# Applying Sparse Partial Least Squares Regression (SPLSR) To Explore Associations Between Cortical Thickness and Subvolume Using ADNI Data

*Melissa Nunez*

*10/17/2018*

**Descriptive Statistics: Gender and Education**

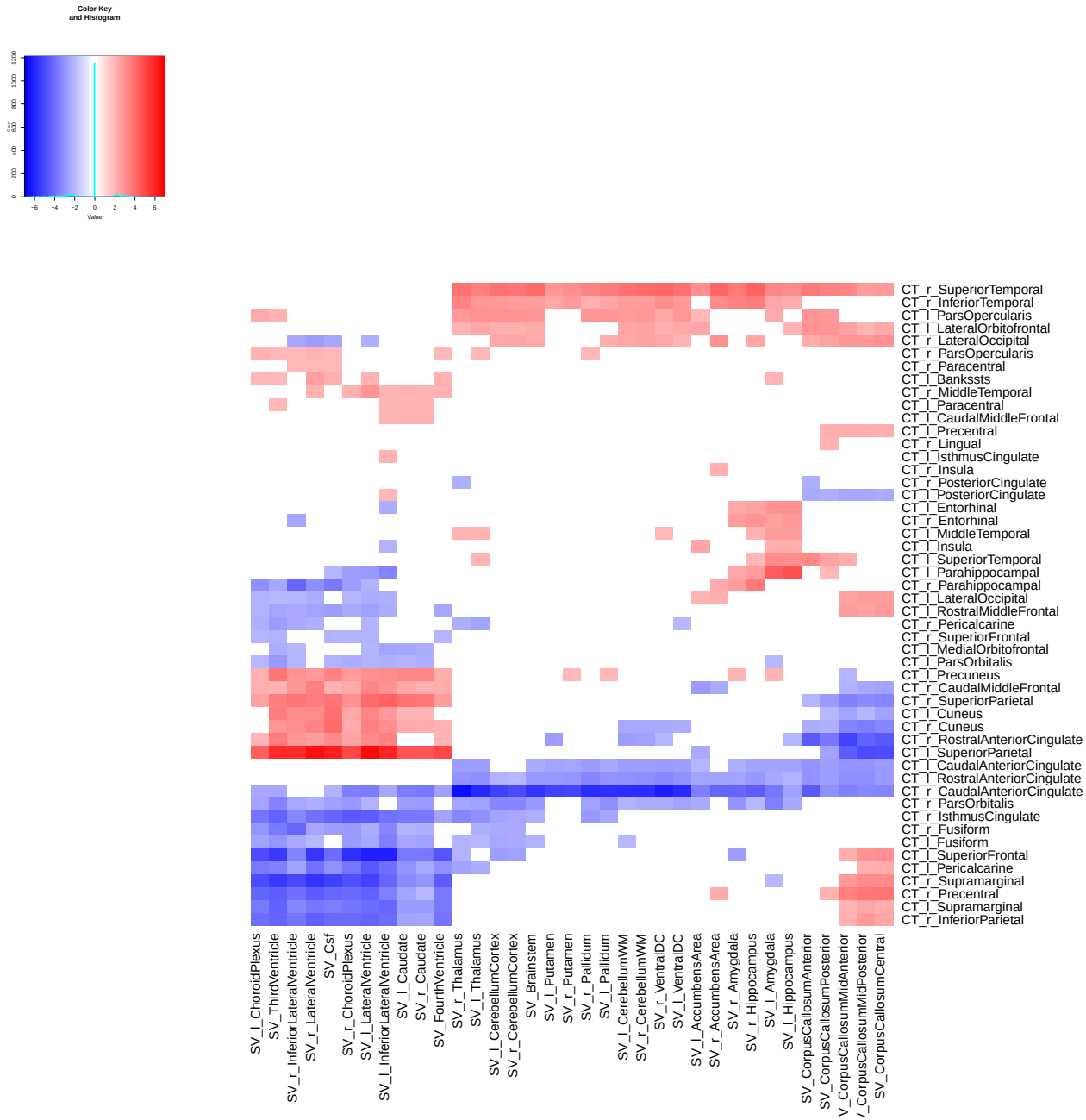
| Gender | Count |
|---|---|
| 1 | 754 |
| 2 | 616 |
| Total | 1370 |

| Education Level | Count |
|---|---|
| high | 1168 |
| low | 202 |
| Sum | 1370 |

