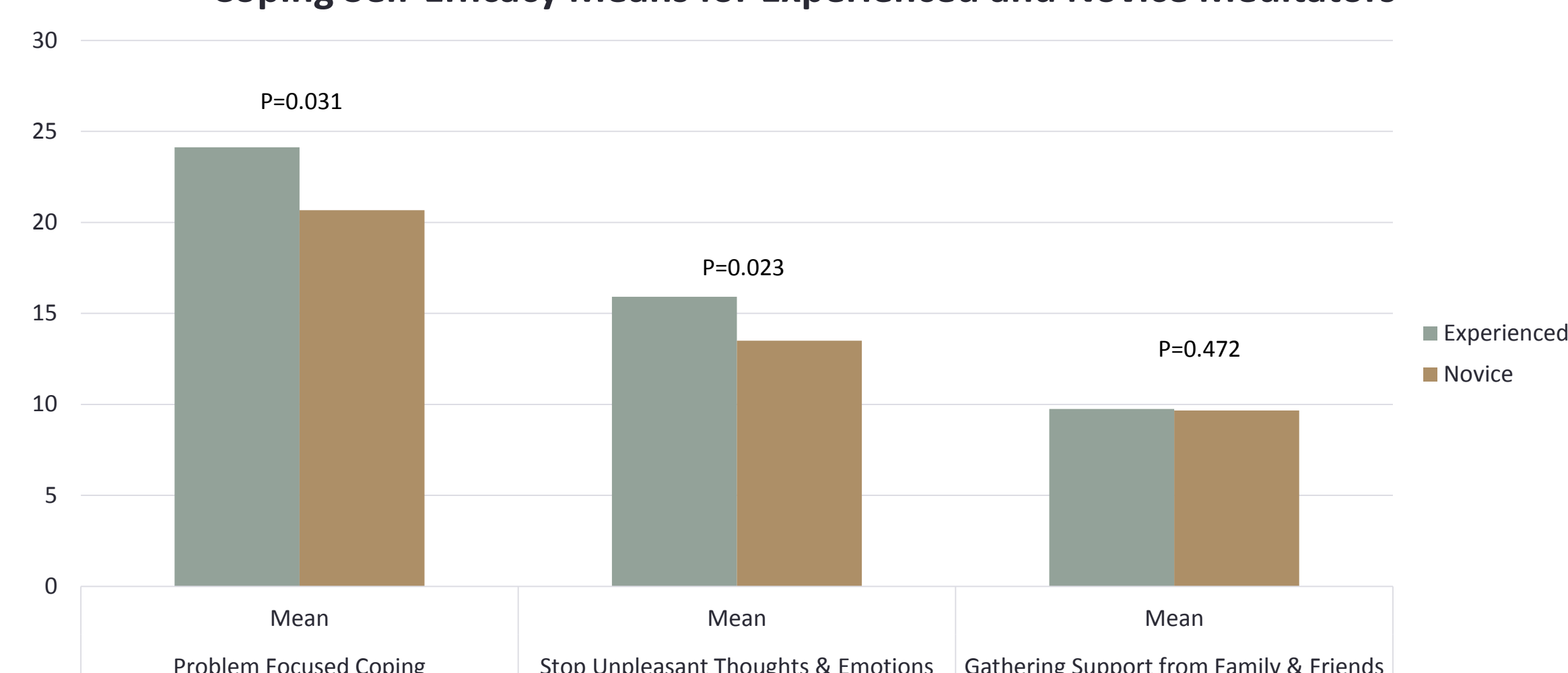
## PSYCHOLOGICAL FUNCTIONING RESULTS

Anxiety and Happiness Scores Before and After THM



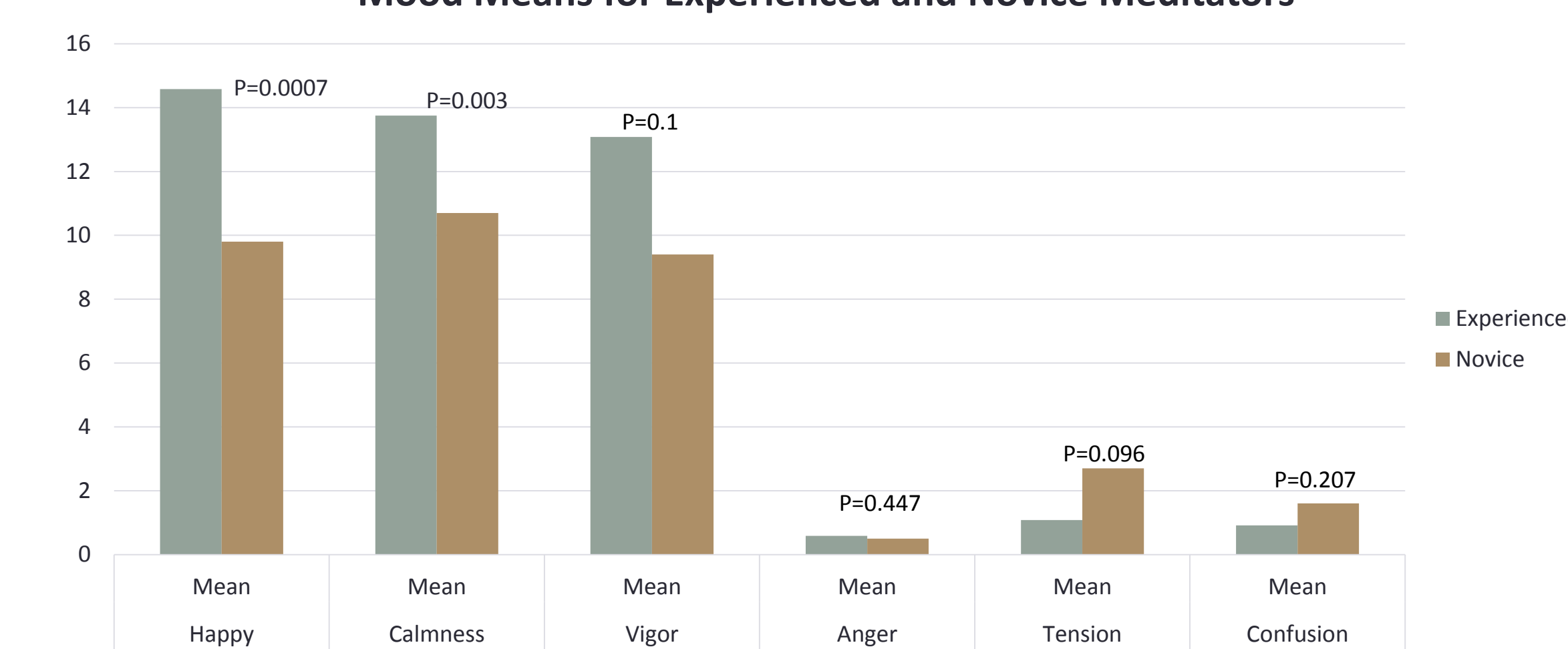
- As predicted, experienced meditators reported significantly less anxiety and higher levels of happiness at baseline compared to the novice meditators.
- Following MTH, novice meditators showed statistically significant decreases in anxiety and increased happiness scores.
- Experienced meditators showed statistically significant decreases in anxiety following MTH and non-significant increases in happiness.

Coping Self-Efficacy Means for Experienced and Novice Meditators



Experienced meditators scored significantly higher than the novice meditators on both problem focused coping and stopping unpleasant thoughts and emotions, suggesting that the experienced meditators are better equipped to manage difficulties in their lives. There was no difference between groups on gathering support from family and friends.

