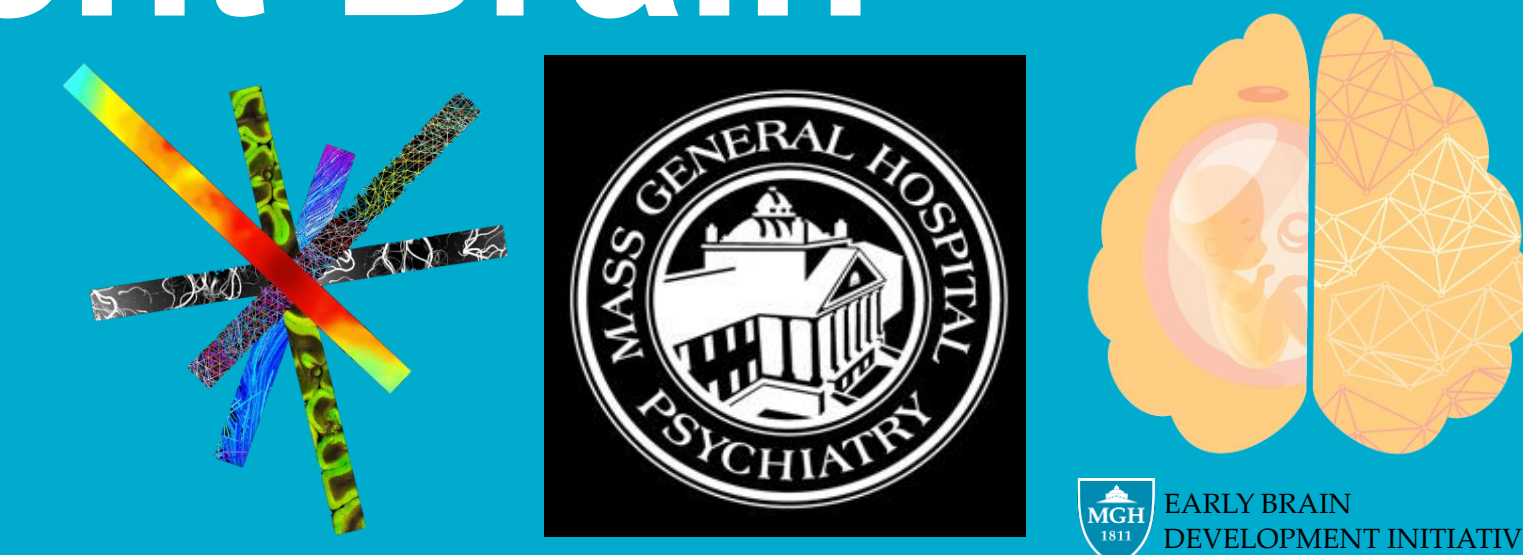


# Mapping Interaction of Social Determinants of Mental Health onto Adolescent Brain

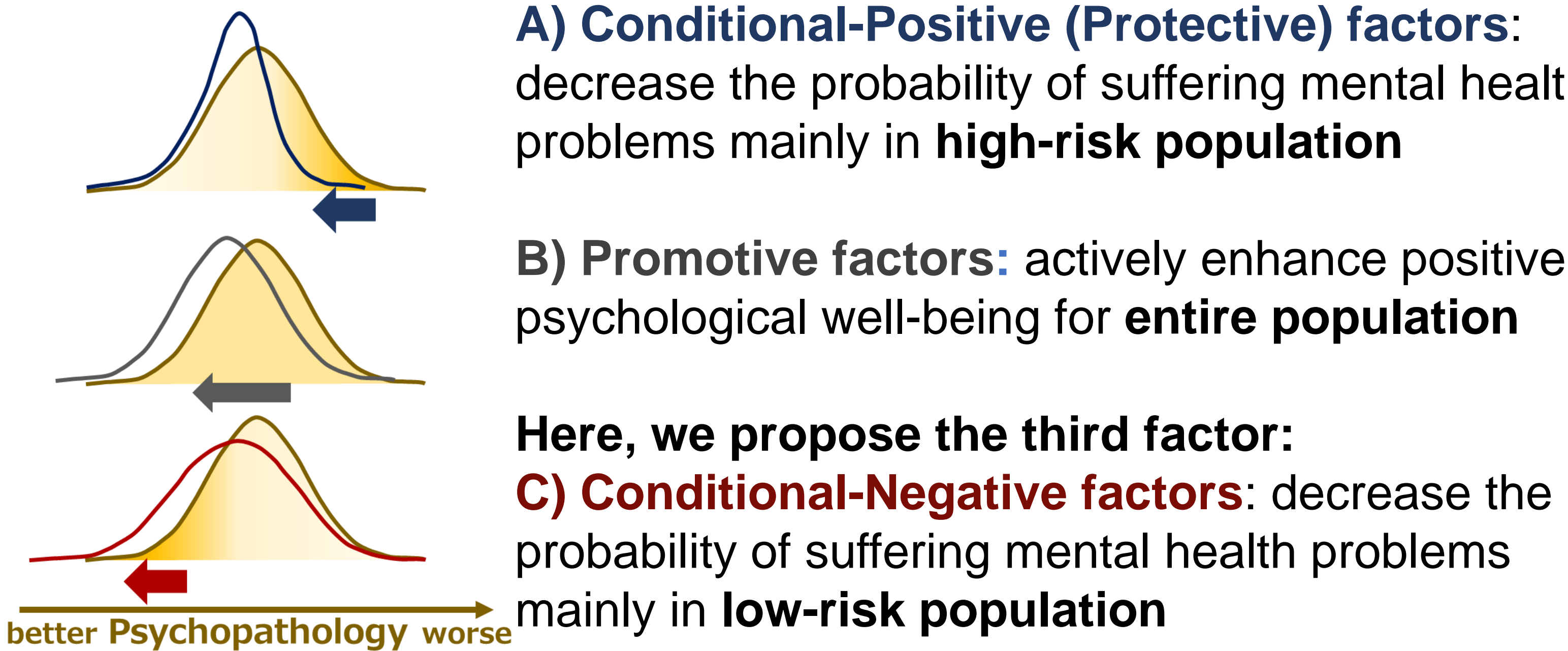
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## Purpose

Adverse social determinants of Mental health (SDoMH) can substantially increase risk of mental health disorders, and such exposures in childhood can propagate and shape mental health risks over the lifespan. SDoMH that exert positive effects on child mental health have been less well studied, and if identified could catalyze development of protective, promotive, and preferential interventions we are proposing.



