Predicting Personality Using fMRI

Introduction

Personality is a collection of individual features that are formed during the development of an individual. It reflects people's values, attitudes, habits etc., which are of vital importance for individual behaviours and social relationships. Personality can be measured by various of tests and is usually broken into components called the Big Five including Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Goldberg, 1993; Costa & McCrae, 1992). This research looks at connections between the Big Five personality factors and brain imaging data, particularly resting-state functional MRI (rfMRI), and tries to predict each of the five factors by identifying personality-related brain network. rfMRI is especially advantageous for this investigation as no task paradigms are needed, which avoids the possible biases incurred by tasks.

We apply two methods to carry out the prediction, linear regression Support Vector Machine (SVM), to two sets of data in parallel, dataset from Southwest University, Chongqing China and the Human Connectome Project (HCP). In the dataset from Southwest University we significantly predict Extraversion and Conscientiousness by using linear regression. By applying SVM, we predict Extraversion significant as well. However, the accuracy of all predictions are low. For the HCP dataset, we have more information on participants demographics, therefore predicting using linear regression model is applied to rfMRI directly, and to rfMRI with some nuisances removed like age, gender, etc. These parallel analysis give very different results as predicting using rfMRI directly gives significant predictions on most of the factors, however with the nuisances removed rfMRI, all the predictions become non-significant. In the end, we studies the effects of all the nuisances removed from rfMRI on personality predicting.

Being able to predict personality has great value in developing personalised medication. Also, this research would offer insights on factors that affect personality. Especially, these factors may be originally on different scales, bringing them all together in predicting personality could let us investigate their contributions/information on the same scale.

Methods

Finn's papers Literature review on the previous method.

Data

The data is from Southwest University, Chongqing China, consisting of 131 healthy young subjects (age 19.7) with 44 males and 67 females. The personality data is formed by the well-defined Big Five (Goldberg, 1993; Costa & McCrae, 1992) factors in psychology, Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. For each of the subjects, scores for all the five factors are obtained.

All Resting-state fMRI data were collected in the Southwest University Centre for Brain Imaging, Chongqing, China, using a 3.0-T Siemens Trio MRI scanner (Siemens Medical, Erlangen, Germany). Each subject was required not to drink alcohol the day before the experiments, which was then confirmed right before the scanning by questionnaires.

Resting-state fMRI Acquisition

In resting-state fMRI scanning, the subjects were instructed to rest without thinking about a particular topic, and not to fall asleep or close their eyes. The 8-min scan of 242 contiguous whole-brain resting-state functional images was obtained using gradient-echo planar imaging (EPI) sequences with the following parameters: slices = 32, repetition time (TR)/echo time (TE) = 2000/30ms, flip angle = 90, field of view (FOV) = 220 mm × 220 mm, and thickness/slice gap = 3/1 mm, voxel size 3.4 × 3.4 × 3 .

fMRI data pre-processing and functional connectivity matrix

All fMRI data were pre-processed by SPM8 and the Data Processing Assistant for Resting-State fMRI (DPARSF) (Chao-Gan and Yu-Feng, 2010). We applied both Power atlas (Power et al., 2011) and AAL2 atlas (Rolls et al., 2015) to parcellate the brain. The Power atlas consists of 264 brain regions and for AAl2 we used 94 regions excluding the cerebellum. Then each of the regions was represented as a time series and the Pearson's correlation between every pair of them was calculated to form the connectivity matrix. Therefore, for each subject, Power atlas gives the connectivity matrix of dimension 34716 (264*263/2) and the connectivity matrix for AAL2 has dimension 4371 (94*93/2). For the sake of simplification, we will illustrate the analysis using Power atlas only. All the analysis was repeated to the AAL2 atlas as well.

Personality related functional brain network

We applied the analysis separately to each of the Big Five factors. We computed Pearson's correlation between each of the brain connectivities (links) and the personality scores. The personality related functional brain network was then formed by links with correlation p-value smaller than a pre-defined threshold We first tried the threshold with 0.01. To compare the difference, we later tried with 0.05. The brain network is divided into two, positive brain network, whose links are positively correlated with the personality score, and the negative brain network whose links are negatively related. Once we have these networks, we need to test whether we could make positive predictions about personality from these positive and negative networks.

Prediction using personality related brain network

We applied leave-one-out cross-validation to carry out the prediction. For the total of 131 subjects, one was excluded at a time to serve as the test set and the rest of the 130 subjects formed the training set. The positive and negative brain networks were generated using the training set with the method illustrated above. For each of the subjects in the training set, we define the *positive/negative network strength* by summing up the connectivity in the positive and negative networks respectively. We then used this network strength as the independent variable to predict the personality scores. A linear model was fitted between the network strengths and the personality scores in the training set to obtain the linear coefficients for both networks separately. The positive and negative network strengths for the test set were calculated, and the linear coefficients from the training set were applied to the test subject to acquire two predicted personality scores for the test subject, one from the positive network and one from the negative network. Finally we loop over all subjects to get two predicted values for each subject.

The prediction power of a network for a personality factor is measured by correlating the predicted scores with the true score. Both correlation and p-value were considered. We only consider results with where the predictions are positively correlated with the true scores.

Common network for all subjects

In order to see what links play important roles in predicting each personality factor for both networks, we selected links that pass the threshold for every subject and form them into the common positive/negative network. For easier interpretation, the links in Power atlas were matched into the Brodmann areas (BA).

Results

Power atlas

Of the Big Five factors, three out of five turned out having significant predictions for one of the networks, negative network of Conscientiousness, negative network of Extraversion and positive network of Openness to Experience (table 1).

Among all the significant networks, the predicted values of negative network of Conscientiousness are positively correlated with the true Conscientiousness scores. So it is with the negative network of Extraversion. The most significant network in predicting personality is the positive network of Openness to Experience. However, the predictions are negatively correlated with the true scores (figure 1), therefore not sensible predictions. In the rest of the results, we will only focus on networks making predictions that are positively correlated with true scores.

Table1. Prediction power on Big Five personality factors using Power atlas. Significance of individual links is 0.01. Values with * are significant.

	Positive Network		Negative Network	
	Correlation (R-value)	Significance (p-value)	Correlation (R-value)	Significance (p-value)
Agreeableness	0.0192	0.8276	0.082	0.3519
Conscientiousness	0.1666	0.0572	0.2981	5.4440e-04*
Extraversion	0.1979	0.0234	0.3187	2.0684e-04*
Neuroticism	0.2010	0.0214	-0.0233	0.7914
Openness to Experience	-0.3909	3.9154e-06*	-0.0576	0.5132

