Supplementary Figure S20. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated with bronchiectasis.

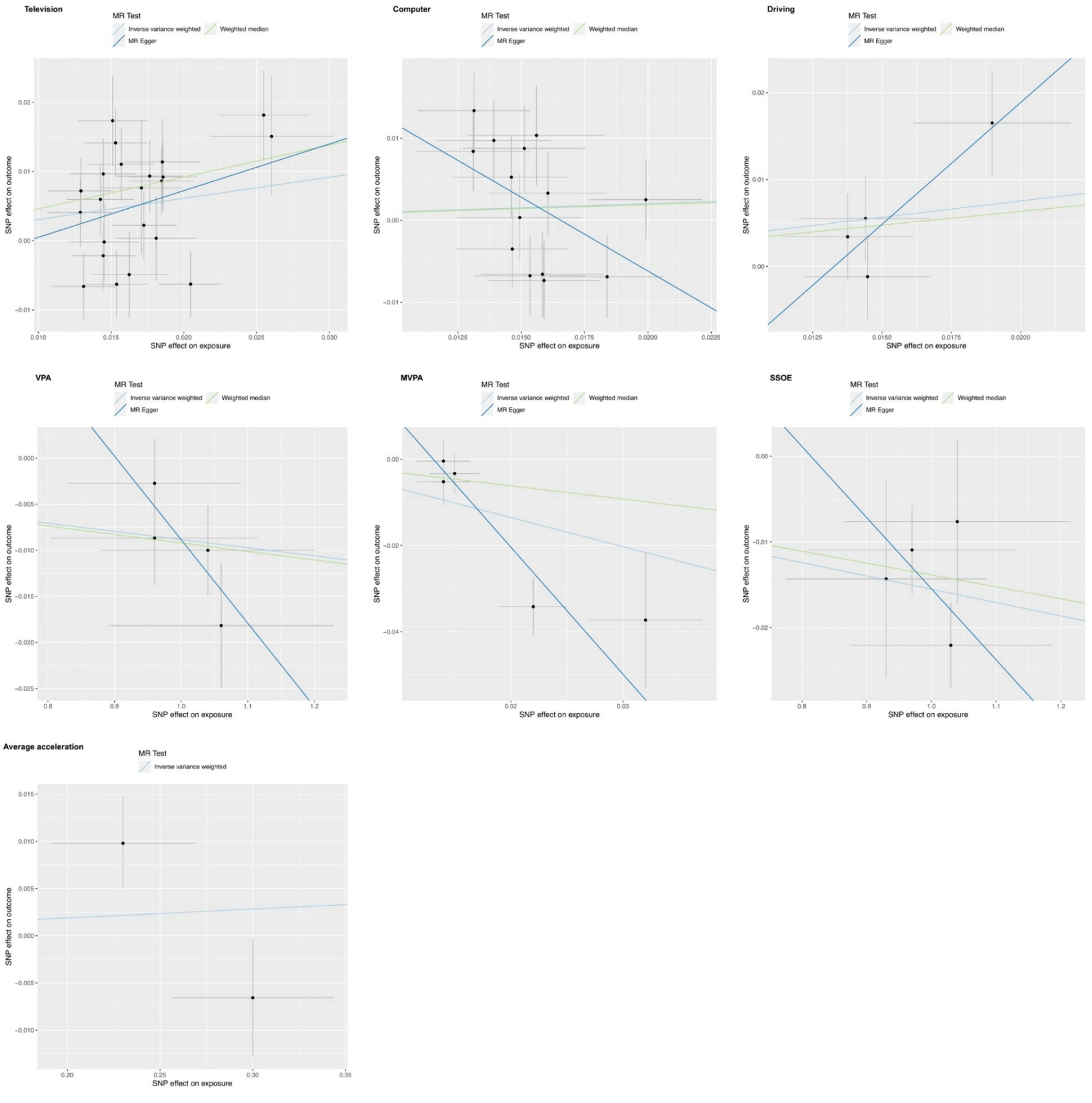
Supplementary Figure S21. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated with COPD.

Supplementary Figure S22. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated with IPF.

Supplementary Figure S23. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated with PAH.

Supplementary Figure S24. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated with OSAS.

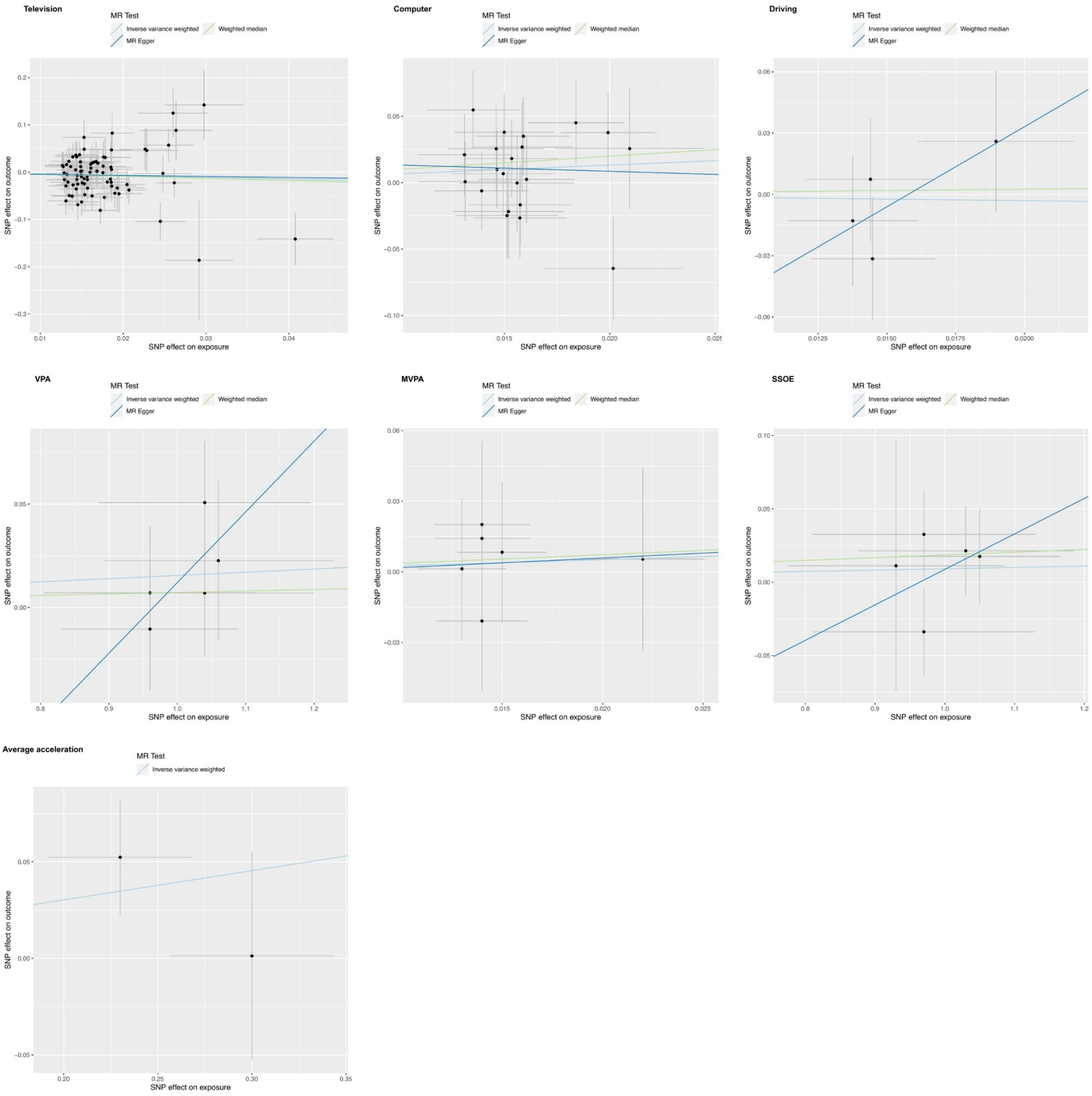
Supplementary Figure S1. Scatter plots showing the effect of liability to leisure sedentary behaviors and physical activity on asthma



The x-axis represents the genetic association with leisure sedentary behaviors and physical activity; the y-axis represents the genetic association with risk of asthma. The regression line for inverse variance weighted, weighted median, and MR Egger. The slope of each line corresponds to the estimated MR effect per method.

Abbreviation: MR, Mendelian randomization; SNP, Single Nucleotide Polymorphism; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises.

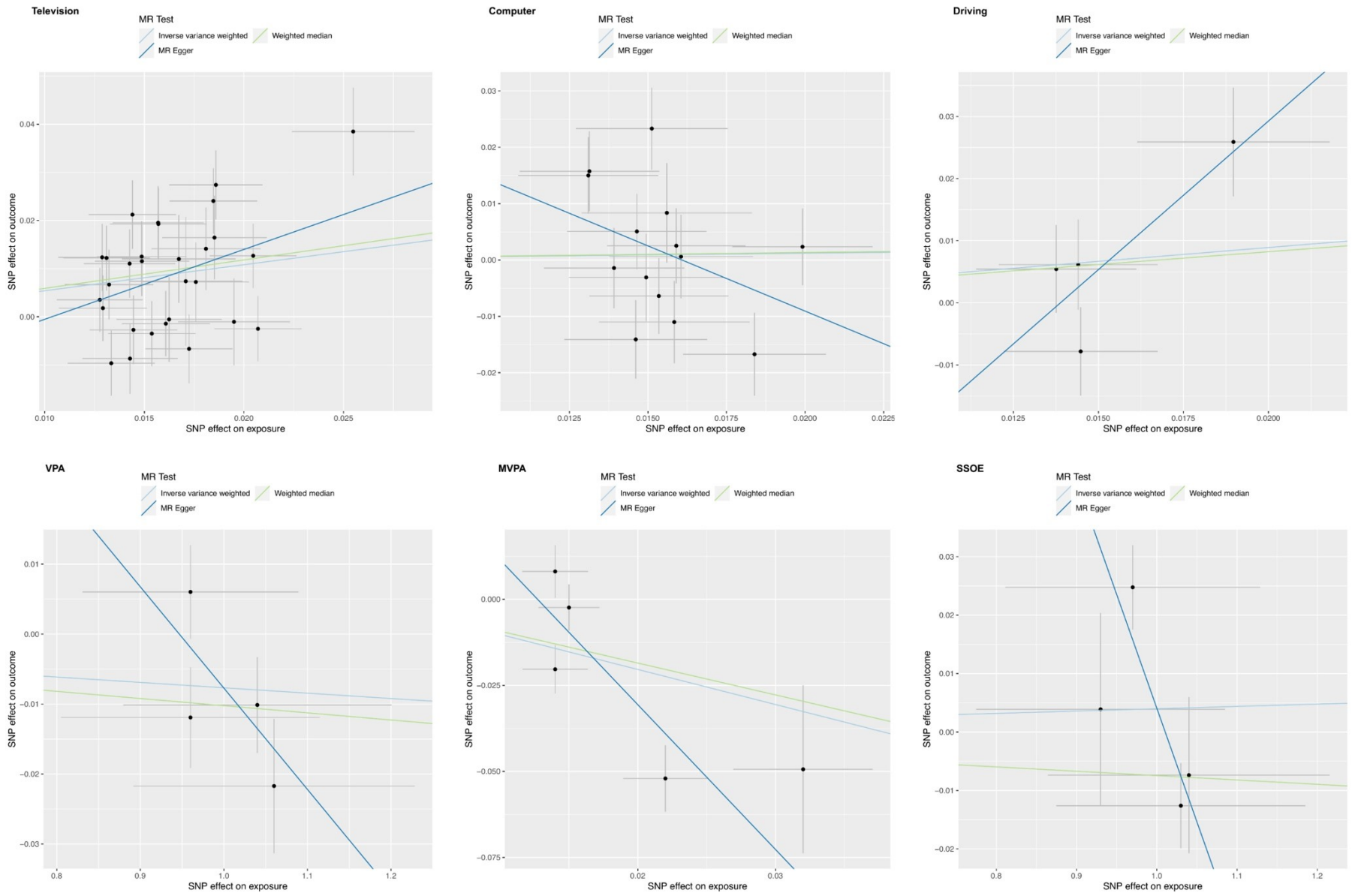
Supplementary Figure S2. Scatter plots showing the effect of liability to leisure sedentary behaviors and physical activity on bronchiectasis.



The x-axis represents the genetic association with leisure sedentary behaviors and physical activity; the y-axis represents the genetic association with risk of bronchiectasis. The regression line for inverse variance weighted, weighted median, and MR Egger. The slope of each line corresponds to the estimated MR effect per method.

Abbreviation: MR, Mendelian randomization; SNP, Single Nucleotide Polymorphism; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises.

