Prelim PINT stats

Going to Start Loading saba's PINT data

```
library(dplyr)
library(tidyr)
library(readr)
library(broom)
library(igraph)
library(stringr)
library(tibble)
library(purrr)
library(ggplot2)
library(knitr)
```

The paths to data

```
pint_outputs <- '../data/PINT_outputs_s8_6-6-12/'
subcortical_outputs_dir <- '../data/subcortical_ts/'

Yeo7_2011_80verts <- read_csv("~/code/ciftify/ciftify/data/PINT/Yeo7_2011_80verts.csv",
                              col_types = c(
                                hemi = col_character(),
                                tvertex = col_integer(),
                                LRpairs = col_integer(),
                                roiidx = col_integer(),
                                NETWORK = col_integer(),
                                LOBE = col_character(),
                                SHORTNAME = col_character(),
                                x = col_integer(),
                                y = col_integer(),
                                z = col_integer()
                              ))
```

read and mangle the phenotypic data

```
## reading in the qced_sublists csv to get the sublists
qced_sublists <- read_csv("../phenotypic/NEWallSubjects_completeData3_DM_not_sexmatched.csv",
                          col_types = c(
                            X1 = col_integer(),
                            name = col_character(),
                            subid = col_character(),
                            DX_GROUP = col_integer(),
                            mean_fd = col_double(),
                            age = col_integer(),
                            sex.x = col_integer(),
                            educationCode = col_double(),
                            site = col_integer(),
                            sex.y = col_integer(),
```

```
                            X.bad_fd = col_double(),
                            global_corr = col_double(),
                            mean_snfr = col_double()
                          ))
```

```
## Warning: Missing column names filled in: 'X1' [1]
```

```
pheno <- qced_sublists %>%
  mutate(Site = factor(site, levels = c(1,2,3),
                       labels = c("CMH","ZHH","COBRE")) ,
         DX = factor(DX_GROUP, level = c(1,2), labels = c('SSD', 'Ctrl')),
         Sex = factor(sex.x),
         Edu = if_else(is.na(educationCode),
                       true = mean(educationCode, na.rm = T),
                       false = educationCode))
```

adding transformed variables

```
transform_to_normal <- function(X) {
  # calculate the best exponent using powerTransform:
  pT <- car::powerTransform(X)
  # apply the power transform and save the result to a new variable
  X_pT <- X^pT$lambda ## note ^ is exponent in r
  return(X_pT)
}

pheno <- pheno %>%
  mutate(Age_pt = transform_to_normal(age),
         mean_fd_pt = transform_to_normal(mean_fd),
         Edu_std = scale(Edu)[,1],
         Age_std = scale(age)[,1])
```

Code for reading in all the timeseries..

searching for the meants files

```
pint_outputlist <- data.frame("filepath" = list.files(pint_outputs,
                                                      recursive = T,
                                                      pattern = "_summary.csv")) %>%
  separate(filepath, into = c("subid", "summary_file"), sep = '/')

subcort_outputlist <- data.frame("subid" = list.files(subcortical_outputs_dir,
                                                      recursive = F))

pint_outputlist <- inner_join(pint_outputlist, subcort_outputlist, by = "subid")
```

```
## Warning in inner_join_impl(x, y, by$x, by$y, suffix$x, suffix$y): joining
## character vector and factor, coercing into character vector
```

A table that describes the current expected subortical files

```
# a tibble table to specify the subcortical meants files that were generated
subcortical_files <- tribble(
  ~file_prefix, ~name,
  "Thalamus_corrected", "Thalamus",
  "Striatum_network_1", "Striatum_VI",
"Striatum_network_2", "Striatum_SM",
"Striatum_network_3", "Striatum_DA",
"Striatum_network_4", "Striatum_VA",
"Striatum_network_5", "Striatum_Limbic",
"Striatum_network_6", "Striatum_FP",
"Striatum_network_7", "Striatum_DM")

kable(subcortical_files)
```

file_prefix	name
Thalamus_corrected	Thalamus
Striatum_network_1	Striatum_VI
Striatum_network_2	Striatum_SM
Striatum_network_3	Striatum_DA
Striatum_network_4	Striatum_VA
Striatum_network_5	Striatum_Limbic
Striatum_network_6	Striatum_FP
Striatum_network_7	Striatum_DM

This function reads and concatenates all subcortical timeseries files for one subject

```
#' read a meants file generated by PINT of ciftify_meants
#'
#' @param filepath the full path to the file
#'
#' @return a dataframe where rows are rois and colums are timepoints
read_meants_csv <- function(filepath) {
   meants <-read_csv(filepath,
                     col_names = FALSE,
                     col_types = c(.default = col_double()))
   return(meants)
}

#' reads in the subcortical data for one subject specified in the subcortical template
#'
#' @param subid the subject id prefix for the output
#' @param subcortical_outputs_dir the base output directory for the subcortical ts data
#' @param subcortical_template a dataframe with a 'file_prefix' column decscribing the subcortical regi
#' @param smoothing the amount of smoothing on the origianl dtseries (defaults to 0)
#'
#' @return the cpmcatenated mean timeseries data as a dataframe
read_subcortical_meants <- function(subid, subcortical_outputs_dir,
                                    subcortical_template = subcortical_files,
                                    smoothing = 's0') {
  subcort_meants <- subcortical_template %>%
    mutate(filepath = str_c(subcortical_outputs_dir,subid, '/',
                            subid, '_', smoothing, '_', file_prefix, '.nii_meants.csv'),
           thedata = map(filepath, ~read_meants_csv(.x))) %>%
```

```
    select(thedata) %>%
    unnest()
  return(subcort_meants)
}

#' Read the contents of a csv generated by PINT
#'
#' @param subid The subject identifier
#' @param vertex_type "ivertex" or "tvertex"
#' @param pint_outputs the basepath of the pint outputs
#'
#' @return a dataframe of the _meants.csv contents
read_pint_meants <- function(subid, vertex_type, pint_outputs) {
  expected_filepath <- file.path(pint_outputs, subid,
                           str_c(subid, '_', vertex_type, '_meants.csv'))
  meants = read_meants_csv(expected_filepath)
  return(meants)
}
```

This reads all files and generate PINT to subcortical correlation values for a given subject

```
#' read all fMRI timeseries data for one subject and correlates PINT ROIs with subcortex
#'
#' @param subid the subject id
#' @param pint_outputs the path to the pint output directory
#' @param subcortical_outputs_dir the path to the subcortical timeseries directory
#' @param Yeo7_2011_80verts as data frame describing the PINT ROIs
#' @param subcortical_files a tibble of expected subcortical ts files
#'
#' @return a dataframe (graph style) of PINT ROI to subcortical correlations
subject_subcort_corrs <- function(subid, pint_outputs, subcortical_outputs_dir,
                                  Yeo7_2011_80verts, subcortical_files) {

  ivertex_meants <- read_pint_meants(subid, 'ivertex', pint_outputs)
  tvertex_meants <- read_pint_meants(subid, 'tvertex', pint_outputs)
  subcort_meants <- read_subcortical_meants(subid,
                                            subcortical_outputs_dir,
                                            subcortical_template = subcortical_files)

  # correlate the ivertex timeseries with the subcortical data
  ivertex_subcortcorr <- as.data.frame(cor(t(subcort_meants), t(ivertex_meants)))
  names(ivertex_subcortcorr) <- Yeo7_2011_80verts$SHORTNAME
  ivertex_result <- ivertex_subcortcorr %>%
    mutate(subcort_ROI = subcortical_files$name) %>%
    gather(PINT_ROI, ivertex_corr, -subcort_ROI)

  # correlated the tvertex timeseries with the subcortical data
  tvertex_subcortcorr <- as.data.frame(cor(t(subcort_meants), t(tvertex_meants)))
  names(tvertex_subcortcorr) <- Yeo7_2011_80verts$SHORTNAME
  tvertex_result <- tvertex_subcortcorr %>%
    mutate(subcort_ROI = subcortical_files$name) %>%
    gather(PINT_ROI, tvertex_corr, -subcort_ROI)

  # combine ivertex and tvertex and return
```

```
  subresult <- ivertex_result %>%
    inner_join(tvertex_result, by = c("PINT_ROI", "subcort_ROI"))
  return(subresult)
}
```

This reads all the subcortical files it can find

```
run_read_subject_subcort_corrs <- function(subid) {
  df <-subject_subcort_corrs(subid, pint_outputs, subcortical_outputs_dir,
                                  Yeo7_2011_80verts, subcortical_files)
  return(df)
}

all_subcort_results <- pint_outputlist %>%
  mutate(subcort_corrs = map(subid, ~run_read_subject_subcort_corrs(.x)))
```

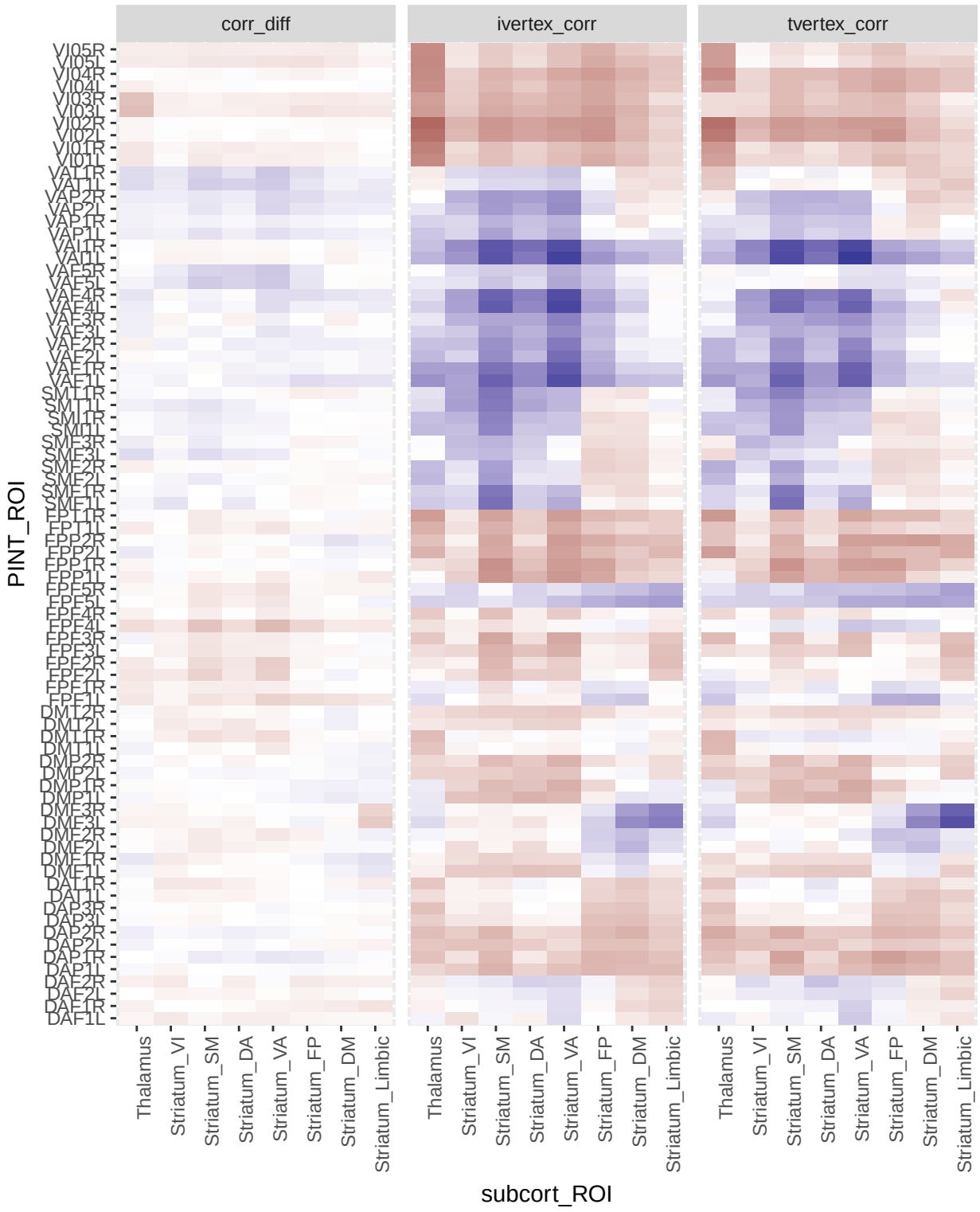
merge with the phenotypic data

```
results_pheno <- all_subcort_results %>%
  inner_join(pheno, by = "subid") %>%
  unnest() %>%
  mutate(YeoNet = str_sub(PINT_ROI, 1,2),
         hemisphere = str_sub(PINT_ROI, 5,5)) %>%
  mutate(YeoNet = factor(YeoNet, levels = c("VI", "SM", "DA", "VA", "FP", "DM")),
         subcort_ROI = factor(subcort_ROI,
                              levels = c("Thalamus", "Striatum_VI", "Striatum_SM",
                                         "Striatum_DA","Striatum_VA","Striatum_FP",
                                         "Striatum_DM","Striatum_Limbic"))) %>%
  select(subid, PINT_ROI, subcort_ROI,
         ivertex_corr, tvertex_corr,
         DX, Edu, Sex, mean_fd, age, Site,
         Age_pt, mean_fd_pt, Edu_std, Age_std,
         YeoNet, hemisphere)

# classify the connections
results_pheno <- results_pheno %>%
  separate(subcort_ROI, into = c("tmp", "Striatum_ROI"),
           sep = '_', fill = "left", remove = FALSE) %>%
  ungroup() %>%
  mutate(conn_type = case_when(
    .$Striatum_ROI == "Thalamus" ~ "Thalamus",
    .$Striatum_ROI == .$YeoNet ~ "Striatum_same_net",
    TRUE ~ "Striatum_diff_net"))
```

Is PINT "focusing" cortical subcortical connectivity

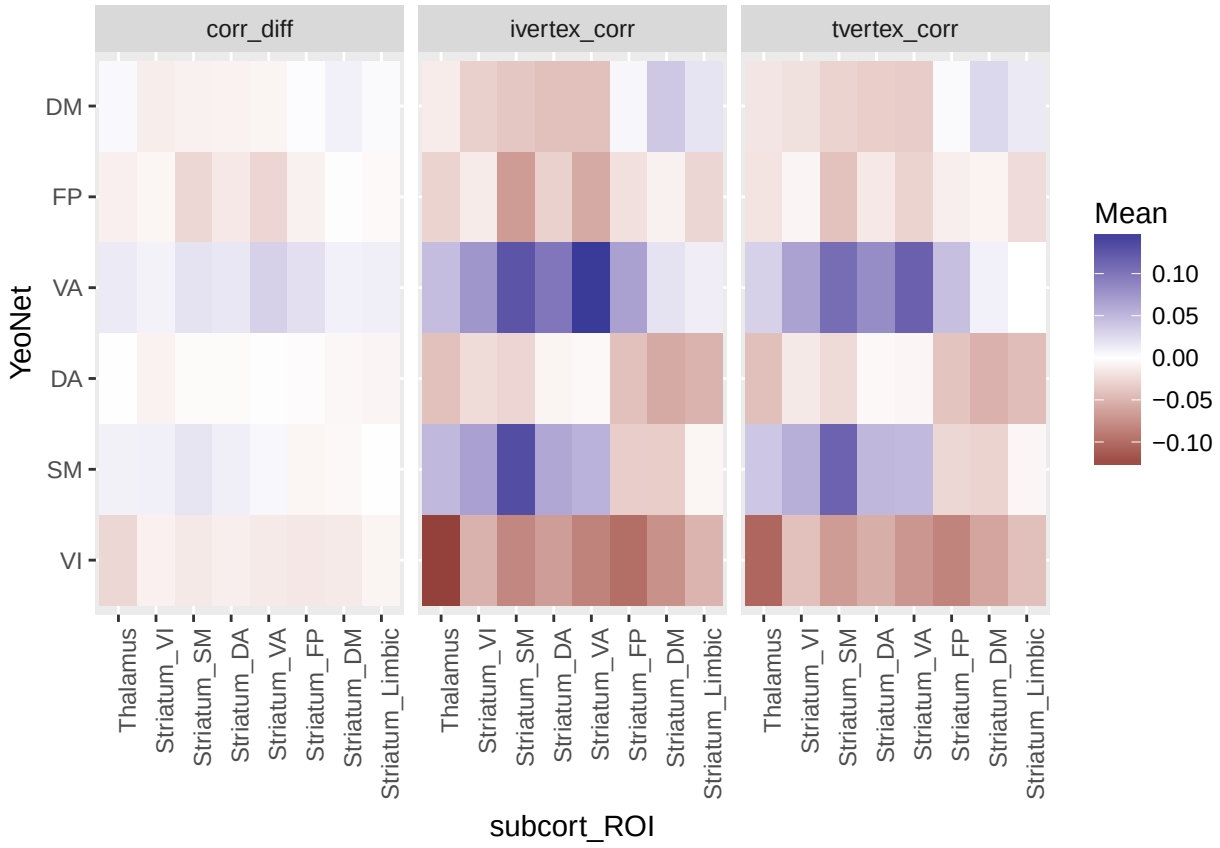
```
table1 <- results_pheno %>%
  mutate(corr_diff = ivertex_corr - tvertex_corr) %>%
```

```
  gather(corr_type, rval, ivertex_corr, tvertex_corr, corr_diff) %>%
  group_by(corr_type, PINT_ROI, subcort_ROI) %>%
  summarise(n = n(),
            Mean = mean(rval),
            SD = sd(rval))

ggplot(table1, aes(y = PINT_ROI, x = subcort_ROI, fill = Mean)) +
  geom_tile() +
  scale_fill_gradient2(breaks = c(-0.5,0.5)) +
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) +
  facet_wrap(~corr_type, ncol = 3)
```



