

Don't go to bed angry! Good for your relationship and for your frontal cortex

A new study found that people who have greater alpha wave power in their right frontal cortex during REM sleep and evening wakefulness experience more anger in dreams.

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It is still unclear how neural processes regarding mood and emotion differ in wakeful versus dreaming states. Sikka et al. recently published a paper in 2019 in *The Journal of Neuroscience* titled “EEG Frontal Alpha Asymmetry and Dream Affect: Alpha Oscillations Over the Right Frontal Cortex During REM Sleep and Pre-Sleep Wakefulness Predict Anger in REM Sleep Dreams”¹. Sikka et al. used electroencephalography on humans during evening resting wakefulness and REM sleep and observed increases in alpha waves in the right frontal cortex compared to the left frontal cortex. This is known as frontal alpha asymmetry (FAA). Participants were awakened in the middle of their REM sleep and provided a dream report. Results demonstrated that FAA during evening wakefulness and REM sleep correlate with increased ratings of dream anger. FAA may be important in regulating emotions both during wakefulness and during dreams.

Humans experience emotions both in waking and dreaming states^{2,3}. Neural processes that underlie these emotions are expected to be similar in both waking and dreaming states^{4,5,6,7}. There is evidence for activation of brain regions during REM sleep that are involved in mood and emotions^{8,9,10}. The connection between emotional dream experiences that were reported upon awakening and neural activity during pre-awakening sleep has not been studied well. Electroencephalographic (EEG) FAA measures the difference in alpha waves on the right frontal cortex compared to the left frontal cortex.

The methods of the Sikka et al. study are outlined in the following. 17 human participants (with seven men) spent two nights in the sleep laboratory, separated by a week. On both nights, EEG electrodes were attached, and baseline recordings were taken. Participants then fell asleep, and sleep stages were scored visually^{11,12}. Every time that REM sleep lasted for more than five minutes, a tone was used to awaken the participants. The participants then provided an oral report on their dream, described the last image they saw in their dream, and rated their emotions using a computer program. Finally, the participants were awoken for the final time and after one last dream report, morning baseline EEG recordings were taken.

Sikka et al. found that participants experienced more intense emotions during dreaming than during evening or morning wakefulness. Evening FAA and REM FAA were highly correlated with each other. They also found that the relationship between REM sleep FAA and anger during dreaming were driven by increased alpha power in the right frontal cortex (Figure 1). This was found to be specific to alpha waves only.

Sikka et al. demonstrated in this study that emotions during dreaming and wakeful states are highly similar and can even be measured using a quantitative technique, being EEG. Similar brain regions are activated in wake vs. dream, and similar emotional experiences are reported. This implies that memory consolidation is an important process during REM sleep, and subjective experiences during the day with emotional tags are relived in dreams.

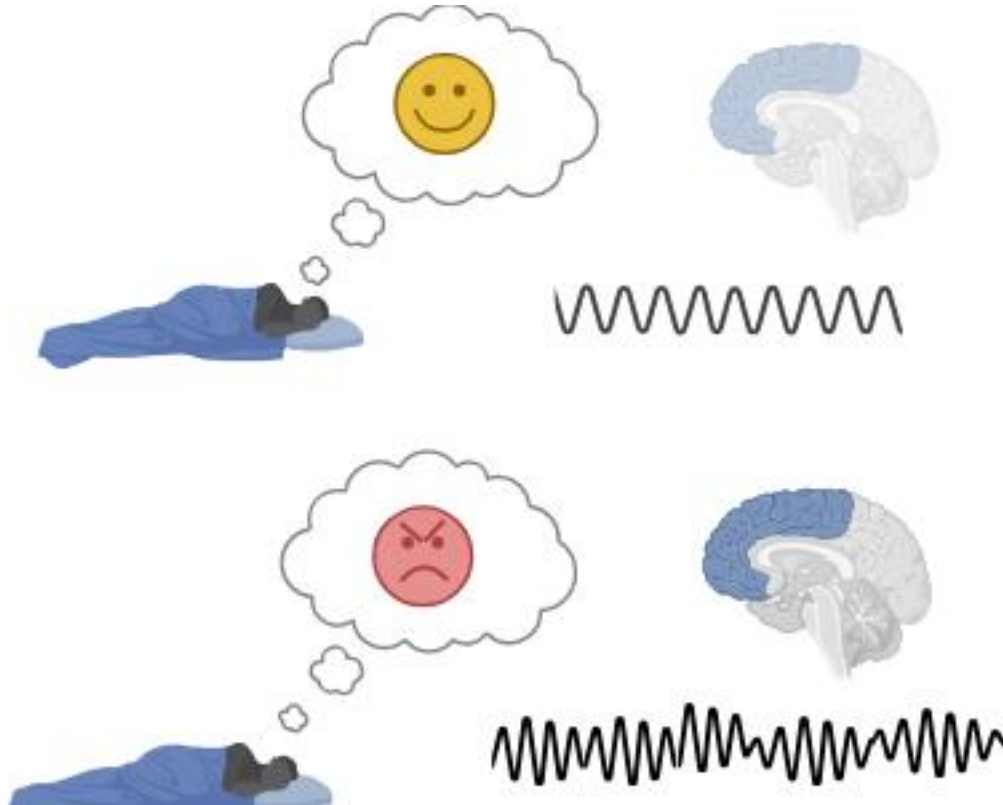


Figure 9. This figure demonstrates that the relationship between REM sleep FAA and anger during dreaming were driven by increased alpha power in the right frontal cortex. People dreaming with non-negative emotions had reduced FAA.

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