Relation of Childhood Home Environment to Cortical Thickness in Late Adolescence: Statistical Analysis

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Eigenanatomy was run on the full cohort to produce the summary regions contained in the csv file herein named `home_53_figshare.csv`.
The eigenanatomy vectors contain values greater than or equal to zero. We employed the first 30 projections as described in the paper.
The eigenanatomy vectors are applied to scaled matrix data s.t. the columns 1 to 30 in `home_53_figshare.csv` were computed via

$$E_p = X_{\text{thickness}} E_v$$

where $X_{\text{thickness}}$ is the $n \times q$ scaled thickness matrix for all n subjects, q denotes the number of voxels in the template cortical mask and E_v denotes the matrix of sparse eigenanatomy vectors.

The variables within the csv are described in Table 1 below.

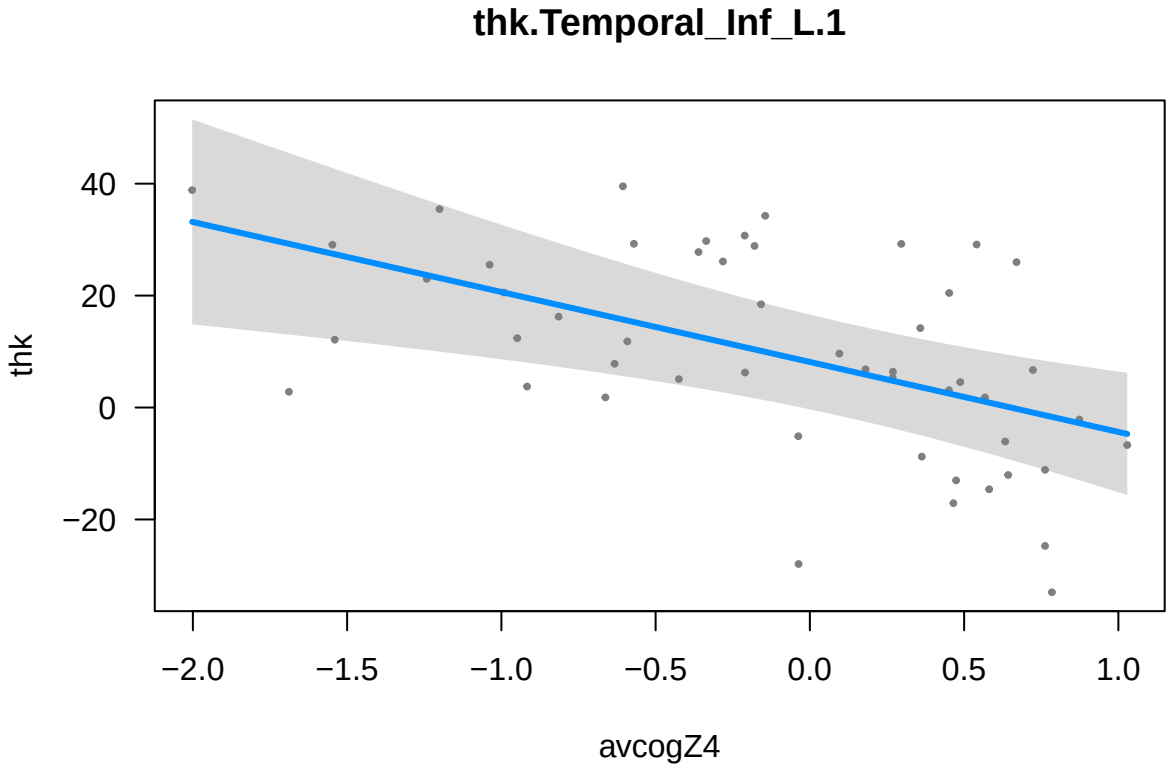
variableName	description
csn	Maternal use of cocaine during pregnancy
sexn	Gender
myage	Age at scan
FSIQ18	Full Scale IQ age 18
pfullsiq	Parental IQ
avcogZ4	Cognitive stimulation of home environment age 4
avemotZ4	Nurturance of home environment age 4
Fost	Ever in foster care?

