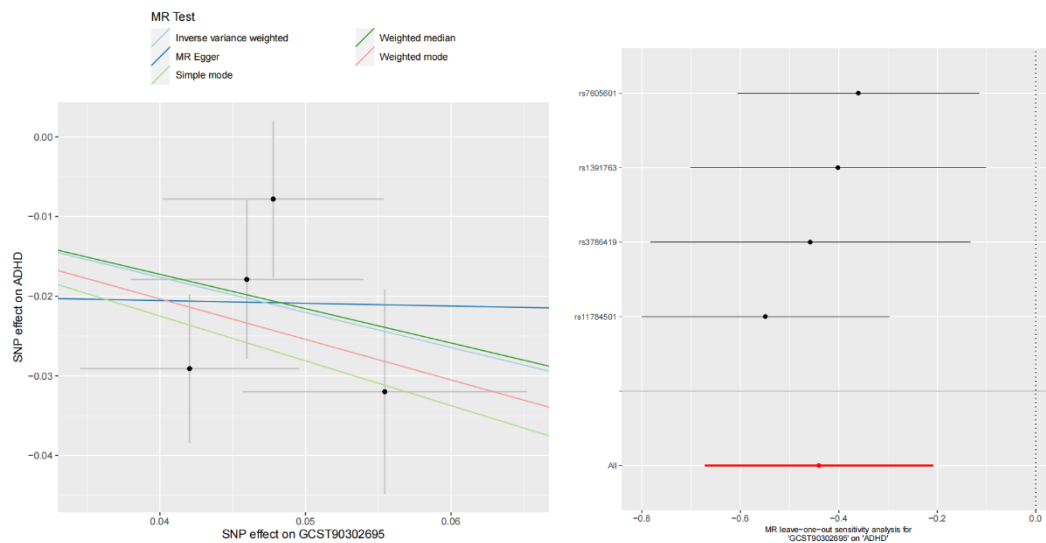
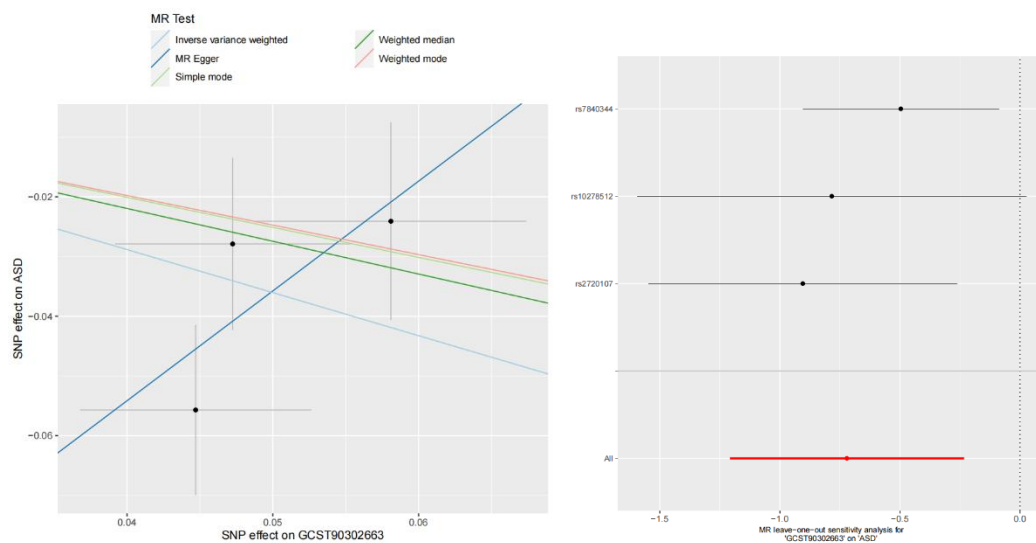