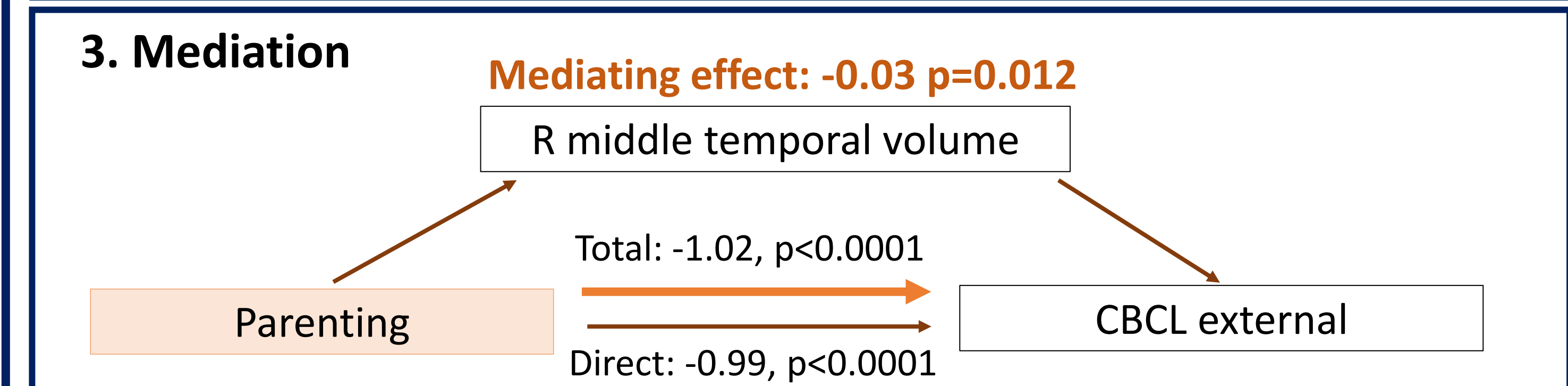
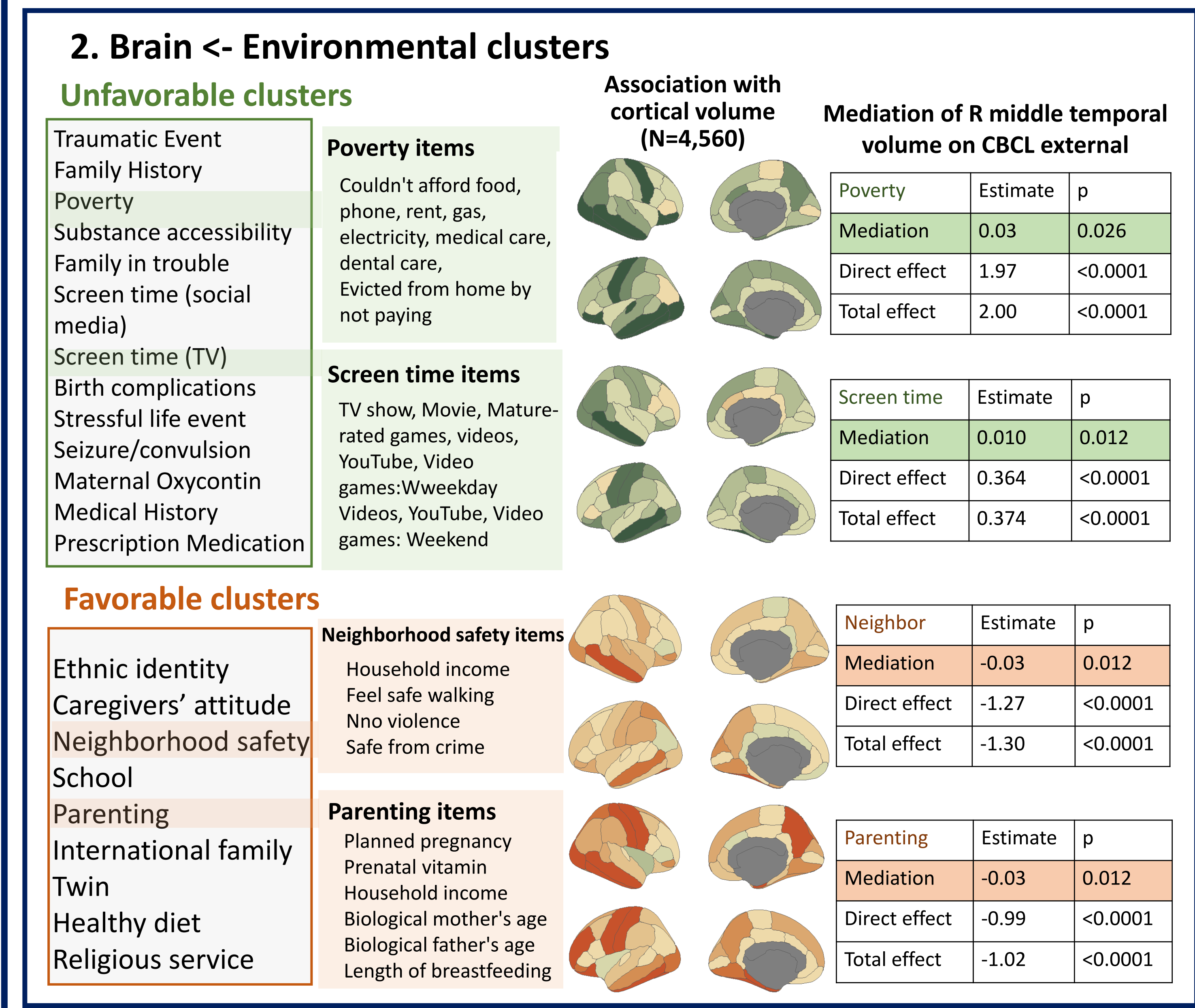