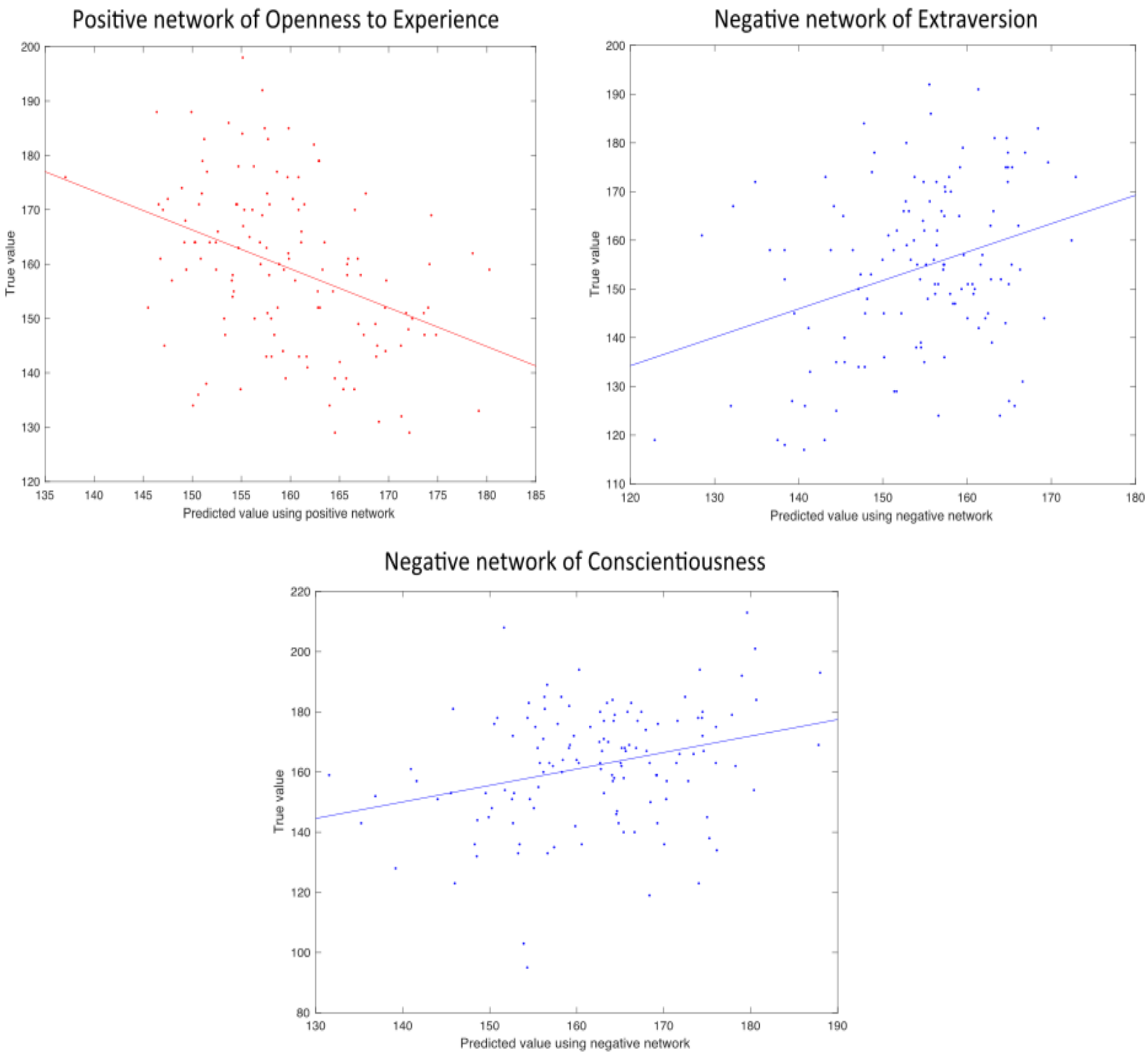

Figure1. Predicted values versus true values for the positive network of Openness to Experience, negative network of Extraversion and negative network of Conscientiousness (from left to right, top to bottom).

We then examined the links in the common negative networks for Openness to Experience and Extraversion which have significant positive predictions.

For the common negative network of Openness of Experience, there are 74 links across all subjects (see Table S1). Brodmann area (BA) 40 comes up most frequently which is part of the parietal cortex and involved with language perception and processing. The areas it is mostly connecting to are 7 (parietal cortex involved in spatial vision), 20 (inferior temporal visual cortex involved in object and face perception) and 13 (posterior orbitofrontal cortex involved in emotion) (Rolls, 2016a).
Area 19 is involved as frequently as area 40 and area 19 is an area in the ventral visual stream (Rolls, 2016a). It is mostly connected with area 20 and 21, which are inferior and middle, temporal gyrus and related to perception.

There are 231 links in the common negative network of Extraversion (Table S2). Except for the visual areas, BA 32 comes up very frequently which is part of the anterior cingulate cortex involved in emotion (Rolls, 2014, 2016a). But area 32 is mostly linked to visual areas. BA 47/12 in the lateral orbitofrontal cortex is also an interesting emotion area, particularly punishment and non-reward related (Rolls, 2014; Cheng et al., 2016; Rolls, 2016b), which comes up a few times in this network. It connects to areas that are involved in vision, auditory and speech related (e.g. BA 7, BA 22 and BA 19). Interestingly, it is also connected to BA 39, the angular gyrus, which is involved in language (Rolls, 2016a).

AAL2 atlas

Although the Power atlas parcellates the brain more finely (264 regions), it is difficult to make interpretations of those regions since there are not grouped based on functions. Therefore, we repeated our analysis using the AAL2 atlas for 94 regions excluding the cerebellum which the interpretations of the AAL2 areas are more widely understood (Rolls, 2015). We first tried with the threshold of 0.01. Among all five-personality factors, two had networks that could make significant predictions. One was the negative network of Extraversion (R=0.2543, p=0.0034). (alternatively this network is positively correlated with introversion) and negative network of Openness to Experience (R=-0.2660, p= 0.0021). Since the negative network of Openness to Experience negatively predicts the personality which implies the model is not fitting, we will not consider its results.

In the common negative network of Extraversion, 76 links passed the threshold across all subjects. A considerable proportion of them link the occipital lobe (visual cortical areas) to the parietal, temporal, and central (somatosensory and motor) (Figure 2, right; Figure 3 Bottom).

Since only one set of predictions turned out being successful for the single edge threshold of p< 0.01, we relaxed the threshold to 0.05. However, only one network survived, negative network of Extraversion (R=0.3183, p=2.1379e-04) consisting of 133 links, shown in the circular graph (Figure 4). This set of predictions is more positively related to the true personality scores than using the threshold 0.01. When the threshold of the correlation between the connectivity and personality is 0.01, the correlation of predicted score and true score is 0.2543. When the threshold of the correlation between the connectivity and personality is 0.05, the correlation of predicted score and true score is 0.3183.

This could imply edges that can efficiently predict Extraversion are added to the negative network. They include edges in the orbital frontal areas and singular areas which are of interests because these brain areas maybe related to personality (Rolls 2014 book). From Figure 4 we can see that most links connect occipital lobes between two hemispheres, occipital to central and occipital to sub-cortical. However, due to the links in the negative network are selected being negatively correlated with Extraversion, therefore, the stronger of these links are, the less extravert a person can be.

To see the differences of using different thresholds, we then varied the threshold of just this network to 0.02 and found that it is still significant with R=0.2986 and p=5.3232e-04. However, using threshold 0.02 gives more interpretable links than the threshold of 0.01, e.g. ACC and PCC, HIP which are all related to Extraversion. In total, 78 links passed this threshold that shared by all subjects. The right graph in Figure 5 shows that the right middle occipital and the left inferior occipital have the most links connected to. Most interestingly, we found links in anterior and medial orbital frontal gyrus, inferior and superior frontal gyrus which connected to Putaman Caudate, temporal and anterior cingulate respectively (Figure 5). OFGpos with PHG link is negatively correlated with Extraversion, i.e positively correlated introversion.

Comparison between the results with the Power and AAL2 parcellations

Using the Power atlas, we found three networks that significantly predicted three personality factors Extraversion, Openness to Experience and Conscientiousness. With AAL2, two networks stood out, in which functional connectivities negatively predicted Extraversion and Openness to Experience. However, in the Power atlas, it was the positive network of Openness to Experience that was significant. In general, the Power atlas with its greater number of areas (264 vs 94) seems having stronger prediction power, however, it is quite difficult to interpret the links in each of the networks with the Power atlas.

Analysis using Support Vector Machine (SVM)

We have also carried out a prediction analysis using Support Vector Machine (SVM). We used Matlab toolbox *Libsvm* (Chang and Lin, 2011) with different kinds of kernel functions. This library supports options of multi-class classification and regression. Since our personality score is continuous, the regression option was selected. We tried both *epsilon-SVR* and *nu-SVR* methods which the latter one gives control on the proportion of support vectors in the solution. However, *epsilon-SVR* would control how much error there will be in the model. Therefore, we tried both.

We used functional connectivity as the explanatory variables to predict Extraversion since this personality factor turned out being significant in the previous analysis. The AAL2 atlas was first applied because it is easier to interpret. To predict individual personality scores, we applied leave-one-out cross-validation (LOOCV). We train the SVM regression model on N-1 subjects and predict on the left out one and then loop over all of the subjects.

For *epsilon-SVR*, we first tried radial basis function (RBF) kernel which is the default setting, it has expression exp(-gamma*Iu-vI^2). However, we got negative prediction correlation from this method (r= -0.6216, p=10^-15) (see Fig.6). From Fig.6 we can see that not only there is a strong negative predicting power which makes the prediction on opposite, also the range of the predicted value is really small, therefore we cannot accept this model. Since we have much more features than subjects, we then tried with the linear kernel which gave insignificant results (r=0.1265 p=0.1499). We have also tried tuning the parameters in the cost function and optimisation conditions but they don't outperform the default setting. (Summary see table 2).

Because of the poor behaviour of AAL2 atlas, we switched to the Power atlas to see the performance. Again we first tried RBF kernel and got the similar results with the AAL2 atlas (r=-0.645, p=10^-16). The linear kernel made a improvement in predicting and gave r=0.2131 and p=0.0145 (see Fig.7). The range of the predicted score is more alike to the true range as we can see from figure 7. (Summary see table 3).

Moreover, we have also tried with non-linear kernel and *nu-SVR.* The results are neither insignificant nor negatively predicting and have too few predicted values. Therefore, we have drawn conclusions that SVM overall does not work properly on this set of data, and the best performance model is to use the Power atlas with linear kernel in epsilon-*SVR* model.

Table2. Summary statistics using AAL2 atlas for SVM modelling.

Kernel	r value	p value	Best parameter setting
Linear	0.1265	0.1499	Default (C=1, p=0.1)
RBF	-0.6216	e-15	Default (gamma=1/no. features, C=1)
Non-linear	bad performance		

Table3. Summary statistics using Power atlas for SVM modelling.