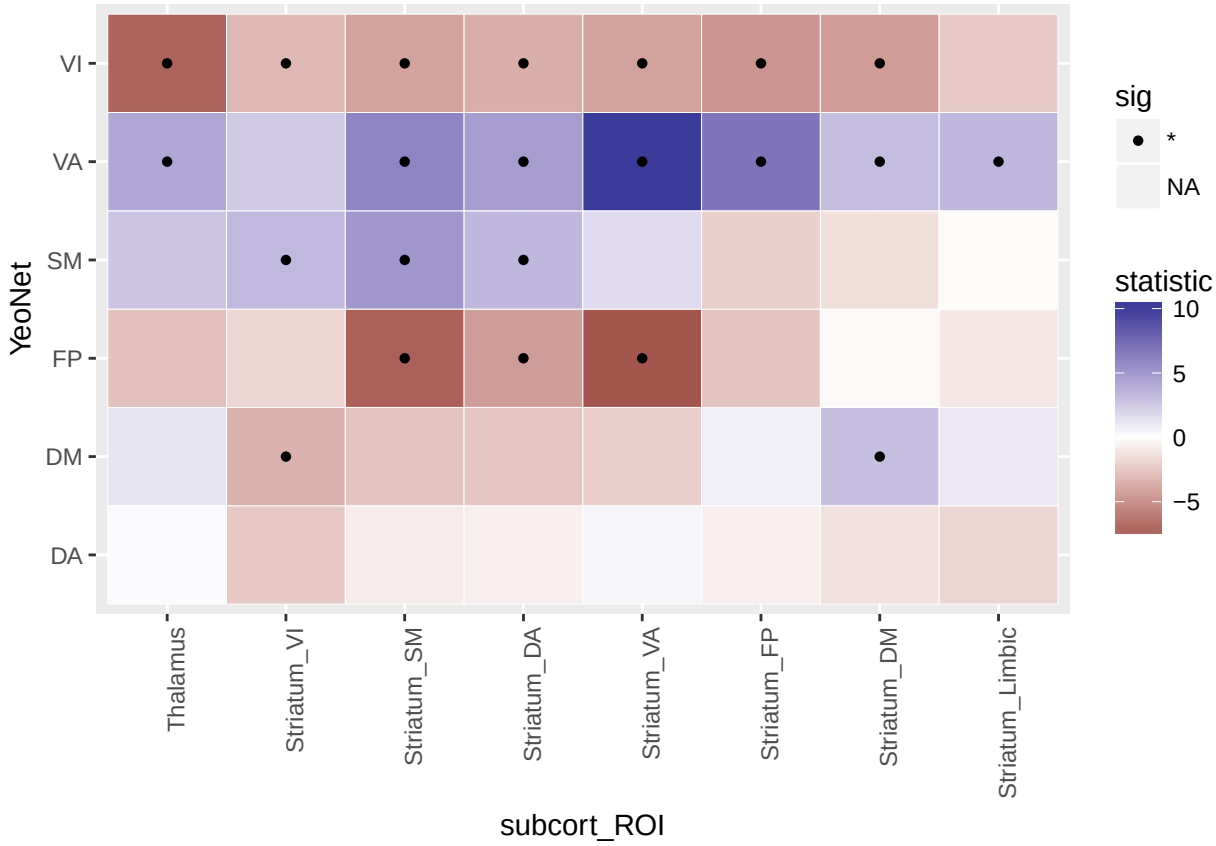

```
table2 <- results_pheno %>%
  mutate(corr_diff = ivertex_corr - tvertex_corr) %>%
  gather(corr_type, rval, ivertex_corr, tvertex_corr, corr_diff) %>%
  group_by(corr_type, YeoNet, subcort_ROI) %>%
  summarise(n = n(),
            Mean = mean(rval),
```

```
            SD = sd(rval))

ggplot(table2, aes(y = YeoNet, x = subcort_ROI, fill = Mean)) +
  geom_tile() +
  scale_fill_gradient2() +
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) +
  facet_wrap(~corr_type, ncol = 3)
```

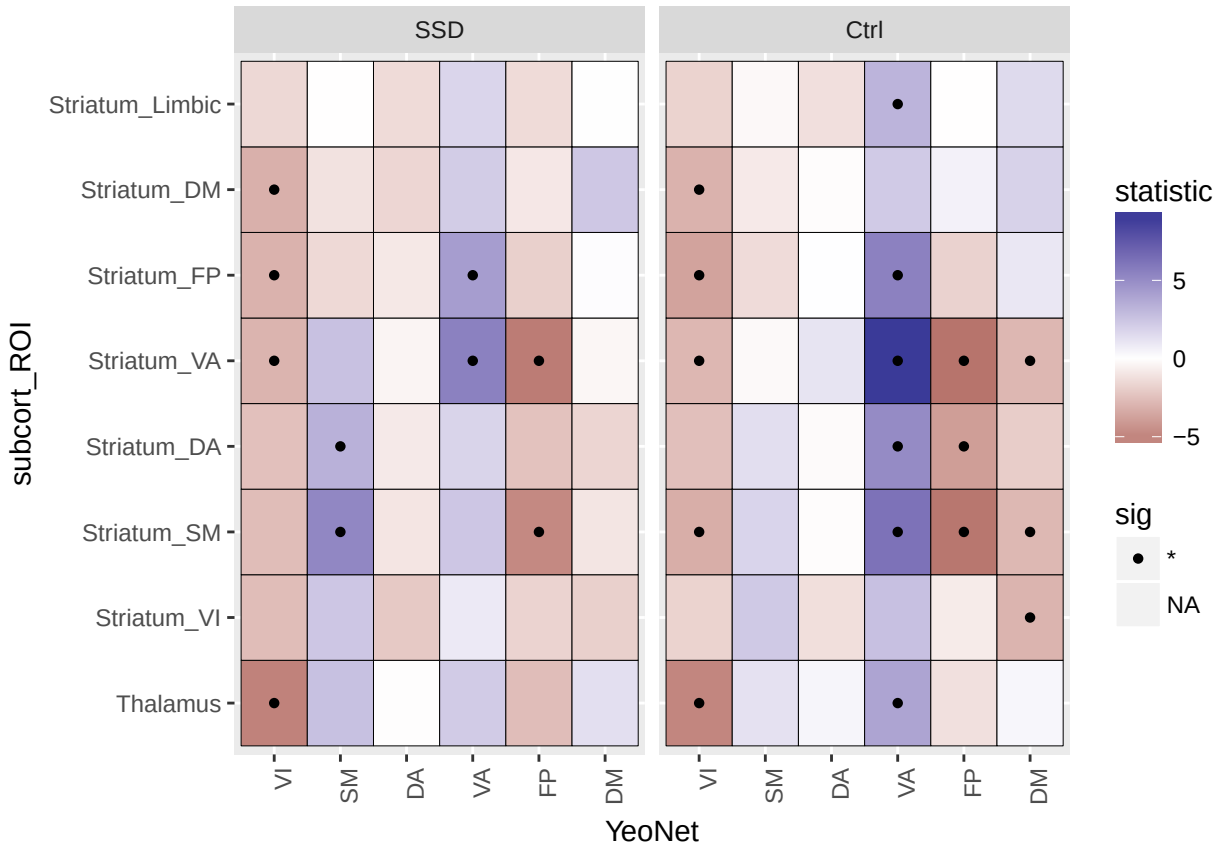



```
net_means <- results_pheno %>%
  mutate(corr_diff = ivertex_corr - tvertex_corr,
         YeoNet = str_sub(PINT_ROI, 1,2)) %>%
  group_by(YeoNet, subcort_ROI, subid) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  ungroup() %>%
  group_by(YeoNet, subcort_ROI) %>%
  do(tidy(t.test(.$netmean_ivertex, .$netmean_tvertex, paired = TRUE)))

net_means %>%
  ungroup() %>%
  mutate(sig = if_else(p.value < 0.005, '*', NA_character_)) %>%
ggplot(aes(y = YeoNet, x = subcort_ROI, fill = statistic)) +
  geom_tile(color = "white") +
  geom_point(aes(shape = sig)) +
  scale_fill_gradient2() +
  theme(axis.text.x = element_text(angle = 90, hjust = 1))
```

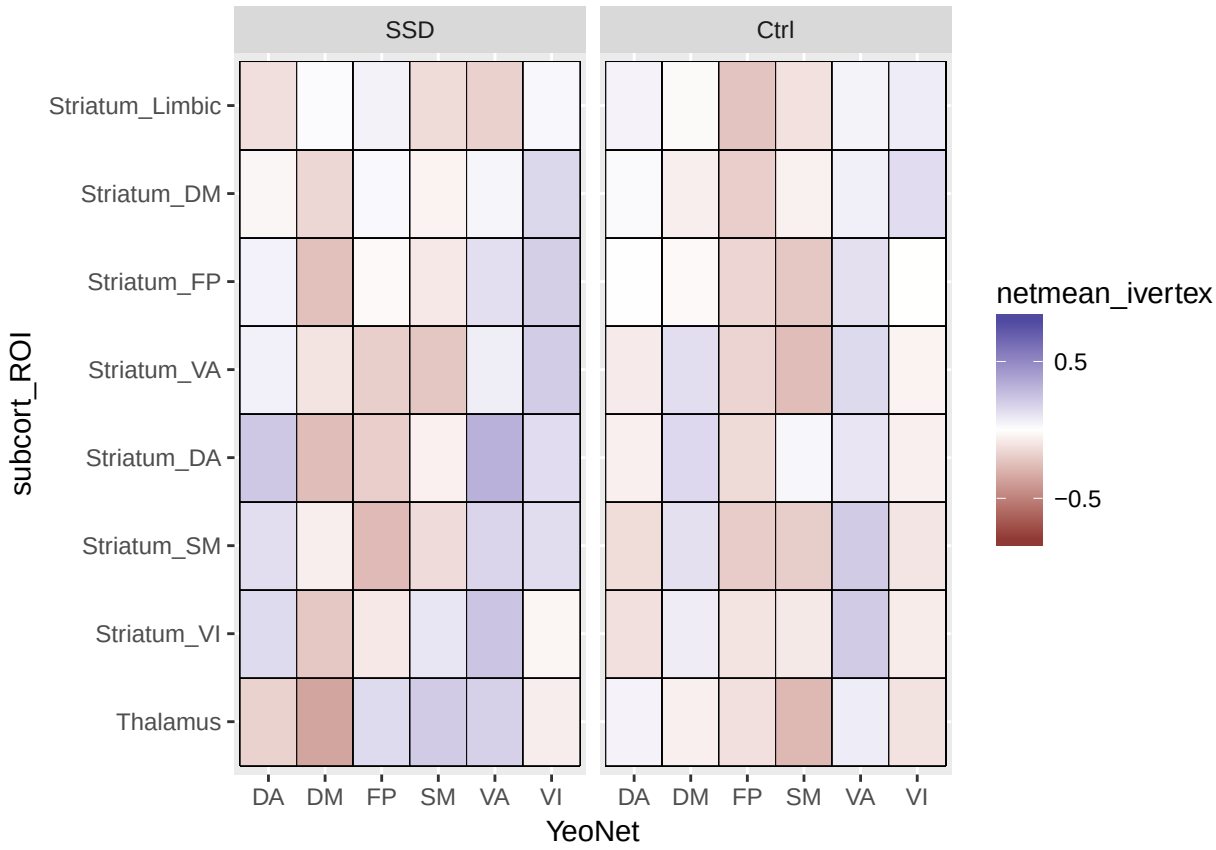
```
## Warning: Removed 26 rows containing missing values (geom_point).
```



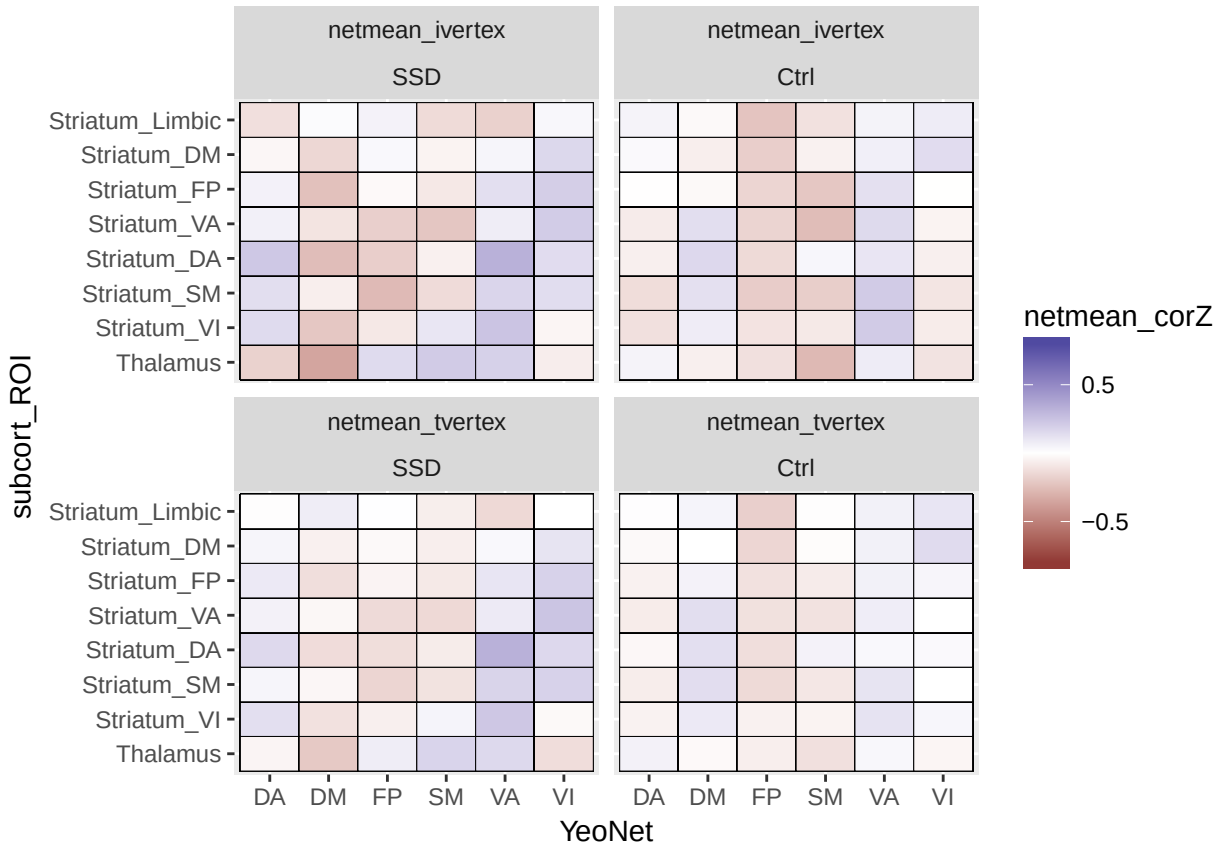

```
net_means_byDX <- results_pheno %>%
  mutate(corr_diff = ivertex_corr - tvertex_corr) %>%
  group_by(YeoNet, subcort_ROI, subid, DX) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  ungroup() %>%
  group_by(YeoNet, subcort_ROI, DX) %>%
  do(tidy(t.test(.$netmean_ivertex, .$netmean_tvertex, paired = TRUE)))

net_means_byDX %>%
  ungroup() %>%
  mutate(sig = if_else(p.value < 0.005, '*', NA_character_) ) %>%
ggplot(aes(x = YeoNet, y = subcort_ROI, fill = statistic)) +
  geom_tile(color = "black", na.rm = TRUE) +
  geom_point(aes(shape = sig), na.rm = TRUE) +
  scale_fill_gradient2() +
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) +
  facet_wrap(~ DX)
```




```
results_pheno %>%
  mutate(corr_diff = ivertex_corr - tvertex_corr,
         YeoNet = str_sub(PINT_ROI, 1,2)) %>%
  group_by(YeoNet, subcort_ROI, subid, DX, age) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  filter(age > 17, age < 51) %>%
  ggplot(aes(x = YeoNet, y=subcort_ROI, fill = netmean_ivertex)) +
  geom_tile(color = "black") +
  scale_fill_gradient2(breaks = c(-0.5,0.5)) +
  facet_wrap(~ DX)
```




```
results_pheno %>%
  mutate(corr_diff = ivertex_corr - tvertex_corr,
         YeoNet = str_sub(PINT_ROI, 1,2)) %>%
  group_by(YeoNet, subcort_ROI, subid, DX, age) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  gather(vertex_type, netmean_corZ, netmean_ivertex, netmean_tvertex) %>%
  filter(age > 17, age < 51) %>%
  ggplot(aes(x = YeoNet, y=subcort_ROI, fill = netmean_corZ)) +
  geom_tile(color = "black") +
  scale_fill_gradient2(breaks = c(-0.5,0.5)) +
  facet_wrap(vertex_type ~ DX)
```




```
library(knitr)

DX_lm_model <- results_pheno %>%
  gather(vertex_type, corZ, ivertex_corr, tvertex_corr) %>%
  filter(age > 17, age < 51) %>%
  group_by(vertex_type, subcort_ROI, PINT_ROI) %>%
  do(tidy(lm(corZ ~ DX*Sex + mean_fd_pt + poly(Age_std,2) + Edu_std + Site,.))) %>%
  select(vertex_type, subcort_ROI, PINT_ROI, term, statistic, p.value) %>%
  ungroup() %>%
  group_by(term) %>%
  mutate(p_FDR = p.adjust(p.value, method = "fdr")) %>%
  arrange(p.value)

DX_lm_model %>%
  filter(term %in% c("DXCtrl", "Sex2", "DXCtrl:Sex2")) %>%
  filter(p.value < 0.1) %>%
  kable()
```

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_VI	DMF2R	DXCtrl	-3.814624	0.0001545	0.1825073
tvertex_corr	Striatum_Limbic	VAP1L	Sex2	3.641967	0.0003005	0.2144617
tvertex_corr	Striatum_Limbic	VAF1R	Sex2	3.612992	0.0003351	0.2144617
ivertex_corr	Striatum_DM	FPF4R	DXCtrl	3.604334	0.0003462	0.1825073
tvertex_corr	Thalamus	VAP1R	DXCtrl	3.547462	0.0004278	0.1825073
tvertex_corr	Striatum_Limbic	VAP1L	DXCtrl:Sex2	-3.510582	0.0004899	0.6271335
ivertex_corr	Striatum_SM	DMF2L	DXCtrl	-3.394927	0.0007443	0.2177980
tvertex_corr	Striatum_VI	DMF2R	Sex2	-3.304116	0.0010251	0.4373655