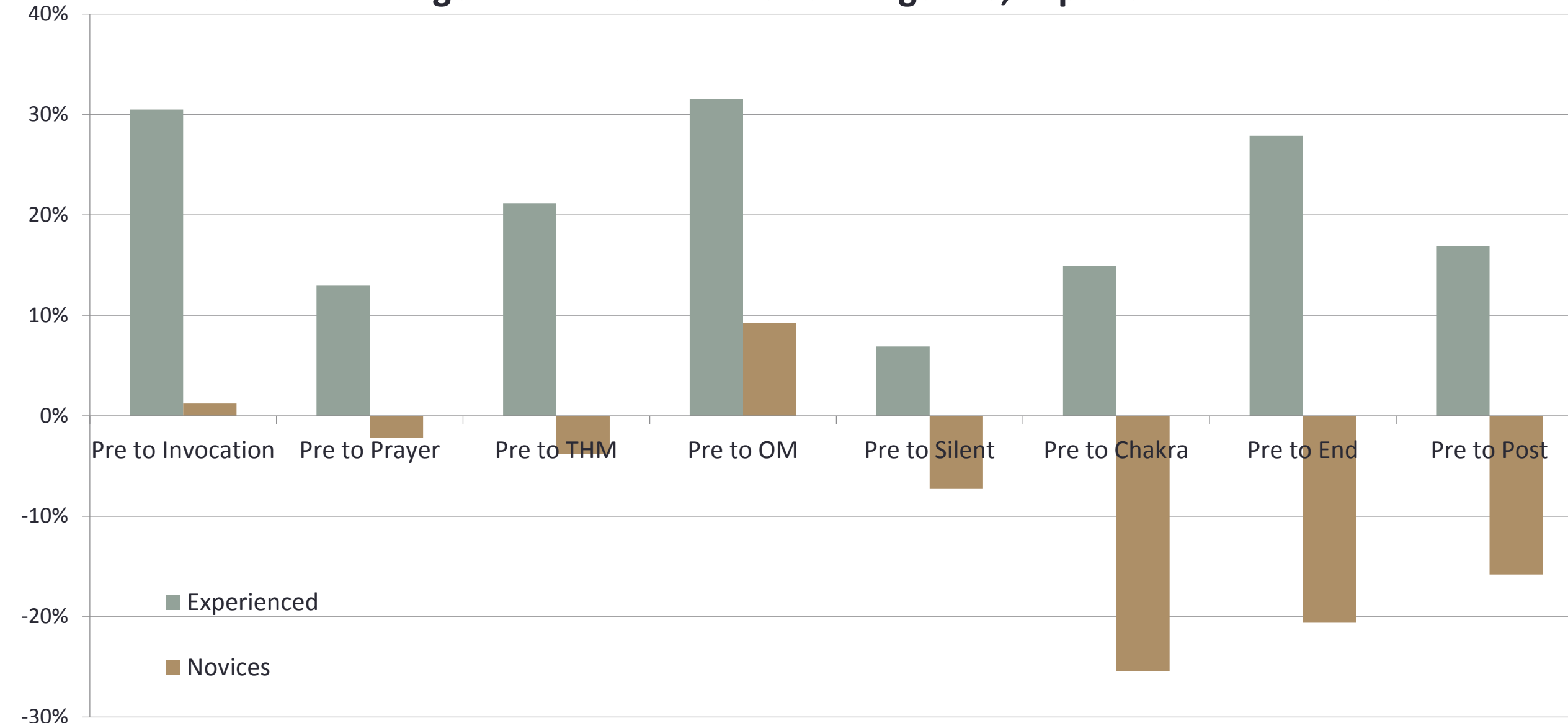
Mood Means for Experienced and Novice Meditators



- For all of the "positive" emotional states (happiness, calmness and vigor) the experienced group scored higher at baseline than the novice meditation group. Happiness and Calmness were significantly higher while vigor approached significance.
- None of the "negative" emotional states were significantly different between groups at baseline. However, some of the differences, such as tension were approaching significance. It is noted that all subjects scored very low on the baseline "negative" states.