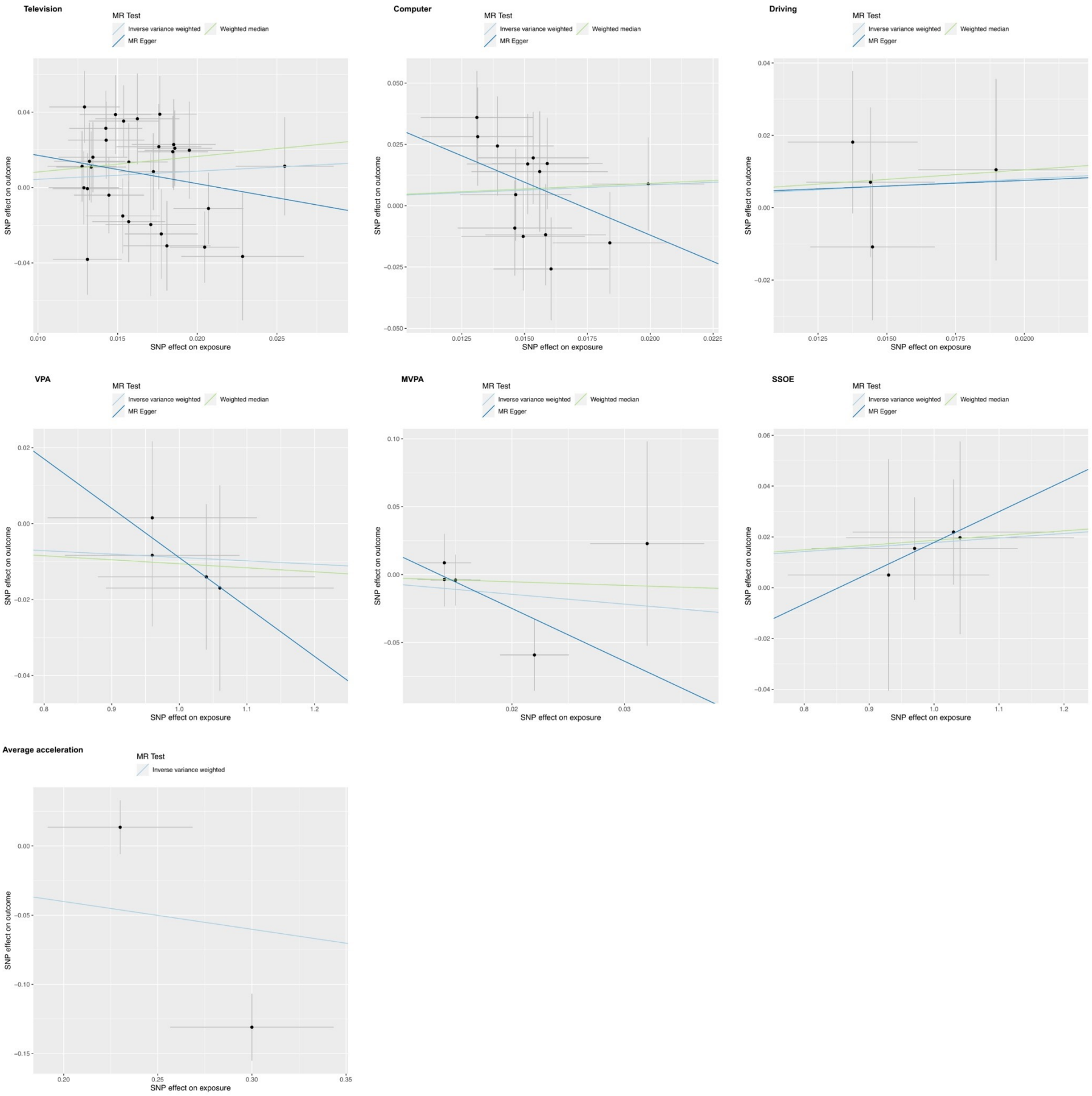
Supplementary Figure S3. Scatter plots showing the effect of liability to leisure sedentary behaviors and physical activity on COPD.



The x-axis represents the genetic association with leisure sedentary behaviors and physical activity; the y-axis represents the genetic association with risk of COPD. The regression line for inverse variance weighted, weighted median, and MR Egger. The slope of each line corresponds to the estimated MR effect per method.

Abbreviation: COPD, Chronic Obstructive Pulmonary Disease; MR, Mendelian randomization; SNP, Single Nucleotide Polymorphism; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises.

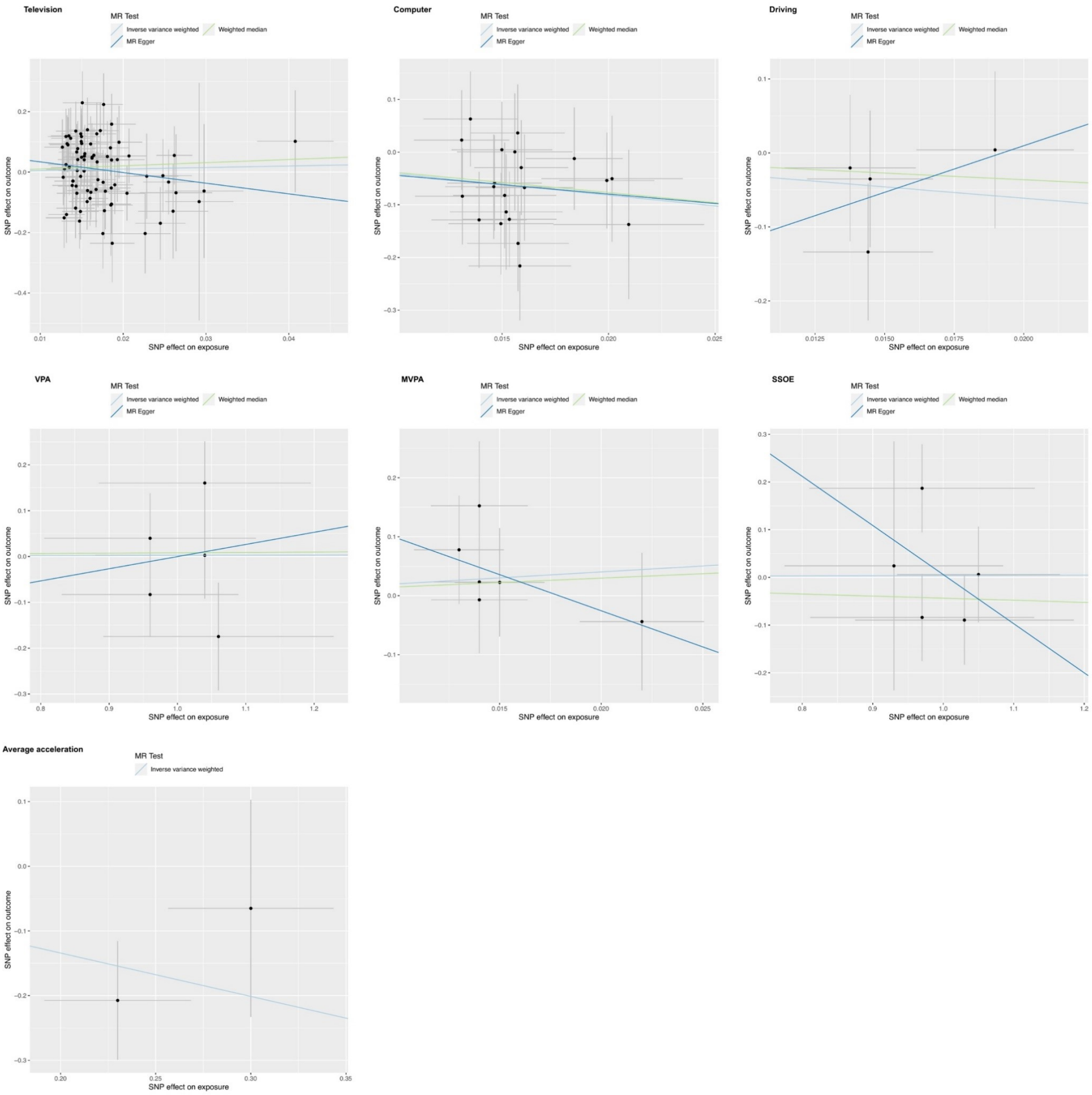
Supplementary Figure S4. Scatter plots showing the effect of liability to leisure sedentary behaviors and physical activity on IPF.



The x-axis represents the genetic association with leisure sedentary behaviors and physical activity; the y-axis represents the genetic association with risk of IPF. The regression line for inverse variance weighted, weighted median, and MR Egger. The slope of each line corresponds to the estimated MR effect per method.

Abbreviation: IPF, Idiopathic Pulmonary Fibrosis; MR, Mendelian randomization; SNP, Single Nucleotide Polymorphism; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises.

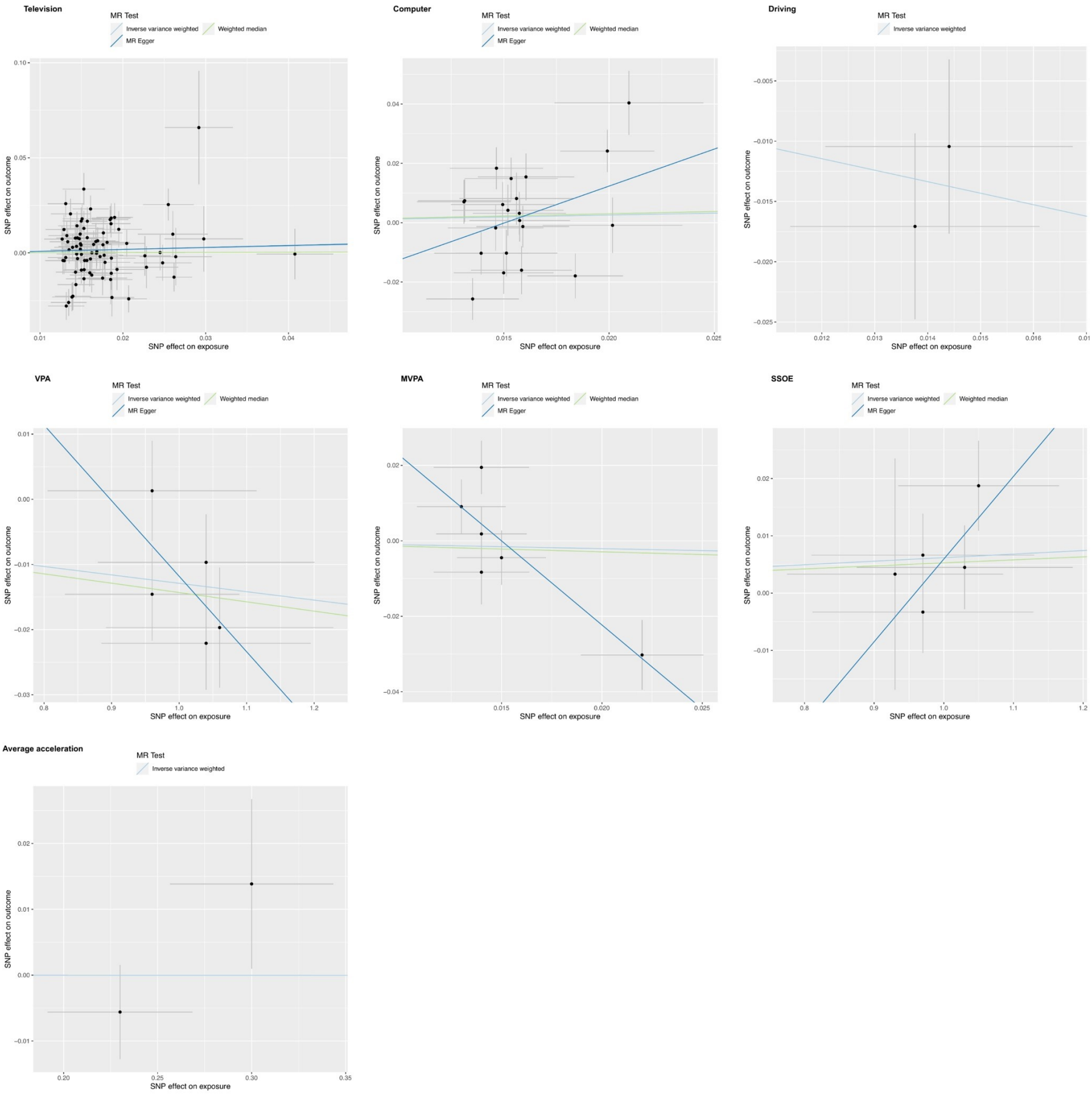
Supplementary Figure S5. Scatter plots showing the effect of liability to leisure sedentary behaviors and physical activity on PAH.



