

FEAR RELEVANCE MODULATES FRONTAL CORTEX ACTIVITY DURING ANTICIPATION OF PAIN

Vincent D. Costa, Margaret M. Bradley, Francesco Versace, & Peter, J. Lang (University of Florida, Center for the Study of Emotion and Attention)

Introduction

Anticipation of pain readily prompts defensive activation in body and brain. Prior psychophysiological research suggests that individual differences in fear of pain modulate physiological reactivity during pain anticipation. Neuroimaging studies have shown that anticipatory processes are mediated by ventromedial prefrontal, cingulate, and insular cortices. Here, event-related functional magnetic resonance imaging on the University of Florida McKnight Brain Institute's 3T Siemens Allegra MR scanner was used to explore how self-reported fear of pain modulates cortical activation during an instructed fear paradigm.

Experimental

Female participants differing in self-reported pain anxiety viewed simple cues that signaled the potential of electric shock (threat) or no shock (safe). A conjunction analysis examined the overlap and divergence of neural activity between the fearful and non-fearful groups.

Results and Discussion

Across all participants, threat of shock elicited greater signal change in medial and inferior frontal gyri, dorsal anterior cingulate cortex, anterior insula and cerebellum. High fear participants showed a greater extent of activation in the medial and inferior frontal gyri, anterior insula, and inferior parietal lobule. These effects are consistent with group differences in self-reported anxiety, and coincide with enhanced skin conductance responses during threat periods among high fear individuals. Interestingly, increased fearfulness was uniquely associated with signal change in premotor cortex and the superior temporal gyrus.

Conclusions

These findings are consistent with prior work identifying the neural structures mediating anticipatory anxiety, and show that increased fearfulness exaggerates neural and physiological reactions during expectation of an aversive event.

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