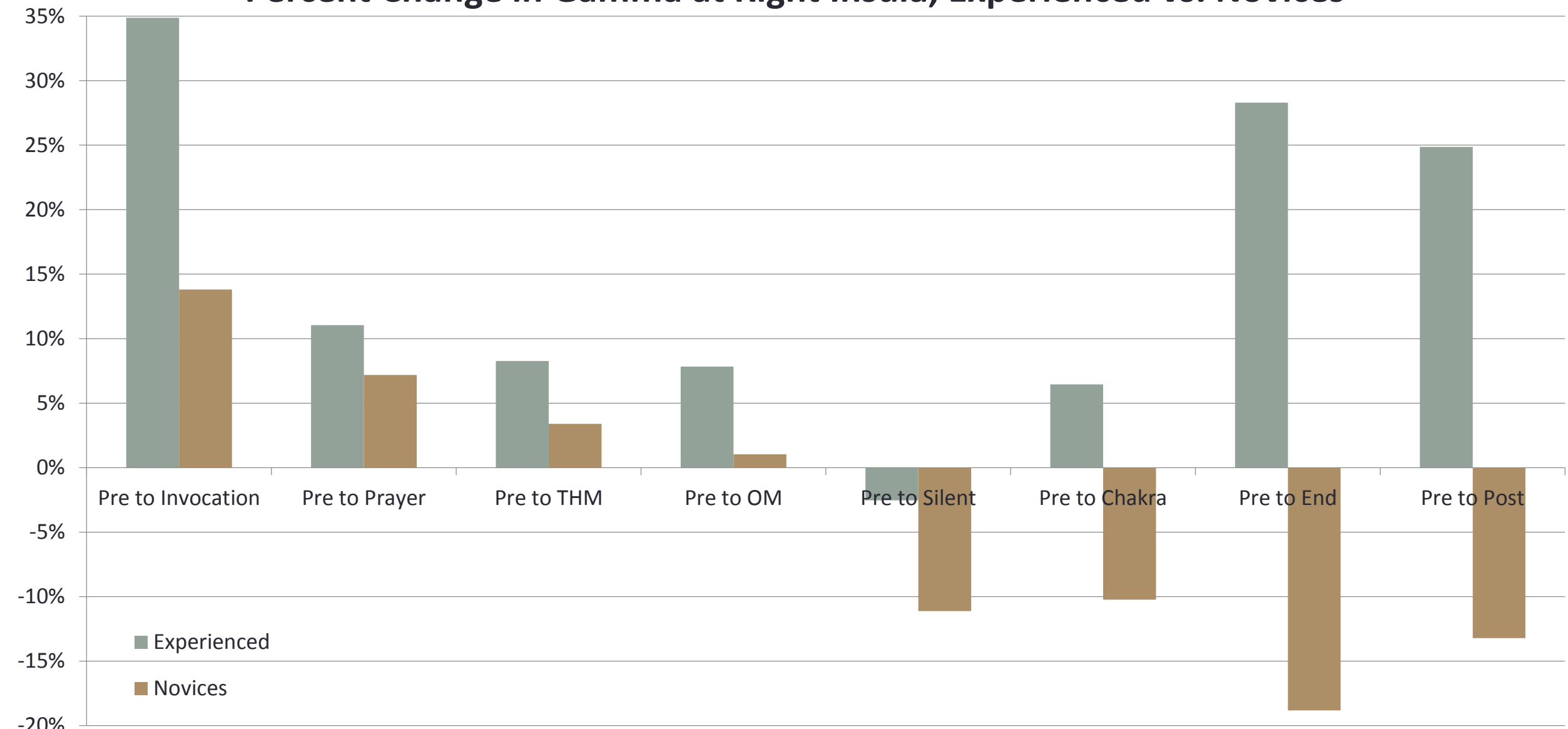
## SLORETA RESULTS

Percent Change in Gamma at Anterior Cingulate, Experienced vs. Novices



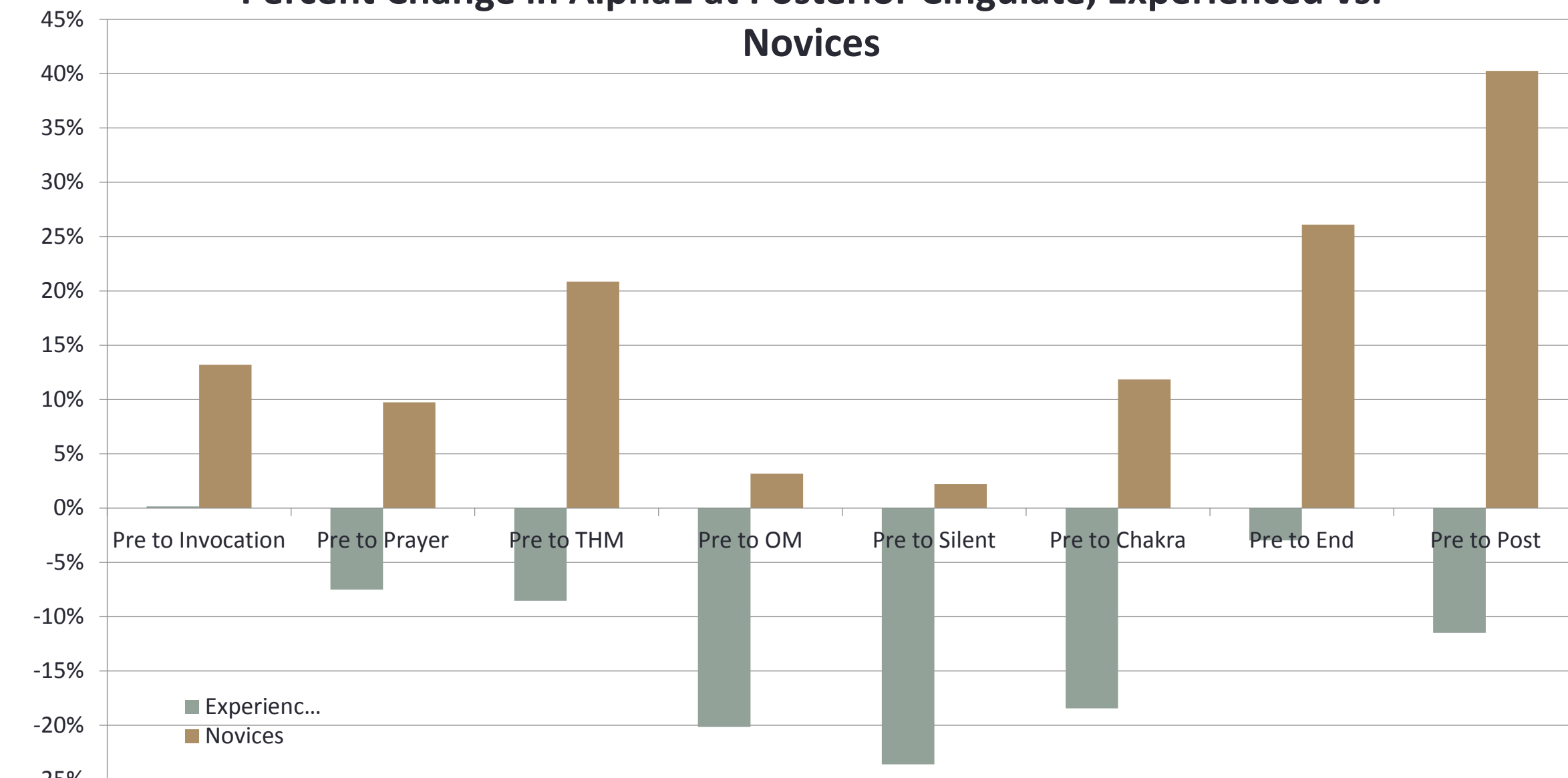
Experienced group showed statistically significant increases during OM\* and end/blessing\*. Novice group showed statistically significant decreases during chakra\*\* and end\*\*. \*p<.10; \*\*p<.05