Eigenanatomy: Kandel, B. M.; Wang, D. J. J.; Gee, J. C. & Avants, B. B. *Eigenanatomy: Sparse dimensionality reduction for multi-modal medical image analysis.* Methods, Penn Image Computing and Science Laboratory, University of Pennsylvania, Philadelphia, PA, United States; Department of Radiology, Hospital of the University of Pennsylvania, Philadelphia, PA, United States., 2014

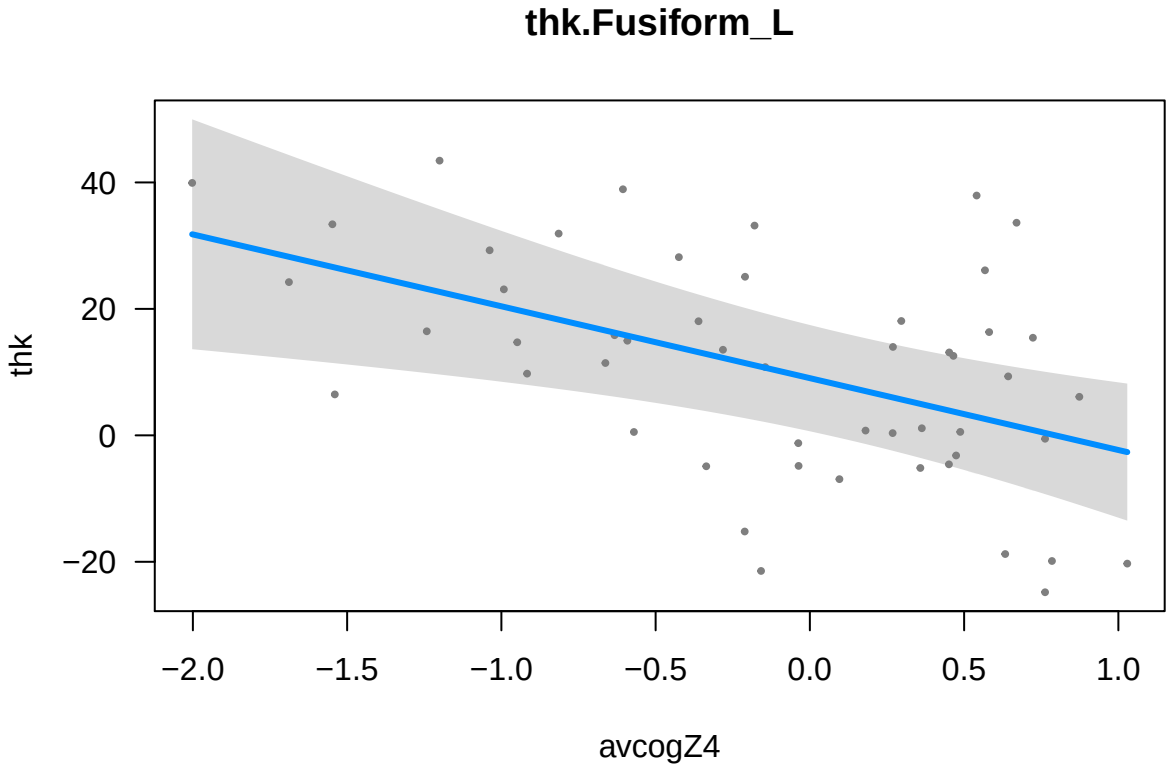
```
library(visreg)
for ( runner in 1:2 ) {
inds<-1:30
pv<-rep(NA,length(inds))
if ( ! exists("qv") ) qv<-rep(NA,length(inds))
ct<-1
for ( i in inds )
{
ldemog<-data.frame(thk=data.matrix(dd)[,i],
                   csn=dd$csn,
                   sexn=dd$sexn,
                   myage=dd$myage,
                   FSIQ18=dd$FSIQ18,
                   pfullsiq=dd$pfullsiq,
                   avcogZ4=dd$avcogZ4,
```

```
                    avemotZ4=dd$avemotZ4,
                    Fost=factor(dd$Fost)
                    )
mdl<-lm( thk  ~ csn+sexn+myage+FSIQ18+pfullsiq+avcogZ4+avemotZ4+Fost,data=ldemog)
smdl=summary(mdl)
if ( ! is.na(qv[ct]) )
  if ( qv[ct] <=0.05 ) {
    m_table <- broom::tidy(mdl)
    kk=knitr::kable( m_table, digits = 5, align = "r",
      col.names = c("Param", "B", "SE", "t", "p"))
    print(kk)
    }
  cat("\n")
if ( ! is.na(qv[ct]) )
  if ( qv[ct] <=0.05 ) {
    visreg( mdl, "avcogZ4" , main=names(dd)[i] )
    }
  cat("\n")
  cat("\n")
pv[ct]<-coefficients(smdl)[,4][7]
ct<-ct+1
}
qv<-p.adjust(pv,method="BH")
names(dd)[inds[which(qv<=0.05)]]
}
```

