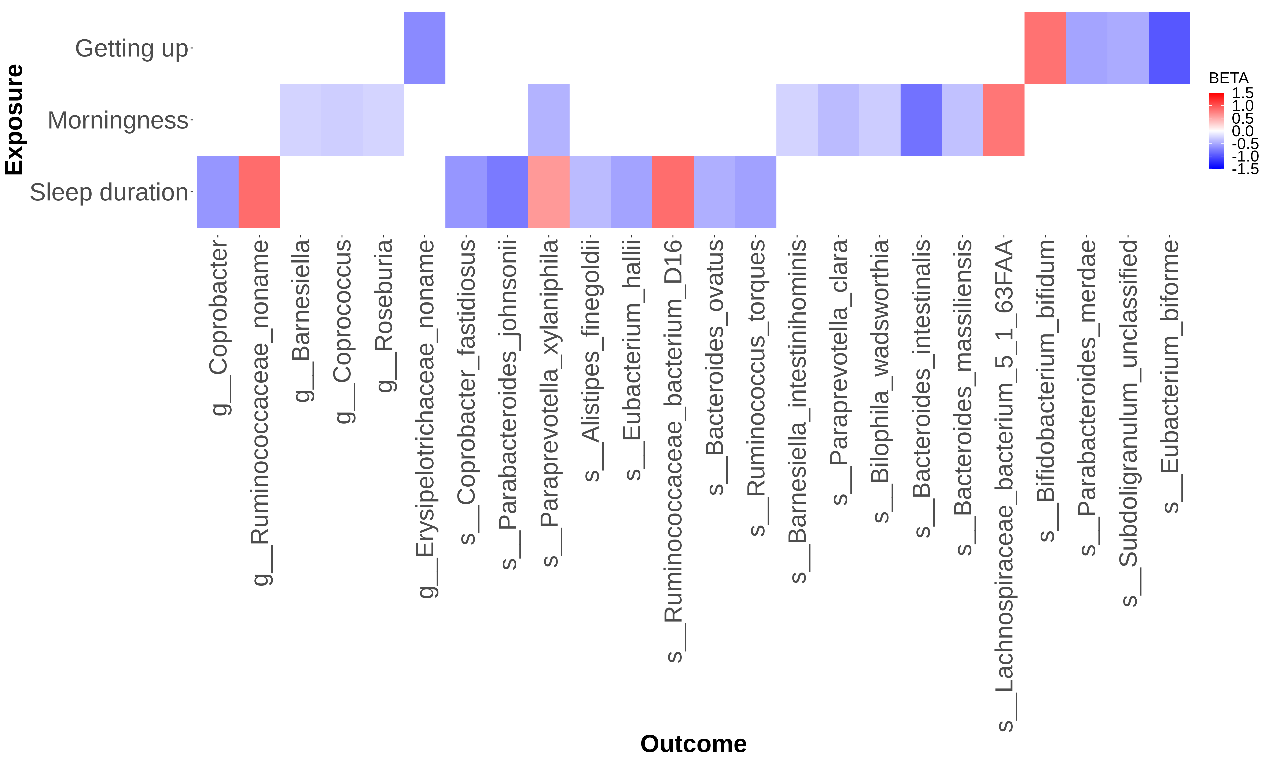
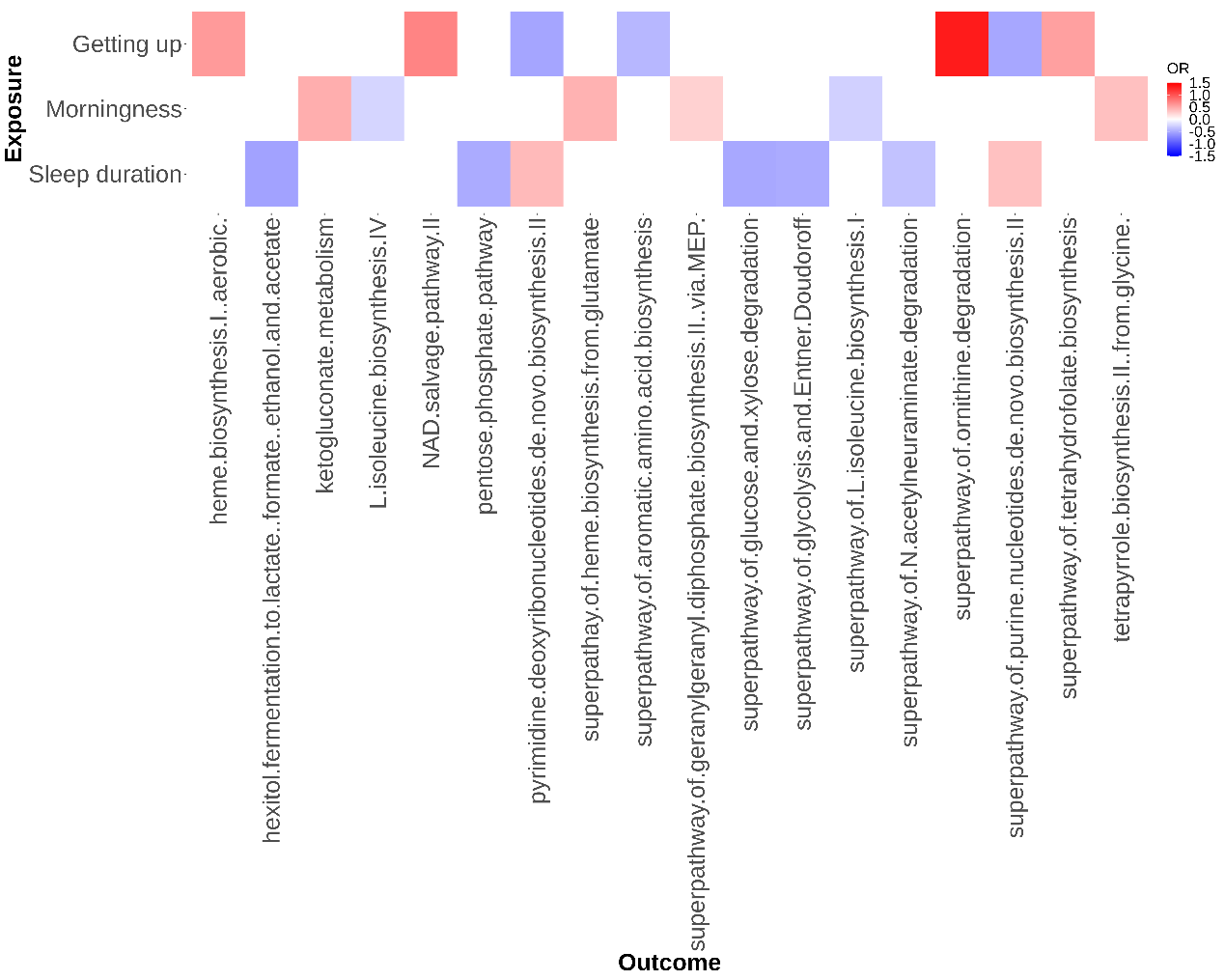
Table 1. GWAS summary statistics: source and description