The x-axis represents the genetic association with leisure sedentary behaviors and physical activity; the y-axis represents the genetic association with risk of PAH. The regression line for inverse variance weighted, weighted median, and MR Egger. The slope of each line corresponds to the estimated MR effect per method.

Abbreviation: PAH, Pulmonary Hypertension; MR, Mendelian randomization; SNP, Single Nucleotide Polymorphism; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises.

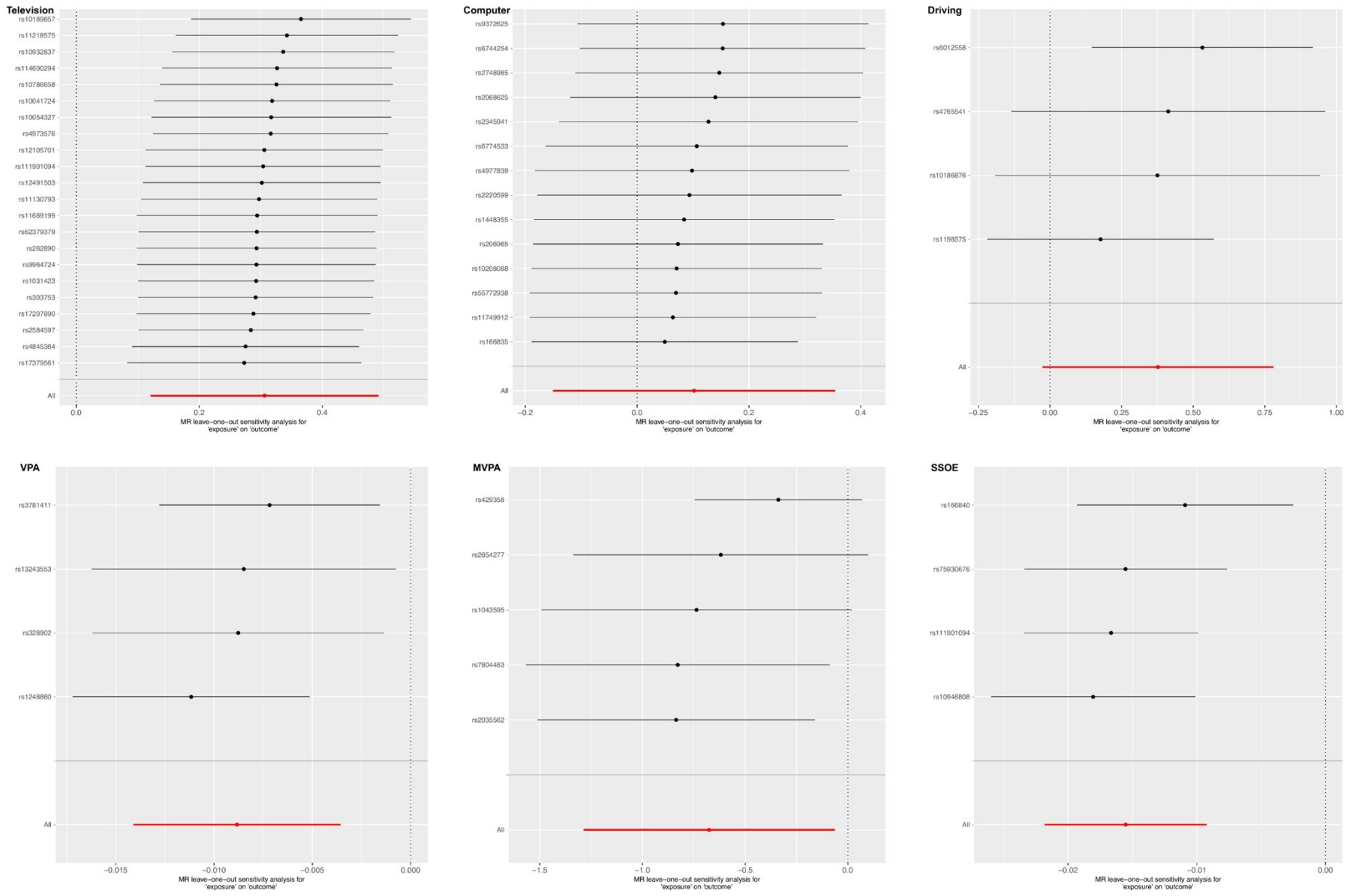
Supplementary Figure S6. Scatter plots showing the effect of liability to leisure sedentary behaviors and physical activity on OSAS.



The x-axis represents the genetic association with leisure sedentary behaviors and physical activity; the y-axis represents the genetic association with risk of OSAS. The regression line for inverse variance weighted, weighted median, and MR Egger. The slope of each line corresponds to the estimated MR effect per method.

Abbreviation: OSAS, Obstructive Sleep Apnea Syndrome; MR, Mendelian randomization; SNP, Single Nucleotide Polymorphism; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises.

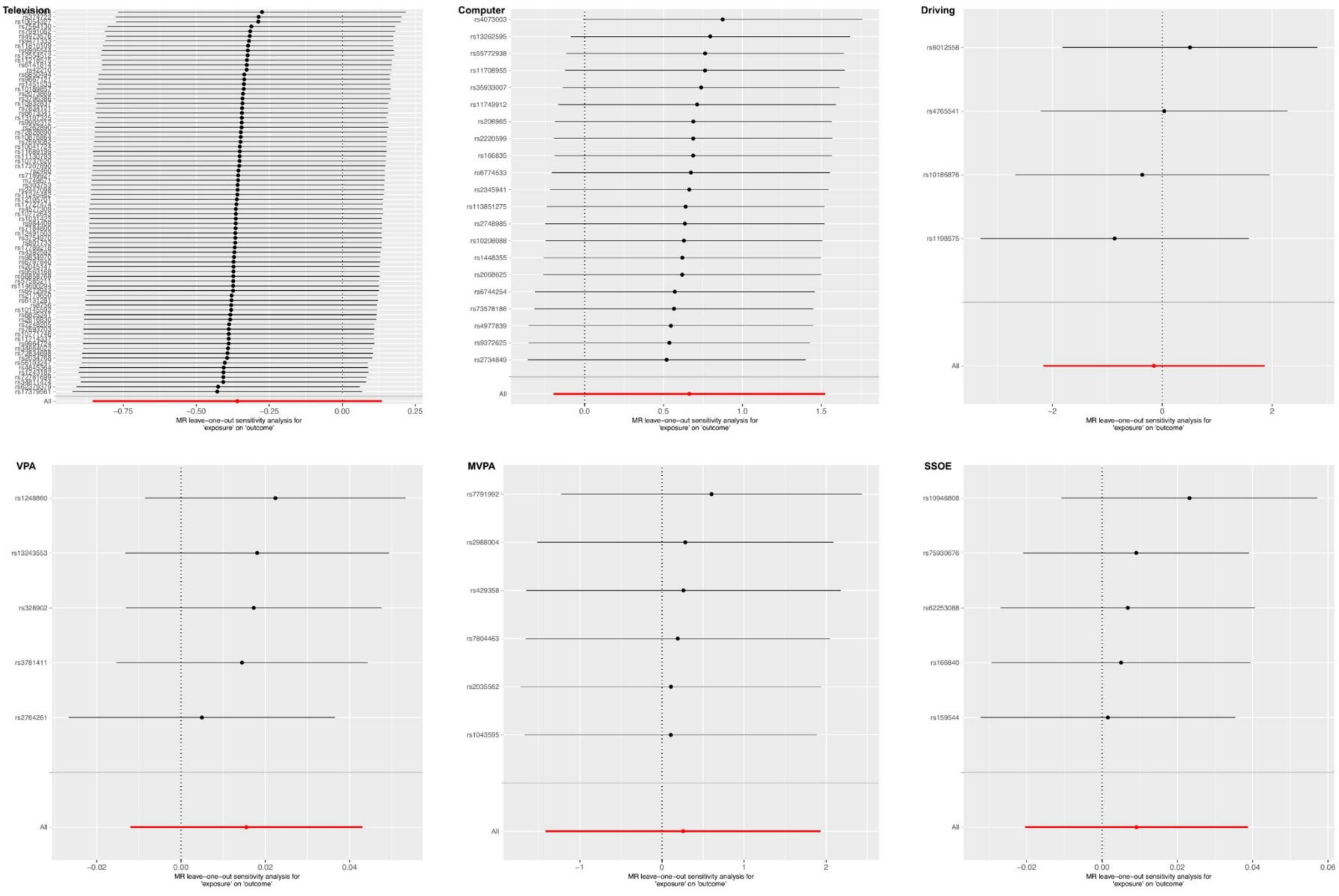
Supplementary Figure S7. Leave-one-out plots of the causal effect of leisure sedentary behaviors and physical activity on asthma.



The x-axis shows MR leave-one-out sensitivity analysis for leisure sedentary behaviors and physical activity on asthma. The y-axis shows SNPs on asthma. Each *black line* represents the IVW applied to estimate the causal effect, excluding the particular variants. *The Red lines* represent the IVW estimations using all SNPs.

Abbreviation: MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; IVW, inverse variance weighted; SNPs, Single Nucleotide Polymorphisms.

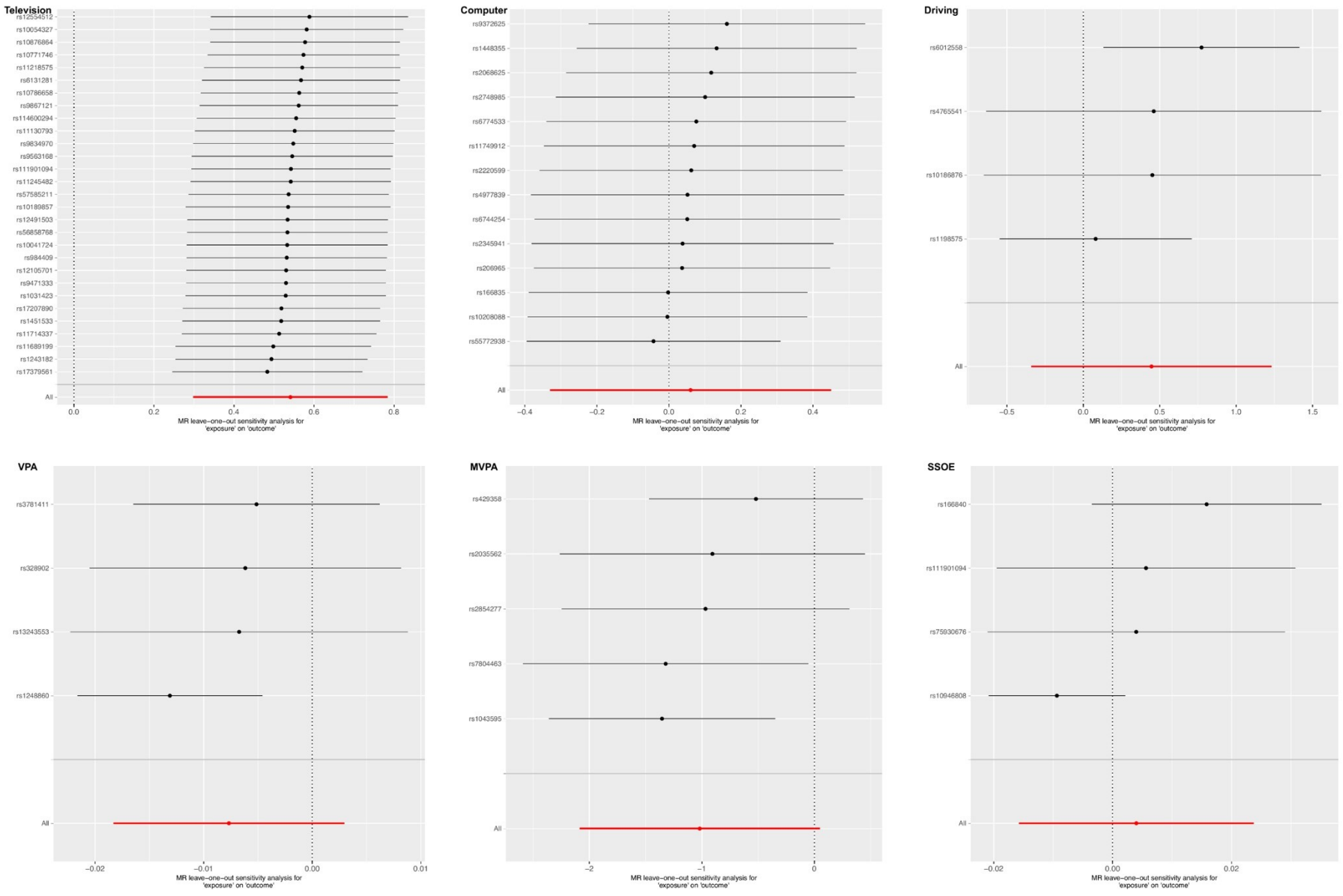
Supplementary Figure S8. Leave-one-out plots of the causal effect of leisure sedentary behaviors and physical activity on bronchiectasis.



