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Genotype-Environment Correlation by Intervention Effects Underlying Middle Childhood Peer Rejection and Associations with Adolescent Marijuana Use

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Aggression in middle childhood can contribute to peer rejection, subsequently increasing risk for substance use in adolescence. Peer relationships can also be associated with a child's genetic predisposition, a genotype-environment correlation (rGE). Additionally, psychosocial interventions can buffer genetic predispositions for negative behavior. The current study examined for rGEs between polygenic risk for aggression and peer rejection in middle childhood, subsequent associations with adolescent marijuana use, and potential moderating effects of a psychosocial intervention, the Family Check-Up.

Participants from a longitudinal randomized prevention trial of high-risk children ($n=233$ control, $n=228$ intervention) were assessed for peer rejection annually from 8.5 to 10.5, and marijuana use at 16. Functional polygenic risk scores (PRSs) were created based on a meta-GWAS of childhood aggression (Pappa et al., 2016), and filtered using gene-set enrichment analyses to retain functional SNPs (annotated, regulatory, eQTL) at $p < .05$. Time-varying effect modeling was used to examine developmental associations between PRSs and peer rejection. Peer rejection age bands were subsequently created to examine associations with marijuana use.

The PRS was associated with peer rejection from 8.75 to 9.5. The age band for this period was associated with marijuana use at age 16. However, these effects were present only in the control group. Results indicate an evocative rGE such that genetic predisposition for aggression elicits greater peer rejection in middle childhood, which increases risk for marijuana use in adolescence. The absence of effects in the intervention group suggests that psychosocial interventions can buffer rGEs and effects on marijuana use.