main

August 31, 2021

1 Examine discordant plots with mashr

[1]:
```
library(dplyr)
library(mashr)
```

```
Attaching package: ‘dplyr’


The following objects are masked from ‘package:stats’:

    filter, lag


The following objects are masked from ‘package:base’:

    intersect, setdiff, setequal, union


Loading required package: ashr
```

[2]:
```
load("../../_m/genes/mashr_meta_results.RData")
labs = c("Caudate", "DLPFC", "Hippocampus")
```

1.1 Load SZ associated eGenes

[3]:
```
df <- data.table::fread("../../summary_table/_m/
 ↪Brainseq_LIBD_caudate_specific_4features_PGC2.eGenes.txt.gz") %>%
    select(variant_id, gene_id, P, Type) %>% filter(Type=="Gene") %>%
    arrange(P) %>% mutate(effect=paste(gene_id, variant_id, sep="_"))
df
```

A data.table: 11 × 5

variant_id <chr>	gene_id <chr>	P <dbl>	Type <chr>	effect <chr>
chr6:31910718:A:G	ENSG00000204371.11	5.34e-15	Gene	ENSG00000204371.11_
chr6:26090224:T:C	ENSG00000124610.4	1.50e-13	Gene	ENSG00000124610.4_cl
chr14:103800327:C:T	ENSG00000088808.16	1.24e-12	Gene	ENSG00000088808.16_
chr16:29971163:G:A	ENSG00000149930.17	2.23e-12	Gene	ENSG00000149930.17_
chr16:29961369:C:T	ENSG00000174938.14	3.06e-12	Gene	ENSG00000174938.14_
chr2:200299060:A:G	ENSG00000196141.13	8.28e-11	Gene	ENSG00000196141.13_
chr3:181110020:A:G	ENSG00000205981.6	4.30e-10	Gene	ENSG00000205981.6_cl
chr22:42070946:C:T	ENSG00000213790.2	2.62e-09	Gene	ENSG00000213790.2_cl
chr5:152894716:G:A	ENSG00000249484.8	5.71e-09	Gene	ENSG00000249484.8_cl
chr12:122966218:G:C	ENSG00000150967.17	6.59e-09	Gene	ENSG00000150967.17_
chr6:31701719:C:T	ENSG00000204386.10	1.85e-08	Gene	ENSG00000204386.10_

[4]:
```
m2$result$PosteriorMean %>% as.data.frame %>%
    tibble::rownames_to_column("effect") %>%
    filter(effect %in% df$effect) %>% arrange(Caudate)
```

A data.frame: 11 × 4

effect <chr>	Caudate <dbl>	DLPFC <dbl>	Hippocampus <dbl>
ENSG00000196141.13_chr2:200299060:A:G	-0.18460545	-0.0243577334	-0.042776874
ENSG00000150967.17_chr12:122966218:G:C	-0.10385129	0.0027315007	0.014531011
ENSG00000205981.6_chr3:181110020:A:G	-0.06915457	-0.0402940544	-0.031043260
ENSG00000174938.14_chr16:29961369:C:T	0.11417056	0.0446638014	0.004810389
ENSG00000213790.2_chr22:42070946:C:T	0.13182114	-0.0455366398	0.026797887
ENSG00000204386.10_chr6:31701719:C:T	0.16037133	-0.0034306019	-0.024876851
ENSG00000149930.17_chr16:29971163:G:A	0.16881147	-0.0012440206	-0.027868874
ENSG00000124610.4_chr6:26090224:T:C	0.18508321	0.0257459230	0.048399175
ENSG00000088808.16_chr14:103800327:C:T	0.33169961	0.0119323438	-0.024170940
ENSG00000249484.8_chr5:152894716:G:A	0.39759128	0.0006505036	0.068421660
ENSG00000204371.11_chr6:31910718:A:G	0.42998004	-0.0232548631	-0.008380841