The x-axis shows MR leave-one-out sensitivity analysis for leisure sedentary behaviors and physical activity on bronchiectasis. The y-axis shows SNPs on bronchiectasis. Each *black line* represents the IVW applied to estimate the causal effect, excluding the particular variants. *The Red lines* represent the IVW estimations using all SNPs.

Abbreviation: MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; IVW, inverse variance weighted; SNPs, Single Nucleotide Polymorphisms.

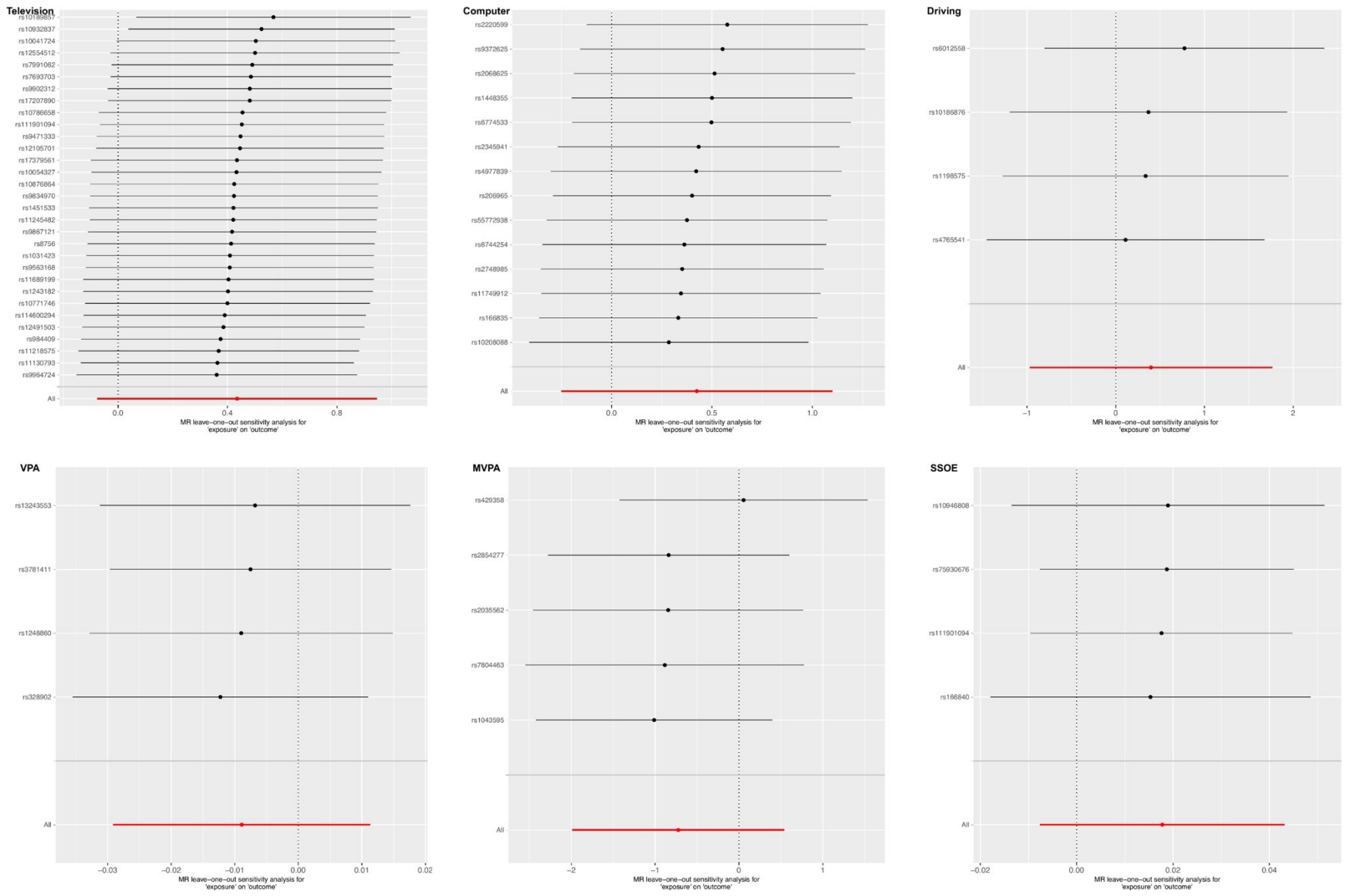
Supplementary Figure S9. Leave-one-out plots of the causal effect of leisure sedentary behaviors and physical activity on COPD.



The x-axis shows MR leave-one-out sensitivity analysis for leisure sedentary behaviors and physical activity on COPD. The y-axis shows SNPs on COPD. Each *black line* represents the IVW applied to estimate the causal effect, excluding the particular variants. *The Red lines* represent the IVW estimations using all SNPs.

Abbreviation: COPD, Chronic Obstructive Pulmonary Disease; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; IVW, inverse variance weighted; SNPs, Single Nucleotide Polymorphisms.

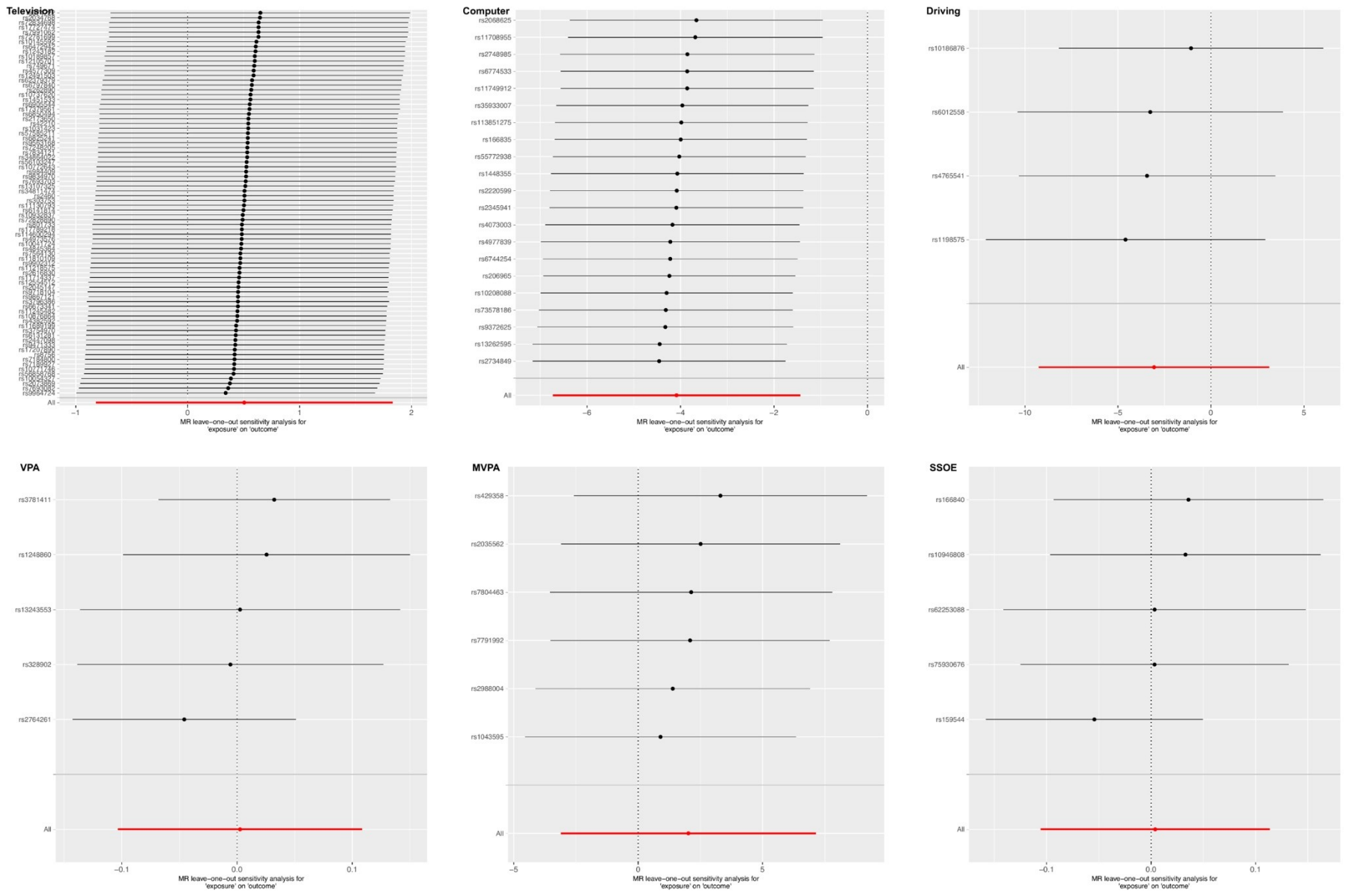
Supplementary Figure S10. Leave-one-out plots of the causal effect of leisure sedentary behaviors and physical activity on IPF.



The x-axis shows MR leave-one-out sensitivity analysis for leisure sedentary behaviors and physical activity on IPF. The y-axis shows SNPs on IPF. Each *black line* represents the IVW applied to estimate the causal effect, excluding the particular variants. *The Red lines* represent the IVW estimations using all SNPs.

Abbreviation: IPF, Idiopathic Pulmonary Fibrosis; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; IVW, inverse variance weighted; SNPs, Single Nucleotide Polymorphisms.

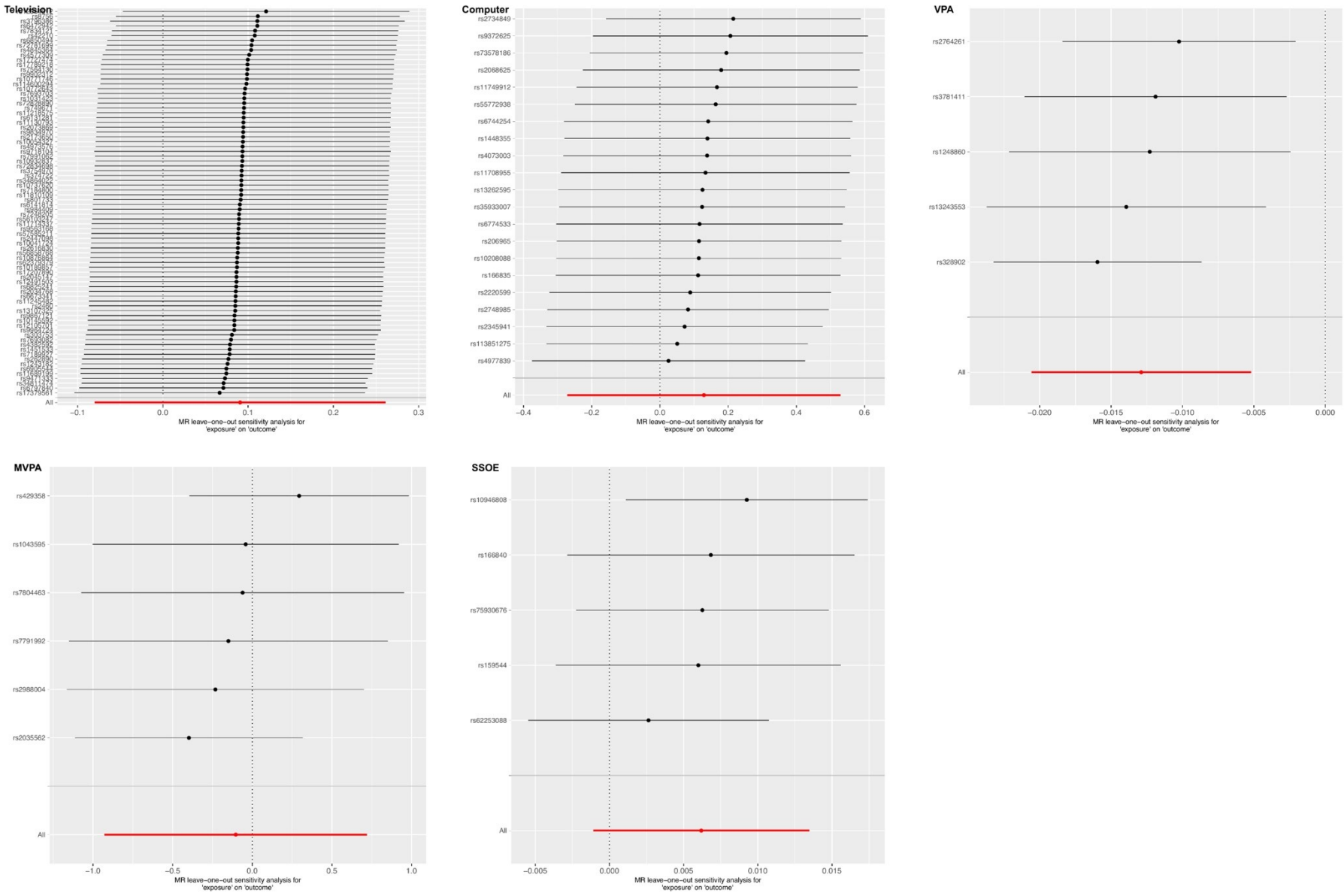
Supplementary Figure S11. Leave-one-out plots of the causal effect of leisure sedentary behaviors and physical activity on PAH.



