

1 **Functional Connectivity Prediction with Deep**
2 **Learning for Graph Transformation- Appendix**

3

4 **Appendix**

5 **A Parameter Tuning**

6 A list of hyperparameters that were tuned to achieve the best performance for SF-GAN are included here.
7 A 3-fold cross validation was performed, with 100 data samples for test, and 716 samples for training,
8 resulting in chosen values for hyperparameters. Initial learning rate for adam was set to 0.0001 for both
9 Dataset 1 and Dataset 2. Batch size was set to number of test samples. Number of epochs was 30 for
10 the Baseline and all regularized SF-GAN methods. λ_1 equal to 10^2 was used for both datasets.

11 **B Additional case studies and brain visualizations**

12 Here, we have included additional visualizations from Dataset 2. The predictions are provided by SF-GAN
13 Setting 1.

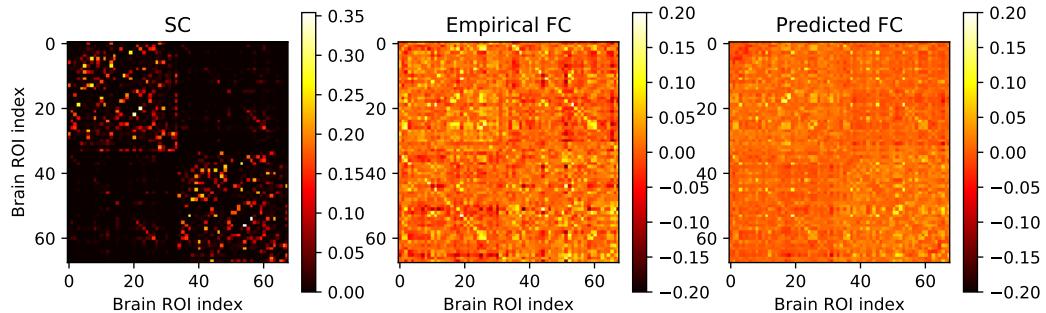


Figure B.1: Case study: subject 23