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_VA	SMI1L	DXCtrl:Sex2	-3.290817	0.0010736	0.6560162
tvertex_corr	Striatum_SM	VAP2L	DXCtrl	3.272510	0.0011440	0.2177980
tvertex_corr	Striatum_FP	FPP2R	DXCtrl	3.240333	0.0012780	0.2177980
tvertex_corr	Striatum_VI	DMF2R	DXCtrl:Sex2	3.150085	0.0017356	0.6560162
ivertex_corr	Striatum_SM	VAI1L	DXCtrl	3.138955	0.0018015	0.2177980
tvertex_corr	Striatum_DM	VAP1L	DXCtrl:Sex2	-3.100087	0.0020501	0.6560162
tvertex_corr	Thalamus	DMT2L	DXCtrl	-3.081307	0.0021811	0.2177980
tvertex_corr	Striatum_SM	VAF1L	DXCtrl	3.080356	0.0021880	0.2177980
ivertex_corr	Striatum_VA	VAF1R	DXCtrl	3.071010	0.0022562	0.2177980
tvertex_corr	Striatum_VA	VAP2R	DXCtrl	3.057786	0.0023561	0.2177980
tvertex_corr	Striatum_VA	DMT2L	DXCtrl	-3.051515	0.0024049	0.2177980
ivertex_corr	Thalamus	FPP1L	DXCtrl	3.034623	0.0025410	0.2177980
ivertex_corr	Striatum_SM	DMT2L	DXCtrl	-3.010666	0.0027462	0.2177980
ivertex_corr	Thalamus	FPP1R	DXCtrl	3.008165	0.0027684	0.2177980
ivertex_corr	Striatum_VA	DMT2L	DXCtrl	-2.986796	0.0029656	0.2177980
tvertex_corr	Striatum_DM	DMT2L	DXCtrl	-2.975657	0.0030733	0.2177980
tvertex_corr	Striatum_SM	DMF2R	DXCtrl	-2.964249	0.0031874	0.2177980
ivertex_corr	Striatum_VA	DMF2L	DXCtrl	-2.959798	0.0032329	0.2177980
tvertex_corr	Striatum_VI	FPF4L	DXCtrl:Sex2	-2.950000	0.0033353	0.8538407
ivertex_corr	Striatum_SM	VAF1L	DXCtrl	2.935307	0.0034944	0.2191873
ivertex_corr	Striatum_SM	VAP2L	DXCtrl	2.926234	0.0035960	0.2191873
ivertex_corr	Striatum_VA	VAP2R	DXCtrl	2.905660	0.0038366	0.2232218
ivertex_corr	Striatum_Limbic	VAF2L	Sex2	2.902513	0.0038747	0.7284496
ivertex_corr	Striatum_Limbic	SMF1L	Sex2	2.898132	0.0039283	0.7284496
tvertex_corr	Striatum_VI	DMF1R	Sex2	-2.884345	0.0041013	0.7284496
ivertex_corr	Thalamus	DMT2L	DXCtrl	-2.859320	0.0044331	0.2407507
tvertex_corr	Striatum_DM	VAP1L	DXCtrl	2.853474	0.0045141	0.2407507
tvertex_corr	Striatum_VA	VAF1L	DXCtrl	2.809013	0.0051751	0.2456851
tvertex_corr	Striatum_VA	VAP2L	DXCtrl	2.807658	0.0051966	0.2456851
ivertex_corr	Striatum_Limbic	VAF1R	Sex2	2.805066	0.0052379	0.7284496
tvertex_corr	Striatum_VI	FPF4L	Sex2	2.795987	0.0053848	0.7284496
ivertex_corr	Striatum_FP	FPP1R	DXCtrl	2.788594	0.0055072	0.2456851
ivertex_corr	Striatum_VI	DMP1R	DXCtrl	-2.785709	0.0055556	0.2456851
tvertex_corr	Thalamus	VAP1R	Sex2	2.785376	0.0055612	0.7284496
tvertex_corr	Striatum_DM	DAT1R	Sex2	-2.777762	0.0056910	0.7284496
ivertex_corr	Striatum_DM	DMP1L	DXCtrl	-2.775736	0.0057260	0.2456851
tvertex_corr	Striatum_Limbic	VAF1R	DXCtrl:Sex2	-2.762502	0.0059595	0.9971437
tvertex_corr	Striatum_DM	DMF1L	DXCtrl:Sex2	2.748988	0.0062067	0.9971437
ivertex_corr	Striatum_VI	DMP1R	DXCtrl:Sex2	2.746852	0.0062466	0.9971437
ivertex_corr	Thalamus	VAP1R	DXCtrl	2.745563	0.0062708	0.2456851
tvertex_corr	Striatum_VA	DMT1L	DXCtrl	-2.741344	0.0063506	0.2456851
ivertex_corr	Striatum_SM	DMF2R	DXCtrl	-2.738309	0.0064086	0.2456851
ivertex_corr	Striatum_SM	DMF1R	DXCtrl	-2.726434	0.0066400	0.2456851
ivertex_corr	Striatum_VA	VAF4L	DXCtrl	2.720725	0.0067539	0.2456851
ivertex_corr	Striatum_VA	VAF1L	DXCtrl	2.714558	0.0068790	0.2456851
tvertex_corr	Thalamus	FPP1L	DXCtrl	2.712318	0.0069249	0.2456851
tvertex_corr	Striatum_VA	FPP2R	DXCtrl	2.703813	0.0071018	0.2456851
tvertex_corr	Striatum_SM	DMT2L	DXCtrl	-2.693617	0.0073193	0.2465453
ivertex_corr	Striatum_DM	DMT2L	DXCtrl	-2.665597	0.0079481	0.2471530
tvertex_corr	Striatum_DM	DMP1L	DXCtrl	-2.656484	0.0081629	0.2471530
ivertex_corr	Striatum_SM	VAI1R	DXCtrl	2.655323	0.0081906	0.2471530
tvertex_corr	Striatum_SM	VAP2R	DXCtrl	2.640862	0.0085431	0.2471530

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_FP	FPF4R	DXCtrl	2.639996	0.0085646	0.2471530
ivertex_corr	Striatum_SM	VAF2L	DXCtrl	2.637412	0.0086292	0.2471530
tvertex_corr	Thalamus	FPF4L	DXCtrl	2.631605	0.0087759	0.2471530
tvertex_corr	Striatum_FP	DMT2L	DXCtrl	-2.618869	0.0091054	0.2471530
tvertex_corr	Striatum_SM	FPF5L	DXCtrl	2.618500	0.0091151	0.2471530
tvertex_corr	Striatum_FP	FPF3R	DXCtrl	2.604710	0.0094847	0.2471530
tvertex_corr	Thalamus	VAP1R	DXCtrl:Sex2	-2.599965	0.0096149	0.9971437
tvertex_corr	Striatum_VA	FPF1R	DXCtrl	2.597560	0.0096815	0.2471530
tvertex_corr	Striatum_DA	FPF5R	Sex2	2.596787	0.0097030	0.8903195
ivertex_corr	Striatum_VA	DMP1L	DXCtrl	-2.593058	0.0098074	0.2471530
ivertex_corr	Striatum_VI	DMF1R	Sex2	-2.588930	0.0099240	0.8903195
ivertex_corr	Striatum_DA	FPF5L	Sex2	2.584140	0.0100609	0.8903195
tvertex_corr	Striatum_SM	VAI1L	DXCtrl	2.580319	0.0101713	0.2471530
tvertex_corr	Striatum_VI	DMP2L	Sex2	-2.568239	0.0105276	0.8903195
ivertex_corr	Striatum_SM	VAF4L	DXCtrl	2.563887	0.0106586	0.2471530
tvertex_corr	Striatum_DM	FPP2R	DXCtrl	2.559662	0.0107872	0.2471530
tvertex_corr	Striatum_VA	VAF1R	DXCtrl	2.558441	0.0108246	0.2471530
ivertex_corr	Striatum_DA	FPT1R	Sex2	2.556722	0.0108775	0.8903195
tvertex_corr	Thalamus	VAP1L	DXCtrl	2.553913	0.0109644	0.2471530
ivertex_corr	Striatum_Limbic	VAF1L	Sex2	2.548648	0.0111290	0.8903195
ivertex_corr	Striatum_VA	DMF3L	DXCtrl	-2.548186	0.0111436	0.2471530
ivertex_corr	Striatum_DA	VAF2L	DXCtrl	2.545030	0.0112434	0.2471530
tvertex_corr	Striatum_SM	VAF2L	DXCtrl	2.542578	0.0113215	0.2471530
ivertex_corr	Striatum_Limbic	FPF4L	DXCtrl	2.535704	0.0115430	0.2471530
ivertex_corr	Striatum_FP	FPP2L	DXCtrl	2.534405	0.0115853	0.2471530
ivertex_corr	Striatum_DM	FPP1R	DXCtrl	2.523119	0.0119586	0.2503809
tvertex_corr	Striatum_DA	DAF1L	DXCtrl	-2.518106	0.0121278	0.2503809
ivertex_corr	Striatum_VI	DMF1R	DXCtrl	-2.505790	0.0125526	0.2530920
ivertex_corr	Striatum_SM	VAP2R	DXCtrl	2.495037	0.0129343	0.2530920
tvertex_corr	Thalamus	FPP1R	DXCtrl	2.492462	0.0130272	0.2530920
tvertex_corr	Striatum_DM	VAP1R	DXCtrl	2.491831	0.0130501	0.2530920
tvertex_corr	Striatum_VI	DMP1R	Sex2	-2.490182	0.0131100	0.9871037
ivertex_corr	Striatum_DM	DMP1R	DXCtrl	-2.482914	0.0133769	0.2555588
tvertex_corr	Striatum_Limbic	DMF1L	DXCtrl:Sex2	2.481516	0.0134288	0.9971437
ivertex_corr	Thalamus	DMT2R	DXCtrl	-2.463422	0.0141167	0.2598491
ivertex_corr	Striatum_DM	DMP2R	DXCtrl	-2.462260	0.0141620	0.2598491
ivertex_corr	Striatum_VA	VAF4R	DXCtrl	2.460481	0.0142314	0.2598491
ivertex_corr	Striatum_VA	VAF2L	DXCtrl	2.455857	0.0144135	0.2598491
tvertex_corr	Striatum_FP	DAT1R	Sex2	-2.454746	0.0144575	0.9993737
tvertex_corr	Striatum_DM	VAP2L	DXCtrl	2.450202	0.0146389	0.2602474
tvertex_corr	Striatum_DM	DAT1R	DXCtrl:Sex2	2.439349	0.0150803	0.9971437
tvertex_corr	Striatum_DM	DMF1L	DXCtrl	-2.422516	0.0157881	0.2745384
tvertex_corr	Striatum_SM	VAP1L	DXCtrl	2.420571	0.0158718	0.2745384
ivertex_corr	Striatum_DA	FPF5R	Sex2	2.415116	0.0161084	0.9993737
tvertex_corr	Striatum_VI	FPF3R	Sex2	-2.401990	0.0166908	0.9993737
ivertex_corr	Striatum_VI	DMP1R	Sex2	-2.395389	0.0169906	0.9993737
ivertex_corr	Striatum_VA	VAP2L	DXCtrl	2.391364	0.0171757	0.2931327
tvertex_corr	Striatum_SM	SMI1L	DXCtrl:Sex2	-2.387882	0.0173373	0.9971437
tvertex_corr	Striatum_Limbic	VAF1L	Sex2	2.365925	0.0183873	0.9993737
ivertex_corr	Striatum_VI	DMF1R	DXCtrl:Sex2	2.360008	0.0186797	0.9971437
tvertex_corr	Striatum_DA	DMP1R	Sex2	-2.357771	0.0187912	0.9993737
ivertex_corr	Striatum_Limbic	VAF1R	DXCtrl:Sex2	-2.356889	0.0188354	0.9971437

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_SM	FPP1L	DXCtrl	2.355874	0.0188864	0.3180860
tvertex_corr	Striatum_FP	DAT1R	DXCtrl:Sex2	2.355758	0.0188922	0.9971437
tvertex_corr	Striatum_VA	VAP1L	DXCtrl	2.347344	0.0193191	0.3211494
ivertex_corr	Striatum_VI	SMF2R	DXCtrl	2.342319	0.0195781	0.3212818
tvertex_corr	Striatum_DA	DMF1R	Sex2	-2.331618	0.0201398	0.9993737
ivertex_corr	Thalamus	VAP1L	DXCtrl	2.330277	0.0202112	0.3274732
ivertex_corr	Striatum_DM	DMF2R	Sex2	2.322967	0.0206042	0.9993737
tvertex_corr	Striatum_VI	DMP1R	DXCtrl	-2.320845	0.0207195	0.3315122
ivertex_corr	Thalamus	VAP1R	Sex2	2.308625	0.0213947	0.9993737
ivertex_corr	Striatum_SM	VI05L	DXCtrl	-2.306295	0.0215256	0.3401574
tvertex_corr	Striatum_DA	DAF1L	DXCtrl:Sex2	2.302132	0.0217612	0.9971437
ivertex_corr	Striatum_DA	DAF1R	Sex2	-2.301997	0.0217689	0.9993737
tvertex_corr	Striatum_DA	DMF2R	DXCtrl:Sex2	2.301940	0.0217721	0.9971437
tvertex_corr	Striatum_VA	DAT1R	Sex2	-2.287290	0.0226196	0.9993737
tvertex_corr	Striatum_VA	VI05R	DXCtrl	-2.281116	0.0229853	0.3563914
ivertex_corr	Striatum_VA	DMT2R	DXCtrl	-2.278320	0.0231526	0.3563914
tvertex_corr	Striatum_FP	VAP2R	DXCtrl	2.270785	0.0236088	0.3563914
tvertex_corr	Striatum_VI	SMF2R	DXCtrl	2.269839	0.0236666	0.3563914
tvertex_corr	Striatum_Limbic	VAP1R	Sex2	2.259988	0.0242760	0.9993737
tvertex_corr	Striatum_FP	SMI1L	DXCtrl:Sex2	-2.255573	0.0245535	0.9971437
ivertex_corr	Striatum_DA	FPT1L	Sex2	2.253709	0.0246715	0.9993737
ivertex_corr	Striatum_VI	DMF2R	DXCtrl	-2.252008	0.0247797	0.3688139
ivertex_corr	Striatum_VA	SMI1L	DXCtrl:Sex2	-2.244856	0.0252388	0.9971437
ivertex_corr	Thalamus	SMI1L	DXCtrl	-2.240161	0.0255441	0.3723259
tvertex_corr	Striatum_VA	VAF2L	DXCtrl	2.239346	0.0255974	0.3723259
tvertex_corr	Striatum_VI	DMP1R	DXCtrl:Sex2	2.236957	0.0257543	0.9971437
tvertex_corr	Striatum_VA	SMF3R	DXCtrl	-2.226802	0.0264306	0.3780205
ivertex_corr	Striatum_VA	VAP1R	DXCtrl	2.224595	0.0265796	0.3780205
ivertex_corr	Striatum_DA	DMP1R	DXCtrl:Sex2	2.223650	0.0266436	0.9971437
ivertex_corr	Striatum_Limbic	SMF1L	DXCtrl:Sex2	-2.221179	0.0268116	0.9971437
tvertex_corr	Striatum_VI	DAF1R	Sex2	-2.217061	0.0270936	0.9993737
tvertex_corr	Thalamus	DMF2R	DXCtrl	-2.211366	0.0274879	0.3811995
tvertex_corr	Striatum_VI	DAF1L	DXCtrl:Sex2	2.209879	0.0275917	0.9971437
tvertex_corr	Thalamus	DMF1L	Sex2	-2.208251	0.0277057	0.9993737
ivertex_corr	Striatum_VI	DMT2R	Sex2	-2.204217	0.0279899	0.9993737
ivertex_corr	Striatum_VA	SMF2R	DXCtrl:Sex2	-2.203003	0.0280759	0.9971437
ivertex_corr	Striatum_VA	VI05L	DXCtrl	-2.201985	0.0281483	0.3811995
ivertex_corr	Striatum_Limbic	FPF5R	DXCtrl	2.199746	0.0283079	0.3811995
ivertex_corr	Striatum_DA	DMP1R	Sex2	-2.198614	0.0283889	0.9993737
ivertex_corr	Striatum_VA	FPP1L	DXCtrl	2.197558	0.0284647	0.3811995
tvertex_corr	Striatum_DM	DMT1L	DXCtrl	-2.188865	0.0290948	0.3811995
ivertex_corr	Striatum_SM	DMT1L	DXCtrl	-2.188091	0.0291515	0.3811995
tvertex_corr	Striatum_VA	DAP2R	DXCtrl	2.186552	0.0292645	0.3811995
ivertex_corr	Thalamus	FPP2L	DXCtrl	2.185697	0.0293275	0.3811995
tvertex_corr	Striatum_DM	FPF3R	DXCtrl	2.183585	0.0294834	0.3811995
ivertex_corr	Striatum_VA	DMF1R	DXCtrl	-2.175389	0.0300955	0.3852220
ivertex_corr	Striatum_VI	DMF2R	DXCtrl:Sex2	2.171280	0.0304064	0.9971437
ivertex_corr	Striatum_SM	DMF1L	DXCtrl	-2.167918	0.0306629	0.3885994
tvertex_corr	Striatum_SM	SMI1R	DXCtrl:Sex2	-2.167118	0.0307243	0.9971437
ivertex_corr	Striatum_FP	FPP1L	DXCtrl	2.161448	0.0311618	0.3910501
tvertex_corr	Striatum_DA	DMP2L	Sex2	-2.160455	0.0312390	0.9993737
ivertex_corr	Striatum_Limbic	VAP1L	Sex2	2.156459	0.0315512	0.9993737

