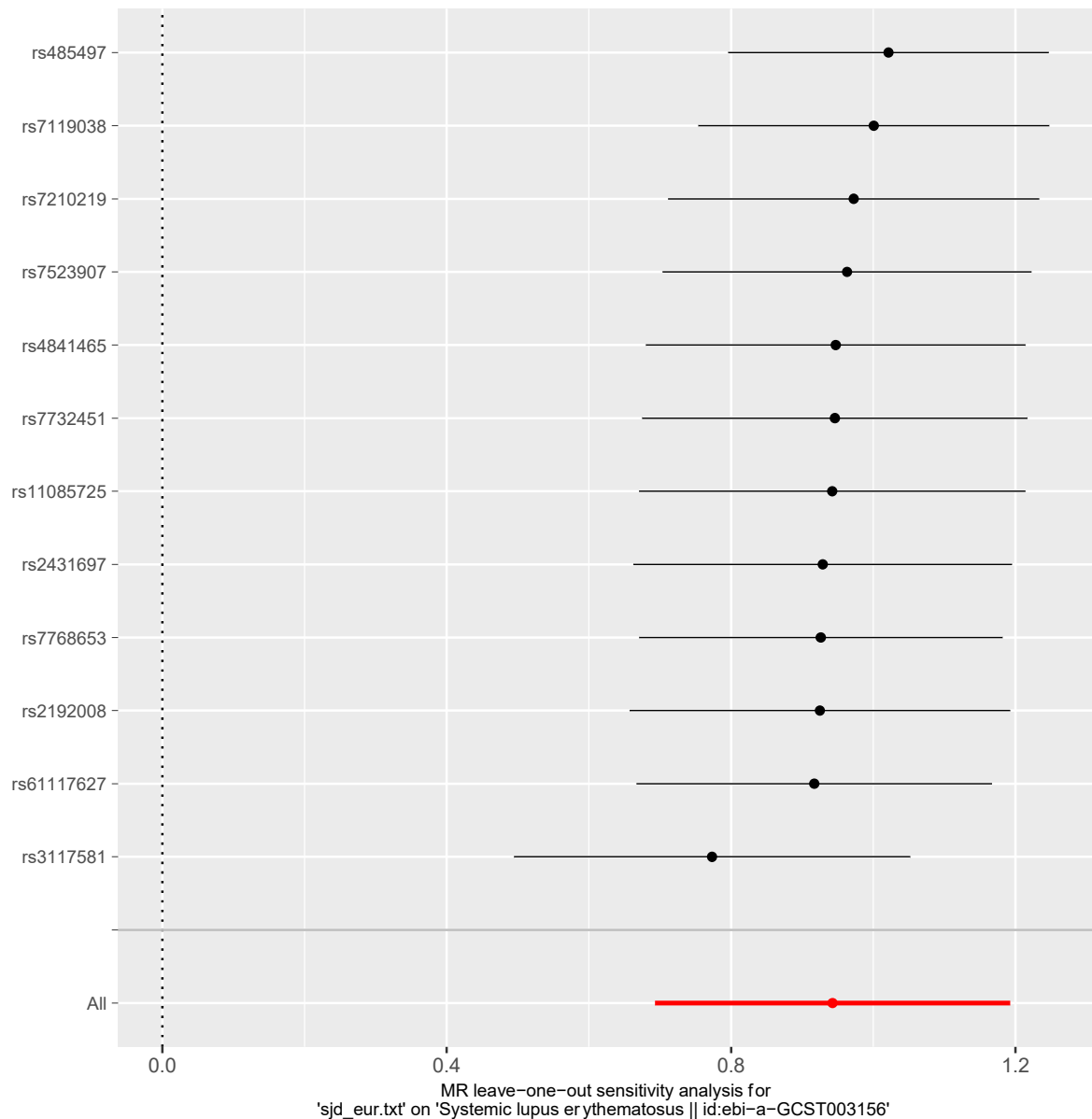