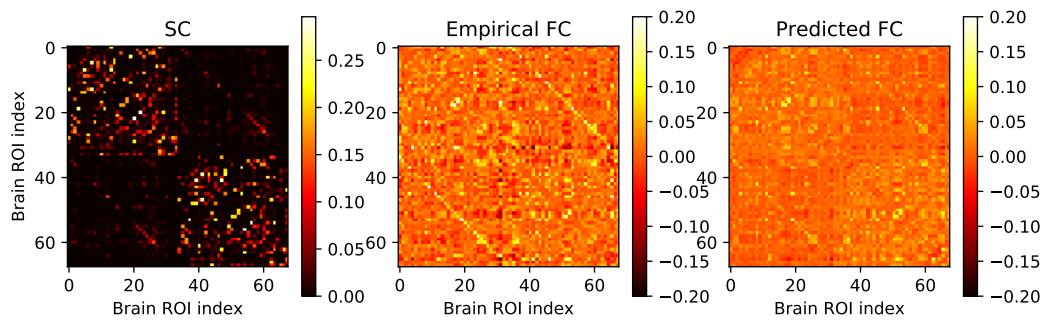


Figure B.2: Case study: subject 25

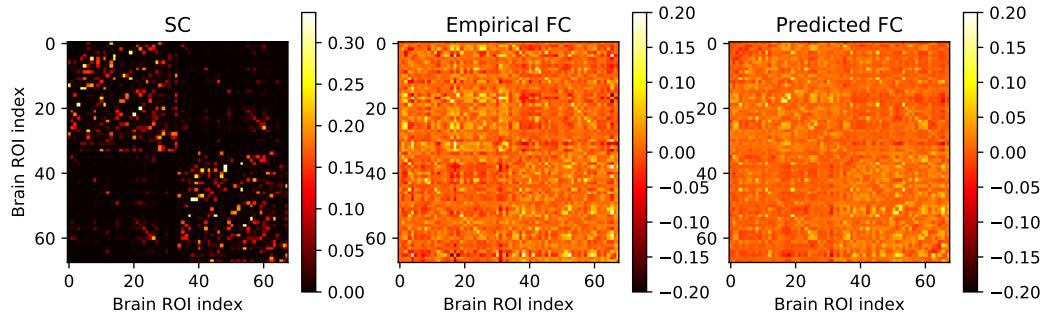


Figure B.3: Case study: subject 30

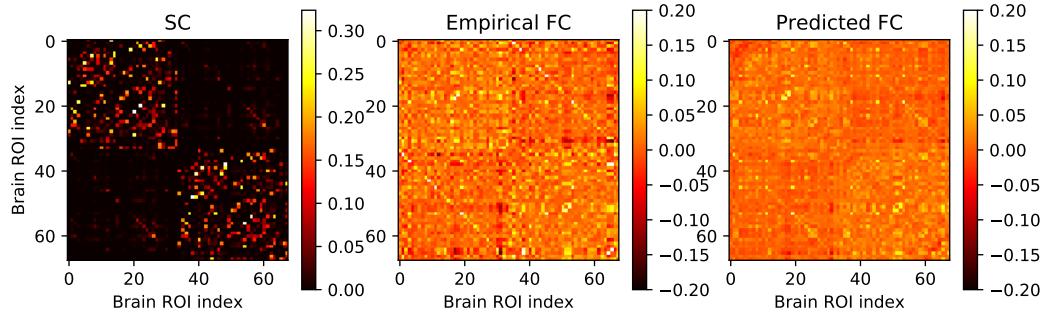


Figure B.4: Case study: subject 31

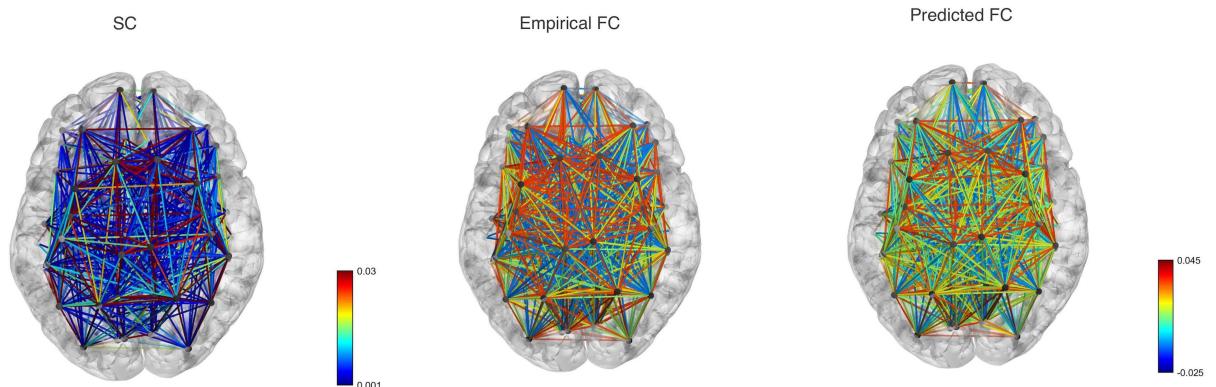


Figure B.5: Case study: subject 23

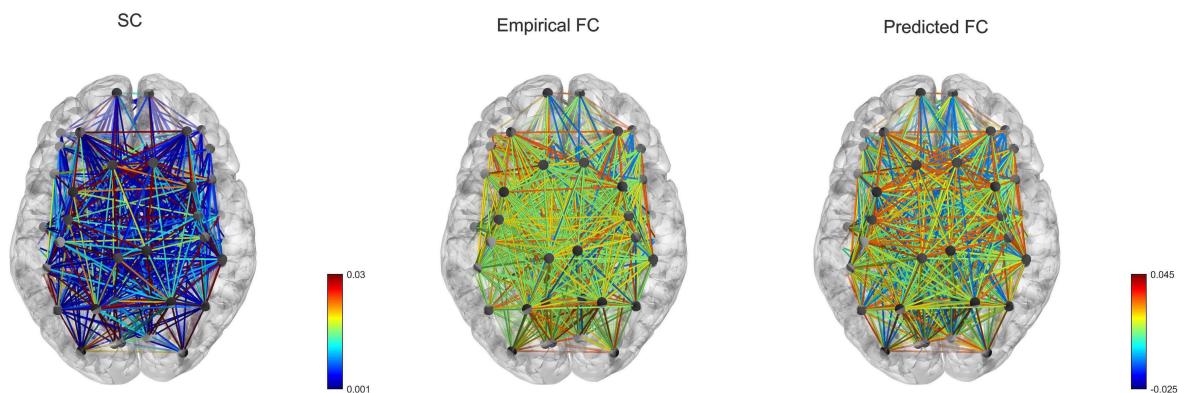


Figure B.6: Case study: subject 7

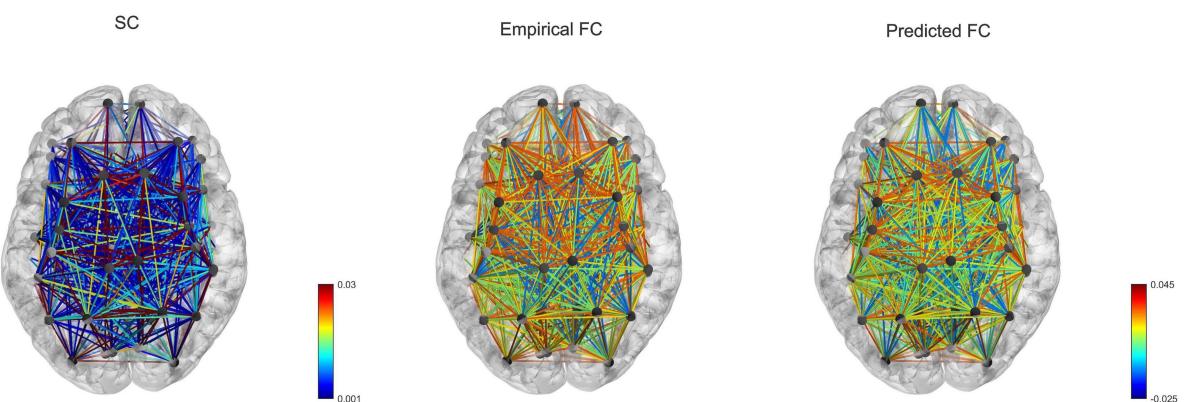


Figure B.7: Case study: subject 34

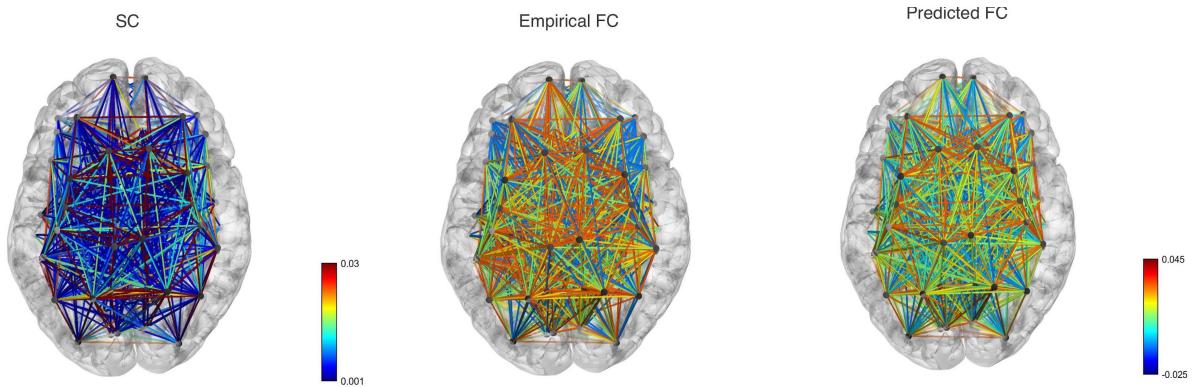


Figure B.8: Case study: subject 25

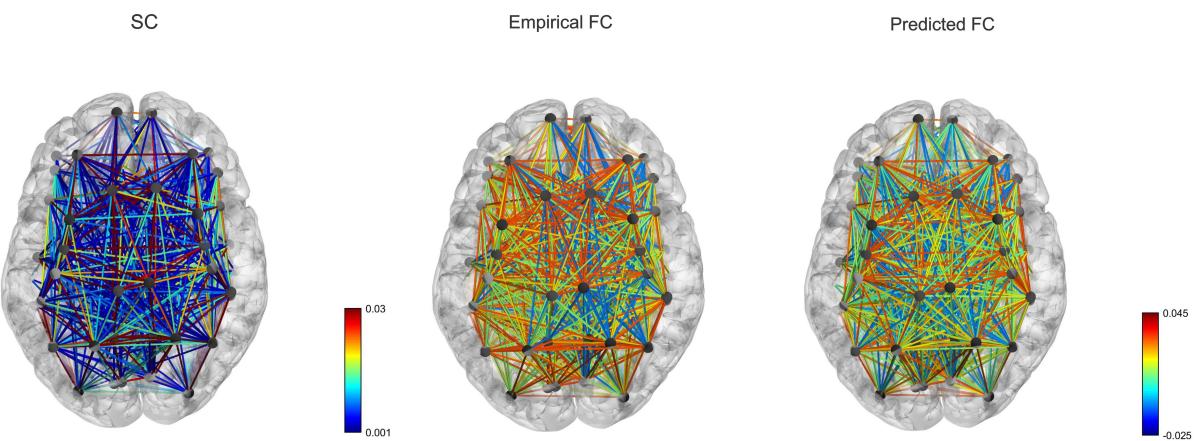


Figure B.9: Case study: subject 57

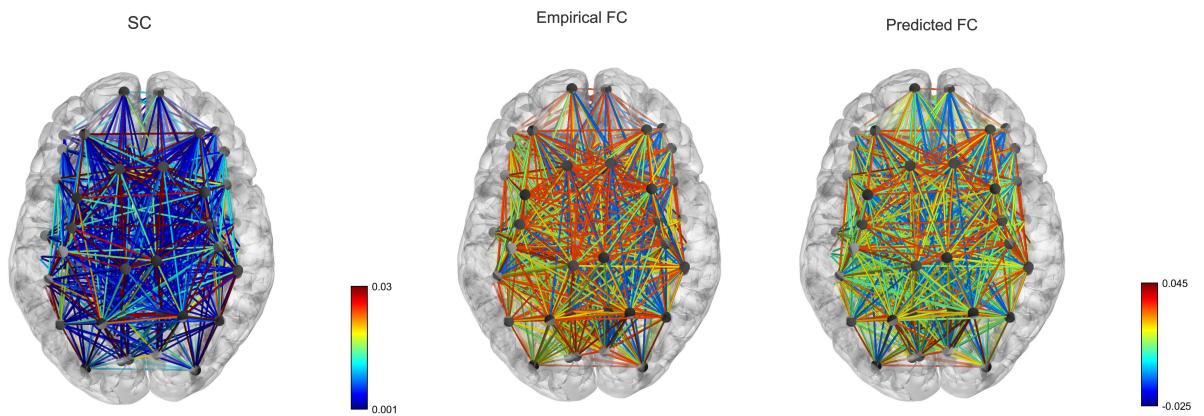


Figure B.10: Case study: subject 69

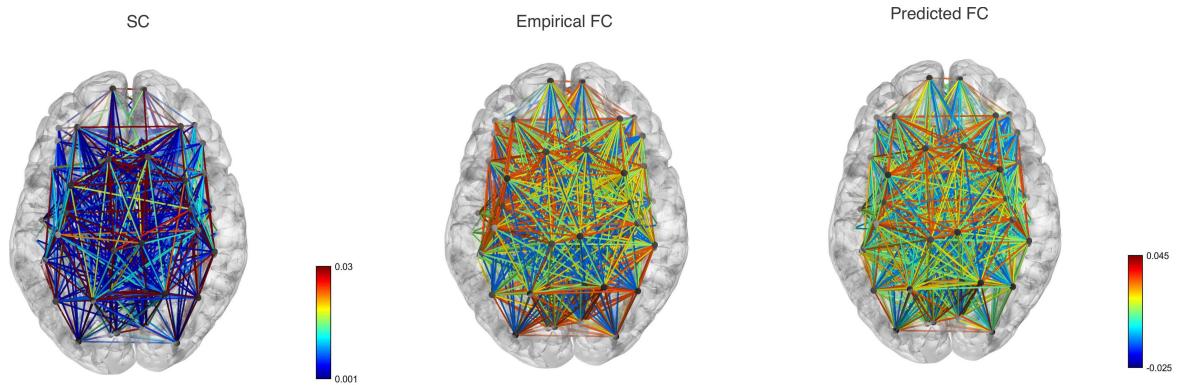


Figure B.11: Case study: subject 30

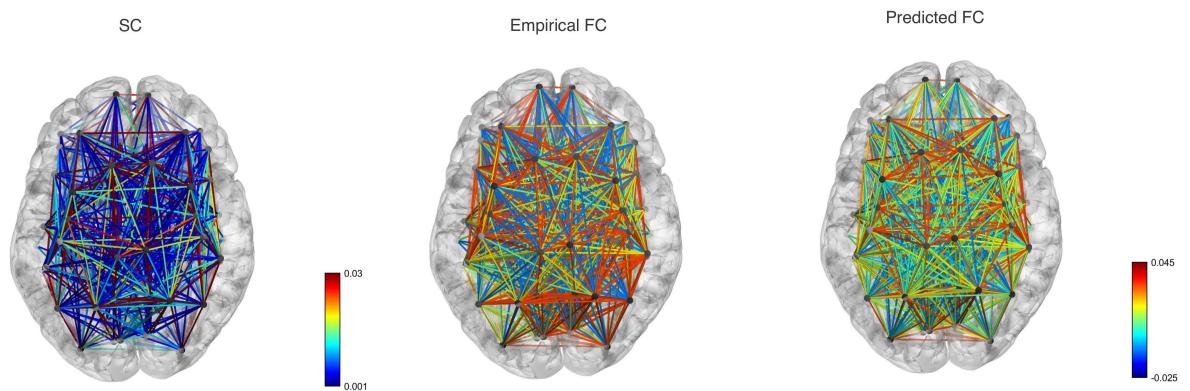


Figure B.12: Case study: subject 31

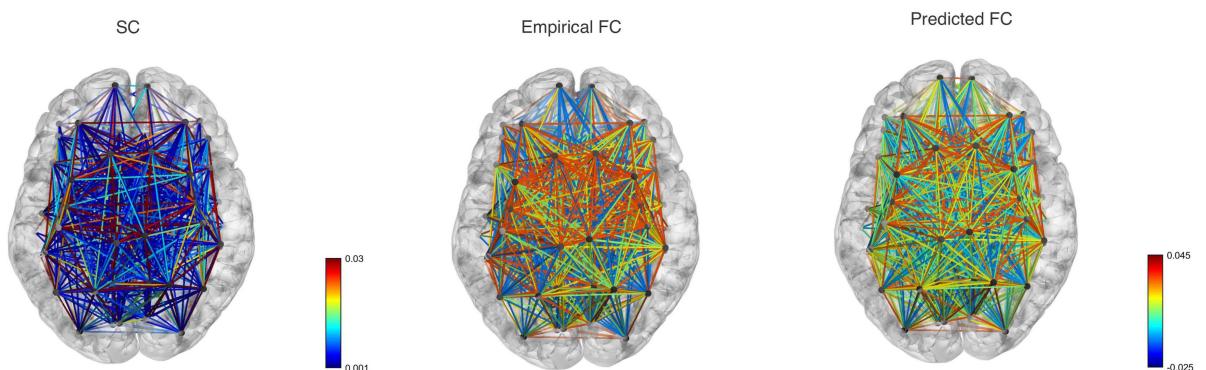