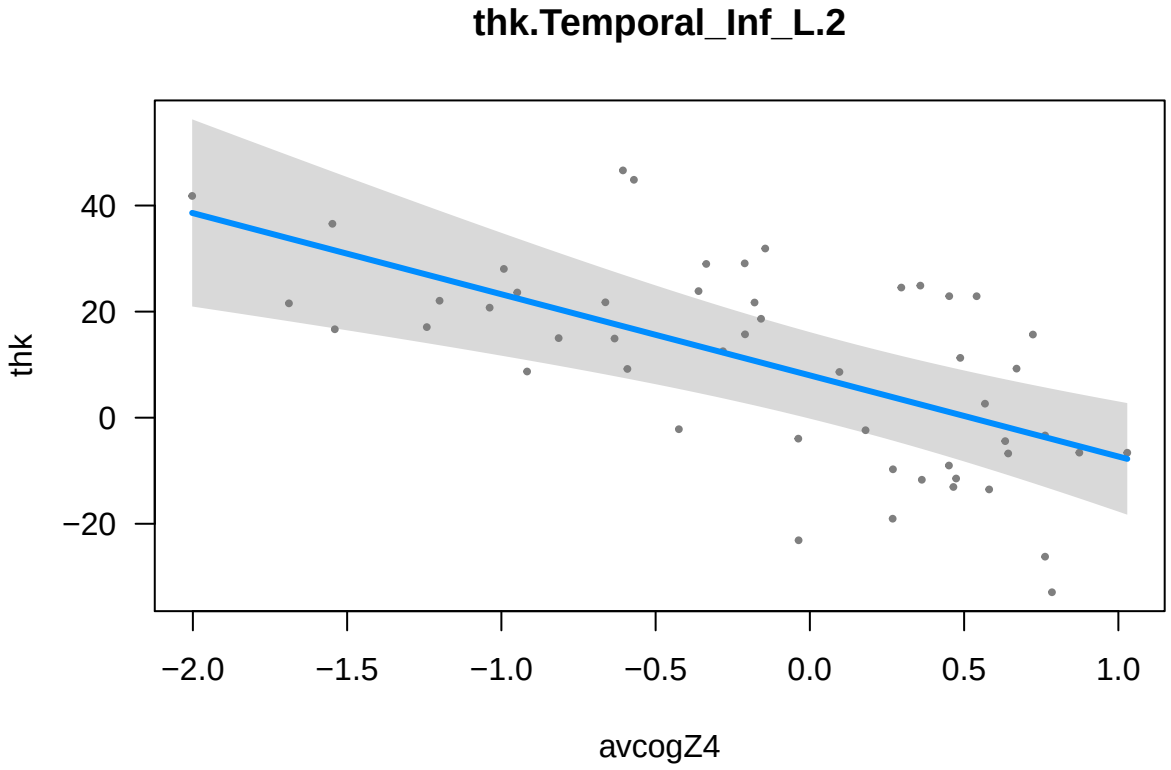
Param	B	SE	t	p
(Intercept)	143.67676	59.89667	2.39874	0.02097
csncontrol	12.56619	5.73415	2.19147	0.03402
sexnMALE	-9.42078	4.93410	-1.90932	0.06307
myage	-5.40175	2.12770	-2.53877	0.01492
FSIQ18	-0.12598	0.29349	-0.42926	0.66993
pfullsiq	-0.34065	0.39649	-0.85917	0.39512
avcogZ4	-12.50221	3.79703	-3.29263	0.00202
avemotZ4	-2.65949	3.73634	-0.71179	0.48053
Fostnever in foster care	-5.55618	7.86317	-0.70661	0.48371



