

Embodied and Situated Cognition: from Phenomenology to Neuroscience and Artificial Intelligence

OBSERVING OTHERS' PAIN: BEHAVIOR AND BRAIN MECHANISMS

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Our perceptual and phenomenal experience of the world includes not only the sensory features of our surroundings, but also their emotional and motivational valence. These "motivational features" of objects and events are important for the behaving organism to navigate within and adapt flexibly to an environment full of shifting dangers and rewards. This presentation examines the behavioral and brain bases of how certain motivationally-relevant, affective aspects of our perceptual world can influence behavior. In particular, it explores the neural correlates of our subjective responses to others' pain. For example, seeing an injury befall somebody else can make us feel squeamish, make us gasp or wince, and even make us recoil bodily. Why can these third-person events so often create such a subjective, first-person buzz even when there is no imminent threat of harm to the observer?

The functional magnetic resonance imaging (fMRI) evidence indicates that both feeling pain directly and seeing others' apparent injury give rise to activations in the dorsal anterior cingulate cortex (dACC) and midcingulate cortex (MCC). These "motivational-affective" regions play roles in evaluating, anticipating, and learning about aversive events, as well as in preparing appropriate skeletomotor responses to pain. The behavioral evidence indicates that visual information about others' pain not only influences the observer's own motor system, but also facilitates specific motor responses that would be appropriate were the observer in the place of the observed. Taken together, this evidence supports a central functional claim: that the cingulate's role in representing observed pain is intimately bound to motivational processes involved in producing appropriate behavioral responses to pain-related events. Such a mechanism could enable observational learning about aversive events and contexts, while underpinning the affectively-laden "empathic" interpretation of others' distress.