

CinguloAmygdala Interactions in Surprise and Extinction: Interpreting Associative Ambiguity

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Many chapters in this volume depict the anterior cingulate cortex (ACC) as a heterogeneous structure involved in the processing of both cognitive and emotional information. A vast animal and human literature supports the notion that the amygdala is a critical structure in the processing of emotional information. Given the strong reciprocal connectivity between the ACC and the amygdala, any assessment of the role of the ACC in the processing of emotional information would benefit from careful consideration of cinguloamygdala interactions. To this end, we explore the relation between electrophysiological data recorded from the rodent brain and functional neuroimaging data gleaned from studies in humans. Taken together, these data reveal a specific role for cinguloamygdala processing in the interpretation of emotional information, especially when the predictive value of biologically relevant stimuli is ambiguous.

Goals of This Chapter

We begin by briefly describing the anatomical connections between the ACC, the anterior midcingulate cortex (amCC), and amygdala; the reader is referred to Chapter 6 for a more thorough review of amygdalocingulate circuits. We then consider studies of extinction learning in animal subjects that have delineated a particularly compelling relationship between the subgenual ACC and the amygdala. Finally, human neuroimaging reports