Figure B.13: Case study: subject 4

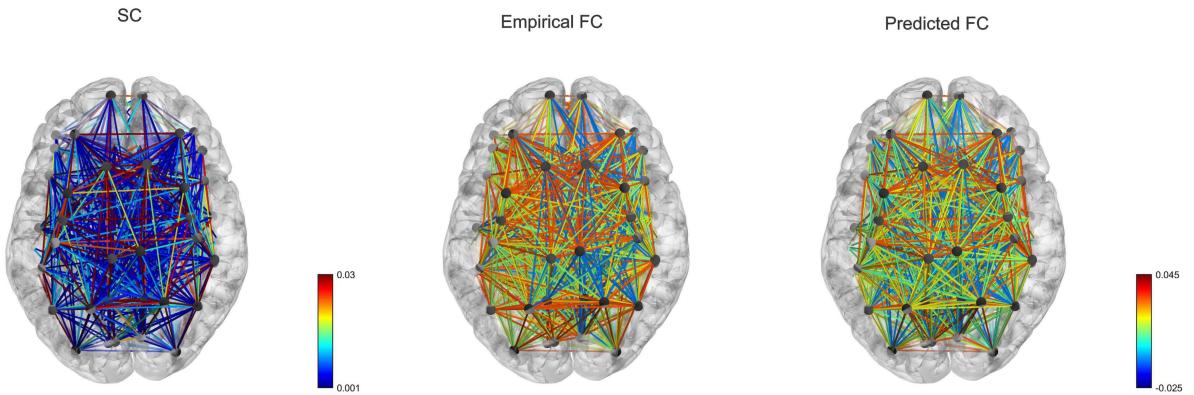


Figure B.14: Case study: subject 51

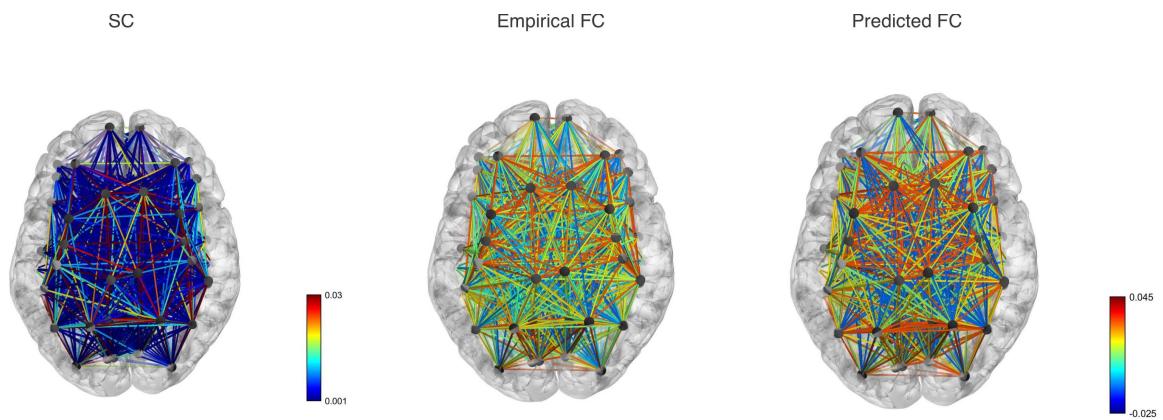


Figure B.15: Case study: subject 16

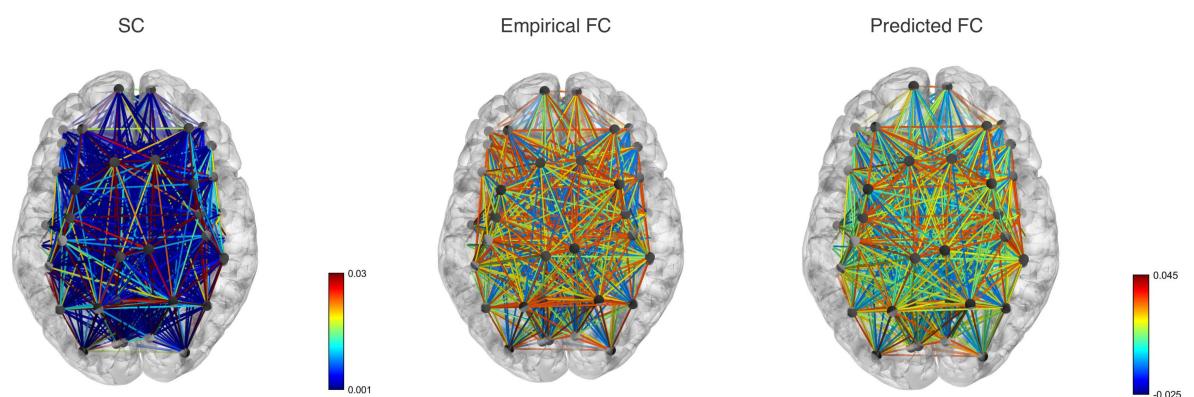


Figure B.16: Case study: subject 36

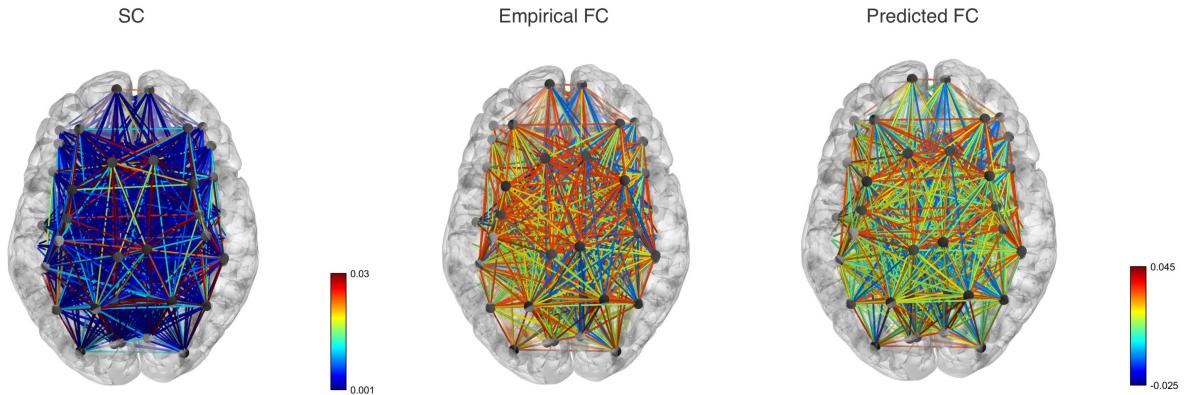


Figure B.17: Case study: subject 40

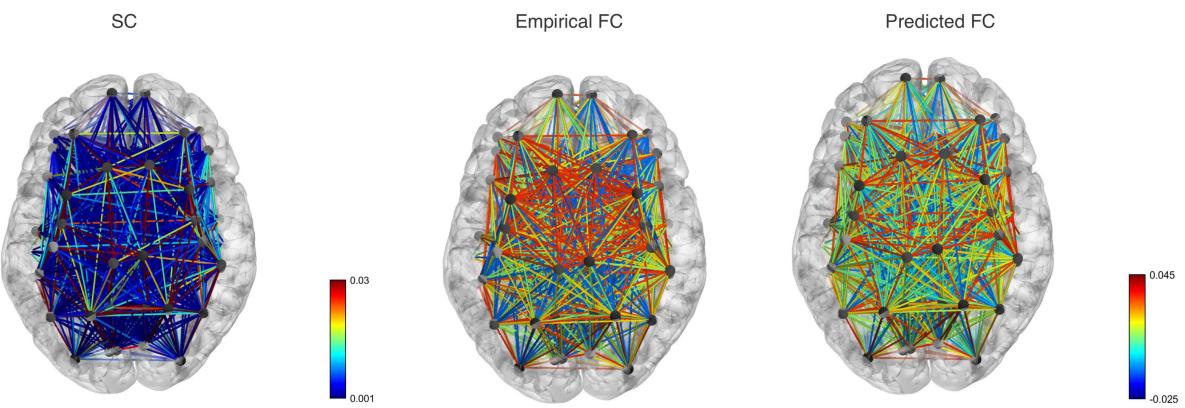


Figure B.18: Case study: subject 64

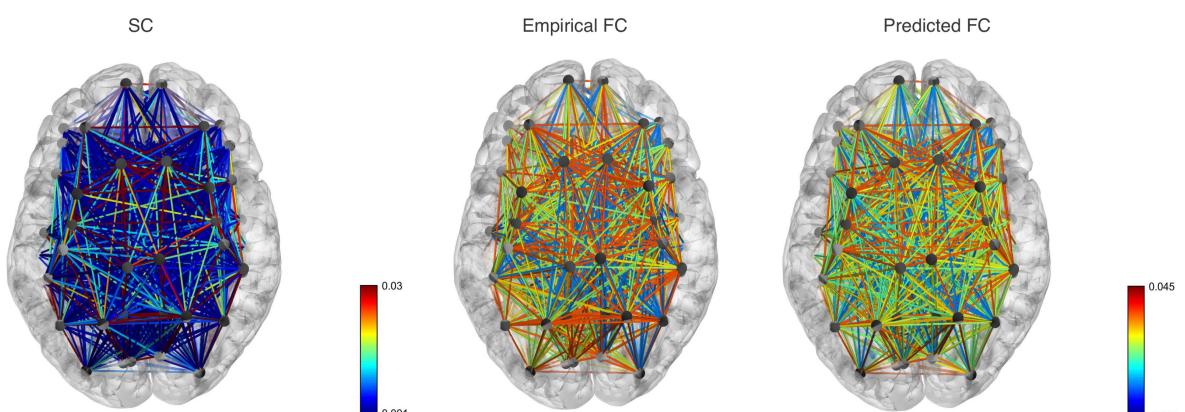


Figure B.19: Case study: subject 66

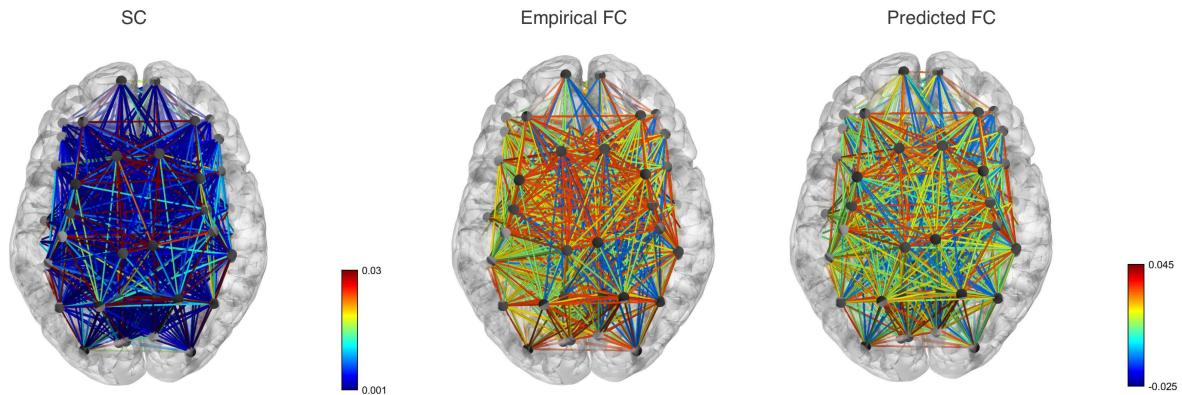


Figure B.20: Case study: subject 71

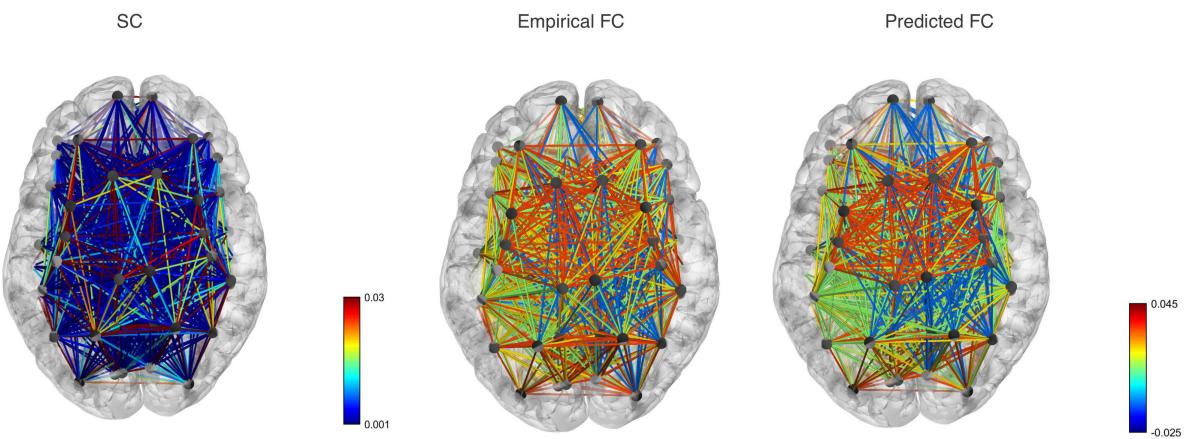


Figure B.21: Case study: subject 79

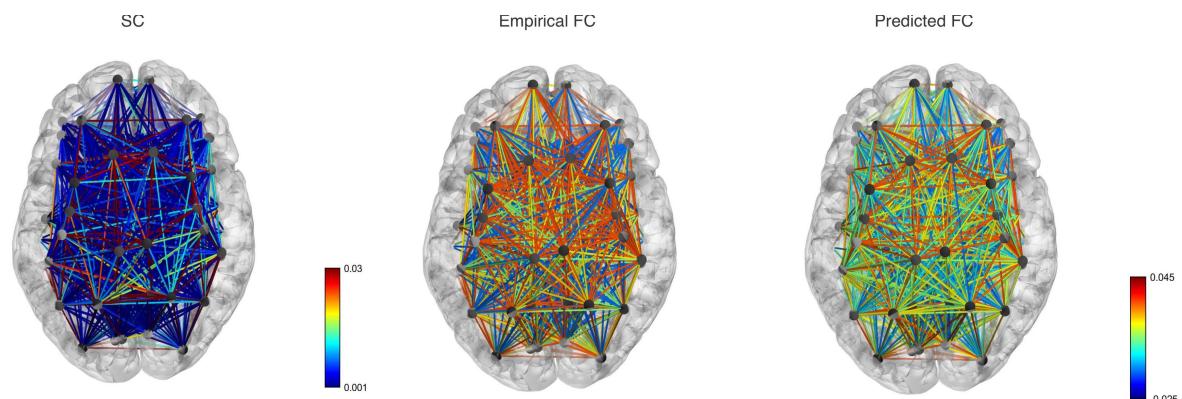


Figure B.22: Case study: subject 84

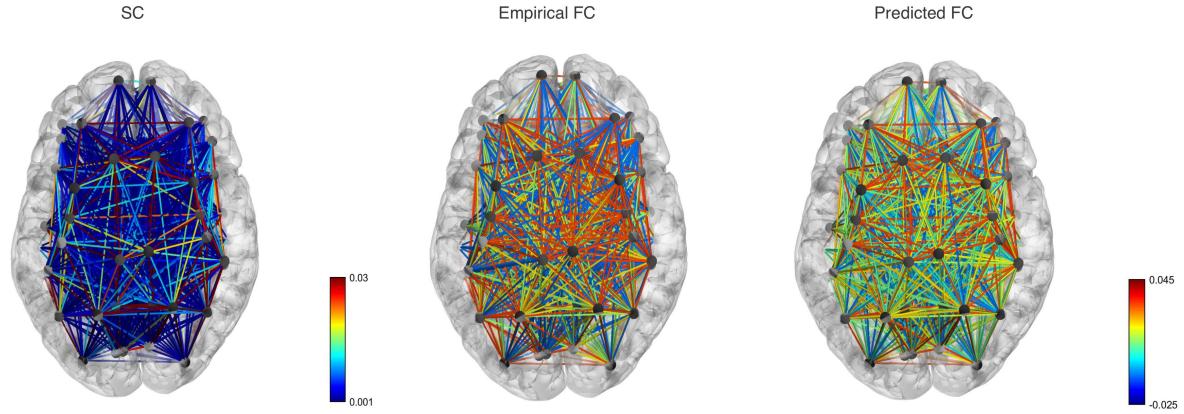


Figure B.23: Case study: subject 90

¹⁴ C Meta features