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_SM	VAI1R	DXCtrl	2.151392	0.0319510	0.3926586
tvertex_corr	Striatum_VA	VI04R	DXCtrl	-2.144366	0.0325125	0.3926586
ivertex_corr	Striatum_SM	VAP1R	DXCtrl	2.134713	0.0332978	0.3926586
ivertex_corr	Striatum_VA	FPP1R	DXCtrl	2.134273	0.0333340	0.3926586
tvertex_corr	Striatum_DM	DMP1R	DXCtrl	-2.130352	0.0336579	0.3926586
ivertex_corr	Striatum_VA	SMF3L	DXCtrl	-2.123845	0.0342014	0.3926586
tvertex_corr	Thalamus	FPF1R	DXCtrl:Sex2	2.121994	0.0343574	0.9971437
ivertex_corr	Thalamus	SMF3R	DXCtrl	-2.121659	0.0343857	0.3926586
ivertex_corr	Striatum_SM	VAF3R	DXCtrl	2.119753	0.0345470	0.3926586
tvertex_corr	Striatum_SM	FPP2R	DXCtrl	2.118359	0.0346655	0.3926586
tvertex_corr	Striatum_Limbic	SMF3L	Sex2	2.116803	0.0347981	0.9993737
ivertex_corr	Striatum_DA	VAI1R	DXCtrl	2.112291	0.0351850	0.3926586
ivertex_corr	Thalamus	VAP1R	DXCtrl:Sex2	-2.111969	0.0352128	0.9971437
ivertex_corr	Striatum_VA	VAF3R	DXCtrl	2.110662	0.0353256	0.3926586
tvertex_corr	Striatum_VA	VAI1R	Sex2	-2.105261	0.0357953	0.9993737
tvertex_corr	Striatum_SM	FPF5L	DXCtrl:Sex2	-2.102223	0.0360618	0.9971437
ivertex_corr	Striatum_VA	FPF5L	Sex2	2.100145	0.0362451	0.9993737
ivertex_corr	Striatum_FP	FPP2R	DXCtrl	2.099442	0.0363072	0.3926586
ivertex_corr	Striatum_DM	FPP2L	DXCtrl	2.097863	0.0364473	0.3926586
tvertex_corr	Thalamus	VI04L	DXCtrl	-2.093517	0.0368350	0.3926586
ivertex_corr	Striatum_SM	VAF1R	DXCtrl	2.093170	0.0368661	0.3926586
tvertex_corr	Striatum_DA	DMP2L	DXCtrl:Sex2	2.092543	0.0369223	0.9971437
tvertex_corr	Striatum_SM	VI04R	DXCtrl	-2.090893	0.0370708	0.3926586
ivertex_corr	Striatum_SM	DMF3L	DXCtrl	-2.090254	0.0371284	0.3926586
tvertex_corr	Striatum_FP	VAP1L	DXCtrl:Sex2	-2.089716	0.0371769	0.9971437
tvertex_corr	Striatum_SM	DAF1L	DXCtrl:Sex2	2.088889	0.0372517	0.9971437
tvertex_corr	Striatum_VA	SMI1L	Sex2	2.088128	0.0373206	0.9993737
ivertex_corr	Striatum_VA	VAF2R	DXCtrl	2.087493	0.0373782	0.3926586
tvertex_corr	Striatum_DA	SMF2R	DXCtrl	2.086305	0.0374861	0.3926586
tvertex_corr	Striatum_DA	DMF2R	DXCtrl	-2.086218	0.0374940	0.3926586
ivertex_corr	Striatum_VA	FPP2R	DXCtrl	2.081343	0.0379398	0.3926586
ivertex_corr	Striatum_DM	DAT1R	Sex2	-2.079509	0.0381086	0.9993737
ivertex_corr	Striatum_DM	DMF3L	DXCtrl	-2.077118	0.0383298	0.3926586
tvertex_corr	Striatum_VA	FPF5L	DXCtrl:Sex2	-2.072785	0.0387333	0.9971437
tvertex_corr	Striatum_SM	DMF2L	DXCtrl	-2.071605	0.0388438	0.3926586
ivertex_corr	Striatum_VI	DMP2L	Sex2	-2.069048	0.0390842	0.9993737
tvertex_corr	Striatum_VA	VAF2R	DXCtrl	2.067405	0.0392393	0.3926586
tvertex_corr	Striatum_FP	DAP1L	DXCtrl	2.062209	0.0397334	0.3926586
ivertex_corr	Thalamus	DMF2L	DXCtrl	-2.059510	0.0399921	0.3926586
ivertex_corr	Striatum_VA	DMT1L	DXCtrl	-2.058759	0.0400644	0.3926586
ivertex_corr	Striatum_VA	VAI1R	Sex2	-2.056773	0.0402560	0.9993737
ivertex_corr	Striatum_Limbic	VAF1L	DXCtrl	2.054893	0.0404380	0.3926586
ivertex_corr	Striatum_DM	FPF4L	DXCtrl	2.053936	0.0405310	0.3926586
ivertex_corr	Thalamus	DMT1R	DXCtrl	-2.052799	0.0406417	0.3926586
ivertex_corr	Striatum_Limbic	DAF1L	Sex2	2.051957	0.0407238	0.9993737
tvertex_corr	Striatum_VA	DMT2R	DXCtrl	-2.050718	0.0408449	0.3926586
ivertex_corr	Striatum_DM	FPP1L	DXCtrl	2.047977	0.0411139	0.3926586
tvertex_corr	Striatum_Limbic	VAP1R	DXCtrl:Sex2	-2.046469	0.0412626	0.9971437
tvertex_corr	Striatum_DM	VAP1R	DXCtrl:Sex2	-2.045174	0.0413905	0.9971437
tvertex_corr	Striatum_VI	DAF1L	DXCtrl	-2.044945	0.0414132	0.3926586
ivertex_corr	Thalamus	VAT1L	Sex2	-2.044614	0.0414460	0.9993737
tvertex_corr	Thalamus	FPF3R	Sex2	-2.040005	0.0419048	0.9993737

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_DA	VAF1R	DXCtrl	2.035835	0.0423236	0.3933253
ivertex_corr	Striatum_VA	DMP1R	DXCtrl	-2.032721	0.0426387	0.3933253
tvertex_corr	Striatum_SM	VI05R	DXCtrl	-2.032569	0.0426541	0.3933253
tvertex_corr	Striatum_VI	FPT1R	DXCtrl	-2.031582	0.0427545	0.3933253
ivertex_corr	Striatum_Limbic	SMT1L	DXCtrl	2.028979	0.0430200	0.3933253
ivertex_corr	Striatum_FP	DMF2R	Sex2	2.027394	0.0431824	0.9993737
ivertex_corr	Striatum_DA	VI05L	DXCtrl	-2.025588	0.0433680	0.3936953
tvertex_corr	Striatum_DA	VI05L	DXCtrl	-2.021471	0.0437937	0.3947602
tvertex_corr	Striatum_Limbic	SMF1L	Sex2	2.020882	0.0438549	0.9993737
tvertex_corr	Striatum_Limbic	DMT1L	DXCtrl:Sex2	2.017075	0.0442521	0.9971437
tvertex_corr	Striatum_Limbic	SMF3L	DXCtrl:Sex2	-2.016828	0.0442780	0.9971437
tvertex_corr	Thalamus	VAT1R	DXCtrl	-2.012306	0.0447541	0.3976901
tvertex_corr	Striatum_SM	FPP1L	DXCtrl	2.012203	0.0447650	0.3976901
tvertex_corr	Striatum_DM	VAF1R	DXCtrl	2.008593	0.0451482	0.3976901
ivertex_corr	Striatum_Limbic	VAF2R	Sex2	2.007043	0.0453135	0.9993737
tvertex_corr	Striatum_VA	SMF3L	DXCtrl	-2.005065	0.0455253	0.3976901
tvertex_corr	Striatum_FP	DMF3L	DXCtrl	-2.003698	0.0456722	0.3976901
tvertex_corr	Striatum_DA	DMF2R	Sex2	-2.003113	0.0457352	0.9993737
tvertex_corr	Striatum_VA	VI05L	DXCtrl	-1.998698	0.0462129	0.3996790
tvertex_corr	Striatum_SM	DMT1L	DXCtrl	-1.987098	0.0474879	0.4079501
tvertex_corr	Striatum_VI	FPF5R	Sex2	1.985807	0.0476316	0.9993737
tvertex_corr	Striatum_DM	FPF2R	Sex2	-1.983994	0.0478341	0.9993737
tvertex_corr	Striatum_SM	FPF1R	DXCtrl	1.983932	0.0478411	0.4082438
ivertex_corr	Striatum_FP	FPF1L	Sex2	1.982753	0.0479731	0.9993737
tvertex_corr	Striatum_FP	DMF1L	DXCtrl:Sex2	1.979284	0.0483634	0.9971437
tvertex_corr	Striatum_FP	VAP1R	DXCtrl	1.976591	0.0486683	0.4125522
tvertex_corr	Striatum_Limbic	FPF4L	DXCtrl	1.973090	0.0490671	0.4130337
tvertex_corr	Striatum_VI	DMP2L	DXCtrl:Sex2	1.971065	0.0492989	0.9971437
ivertex_corr	Striatum_DA	FPF4L	Sex2	1.968600	0.0495825	0.9993737
ivertex_corr	Striatum_DM	FPF5L	Sex2	1.965850	0.0499005	0.9993737
ivertex_corr	Striatum_VA	VAI1L	DXCtrl	1.962387	0.0503033	0.4130337
ivertex_corr	Thalamus	FPF4R	DXCtrl	1.959147	0.0506826	0.4130337
tvertex_corr	Striatum_VA	VAI1L	DXCtrl	1.958529	0.0507552	0.4130337
ivertex_corr	Striatum_DM	DMF2L	DXCtrl	-1.956993	0.0509362	0.4130337
tvertex_corr	Striatum_FP	DMP2R	DXCtrl:Sex2	1.956379	0.0510085	0.9971437
ivertex_corr	Striatum_DM	SMF2R	DXCtrl:Sex2	-1.954880	0.0511858	0.9971437
ivertex_corr	Striatum_DM	SMF2L	DXCtrl:Sex2	-1.954434	0.0512387	0.9971437
ivertex_corr	Striatum_VA	VAF5R	DXCtrl	1.953784	0.0513157	0.4130337
ivertex_corr	Striatum_DA	SMF2R	DXCtrl	1.952034	0.0515238	0.4130337
ivertex_corr	Striatum_VA	SMF3R	DXCtrl	-1.951187	0.0516248	0.4130337
ivertex_corr	Striatum_VA	FPP2L	DXCtrl	1.951150	0.0516292	0.4130337
ivertex_corr	Striatum_VA	DMT2L	DXCtrl:Sex2	1.950594	0.0516955	0.9971437
ivertex_corr	Striatum_SM	DAF1R	DXCtrl:Sex2	1.948039	0.0520014	0.9971437
tvertex_corr	Striatum_Limbic	VAF1R	DXCtrl	1.944340	0.0524470	0.4169699
ivertex_corr	Striatum_VA	DMT2L	Sex2	-1.941325	0.0528125	0.9993737
tvertex_corr	Striatum_DM	DMF1L	Sex2	-1.939307	0.0530583	0.9993737
ivertex_corr	Striatum_Limbic	VAF4R	DXCtrl	1.935633	0.0535083	0.4215272
ivertex_corr	Striatum_DM	DMP2L	DXCtrl	-1.934247	0.0536789	0.4215272
ivertex_corr	Striatum_VI	DMT2L	Sex2	-1.928616	0.0543767	0.9993737
tvertex_corr	Striatum_Limbic	FPF5L	DXCtrl:Sex2	-1.927294	0.0545416	0.9971437
tvertex_corr	Striatum_FP	FPP2L	DXCtrl	1.927115	0.0545639	0.4258644
ivertex_corr	Striatum_VI	DMT2L	DXCtrl:Sex2	1.927040	0.0545732	0.9971437

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_Limbic	VAF2R	DXCtrl:Sex2	-1.925866	0.0547201	0.9971437
tvertex_corr	Striatum_VA	FPF5L	Sex2	1.924872	0.0548448	0.9993737
ivertex_corr	Thalamus	VAP2R	DXCtrl	1.922326	0.0551650	0.4279467
tvertex_corr	Striatum_VA	DAT1L	Sex2	-1.922164	0.0551855	0.9993737
ivertex_corr	Thalamus	VAT1R	DXCtrl	-1.918371	0.0556656	0.4292291
ivertex_corr	Thalamus	VI04R	DXCtrl	-1.915717	0.0560037	0.4292500
tvertex_corr	Striatum_VI	DAF1R	DXCtrl:Sex2	1.913958	0.0562287	0.9971437
ivertex_corr	Striatum_SM	VI01R	Sex2	1.911285	0.0565721	0.9993737
ivertex_corr	Striatum_DA	FPP1R	Sex2	1.910767	0.0566388	0.9993737
tvertex_corr	Striatum_SM	VI05L	DXCtrl	-1.902873	0.0576640	0.4388045
tvertex_corr	Striatum_Limbic	VAP1L	DXCtrl	1.900799	0.0579359	0.4388045
ivertex_corr	Striatum_SM	FPP1R	DXCtrl	1.896626	0.0584863	0.4395248
ivertex_corr	Striatum_SM	VAF4R	DXCtrl	1.894881	0.0587178	0.4395248
ivertex_corr	Thalamus	FPF3R	Sex2	-1.891233	0.0592040	0.9993737
tvertex_corr	Striatum_FP	VAF1R	DXCtrl	1.887470	0.0597091	0.4416328
ivertex_corr	Striatum_DM	FPP2R	DXCtrl	1.887283	0.0597343	0.4416328
ivertex_corr	Striatum_FP	SMF1L	DXCtrl:Sex2	-1.886831	0.0597953	0.9971437
tvertex_corr	Striatum_VI	DAP3L	DXCtrl	1.885060	0.0600345	0.4416328
tvertex_corr	Striatum_SM	DMP2L	Sex2	-1.879931	0.0607319	0.9993737
ivertex_corr	Striatum_FP	VAP2R	DXCtrl	1.879452	0.0607973	0.4446892
tvertex_corr	Striatum_DA	VI04L	Sex2	1.876319	0.0612271	0.9993737
tvertex_corr	Striatum_SM	VAF4L	DXCtrl	1.875365	0.0613584	0.4462426
ivertex_corr	Striatum_FP	VAF5R	Sex2	-1.870438	0.0620403	0.9993737
tvertex_corr	Striatum_DA	FPF4R	DXCtrl	-1.866694	0.0625628	0.4494921
ivertex_corr	Striatum_SM	VAF2R	DXCtrl	1.866550	0.0625829	0.4494921
ivertex_corr	Thalamus	FPF4L	DXCtrl	1.864585	0.0628587	0.4494921
ivertex_corr	Striatum_VI	DMP2R	DXCtrl:Sex2	1.860971	0.0633685	0.9971437
ivertex_corr	Thalamus	FPT1R	Sex2	-1.860929	0.0633744	0.9993737
ivertex_corr	Striatum_DM	VAP1L	DXCtrl:Sex2	-1.860896	0.0633792	0.9971437
tvertex_corr	Striatum_VI	DAF2L	Sex2	-1.859731	0.0635442	0.9993737
ivertex_corr	Striatum_DA	DAF1R	DXCtrl:Sex2	1.857525	0.0638578	0.9971437
tvertex_corr	Striatum_Limbic	FPF2L	Sex2	1.856984	0.0639349	0.9993737
tvertex_corr	Striatum_SM	DMT2R	DXCtrl	-1.856960	0.0639382	0.4510642
tvertex_corr	Thalamus	VI04R	DXCtrl	-1.856953	0.0639393	0.4510642
ivertex_corr	Striatum_Limbic	DMF1L	DXCtrl:Sex2	1.856731	0.0639709	0.9971437
ivertex_corr	Striatum_VA	FPF1L	Sex2	1.855775	0.0641074	0.9993737
ivertex_corr	Striatum_VI	DMP2L	DXCtrl:Sex2	1.854386	0.0643062	0.9971437
ivertex_corr	Striatum_DM	SMF1L	DXCtrl:Sex2	-1.853927	0.0643719	0.9971437
tvertex_corr	Striatum_SM	DAP3L	DXCtrl	1.853360	0.0644533	0.4510642
ivertex_corr	Striatum_SM	VI04R	DXCtrl	-1.853117	0.0644881	0.4510642
ivertex_corr	Striatum_VI	DMP2R	Sex2	-1.852681	0.0645508	0.9993737
ivertex_corr	Striatum_DA	DMT2L	Sex2	-1.851711	0.0646903	0.9993737
tvertex_corr	Striatum_Limbic	SMF2L	Sex2	1.851549	0.0647137	0.9993737
tvertex_corr	Thalamus	VAP2R	DXCtrl	1.850367	0.0648841	0.4513678
ivertex_corr	Striatum_DM	SMF1R	DXCtrl:Sex2	-1.850342	0.0648877	0.9971437
ivertex_corr	Striatum_Limbic	SMI1L	DXCtrl:Sex2	-1.845617	0.0655726	0.9971437
tvertex_corr	Striatum_VI	VAF3R	DXCtrl:Sex2	1.842649	0.0660060	0.9971437
tvertex_corr	Striatum_DA	VAF2L	DXCtrl	1.836582	0.0668990	0.4624048
tvertex_corr	Striatum_SM	DMF2R	DXCtrl:Sex2	1.834710	0.0671765	0.9971437
tvertex_corr	Striatum_FP	VAP2L	DXCtrl	1.834598	0.0671932	0.4624048
ivertex_corr	Striatum_Limbic	VAF1L	DXCtrl:Sex2	-1.830083	0.0678667	0.9971437
tvertex_corr	Striatum_VA	VAP2R	DXCtrl:Sex2	-1.825884	0.0684980	0.9971437

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_DA	VAF1L	DXCtrl	1.824969	0.0686363	0.4697954
ivertex_corr	Striatum_FP	VAF1R	DXCtrl	1.822560	0.0690012	0.4697954
ivertex_corr	Striatum_FP	FPF5L	Sex2	1.821023	0.0692350	0.9993737
tvertex_corr	Thalamus	DMT1L	DXCtrl	-1.819723	0.0694332	0.4702351
ivertex_corr	Thalamus	SMF1L	DXCtrl:Sex2	-1.818725	0.0695856	0.9971437
tvertex_corr	Striatum_DA	DMF1L	Sex2	-1.818070	0.0696858	0.9993737
tvertex_corr	Striatum_SM	DAF1R	DXCtrl:Sex2	1.808716	0.0711299	0.9971437
tvertex_corr	Thalamus	DMT1R	DXCtrl	-1.805749	0.0715931	0.4785868
tvertex_corr	Striatum_DA	VAF1L	DXCtrl	1.804865	0.0717317	0.4785868
tvertex_corr	Striatum_SM	VAP1R	Sex2	-1.804816	0.0717393	0.9993737
ivertex_corr	Striatum_DM	VAF1R	DXCtrl	1.804506	0.0717880	0.4785868
tvertex_corr	Striatum_VI	FPF3L	DXCtrl:Sex2	1.804120	0.0718486	0.9971437
tvertex_corr	Striatum_SM	SMI1L	Sex2	1.802843	0.0720492	0.9993737
ivertex_corr	Striatum_Limbic	FPF3L	DXCtrl:Sex2	1.802420	0.0721159	0.9971437
ivertex_corr	Striatum_SM	DMT2L	Sex2	-1.797556	0.0728852	0.9993737
tvertex_corr	Striatum_FP	FPF1R	DXCtrl	1.792231	0.0737350	0.4890194
ivertex_corr	Striatum_Limbic	VAF2L	DXCtrl:Sex2	-1.790974	0.0739368	0.9971437
ivertex_corr	Thalamus	FPF3L	DXCtrl	1.787351	0.0745209	0.4900563
ivertex_corr	Striatum_FP	DMT2L	DXCtrl:Sex2	1.786880	0.0745971	0.9971437
tvertex_corr	Striatum_VA	VAF4R	DXCtrl	1.786510	0.0746570	0.4900563
tvertex_corr	Striatum_VI	SMF3R	Sex2	-1.784371	0.0750042	0.9993737
ivertex_corr	Striatum_DA	FPF4R	Sex2	1.783283	0.0751814	0.9993737
tvertex_corr	Striatum_DA	DMP1L	Sex2	-1.783138	0.0752050	0.9993737
tvertex_corr	Thalamus	SMI1R	DXCtrl:Sex2	-1.780609	0.0756181	0.9971437
tvertex_corr	Striatum_SM	VAP2R	DXCtrl:Sex2	-1.778521	0.0759605	0.9971437
ivertex_corr	Striatum_Limbic	VAI1L	DXCtrl:Sex2	-1.773034	0.0768666	0.9971437
ivertex_corr	Striatum_Limbic	SMI1R	Sex2	1.772489	0.0769571	0.9993737
ivertex_corr	Striatum_VI	DMF2L	DXCtrl:Sex2	1.771169	0.0771765	0.9971437
tvertex_corr	Striatum_DA	DAP2L	DXCtrl:Sex2	-1.770086	0.0773570	0.9971437
tvertex_corr	Striatum_DM	DAP1L	DXCtrl	1.766596	0.0779407	0.5038110
ivertex_corr	Striatum_SM	VAP1L	DXCtrl	1.764931	0.0782206	0.5038110
tvertex_corr	Striatum_SM	DAT1R	DXCtrl:Sex2	1.764065	0.0783665	0.9971437
tvertex_corr	Striatum_FP	DAP1R	DXCtrl	1.763837	0.0784050	0.5038110
tvertex_corr	Thalamus	DMT2R	DXCtrl	-1.763441	0.0784718	0.5038110
ivertex_corr	Striatum_DM	DMF1L	DXCtrl:Sex2	1.762112	0.0786962	0.9971437
tvertex_corr	Striatum_DM	DMP2R	DXCtrl:Sex2	1.760131	0.0790320	0.9971437
ivertex_corr	Thalamus	VAF5L	DXCtrl	1.759424	0.0791519	0.5038110
ivertex_corr	Striatum_Limbic	VAP1R	Sex2	1.758928	0.0792363	0.9993737
ivertex_corr	Striatum_SM	DAF1R	Sex2	-1.756109	0.0797169	0.9993737
ivertex_corr	Striatum_VA	DMF2R	DXCtrl	-1.753026	0.0802454	0.5038110
tvertex_corr	Striatum_VA	DMF1L	Sex2	-1.752924	0.0802630	0.9993737
ivertex_corr	Striatum_Limbic	SMF2L	Sex2	1.752103	0.0804040	0.9993737
tvertex_corr	Striatum_VA	VAF4L	DXCtrl	1.751501	0.0805078	0.5038110
tvertex_corr	Striatum_FP	VAF4L	DXCtrl	1.751251	0.0805509	0.5038110
ivertex_corr	Striatum_Limbic	SMI1L	Sex2	1.751195	0.0805605	0.9993737
tvertex_corr	Thalamus	DMF2L	DXCtrl	-1.750975	0.0805984	0.5038110
ivertex_corr	Striatum_Limbic	DAF1R	Sex2	1.750806	0.0806275	0.9993737
tvertex_corr	Thalamus	DMP2R	DXCtrl:Sex2	1.750228	0.0807273	0.9971437
ivertex_corr	Striatum_FP	SMI1R	DXCtrl:Sex2	-1.747791	0.0811491	0.9971437
tvertex_corr	Striatum_DM	FPF4R	DXCtrl	1.746897	0.0813042	0.5038110
ivertex_corr	Striatum_Limbic	DMF2L	DXCtrl:Sex2	1.746711	0.0813365	0.9971437
ivertex_corr	Striatum_VA	VAF5L	DXCtrl	1.746100	0.0814428	0.5038110

