Mantra in Meditation: The Effect of Sound on Relaxation

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Introduction

- The repetition of mantra in meditation has proved to induce positive physiological effects.
- Jyoti and centering meditation has proven to increase blood flow to prefrontal cortex regions and reduce stress. [1]
- Centering meditation has demonstrated decreased level of depression, anxiety, and anger .[2]
- The presence of sound, in Vedic recitation, has proven to increase frontal, parietal, and frontal-parietal theta pairs. [3]

This study examines the physiological effects that yogic mantras in meditation, specifically the "OM" sound, have on brainwaves peak frequency and skin temperature.

Methods

Two subsequent studies :

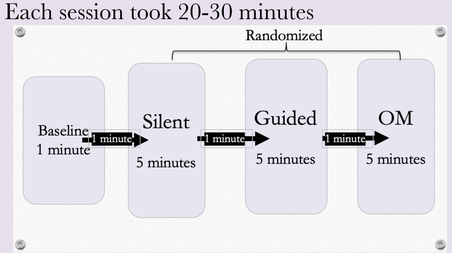
- Study 1: n=30,
- Study 2: n=15, sample population limited to participants with prior meditation experience
- All participants are healthy adults with ages ranging between 18 and 60.

Measures

- Muse Meditative Headband 2™ gathered brainwave peaks in "active, neutral, and calm" frequencies.
- Galvanic Skin Response Device measured temperature in fingertips.

Procedure

- Each session took 20-30 minutes



Hypotheses

- We predicted the OM sound would have a significantly higher number of calm brainwave peaks and lower temperature compared to all other interactions.

Results

Study 1

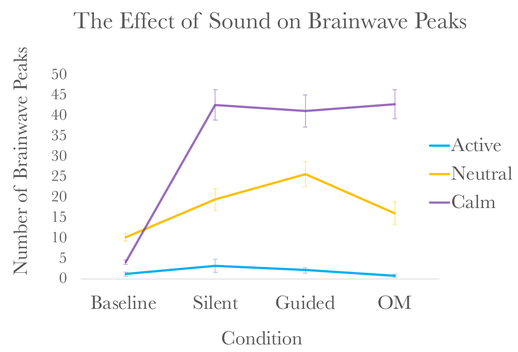


Figure 1: The Effect of Sound on Brainwave Peaks.

In all levels, the silent, guided and OM conditions are significantly higher than the baseline condition. In the active level, the silent (*M*= 3.23, 95% CI [-.09, 6.53]) and guided (*M*= 2.13, 95% CI [.75, 3.51]) conditions are significantly higher than the OM (*M*= .80, 95% CI [-.04, 1.64]) condition. In the neutral level, the baseline condition (*M*= 10.23, 95% CI [8.34, 12.13]) is significantly lower from the silent (*M*= 19.47, 95% CI [13.92, 25.02]) and guided (*M*= 25.70, 95% CI [19.44, 31.96]) conditions. In the calm level, the baseline condition (*M*= 4.13, 95% CI [3.07, 5.19]) is significantly lower than the silent (*M*= 42.67, 95% CI [35.04, 50.29]), guided (*M*= 41.17, 95% CI [33.11, 49.22]) and OM (*M*= 42.83, 95% CI [35.57, 50.10]) conditions, indicating an increase in relaxation and calm brainwave peaks in all conditions.

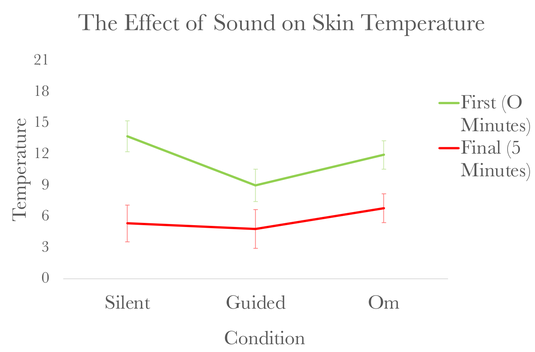


Figure 2: The Effect of Sound on Temperature (°F).

The 5-minute increment is significantly lower (*M*=5.83, 95% CI [4.41, 7.26]) than the 0-minute increment (*M*=9.78, 95% CI [8.83, 10.74]) indicating significant relaxation across all the silent, guided, and OM conditions.

At the 0-minute increment, the silent (*M*= 8.97, 95% CI [7.40, 10.53]) and guided (*M*= 7.93, 95% CI [5.87, 9.99]) conditions are not significantly different. The OM condition (*M*= 12.34, 95% CI [10.47, 14.26]) is significantly higher than all other conditions, indicating lower initial relaxation.

At the five-minute increment, the guided condition (*M*=3.63, 95% CI [1.59, 5.68]) is significantly lower than the silent (*M*= 5.87, 95% CI [3.39, 8.35]) and OM (*M*= 6.20, 95% CI [3.43, 8.97]) conditions, indicating increased relaxation in the guided meditation.

Study 2

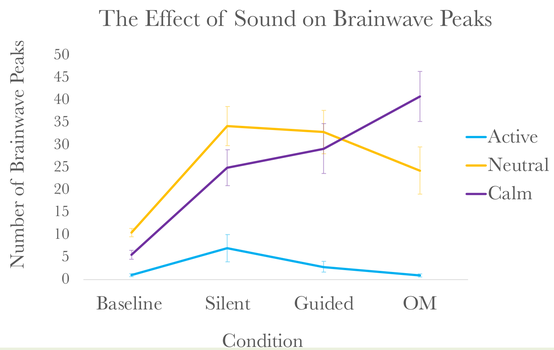


Figure 3: The Effect of Sound on Brainwave Peaks.