The x-axis shows MR leave-one-out sensitivity analysis for leisure sedentary behaviors and physical activity on PAH. The y-axis shows SNPs on PAH. Each *black line* represents the IVW applied to estimate the causal effect, excluding the particular variants. *The Red lines* represent the IVW estimations using all SNPs.

Abbreviation: PAH, Pulmonary Hypertension; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; IVW, inverse variance weighted; SNPs, Single Nucleotide Polymorphisms.

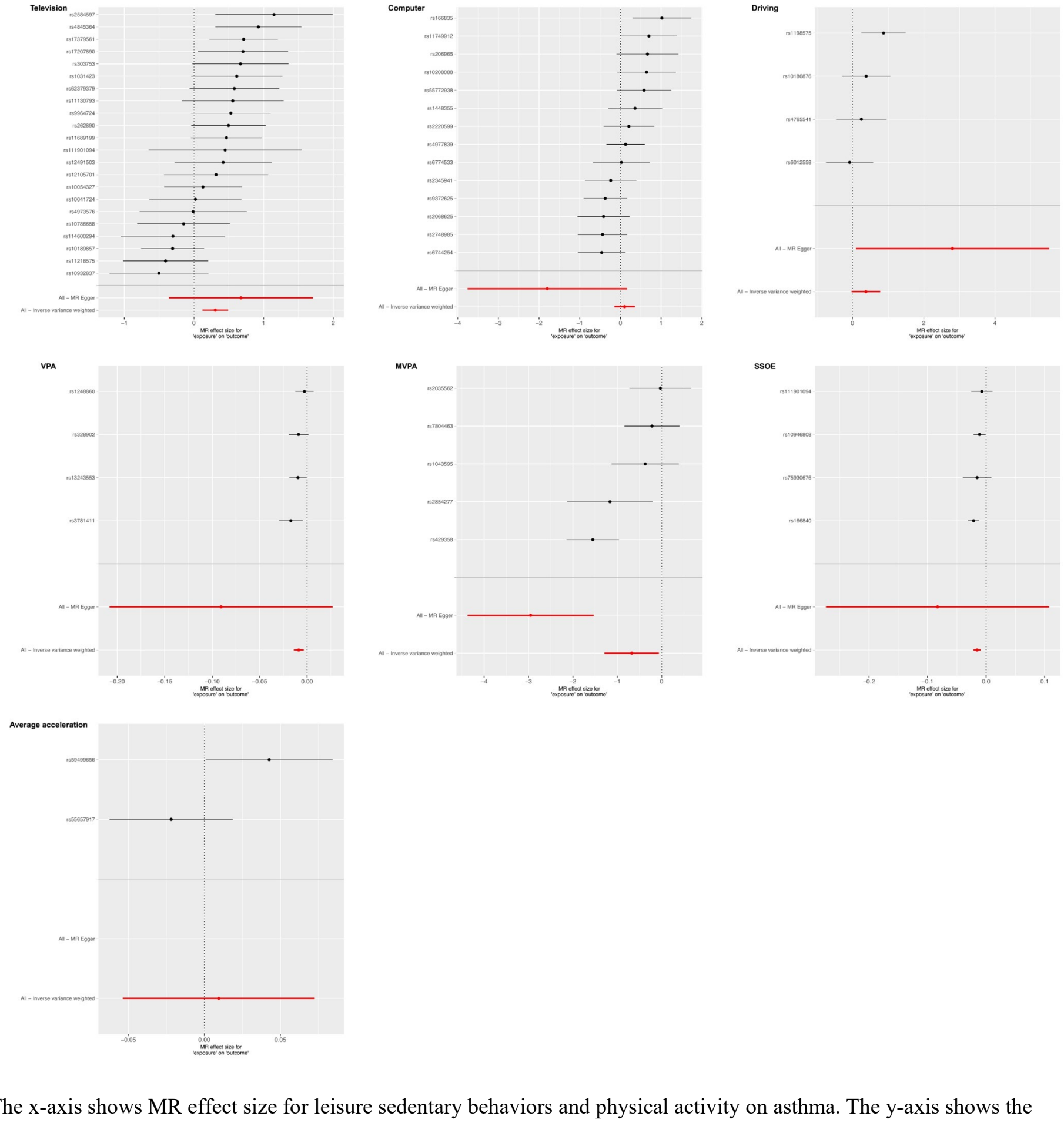
Supplementary Figure S12. Leave-one-out plots of the causal effect of leisure sedentary behaviors and physical activity on OSAS.



The x-axis shows MR leave-one-out sensitivity analysis for leisure sedentary behaviors and physical activity on OSAS. The y-axis shows SNPs on sleep apnea OSAS. Each *black line* represents the IVW applied to estimate the causal effect, excluding the particular variants. *The Red lines* represent the IVW estimations using all SNPs.

Abbreviation: OSAS, Obstructive Sleep Apnea Syndrome; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; IVW, inverse variance weighted; SNPs, Single Nucleotide Polymorphisms.

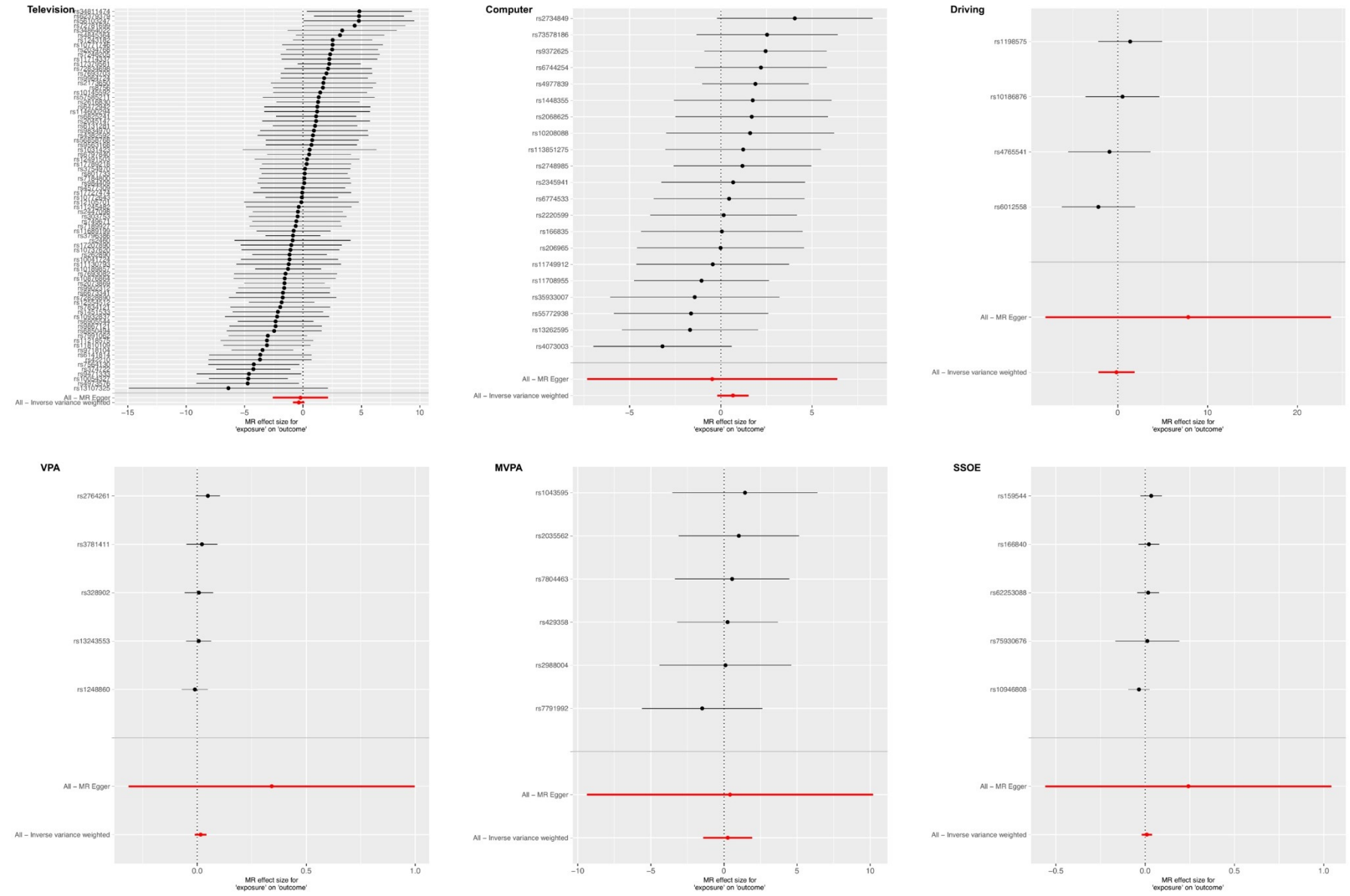
Supplementary Figure S13. Forest plots of leisure sedentary behaviors and physical activity associated with asthma.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on asthma. The y-axis shows the analysis for each of SNPs.

Abbreviation: MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; SNPs, Single Nucleotide Polymorphisms.

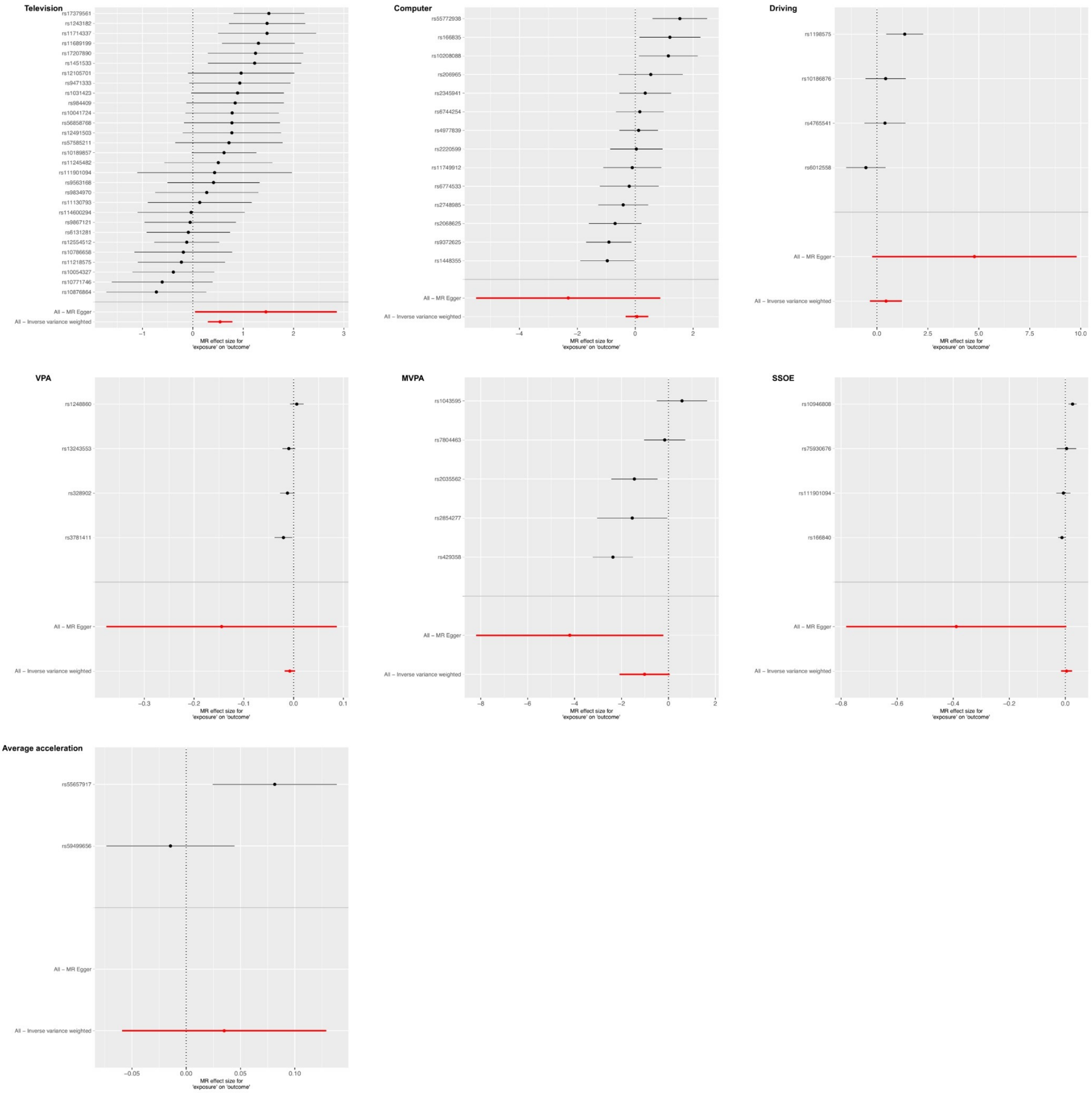
Supplementary Figure S14. Forest plots of leisure sedentary behaviors and physical activity associated with bronchiectasis.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on bronchiectasis. The y-axis shows the analysis for each of SNPs.