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_VI	VAI1R	DXCtrl	1.745911	0.0814757	0.5038110
ivertex_corr	Striatum_Limbic	VAP1L	DXCtrl:Sex2	-1.743650	0.0818698	0.9971437
tvertex_corr	Striatum_DA	DAF1L	Sex2	-1.742983	0.0819864	0.9993737
ivertex_corr	Striatum_VI	SMF3R	Sex2	-1.742628	0.0820485	0.9993737
tvertex_corr	Striatum_SM	DMF1L	Sex2	-1.742103	0.0821405	0.9993737
tvertex_corr	Thalamus	VAP1L	Sex2	1.739421	0.0826112	0.9993737
tvertex_corr	Striatum_DM	DMT1R	DXCtrl	-1.738732	0.0827326	0.5091234
ivertex_corr	Striatum_VA	SMI1R	DXCtrl:Sex2	-1.736164	0.0831861	0.9971437
ivertex_corr	Striatum_FP	SMT1R	DXCtrl:Sex2	-1.735419	0.0833180	0.9971437
ivertex_corr	Striatum_Limbic	FPF5R	DXCtrl:Sex2	-1.734806	0.0834265	0.9971437
ivertex_corr	Striatum_VI	DAF1R	Sex2	-1.731810	0.0839593	0.9993737
ivertex_corr	Striatum_Limbic	VAF1R	DXCtrl	1.730688	0.0841596	0.5145018
ivertex_corr	Striatum_DA	DMF1R	DXCtrl	-1.728591	0.0845349	0.5145018
tvertex_corr	Striatum_DA	SMI1L	DXCtrl:Sex2	-1.728565	0.0845395	0.9971437
tvertex_corr	Striatum_DM	FPF2L	DXCtrl	1.727045	0.0848124	0.5145018
ivertex_corr	Striatum_SM	FPP1L	DXCtrl:Sex2	-1.726905	0.0848377	0.9971437
tvertex_corr	Striatum_VI	SMI1L	Sex2	1.725644	0.0850646	0.9993737
tvertex_corr	Striatum_DA	VAI1R	DXCtrl	1.724010	0.0853595	0.5153781
tvertex_corr	Striatum_VA	DMF2L	DXCtrl	-1.720778	0.0859450	0.5164772
ivertex_corr	Striatum_VA	VAP2R	Sex2	-1.720102	0.0860680	0.9993737
ivertex_corr	Striatum_VI	FPT1L	Sex2	1.719283	0.0862170	0.9993737
tvertex_corr	Striatum_VA	DMF2R	DXCtrl	-1.718544	0.0863518	0.5164966
tvertex_corr	Striatum_VA	DMP2L	DXCtrl:Sex2	1.715684	0.0868748	0.9971437
tvertex_corr	Thalamus	FPF3R	DXCtrl	1.714865	0.0870250	0.5166794
tvertex_corr	Striatum_SM	VI04L	DXCtrl	-1.713969	0.0871896	0.5166794
ivertex_corr	Thalamus	DMF1L	Sex2	-1.711612	0.0876237	0.9993737
ivertex_corr	Striatum_VI	DMP1L	DXCtrl:Sex2	1.711588	0.0876282	0.9971437
tvertex_corr	Striatum_VA	SMI1R	DXCtrl:Sex2	-1.709299	0.0880515	0.9971437
ivertex_corr	Striatum_FP	VAT1L	Sex2	-1.707240	0.0884337	0.9993737
tvertex_corr	Striatum_SM	FPF3R	Sex2	-1.707096	0.0884605	0.9993737
ivertex_corr	Striatum_DM	VI05R	Sex2	-1.705620	0.0887354	0.9993737
ivertex_corr	Striatum_VI	DMF2R	Sex2	-1.704729	0.0889017	0.9993737
ivertex_corr	Striatum_DM	DMP1L	DXCtrl:Sex2	1.703906	0.0890554	0.9971437
tvertex_corr	Striatum_VI	VI03R	DXCtrl:Sex2	1.702452	0.0893276	0.9971437
tvertex_corr	Striatum_VI	FPF3L	Sex2	-1.698962	0.0899840	0.9993737
ivertex_corr	Striatum_DA	SMT1L	DXCtrl	1.697338	0.0902905	0.5325893
ivertex_corr	Striatum_VI	SMF2R	DXCtrl:Sex2	-1.691943	0.0913154	0.9971437
tvertex_corr	Striatum_FP	DMF1L	Sex2	-1.690300	0.0916295	0.9993737
ivertex_corr	Striatum_DA	VI04L	Sex2	1.688215	0.0920292	0.9993737
tvertex_corr	Striatum_DM	DMF2L	DXCtrl	-1.687369	0.0921917	0.5397073
tvertex_corr	Striatum_Limbic	FPF5L	Sex2	1.686761	0.0923087	0.9993737
ivertex_corr	Striatum_DM	VAP1L	DXCtrl	1.686595	0.0923406	0.5397073
tvertex_corr	Thalamus	VI03R	DXCtrl:Sex2	1.683416	0.0929545	0.9971437
ivertex_corr	Striatum_VA	DMF1L	DXCtrl	-1.681212	0.0933819	0.5433131
ivertex_corr	Thalamus	VAF2L	Sex2	1.680043	0.0936092	0.9993737
tvertex_corr	Thalamus	VI03L	DXCtrl:Sex2	1.679804	0.0936557	0.9971437
tvertex_corr	Striatum_FP	VAP2R	DXCtrl:Sex2	-1.679047	0.0938032	0.9971437
tvertex_corr	Thalamus	VI01L	DXCtrl:Sex2	-1.676791	0.0942441	0.9971437
ivertex_corr	Striatum_Limbic	DMP2L	DXCtrl:Sex2	1.676765	0.0942492	0.9971437
ivertex_corr	Striatum_DA	FPF3L	DXCtrl:Sex2	1.675757	0.0944466	0.9971437
tvertex_corr	Striatum_VA	VAI1R	DXCtrl	1.675038	0.0945878	0.5465821
tvertex_corr	Striatum_FP	FPP1R	DXCtrl	1.673969	0.0947978	0.5465821

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_DM	VAT1L	Sex2	-1.671179	0.0953477	0.9993737
ivertex_corr	Striatum_DA	FPF1R	Sex2	1.669202	0.0957391	0.9993737
tvertex_corr	Striatum_DA	FPF5R	DXCtrl:Sex2	-1.665253	0.0965244	0.9971437
tvertex_corr	Striatum_SM	DMP2L	DXCtrl:Sex2	1.665061	0.0965629	0.9971437
tvertex_corr	Striatum_DA	DMF3L	DXCtrl:Sex2	1.665053	0.0965644	0.9971437
tvertex_corr	Striatum_VI	VAI1L	Sex2	1.664505	0.0966739	0.9993737
tvertex_corr	Striatum_SM	DMF1L	DXCtrl	-1.663362	0.0969024	0.5508247
ivertex_corr	Striatum_VI	FPT1R	DXCtrl	-1.662272	0.0971207	0.5508247
ivertex_corr	Striatum_DM	FPF5R	DXCtrl	1.662220	0.0971311	0.5508247
ivertex_corr	Striatum_SM	SMT1L	DXCtrl:Sex2	-1.662031	0.0971691	0.9971437
ivertex_corr	Striatum_FP	SMF2R	DXCtrl:Sex2	-1.661780	0.0972194	0.9971437
tvertex_corr	Thalamus	VAF5L	DXCtrl	1.661603	0.0972550	0.5508247
tvertex_corr	Striatum_VI	DMP2R	Sex2	-1.661343	0.0973073	0.9993737
ivertex_corr	Striatum_SM	SMT1R	DXCtrl:Sex2	-1.658502	0.0978792	0.9971437
ivertex_corr	Striatum_DM	DMP1R	DXCtrl:Sex2	1.656957	0.0981912	0.9971437
ivertex_corr	Striatum_SM	FPP2R	DXCtrl	1.656472	0.0982893	0.5529974
ivertex_corr	Striatum_FP	FPF1R	DXCtrl	1.653508	0.0988909	0.5529974
ivertex_corr	Striatum_SM	FPF1L	DXCtrl	1.653293	0.0989347	0.5529974
tvertex_corr	Striatum_Limbic	SMI1L	Sex2	1.651473	0.0993057	0.9993737
tvertex_corr	Thalamus	SMI1R	Sex2	1.648813	0.0998500	0.9993737
tvertex_corr	Striatum_DM	SMT1R	DXCtrl	-1.648790	0.0998546	0.5557126

```
DX_lm_model <- results_pheno %>%
  gather(vertex_type, corZ, ivertex_corr, tvertex_corr) %>%
  filter(age > 17, age < 51) %>%
  group_by(vertex_type, subcort_ROI, PINT_ROI) %>%
  do(tidy(lm(corZ ~ DX*Sex + mean_fd_pt + poly(Age_std,2) + Edu_std + Site,.))) %>%
  select(vertex_type, subcort_ROI, PINT_ROI, term, statistic, p.value) %>%
  ungroup() %>%
  group_by(term) %>%
  mutate(p_FDR = p.adjust(p.value, method = "fdr")) %>%
  arrange(p.value)

DX_lm_model %>%
  filter(term %in% c("DXCtrl", "Sex2")) %>%
  filter(p.value < 0.1) %>%
  kable()
```

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_VI	DMF2R	DXCtrl	-3.814624	0.0001545	0.1825073
tvertex_corr	Striatum_Limbic	VAP1L	Sex2	3.641967	0.0003005	0.2144617
tvertex_corr	Striatum_Limbic	VAF1R	Sex2	3.612992	0.0003351	0.2144617
ivertex_corr	Striatum_DM	FPF4R	DXCtrl	3.604334	0.0003462	0.1825073
tvertex_corr	Thalamus	VAP1R	DXCtrl	3.547462	0.0004278	0.1825073
ivertex_corr	Striatum_SM	DMF2L	DXCtrl	-3.394927	0.0007443	0.2177980
tvertex_corr	Striatum_VI	DMF2R	Sex2	-3.304116	0.0010251	0.4373655
tvertex_corr	Striatum_SM	VAP2L	DXCtrl	3.272510	0.0011440	0.2177980
tvertex_corr	Striatum_FP	FPP2R	DXCtrl	3.240333	0.0012780	0.2177980
ivertex_corr	Striatum_SM	VAI1L	DXCtrl	3.138955	0.0018015	0.2177980
tvertex_corr	Thalamus	DMT2L	DXCtrl	-3.081307	0.0021811	0.2177980
tvertex_corr	Striatum_SM	VAF1L	DXCtrl	3.080356	0.0021880	0.2177980

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_VA	VAF1R	DXCtrl	3.071010	0.0022562	0.2177980
tvertex_corr	Striatum_VA	VAP2R	DXCtrl	3.057786	0.0023561	0.2177980
tvertex_corr	Striatum_VA	DMT2L	DXCtrl	-3.051515	0.0024049	0.2177980
ivertex_corr	Thalamus	FPP1L	DXCtrl	3.034623	0.0025410	0.2177980
ivertex_corr	Striatum_SM	DMT2L	DXCtrl	-3.010666	0.0027462	0.2177980
ivertex_corr	Thalamus	FPP1R	DXCtrl	3.008165	0.0027684	0.2177980
ivertex_corr	Striatum_VA	DMT2L	DXCtrl	-2.986796	0.0029656	0.2177980
tvertex_corr	Striatum_DM	DMT2L	DXCtrl	-2.975657	0.0030733	0.2177980
tvertex_corr	Striatum_SM	DMF2R	DXCtrl	-2.964249	0.0031874	0.2177980
ivertex_corr	Striatum_VA	DMF2L	DXCtrl	-2.959798	0.0032329	0.2177980
ivertex_corr	Striatum_SM	VAF1L	DXCtrl	2.935307	0.0034944	0.2191873
ivertex_corr	Striatum_SM	VAP2L	DXCtrl	2.926234	0.0035960	0.2191873
ivertex_corr	Striatum_VA	VAP2R	DXCtrl	2.905660	0.0038366	0.2232218
ivertex_corr	Striatum_Limbic	VAF2L	Sex2	2.902513	0.0038747	0.7284496
ivertex_corr	Striatum_Limbic	SMF1L	Sex2	2.898132	0.0039283	0.7284496
tvertex_corr	Striatum_VI	DMF1R	Sex2	-2.884345	0.0041013	0.7284496
ivertex_corr	Thalamus	DMT2L	DXCtrl	-2.859320	0.0044331	0.2407507
tvertex_corr	Striatum_DM	VAP1L	DXCtrl	2.853474	0.0045141	0.2407507
tvertex_corr	Striatum_VA	VAF1L	DXCtrl	2.809013	0.0051751	0.2456851
tvertex_corr	Striatum_VA	VAP2L	DXCtrl	2.807658	0.0051966	0.2456851
ivertex_corr	Striatum_Limbic	VAF1R	Sex2	2.805066	0.0052379	0.7284496
tvertex_corr	Striatum_VI	FPF4L	Sex2	2.795987	0.0053848	0.7284496
ivertex_corr	Striatum_FP	FPP1R	DXCtrl	2.788594	0.0055072	0.2456851
ivertex_corr	Striatum_VI	DMP1R	DXCtrl	-2.785709	0.0055556	0.2456851
tvertex_corr	Thalamus	VAP1R	Sex2	2.785376	0.0055612	0.7284496
tvertex_corr	Striatum_DM	DAT1R	Sex2	-2.777762	0.0056910	0.7284496
ivertex_corr	Striatum_DM	DMP1L	DXCtrl	-2.775736	0.0057260	0.2456851
ivertex_corr	Thalamus	VAP1R	DXCtrl	2.745563	0.0062708	0.2456851
tvertex_corr	Striatum_VA	DMT1L	DXCtrl	-2.741344	0.0063506	0.2456851
ivertex_corr	Striatum_SM	DMF2R	DXCtrl	-2.738309	0.0064086	0.2456851
ivertex_corr	Striatum_SM	DMF1R	DXCtrl	-2.726434	0.0066400	0.2456851
ivertex_corr	Striatum_VA	VAF4L	DXCtrl	2.720725	0.0067539	0.2456851
ivertex_corr	Striatum_VA	VAF1L	DXCtrl	2.714558	0.0068790	0.2456851
tvertex_corr	Thalamus	FPP1L	DXCtrl	2.712318	0.0069249	0.2456851
tvertex_corr	Striatum_VA	FPP2R	DXCtrl	2.703813	0.0071018	0.2456851
tvertex_corr	Striatum_SM	DMT2L	DXCtrl	-2.693617	0.0073193	0.2465453
ivertex_corr	Striatum_DM	DMT2L	DXCtrl	-2.665597	0.0079481	0.2471530
tvertex_corr	Striatum_DM	DMP1L	DXCtrl	-2.656484	0.0081629	0.2471530
ivertex_corr	Striatum_SM	VAI1R	DXCtrl	2.655323	0.0081906	0.2471530
tvertex_corr	Striatum_SM	VAP2R	DXCtrl	2.640862	0.0085431	0.2471530
ivertex_corr	Striatum_FP	FPF4R	DXCtrl	2.639996	0.0085646	0.2471530
ivertex_corr	Striatum_SM	VAF2L	DXCtrl	2.637412	0.0086292	0.2471530
tvertex_corr	Thalamus	FPF4L	DXCtrl	2.631605	0.0087759	0.2471530
tvertex_corr	Striatum_FP	DMT2L	DXCtrl	-2.618869	0.0091054	0.2471530
tvertex_corr	Striatum_SM	FPF5L	DXCtrl	2.618500	0.0091151	0.2471530
tvertex_corr	Striatum_FP	FPF3R	DXCtrl	2.604710	0.0094847	0.2471530
tvertex_corr	Striatum_VA	FPF1R	DXCtrl	2.597560	0.0096815	0.2471530
tvertex_corr	Striatum_DA	FPF5R	Sex2	2.596787	0.0097030	0.8903195
ivertex_corr	Striatum_VA	DMP1L	DXCtrl	-2.593058	0.0098074	0.2471530
ivertex_corr	Striatum_VI	DMF1R	Sex2	-2.588930	0.0099240	0.8903195
ivertex_corr	Striatum_DA	FPF5L	Sex2	2.584140	0.0100609	0.8903195
tvertex_corr	Striatum_SM	VAI1L	DXCtrl	2.580319	0.0101713	0.2471530