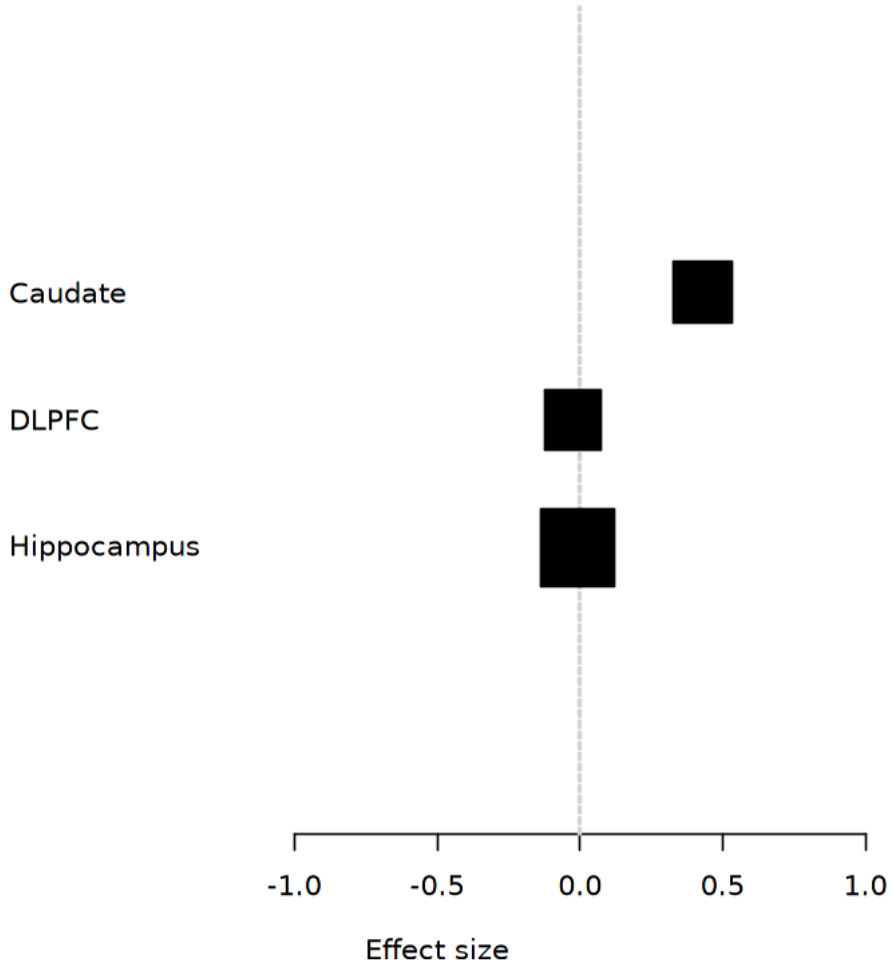
1.2 Generate metaplots

1.2.1 Interaction model

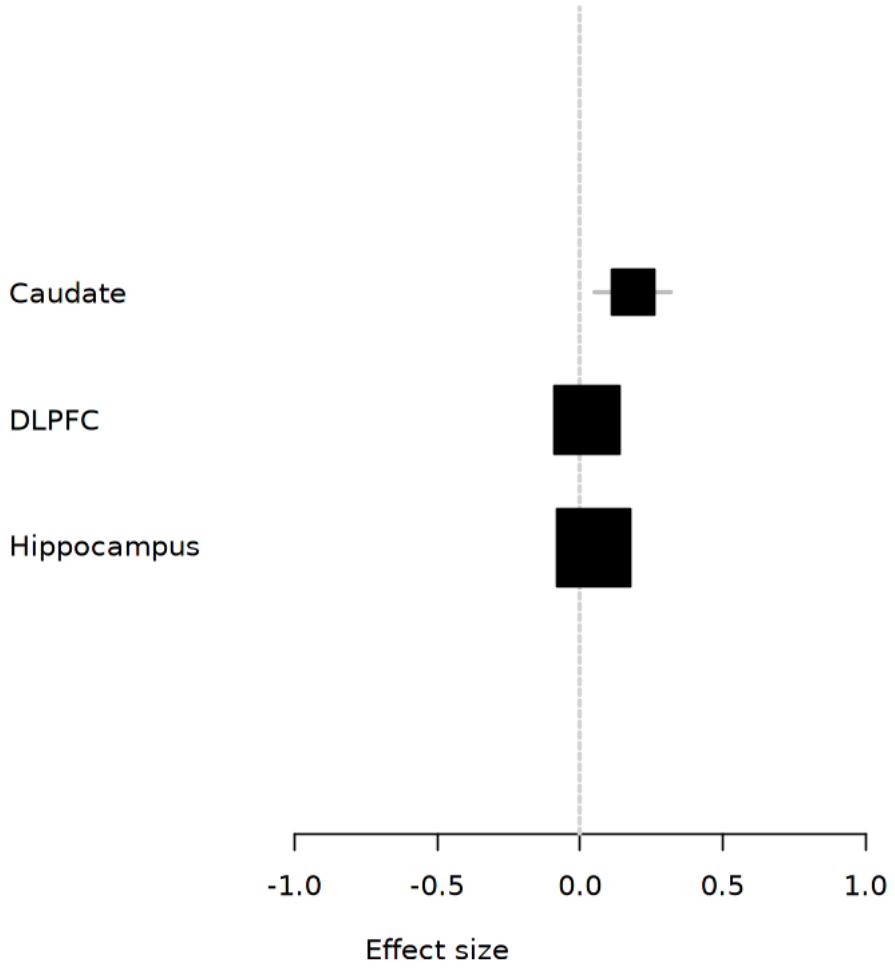
[5]:
```
for(ii in seq_along(df$effect)){
    gene_id = df$effect[ii]
    outfile = paste("metaplot", df$gene_id[ii], sep="_")
    print(m2$result$PosteriorMean[gene_id,])
    mash_plot_meta(m2, get_significant_results(m2)[gene_id], ylab="",␣
 ↪xlim=c(-1, 1), labels=labs)
    R.devices::devEval(c("png", "pdf"), name=outfile, {
        mash_plot_meta(m2, get_significant_results(m2)[gene_id], ylab="",␣
 ↪xlim=c(-1, 1), labels=labs)
    })
}
```

```
    Caudate        DLPFC  Hippocampus
```