Abbreviation: MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; SNPs, Single Nucleotide Polymorphisms.

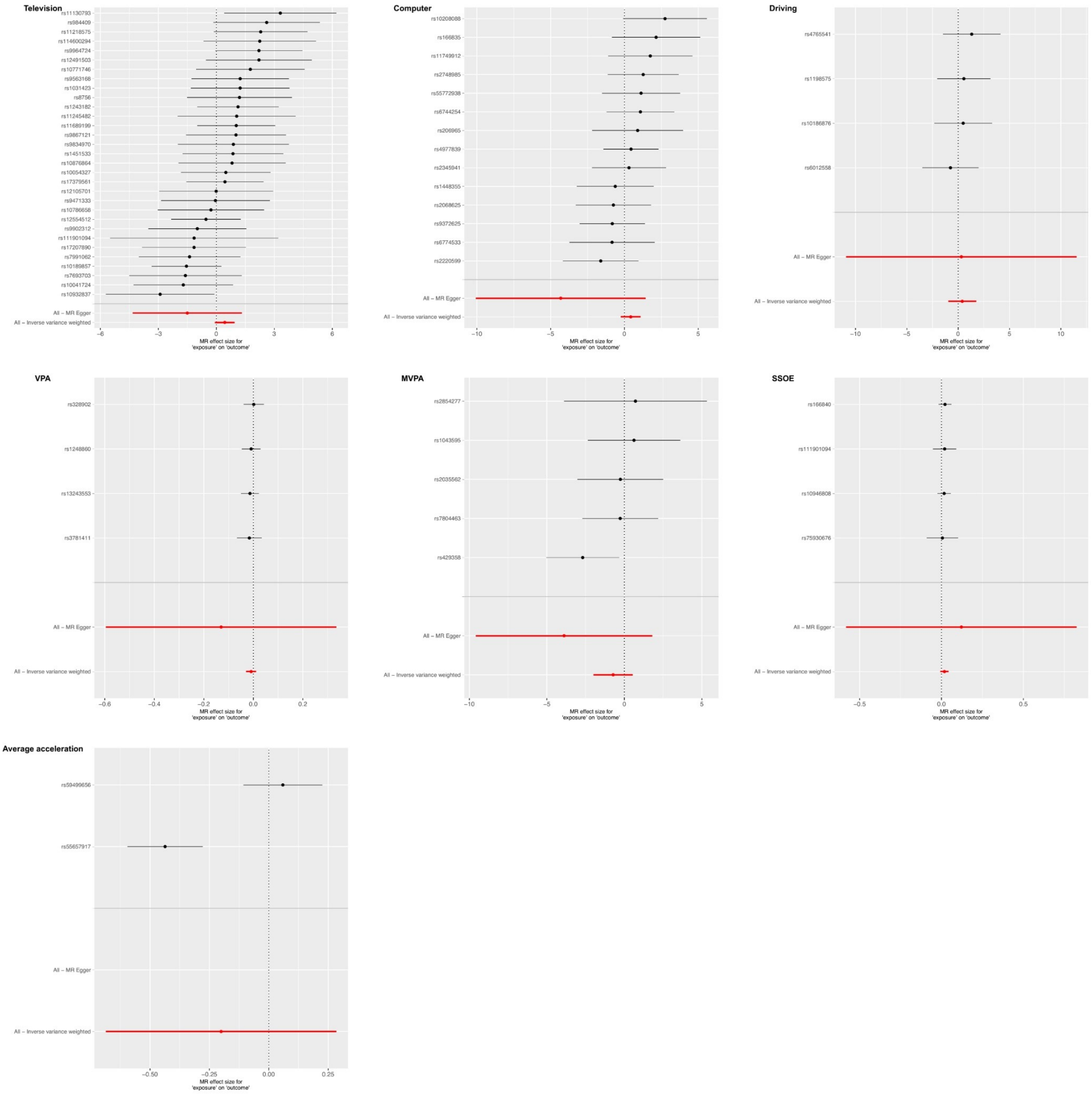
Supplementary Figure S15. Forest plot of leisure sedentary behaviors and physical activity associated with COPD.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on COPD. The y-axis shows the analysis for each of SNPs.

Abbreviation: COPD, Chronic Obstructive Pulmonary Disease; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; SNPs, Single Nucleotide Polymorphisms.

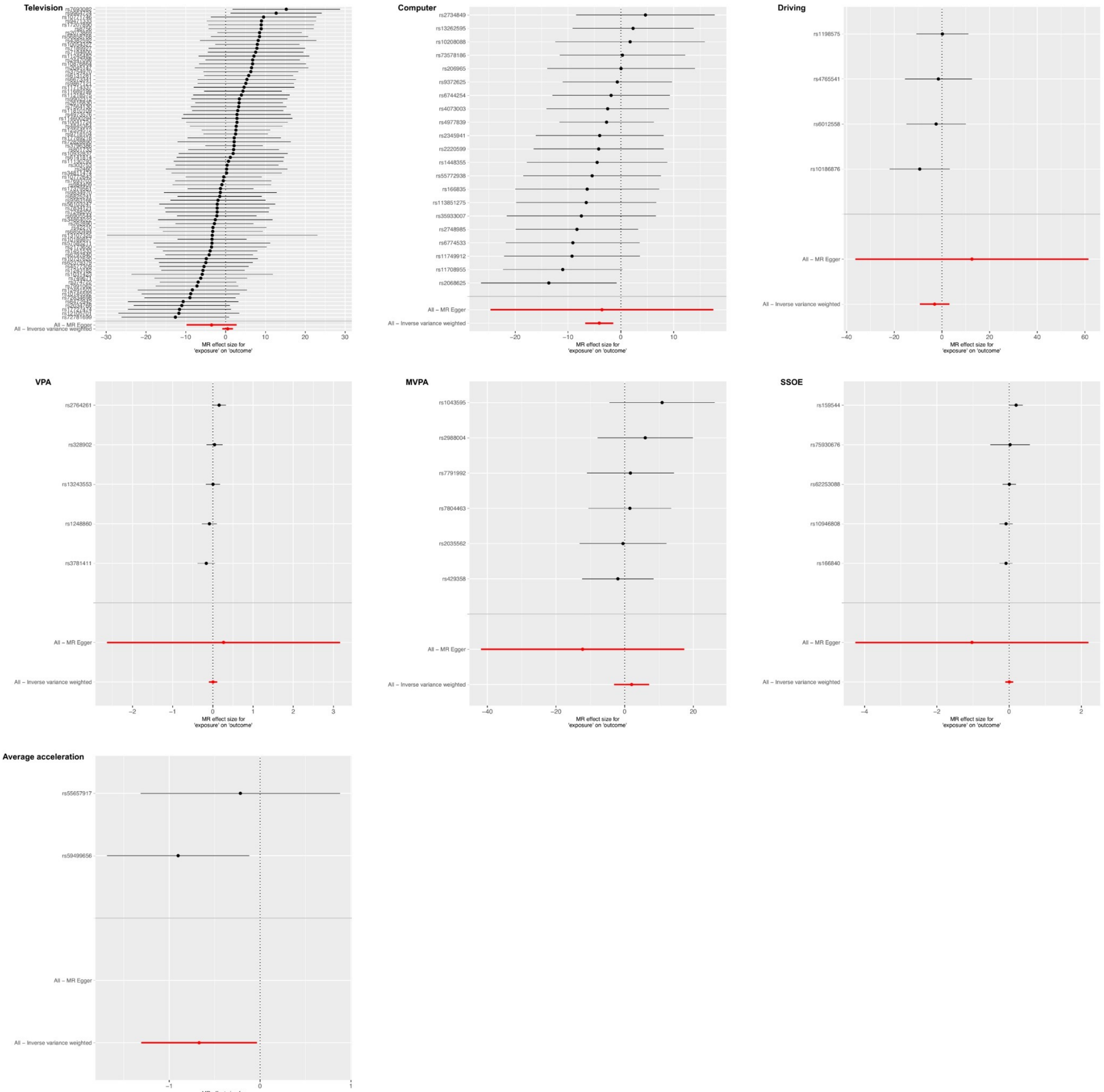
Supplementary Figure S16. Forest plot of leisure sedentary behaviors and physical activity associated with IPF.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on IPF. The y-axis shows the analysis for each of SNPs.

Abbreviation: IPF, Idiopathic Pulmonary Fibrosis; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; SNPs, Single Nucleotide Polymorphisms.

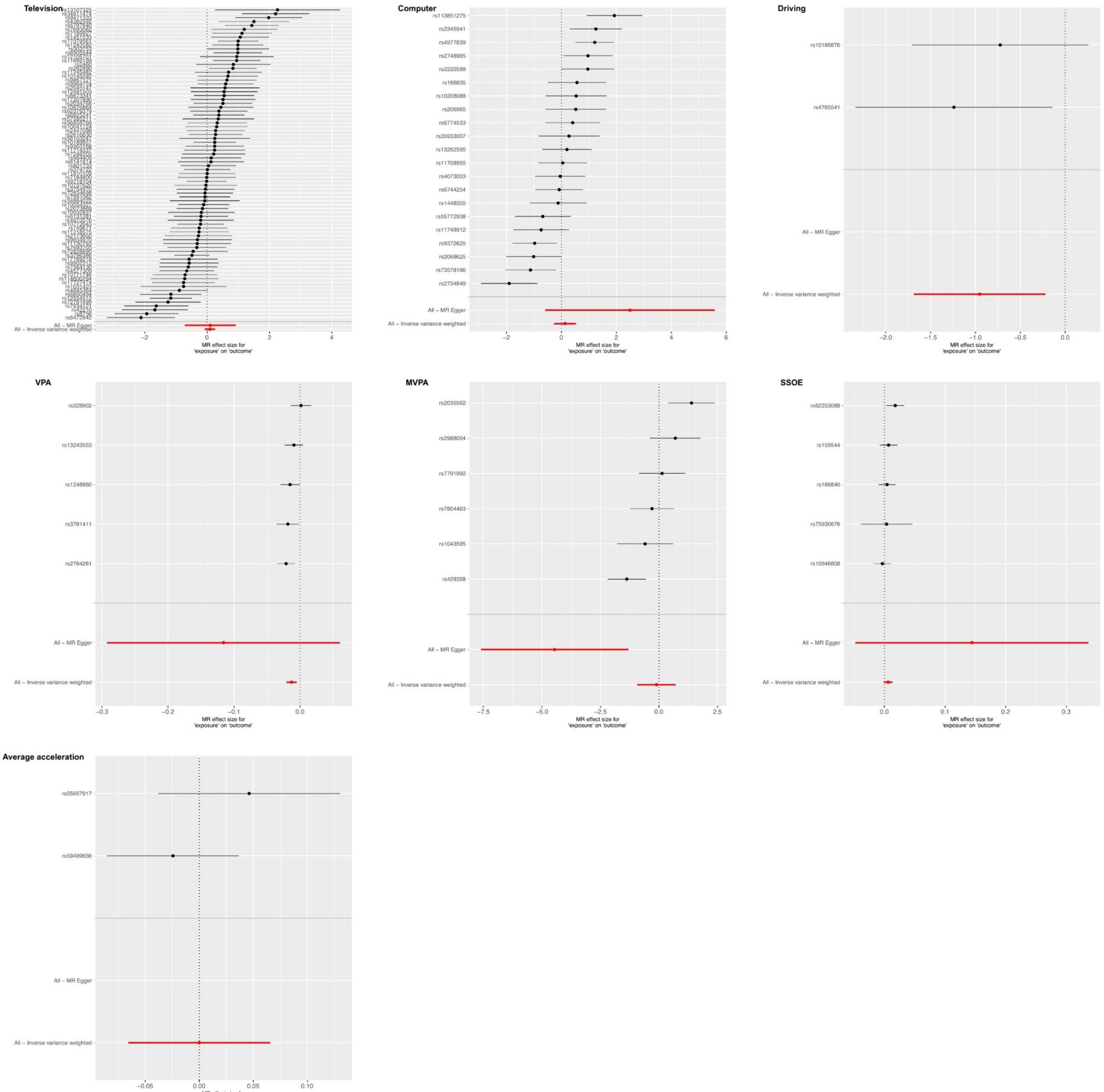
Supplementary Figure S17. Forest plots of leisure sedentary behaviors and physical activity associated with PAH.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on PAH. The y-axis shows the analysis for each of SNPs.