Kernel	r value	p value	Best parameter setting
Linear	0.2131	0.0148	Default (C=1, p=0.1)
RBF	-0.645	e-16	Default (gamma=1/no. features, C=1)
Non-linear	bad performance (too few distinct values)		

Personality Prediction on HCP data

To cross validate the results we have got, we applied the same predicting analysis to the Human Connectome Project (HCP) data, which is a much bigger project and potentially with higher quality of the data. This dataset also has the Big Five personality tests scores. So far, we have access to the S900 release which consists of around 900 of subjects. After removing the subjects with missing data, we have 813 subjects left.

The imaging data is rfMRI with ICA preprocessed into 200 independent brain regions. Then the partial correlation connectivity matrix is calculated. This is to better look at the effect of single edges without the interaction with other links. Therefore, for each of the subject, we have their partial functional connectivity matrix of 200*200. We then selected 11 variables as the confounders. They are Data release, Gender, Age, rfMRI motion, Height, Weight, BP Systolic, BP Diastolic, Haemoglobin, Intercranial volume and Brain volume. We carried out two parallel analysis to the original connectivity matrix and deconfounded connectivity matrix for each of the five personality factors.

The method in these two analysis is almost the same with the one applied to the dataset from University, except instead of using leave-one-out cross-validation, we applied split-half cross-validation for 10 different splits to increase the statistical power. For small datasets like the one we obtained from the Southwest University, China, doing N-fold cross-validation may loss the statistical power in both training set and test set since each fold may consist of only a small number of subjects. However, for large scale datasets like the HCP, doing leave-one-out cross-validation would cause the test set being not representative enough, therefore, a N-fold cross validation is appropriate. Here, we are using split-half cross-validation since we believe having training and test sets of sizes both being around 400 is a reasonable number to produce statistically powerful results (comment on the power w.r.t LOOCV)

First of all, the partial connectivity matrix is normalised (subtract mean and divide by std). Then it goes through deconfounding. Assume the data matrix that is going to be deconfounded as X, the confounders set as C. Then the decoufounding is simply X - C*pinv(C)*X, where pinv is the pseudo-inverse function. The deconfounded connectivity matrix is centralised again. For the non-decounfound analysis, these two steps are skipped. A specific personality is then selected as the response variable. All the subjects are grouped into 2 halves without breaking the family structures. Half of the subjects are used as the training set, the other half as the test set. The significant links are selected based on the correlation significancy of 0.01. Again the links are selected into the positive network and negative network.
We train a linear regression model on the training half with selected significant links as the explanatory variables and the personality score for a specific factor as the response. The coefficients obtained from the training set are then applied to the test set to get a predicted personality score for each of the subjects. The accuracy of the prediction is measure by calculating the correlation between true personality score and the predicted score. Also we have measured the difference between the actual score and the predicted score. The procedure is repeated for 10 different splits. Final results are calculated by taking the average.

Results for the confounders being removed from the functional connectivity
Table 4 reports the summary results of predicting all the five personality factors using non-deconfounded connectivity matrix. It concludes the mean correlation for 10 simulations, the number of significant simulations out the total 10 (using threshold 0.01) and mean error. All of them are calculated for both positive network and negative network. The mean error is defined in the following way: First of all, the difference between predicted personality score and the true score is calculated for each subject in the test set and is denoted as d. Secondly, the proportion of d in the true score is computed (d/true score) and the absolute value is taken. Then we calculate the average of this proportion of all the subjects in the test set and this is the mean error for one simulation. In the end, the mean of all 10 simulations is reported in the table below.

We can see that Agreeableness is the most predictable factor with 8 out of 10 and 9 out of 10 being significant simulations for positive and negative networks respectively. Besides, the mean error is the lowest among all five personalities. Openness and the negative network of Conscientiousness have similar performance. The total number of significant simulations for Openness is higher than Conscientiousness, however, the mean error is higher as well. Both Neuroticism and Extraversion look pretty unpredictable by the non-deconfounded functional connectivity. Although the negative network of Neuroticism has 5 significant simulations, the mean correlation is low and the mean error is extremely high.

Table 4. Summary results for all five personality factors using non-deconfounded connectivity matrix.

	Positive network			Negative Network		
	Mean correlation	# of sig. simulations	Mean error	Mean correlation	# of sig. simulations	Mean error
Agreeablness	0.1519(0.0391)	8/10	14.5%	0.183(0.040)	9/10	14.03%
Openness	0.1229(0.0538)	5/10	21.64%	0.1081(0.0353)	5/10	21.88%
Conscientiousness	0.0904(0.0404)	3/10	17.54%	0.131(0.035)	6/10	16.96%
Neuroticism	0.1062(0.024)	1	72.48%	0.114(0.0389)	5	70.23%
Extraversion	0.072(0.055)	1	20.51%	0.082(0.041)	1	20.63%

Results for deconfounded connectivity matrix

We compare the results above with predictions using deconfounded partial connectivity matrix and the same summary statistics are reported in table 5. None of the predictions looks successful - most number of significant simulations being zero. Agreeableness still has the best perform although only one in each network being significant . The mean errors don't change significantly, but the mean correlations for Agreeableness, Openness, Conscientiousness and Neuroticism become much lower. Extraversion stay unpredictable in both cases.

Table 5. Summary results for all five personality factors using deconfounded connectivity matrix.

	Positive network			Negative Network		
	Mean correlation	# of sig. simulations	Mean error	Mean correlation	# of sig. simulations	Mean error
Agreeablness	0.0544(0.056)	1/10	15.15%	0.090(0.035)	1	15.03%
Openness	0.055(0.052)	1	23.04%	0.046(0.030)	0	22.79%
Conscientiousness	-0.002(0.061)	0	18.66%	0.037(0.047)	0	18.20%
Neuroticism	0.023(0.050)	0	78.14%	0.027(0.043)	0	76.52%

Extraversion	0.077(0.024)	0	20.96%	0.109(0.032)	1	20.78%

Effects of confounders

We also had a look at the effect of all confounders in predicting personalities. We exclude one confounder at a time and use the rest to deconfound the connectivity matrix. Then we keep the rest of the analysis the same and see the effect of missing one particular confounder in predicting Agreeableness since Agreeableness has shown of being the most predictable personality.

We found that none of the confounders plays a critical role in affecting the predictions except the rfMRI motion, which increased the number of significant splits in the negative network significantly (compared with table 5), but still not as high as in table 4. Therefore, we can conclude that rfMRI motion has the highest impact on predicting Agreeableness using partial connectivity matrix. Each of the other confounders that has been selected has some but not significant effects. However the total effects of all the confounders make the prediction of Agreeableness from fairly successful to almost none.

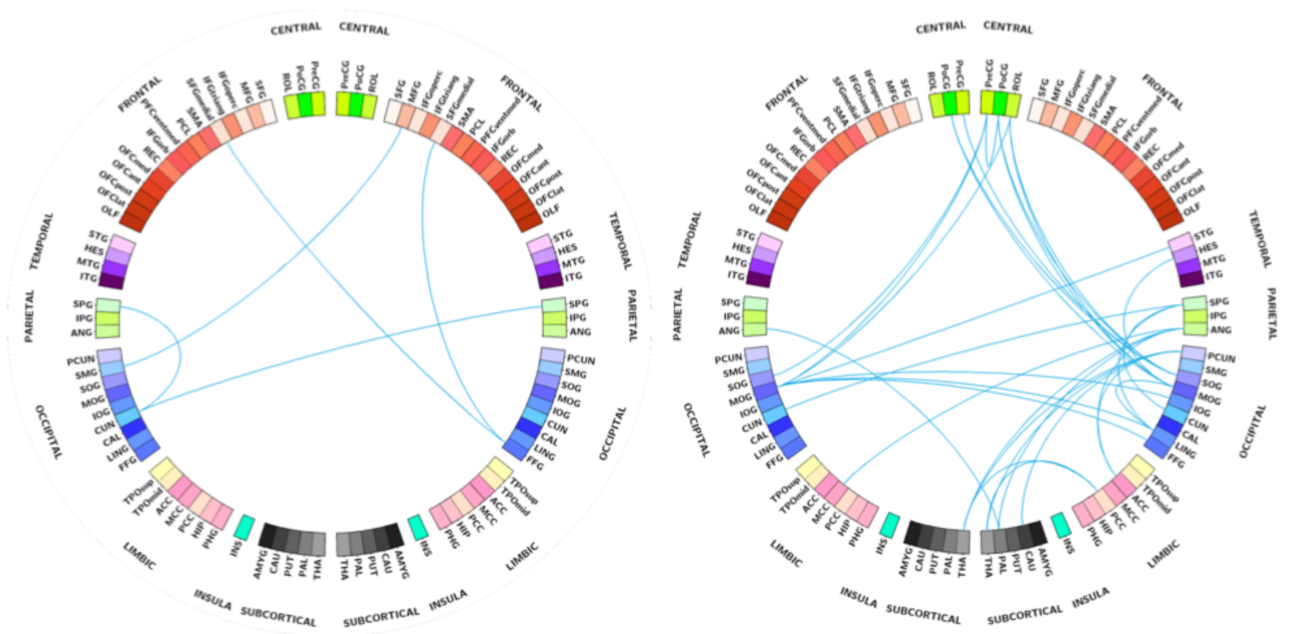

Figure 2. On the left is the circular graph of links in the common negative network of Openness to Experience; on the right is the circular graph of links in the common negative network of Extraversion. Links in both graphs were generated using threshold 0.01.