Percent Change in Gamma at Right Insula, Experienced vs. Novices



Experienced group showed statistically significant increases in gamma at right Insula during end/blessing\* and post\*. Novice group showed statistically significant decreases during end\*\*. \*p<.10; \*\*p<.05

Percent Change in Alpha1 at Posterior Cingulate, Experienced vs. Novices



Experienced group showed statistically significant decreases in alpha1 at PCC during OM\* silent\*\* and chakra\*\*. Novice group showed statistically significant increases during THM\*\*, end/blessing\* and post\*\*. \*p<.10; \*\*p<.05

## CONCLUSIONS

- There was a strong difference between groups on pre-meditation levels of anxiety, happiness, calmness and coping self-efficacy suggesting that experienced meditators have a more positive outlook and are better equipped to manage difficulties in their lives.
- All subjects indicated significant decreases in anxiety immediately following the MTH, suggesting that this guided meditation is a potentially effective tool for anxiety management in subjects with and without experience in meditation.
- Novice, but not experienced meditators reported significant increases in happiness immediately following MTH. It is likely that the experienced group did not show significant changes due to a ceiling effect based on their pre-meditation scores.
- At the ACC, experienced meditators increased gamma at all points of the meditation compared to baseline while novice meditators showed decreased gamma during the last 4 segments. This suggests that the experienced meditators demonstrated focused attention throughout, but particularly during invocation, OM and the end blessing. Novice meditators appeared to show a decrease in focused attention as the meditation progressed.
- At the right Insula, a similar pattern emerged to that observed at the ACC. Interestingly, the novice group showed increases at the beginning with a fairly linear pattern of decreased activation for the remainder of the meditation. Because the right insula is involved in emotion and tends to increase during lovingkindness meditations, these findings suggest that experienced meditators responded as expected while novice meditators may have had difficulty maintaining an emotional connection as the meditation progressed.
- At the PCC, novice meditators showed a consistent increase in alpha1 activity during the course of the meditation suggesting that their minds were becoming more relaxed, peaceful and silent. At the same time, the experienced meditators showed decreased alpha1 activity as their minds continued to remain active and focused on the details of the meditation.
- Novice meditators appear to be relating to the THM by quieting the mind and relaxing their attentional focus. Gamma decreases and alpha1 increases during different portions of the meditation suggest that they are relating to the meditation in a similar manner to automatic self-transcending meditations such as TM (Travis & Shear, 2010).
- sLORETA analyses of gamma activation in the ACC and insula along with Alpha1 changes in the PCC show that the experienced meditators are engaging with the meditation by increasing attention, focus and emotional responsivity. These results suggest that the THM meditation is experienced as a focused attention and lovingkindness meditation by experienced meditators (Lutz, 2004, 2008).
- While other data collected during this study indicates that THM may be beneficial for all experience levels, it appears that longer-term meditators engage their brain differently and may consequently experience different benefits.

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