Functional somatic syndrome (FSS) is an umbrella term for debilitating somatic symptoms that do not correspond to a known medical dysfunction. Examples are fibromyalgia, irritable bowel syndrome, chronic fatigue syndrome, and functional neurological disorder. Although abnormal processing of emotion has been thought to play a key role in FSS and related conditions since the very beginning of psychoanalysis in Studies on Hysteria by Breuer and Freud, it has been difficult to demonstrate this phenomenon empirically. To test the hypothesis that in FSS patients negative emotions may be misinterpreted by the brain as symptoms indicative of physical disease, a series of experiments was conducted in which negative affect was induced by affective picture viewing, after which self-reported symptoms were assessed. Two studies in healthy volunteers and a third study in FSS patients, selected for being either low or high habitual symptom reporters (HSR), showed that simply viewing negative affective pictures was sufficient to increase somatic symptom reports in high HSR, while this was not the case for low HSR.

We then performed a neuroimaging study to investigate the neural mechanisms underlying this effect: 30 FSS patients and 30 healthy controls participated in the affective picture paradigm in an fMRI scanner. We compared neurologic pain signature (NPS), stimulus intensity-independent pain signature (SIIPS) and picture-induced negative emotion signature (PINES) responses to the negative versus neutral affect contrast and investigated whether they mediated between-group differences in affective picture-induced physical symptom reporting. Consistent with previous behavioral studies, more physical symptoms were reported after viewing negative compared to neutral pictures, and this effect was larger in patients than controls ($p = 0.025$). Consistent with these behavioral findings, patients showed stronger activation in somatosensory regions during negative versus neutral picture viewing. NPS, but not SIIPS nor PINES, responses were higher in patients than controls during negative versus neutral pictures ($p = 0.026$). These differential NPS responses partially mediated between-group differences in physical symptoms.

In conclusion, picture-induced negative affect elicits physical symptoms in FSS patients as a result of activation of somatosensory and nociceptive brain patterns, supporting the idea that affect-driven alterations in the processing of somatic signals is a critical mechanism underlying FSS. These results support the conclusion that alterations in the processing of affective information and misattribution of this information by the brain is an underlying mechanism in FSS.