Abbreviation: PAH, Pulmonary Hypertension; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; SNPs, Single Nucleotide Polymorphisms.

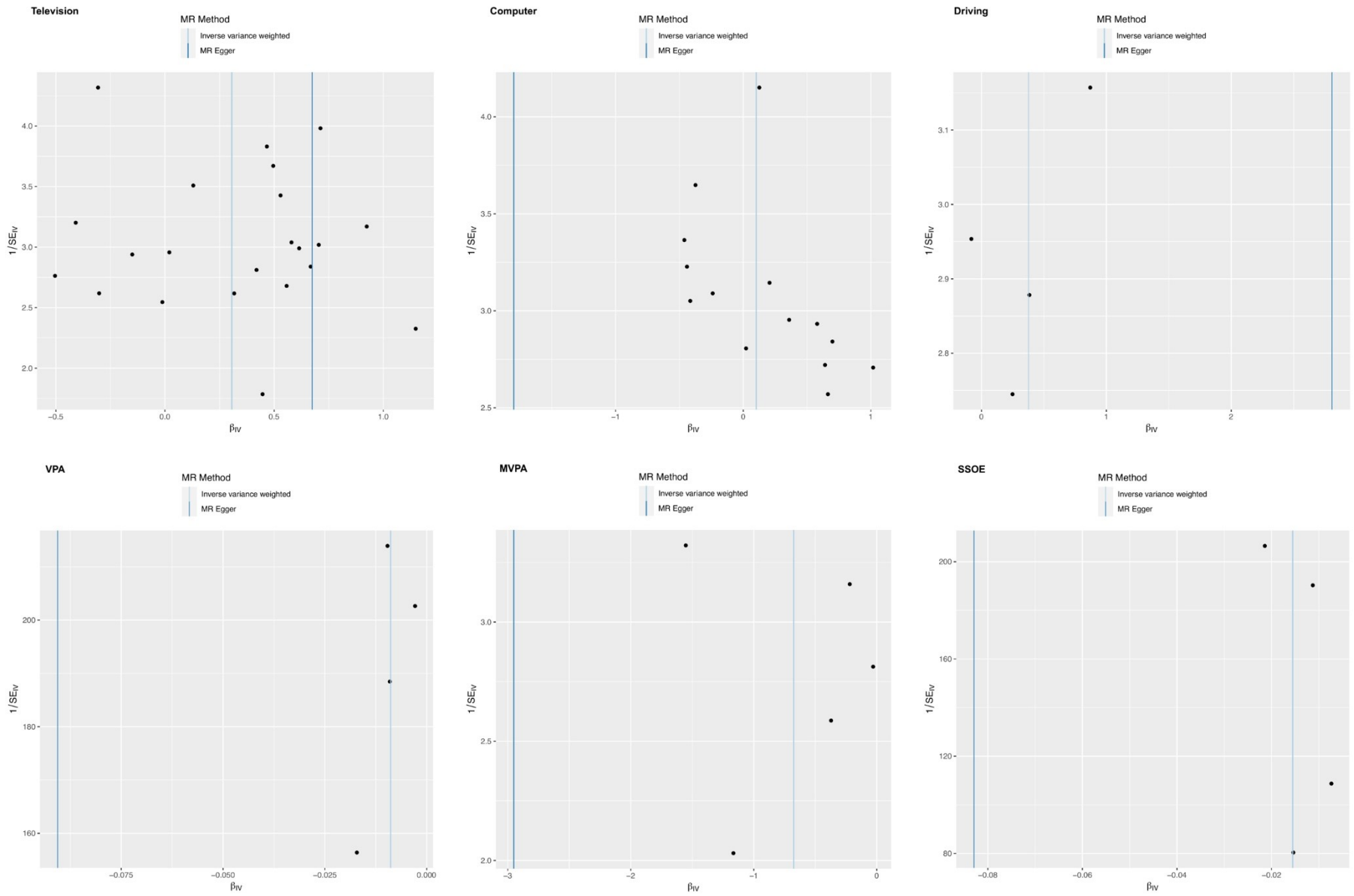
Supplementary Figure S18. Forest plots of leisure sedentary behaviors and physical activity associated with OSAS.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on OSAS. The y-axis shows the analysis for each of SNPs.

Abbreviation: OSAS, Obstructive Sleep Apnea Syndrome; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises; SNPs, Single Nucleotide Polymorphisms.

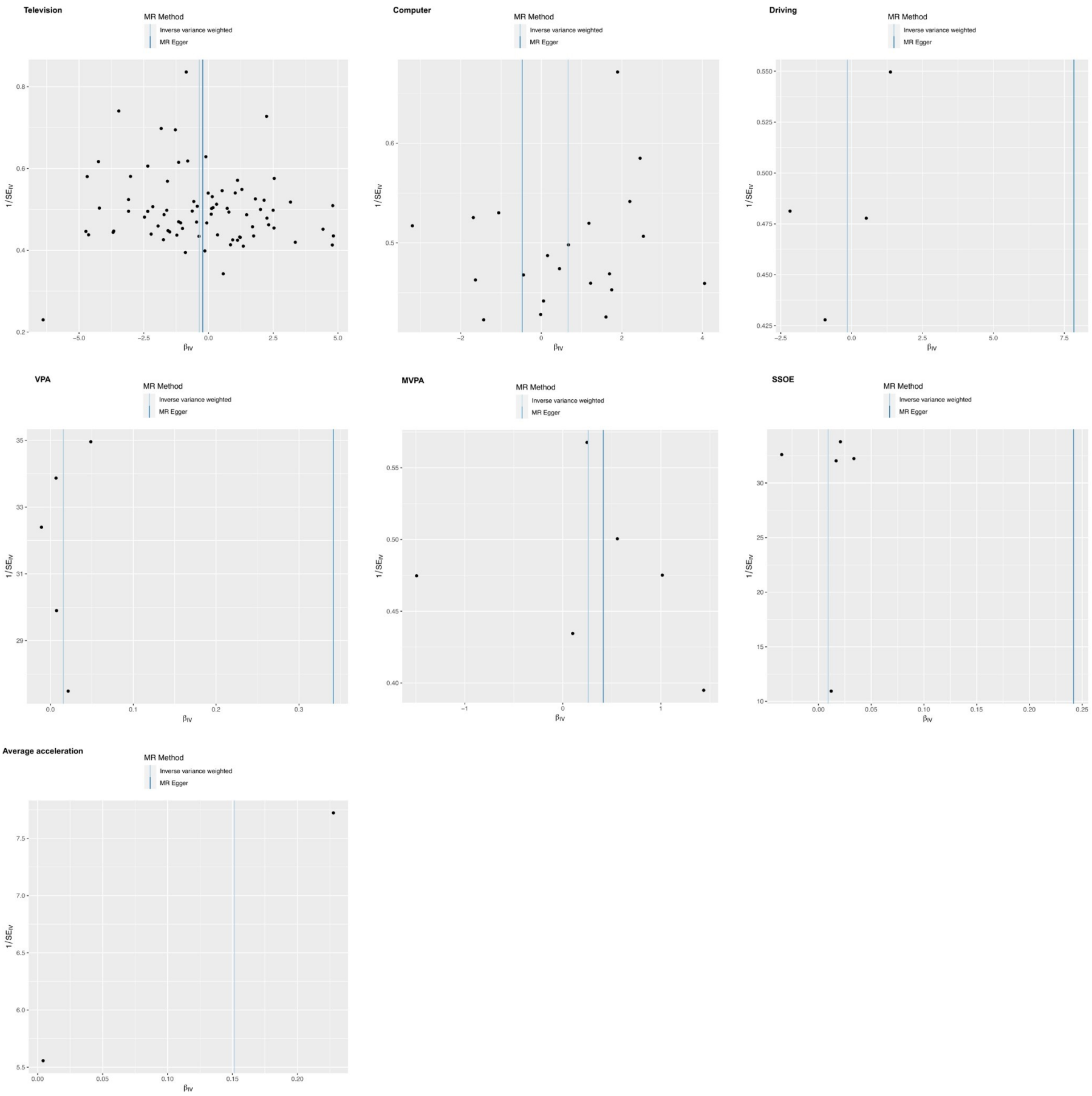
Supplementary Figure S19. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated on asthma.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on asthma. The y-axis indicates the precision of each estimate, expressed as the reciprocal of the standard error.

Abbreviation: MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises;

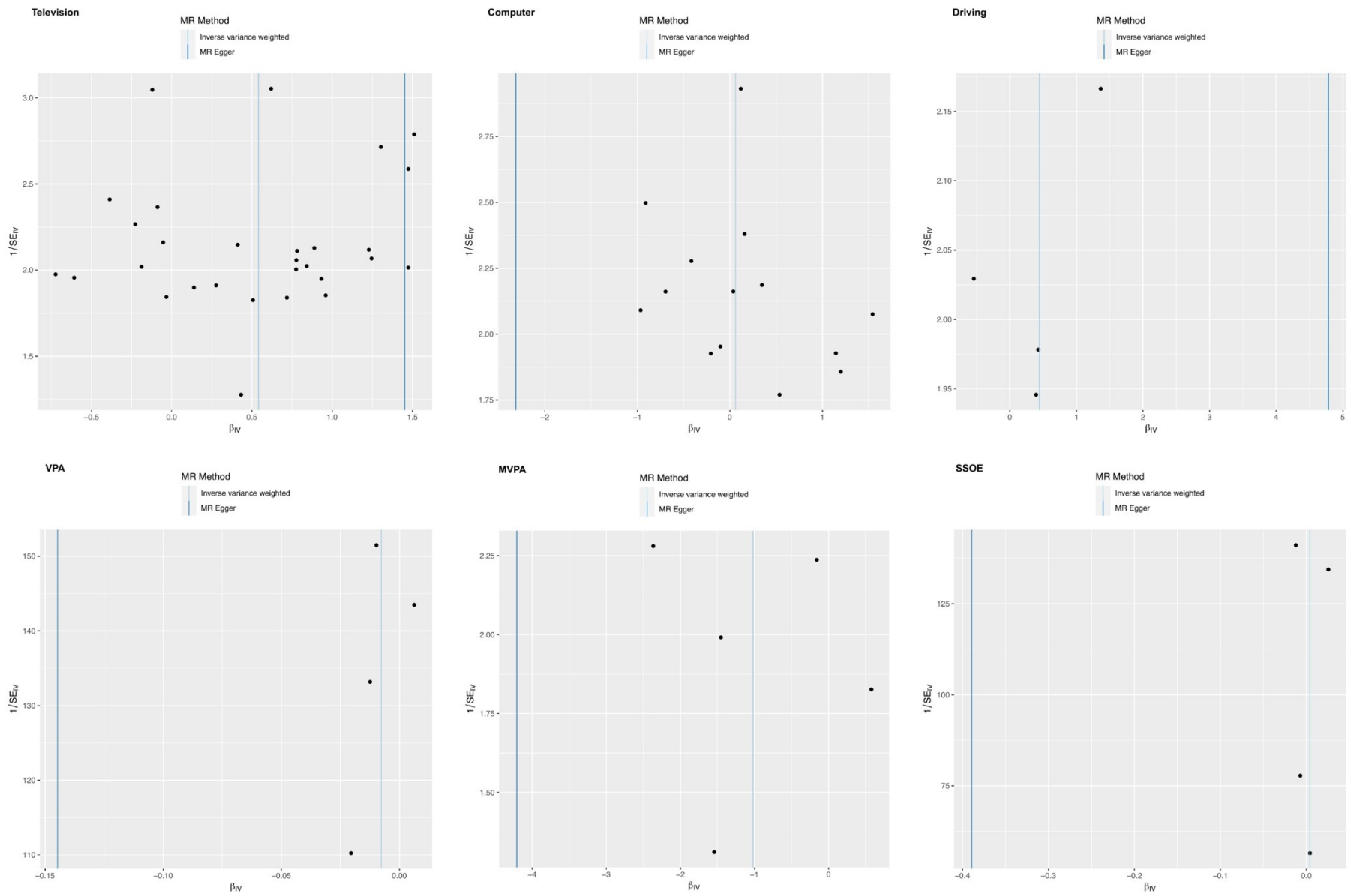
Supplementary Figure S20. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated on bronchiectasis.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on bronchiectasis. The y-axis indicates the precision of each estimate, expressed as the reciprocal of the standard error.