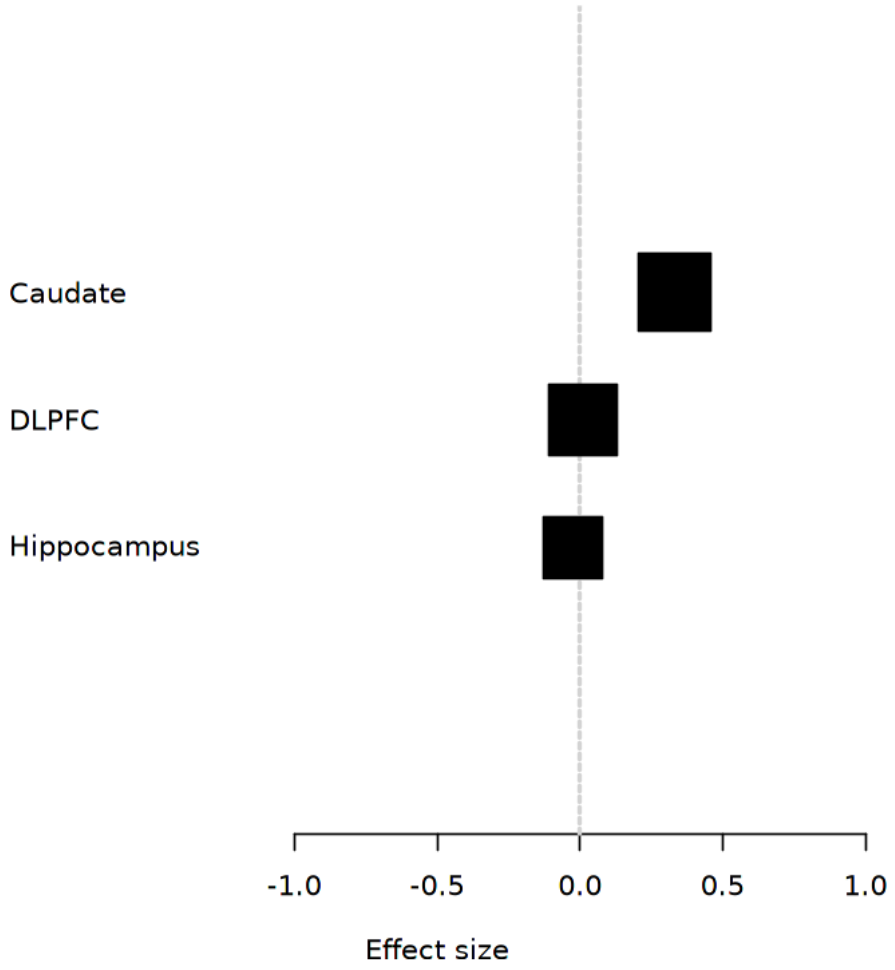
```
0.429980038 -0.023254863 -0.008380841
   Caudate       DLPFC Hippocampus
0.18508321  0.02574592  0.04839918
```



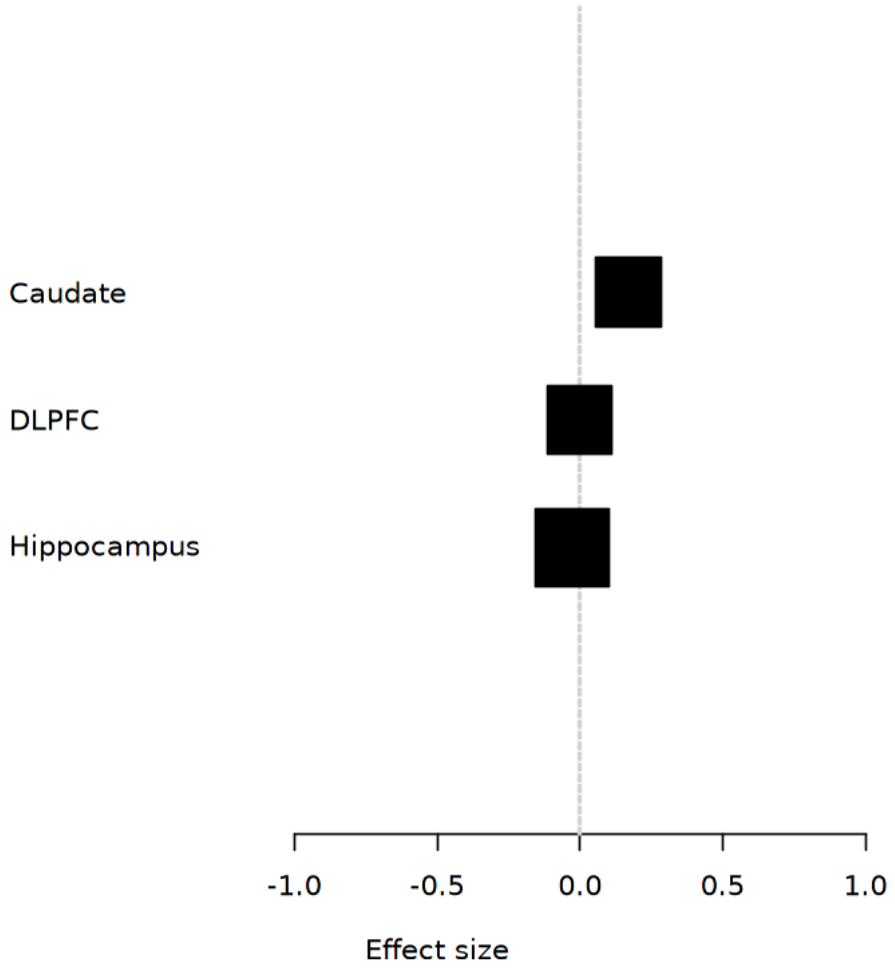

```
   Caudate       DLPFC Hippocampus
0.33169961  0.01193234 -0.02417094
```