|  |  |  |  |
| --- | --- | --- | --- |
| Phenotypes | Consortium | Sample size | Download |
| 207 taxa and 205 pathways | The Dutch Microbiome Project | 7, 738 | https://dutchmicrobiomeproject.molgeniscloud.org |
| Insomnia | UK Biobank | 386, 533 | https://ctg.cncr.nl/software/summary\_statistics |
| Morningness | UK Biobank | 345, 552 | https://ctg.cncr.nl/software/summary\_statistics |
| Sleep duration | UK Biobank | 384, 317 | https://ctg.cncr.nl/software/summary\_statistics |
| Ease of getting up | UK Biobank | 385, 949 | https://ctg.cncr.nl/software/summary\_statistics |
| Daytime napping | UK Biobank | 386, 577 | https://ctg.cncr.nl/software/summary\_statistics |
| Daytime dozing | UK Biobank | 386, 548 | https://ctg.cncr.nl/software/summary\_statistics |
| Snoring | UK Biobank | 359, 916 | https://ctg.cncr.nl/software/summary\_statistics |

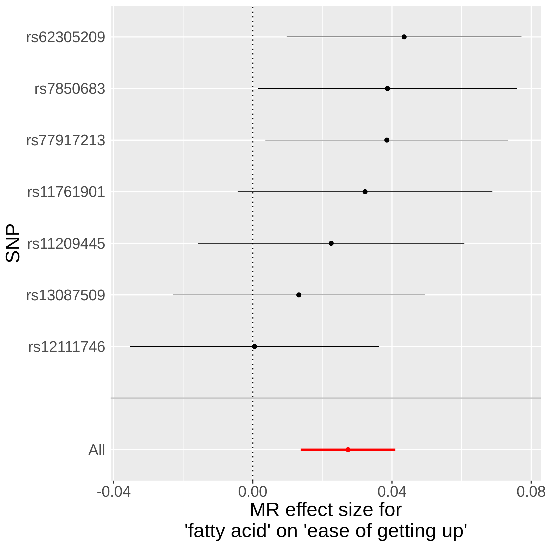
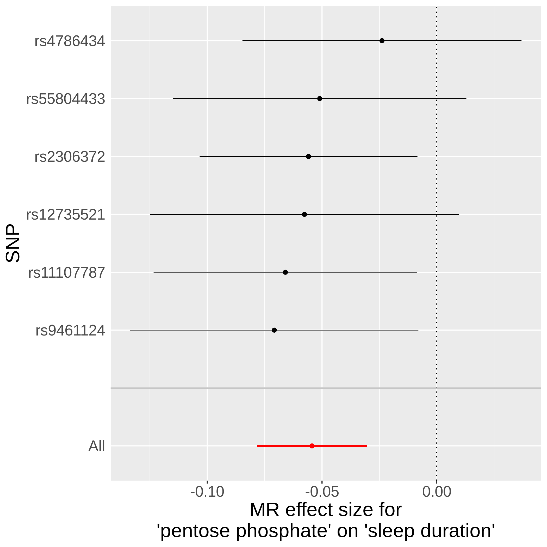


(a)



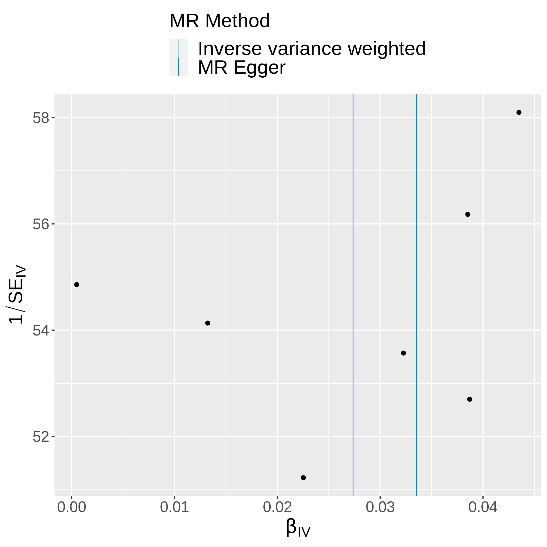
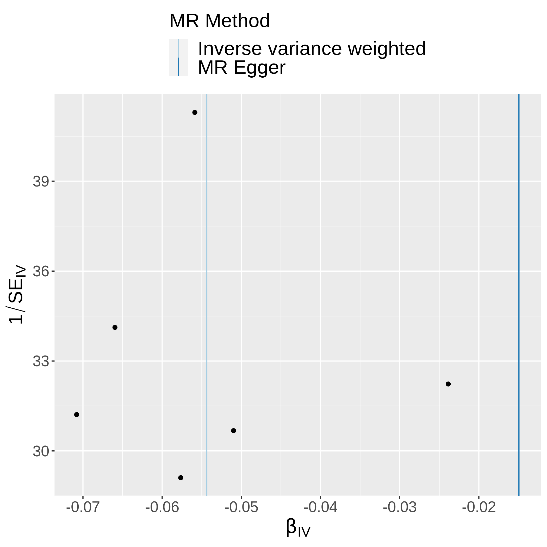
(b)

**Figure 1.** Suggestive causal relationships of sleep-related traits on microbial taxa and pathways: (a) Sleep-related traits on microbial taxa; (b) Sleep-related traits on pathways.



1. (b)

**Figure 2.** MR effect size for the causal association of microbial taxa and pathways on sleep-related traits: (a) Pentose phosphate pathway on sleep duration; (b) Fatty acid pathway on ease of getting up in the morning.



1. (b)

**Figure 3.** Funnel plots for the causal association of microbial taxa and pathways on sleep-related traits: (a) Pentose phosphate pathway on sleep duration; (b) Fatty acid pathway on ease of getting up in the morning.