
Incidental contextual threat in adults and adolescents: an fMRI study

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Abstract

Recent developments chart the neuronal fear pathways during context conditioning. Yet, little is known how, and whether, the same pathways are activated during development given differences in maturation between structures involved in emotional and cognitive processing. Here, in an fMRI task, we used differential context conditioning to (aversive) facial stimuli that were either presented in a context in which conditioning could occur (room A) and a context in which no conditioning occurred (room B). Eighteen adolescents (9 female, mean age 14.92 years) and 18 IQ and sex-matched adults (9 female, mean age 31.22 years) were required to navigate through two different rooms in a virtual maze while encountering the conditioned stimuli. The results revealed a significant two-way interaction between context and threat cue in the orbitofrontal cortex (OFC). This interaction showed that activations to aversive faces relative to non-aversive faces were reduced in the conditioned context. The reverse effect, larger activations for conditioned faces relative to non-conditioned faces were present in the non-conditioned context. In addition, presence in the conditioned context increased insula activation for both groups. Main effects of group on the other hand were restricted to heightened activations for adolescents relative to adults in amygdala and hippocampus. By comparison, no differences emerged on behavioural performance measures or fear ratings. The data implicate a differential role of the OFC in contextual threat. The findings are discussed in relation to recent findings in cue conditioning during development.

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