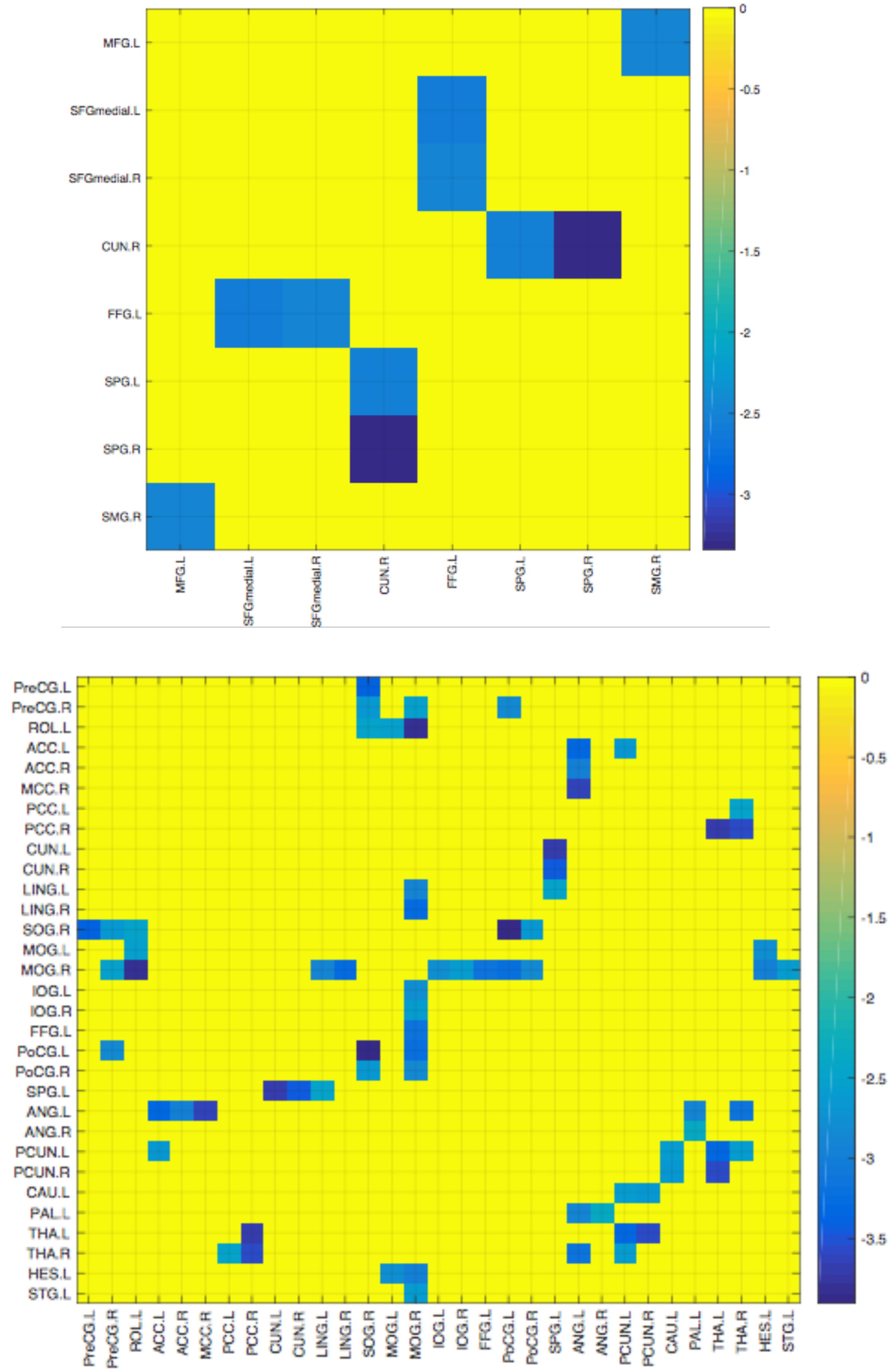

Figure 3. Matrix graph of links in the common negative network of Openness to Experience (top) and Extraversion (bottom). The colour stands for the significance level of the link in predicting respective personality factor. The colour stands for the logarithm of p-values of the correlation between each of the edges and personality score.

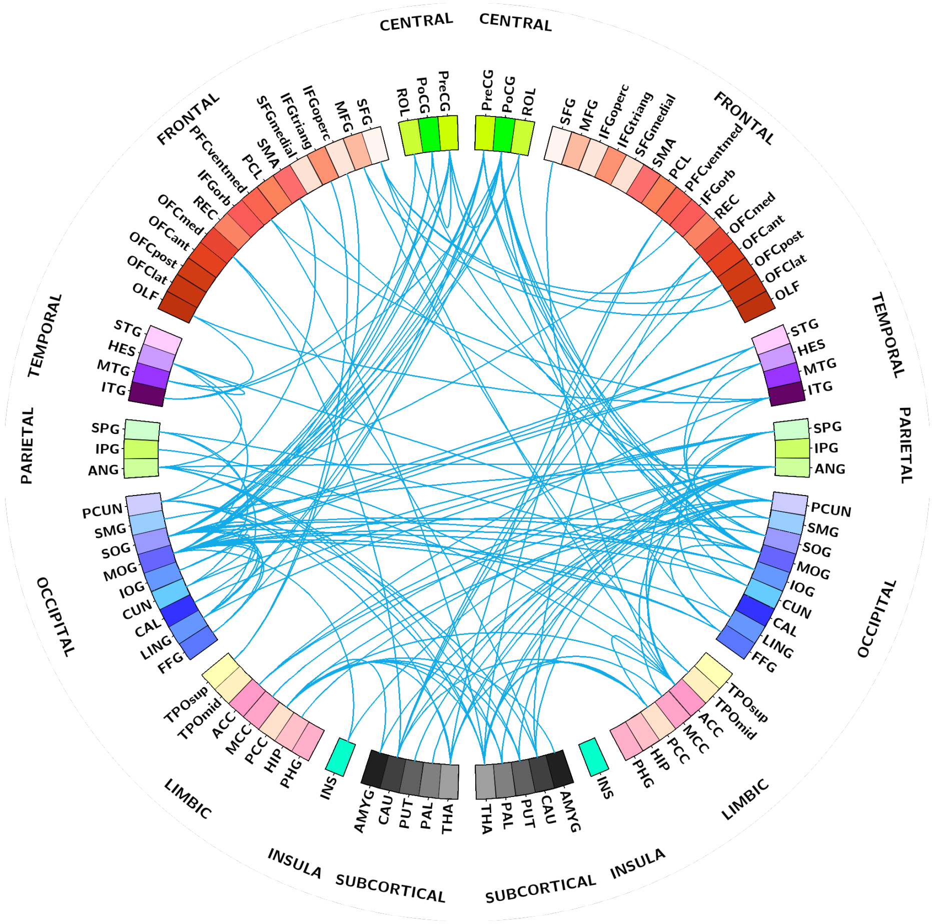

Figure 4. Circular graph of the negative network of Extraversion using threshold 0.05.