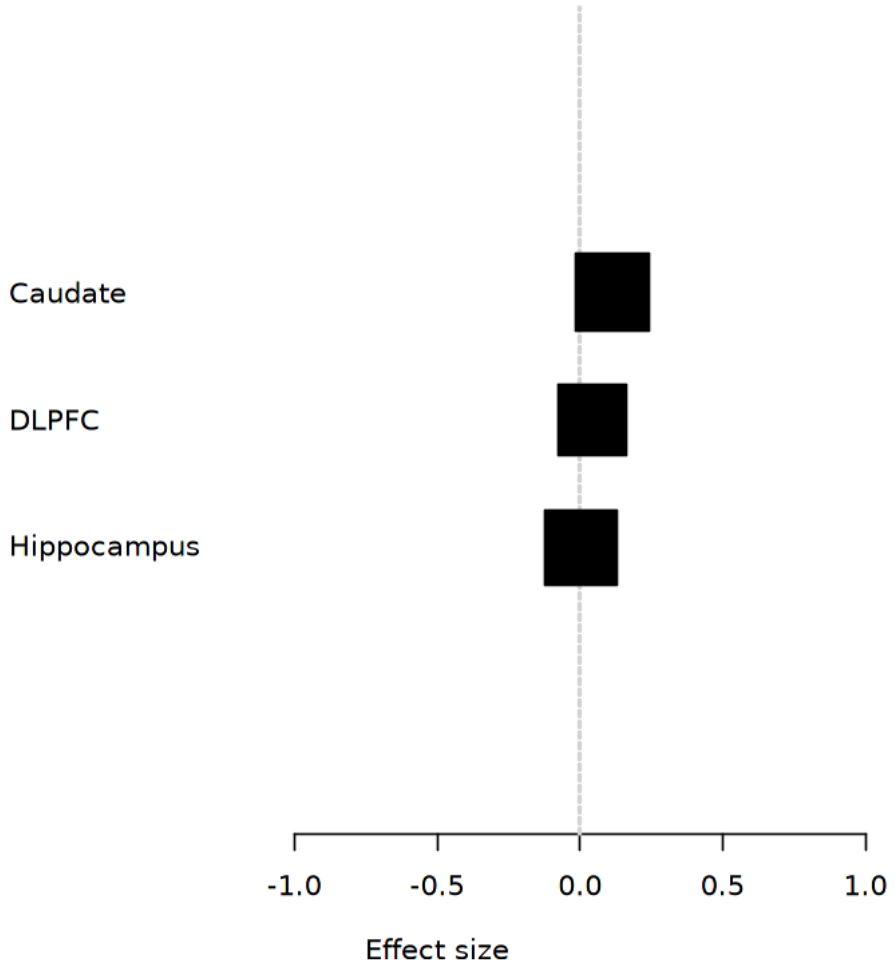

```
    Caudate        DLPFC  Hippocampus
0.168811472 -0.001244021 -0.027868874
```



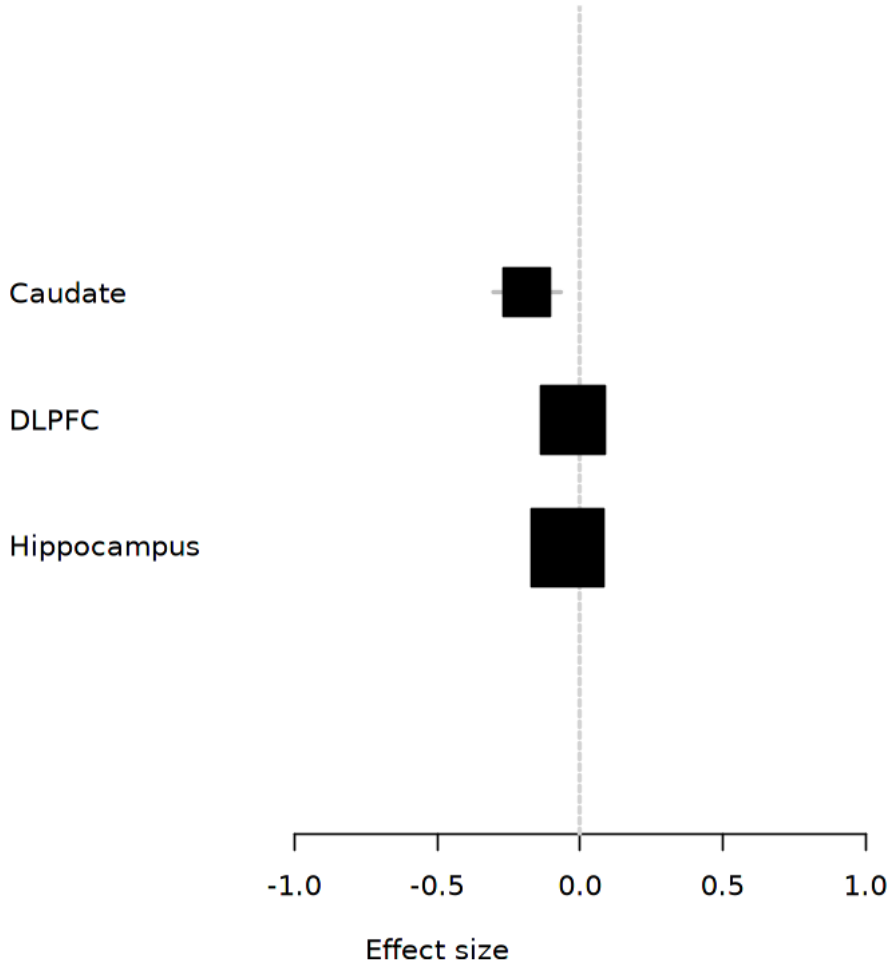

```
    Caudate       DLPFC Hippocampus
0.114170558 0.044663801 0.004810389
```