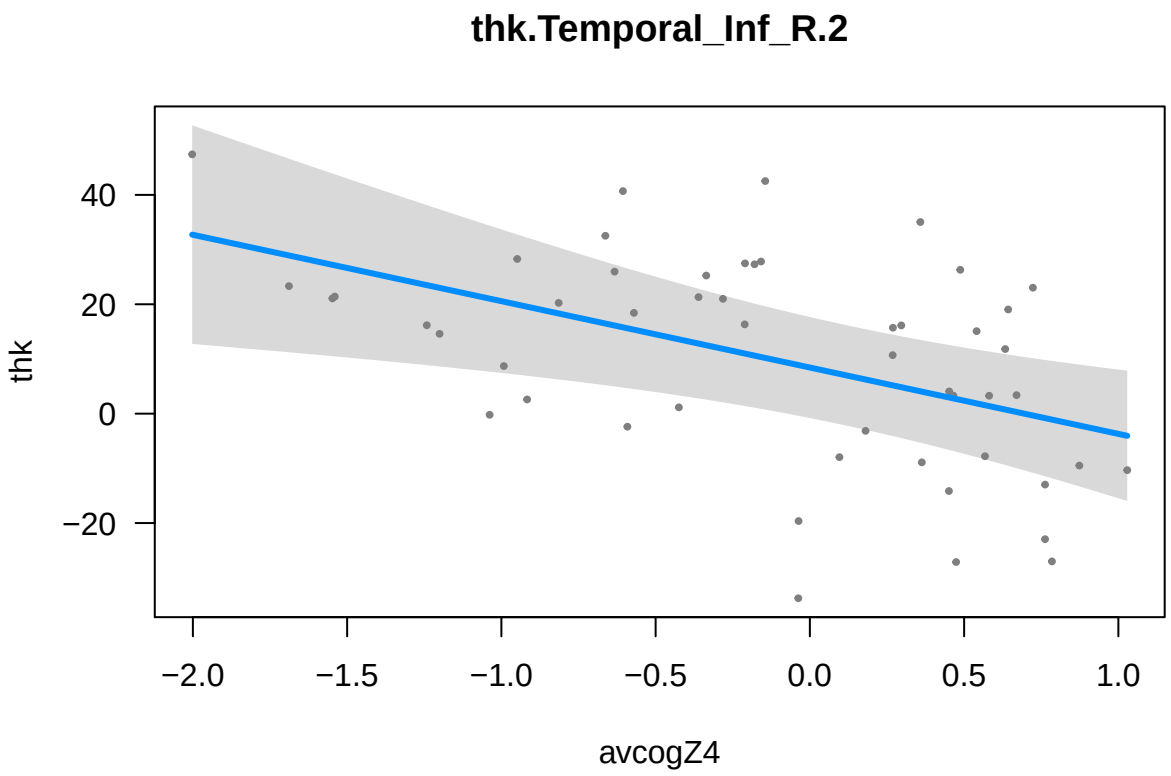
Param	B	SE	t	p
(Intercept)	85.57706	59.43403	1.43987	0.15732
csncontrol	0.59916	5.68986	0.10530	0.91664
sexnMALE	-21.82599	4.89599	-4.45794	0.00006
myage	-3.19612	2.11127	-1.51384	0.13756
FSIQ18	0.11408	0.29123	0.39174	0.69723
pfullsiq	-0.30969	0.39343	-0.78717	0.43560
avcogZ4	-11.36555	3.76770	-3.01658	0.00433
avemotZ4	0.42366	3.70748	0.11427	0.90957
Fostnever in foster care	-0.86428	7.80243	-0.11077	0.91233



Param	B	SE	t	p
(Intercept)	125.28860	57.69049	2.17174	0.03557
csncontrol	12.21518	5.52294	2.21172	0.03248
sexnMALE	-8.57389	4.75236	-1.80413	0.07839
myage	-4.99784	2.04933	-2.43877	0.01905
FSIQ18	0.08201	0.28268	0.29013	0.77315
pfullsiq	-0.45017	0.38189	-1.17882	0.24510
avcogZ4	-15.29701	3.65717	-4.18274	0.00014
avemotZ4	1.42913	3.59872	0.39712	0.69329
Fostnever in foster care	-4.88257	7.57354	-0.64469	0.52264



Param	B	SE	t	p
(Intercept)	92.62261	65.35013	1.41733	0.16376
csncontrol	1.38372	6.25623	0.22118	0.82603
sexnMALE	-17.24479	5.38334	-3.20337	0.00259
myage	-4.66161	2.32142	-2.00808	0.05109
FSIQ18	-0.03587	0.32022	-0.11203	0.91133
pfullsiq	0.01106	0.43259	0.02557	0.97972
avcogZ4	-12.13332	4.14274	-2.92882	0.00548
avemotZ4	-0.81807	4.07653	-0.20068	0.84192
Fostnever in foster care	5.69855	8.57909	0.66424	0.51017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20
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−20
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−1.5
−1.0
−0.5
0.0
0.5
1.0
avcogZ4