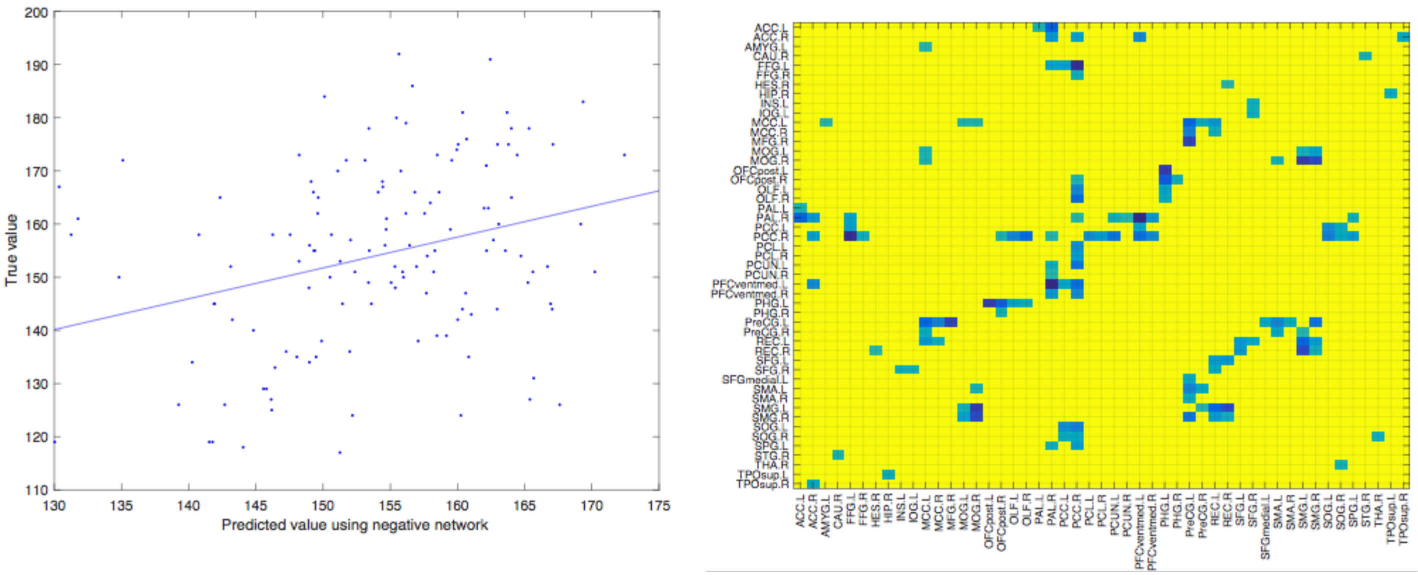

Figure 5. On the left is the predicted values versus true values for the negative network of Extraversion using threshold 0.02 with AAL2 atlas; On the right is the matrix graph showing the common links across all subjects in this network. The colour stands for the logarithm of p-values of the correlation between each of the edges and Extraversion score.

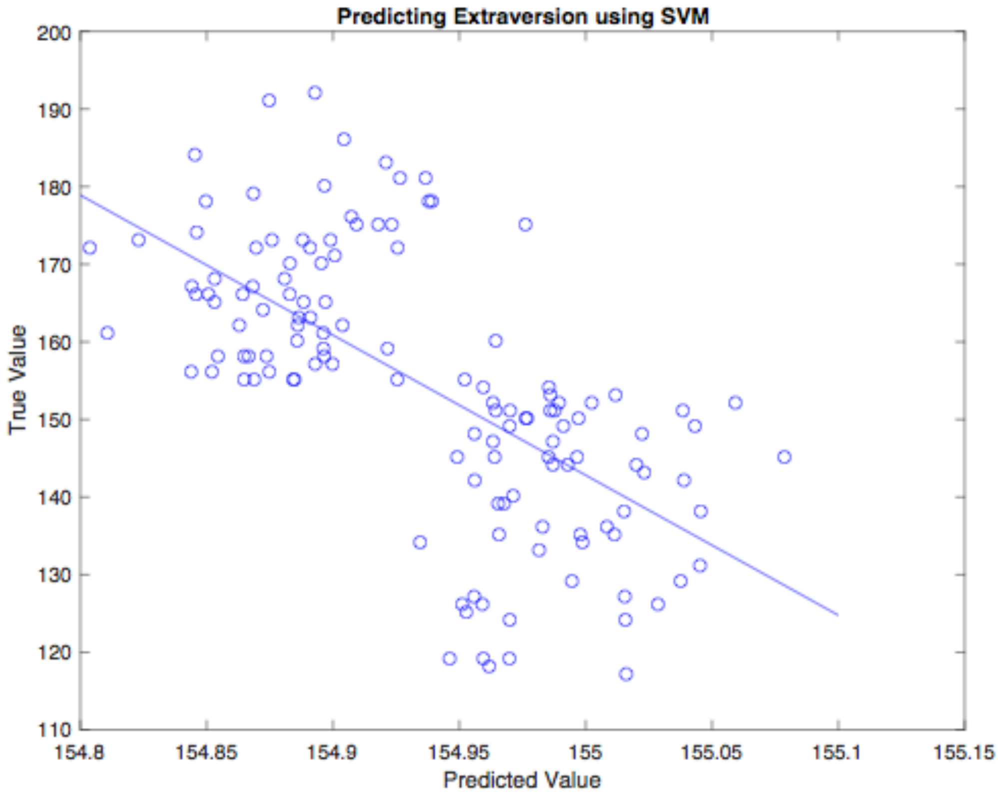

Figure 6. Predicted Extraversion score against true Extraversion score using AAL2 atlas and RBF kernel.

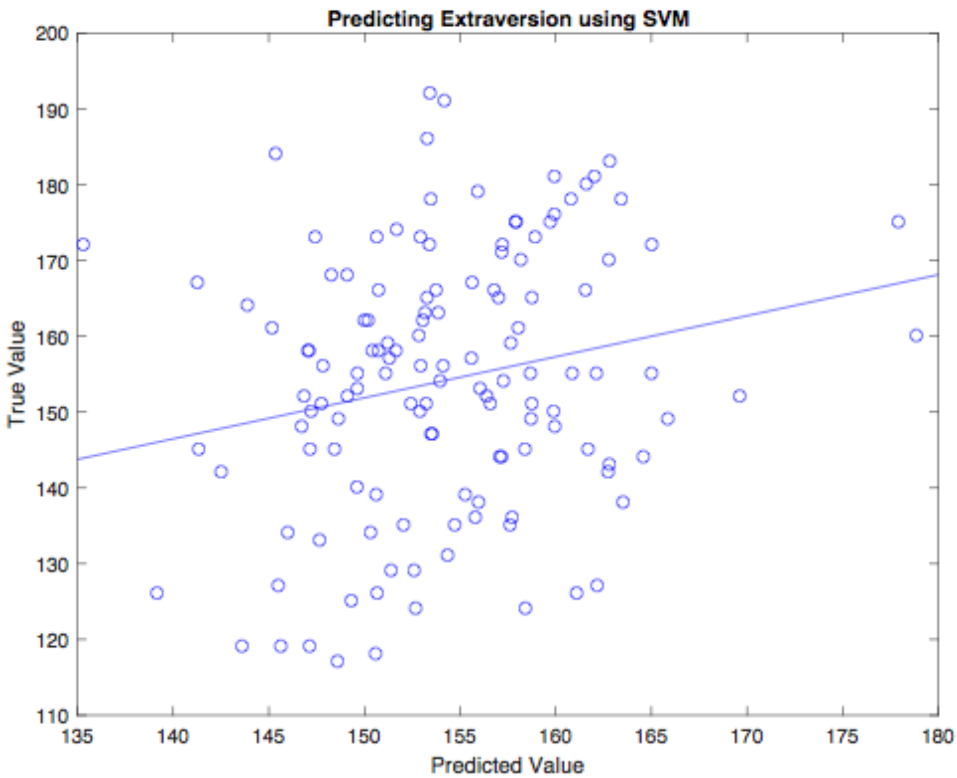

Figure 7. Predicted Extraversion score against true Extraversion score using Power atlas and linear kernel.

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Table S1. All significant links in the common network that is positively related to Openness to Experience using Power atlas. First first three and column 5, 6, 7 are MNI coordinates for the respective area.

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p value
-49	-42	1	BA 22	37	-65	40	BA 19	0.3376	8.021E-05
-50	-34	26	BA 40	-17	-59	64	BA 7	0.2980	5.461E-04
-58	-26	-15	BA 21	-44	-65	35	BA 39	0.2969	5.737E-04
8	-48	31	BA 31	-20	45	39	BA 8	0.2942	6.482E-04
42	-66	-8	BA 19	54	-43	22	BA 40	0.2896	7.942E-04
-13	-40	1	*	-16	29	53	BA 6	0.2874	8.723E-04
-16	29	53	BA 6	17	-80	-34	*	0.2793	1.235E-03
-44	-65	35	BA 39	-58	-30	-4	BA 21	0.2751	1.471E-03
-42	45	-2	BA 10	50	-20	42	BA 2	0.2691	1.883E-03
-53	-49	43	BA 40	33	-12	-34	BA 20	0.2686	1.919E-03
-28	-58	48	BA 7	-3	26	44	BA 8	0.2668	2.068E-03
6	67	-4	BA 10	2	-24	30	BA 23	0.2668	2.068E-03
-58	-30	-4	BA 21	37	-65	40	BA 19	0.2665	2.095E-03
-7	-21	65	BA 6	-49	25	-1	BA 47	0.2659	2.145E-03
32	-26	13	BA 13	47	-30	49	BA 40	0.2639	2.324E-03
15	5	7	Putamen	-16	-65	-20	*	0.2636	2.349E-03
-53	-10	24	BA 4	-42	45	-2	BA 10	0.2629	2.412E-03
22	-65	48	BA 7	-3	26	44	BA 8	0.2625	2.453E-03
37	-65	40	BA 19	49	-3	-38	BA 20	0.2619	2.513E-03
-27	-71	37	BA 19	-68	-41	-5	BA 21	0.2616	2.546E-03
37	32	-2	BA 47	-12	-95	-13	BA 17	0.2597	2.744E-03
35	-67	-34	*	-42	-55	45	BA 40	0.2596	2.754E-03
-46	-61	21	BA 39	-41	-75	26	BA 19	0.2590	2.814E-03
-16	29	53	BA 6	2	-24	30	BA 23	0.2585	2.870E-03
-14	-18	40	BA 24	-52	-63	5	BA 37	0.2579	2.936E-03
54	-43	22	BA 40	-17	-59	64	BA 7	0.2561	3.150E-03
38	43	15	BA 10	48	25	27	BA 46	0.2559	3.172E-03
43	-23	20	BA 13	47	-30	49	BA 40	0.2557	3.205E-03
-10	-2	42	BA 24	-23	-30	72	BA 3	0.2541	3.408E-03