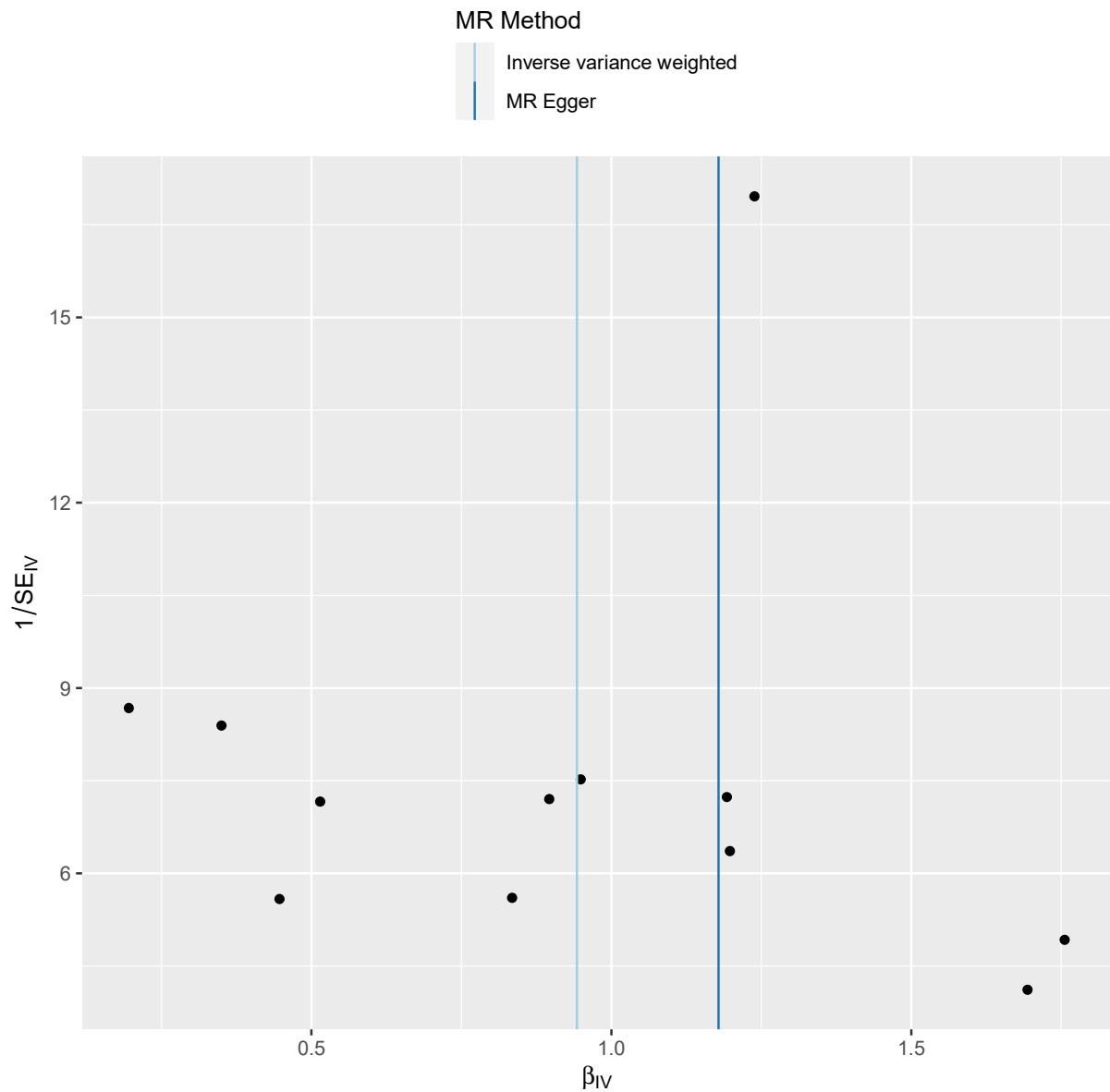


