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MAOA, Maltreatment, and Gene-environment Interaction Predicting children's Mental health: New Evidence and a Meta-analysis

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Previous research on adults has shown that a functional polymorphism in the promoter region of the monoamine oxidase (MAOA) gene moderates the impact of childhood maltreatment on risk for developing antisocial behavior (Caspi et al., 2002; Science). Thus far, attempts to replicate this finding have been mixed. The current study (i) presents new data investigating this finding in a sample of 975 7-year-old boys, and (ii) evaluates the extant data by conducting a meta-analysis of published findings. We replicated the original finding by showing that the MAOA polymorphism moderates the development of psychopathology after exposure to physical abuse, we extended the finding to childhood closer in time to the maltreatment experience, and we ruled-out the possibility of a spurious finding by accounting for passive and evocative gene-environment correlation. Moreover, meta-analysis demonstrated that across five extant studies, the association between maltreatment and mental health problems is significantly stronger in the group of males with the genotype conferring low vs. high MAOA activity (group difference effect size estimates ranging from .14 to .18). These findings provide the strongest evidence to date suggesting that the MAOA genotype influences vulnerability to violent victimization in perpetuating the cycle of violence. This significant gene-environment finding in a statistical sense represents an important launching pad for developmental neuroscience research into the underlying causal, biological mechanisms involved in the etiology of psychopathology. Ultimately, these findings may lead to avenues for both pharmacological and psychosocial interventions to prevent the development of violent behavior in maltreated individuals. In the meantime, these results indicate that further tests to replicate and confirm the gene-environment interaction involving childhood maltreatment and the development of antisocial behavior would be worthwhile.

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