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p value
-17	-59	64	BA 7	65	-33	20	BA 42	0.2530	3.552E-03
8	-48	31	BA 31	17	-80	-34	*	0.2523	3.646E-03
-58	-26	-15	BA 21	37	-65	40	BA 19	0.2522	3.657E-03
43	-72	28	BA 39	-56	-13	-10	BA 21	0.2519	3.697E-03
-16	-46	73	BA 37	46	-47	-17	BA 37	0.2517	3.726E-03
-20	64	19	BA 10	65	-31	-9	BA 21	0.2517	3.726E-03
65	-33	20	BA 42	20	-66	2	*	0.2474	4.393E-03
28	-77	-32	*	17	-80	-34	*	0.2450	4.800E-03
42	-66	-8	BA 19	54	-43	22	BA 40	0.2896	7.942E-04
48	25	27	BA 46	38	43	15	BA 10	0.2559	3.172E-03
-53	-49	43	BA 40	33	-12	-34	BA 20	0.2686	1.919E-03
17	-80	-34	*	8	-48	31	BA 31	0.2523	3.646E-03
17	-80	-34	*	-16	29	53	BA 6	0.2793	1.235E-03
17	-80	-34	*	28	-77	-32	*	0.2450	4.800E-03
35	-67	-34	*	-42	-55	45	BA 40	0.2596	2.754E-03
38	43	15	BA 10	48	25	27	BA 46	0.2559	3.172E-03
-28	-58	48	BA 7	-3	26	44	BA 8	0.2668	2.068E-03
37	-65	40	BA 19	-58	-26	-15	BA 21	0.2522	3.657E-03
37	-65	40	BA 19	-58	-30	-4	BA 21	0.2665	2.095E-03
37	-65	40	BA 19	-49	-42	1	BA 22	0.3376	8.021E-05
37	-65	40	BA 19	49	-3	-38	BA 20	0.2619	2.513E-03
-42	-55	45	BA 40	35	-67	-34	*	0.2596	2.754E-03
-42	45	-2	BA 10	50	-20	42	BA 2	0.2691	1.883E-03
-42	45	-2	BA 10	-53	-10	24	BA 4	0.2629	2.412E-03
-3	26	44	BA 8	-28	-58	48	BA 7	0.2668	2.068E-03
-3	26	44	BA 8	22	-65	48	BA 7	0.2625	2.453E-03
37	32	-2	BA 47	-12	-95	-13	BA 17	0.2597	2.744E-03
2	-24	30	BA 23	6	67	-4	BA 10	0.2668	2.068E-03
2	-24	30	BA 23	-16	29	53	BA 6	0.2585	2.870E-03
15	5	7	Putamen	-16	-65	-20	*	0.2636	2.349E-03
54	-43	22	BA 40	42	-66	-8	BA 19	0.2896	7.942E-04
54	-43	22	BA 40	-17	-59	64	BA 7	0.2561	3.150E-03
-49	25	-1	BA 47	-7	-21	65	BA 6	0.2659	2.145E-03
-16	-65	-20	*	15	5	7	Putamen	0.2636	2.349E-03

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p value
33	-12	-34	BA 20	-53	-49	43	BA 40	0.2686	1.919E-03
49	-3	-38	BA 20	37	-65	40	BA 19	0.2619	2.513E-03
-52	-63	5	BA 37	-14	-18	40	BA 24	0.2579	2.936E-03
46	-47	-17	BA 37	-16	-46	73		0.2517	3.726E-03
47	-30	49	BA 40	32	-26	13	BA 13	0.2639	2.324E-03
47	-30	49	BA 40	43	-23	20	BA 13	0.2557	3.205E-03
22	-65	48	BA 7	-3	26	44	BA 8	0.2625	2.453E-03
-27	-71	37	BA 19	-68	-41	-5	BA 21	0.2616	2.546E-03
-17	-59	64	BA 7	65	-33	20	BA 42	0.2530	3.552E-03
-17	-59	64	BA 7	-50	-34	26	BA 40	0.2980	5.461E-04
-17	-59	64	BA 7	54	-43	22	BA 40	0.2561	3.150E-03

Table S2**.** All significant links in the common negative network of Extraversion using Power atlas. First three columns and column 5, 6, 7 are MNI coordinates for the respective Power area.

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
29	-77	25	BA 19	-16	-65	-20	*	-0.4076	1.348E-06
-54	-23	43	BA 2	29	-77	25	BA 19	-0.4032	1.799E-06
44	-8	57	BA 6	29	-77	25	BA 19	-0.3802	7.506E-06
42	-20	55	BA 3	22	-65	48	BA 7	-0.3588	2.567E-05
40	-72	14	BA 39	-14	-91	31	BA 19	-0.3504	4.089E-05
42	-20	55	BA 3	22	-58	-23	*	-0.3500	4.168E-05
46	-47	-17	BA 37	-40	-19	54	BA 4	-0.3464	5.045E-05
8	-48	31	BA 31	12	-17	8	*	-0.3445	5.601E-05
40	-72	14	BA 39	15	-87	37	BA 19	-0.3420	6.397E-05
-42	-55	45	BA 40	0	30	27	BA 32	-0.3414	6.600E-05
8	-48	31	BA 31	-10	-18	7	Medial Dorsal Nucleus	-0.3398	7.184E-05
-16	-65	-20	*	-37	-29	-26	*	-0.3397	7.197E-05
29	-77	25	BA 19	-38	-33	17	BA 41	-0.3382	7.807E-05
29	-77	25	BA 19	22	-58	-23	*	-0.3367	8.421E-05
-16	-77	34	BA 7	-16	-65	-20	*	-0.3362	8.618E-05
-39	-75	44	BA 19	15	5	7	Putamen	-0.3359	8.774E-05
-42	-55	45	BA 40	-11	26	25	BA 32	-0.3355	8.942E-05
-39	-75	44	BA 19	-15	4	8	Putamen	-0.3329	1.023E-04
-44	-65	35	BA 39	-11	26	25	BA 32	-0.3323	1.053E-04
42	-20	55	BA 3	46	-47	-17	BA 37	-0.3313	1.112E-04
18	-47	-10	*	-33	-46	47	BA 7	-0.3302	1.170E-04
-40	-19	54	BA 4	29	-77	25	BA 19	-0.3300	1.185E-04
-28	-79	19	BA 19	18	-47	-10	*	-0.3265	1.411E-04
15	5	7	Putamen	-44	-65	35	BA 39	-0.3255	1.487E-04
-38	-27	69	BA 4	29	-77	25	BA 19	-0.3226	1.716E-04
-40	-19	54	BA 4	29	-5	54	BA 6	-0.3178	2.166E-04
22	-58	-23	*	-18	-68	5	BA 30	-0.3176	2.185E-04
46	-47	-17	BA 37	-38	-15	69	BA 6	-0.3173	2.213E-04

