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24.3 Reward Processing and Behavior Traits in Female Youth: Implications for Psychiatric Vulnerabilities

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24.2—25.1

white matter, sex, and dimensional psychopathology in a community-based sample of 9- to 10-year-old children from the Adolescent Brain Cognitive Development (ABCD) study (discovery/replication cohort: 4448/4448 children, 47.1/47.8% female). We hypothesized that sex and diverse aspects of psychopathology would be widely related to white matter microstructure.

Methods: Microstructure measures were derived using traditional diffusion tensor imaging (DTI) and advanced restriction spectrum imaging (RSI) in 21 white matter regions of interest (ROIs), with false discovery rate (FDR) correction across ROIs in the discovery cohort. Dimensional psychopathology was characterized using the parent-report Child Behavior Checklist (CBCL). Primary CBCL analyses focused on internalizing and externalizing problems (discovery/replication cohort: 17.1/17.3% internalizing t-scores ≥ 60 , 10.1/10.2% externalizing t-scores ≥ 60); follow-up analyses examined all syndrome scales, with FDR correction.

Results: We found significant and replicable sex differences in DTI and RSI metrics for every ROI examined (all $p < 0.05$; [std. betas] = 0.05-0.43). Such sex effects did not significantly depend on psychopathology, as assessed with the CBCL. DTI and RSI measures were independently and reliably related to externalizing but not internalizing problems in a subset of ROIs (all $p < 0.04$; [std. betas] = 0.03-0.05). Follow-up analyses indicated widespread and replicable white matter associations with attention and social problems (all $p < 0.05$; [std. betas] = 0.03-0.08), as well as more localized associations with aggression, rule breaking, and thought problems (all $p < 0.05$; [std. betas] = 0.02-0.06).

Conclusions: These findings provide an important foundation for the study of mental health conditions in pediatric populations.

IMAGS, PSP, DEV

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24.2 Voxel-based morphometry reveals that different subtypes of bully victimization have different effects on the brain



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Objectives: It is widely known that bully victimization associates with negative outcomes. A prior study reported that bully victimization affects the brain volume. Classically, bully is divided into 2 subtypes: direct bully (eg, pushing or hitting) and indirect bully (eg, backbiting or teasing), which are thought to have different effects. The effects of each subtype on brain volume, however, have not been elucidated. Thus, the purpose of our study was to investigate the differences in the impact of bully victimization on brain structure by subtype of bully.

Methods: The participants were 96 Japanese young adults aged 18 to 27 years (mean = 21.3) who reported bully victimization experience. The frequency of each subtype of bully victimization in childhood was assessed using 3 questions, each with a 4-point scale. Three-dimensional T1-weighted brain images were acquired using a 3-T Philips Intra Achieva scanner. Preprocessing of images was performed in a standard manner of voxel-based morphometry using statistical parametric mapping software 12. Whole-brain multiple regression analysis was conducted to examine the associations between bully victimization frequency of each subtype and regional gray matter volume (rGMV) adjusting for sex and age effect.

Results: We found a significant positive correlation between rGMV in the left superior parietal lobe and direct bully victimization frequency (MNI coordinates at peak voxel = [x = -26; y = -47; z = 53]; cluster size = 1482; threshold-free cluster environment [TFCE] = 1569.90; $p = 0.009$), and a significant positive correlation between rGMV in the left subcallosal region and indirect bully victimization frequency (MNI coordinates at peak voxel = [x = -5; y = 9; z = -18]; cluster size = 226; TFCE = 1217.93; $p = 0.019$).

Conclusions: We have shown that different types of bully victimization affect the structure in different brain regions. Hypertrophy of the left superior parietal lobe has been implicated in attentional deficits, which will be an adaptation of the brain to reduce attention to unpleasant external stimuli.

Abnormalities in the subcallosal volume are thought to be associated with depression, which will result from the stress in interpersonal relationships. We should consider different interventional methods depending on the type of bully.

BLY, IMAGS, NEPSYC

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24.3 REWARD PROCESSING AND BEHAVIOR TRAITS IN FEMALE YOUTH: IMPLICATIONS FOR PSYCHIATRIC VULNERABILITIES



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Objectives: Adolescence is a critical period for development of personality but also psychopathology. Those processes may be specific to sex, and brain reward circuits may have a role. Here, we studied how reward processing and temperament associations differ across adolescent and adult females.

Methods: A total of 29 adolescent girls and 41 adult women completed temperament assessments and performed a classical taste-conditioning paradigm during brain imaging. Data were analyzed for the dopamine-related prediction error response. In addition, unexpected stimulus receipt or omission and expected receipt response were also analyzed. Heat maps identified cortical-subcortical brain response associations.

Results: Adolescents showed stronger prediction error as well as unexpected receipt and omission responses (partial $\eta^2 = 0.063$ to 0.166; $p = 0.001$ to 0.043) in insula, orbitofrontal cortex (OFC), and striatum compared to adults. The expected stimulus receipt response was similar between groups. In adolescents vs adults, persistence was more strongly positively related to prediction error (OFC, insula, striatum; Fisher-Z = 1.704 to 3.008; $p = 0.001$ to 0.044), and unexpected stimulus receipt (OFC, insula; Fisher-Z = 1.843 to 2.051; $p = 0.014$ to 0.033), and negatively with omission (OFC, insula, striatum; Fisher-Z = -1.905 to -3.069; $p = 0.001$ to 0.028). Reward sensitivity and reward dependence correlated more positively with unexpected stimulus receipt and more negatively with stimulus omission response in adolescents. Adolescents showed significant correlations between striatum and frontal cortex for unexpected stimulus receipt and omission that correlated with persistence but were absent in adults.

Conclusions: Associations between temperamental traits and brain reward response may provide neurotypical markers that contribute to developing adaptive or maladaptive behavior patterns when transitioning from adolescence toward adulthood.

TEMP, DEV, ADOL

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NEUROMODULATION

25.1 ESTABLISHING A NEUROSCIENCE DIDACTIC SERIES FOR PSYCHIATRIC RESIDENTS: A DEVELOPMENTAL PERSPECTIVE



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Objectives: Adverse childhood experiences (ACEs) including traumatic experiences can affect the development of a child in many ways, including an increased risk of behavioral problems. The first objective is to discuss the development of a neuroscience didactic series on the impact of trauma for psychiatry residents. The second objective is to discuss feedback received from psychiatry residents about the series.