¹⁵ A list of meta features used in this work, is provided in Table C.1, and a list of the name of categories
¹⁶ 1 to 5 is shown in Table C.2. Since the corresponding data is restricted due to patient confidentiality
¹⁷ concerns, the actual subject meta data is not released here.

Table C.1: List of meta features and the corresponding categories

Feature	Category
Age of participant in Yrs	1
Ethnicity	1
Handedness from -100 to 100	1
employment status	1
Total household income	1
Years of education completed	1
Is respondent still in school for degree course?	1
Is respondent married or in live-in relationship?	1
Is respondent Missouri born?	1
Height (in Inches)	2
Weight (in Pounds)	2
BMI ($703 * weight(lb) / (heightin.^2)$)	2
Participant's current self-reported BMI category	2

Features	Category
Participant' self-reported BMI category for their heaviest period	2
Was blood drawn from participant	2
Blood sample 1 percentage of total blood volume that are red blood cells	2
Blood sample 2 percentage of total blood volume that are red blood cells	2
Systolic blood pressure of subject	2
Diastolic blood pressure of subject	2
If the participant's mother had schizophrenia or psychosis	2
If the participant's father had schizophrenia or psychosis	2
If the participant's mother had depression or psychosis.	2
If the participant's father had depression or psychosis.	2
If the participant's mother had bipolar disorder.	2
If the participant's father had bipolar disorder.	2
If the participant's mother had anxiety.	2
If the participant's father had anxiety.	2
If the participant's mother had drug/alcohol problems.	2
If the participant's father had drug/alcohol problems.	2
If the participant's mother had Alzheimer's Disease or dementia	2
If the participant's father had Alzheimer's Disease or dementia	2
If the participant's mother had Parkinson's Disease	2