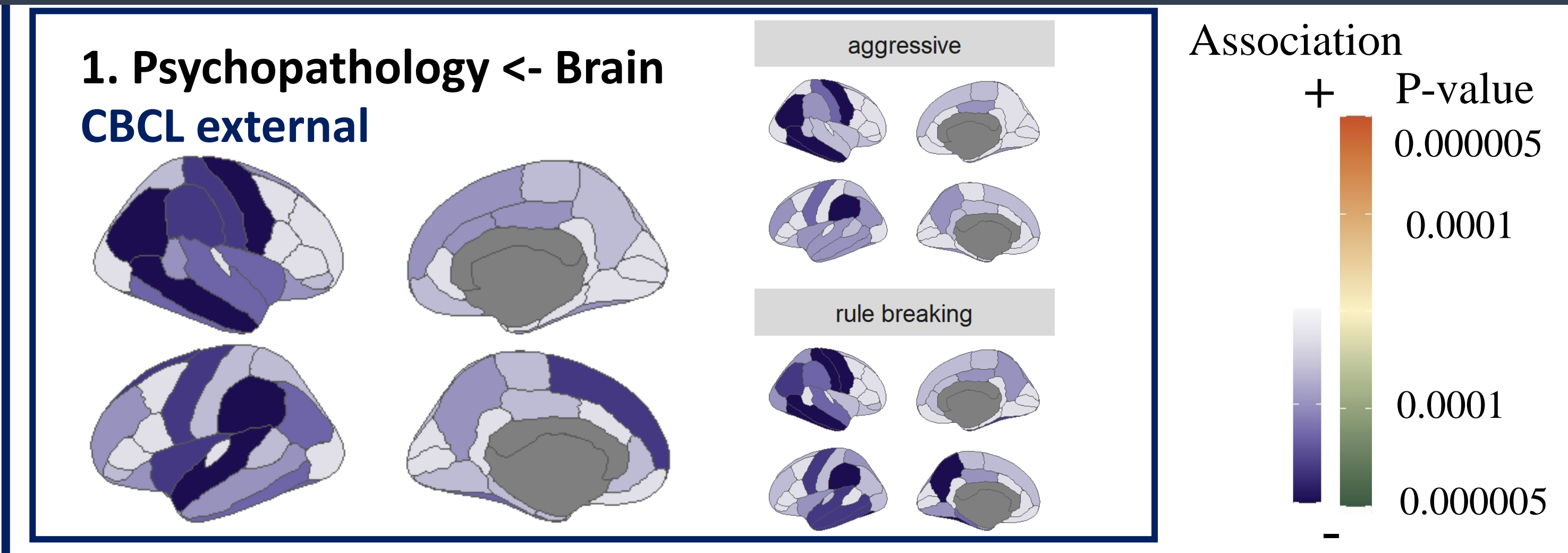
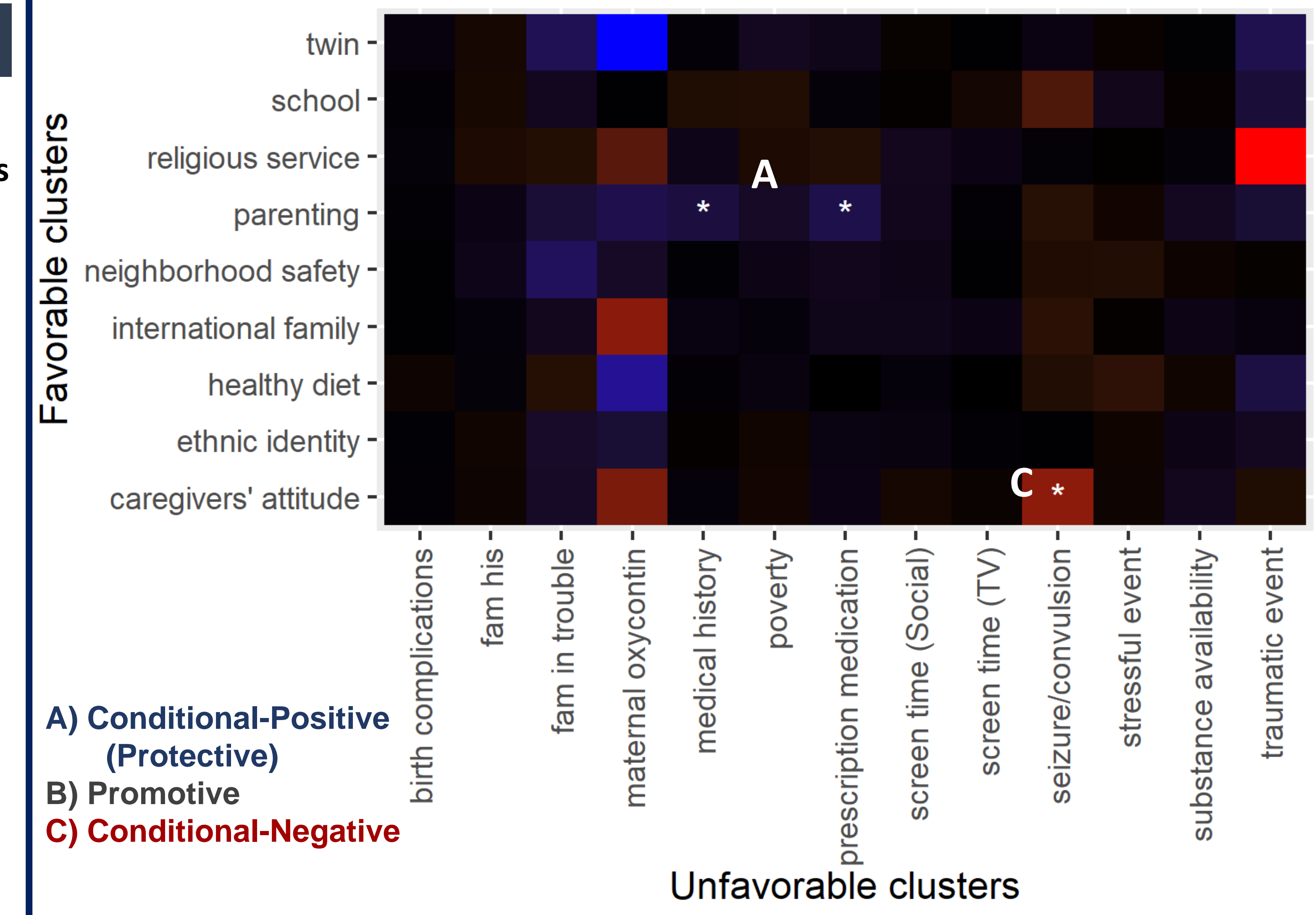
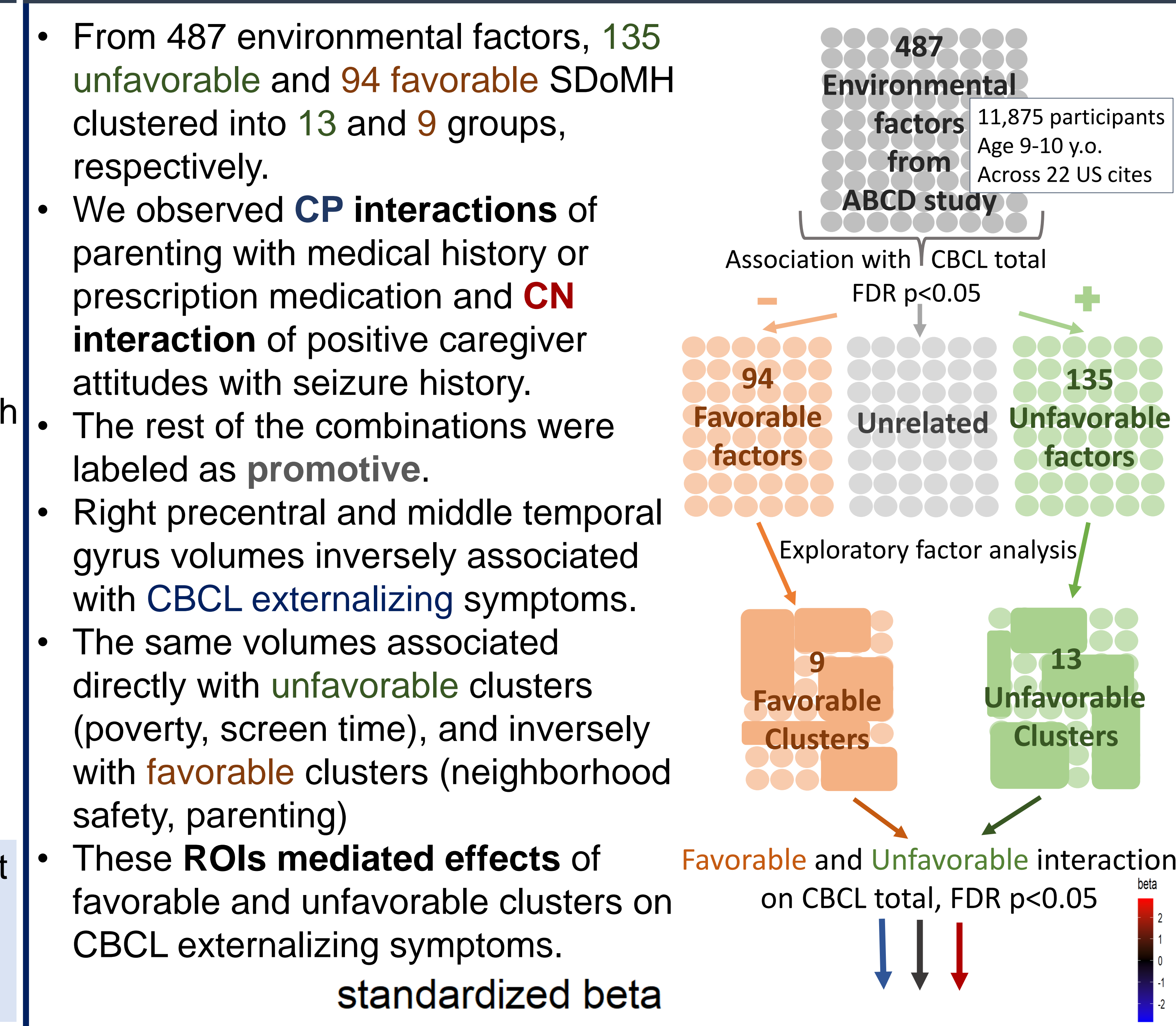
**Hypothesis 1** Different pattern of the effect of favorable factors against unfavorable factors on adolescent psychopathology: CP, promotive, and CN (proof of concept).