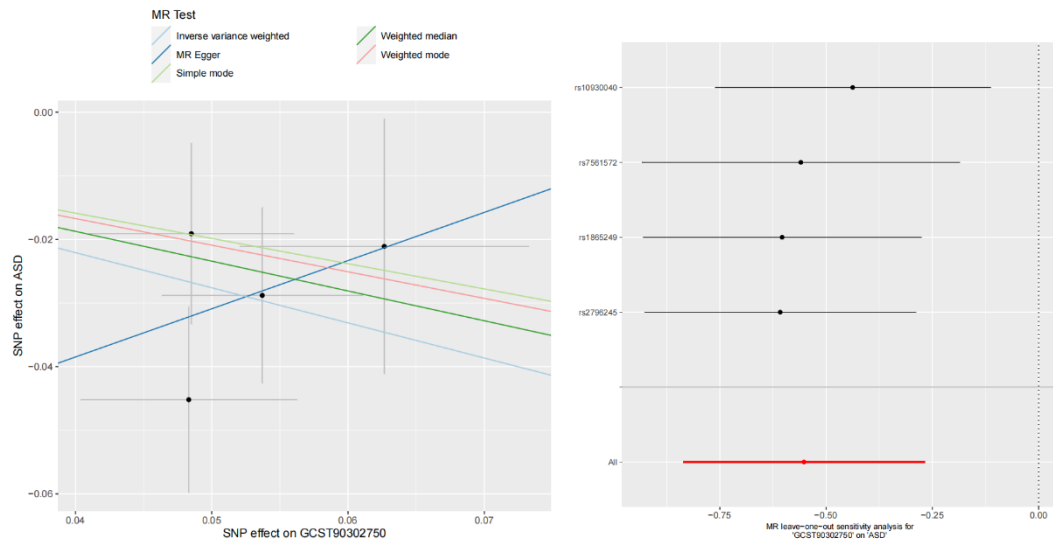
(a) Left-hemisphere dorsal attention network to right-hemisphere somatomotor network white-matter structural connectivity (GCST90302695) & ADHD



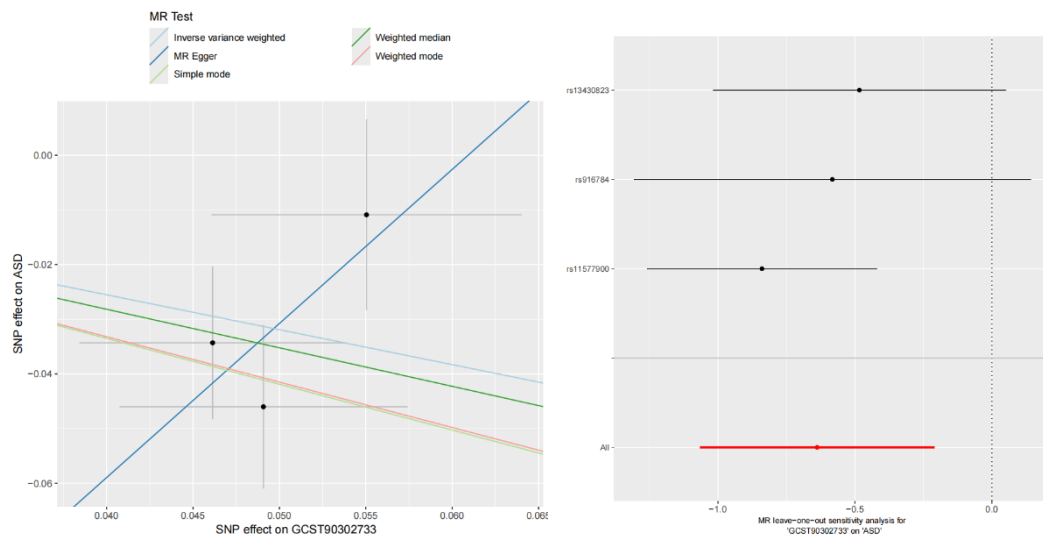
(b) Left-hemisphere visual network to caudate white-matter structural connectivity (GCST90302663) & ASD



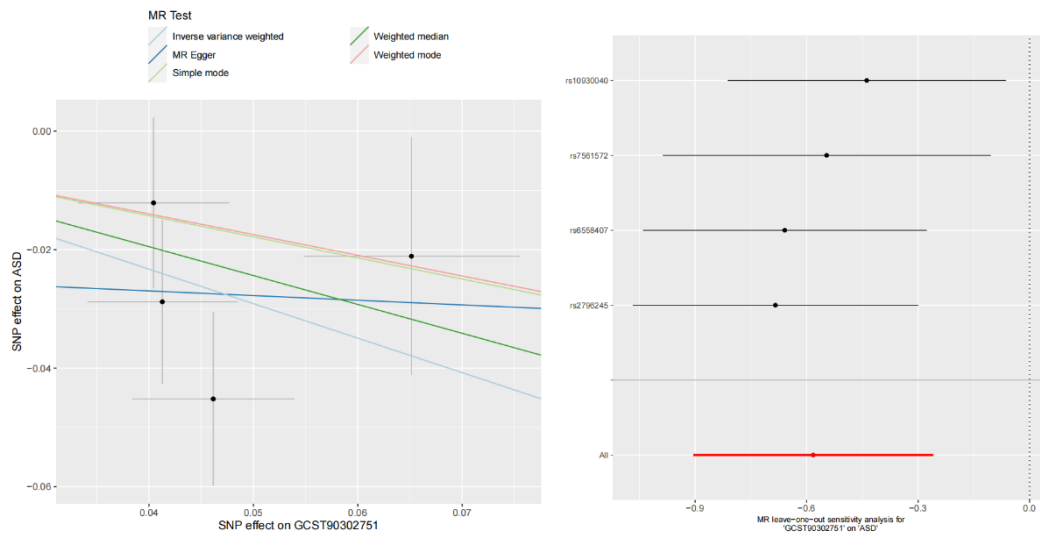
(c) Left-hemisphere control network to right-hemisphere control network white-matter structural connectivity (GCST90302750) & ASD