If the participant's father had Parkinson's Disease	2
If the participant's mother had Tourette's Syndrome	2
If the participant's father had Tourette's Syndrome	2
None of the above - Mother	2
None of the above - Father	2
ASR Anxious/Depressed Raw Score	3
ASR Anxious/Depressed Gender and Age Adjusted Percentile	3
ASR Withdrawn Raw Score	3
ASR Withdrawn Gender and Age Adjusted T-score	3
ASR Somatic Complaints Raw Score	3
ASR Somatic Complaints Gender and Age Adjusted T-score	3

Features	Category
ASR Thought Problems Raw Score	3
ASR Thought Problems Gender and Age Adjusted T-score	3
ASR Attention Problems Raw Score	3
ASR Attention Problems Gender and Age Adjusted T-score	3
ASR Aggressive Behavior Raw Score	3
ASR Aggressive Behavior Gender and Age Adjusted T-score	3
ASR Rule Breaking Behavior Raw Score	3
ASR Rule Breaking Behavior Gender and Age Adjusted T-score	3
ASR Intrusive Raw Score (ASR_Intr_Raw)	3
ASR Intrusive Gender and Age Adjusted T-score	3
ASR Other Raw Score	3
ASR Critical Items Raw Score	3
ASR Internalizing Raw Score	3
ASR Internalizing Gender and Age Adjusted T-score	3
ASR Externalizing Raw Score	3
ASR Externalizing Gender and Age Adjusted T-score	3
ASR Sum of Thought, Attention, and Other Raw Score	3
ASR Total Raw Score	3
ASR Total Problems Gender and Age Adjusted T-score	3
ASR DSM Depressive Problems Raw Score	3
ASR DSM Depressive Problems Gender and Age Adjusted T-score	3
ASR DSM Anxiety Problems Raw Score	3
ASR DSM Anxiety Problems Gender and Age Adjusted T-score	3
ASR DSM Somatic Problems Raw Score	3
ASR DSM Somatic Problems Gender and Age Adjusted T-score	3
ASR DSM Avoidant Personality Problems Raw Score	3
ASR DSM Avoidant Personality Problems Gender and Age Adjusted T-score	3
ASR DSM AD/H Problems Raw Score	3
ASR DSM AD/H Problems Gender and Age Adjusted T-score	3
ASR DSM Inattention Problems Raw Score	3