Supplemental Material for *Pervasive sharing of causal genetic risk factors contributes to clinical and molecular overlap between Sjögren's Disease and Systemic Lupus Erythematosus*

Analysis 1: The casual effect of SjD variants on SLE in European ancestry GWAS

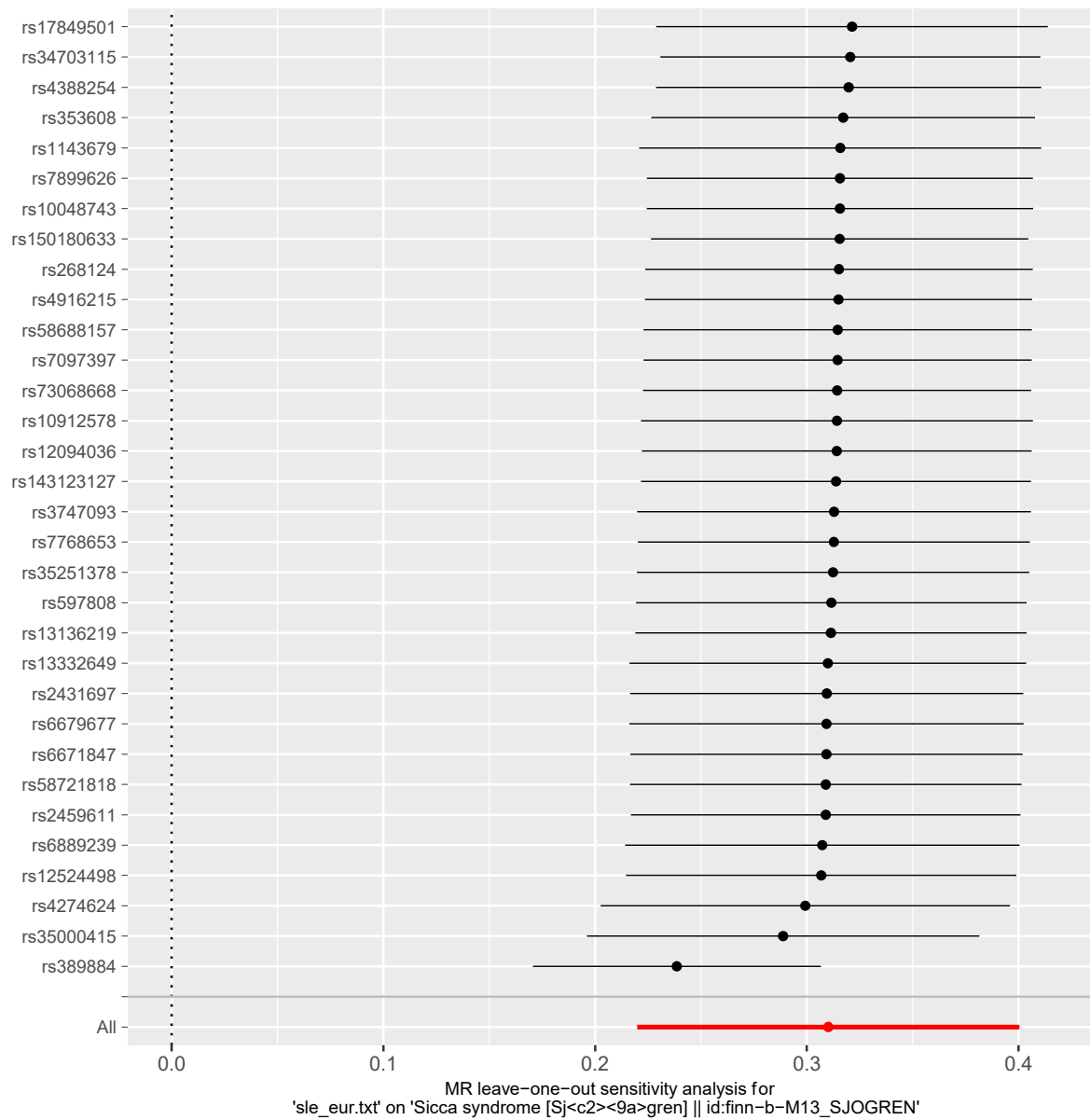


**Figure S1. Leave-one out sensitivity Analysis reveals a stable causal relationship between Sjögren's Disease and Systemic Lupus Erythematosus in a GWAS of persons with European ancestry** Forest plot of the aggregate (inverse-variance weighted) MR effect sizes (beta+/-se) of SjD risk variants on SLE in the Bentham J., et al. GWAS with the indicated variant left out.