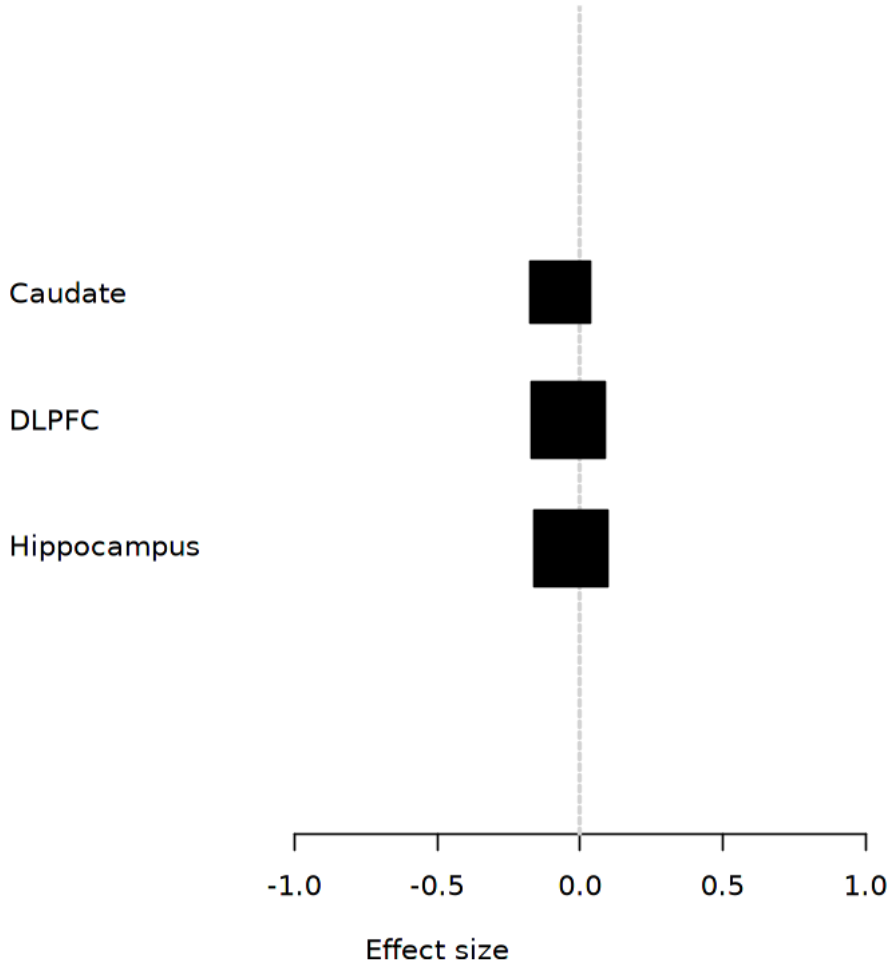

```
    Caudate       DLPFC Hippocampus
-0.18460545 -0.02435773 -0.04277687
```



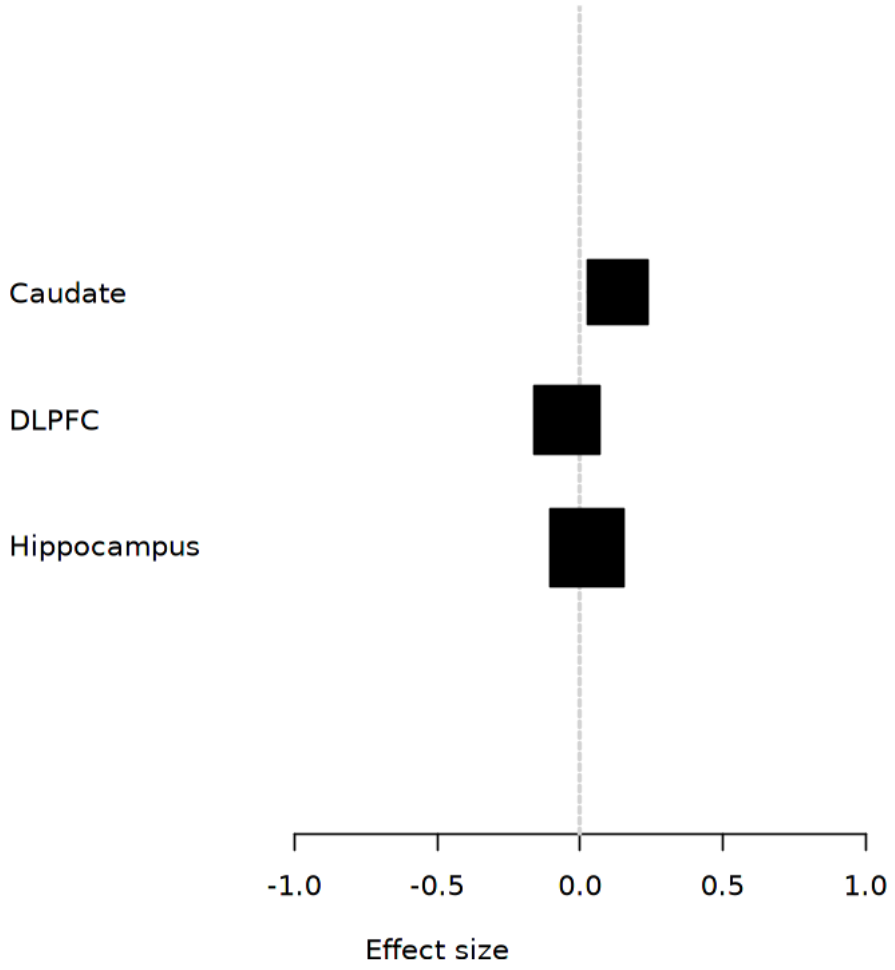

```
    Caudate       DLPFC Hippocampus
-0.06915457 -0.04029405 -0.03104326
```



