

## TITLE

Spectral quality of light affects emotional brain responses in healthy individuals and in patients

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## ABSTRACT

Light constitutes a strong stimulator of alertness and cognition through a novel photoreception system maximally sensitive to blue light, as opposed the classical visual system, maximally sensitive to green light. The successful use of light therapy for Seasonal affective disorder (SAD) suggests that light affects emotion regulation. Whether light and its spectral quality directly affect emotion processing was, however, unknown.

We recorded fMRI brain responses to vocal emotional stimulations in healthy individuals alternatively exposed to blue and green monochromatic light. We then recorded brain responses to vocal emotional stimulations under blue and green light in patients with SAD and in controls during winter.

Analyses revealed that blue light enhances the functional connectivity between the amygdala, hypothalamus and voice area of the temporal cortex for the processing of vocal emotional stimuli in healthy individuals. Results also show that patients with SAD present abnormal hypothalamic responses to emotional auditory stimuli, with increased and decreased activations under blue and green light, respectively.

These finding constitute the first evidence in favor of an acute impact of light and of its spectral composition on emotion brain processing. They provide neurobiological substrates through which light could exert its therapeutic effect.