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_VI	DMP2L	Sex2	-2.568239	0.0105276	0.8903195
ivertex_corr	Striatum_SM	VAF4L	DXCtrl	2.563887	0.0106586	0.2471530
tvertex_corr	Striatum_DM	FPP2R	DXCtrl	2.559662	0.0107872	0.2471530
tvertex_corr	Striatum_VA	VAF1R	DXCtrl	2.558441	0.0108246	0.2471530
ivertex_corr	Striatum_DA	FPT1R	Sex2	2.556722	0.0108775	0.8903195
tvertex_corr	Thalamus	VAP1L	DXCtrl	2.553913	0.0109644	0.2471530
ivertex_corr	Striatum_Limbic	VAF1L	Sex2	2.548648	0.0111290	0.8903195
ivertex_corr	Striatum_VA	DMF3L	DXCtrl	-2.548186	0.0111436	0.2471530
ivertex_corr	Striatum_DA	VAF2L	DXCtrl	2.545030	0.0112434	0.2471530
tvertex_corr	Striatum_SM	VAF2L	DXCtrl	2.542578	0.0113215	0.2471530
ivertex_corr	Striatum_Limbic	FPF4L	DXCtrl	2.535704	0.0115430	0.2471530
ivertex_corr	Striatum_FP	FPP2L	DXCtrl	2.534405	0.0115853	0.2471530
ivertex_corr	Striatum_DM	FPP1R	DXCtrl	2.523119	0.0119586	0.2503809
tvertex_corr	Striatum_DA	DAF1L	DXCtrl	-2.518106	0.0121278	0.2503809
ivertex_corr	Striatum_VI	DMF1R	DXCtrl	-2.505790	0.0125526	0.2530920
ivertex_corr	Striatum_SM	VAP2R	DXCtrl	2.495037	0.0129343	0.2530920
tvertex_corr	Thalamus	FPP1R	DXCtrl	2.492462	0.0130272	0.2530920
tvertex_corr	Striatum_DM	VAP1R	DXCtrl	2.491831	0.0130501	0.2530920
tvertex_corr	Striatum_VI	DMP1R	Sex2	-2.490182	0.0131100	0.9871037
ivertex_corr	Striatum_DM	DMP1R	DXCtrl	-2.482914	0.0133769	0.2555588
ivertex_corr	Thalamus	DMT2R	DXCtrl	-2.463422	0.0141167	0.2598491
ivertex_corr	Striatum_DM	DMP2R	DXCtrl	-2.462260	0.0141620	0.2598491
ivertex_corr	Striatum_VA	VAF4R	DXCtrl	2.460481	0.0142314	0.2598491
ivertex_corr	Striatum_VA	VAF2L	DXCtrl	2.455857	0.0144135	0.2598491
tvertex_corr	Striatum_FP	DAT1R	Sex2	-2.454746	0.0144575	0.9993737
tvertex_corr	Striatum_DM	VAP2L	DXCtrl	2.450202	0.0146389	0.2602474
tvertex_corr	Striatum_DM	DMF1L	DXCtrl	-2.422516	0.0157881	0.2745384
tvertex_corr	Striatum_SM	VAP1L	DXCtrl	2.420571	0.0158718	0.2745384
ivertex_corr	Striatum_DA	FPF5R	Sex2	2.415116	0.0161084	0.9993737
tvertex_corr	Striatum_VI	FPF3R	Sex2	-2.401990	0.0166908	0.9993737
ivertex_corr	Striatum_VI	DMP1R	Sex2	-2.395389	0.0169906	0.9993737
ivertex_corr	Striatum_VA	VAP2L	DXCtrl	2.391364	0.0171757	0.2931327
tvertex_corr	Striatum_Limbic	VAF1L	Sex2	2.365925	0.0183873	0.9993737
tvertex_corr	Striatum_DA	DMP1R	Sex2	-2.357771	0.0187912	0.9993737
ivertex_corr	Striatum_SM	FPP1L	DXCtrl	2.355874	0.0188864	0.3180860
tvertex_corr	Striatum_VA	VAP1L	DXCtrl	2.347344	0.0193191	0.3211494
ivertex_corr	Striatum_VI	SMF2R	DXCtrl	2.342319	0.0195781	0.3212818
tvertex_corr	Striatum_DA	DMF1R	Sex2	-2.331618	0.0201398	0.9993737
ivertex_corr	Thalamus	VAP1L	DXCtrl	2.330277	0.0202112	0.3274732
ivertex_corr	Striatum_DM	DMF2R	Sex2	2.322967	0.0206042	0.9993737
tvertex_corr	Striatum_VI	DMP1R	DXCtrl	-2.320845	0.0207195	0.3315122
ivertex_corr	Thalamus	VAP1R	Sex2	2.308625	0.0213947	0.9993737
ivertex_corr	Striatum_SM	VI05L	DXCtrl	-2.306295	0.0215256	0.3401574
ivertex_corr	Striatum_DA	DAF1R	Sex2	-2.301997	0.0217689	0.9993737
tvertex_corr	Striatum_VA	DAT1R	Sex2	-2.287290	0.0226196	0.9993737
tvertex_corr	Striatum_VA	VI05R	DXCtrl	-2.281116	0.0229853	0.3563914
ivertex_corr	Striatum_VA	DMT2R	DXCtrl	-2.278320	0.0231526	0.3563914
tvertex_corr	Striatum_FP	VAP2R	DXCtrl	2.270785	0.0236088	0.3563914
tvertex_corr	Striatum_VI	SMF2R	DXCtrl	2.269839	0.0236666	0.3563914
tvertex_corr	Striatum_Limbic	VAP1R	Sex2	2.259988	0.0242760	0.9993737
ivertex_corr	Striatum_DA	FPT1L	Sex2	2.253709	0.0246715	0.9993737
ivertex_corr	Striatum_VI	DMF2R	DXCtrl	-2.252008	0.0247797	0.3688139

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Thalamus	SMI1L	DXCtrl	-2.240161	0.0255441	0.3723259
tvertex_corr	Striatum_VA	VAF2L	DXCtrl	2.239346	0.0255974	0.3723259
tvertex_corr	Striatum_VA	SMF3R	DXCtrl	-2.226802	0.0264306	0.3780205
ivertex_corr	Striatum_VA	VAP1R	DXCtrl	2.224595	0.0265796	0.3780205
tvertex_corr	Striatum_VI	DAF1R	Sex2	-2.217061	0.0270936	0.9993737
tvertex_corr	Thalamus	DMF2R	DXCtrl	-2.211366	0.0274879	0.3811995
tvertex_corr	Thalamus	DMF1L	Sex2	-2.208251	0.0277057	0.9993737
ivertex_corr	Striatum_VI	DMT2R	Sex2	-2.204217	0.0279899	0.9993737
ivertex_corr	Striatum_VA	VI05L	DXCtrl	-2.201985	0.0281483	0.3811995
ivertex_corr	Striatum_Limbic	FPF5R	DXCtrl	2.199746	0.0283079	0.3811995
ivertex_corr	Striatum_DA	DMP1R	Sex2	-2.198614	0.0283889	0.9993737
ivertex_corr	Striatum_VA	FPP1L	DXCtrl	2.197558	0.0284647	0.3811995
tvertex_corr	Striatum_DM	DMT1L	DXCtrl	-2.188865	0.0290948	0.3811995
ivertex_corr	Striatum_SM	DMT1L	DXCtrl	-2.188091	0.0291515	0.3811995
tvertex_corr	Striatum_VA	DAP2R	DXCtrl	2.186552	0.0292645	0.3811995
ivertex_corr	Thalamus	FPP2L	DXCtrl	2.185697	0.0293275	0.3811995
tvertex_corr	Striatum_DM	FPF3R	DXCtrl	2.183585	0.0294834	0.3811995
ivertex_corr	Striatum_VA	DMF1R	DXCtrl	-2.175389	0.0300955	0.3852220
ivertex_corr	Striatum_SM	DMF1L	DXCtrl	-2.167918	0.0306629	0.3885994
ivertex_corr	Striatum_FP	FPP1L	DXCtrl	2.161448	0.0311618	0.3910501
tvertex_corr	Striatum_DA	DMP2L	Sex2	-2.160455	0.0312390	0.9993737
ivertex_corr	Striatum_Limbic	VAP1L	Sex2	2.156459	0.0315512	0.9993737
tvertex_corr	Striatum_SM	VAI1R	DXCtrl	2.151392	0.0319510	0.3926586
tvertex_corr	Striatum_VA	VI04R	DXCtrl	-2.144366	0.0325125	0.3926586
ivertex_corr	Striatum_SM	VAP1R	DXCtrl	2.134713	0.0332978	0.3926586
ivertex_corr	Striatum_VA	FPP1R	DXCtrl	2.134273	0.0333340	0.3926586
tvertex_corr	Striatum_DM	DMP1R	DXCtrl	-2.130352	0.0336579	0.3926586
ivertex_corr	Striatum_VA	SMF3L	DXCtrl	-2.123845	0.0342014	0.3926586
ivertex_corr	Thalamus	SMF3R	DXCtrl	-2.121659	0.0343857	0.3926586
ivertex_corr	Striatum_SM	VAF3R	DXCtrl	2.119753	0.0345470	0.3926586
tvertex_corr	Striatum_SM	FPP2R	DXCtrl	2.118359	0.0346655	0.3926586
tvertex_corr	Striatum_Limbic	SMF3L	Sex2	2.116803	0.0347981	0.9993737
ivertex_corr	Striatum_DA	VAI1R	DXCtrl	2.112291	0.0351850	0.3926586
ivertex_corr	Striatum_VA	VAF3R	DXCtrl	2.110662	0.0353256	0.3926586
tvertex_corr	Striatum_VA	VAI1R	Sex2	-2.105261	0.0357953	0.9993737
ivertex_corr	Striatum_VA	FPF5L	Sex2	2.100145	0.0362451	0.9993737
ivertex_corr	Striatum_FP	FPP2R	DXCtrl	2.099442	0.0363072	0.3926586
ivertex_corr	Striatum_DM	FPP2L	DXCtrl	2.097863	0.0364473	0.3926586
tvertex_corr	Thalamus	VI04L	DXCtrl	-2.093517	0.0368350	0.3926586
ivertex_corr	Striatum_SM	VAF1R	DXCtrl	2.093170	0.0368661	0.3926586
tvertex_corr	Striatum_SM	VI04R	DXCtrl	-2.090893	0.0370708	0.3926586
ivertex_corr	Striatum_SM	DMF3L	DXCtrl	-2.090254	0.0371284	0.3926586
tvertex_corr	Striatum_VA	SMI1L	Sex2	2.088128	0.0373206	0.9993737
ivertex_corr	Striatum_VA	VAF2R	DXCtrl	2.087493	0.0373782	0.3926586
tvertex_corr	Striatum_DA	SMF2R	DXCtrl	2.086305	0.0374861	0.3926586
tvertex_corr	Striatum_DA	DMF2R	DXCtrl	-2.086218	0.0374940	0.3926586
ivertex_corr	Striatum_VA	FPP2R	DXCtrl	2.081343	0.0379398	0.3926586
ivertex_corr	Striatum_DM	DAT1R	Sex2	-2.079509	0.0381086	0.9993737
ivertex_corr	Striatum_DM	DMF3L	DXCtrl	-2.077118	0.0383298	0.3926586
tvertex_corr	Striatum_SM	DMF2L	DXCtrl	-2.071605	0.0388438	0.3926586
ivertex_corr	Striatum_VI	DMP2L	Sex2	-2.069048	0.0390842	0.9993737
tvertex_corr	Striatum_VA	VAF2R	DXCtrl	2.067405	0.0392393	0.3926586

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_FP	DAP1L	DXCtrl	2.062209	0.0397334	0.3926586
ivertex_corr	Thalamus	DMF2L	DXCtrl	-2.059510	0.0399921	0.3926586
ivertex_corr	Striatum_VA	DMT1L	DXCtrl	-2.058759	0.0400644	0.3926586
ivertex_corr	Striatum_VA	VAI1R	Sex2	-2.056773	0.0402560	0.9993737
ivertex_corr	Striatum_Limbic	VAF1L	DXCtrl	2.054893	0.0404380	0.3926586
ivertex_corr	Striatum_DM	FPF4L	DXCtrl	2.053936	0.0405310	0.3926586
ivertex_corr	Thalamus	DMT1R	DXCtrl	-2.052799	0.0406417	0.3926586
ivertex_corr	Striatum_Limbic	DAF1L	Sex2	2.051957	0.0407238	0.9993737
tvertex_corr	Striatum_VA	DMT2R	DXCtrl	-2.050718	0.0408449	0.3926586
ivertex_corr	Striatum_DM	FPP1L	DXCtrl	2.047977	0.0411139	0.3926586
tvertex_corr	Striatum_VI	DAF1L	DXCtrl	-2.044945	0.0414132	0.3926586
ivertex_corr	Thalamus	VAT1L	Sex2	-2.044614	0.0414460	0.9993737
tvertex_corr	Thalamus	FPF3R	Sex2	-2.040005	0.0419048	0.9993737
ivertex_corr	Striatum_DA	VAF1R	DXCtrl	2.035835	0.0423236	0.3933253
ivertex_corr	Striatum_VA	DMP1R	DXCtrl	-2.032721	0.0426387	0.3933253
tvertex_corr	Striatum_SM	VI05R	DXCtrl	-2.032569	0.0426541	0.3933253
tvertex_corr	Striatum_VI	FPT1R	DXCtrl	-2.031582	0.0427545	0.3933253
ivertex_corr	Striatum_Limbic	SMT1L	DXCtrl	2.028979	0.0430200	0.3933253
ivertex_corr	Striatum_FP	DMF2R	Sex2	2.027394	0.0431824	0.9993737
ivertex_corr	Striatum_DA	VI05L	DXCtrl	-2.025588	0.0433680	0.3936953
tvertex_corr	Striatum_DA	VI05L	DXCtrl	-2.021471	0.0437937	0.3947602
tvertex_corr	Striatum_Limbic	SMF1L	Sex2	2.020882	0.0438549	0.9993737
tvertex_corr	Thalamus	VAT1R	DXCtrl	-2.012306	0.0447541	0.3976901
tvertex_corr	Striatum_SM	FPP1L	DXCtrl	2.012203	0.0447650	0.3976901
tvertex_corr	Striatum_DM	VAF1R	DXCtrl	2.008593	0.0451482	0.3976901
ivertex_corr	Striatum_Limbic	VAF2R	Sex2	2.007043	0.0453135	0.9993737
tvertex_corr	Striatum_VA	SMF3L	DXCtrl	-2.005065	0.0455253	0.3976901
tvertex_corr	Striatum_FP	DMF3L	DXCtrl	-2.003698	0.0456722	0.3976901
tvertex_corr	Striatum_DA	DMF2R	Sex2	-2.003113	0.0457352	0.9993737
tvertex_corr	Striatum_VA	VI05L	DXCtrl	-1.998698	0.0462129	0.3996790
tvertex_corr	Striatum_SM	DMT1L	DXCtrl	-1.987098	0.0474879	0.4079501
tvertex_corr	Striatum_VI	FPF5R	Sex2	1.985807	0.0476316	0.9993737
tvertex_corr	Striatum_DM	FPF2R	Sex2	-1.983994	0.0478341	0.9993737
tvertex_corr	Striatum_SM	FPF1R	DXCtrl	1.983932	0.0478411	0.4082438
ivertex_corr	Striatum_FP	FPF1L	Sex2	1.982753	0.0479731	0.9993737
tvertex_corr	Striatum_FP	VAP1R	DXCtrl	1.976591	0.0486683	0.4125522
tvertex_corr	Striatum_Limbic	FPF4L	DXCtrl	1.973090	0.0490671	0.4130337
ivertex_corr	Striatum_DA	FPF4L	Sex2	1.968600	0.0495825	0.9993737
ivertex_corr	Striatum_DM	FPF5L	Sex2	1.965850	0.0499005	0.9993737
ivertex_corr	Striatum_VA	VAI1L	DXCtrl	1.962387	0.0503033	0.4130337
ivertex_corr	Thalamus	FPF4R	DXCtrl	1.959147	0.0506826	0.4130337
tvertex_corr	Striatum_VA	VAI1L	DXCtrl	1.958529	0.0507552	0.4130337
ivertex_corr	Striatum_DM	DMF2L	DXCtrl	-1.956993	0.0509362	0.4130337
ivertex_corr	Striatum_VA	VAF5R	DXCtrl	1.953784	0.0513157	0.4130337
ivertex_corr	Striatum_DA	SMF2R	DXCtrl	1.952034	0.0515238	0.4130337
ivertex_corr	Striatum_VA	SMF3R	DXCtrl	-1.951187	0.0516248	0.4130337
ivertex_corr	Striatum_VA	FPP2L	DXCtrl	1.951150	0.0516292	0.4130337
tvertex_corr	Striatum_Limbic	VAF1R	DXCtrl	1.944340	0.0524470	0.4169699
ivertex_corr	Striatum_VA	DMT2L	Sex2	-1.941325	0.0528125	0.9993737
tvertex_corr	Striatum_DM	DMF1L	Sex2	-1.939307	0.0530583	0.9993737
ivertex_corr	Striatum_Limbic	VAF4R	DXCtrl	1.935633	0.0535083	0.4215272
ivertex_corr	Striatum_DM	DMP2L	DXCtrl	-1.934247	0.0536789	0.4215272