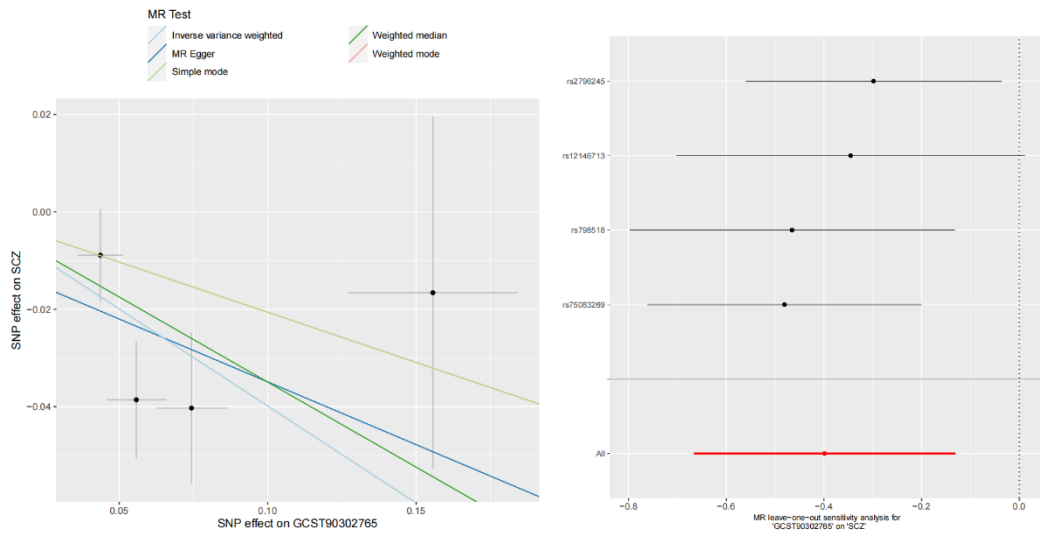
(d) Left-hemisphere limbic network to right-hemisphere limbic network white-matter structural connectivity (GCST90302733) & ASD



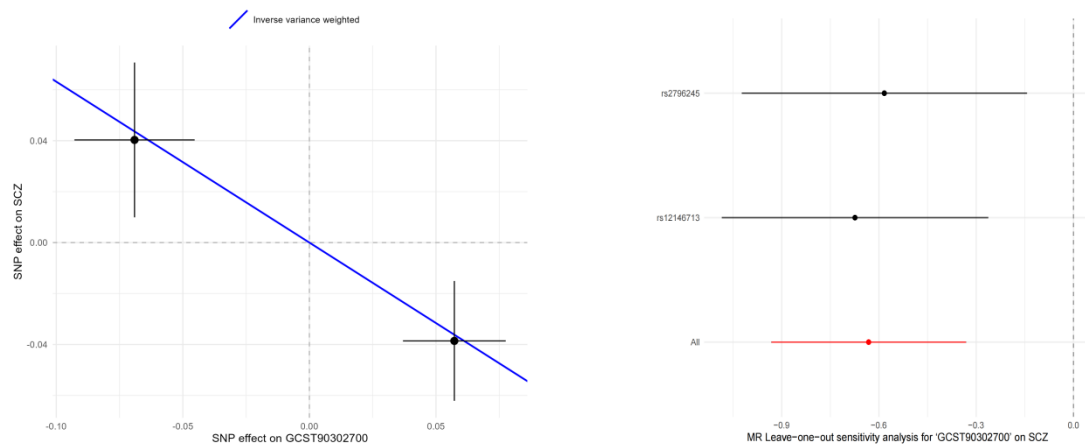
(e) Left-hemisphere control network to right-hemisphere default mode network white-matter structural connectivity (GCST90302751) & ASD