Abbreviation: MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises;

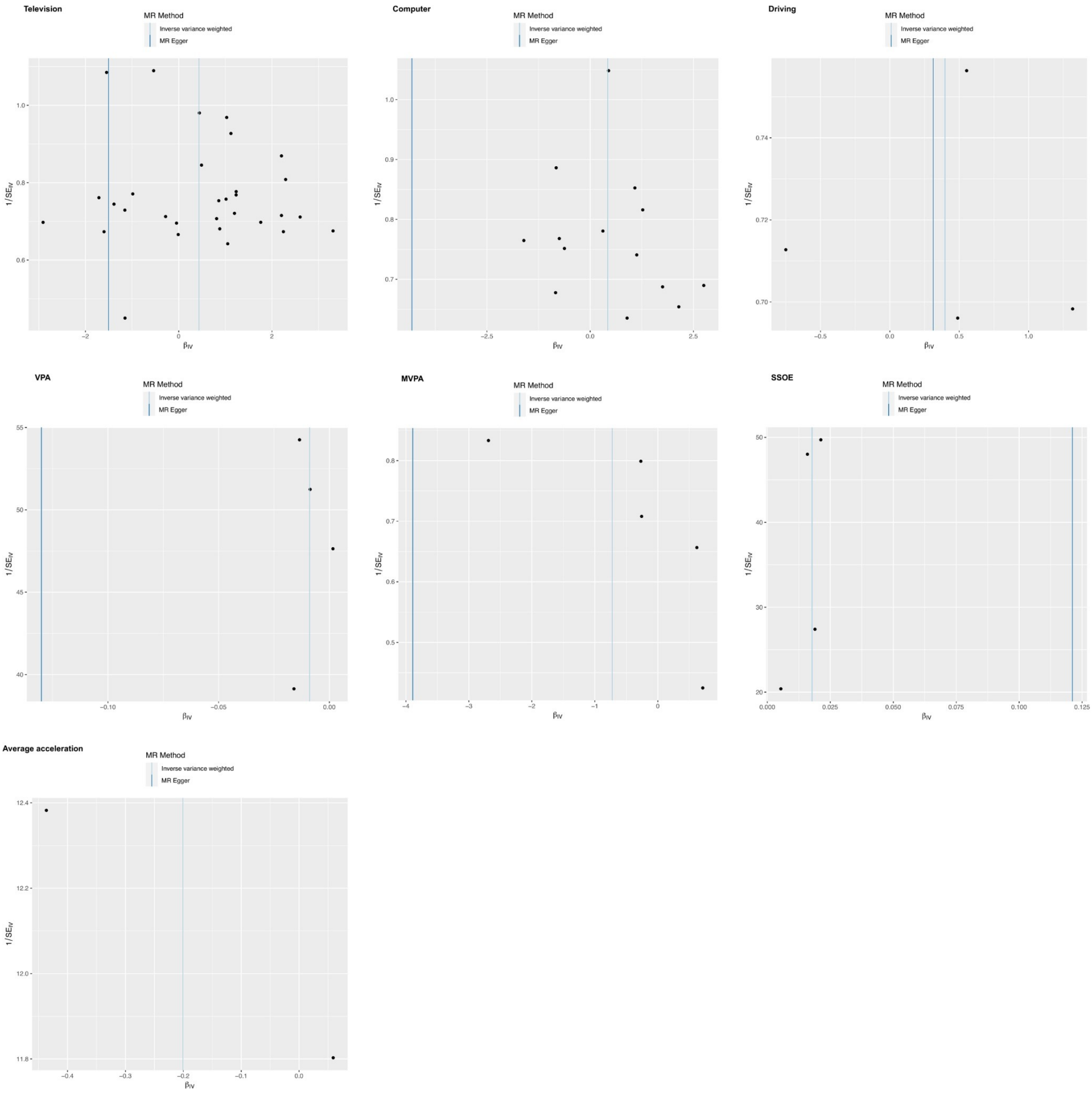
Supplementary Figure S21. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated on COPD.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on COPD. The y-axis indicates the precision of each estimate, expressed as the reciprocal of the standard error.

Abbreviation: COPD, Chronic Obstructive Pulmonary Disease; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises;

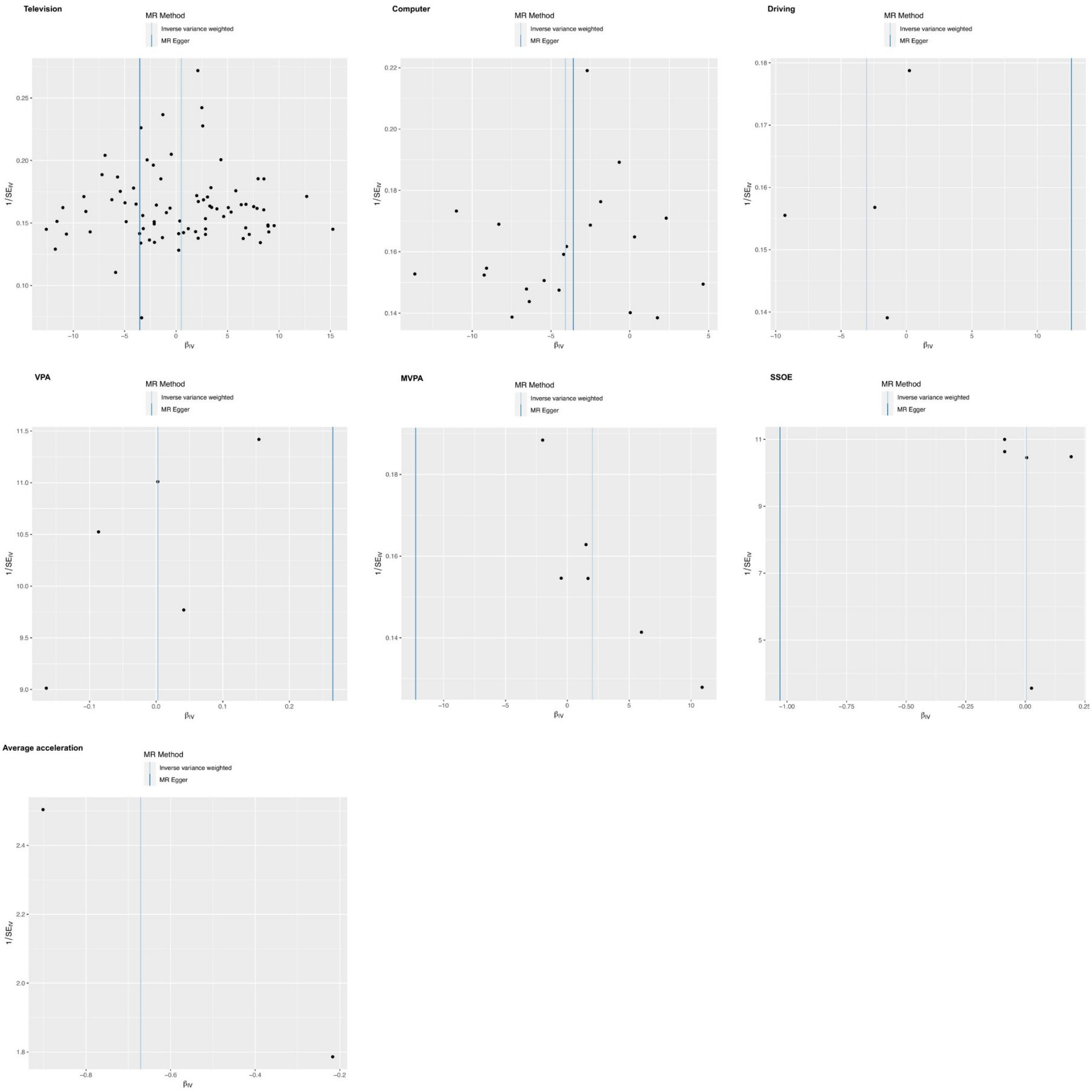
Supplementary Figure S22. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated on IPF.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on IPF. The y-axis indicates the precision of each estimate, expressed as the reciprocal of the standard error.

Abbreviation: IPF, Idiopathic Pulmonary Fibrosis; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises;

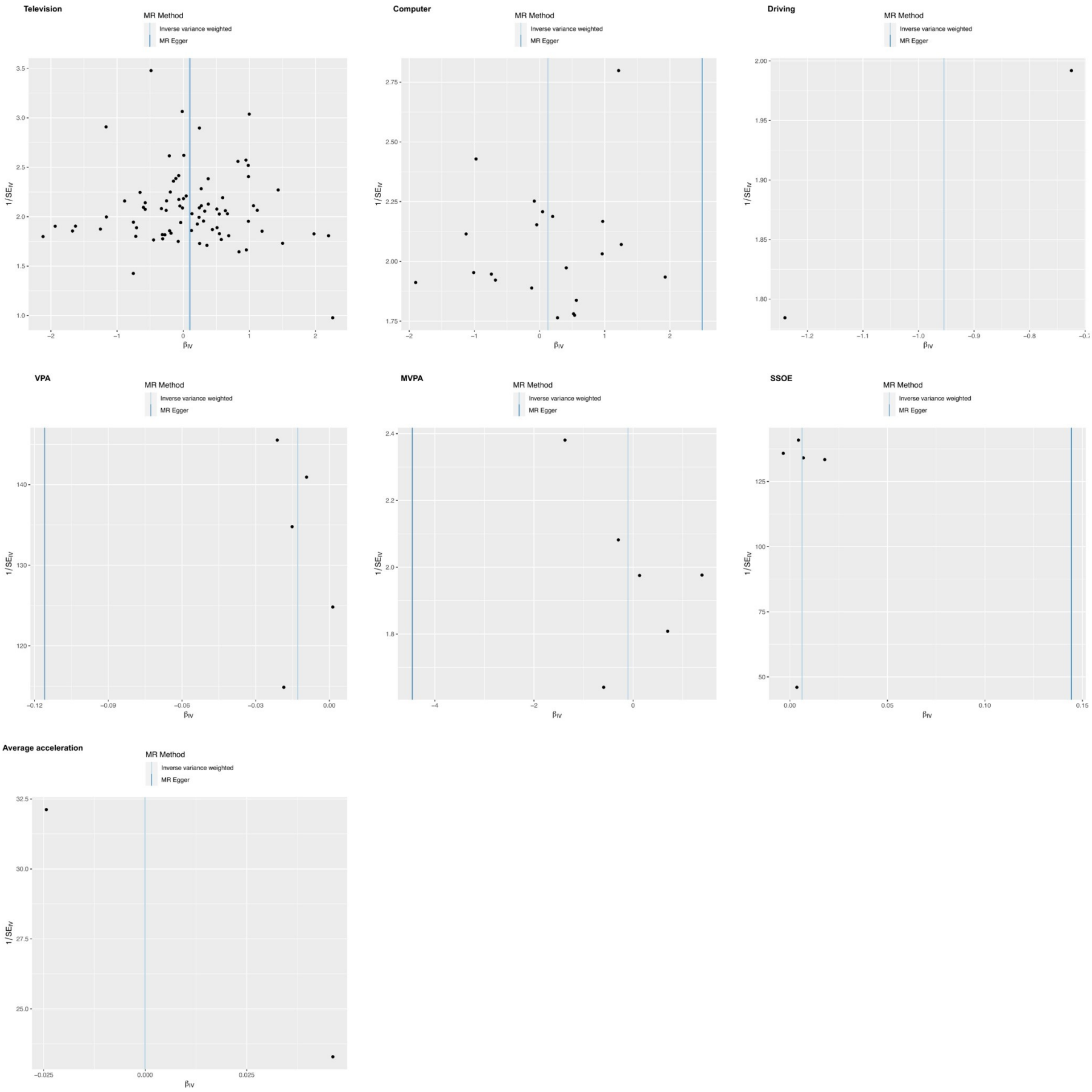
Supplementary Figure S23. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated on PAH.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on PAH. The y-axis indicates the precision of each estimate, expressed as the reciprocal of the standard error.

Abbreviation: PAH, Pulmonary Hypertension; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises;

Supplementary Figure S24. Funnel plots for assessing instrumental variable heterogeneity in leisure sedentary behaviors and physical activity associated on OSAS.



The x-axis shows MR effect size for leisure sedentary behaviors and physical activity on OSAS. The y-axis indicates the precision of each estimate, expressed as the reciprocal of the standard error.

Abbreviation: OSAS, Obstructive Sleep Apnea Syndrome; MR, Mendelian randomization; VPA, Vigorous Physical Activity; MVPA, Moderate to Vigorous Physical Activity; SSOE, Strenuous sports or other exercises;