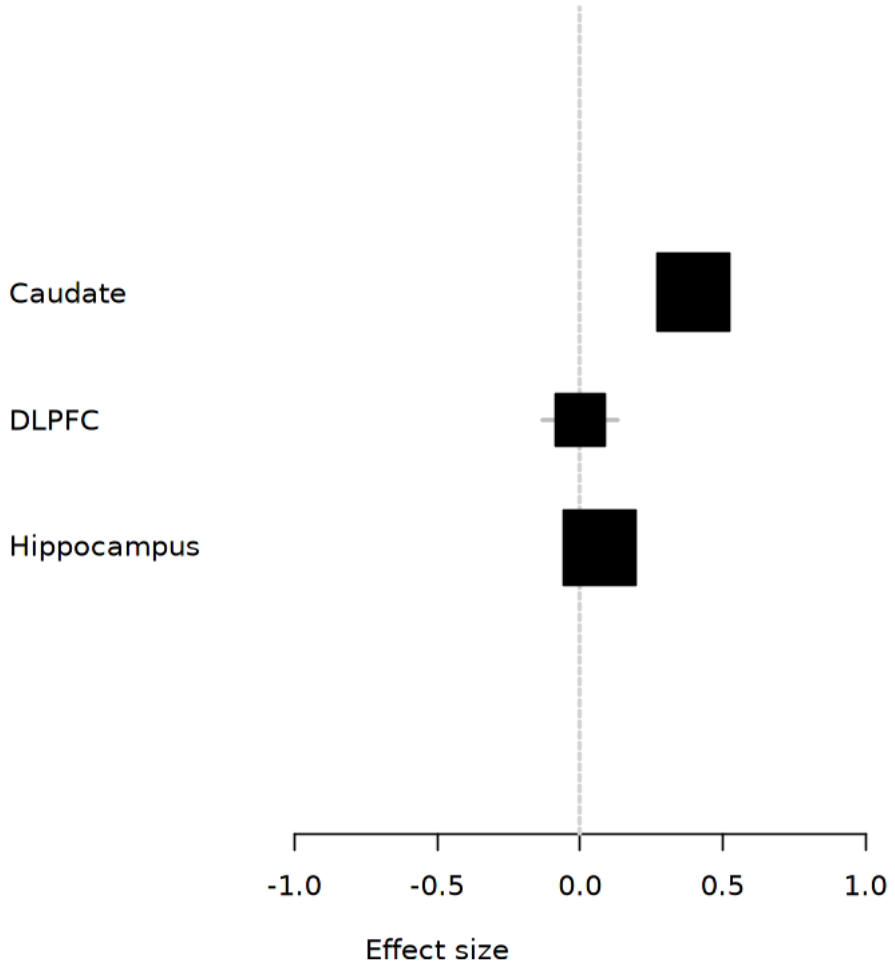

```
   Caudate       DLPFC Hippocampus
0.13182114 -0.04553664  0.02679789
```