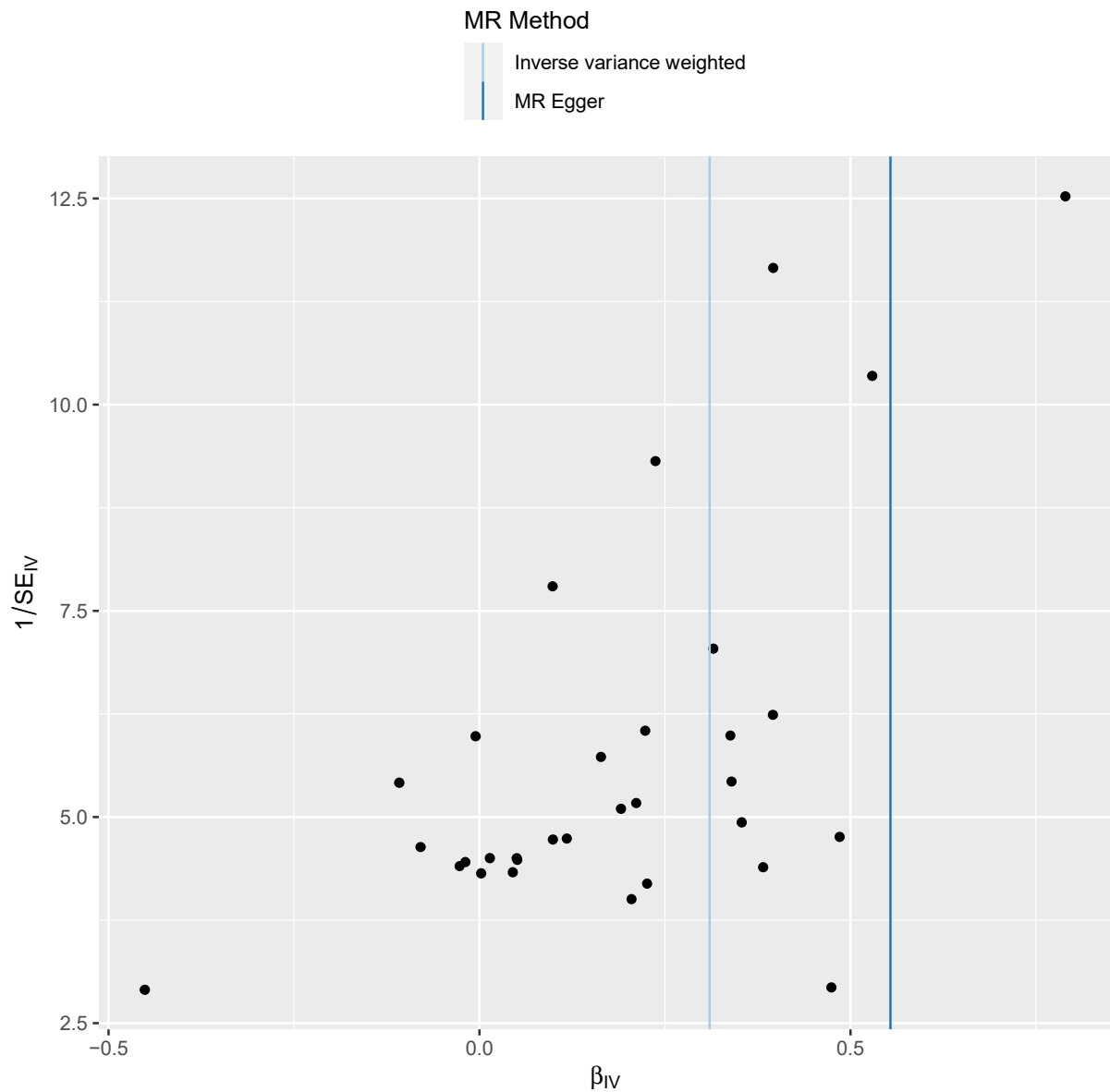


**Figure S2. Funnel Plot of effects of SjD variants in SLE GWAS performed in a cohort of persons with European ancestry.** Shown is the inverse of the standard error plotted as a function of the effect sizes for SjD risk variants on SLE in the Bentham J., et al. GWAS. Values lower on the y-axis are less precise. The wider the distribution, the greater the heterogeneity, which can arise from horizontal pleiotropy. Asymmetry indicates directionality, which can bias MR methods. MR-Egger adjusts for such directional horizontal pleiotropy.

