Prestimulus functional connectivity determines pain perception in humans.

Abstract:

Pain is a highly subjective experience that can be substantially influenced by differences in individual susceptibility as well as personality. How susceptibility to pain and personality translate to brain activity is largely unknown. Here, we report that the functional connectivity of two key brain areas before a sensory event reflects the susceptibility to a subsequent noxious stimulus being perceived as painful. Specifically, the prestimulus connectivity among brain areas related to the subjective perception of the body and to the modulation of pain (anterior insular cortex and brainstem, respectively) determines whether a noxious event is perceived as painful. Further, these effects of prestimulus connectivity on pain perception covary with pain-relevant personality traits. More anxious and pain-attentive individuals display weaker descending connectivity to pain modulatory brain areas. We conclude that variations in functional connectivity underlie personality-related differences in individual susceptibility to pain.