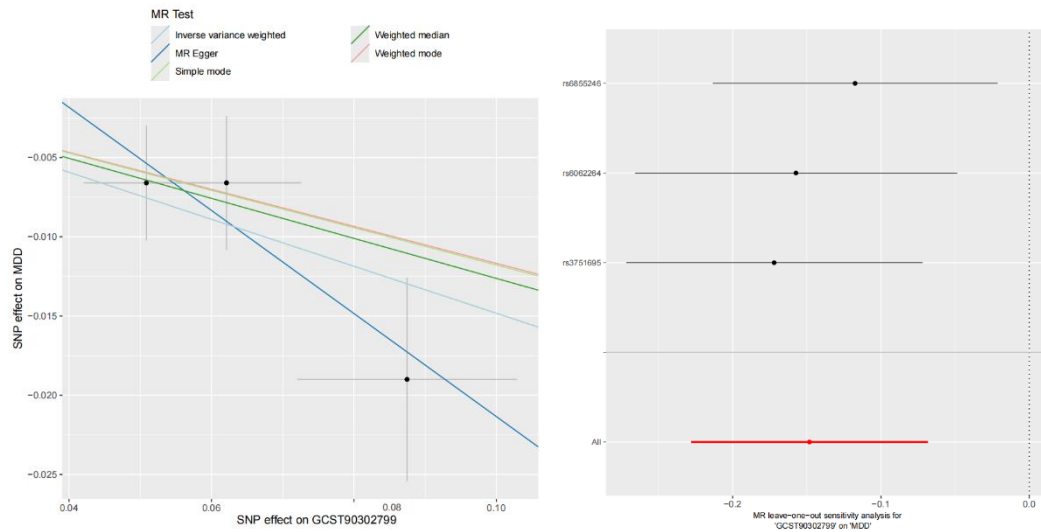
(f) Left-hemisphere default mode network to right-hemisphere control network white-matter structural connectivity (GCST90302765) & SCZ



(g) Left-hemisphere dorsal attention network to right-hemisphere default mode network white-matter structural connectivity (GCST90302700) & SCZ



(h) Right-hemisphere somatomotor network to amygdala white-matter structural connectivity (GCST90302799) & MDD



(i) Right-hemisphere control network to thalamus white-matter structural connectivity (GCST90302836) & MDD

