Pain and emotional distress are realities that affect us all. Understanding the brain representations that underlie pain and suffering could transform how we understand and treat them; but currently, there are no human brain measures adequate for determining whether one is angry or sad, whether pain is physical or emotional, or whether one is feeling pain that is intense or mild. In this talk, I describe a series of studies aimed at beginning to address these questions. Combining functional neuroimaging with machine learning techniques, we have developed brain markers capable of indicating the intensity of pain and negative emotion in individual participants with > 90% accuracy, with no prior knowledge of an individual's experience. In addition to their use as markers, such maps can provide insight into the structure of the neurophysiological representations underlying pain and distress. Our findings suggest that specific types of aversive experiences are encoded in separate, population-based patterns that are co-localized in similar gross anatomical circuits.
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