## Analysis 2: The casual effect of SLE variants on SjD in European ancestry GWAS.

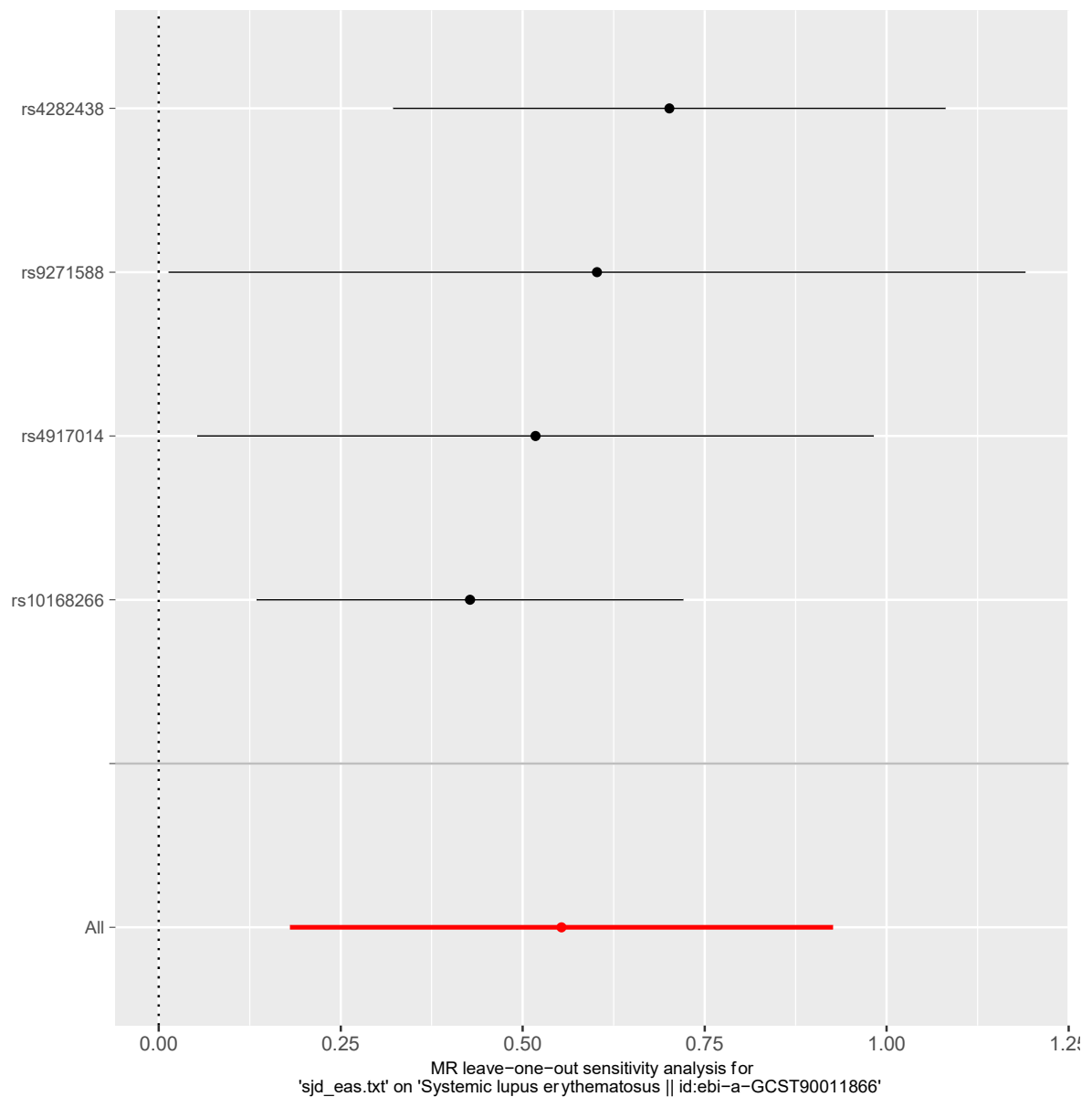


**Figure S3. Leave-one out sensitivity Analysis reveals stable causal relationship between SLE and SjD in a GWAS of persons with European ancestry.** Forest plot of the aggregate (inverse-variance weighted) MR effect sizes (beta+/-se) of SLE risk variants on SjD in the FinnGen M13\_Sjogren GWAS with the indicated variant left out.