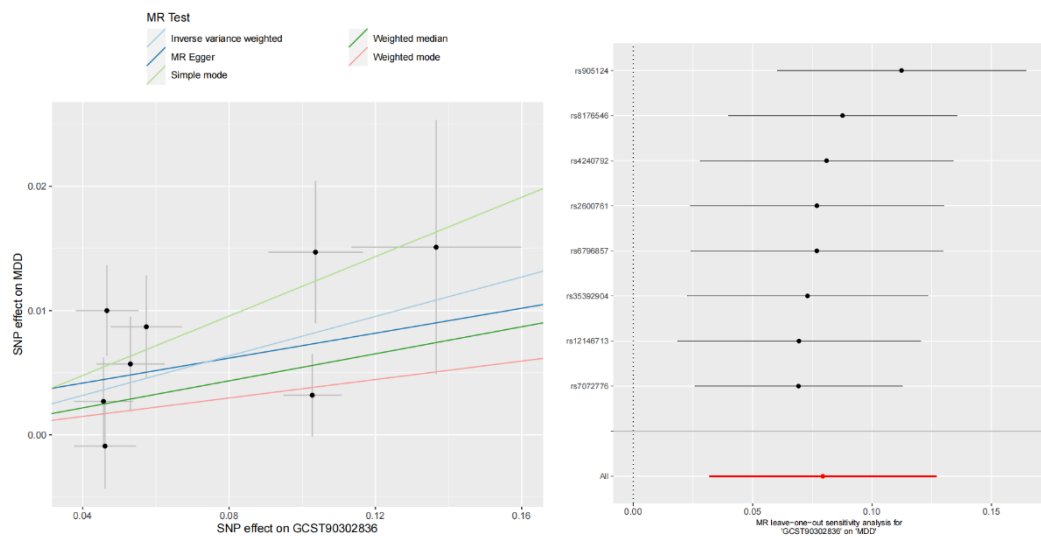


Figure S1. The scatter plots on the left display the genetic associations between exposure (x-axis) and outcome (y-axis). The leave-one-out analysis plots of inverse-variance weighted (IVW) results between exposure and outcome are shown on the right. (a) Left-hemisphere dorsal attention network (DAN) to right-hemisphere somatomotor network (SMN) white-matter structural connectivity (GCST90302695) (N = 26,333) as exposure and attention deficit hyperactivity disorder (ADHD) (N = 225,534) as outcome. (b) left-hemisphere visual network (VN) to caudate white-matter structural connectivity (GCST90302663) (N = 26,333) as exposure and autism spectrum disorder (ASD) (N = 46,350) as outcome. (c) Left-hemisphere control network (CN) to right-hemisphere CN white-matter structural connectivity (GCST90302750) (N = 26,333) as exposure and ASD (N = 46,350) as outcome. (d) left-hemisphere limbic network (LN) to right-hemisphere LN white-matter structural connectivity (GCST90302733) (N = 26,333) as exposure and ASD (N = 46,350) as outcome. (e) left-hemisphere CN to right-hemisphere default mode

network (DMN) white-matter structural connectivity (GCST90302751) (N = 26,333) as exposure and ASD (N = 46,350) as outcome. (f) Left-hemisphere CN white-matter structural connectivity (GCST90302765) (N = 26,333) as exposure and schizophrenia (SCZ) (N = 275,249) as outcome. (g) right-hemisphere SMN to amygdala white-matter structural connectivity (GCST90302799) (N = 26,333) as exposure and major depressive disorder (MDD) (N = 1,074,629) as outcome. (h) right-hemisphere CN to thalamus white-matter structural connectivity (GCST90302836) (N = 26,333) as exposure and MDD (N = 1,074,629) as outcome. (a-i) left show the effect sizes of genetic variants on the two traits, and the error bar represent one standard error. (a-i) right show the effect estimates that represent the log odds ratio of disorder per one-s.d. change in mean structural connectivity phenotype, and the error bars represent 95% confidence intervals (CI).

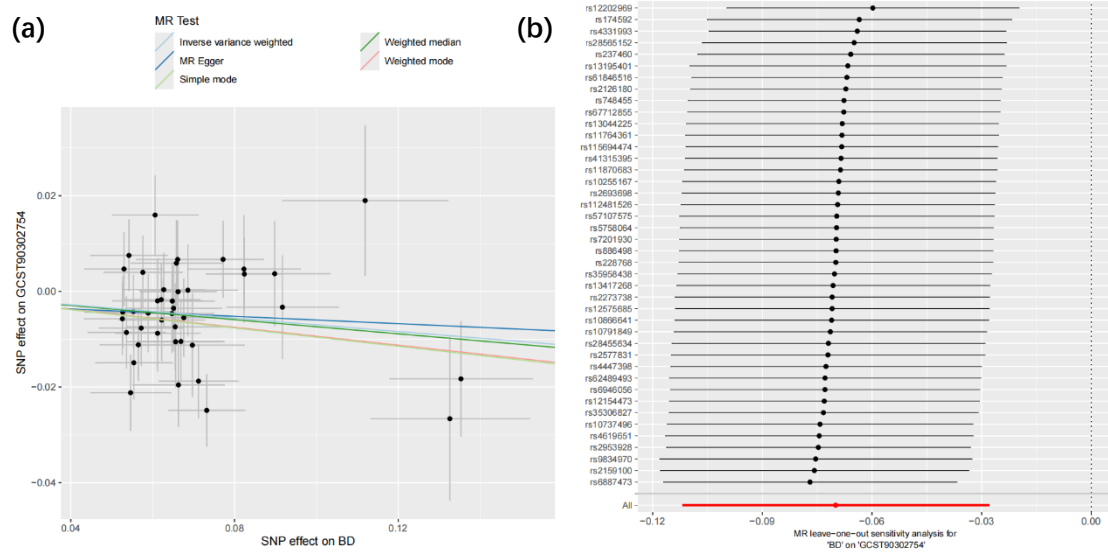


Figure S2. (a) The scatter plots on the left display the genetic associations between bipolar disorder (BD) (x-axis) and left-hemisphere control network to putamen white-matter structural connectivity (GCST90302754) (y-axis). (b) The leave-one-out analysis plots of inverse-variance weighted (IVW) results between BD and GCST90302754 are shown on the right.