vulnerable to reverse causation and confounding. Mendelian randomization (MR) studies with even large numbers of unrelated individuals can suffer from familial biases, and dynamic effects (‘genetic nurture’) can be especially pronounced for socially patterned phenotypes like obesity. We introduce a ‘within-family’ MR (WFMR) design that uses genotyped mother-father-offspring trios to overcome these biases.

**Methods**

In 5237 8-year-old children from the Norwegian Mother, Father and Child Cohort Study (MoBa), we estimated the effects of body mass index (BMI) on symptoms of depression, attention-deficit hyperactivity disorder (ADHD), anxiety, and autism spectrum disorder (ASD). Child height, weight, and outcomes were based on mother-reported information from questionnaires. We used polygenic risk scores (PRS) as instrumental variables for BMI, with and without adjustment for parents’ own PRS. PRS were calculated in PRCise, and all other analysis completed in STATAv15. PRS were calculated using genetic variants from the largest and most recent genome-wide association study (GWAS) for BMI.

**Results**

Initial MR estimates implied a one-unit higher BMI increased depression symptoms by 0.12 (95%CI 0.05,0.20) and ADHD symptoms by 0.11(0.03,0.18) standard-deviations, and reduced symptoms of anxiety by -0.11(-0.19,-0.03) and symptoms of ASD by -0.05(-0.13,0.03). For ASD, associations did not differ substantially between symptoms related to social communication (-0.03(-0.12,0.05) and to repetitive behaviour (-0.04(-0.12, 0.03). Accounting for parental genotypes in WFMR made little difference to estimates, with no strong evidence of indirect effects of parental genotypes on offspring phenotype. Next steps will be to examine relationships using gene variants associated with BMI during childhood specifically, and to investigate the influence of depressive, ADHD, anxiety and ASD symptoms on childhood BMI.

**Conclusion**

Influence of childhood BMI on emotional and neurodevelopmental health is not explained by family-level genetic biases, suggesting childhood BMI may affect these symptoms. Negative associations of BMI with anxiety are consistent with results from the UK Biobank, where genetic propensities for BMI were negatively associated with risk of self-reporting as a ‘nervous’ person. Intervening on childhood BMI may influence these outcomes.