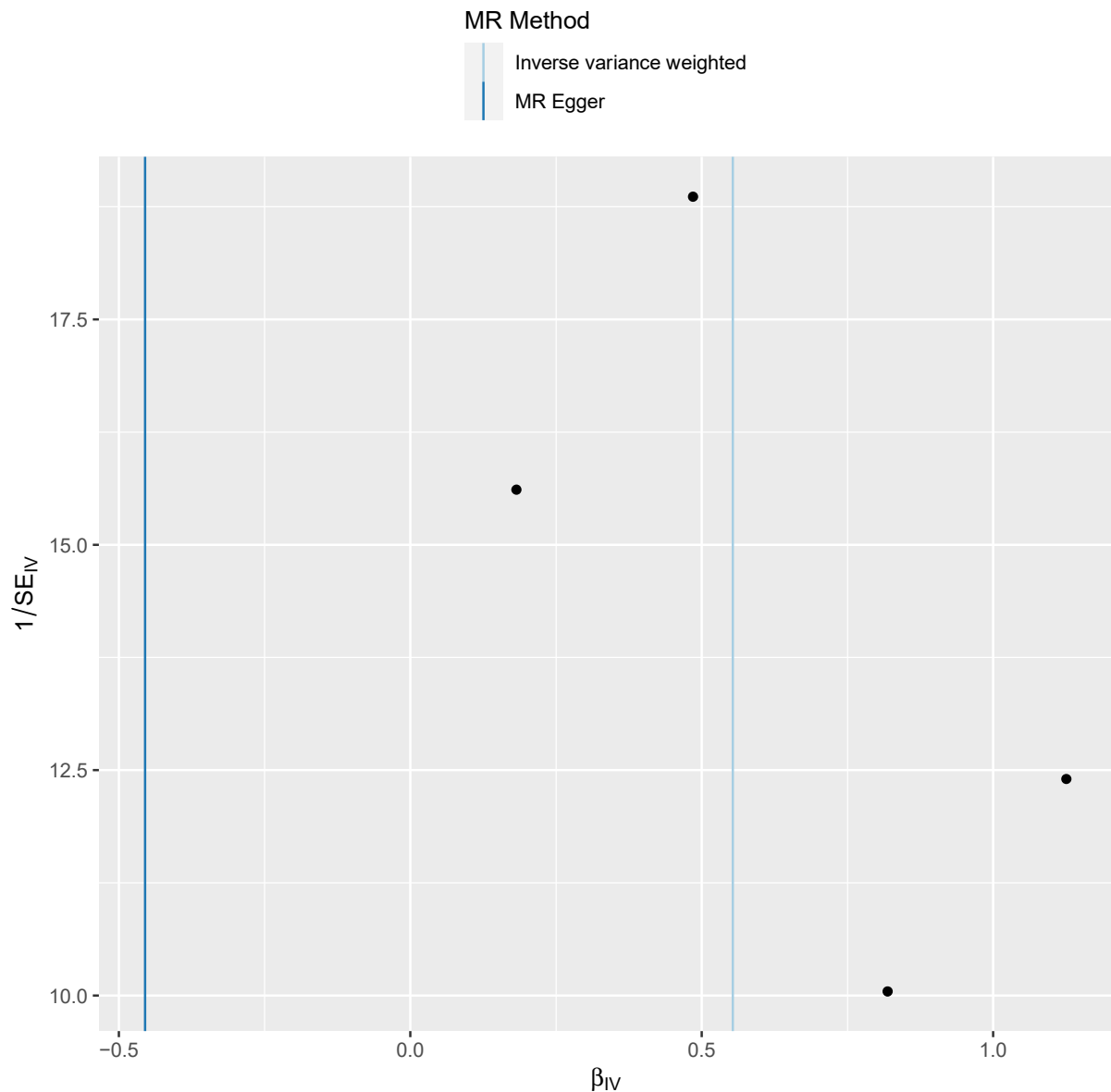


**Figure S4. Funnel Plot of effects of SLE variants on SjD GWAS performed in a cohort of persons with European ancestry.** Shown is the inverse of the standard error plotted as a function of the effect sizes for SLE risk variants on SjD in the FinnGen M13\_Sjogren GWAS. Values lower on the y-axis are less precise. The wider the distribution, the greater the heterogeneity, which can arise from horizontal pleiotropy. Asymmetry indicates directionality, which can bias MR methods. MR-Egger adjusts for such directional horizontal pleiotropy.

Analysis 3: The casual effect of SjD variants on SLE in East Asian ancestry GWAS.