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
-16	-52	-1	BA 19	22	-58	-23	*	-0.3170	2.245E-04
-54	-23	43	BA 2	-28	-79	19	BA 19	-0.3167	2.288E-04
-39	-75	44	BA 19	-11	26	25	BA 32	-0.3162	2.340E-04
-28	-79	19	BA 19	-16	-65	-20	*	-0.3156	2.406E-04
4	-48	51	BA 7	-10	-18	7	Medial Dorsal Nucleus	-0.3143	2.559E-04
-55	-9	12	BA 43	29	-77	25	BA 19	-0.3140	2.594E-04
40	-72	14	BA 39	-16	-65	-20	*	-0.3128	2.747E-04
8	-48	31	BA 31	6	-24	0	*	-0.3127	2.764E-04
40	-72	14	BA 39	-33	-79	-13	BA 19	-0.3122	2.827E-04
20	-86	-2	BA 17	22	-58	-23	*	-0.3119	2.866E-04
-49	-11	35	BA 6	29	-77	25	BA 19	-0.3116	2.907E-04
52	-34	-27	BA 20	8	42	-5	BA 32	-0.3114	2.941E-04
18	-47	-10	*	29	-77	25	BA 19	-0.3065	3.705E-04
-39	-75	44	BA 19	-22	7	-5	Putamen	-0.3064	3.725E-04
-15	4	8	Putamen	-44	-65	35	BA 39	-0.3063	3.729E-04
38	-17	45	BA 4	22	-58	-23	*	-0.3055	3.877E-04
-16	-65	-20	*	37	-84	13	BA 19	-0.3052	3.935E-04
-44	-65	35	BA 39	6	-24	0	*	-0.3047	4.027E-04
18	-47	-10	*	-42	-60	-9	BA 37	-0.3044	4.079E-04
29	-77	25	BA 19	42	-20	55	BA 3	-0.3025	4.455E-04
-38	-15	69	BA 6	22	-65	48	BA 7	-0.3013	4.695E-04
44	-8	57	BA 6	-28	-79	19	BA 19	-0.2989	5.234E-04
6	-81	6	BA 17	22	-58	-23	*	-0.2987	5.300E-04
40	-72	14	BA 39	-15	-72	-8	BA 18	-0.2981	5.437E-04
0	30	27	BA 32	-50	-7	-39	BA 20	-0.2964	5.866E-04
-49	25	-1	BA 47	11	-66	42	BA 7	-0.2963	5.890E-04
-46	-61	21	BA 39	52	-59	36	BA 40	-0.2961	5.955E-04
7	8	51	BA 6	-58	-30	-4	BA 21	-0.2960	5.985E-04
-40	-19	54	BA 4	33	-53	44	BA 40	-0.2941	6.508E-04
-49	-11	35	BA 6	37	-84	13	BA 19	-0.2936	6.651E-04
18	-47	-10	*	-28	-58	48	BA 7	-0.2930	6.846E-04
-28	-79	19	BA 19	-14	-91	31	BA 19	-0.2927	6.926E-04

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
32	14	56	BA 6	-11	26	25	BA 32	-0.2912	7.407E-04
37	1	-4	*	-39	-75	44	BA 19	-0.2910	7.461E-04
15	-77	31	BA 19	40	-72	14	BA 39	-0.2906	7.581E-04
18	-47	-10	*	-16	-65	-20	*	-0.2900	7.793E-04
-54	-23	43	BA 2	24	-87	24	BA 18	-0.2900	7.800E-04
-46	31	-13	BA 47	56	-46	11	BA 22	-0.2899	7.840E-04
-3	-81	21	BA 18	-32	-1	54	BA 6	-0.2894	8.020E-04
18	-47	-10	*	-27	-71	37	BA 19	-0.2890	8.148E-04
-38	-27	69	BA 4	-28	-79	19	BA 19	-0.2882	8.429E-04
-49	-11	35	BA 6	40	-72	14	BA 39	-0.2882	8.437E-04
29	-5	54	BA 6	18	-47	-10	*	-0.2877	8.638E-04
42	-20	55	BA 3	-49	-11	35	BA 6	-0.2870	8.899E-04
55	-31	-17	BA 20	-5	18	34	BA 32	-0.2861	9.252E-04
40	-72	14	BA 39	24	-87	24	BA 18	-0.2849	9.713E-04
8	-48	31	BA 31	-15	4	8	Putamen	-0.2849	9.716E-04
22	-65	48	BA 7	-3	-81	21	BA 18	-0.2848	9.793E-04
27	-59	-9	BA 19	29	-5	54	BA 6	-0.2846	9.868E-04
38	-17	45	BA 4	22	-65	48	BA 7	-0.2845	9.889E-04
24	-87	24	BA 18	22	-58	-23	*	-0.2838	1.018E-03
18	-47	-10	*	22	-65	48	BA 7	-0.2836	1.027E-03
-40	-19	54	BA 4	-49	-11	35	BA 6	-0.2830	1.057E-03
-37	-29	-26	*	38	-17	45	BA 4	-0.2829	1.062E-03
24	-87	24	BA 18	46	-47	-17	BA 37	-0.2828	1.064E-03
-44	-65	35	BA 39	10	22	27	BA 32	-0.2827	1.068E-03
-40	-19	54	BA 4	40	-72	14	BA 39	-0.2827	1.070E-03
-54	-23	43	BA 2	18	-47	-10	*	-0.2824	1.084E-03
15	-87	37	BA 19	29	-5	54	BA 6	-0.2821	1.098E-03
-39	-75	44	BA 19	36	10	1	*	-0.2819	1.106E-03
9	-4	6	Ventral Anterior Nucleus	-39	-75	44	BA 19	-0.2818	1.109E-03
-16	-77	34	BA 7	22	-58	-23	*	-0.2818	1.113E-03
-16	-52	-1	BA 19	-28	-79	19	BA 19	-0.2816	1.120E-03
-42	-74	0	BA 19	40	-72	14	BA 39	-0.2816	1.120E-03

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
38	-17	45	BA 4	29	-5	54	BA 6	-0.2808	1.162E-03
43	-72	28	BA 39	-10	-18	7	Medial Dorsal Nucleus	-0.2805	1.176E-03
-40	-19	54	BA 4	-53	-10	24	BA 4	-0.2800	1.197E-03
34	16	-8	BA 47	-39	-75	44	BA 19	-0.2795	1.227E-03
-38	-27	69	BA 4	-16	-65	-20	*	-0.2792	1.240E-03
-38	-15	69	BA 6	29	-77	25	BA 19	-0.2790	1.250E-03
42	-66	-8	BA 19	-32	-55	-25	*	-0.2788	1.261E-03
52	-59	36	BA 40	-15	4	8	Putamen	-0.2771	1.354E-03
-47	-76	-10	BA 19	-32	-55	-25	*	-0.2771	1.356E-03
12	-17	8	*	-7	-55	27	BA 31	-0.2766	1.382E-03
8	-91	-7	BA 17	22	-58	-23	*	-0.2766	1.383E-03
-39	-75	44	BA 19	5	23	37	BA 32	-0.2765	1.391E-03
44	-8	57	BA 6	-49	-11	35	BA 6	-0.2763	1.400E-03
-3	26	44	BA 8	54	-43	22	BA 40	-0.2760	1.419E-03
-33	-46	47	BA 7	38	-17	45	BA 4	-0.2756	1.442E-03
37	-84	13	BA 19	44	-8	57	BA 6	-0.2751	1.472E-03
-23	-30	72	BA 3	18	-47	-10	*	-0.2734	1.580E-03
-17	-59	64	BA 7	-14	-91	31	BA 19	-0.2733	1.585E-03
-44	-65	35	BA 39	0	30	27	BA 32	-0.2733	1.589E-03
38	-17	45	BA 4	40	-72	14	BA 39	-0.2730	1.609E-03
44	-8	57	BA 6	40	-72	14	BA 39	-0.2726	1.633E-03
-5	18	34	BA 32	-42	-55	45	BA 40	-0.2725	1.641E-03
-14	-91	31	BA 19	29	-77	25	BA 19	-0.2723	1.651E-03
8	-72	11	BA 23	22	-58	-23	*	-0.2723	1.651E-03
-16	-65	-20	*	42	-20	55	BA 3	-0.2723	1.655E-03
-16	-65	-20	*	8	-91	-7	BA 17	-0.2722	1.661E-03
40	-72	14	BA 39	26	-79	-16	*	-0.2721	1.667E-03
-7	-55	27	BA 31	-10	-18	7	Medial Dorsal Nucleus	-0.2716	1.702E-03
-28	-58	48	BA 7	15	-87	37	BA 19	-0.2713	1.719E-03
4	-48	51	BA 7	-3	26	44	BA 8	-0.2713	1.720E-03
-21	-31	61	BA 3	-27	-71	37	BA 19	-0.2709	1.753E-03
5	23	37	BA 32	-42	-55	45	BA 40	-0.2707	1.762E-03