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_VI	DMT2L	Sex2	-1.928616	0.0543767	0.9993737
tvertex_corr	Striatum_FP	FPP2L	DXCtrl	1.927115	0.0545639	0.4258644
tvertex_corr	Striatum_VA	FPF5L	Sex2	1.924872	0.0548448	0.9993737
ivertex_corr	Thalamus	VAP2R	DXCtrl	1.922326	0.0551650	0.4279467
tvertex_corr	Striatum_VA	DAT1L	Sex2	-1.922164	0.0551855	0.9993737
ivertex_corr	Thalamus	VAT1R	DXCtrl	-1.918371	0.0556656	0.4292291
ivertex_corr	Thalamus	VI04R	DXCtrl	-1.915717	0.0560037	0.4292500
ivertex_corr	Striatum_SM	VI01R	Sex2	1.911285	0.0565721	0.9993737
ivertex_corr	Striatum_DA	FPP1R	Sex2	1.910767	0.0566388	0.9993737
tvertex_corr	Striatum_SM	VI05L	DXCtrl	-1.902873	0.0576640	0.4388045
tvertex_corr	Striatum_Limbic	VAP1L	DXCtrl	1.900799	0.0579359	0.4388045
ivertex_corr	Striatum_SM	FPP1R	DXCtrl	1.896626	0.0584863	0.4395248
ivertex_corr	Striatum_SM	VAF4R	DXCtrl	1.894881	0.0587178	0.4395248
ivertex_corr	Thalamus	FPF3R	Sex2	-1.891233	0.0592040	0.9993737
tvertex_corr	Striatum_FP	VAF1R	DXCtrl	1.887470	0.0597091	0.4416328
ivertex_corr	Striatum_DM	FPP2R	DXCtrl	1.887283	0.0597343	0.4416328
tvertex_corr	Striatum_VI	DAP3L	DXCtrl	1.885060	0.0600345	0.4416328
tvertex_corr	Striatum_SM	DMP2L	Sex2	-1.879931	0.0607319	0.9993737
ivertex_corr	Striatum_FP	VAP2R	DXCtrl	1.879452	0.0607973	0.4446892
tvertex_corr	Striatum_DA	VI04L	Sex2	1.876319	0.0612271	0.9993737
tvertex_corr	Striatum_SM	VAF4L	DXCtrl	1.875365	0.0613584	0.4462426
ivertex_corr	Striatum_FP	VAF5R	Sex2	-1.870438	0.0620403	0.9993737
tvertex_corr	Striatum_DA	FPF4R	DXCtrl	-1.866694	0.0625628	0.4494921
ivertex_corr	Striatum_SM	VAF2R	DXCtrl	1.866550	0.0625829	0.4494921
ivertex_corr	Thalamus	FPF4L	DXCtrl	1.864585	0.0628587	0.4494921
ivertex_corr	Thalamus	FPT1R	Sex2	-1.860929	0.0633744	0.9993737
tvertex_corr	Striatum_VI	DAF2L	Sex2	-1.859731	0.0635442	0.9993737
tvertex_corr	Striatum_Limbic	FPF2L	Sex2	1.856984	0.0639349	0.9993737
tvertex_corr	Striatum_SM	DMT2R	DXCtrl	-1.856960	0.0639382	0.4510642
tvertex_corr	Thalamus	VI04R	DXCtrl	-1.856953	0.0639393	0.4510642
ivertex_corr	Striatum_VA	FPF1L	Sex2	1.855775	0.0641074	0.9993737
tvertex_corr	Striatum_SM	DAP3L	DXCtrl	1.853360	0.0644533	0.4510642
ivertex_corr	Striatum_SM	VI04R	DXCtrl	-1.853117	0.0644881	0.4510642
ivertex_corr	Striatum_VI	DMP2R	Sex2	-1.852681	0.0645508	0.9993737
ivertex_corr	Striatum_DA	DMT2L	Sex2	-1.851711	0.0646903	0.9993737
tvertex_corr	Striatum_Limbic	SMF2L	Sex2	1.851549	0.0647137	0.9993737
tvertex_corr	Thalamus	VAP2R	DXCtrl	1.850367	0.0648841	0.4513678
tvertex_corr	Striatum_DA	VAF2L	DXCtrl	1.836582	0.0668990	0.4624048
tvertex_corr	Striatum_FP	VAP2L	DXCtrl	1.834598	0.0671932	0.4624048
ivertex_corr	Striatum_DA	VAF1L	DXCtrl	1.824969	0.0686363	0.4697954
ivertex_corr	Striatum_FP	VAF1R	DXCtrl	1.822560	0.0690012	0.4697954
ivertex_corr	Striatum_FP	FPF5L	Sex2	1.821023	0.0692350	0.9993737
tvertex_corr	Thalamus	DMT1L	DXCtrl	-1.819723	0.0694332	0.4702351
tvertex_corr	Striatum_DA	DMF1L	Sex2	-1.818070	0.0696858	0.9993737
tvertex_corr	Thalamus	DMT1R	DXCtrl	-1.805749	0.0715931	0.4785868
tvertex_corr	Striatum_DA	VAF1L	DXCtrl	1.804865	0.0717317	0.4785868
tvertex_corr	Striatum_SM	VAP1R	Sex2	-1.804816	0.0717393	0.9993737
ivertex_corr	Striatum_DM	VAF1R	DXCtrl	1.804506	0.0717880	0.4785868
tvertex_corr	Striatum_SM	SMI1L	Sex2	1.802843	0.0720492	0.9993737
ivertex_corr	Striatum_SM	DMT2L	Sex2	-1.797556	0.0728852	0.9993737
tvertex_corr	Striatum_FP	FPF1R	DXCtrl	1.792231	0.0737350	0.4890194
ivertex_corr	Thalamus	FPF3L	DXCtrl	1.787351	0.0745209	0.4900563

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
tvertex_corr	Striatum_VA	VAF4R	DXCtrl	1.786510	0.0746570	0.4900563
tvertex_corr	Striatum_VI	SMF3R	Sex2	-1.784371	0.0750042	0.9993737
ivertex_corr	Striatum_DA	FPF4R	Sex2	1.783283	0.0751814	0.9993737
tvertex_corr	Striatum_DA	DMP1L	Sex2	-1.783138	0.0752050	0.9993737
ivertex_corr	Striatum_Limbic	SMI1R	Sex2	1.772489	0.0769571	0.9993737
tvertex_corr	Striatum_DM	DAP1L	DXCtrl	1.766596	0.0779407	0.5038110
ivertex_corr	Striatum_SM	VAP1L	DXCtrl	1.764931	0.0782206	0.5038110
tvertex_corr	Striatum_FP	DAP1R	DXCtrl	1.763837	0.0784050	0.5038110
tvertex_corr	Thalamus	DMT2R	DXCtrl	-1.763441	0.0784718	0.5038110
ivertex_corr	Thalamus	VAF5L	DXCtrl	1.759424	0.0791519	0.5038110
ivertex_corr	Striatum_Limbic	VAP1R	Sex2	1.758928	0.0792363	0.9993737
ivertex_corr	Striatum_SM	DAF1R	Sex2	-1.756109	0.0797169	0.9993737
ivertex_corr	Striatum_VA	DMF2R	DXCtrl	-1.753026	0.0802454	0.5038110
tvertex_corr	Striatum_VA	DMF1L	Sex2	-1.752924	0.0802630	0.9993737
ivertex_corr	Striatum_Limbic	SMF2L	Sex2	1.752103	0.0804040	0.9993737
tvertex_corr	Striatum_VA	VAF4L	DXCtrl	1.751501	0.0805078	0.5038110
tvertex_corr	Striatum_FP	VAF4L	DXCtrl	1.751251	0.0805509	0.5038110
ivertex_corr	Striatum_Limbic	SMI1L	Sex2	1.751195	0.0805605	0.9993737
tvertex_corr	Thalamus	DMF2L	DXCtrl	-1.750975	0.0805984	0.5038110
ivertex_corr	Striatum_Limbic	DAF1R	Sex2	1.750806	0.0806275	0.9993737
tvertex_corr	Striatum_DM	FPF4R	DXCtrl	1.746897	0.0813042	0.5038110
ivertex_corr	Striatum_VA	VAF5L	DXCtrl	1.746100	0.0814428	0.5038110
tvertex_corr	Striatum_VI	VAI1R	DXCtrl	1.745911	0.0814757	0.5038110
tvertex_corr	Striatum_DA	DAF1L	Sex2	-1.742983	0.0819864	0.9993737
ivertex_corr	Striatum_VI	SMF3R	Sex2	-1.742628	0.0820485	0.9993737
tvertex_corr	Striatum_SM	DMF1L	Sex2	-1.742103	0.0821405	0.9993737
tvertex_corr	Thalamus	VAP1L	Sex2	1.739421	0.0826112	0.9993737
tvertex_corr	Striatum_DM	DMT1R	DXCtrl	-1.738732	0.0827326	0.5091234
ivertex_corr	Striatum_VI	DAF1R	Sex2	-1.731810	0.0839593	0.9993737
ivertex_corr	Striatum_Limbic	VAF1R	DXCtrl	1.730688	0.0841596	0.5145018
ivertex_corr	Striatum_DA	DMF1R	DXCtrl	-1.728591	0.0845349	0.5145018
tvertex_corr	Striatum_DM	FPF2L	DXCtrl	1.727045	0.0848124	0.5145018
tvertex_corr	Striatum_VI	SMI1L	Sex2	1.725644	0.0850646	0.9993737
tvertex_corr	Striatum_DA	VAI1R	DXCtrl	1.724010	0.0853595	0.5153781
tvertex_corr	Striatum_VA	DMF2L	DXCtrl	-1.720778	0.0859450	0.5164772
ivertex_corr	Striatum_VA	VAP2R	Sex2	-1.720102	0.0860680	0.9993737
ivertex_corr	Striatum_VI	FPT1L	Sex2	1.719283	0.0862170	0.9993737
tvertex_corr	Striatum_VA	DMF2R	DXCtrl	-1.718544	0.0863518	0.5164966
tvertex_corr	Thalamus	FPF3R	DXCtrl	1.714865	0.0870250	0.5166794
tvertex_corr	Striatum_SM	VI04L	DXCtrl	-1.713969	0.0871896	0.5166794
ivertex_corr	Thalamus	DMF1L	Sex2	-1.711612	0.0876237	0.9993737
ivertex_corr	Striatum_FP	VAT1L	Sex2	-1.707240	0.0884337	0.9993737
tvertex_corr	Striatum_SM	FPF3R	Sex2	-1.707096	0.0884605	0.9993737
ivertex_corr	Striatum_DM	VI05R	Sex2	-1.705620	0.0887354	0.9993737
ivertex_corr	Striatum_VI	DMF2R	Sex2	-1.704729	0.0889017	0.9993737
tvertex_corr	Striatum_VI	FPF3L	Sex2	-1.698962	0.0899840	0.9993737
ivertex_corr	Striatum_DA	SMT1L	DXCtrl	1.697338	0.0902905	0.5325893
tvertex_corr	Striatum_FP	DMF1L	Sex2	-1.690300	0.0916295	0.9993737
ivertex_corr	Striatum_DA	VI04L	Sex2	1.688215	0.0920292	0.9993737
tvertex_corr	Striatum_DM	DMF2L	DXCtrl	-1.687369	0.0921917	0.5397073
tvertex_corr	Striatum_Limbic	FPF5L	Sex2	1.686761	0.0923087	0.9993737
ivertex_corr	Striatum_DM	VAP1L	DXCtrl	1.686595	0.0923406	0.5397073

vertex_type	subcort_ROI	PINT_ROI	term	statistic	p.value	p_FDR
ivertex_corr	Striatum_VA	DMF1L	DXCtrl	-1.681212	0.0933819	0.5433131
ivertex_corr	Thalamus	VAF2L	Sex2	1.680043	0.0936092	0.9993737
tvertex_corr	Striatum_VA	VAI1R	DXCtrl	1.675038	0.0945878	0.5465821
tvertex_corr	Striatum_FP	FPP1R	DXCtrl	1.673969	0.0947978	0.5465821
ivertex_corr	Striatum_DM	VAT1L	Sex2	-1.671179	0.0953477	0.9993737
ivertex_corr	Striatum_DA	FPF1R	Sex2	1.669202	0.0957391	0.9993737
tvertex_corr	Striatum_VI	VAI1L	Sex2	1.664505	0.0966739	0.9993737
tvertex_corr	Striatum_SM	DMF1L	DXCtrl	-1.663362	0.0969024	0.5508247
ivertex_corr	Striatum_VI	FPT1R	DXCtrl	-1.662272	0.0971207	0.5508247
ivertex_corr	Striatum_DM	FPF5R	DXCtrl	1.662220	0.0971311	0.5508247
tvertex_corr	Thalamus	VAF5L	DXCtrl	1.661603	0.0972550	0.5508247
tvertex_corr	Striatum_VI	DMP2R	Sex2	-1.661343	0.0973073	0.9993737
ivertex_corr	Striatum_SM	FPP2R	DXCtrl	1.656472	0.0982893	0.5529974
ivertex_corr	Striatum_FP	FPF1R	DXCtrl	1.653508	0.0988909	0.5529974
ivertex_corr	Striatum_SM	FPF1L	DXCtrl	1.653293	0.0989347	0.5529974
tvertex_corr	Striatum_Limbic	SMI1L	Sex2	1.651473	0.0993057	0.9993737
tvertex_corr	Thalamus	SMI1R	Sex2	1.648813	0.0998500	0.9993737
tvertex_corr	Striatum_DM	SMT1R	DXCtrl	-1.648790	0.0998546	0.5557126

```
DX_lm_model <- results_pheno %>%
  group_by(YeoNet, subcort_ROI, hemisphere,
           subid, DX, Age_std, Sex, Site, Edu_std, mean_fd_pt) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  gather(vertex_type, netmean_corZ, netmean_ivertex, netmean_tvertex) %>%
  group_by(vertex_type, hemisphere, subcort_ROI, YeoNet) %>%
  do(tidy(lm(netmean_corZ ~ DX*Sex + mean_fd_pt + poly(Age_std,2) + Edu_std + Site,.))) %>%
  select(vertex_type, subcort_ROI, YeoNet, hemisphere, term, statistic, p.value) %>%
  ungroup() %>%
  group_by(term) %>%
  mutate(p_FDR = p.adjust(p.value, method = "fdr")) %>%
  arrange(p.value)

kable(DX_lm_model %>% filter(term %in% c("DXCtrl", "Sex2", "DXCtrl:Sex2"), p.value < 0.06))
```

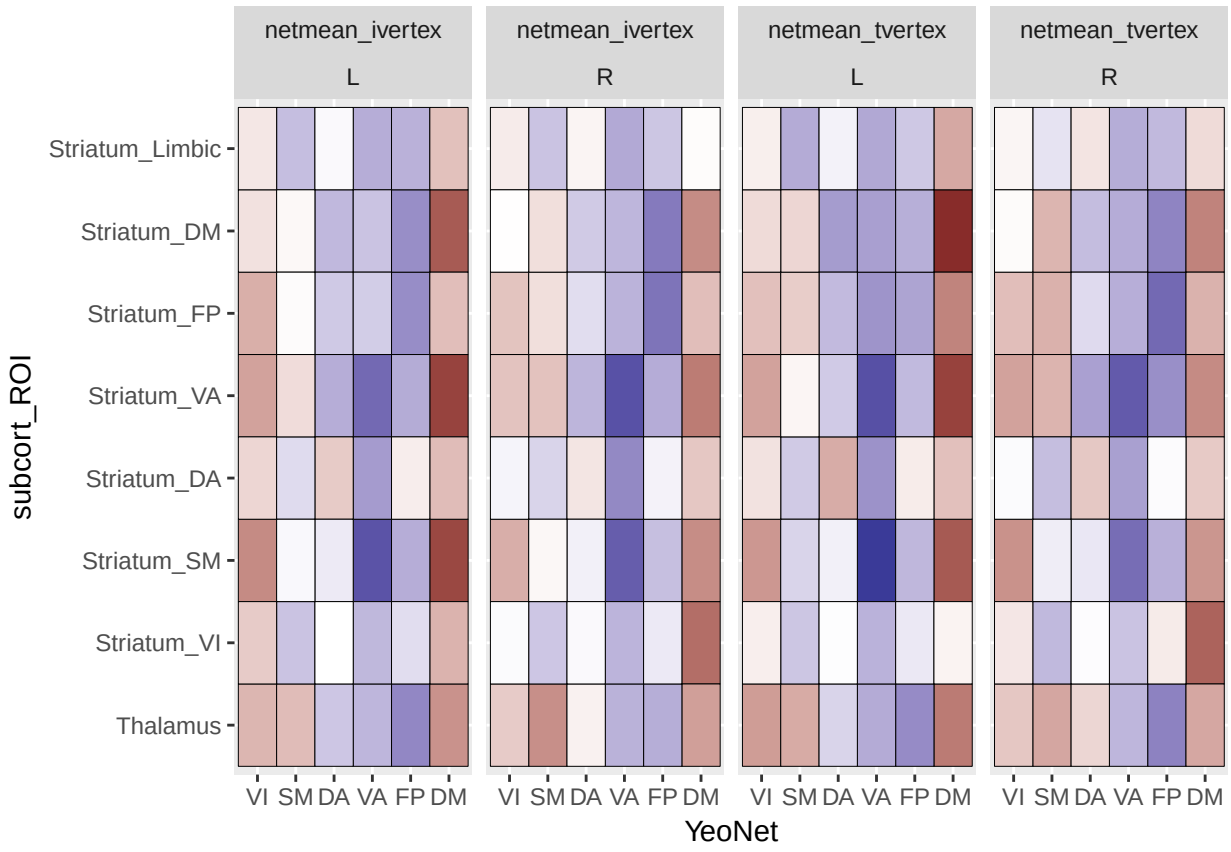
vertex_type	subcort_ROI	YeoNet	hemisphere	term	statistic	p.value	p_FDR
netmean_tvertex	Striatum_SM	VA	L	DXCtrl	3.475700	0.0005565	0.0808184
netmean_tvertex	Striatum_DM	DM	L	DXCtrl	-3.360212	0.0008419	0.0808184
netmean_tvertex	Striatum_VA	VA	L	DXCtrl	3.035565	0.0025333	0.0839802
netmean_tvertex	Striatum_VA	DM	L	DXCtrl	-3.016493	0.0026949	0.0839802
netmean_ivertex	Striatum_VA	VA	R	DXCtrl	3.015313	0.0027052	0.0839802
netmean_ivertex	Striatum_VA	DM	L	DXCtrl	-3.003474	0.0028106	0.0839802
netmean_ivertex	Striatum_SM	VA	L	DXCtrl	2.976833	0.0030618	0.0839802
netmean_ivertex	Striatum_SM	DM	L	DXCtrl	-2.925820	0.0036007	0.0864178
netmean_tvertex	Striatum_VA	VA	R	DXCtrl	2.842873	0.0046643	0.0995053
netmean_tvertex	Striatum_VI	DM	R	Sex2	-2.801009	0.0053030	0.9804099
netmean_ivertex	Striatum_SM	VA	R	DXCtrl	2.791557	0.0054578	0.1047898
netmean_tvertex	Striatum_SM	DM	L	DXCtrl	-2.631616	0.0087756	0.1494178
netmean_ivertex	Striatum_DM	DM	L	DXCtrl	-2.604783	0.0094827	0.1494178
netmean_ivertex	Striatum_VA	VA	L	DXCtrl	2.560346	0.0107663	0.1494178
netmean_tvertex	Striatum_FP	FP	R	DXCtrl	2.556154	0.0108950	0.1494178

vertex_type	subcort_ROI	YeoNet	hemisphere	term	statistic	p.value	p_FDR
netmean_tvertex	Striatum_SM	VA	R	DXCtrl	2.495025	0.0129347	0.1621700
netmean_tvertex	Striatum_VI	DM	R	DXCtrl	-2.479227	0.0135142	0.1621700
netmean_ivertex	Striatum_FP	FP	R	DXCtrl	2.362521	0.0185550	0.2095628
netmean_ivertex	Striatum_VI	DM	R	Sex2	-2.312448	0.0211814	0.9804099
netmean_ivertex	Striatum_VI	DM	R	DXCtrl	-2.297439	0.0220295	0.2349811
netmean_tvertex	Striatum_DA	DM	R	Sex2	-2.274927	0.0233571	0.9804099
netmean_ivertex	Striatum_DM	FP	R	DXCtrl	2.244105	0.0252874	0.2555353
netmean_ivertex	Striatum_DA	FP	R	Sex2	2.242561	0.0253876	0.9804099
netmean_tvertex	Striatum_Limbic	SM	L	Sex2	2.227295	0.0263974	0.9804099
netmean_tvertex	Striatum_DM	DM	L	DXCtrl:Sex2	2.175938	0.0300541	0.9970920
netmean_tvertex	Thalamus	FP	R	DXCtrl	2.100580	0.0362066	0.3290103
netmean_tvertex	Thalamus	DM	L	DXCtrl	-2.076036	0.0384302	0.3290103
netmean_tvertex	Striatum_Limbic	DM	L	DXCtrl:Sex2	2.073065	0.0387071	0.9970920
netmean_ivertex	Striatum_VA	DM	R	DXCtrl	-2.071932	0.0388132	0.3290103
netmean_tvertex	Striatum_DM	FP	R	DXCtrl	2.065576	0.0394127	0.3290103
netmean_tvertex	Striatum_VI	DM	R	DXCtrl:Sex2	2.046738	0.0412360	0.9970920
netmean_tvertex	Striatum_Limbic	VA	R	DXCtrl:Sex2	-2.030759	0.0428383	0.9970920
netmean_tvertex	Striatum_Limbic	SM	L	DXCtrl:Sex2	-2.021557	0.0437848	0.9970920
netmean_ivertex	Thalamus	FP	L	DXCtrl	2.013251	0.0446542	0.3572336
netmean_ivertex	Striatum_Limbic	VA	L	Sex2	2.001369	0.0459234	0.9804099
netmean_ivertex	Striatum_DA	VA	R	DXCtrl	1.984159	0.0478157	0.3647965
netmean_tvertex	Striatum_Limbic	VA	R	Sex2	1.962456	0.0502952	0.9804099
netmean_tvertex	Striatum_DM	DM	R	DXCtrl	-1.953592	0.0513386	0.3647965
netmean_tvertex	Thalamus	FP	L	DXCtrl	1.938629	0.0531410	0.3647965
netmean_tvertex	Striatum_FP	DM	L	DXCtrl	-1.938151	0.0531995	0.3647965
netmean_ivertex	Striatum_VI	DM	R	DXCtrl:Sex2	1.919454	0.0555282	0.9970920
netmean_ivertex	Striatum_FP	FP	L	DXCtrl	1.911207	0.0565821	0.3742948
netmean_ivertex	Striatum_DM	FP	L	DXCtrl	1.896647	0.0584836	0.3742948
netmean_ivertex	Striatum_Limbic	SM	L	Sex2	1.895706	0.0586083	0.9804099

