January 30, 2024

Working NOtes

# Test New Model Orders

It is unclear which model order will provide optimal results. To this end, it was decided to test the model orders between 5 and 20 to establish which, if any, detect significant group-level differences.

## Order 5:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.0962)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.0566 (t-test)

#### lowest correlation p-value: 3.7468e-5, site

## Order 6:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.6949)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.4329 (t-test)

#### lowest correlation p-value: 3.3351e-5, site

## Order 7:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.8070)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.3849 (t-test)

#### lowest correlation p-value: 0.0022, site

## Order 8:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.8973)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.5152

#### lowest correlation p-value: 2.1942e-6, site

## Order 9:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.9164)

### No significant group-level differences between component entropies

#### Lowest group t-test p-value: 0.7312

#### lowest correlation p-value: 0.0131, CPZ

## Order 10:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.0923)

### No significant group-level differences between component entropies

#### Lowest group t-test p-value: 0.0434

#### lowest correlation p-value: 5.06523-7, site

## Order 11:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.4099)

### No significant group-level differences between component entropies

#### Lowest group t-test p-value: 0.2045

#### lowest overall p-value: 3.0477e-8, site

## Order 12:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.8527)

### No significant group-level differences between component entropies

#### Lowest group t-test p-value: 0.4921

#### lowest overall p-value: 0.0265, processing speed

## Order 13:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.8018)

### No significant group-level differences between component entropies

#### Lowest group t-test p-value: 0.4910

#### lowest overall p-value: 0.0907, gender

## Order 14:

### No significant group-level differences between joint entropy (*p*-value: 0.5853)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.2587

#### lowest overall p-value: 2.7057e-07, site

## Order 15:

### No significant group-level differences between joint entropy (*p*-value: 0.6271)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.1327

#### lowest overall p-value: 0.0311, site

## Order 16:

### No significant group-level differences between joint entropy (*p*-value: 0.2309)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.0597

#### lowest correlation p-value: 0.0030, age

## Order 17:

### No significant group-level differences between joint entropy (*p*-value: 0.9973)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.5178

#### lowest correlation p-value: 0.0145, site

## Order 18:

### No significant group-level differences between joint entropy (*p*-value: 0.5320)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.2499

#### lowest correlation p-value: 1.1313e-08, site

## Order 19:

### No significant group-level differences between joint entropy (*p*-value: 0.0931)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.0206

#### lowest correlation p-value: 0.0036, attention & vigilance

## Order 20:

### No significant group-level differences between joint entropy (*p*-value: 0.9055)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.3457

#### lowest correlation p-value: 2.1787e-07, site

## Order 21:

### No significant group-level differences between joint entropy (*p*-value: 0.6175)

### No significant group-level differences between component entropies

#### Lowest group p-value: 0.3180

#### lowest correlation p-value: 8.9186e-04, reasoning & problem solving

## Order 22:

### No significant group-level differences between joint entropy (*t*-test *p*-value: 0.3756)

### No significant group-level differences between component entropies

#### Lowest group t-test p-value: 0.1727, component 11

#### lowest correlation p-value: 0.0028, PANSS (negative)

# Post-ICA Site Effect Removal

# Meeting Results

## Site effects:

### Site means are of : 0.00338, 0.004783, 0.002430, 0.003740, 0.002304, 0.001291, 0.002608

### Mean removal code reduces site means to or less. Note: MATLAB floating-point precision is of .

## Remove site FNC from subjects

### Estimate mean FNC of each site

### Subtract from subject FNCs

### Result:

#### Broad loss of signal across all groups and sites

## Subtract site mean from each time course

### Site mean of each time course (site mean FNC)

## Confirm that *ts.all*, *S*, *I* are properly reshaped

# To-Do

## ~~Plot site alongside time courses in component time course~~

## ~~Visualize effect of removing site effects from FNC matrices~~

## ~~Run model order 4~~

## Remove site means from entropies

### Use *unique*: set setOrder to stable to prevent sorting

## Compare entropy along functional domains:

### Stick to model orders 4-6

#### Show component spatial maps:

##### Full

##### Within-domain (diagonal): non-within set to zero

##### Between-domain (non-diagonal): within set to zero

#### Entropy comparisons between groups

##### Full

##### Within-domain

##### Between-domain

#### Joint entropy

##### Full

##### Within-domain

##### Between-domain

### Groups: within-domain FNC, cross-domain FNC

#### Separate correlation coefficients according to functional domain

#### Concatenate non-diagonal (cross-domain) coefficients

#### Run ICA on both blocks

#### Compare entropy distributions

### How to separate functional domains from FNC matrices?

## ~~Remove site means from post-ICA time courses (currently at~~ *~~newindex~~*~~, line 373)~~

### ~~Will require proper indexing of subject, site, time point before and after ICA~~

### ~~Can serve as reshaping sanity check?~~

## Confirm that *ts.all*, *S*, *I* are properly reshaped

### Implement some sanity check

### Prepare test for all future reshaping

## ~~Implement component-level~~ *~~t~~*~~-tests~~

### Note: must confirm that multiple-comparison correction properly maps *t*-values in cases where only some ICs are valid

February 2, 2024

Working NOtes

# To-Do

## Debug within-, between-domain analysis script