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Exploring the MAOA-Aggression Link: Clues from the Brain's Response to Social Exclusion

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Recent work has shown that a functional polymorphism in the monoamine oxidase A (MAOA) gene predicts aggressive behavior, especially among individuals with early adverse experience. Although individuals with the low expression version of the MAOA gene are more likely to commit violent crimes, it is not clear how this genetic polymorphism predisposes individuals to aggressive behavior. Individuals with the low expression version of the MAOA gene may be more likely to commit violent crimes because they are less socially sensitive (e.g. psychopathic) and thus care less about harming others. Alternatively, individuals with the low expression allele may be more likely to commit violent crimes because they show a heightened sensitivity to negative social cues and then respond to such cues with defensively aggressive behavior. To examine these two possibilities, we investigated how different allelic variants in the MAOA gene related to neural responses to an episode of social exclusion. Previous work has shown that being socially excluded, compared to being included, led to activity in the dorsal anterior cingulate cortex (dACC) and that increased dACC activity was associated with greater self-reported social distress. If the low expression MAOA allele relates to aggression through reduced social sensitivity, individuals with the low expression allele should show reduced dACC activity in response to social exclusion. However, if the low expression MAOA allele relates to aggression through a heightened sensitivity to negative social cues, then individuals with the low expression allele should show greater dACC activity in response to social exclusion. The results of this study will be elucidated and the implications for understanding genetic precursors to aggression will be discussed.