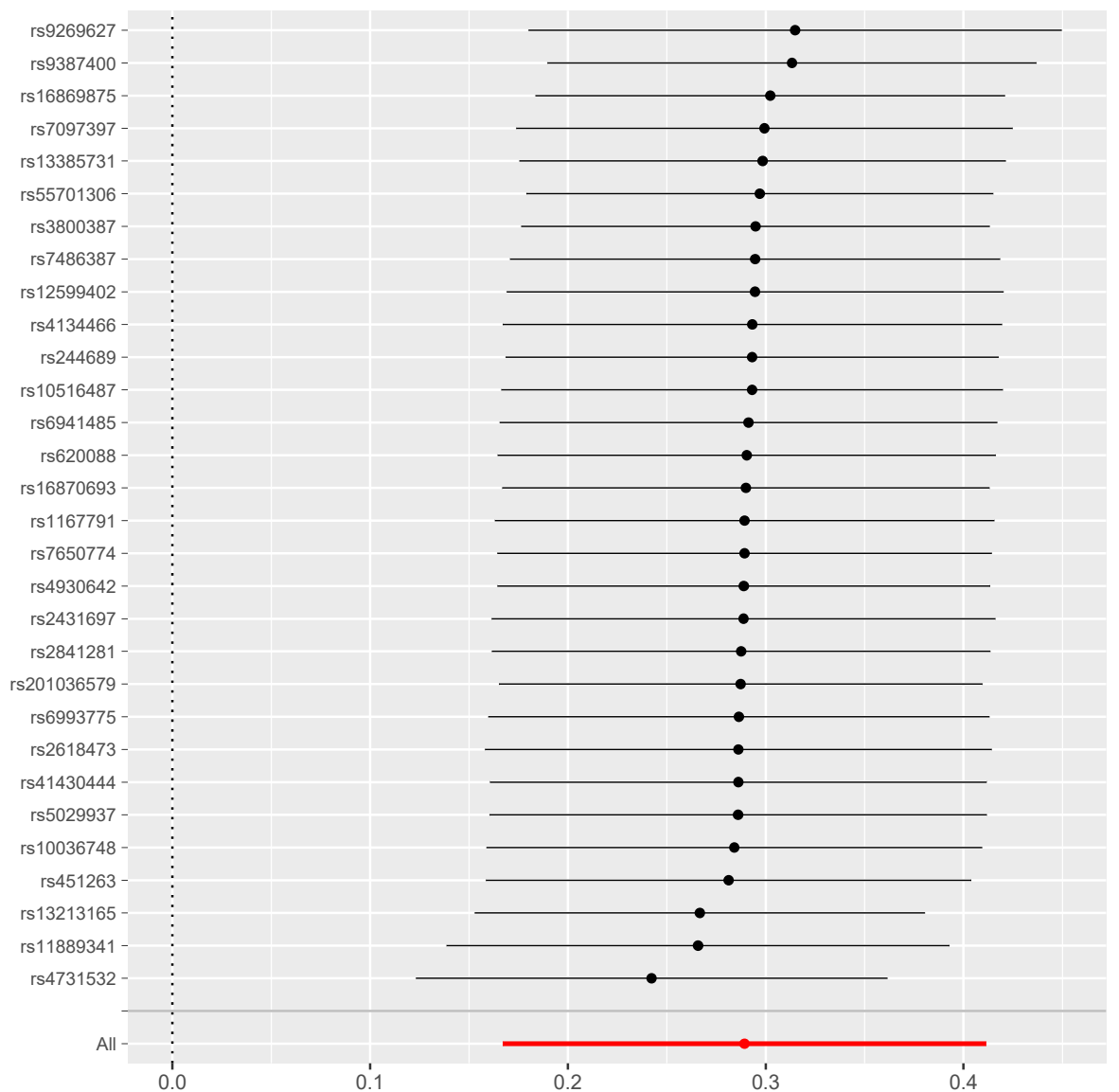


**Figure S5. Leave-one out sensitivity Analysis reveals stable causal relationship between SjD and SLE in a GWAS of persons with East Asian ancestry.** Forest plot of the aggregate (inverse-variance weighted) MR effect sizes (beta+/-se) of SjD risk variants on SLE in the Wang YF, et al. GWAS with the indicated variant left out.