Features	Category
ASR DSM Hyperactivity Problems Raw Score	3
ASR DSM Antisocial Personality Problems Raw Score	3
ASR DSM Antisocial Personality Problems Gender and Age Adjusted T-score	3
Childhood Conduct Problems	3
Non-diagnostic screen available to exclude possible cases of panic disorder	3
Non-diagnostic screen available to exclude possible cases of agoraphobia	3
Has the participant experienced a diagnosed DSMIV Major Depressive Episode over his/her lifetime?	3
Number of depressive symptoms over lifetime that meet DSMIV criterion for major depression.	3
Eye Used For Color Vision Test (Both (B)/Right (R)/Left (L))	4
EVA score - Numerator	4
EVA score - Denominator	4
Eyeglass correction	4
Any breathalyzer over .05	5
Any breathalyzer over .08	5
Positive test for Cocaine	5
Positive test for THC	5
Positive test for Opiates	5
Positive test for Amphetamines	5
Positive test for MethAmphetamine	5
Positive test for Oxycontin	5
Total drinks in past 7 days	5
Number days drank in past 7 days	5
Avg total weekday drinks/day in past 7 days	5
Avg total weekend drinks/day in past 7 days	5
Total drinks in past 7 days (Beer/Wine Coolers)	5
Avg total weekday drinks/day in past 7 days (Beer/Wine Coolers)	5
Avg total weekend drinks/day in past 7 days (Beer/Wine Coolers)	5
Total drinks in past 7 days (Malt Liquor)	5
Avg total weekday drinks/day in past 7 days (Malt Liquor)	5
Avg total weekend drinks/day in past 7 days (Malt Liquor)	5

Features	Category
Total drinks in past 7 days (Wine)	5
Avg total weekday drinks/day in past 7 days (Wine)	5
Avg total weekend drinks/day in past 7 days (Wine)	5
Total drinks in past 7 days (Hard Liquor)	5
Avg total weekday drinks/day in past 7 days (Hard Liquor)	5
Avg total weekend drinks/day in past 7 days (Hard Liquor)	5
Total drinks in past 7 days (Other Alcohol)	5
Avg total weekday drinks/day in past 7 days (Other Alcohol)	5
Avg total weekend drinks/day in past 7 days (Other Alcohol)	5
Number of DSM4 ALC Dependence Criteria Met	5
Participant meets DSM4 criteria for Alcohol Abuse	5
Number of symptoms participant has of DSM4 Alcohol Abuse	5
Participant meets DSM4 criteria for DSM4 Alcohol Dependence	5
Drinks consumed per drinking day in past 12 months	5
Frequency of any alcohol use in past 12 months	5
Frequency of drinking 5+ drinks in past 12 months	5
Frequency drunk in past 12 months	5
Max drinks consumed in a single day in the past 12 months	5
Age at first alcohol use	5
Drinks per day in heaviest 12-month drinking period of participant's lifetime	5
Frequency of any alcohol use in heaviest 12-month drinking period of participant's lifetime	5
Frequency of drinking 5+ drinks during heaviest 12-month drinking period of participant's lifetime	5
Frequency drunk in heaviest 12-month drinking period of participant's lifetime	5
Lifetime max drinks consumed in single day	5
Total times used/smoked ANY TOBACCO in past 7 days	5
Times used/smoked ANY TOBACCO TODAY	5
Number days smoked/used ANY TOBACCO in past 7 days	5
Avg total weekday ANY TOBACCO per day in past 7 days	5
Avg total weekend ANY TOBACCO per day in past 7 days	5
Total # CIGARETTES in past 7 days	5

Features	Category
Avg weekday CIGARETTES per day in past 7 days	5
Avg weekend CIGARETTES per day in past 7 days	5
Total # CIGARS in past 7 days	5
Avg weekday CIGARS per day in past 7 days	5
Avg weekend CIGARS per day in past 7 days	5
Total # PIPES in past 7 days	5
Avg weekday PIPES per day in past 7 days	5
Avg weekend PIPES per day in past 7 days	5
Times used CHEW in past 7 days	5
Avg weekday times used CHEW per day in past 7 days	5
Avg weekend times used Chew in past 7 days	5
Total times used Snuff in past 7 days	5
Avg weekday times used Snuff in past 7 days	5
Times used SNUFF in past 7 days	5
Total times used other tobacco in past 7 days	5
Avg weekday times used other tobacco in past 7 days	5
Avg weekend times used other tobacco in past 7 days	5
Smoking history	5
For those who were/are regular smokers, Is the participant still smoking?	5
Times used illicit drugs	5
Times used cocaine	5
Times used hallucinogens	5
Times used opiates	5
Times used sedatives	5
Times used stimulants	5
Ever used marijuana	5
Participant meets DSM criteria for marijuana dependence	5
Times used marijuana	5

Category number	Category name
1	Subject Information
2	Health and Family History
3	Psychiatric and Life Function
4	Sensory
5	Substance Use

Table C.2: Name of categories