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
-42	-60	-9	BA 37	-16	-52	-1	BA 19	-0.2706	1.774E-03
20	-66	2	*	22	-58	-23	*	-0.2706	1.775E-03
-58	-30	-4	BA 21	42	0	47	BA 6	-0.2705	1.780E-03
-40	-19	54	BA 4	22	-65	48	BA 7	-0.2705	1.783E-03
22	-58	-23	*	18	-47	-10	*	-0.2702	1.803E-03
-5	18	34	BA 32	-44	-65	35	BA 39	-0.2701	1.806E-03
6	-72	24	BA 31	22	-65	48	BA 7	-0.2701	1.809E-03
40	-72	14	BA 39	20	-86	-2	BA 17	-0.2699	1.823E-03
40	-72	14	BA 39	8	-72	11	BA 23	-0.2696	1.845E-03
-7	-52	61	BA 7	35	-67	-34	*	-0.2695	1.855E-03
-17	-59	64	BA 7	15	-77	31	BA 19	-0.2693	1.867E-03
38	-17	45	BA 4	-28	-58	48	BA 7	-0.2691	1.886E-03
32	14	56	BA 6	0	30	27	BA 32	-0.2690	1.888E-03
18	-47	-10	*	-47	-51	-21	*	-0.2689	1.898E-03
-8	-81	7	BA 17	22	-58	-23	*	-0.2685	1.932E-03
38	-17	45	BA 4	-28	-79	19	BA 19	-0.2684	1.938E-03
51	-6	32	BA 6	40	-72	14	BA 39	-0.2680	1.968E-03
37	-84	13	BA 19	50	-20	42	BA 2	-0.2680	1.972E-03
29	-77	25	BA 19	50	-20	42	BA 2	-0.2677	1.990E-03
5	23	37	BA 32	-44	-65	35	BA 39	-0.2677	1.990E-03
65	-31	-9	BA 21	9	-4	6	Ventral Anterior Nucleus	-0.2676	2.005E-03
15	-87	37	BA 19	22	-65	48	BA 7	-0.2672	2.033E-03
55	-31	-17	BA 20	-10	-18	7	Medial Dorsal Nucleus	-0.2662	2.118E-03
-47	-76	-10	BA 19	22	-58	-23	*	-0.2662	2.120E-03
35	-67	-34	*	0	30	27	BA 32	-0.2656	2.166E-03
-7	-71	42	BA 7	5	23	37	BA 32	-0.2654	2.186E-03
44	-8	57	BA 6	-40	-88	-6	BA 18	-0.2653	2.196E-03
-47	-76	-10	BA 19	-38	-27	69	BA 4	-0.2653	2.198E-03
-16	-52	-1	BA 19	-28	-58	48	BA 7	-0.2649	2.228E-03
-54	-23	43	BA 2	-16	-65	-20	*	-0.2649	2.234E-03
-15	4	8	Putamen	47	-50	29	BA 39	-0.2645	2.269E-03
24	-87	24	BA 18	22	-65	48	BA 7	-0.2644	2.279E-03

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
-31	-11	0	Putamen	47	-50	29	BA 39	-0.2643	2.284E-03
-49	-26	5	BA 41	20	-86	-2	BA 17	-0.2641	2.305E-03
29	-17	71	BA 6	17	-91	-14	BA 18	-0.2640	2.312E-03
-38	-15	69	BA 6	40	-72	14	BA 39	-0.2638	2.335E-03
37	-84	13	BA 19	22	-58	-23	*	-0.2636	2.349E-03
-7	-55	27	BA 31	6	-24	0	*	-0.2632	2.391E-03
-14	-91	31	BA 19	-32	-1	54	BA 6	-0.2629	2.412E-03
-16	-52	-1	BA 19	22	-65	48	BA 7	-0.2629	2.417E-03
18	-47	-10	*	-17	-59	64	BA 7	-0.2622	2.487E-03
6	-72	24	BA 31	-23	11	64	BA 6	-0.2620	2.502E-03
-39	-75	44	BA 19	31	-14	2	Putamen	-0.2616	2.543E-03
-44	-65	35	BA 39	12	-17	8	*	-0.2614	2.563E-03
42	-20	55	BA 3	42	-66	-8	BA 19	-0.2612	2.583E-03
15	-77	31	BA 19	29	-5	54	BA 6	-0.2610	2.600E-03
-40	-19	54	BA 4	51	-6	32	BA 6	-0.2609	2.617E-03
-38	-27	69	BA 4	-53	-10	24	BA 4	-0.2609	2.619E-03
-54	-23	43	BA 2	40	-72	14	BA 39	-0.2608	2.622E-03
6	-81	6	BA 17	-17	-59	64	BA 7	-0.2601	2.698E-03
37	-84	13	BA 19	-54	-23	43	BA 2	-0.2600	2.706E-03
-28	-79	19	BA 19	22	-58	-23	*	-0.2599	2.715E-03
-16	-65	-20	*	22	-58	-23	*	-0.2596	2.755E-03
-11	26	25	BA 32	35	-67	-34	*	-0.2595	2.764E-03
-33	-46	47	BA 7	-58	-30	-4	BA 21	-0.2595	2.764E-03
42	-20	55	BA 3	-33	-46	47	BA 7	-0.2592	2.795E-03
22	39	39	BA 8	-10	-18	7	Medial Dorsal Nucleus	-0.2591	2.804E-03
-44	-65	35	BA 39	-31	-11	0	Putamen	-0.2590	2.815E-03
-40	-19	54	BA 4	-28	-79	19	BA 19	-0.2589	2.823E-03
37	-65	40	BA 19	-11	26	25	BA 32	-0.2586	2.864E-03
-23	11	64	BA 6	8	42	-5	BA 32	-0.2582	2.904E-03
-16	-77	34	BA 7	-49	-11	35	BA 6	-0.2580	2.923E-03
15	-63	26	BA 31	-18	-76	-24	*	-0.2575	2.982E-03
-10	39	52	BA 8	46	-47	-17	BA 37	-0.2574	2.994E-03

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
22	-58	-23	*	-24	-91	19	BA 18	-0.2574	3.003E-03
-49	-11	35	BA 6	-28	-79	19	BA 19	-0.2570	3.046E-03
-44	-65	35	BA 39	34	16	-8	BA 47	-0.2569	3.053E-03
-45	-32	47	BA 40	18	-47	-10	*	-0.2569	3.061E-03
-49	-11	35	BA 6	29	-17	71	BA 6	-0.2568	3.068E-03
-39	-75	44	BA 19	-5	18	34	BA 32	-0.2568	3.069E-03
-16	-65	-20	*	-47	-76	-10	BA 19	-0.2567	3.075E-03
40	-72	14	BA 39	42	-66	-8	BA 19	-0.2565	3.099E-03
-3	-81	21	BA 18	-17	-59	64	BA 7	-0.2565	3.104E-03
-8	48	23	BA 9	65	-12	-19	BA 21	-0.2564	3.117E-03
-7	-71	42	BA 7	-3	-81	21	BA 18	-0.2563	3.127E-03
38	-17	45	BA 4	46	-47	-17	BA 37	-0.2560	3.163E-03
-39	-75	44	BA 19	0	30	27	BA 32	-0.2557	3.196E-03
18	-47	-10	*	47	-30	49	BA 40	-0.2552	3.267E-03
38	-17	45	BA 4	29	-77	25	BA 19	-0.2550	3.292E-03
-53	-10	24	BA 4	44	-8	57	BA 6	-0.2547	3.328E-03
-41	-75	26	BA 19	8	42	-5	BA 32	-0.2545	3.349E-03
20	-66	2	*	29	-77	25	BA 19	-0.2544	3.369E-03
-47	-51	-21	*	22	-58	-23	*	-0.2538	3.445E-03
-40	-19	54	BA 4	-42	-60	-9	BA 37	-0.2537	3.455E-03
6	-24	0	*	11	-54	17	BA 23	-0.2537	3.463E-03
42	-20	55	BA 3	51	-6	32	BA 6	-0.2535	3.478E-03
-23	-30	72	BA 3	-16	-52	-1	BA 19	-0.2533	3.504E-03
-37	-29	-26	*	-18	-76	-24	*	-0.2533	3.505E-03
-20	64	19	BA 10	-3	42	16	BA 9	-0.2526	3.606E-03
-40	-19	54	BA 4	-47	-76	-10	BA 19	-0.2525	3.617E-03
-11	26	25	BA 32	43	-72	28	BA 39	-0.2523	3.640E-03
-54	-23	43	BA 2	42	-20	55	BA 3	-0.2523	3.642E-03
-41	-75	26	BA 19	-11	26	25	BA 32	-0.2518	3.716E-03
42	-20	55	BA 3	-28	-79	19	BA 19	-0.2518	3.717E-03
-54	-23	43	BA 2	-24	-91	19	BA 18	-0.2514	3.768E-03
-16	-5	71	BA 6	47	10	33	BA 9	-0.2510	3.826E-03
-39	-75	44	BA 19	23	10	1	Putamen	-0.2509	3.844E-03

X	Y	Z	Brodmann Area	X	Y	Z	Brodmann Area	R value	p-value
38	-17	45	BA 4	37	-84	13	BA 19	-0.2507	3.872E-03
20	-86	-2	BA 17	-16	-65	-20	*	-0.2507	3.877E-03
15	-63	26	BA 31	-49	25	-1	BA 47	-0.2507	3.882E-03
-42	-74	0	BA 19	-38	-27	69	BA 4	-0.2492	4.105E-03
43	-78	-12	BA 19	-32	-55	-25	*	-0.2488	4.162E-03
-44	-65	35	BA 39	31	-14	2	Putamen	-0.2483	4.246E-03
-31	-11	0	Putamen	-39	-75	44	BA 19	-0.2481	4.279E-03
6	-24	0	*	37	-65	40	BA 19	-0.2479	4.308E-03
29	-77	25	BA 19	-53	-10	24	BA 4	-0.2475	4.375E-03
37	-84	13	BA 19	24	-87	24	BA 18	-0.2450	4.789E-03