
GRIN2B TARGETS THE MOST SEVERE COGNITIVE AND BEHAVIORAL IMPAIRMENTS AMONG DISADVANTAGED CHILDREN

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Introduction: it is well established that adversities and *GRIN2B* genetic variants (encoding NMDAR GluN2B subunit) are independently associated with behavioral and cognitive impairments in childhood. However, a high proportion of children exposed to risk have good, long-term outcomes.

Objectives: for the first time, we explored how environmental adversities and *GRIN2B* genetic variants influence children's cognitive abilities and behavioral problems.

Aims: we adopted a gene-by-environment interaction (GxE) approach, to identify children with an unfavorable developmental outcome with the potential of better informing the understanding of susceptibility to developmental disorders.

Methods: 6 SNPs of *GRIN2B* were genotyped in 625 children aged 6-11 years from an Italian community-based sample. The interactive effect of *GRIN2B* variants with 4 measures of adversities (low socioeconomic status - SES, preterm delivery, maternal smoking, absence of breastfeeding) was investigated upon cognitive abilities (vocabulary, block design, forward/backward digit spans of Wechsler's Intelligence Scale, and Rey Figure test) and parents-rated behavioral problems (Child Behavior Checklist/6-18).

Results: rs5796555 x gestational age interaction ($p = .00145$) influenced cognition, with lower IQ memory among children in the 'A/A genotype and ≤ 36 gestational age' group, compared to all other groups. Rs2268119 x SES interaction ($p = .00008$) influenced behavior, with more attention problems among children in the 'either A/T or T/T genotype and low SES' group, compared to all other groups.

Conclusions: *GRIN2B* targets children with the worst outcome in memory and attention functioning among children exposed to environmental adversities. Identification of children with the highest risk may prompt cost-effective preventive/treatment strategies.