**Age Summary**

| | Baseline Age |
|---|---|
| Min. | 54.76 |
| 1st Qu. | 69.15 |
| Median | 73.75 |
| Mean | 73.65 |
| 3rd Qu. | 78.52 |
| Max. | 91.56 |

ADNI data was used to explore associations between cortical thickness and subvolume measures. One hundred boostraped sets were generated, on which partial least squares regression was applied with subvolume as the outcome and cortical thickness as the predictor, using 5-fold cross validation. The optimal number of components was calculated and the beta coefficients were averaged across all 100 datasets. The following heat map summarizes the significant associations.


Color Key
and Histogram
Count
Value
CT_r_SuperiorTemporal
CT_r_InferiorTemporal
CT_r_ParsOpercularis
CT_l_LateralOrbitofrontal
CT_r_LateralOccipital
CT_r_ParsOpercularis
CT_r_Paracentral
CT_l_Bankssts
CT_r_MiddleTemporal
CT_l_Paracentral
CT_l_CaudalMiddleFrontal
CT_l_Precentral
CT_r_Lingual
CT_l_IsthmusCingulate
CT_r_Insula
CT_r_PosteriorCingulate
CT_l_PosteriorCingulate
CT_l_Entorhinal
CT_r_Entorhinal
CT_l_MiddleTemporal
CT_l_Insula
CT_l_SuperiorTemporal
CT_l_Parahippocampal
CT_r_Parahippocampal
CT_l_LateralOccipital
CT_l_RostralMiddleFrontal
CT_r_Pericalcarine
CT_r_SuperiorFrontal
CT_l_MedialOrbitofrontal
CT_l_ParsOrbitalis
CT_l_Precuneus
CT_r_CaudalMiddleFrontal
CT_r_SuperiorParietal
CT_l_Cuneus
CT_r_Cuneus
CT_r_RostralAnteriorCingulate
CT_l_SuperiorParietal
CT_l_CaudalAnteriorCingulate
CT_l_RostralAnteriorCingulate
CT_r_CaudalAnteriorCingulate
CT_r_ParsOrbitalis
CT_r_IsthmusCingulate
CT_r_Fusiform
CT_l_Fusiform
CT_l_SuperiorFrontal
CT_l_Pericalcarine
CT_r_Supramarginal
CT_r_Precentral
CT_l_Supramarginal
CT_r_InferiorParietal
SV_l_ChoroidPlexus
SV_ThirdVentricle
SV_r_InferiorLateralVentricle
SV_r_LateralVentricle
SV_Csf
SV_r_ChoroidPlexus
SV_l_LateralVentricle
SV_l_InferiorLateralVentricle
SV_l_Caudate
SV_r_Caudate
SV_FourthVentricle
SV_r_Thalamus
SV_l_Thalamus
SV_l_CerebellumCortex
SV_r_CerebellumCortex
SV_Brainstem
SV_l_Putamen
SV_r_Putamen
SV_r_Pallidum
SV_l_Pallidum
SV_l_CerebellumWM
SV_r_CerebellumWM
SV_r_VentralDC
SV_l_VentralDC
SV_l_AccumbensArea
SV_r_AccumbensArea
SV_r_Amygdala
SV_r_Hippocampus
SV_l_Amygdala
SV_l_Hippocampus
SV_CorpusCallosumAnterior
SV_CorpusCallosumPosterior
V_CorpusCallosumMidAnterior
/_CorpusCallosumMidPosterior
SV_CorpusCallosumCentral