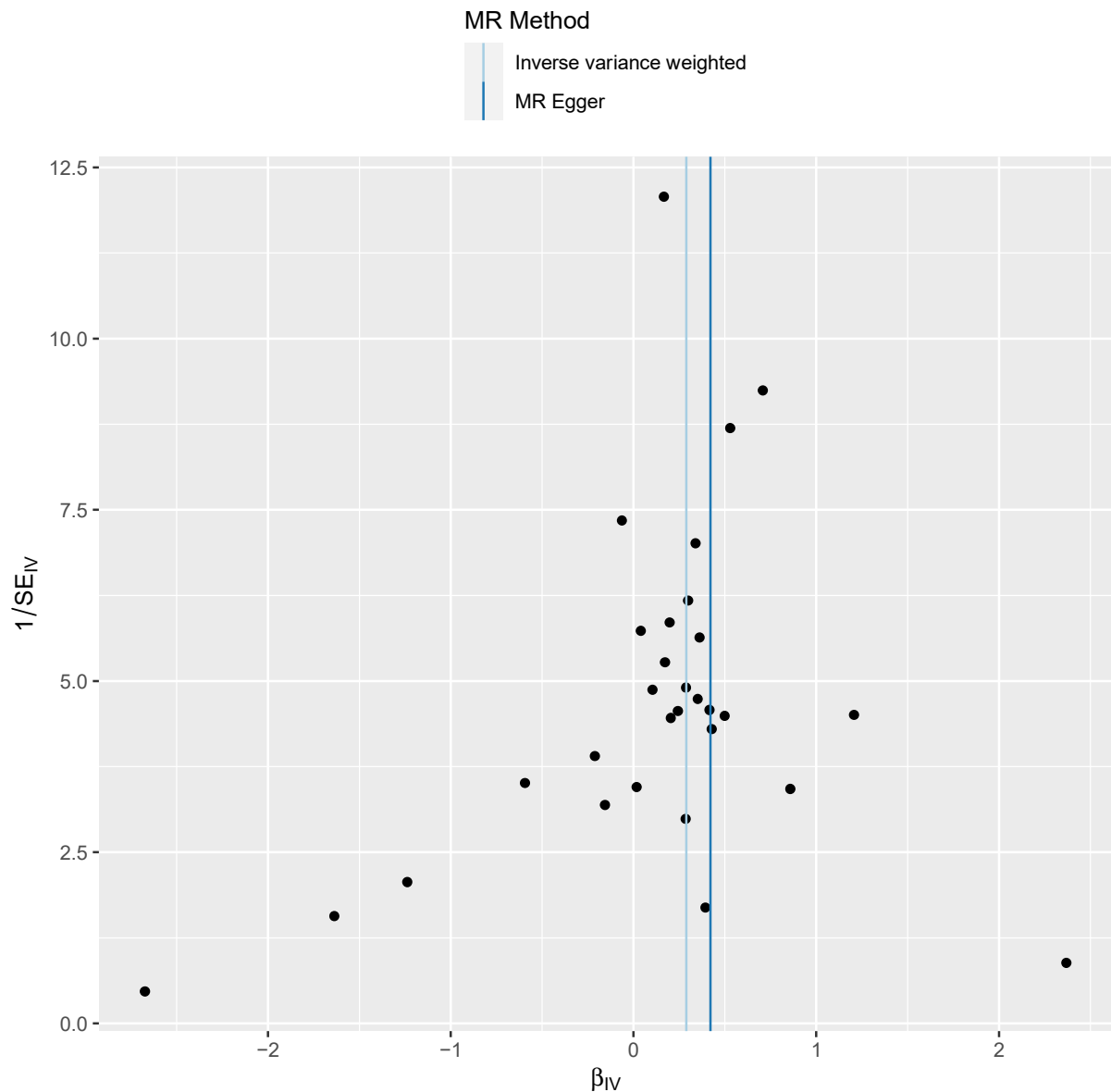


**Figure S6. Funnel Plot of effects of SjD variants identified in SLE GWAS performed in a cohort of persons with East Asian ancestry.** Shown is the inverse of the standard error plotted as a function of the effect sizes for SjD risk variants on SLE in the Wang, YF, et al. SLE GWAS. Values lower on the y-axis are less precise. The wider the distribution, the greater the heterogeneity, which can arise from horizontal pleiotropy. Asymmetry indicates directionality, which can bias MR methods. MR-Egger adjusts for such directional horizontal pleiotropy.

Analysis 4: The casual effect of SLE variants from East Asian ancestry GWAS on SjD in European ancestry GWAS.



**Figure S7. Leave-one out sensitivity Analysis reveals stable causal relationship between SLE variants identified in GWAS of persons with East Asian ancestry on SjD in a GWAS of persons with European ancestry.** Forest plot of the aggregate (inverse-variance weighted) MR effect sizes (beta+/-se) of SLE risk variants on SjD in the FinnGen M13\_Sjogren GWAS with the indicated variant left out.



**Figure S8. Funnel Plot of effects of SjD variants identified in SLE GWAS performed in a cohort of persons with East Asian ancestry.** Shown is the inverse of the standard error plotted as a function of the effect sizes for SLE risk variants on SjD in the FinnGen M13\_Sjogren GWAS. Values lower on the y-axis are less precise. The wider the distribution, the greater the heterogeneity, which can arise from horizontal pleiotropy. Asymmetry indicates directionality, which can bias MR methods. MR-Egger adjusts for such directional horizontal pleiotropy.