Across all levels, the baseline condition is significantly lower than the silent, guided, and OM conditions. In the active level, the baseline condition (*M*=1.00, 95% CI [.28, 1.73]) is not significantly different than the OM (*M*= .93, 95% CI [.19, 1.67]) condition. The guided condition (*M*= 2.87, 95% CI [.30,5.44]) is significantly higher than the baseline and OM conditions. The silent condition (*M*= 7.00, 95% CI [-.48, 13.52]) is significantly higher than all conditions. In the neutral level, baseline (*M*= 10.47, 95% CI [8.48, 12.45]) is significantly lower than the silent (*M*=34.20, 95% CI [24.85, 43.55]), guided (*M*= 32.87, 95% CI [22.51, 43.22]), and OM (*M*= 24.33, 95% CI [13.06, 35.61]) conditions. The OM condition *M*= 24.33, 95% CI [13.06, 35.61]) is significantly lower than the silent (*M*=34.20, 95% CI [24.85, 43.55]) condition. In the calm level, baseline (*M*= 5.53, 95% CI [3.42, 7.65]) is significantly lower than the silent (*M*=24.93, 95% CI [16.35, 33.52]), guided (*M*= 29.20, 95% CI [17.28, 41.12]), and OM (*M*= 40.80, 95% CI [28.83, 52.77]) conditions, indicating an increase in relaxation across all conditions. The OM condition (*M*= 40.80, 95% CI [28.83, 52.77]) is significantly higher than the silent (*M*=24.93, 95% CI [16.35, 33.52]) condition but not significantly different than the guided condition (*M*= 29.20, 95% CI [17.28, 41.12]) indicating the frequency of calm brainwave peaks increased the most in the guided and OM conditions.

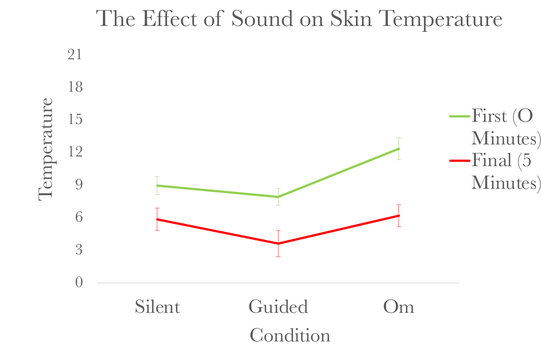


Figure 4: The Effect of Sound on Temperature (°F).

The 5-minute increment is significantly lower (*M*=7.30, 95% CI [5.54, 9.06]) than the 0-minute increment (*M*=11.92, 95% CI [10.57, 13.26]), indicating significant relaxation across all the silent, guided, and OM conditions.

At the 0-minute increment, the silent (*M*=13.73, 95% CI [10.60, 16.87]) and OM conditions (*M*=11.93, 95% CI [7.76, 16.11]) are not significantly different. The guided condition (*M*=4.80, 95% CI [1.82, 7.78]) is significantly lower than the silent condition, indicating a higher initial relaxation.

At the 5-minute increment, the silent (*M*=5.33, 95% CI [1.32, 9.35]), guided (*M*=4.80, 95% CI [1.82, 7.78]), and OM (*M*=6.80, 95% CI [3.23, 10.37]) conditions are not significantly different from each other.

Discussion

- In Study 1, all three meditations of silent, guided, and OM produced significant increases in calm brainwave peaks compared to baseline, suggesting significant relaxation.
- In Study 1, the final skin temperature across all mediations was significantly lower, indicating higher relaxation over each of the 5-minute meditations.
- In Study 2, all three meditations of silent, guided, and OM produced a significant increase in calm brainwave peaks compared to baseline; there was significant relaxation in each of the meditations.
- In Study 2, skin temperature was significantly reduced indicating higher relaxation over each of the 5-minute meditations.
- Overall, there was **significant relaxation effect produced by the silent, guided, and OM meditations.** This is **evidenced by increases in calm brainwave peaks and lower skin temperature.**

Future Research

- Analyzing the amount of time and experience needed to produce any relaxation effect within the body.
- Replicating the study with longer meditations to determine the potential magnitude of relaxation response.
- Examining other types of meditations and compare relaxation effects.

Citations

1. Gutierrez, D., Fox, J., & Wood, A. W. (2015). Center, light, and sound: The psychological benefits of three distinct meditative practices. *Counseling and Values*, *60*(2), 234–247. https://doi.org/10.1002/cvj.12016
2. Higher theta and alpha1 coherence when listening to Vedic recitation compared to coherence during Transcendental Meditation practice Elsevier Enhanced Reader. (n.d.). https://doi.org/10.1016/j.concog.2017.02.002
3. Johnson, M. E., Dose, A. M., Pipe, T. B., Petersen, W. O., Huschka, M. M., Gallenberg, M. M., … Frost, M. H. (2009). Centering prayer for women receiving chemotherapy for recurrent ovarian cancer: A pilot study. *Oncology Nursing Forum*, *36*(4), 421–428. https://doi.org/10.1188/09.onf.421-428

Acknowledgments

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