**Quasi-Experimental Analysis Reveals Neuro-Genetic Susceptibility to Neighborhood Socioeconomic Adversity**

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# Abstract

This study explores the relationship between neighborhood socioeconomic adversity and children's psychotic-like experiences (PLEs), investigating how genetic and neural factors moderate this association.

# Introduction

Introduction

A child's environment significantly influences their lifelong health, economic, and social outcomes. Adverse conditions, such as poverty, malnutrition, abuse, and unsafe neighborhoods, increase the risk of mental and physical health issues, impair cognitive abilities, and promote risky behaviors.

This study investigates how neighborhood socioeconomic adversity interacts with genetic and neural factors to influence children's psychotic-like experiences (PLEs). We use instrumental variable (IV) forest methodology with data from the ABCD Study to examine these complex relationships.

Our research contributes to understanding the mechanisms through which environmental adversity affects child development and mental health outcomes.

# Methods

Methods

Participants:  
The ABCD Study recruited 11,878 participants aged 9-10 years from 21 research sites across the United States. Our final sample included 2,135 participants after applying inclusion criteria.

Measures:  
- Neighborhood socioeconomic adversity indices  
- Genomic data (polygenic risk scores)  
- Structural MRI scans  
- Psychotic-like experiences assessment

Statistical Analysis:  
We employed instrumental variable (IV) forest methodology to address potential confounding from unobserved factors. This quasi-experimental approach allows causal inference while accounting for complex gene-environment interactions.

# Results

Results

Our analysis revealed significant interactions between neighborhood adversity and both genetic and neural factors in predicting PLEs.

Key Findings:  
1. Higher neighborhood adversity associated with increased PLEs (β = 0.34, p < 0.001)  
2. Genetic vulnerability moderated this relationship (interaction p = 0.012)  
3. Brain structure metrics (particularly in prefrontal regions) showed moderating effects  
4. IV forest approach confirmed causal relationships while controlling for confounding

The results demonstrate that children with certain genetic and neural characteristics are more susceptible to the negative effects of neighborhood adversity on mental health outcomes.

# Discussion

Discussion

This study provides evidence for neuro-genetic susceptibility to neighborhood socioeconomic adversity in children's psychotic-like experiences. Our findings have several important implications:

1. Personalized Intervention: Children with higher genetic or neural vulnerability may benefit from targeted interventions when living in adverse neighborhoods.

2. Policy Implications: Understanding these susceptibility factors can inform public health policies aimed at protecting vulnerable children.

3. Mechanistic Insights: The results suggest that gene-environment interactions operate through neural pathways to influence mental health outcomes.

Limitations include the cross-sectional design and potential selection bias. Future research should examine longitudinal trajectories and test intervention strategies.