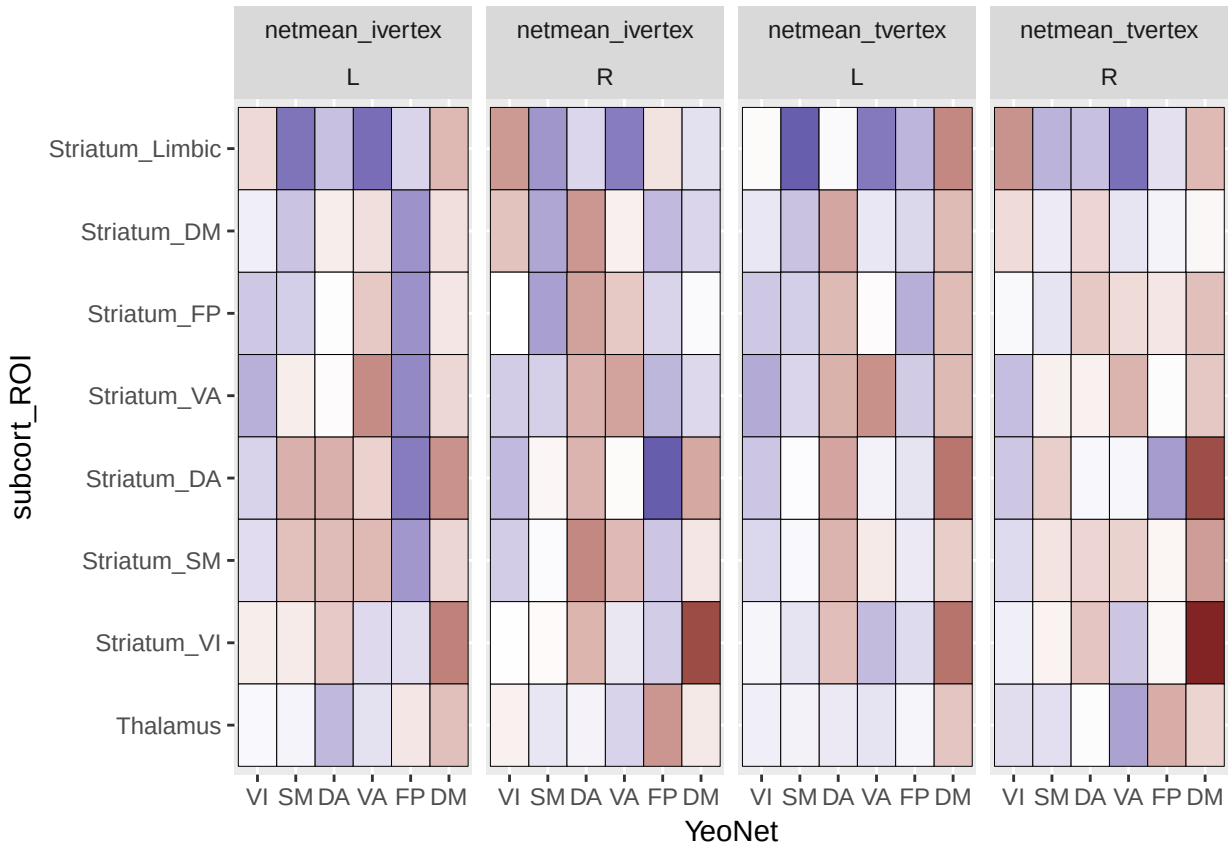
```
0.05/24
```

```
## [1] 0.002083333
```

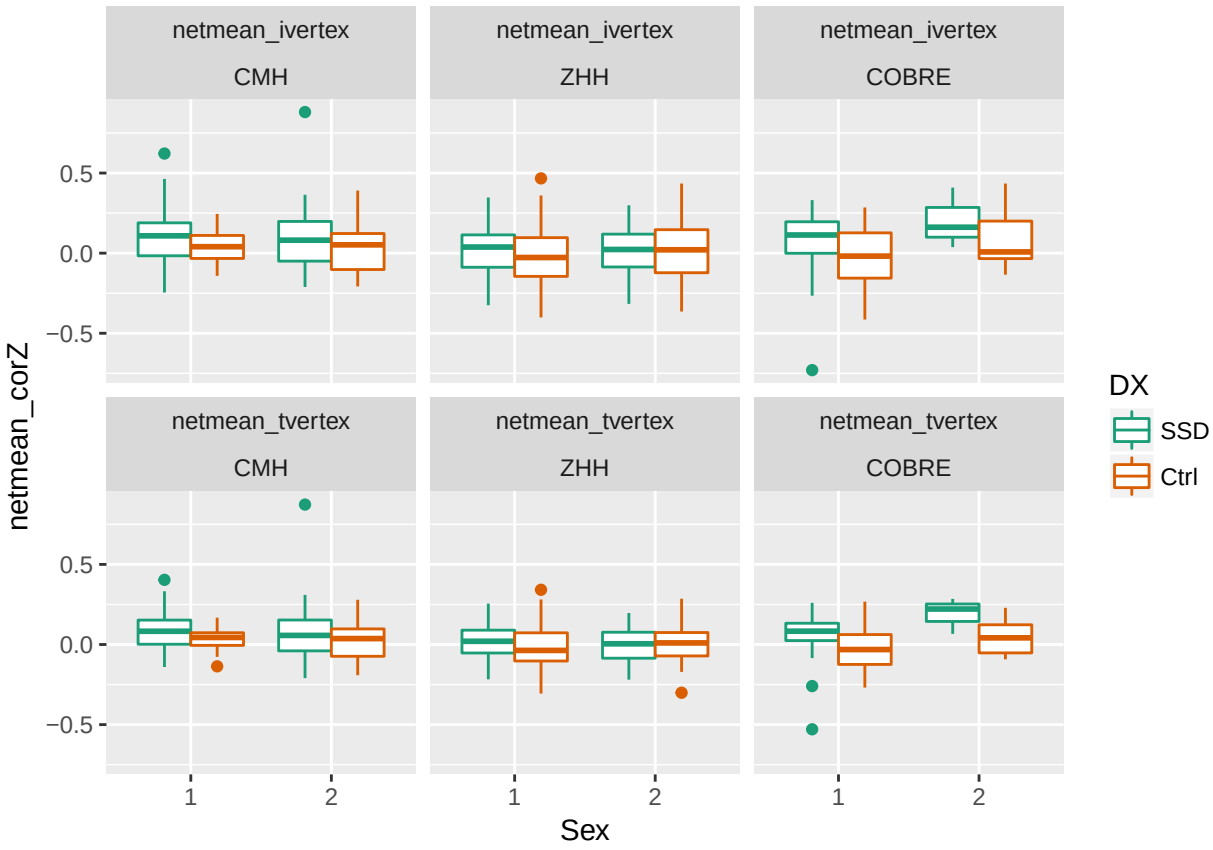
```
DX_lm_model %>%
  filter(term == "DXCtrl") %>%
ggplot(aes(x = YeoNet, y=subcort_ROI, fill = statistic)) +
  geom_tile(color = "black") +
  scale_fill_gradient2(breaks = c(-4.5,-4.5)) +
  facet_wrap(~ vertex_type + hemisphere, ncol = 4)
```



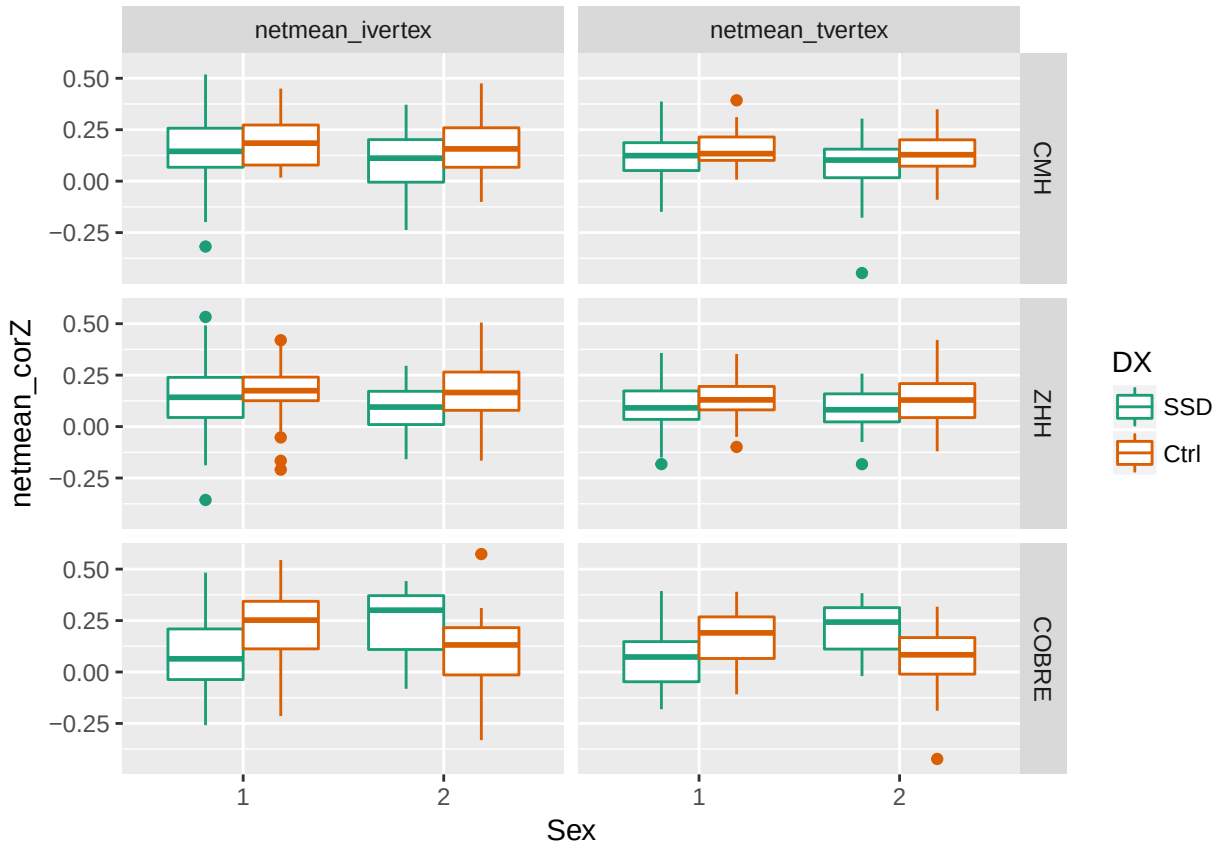

```
DX_lm_model %>%
  filter(term == "Sex2") %>%
ggplot(aes(x = YeoNet, y=subcort_ROI, fill = statistic)) +
  geom_tile(color = "black") +
  scale_fill_gradient2(breaks = c(-4.5,-4.5)) +
  facet_wrap(~ vertex_type + hemisphere, ncol = 4)
```



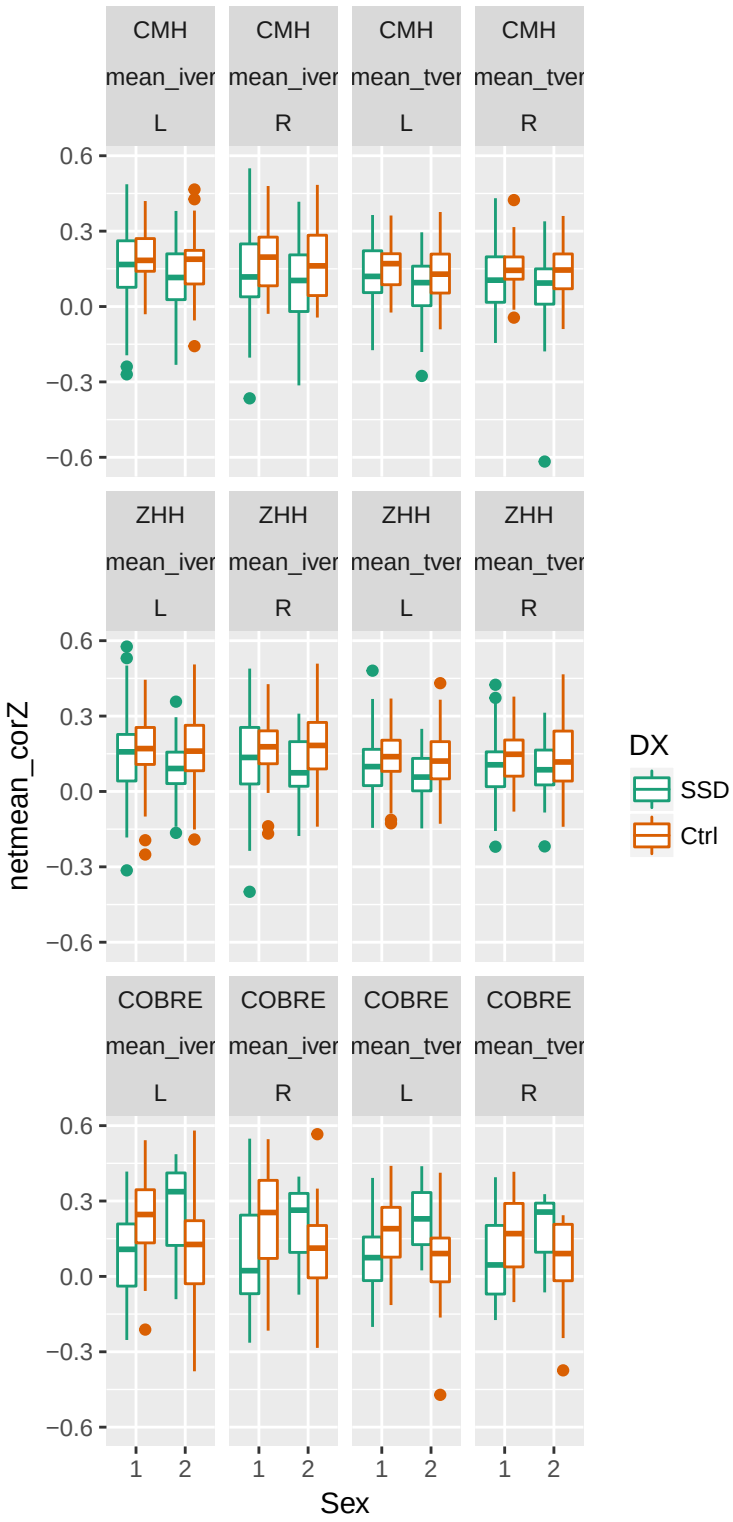

```
results_pheno %>%
  group_by(YeoNet, subcort_ROI,
           subid, DX, Age_std, Sex, Site, Edu_std, mean_fd_pt) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  gather(vertex_type, netmean_corZ, netmean_ivertex, netmean_tvertex) %>%
  filter(YeoNet == "DM", subcort_ROI == "Striatum_DM") %>%
  ggplot(aes(y = netmean_corZ, x = Sex, by = DX, color = DX)) +
  geom_boxplot() +
  scale_color_brewer(palette = "Dark2") +
  facet_wrap(~ vertex_type + Site)
```




```
results_pheno %>%
  group_by(YeoNet, subcort_ROI,
           subid, DX, Age_std, Sex, Site, Edu_std, mean_fd_pt) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  gather(vertex_type, netmean_corZ, netmean_ivertex, netmean_tvertex) %>%
  filter(YeoNet == "VA", subcort_ROI == "Striatum_VA") %>%
  ggplot(aes(y = netmean_corZ, x = Sex, by = DX, color = DX)) +
  geom_boxplot() +
  scale_color_brewer(palette = "Dark2") +
  facet_grid(Site ~ vertex_type)
```




```
results_pheno %>%
  group_by(YeoNet, subcort_ROI, hemisphere,
           subid, DX, Age_std, Sex, Site, Edu_std, mean_fd_pt) %>%
  summarise(netmean_ivertex = mean(ivertex_corr),
            netmean_tvertex = mean(tvertex_corr)) %>%
  gather(vertex_type, netmean_corZ, netmean_ivertex, netmean_tvertex) %>%
  filter(YeoNet == "VA", subcort_ROI == "Striatum_VA") %>%
  ggplot(aes(y = netmean_corZ, x = Sex, by = DX, color = DX)) +
  geom_boxplot() +
  scale_color_brewer(palette = "Dark2") +
  facet_wrap(~ Site + vertex_type + hemisphere)
```


CMH
mean_iver
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R
COBRE
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L
COBRE
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R
0.6
0.3
0.0
−0.3
−0.6
netmean_corZ
1
2
Sex
DX
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