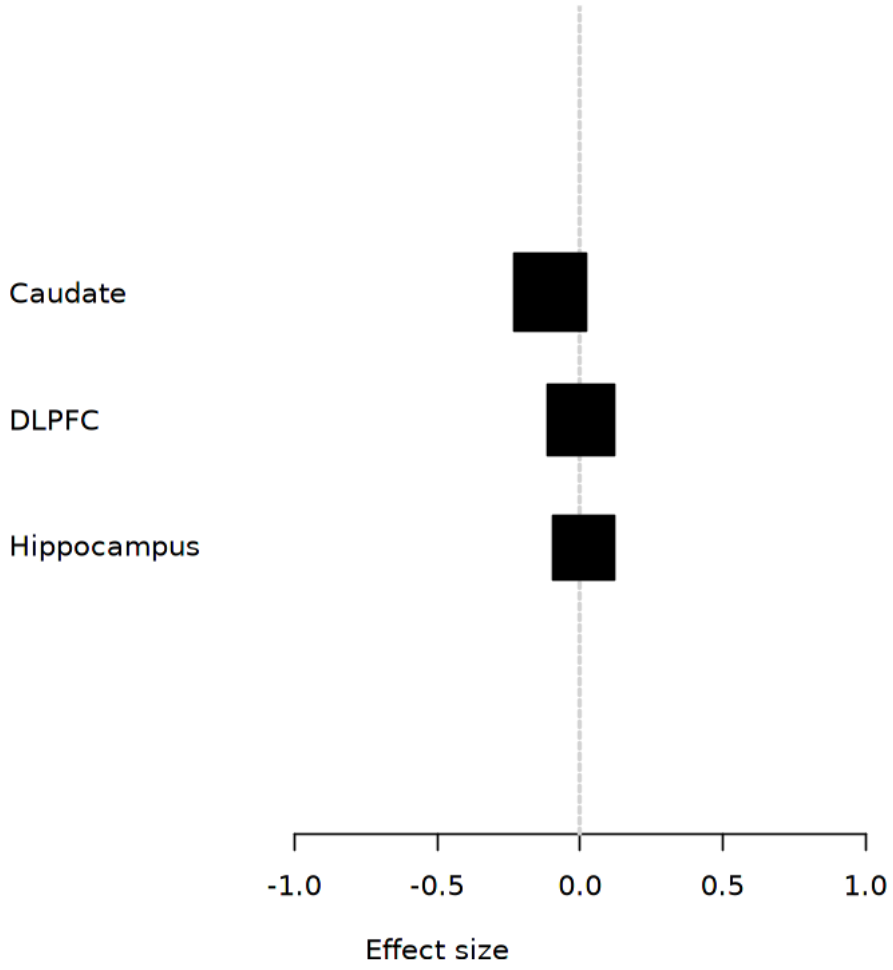

```
     Caudate        DLPFC  Hippocampus
0.3975912784 0.0006505036 0.0684216599
```

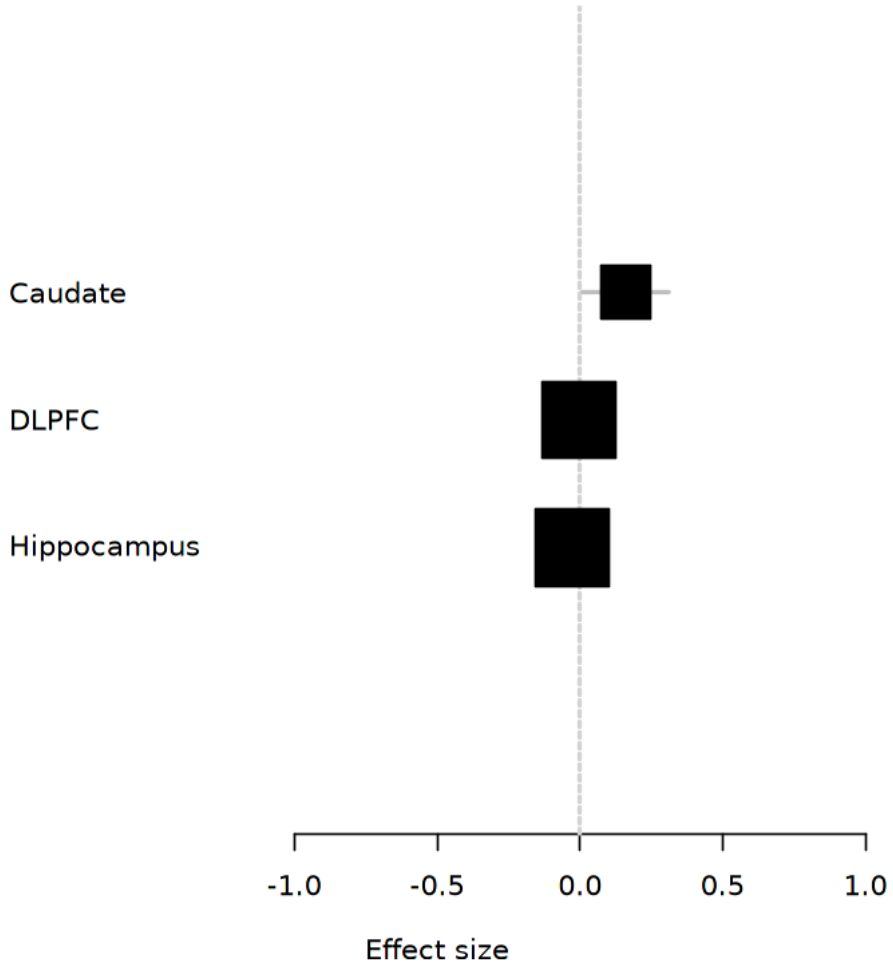



```
     Caudate        DLPFC  Hippocampus
-0.103851287  0.002731501  0.014531011
```




```
    Caudate        DLPFC  Hippocampus
0.160371331 -0.003430602 -0.024876851
```


