$$\mathcal{G} = (\mathcal{V}_G, \mathcal{V}_1, \ldots, \mathcal{V}_J)$$

$$\mathcal{E} = \{(r, s) | (r, s) \in \mathcal{E}_G$$
$$\text{or } s \in \mathcal{V}_G, r \in \mathcal{V}_j$$
$$\text{or } (r, s) \in \mathcal{V}_j\}$$

$$U(X) = \sum_{(s,r) \in \mathcal{V}_G} \beta \psi(x_s, x_r)$$
$$+ \sum_{j=1}^{J} \left(\sum_{(s,\tilde{s})} \alpha \psi(x_s, x_{\tilde{s}}) \right.$$
$$\left. + \sum_{(s,r) \in \mathcal{V}_j} \beta \psi(x_s, x_r) \right).$$

group level

subject level

fMRI
time series

J