**Hypothesis 2.** Effects of SDoMH are mediated by brain morphology.

## Methods

- Cross-sectional data from baseline visits in the Adolescent Brain Cognitive Development (ABCD) Study
- Assessment**
- Outcome: Child Behavior Checklist (CBCL)**  
Parent-report dimensional Psychopathology scale
- Environmental factors**  
Lifetime exposure reported by youth and primary caregiver were selected from the ABCD questionnaire
- Structural MRI**  
3D T1-weighted image, processed with FreeSurfer7.0. Images passed manual quality control were used
- Statistical analysis**
- Multi-level regression analyses were used to see the association between each factor and CBCL total score, covarying age, sex, parental education (fixed effect), family ID, site ID (random effect). Factors with FDR  $p < 0.05$  and total response  $N > 1,000$  were selected.
  - Exploratory Factor Analysis was used to make clusters of negative factors.
  - Multi-level regression analyses with the same covariates were used to test the interaction between favorable and unfavorable clusters. Covariates: Age, sex, parental education (fixed) family ID, site ID (random).
  - Multi-level regression analysis were used to test the association between CBCL external, favorable, and unfavorable clusters and ROI volumes. Age, sex, intracranial volume, QC rating (MQC), surface hole number (SHN) (fixed effect) and family ID, site ID, and scanner (random) were used as covariates.
  - Mediating effect of ROIs on SDoMH and CBCL external were tested covarying age, sex, intracranial volume, MQC, SHN(fixed effect) and site ID (random).
- ABCD study SDoMH scales**  
(Y: youth, P: parents), #items
- Acculturation Survey (P), 4
  - Acculturation Survey (Y), 4
  - Alabama Parenting Q. (P), 42
  - Child Nutrition Assess. (P), 16
  - Commun. Risk/Prot. Fact. (P), 6
  - Cyberbully Q. (Y), 4
  - Demographics Survey (P), 51
  - Developmental History Q. (P), 62
  - Difficulties in Emotion Reg. (P), 36
  - Discrimination Measure (Y), 11
  - Family Conflict Scale (Y), 9
  - Family History 1 (P), 6
  - Family History 2 (P), 7
  - KSADS Traumatic Ev. (P), 17
  - Life Events (P), 35
  - Medical History (P), 15
  - Multi-Group Ethnic ID Surv. (P), 12
  - Neighb'd Questionnaire (Y), 25
  - Neighb'd Safety/Crime Surv. (P), 3
  - Other Resilience (Y), 4
  - Parental Monitoring Q. (Y), 5
  - Peer Experiences Q. (Y), 9
  - PhenX Commun. Cohesion (P), 10
  - Report of Parental Behav. (Y), 11
  - School Risk/Protective Fact. (Y), 12
  - Screen Time Survey (Y), 14
  - Sports/Activities Involv. Q. (P), 29
  - Vancouver Index of Accultur.(P), 16
  - Youth Risk Behavior Survey (Y), 3

## Results



## Conclusion

- Significance**
- The effect of favorable environmental exposures on psychopathology depends in part on the presence or absence of unfavorable exposures.
  - Favorable and unfavorable exposures associate with variance in brain structure that mediates psychopathology.
- Implications**
- The effectiveness of resiliency-related interventions may vary among individuals based on differences in adverse experiences. This indicated the needs of personalized intervention.
  - Longitudinal analyses within ABCD will examine the interplay of favorable and adverse exposures on brain development.

## Limitation

Cross-sectional study: cannot confirm causality. Though we adjusted SES (education), the results could be confounded by other SES, exposures, or genetics..

## Acknowledgement

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