

STUDY: EEG Imaging Reveals that Cove Triggers Relaxation by Activating a Powerful Brain Pathway

Background

Intuition tells us that certain kinds of touch can be quite comforting. And science, it turns out, tells us the same thing. Research has shown that a specific form of physical contact, known as affective touch, promotes a sense of belonging and relaxation. Now, emerging evidence offers clues as to how the body processes these soothing sensations. The answer lies in a brain system known as the interoceptive pathway.

The interoceptive pathway monitors internal sensations, such as hunger and heart rate, and combines this information with inputs from the outside world. Accordingly, the pathway encompasses both receptors on the skin and structures buried deep in the brain, including a region called the insula. When this system runs smoothly, it can promote feelings of calm and wellbeing. Affective touch feels comforting because it taps into this natural relaxation response. Building on this field of research, our scientists began brainstorming ways to promote relaxation by applying affective touch to the skin.

Hypothesis:

We hypothesized that a vibrating device—if calibrated just right—would activate the brain's affective touch response and promote relaxation.

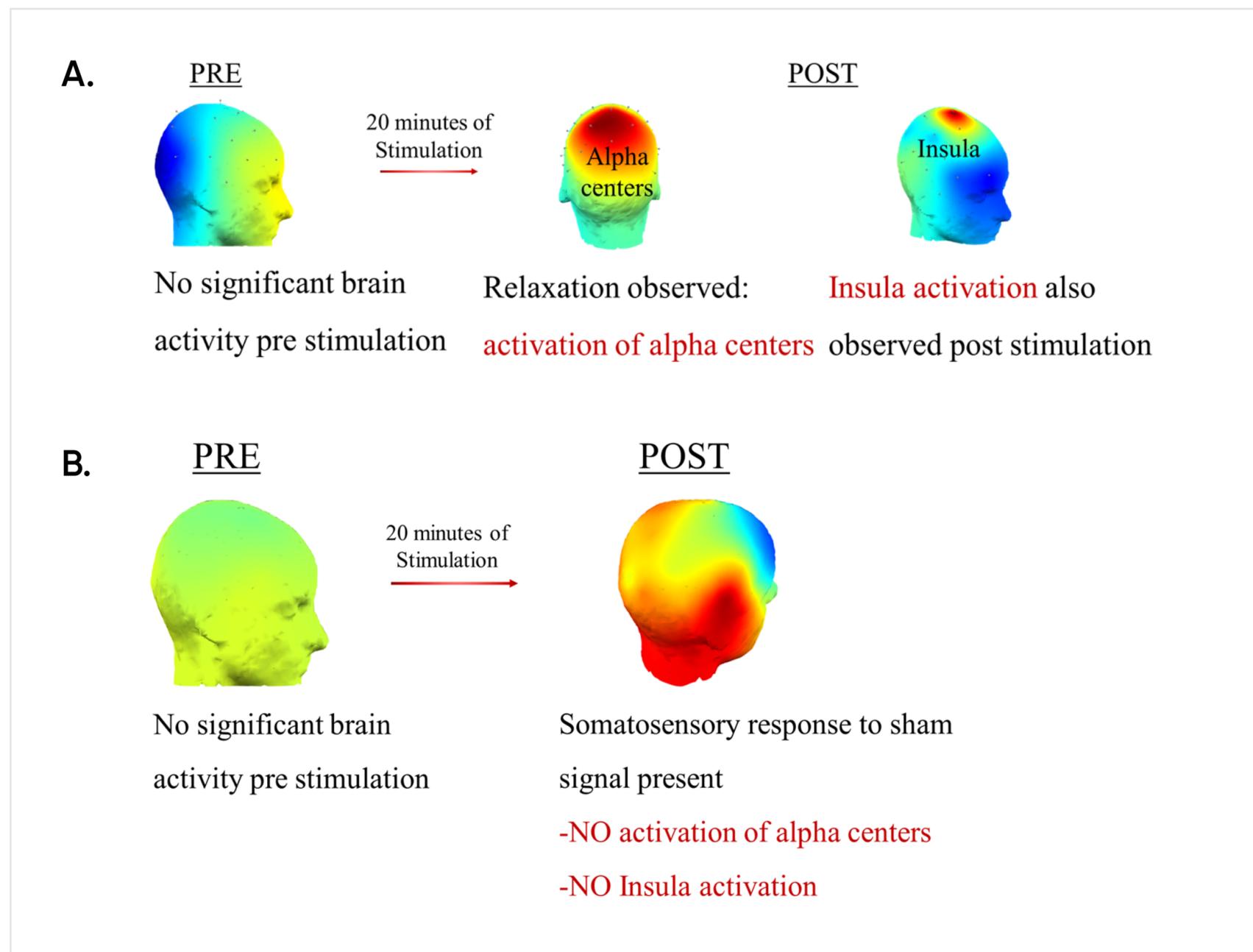
Methods:

To test our hypothesis, we designed a device that gently vibrates at strategic locations behind the ears—an early version of Cove's patented technology. We then invited 709 volunteers to test this device through a series of twenty-minute stimulation sessions. Over the course of two years, we experimented with many different vibration speeds and rhythms to determine which ones, if any, successfully activated the brain's affective touch response.

During stimulation sessions, our researchers monitored volunteers' brain activity through the use of electroencephalography, or EEG. A common technique, EEG measures changes in the brain's electrical dynamics via sensors, called electrodes, placed at various locations on the head. Our researchers used EEG caps with 32 electrodes, allowing them to see which brain areas were active at a given moment, as well as the nature of that activity. We were particularly interested in a specific pattern of activity, called alpha waves, which often appears during meditation and indicates a sense of calm.

Results

After completing 709 EEG tests, we learned that one particular vibration pattern affects the brain in a unique way. 245 volunteers received these special vibrations, which we called "optimal stimulation." Of that group, the majority (62%) experienced increased alpha waves after only one stimulation session. This bump in alpha indicates that optimal stimulation may reduce stress and elicit a feeling of meditative relaxation.



EEG Visualization of (a) optimal stimulation vs (b) vibrations outside of the effective range.

According to our EEG results, optimal stimulation also prompted notable changes in brain activity just above the insula, a critical component of the interoceptive pathway. We later conducted scans of deeper brain regions, which showed that the vibrations activated the insula itself. Together, these findings indicate that optimal stimulation promotes relaxation by activating the interoceptive pathway. Importantly, no other vibration speeds or rhythms produced these powerful effects.

Conclusion:

Our results show that optimal stimulation activates the brain's interoceptive pathway and, in doing so, promotes relaxation.