Caudate
DLPFC
Hippocampus
-1.0
-0.5
0.0
0.5
1.0
Effect size



1.3 Reproducibility

[6]:
```
Sys.time()
proc.time()
options(width=120)
sessioninfo::session_info()
```

```
[1] "2021-08-31 17:14:12 EDT"
```

```
   user  system elapsed
  6.839   0.571   7.714
```

```
 Session info
setting  value
```

```
version  R version 4.0.3 (2020-10-10)
os       Arch Linux
system   x86_64, linux-gnu
ui       X11
language (EN)
collate  en_US.UTF-8
ctype    en_US.UTF-8
tz       America/New_York
date     2021-08-31

 Packages
package     * version  date       lib source
abind         1.4-5    2016-07-21 [1] CRAN (R 4.0.2)
ashr        * 2.2-51   2021-07-22 [1] Github (stephens999/ashr@23ba36a)
assertthat    0.2.1    2019-03-21 [1] CRAN (R 4.0.2)
base64enc     0.1-3    2015-07-28 [1] CRAN (R 4.0.2)
Cairo         1.5-12.2 2020-07-07 [1] CRAN (R 4.0.2)
cli           3.0.0    2021-06-30 [1] CRAN (R 4.0.3)
crayon        1.4.1    2021-02-08 [1] CRAN (R 4.0.3)
data.table    1.14.0   2021-02-21 [1] CRAN (R 4.0.3)
DBI           1.1.1    2021-01-15 [1] CRAN (R 4.0.2)
digest        0.6.27   2020-10-24 [1] CRAN (R 4.0.2)
dplyr       * 1.0.7    2021-06-18 [1] CRAN (R 4.0.3)
ellipsis      0.3.2    2021-04-29 [1] CRAN (R 4.0.3)
evaluate      0.14     2019-05-28 [1] CRAN (R 4.0.2)
fansi         0.5.0    2021-05-25 [1] CRAN (R 4.0.3)
generics      0.1.0    2020-10-31 [1] CRAN (R 4.0.2)
glue          1.4.2    2020-08-27 [1] CRAN (R 4.0.2)
htmltools     0.5.1.1  2021-01-22 [1] CRAN (R 4.0.2)
invgamma      1.1      2017-05-07 [1] CRAN (R 4.0.3)
IRdisplay     1.0      2021-01-20 [1] CRAN (R 4.0.2)
IRkernel      1.2      2021-05-11 [1] CRAN (R 4.0.3)
irlba         2.3.3    2019-02-05 [1] CRAN (R 4.0.2)
jsonlite      1.7.2    2020-12-09 [1] CRAN (R 4.0.2)
lattice       0.20-41  2020-04-02 [2] CRAN (R 4.0.3)
lifecycle     1.0.0    2021-02-15 [1] CRAN (R 4.0.3)
magrittr      2.0.1    2020-11-17 [1] CRAN (R 4.0.2)
mashr       * 0.2.50   2021-07-22 [1] Github (stephenslab/mashr@a54162b)
Matrix        1.3-4    2021-06-01 [1] CRAN (R 4.0.3)
mixsqp        0.3-43   2020-05-14 [1] CRAN (R 4.0.3)
mvtnorm       1.1-2    2021-06-07 [1] CRAN (R 4.0.3)
pbdZMQ        0.3-5    2021-02-10 [1] CRAN (R 4.0.3)
pillar        1.6.1    2021-05-16 [1] CRAN (R 4.0.3)
pkgconfig     2.0.3    2019-09-22 [1] CRAN (R 4.0.2)
plyr          1.8.6    2020-03-03 [1] CRAN (R 4.0.2)
purrr         0.3.4    2020-04-17 [1] CRAN (R 4.0.2)
R.devices     2.17.0   2021-01-19 [1] CRAN (R 4.0.3)
R.methodsS3   1.8.1    2020-08-26 [1] CRAN (R 4.0.3)
```

```
 R.oo          1.24.0   2020-08-26 [1] CRAN (R 4.0.3)
 R.utils       2.10.1   2020-08-26 [1] CRAN (R 4.0.3)
 R6            2.5.0    2020-10-28 [1] CRAN (R 4.0.2)
 Rcpp          1.0.7    2021-07-07 [1] CRAN (R 4.0.3)
 repr          1.1.3    2021-01-21 [1] CRAN (R 4.0.2)
 rlang         0.4.11   2021-04-30 [1] CRAN (R 4.0.3)
 rmeta         3.0      2018-03-20 [1] CRAN (R 4.0.3)
 sessioninfo   1.1.1    2018-11-05 [1] CRAN (R 4.0.2)
 softImpute    1.4-1    2021-05-09 [1] CRAN (R 4.0.3)
 SQUAREM       2021.1   2021-01-13 [1] CRAN (R 4.0.3)
 tibble        3.1.2    2021-05-16 [1] CRAN (R 4.0.3)
 tidyselect    1.1.1    2021-04-30 [1] CRAN (R 4.0.3)
 truncnorm     1.0-8    2018-02-27 [1] CRAN (R 4.0.3)
 utf8          1.2.1    2021-03-12 [1] CRAN (R 4.0.3)
 uuid          0.1-4    2020-02-26 [1] CRAN (R 4.0.2)
 vctrs         0.3.8    2021-04-29 [1] CRAN (R 4.0.3)
 withr         2.4.2    2021-04-18 [1] CRAN (R 4.0.3)

[1] /home/jbenja13/R/x86_64-pc-linux-gnu-library/4.0
[2] /usr/lib/R/library
```