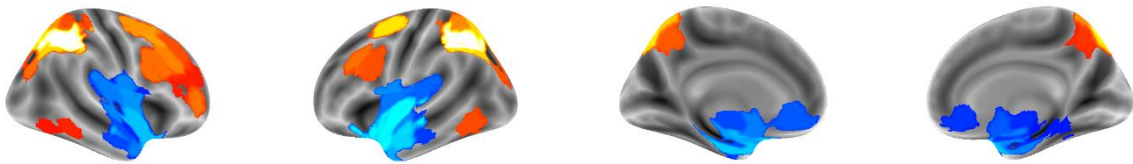*Mean activation maps for each state:*
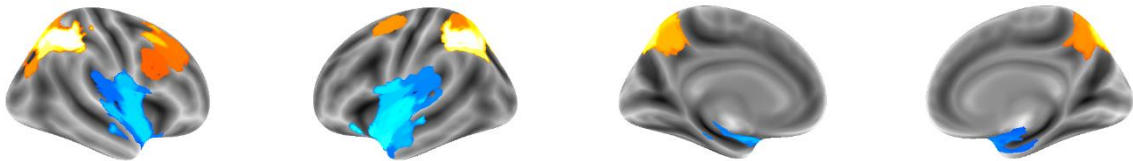
The following graphs show the mean activation maps for each of the five states, for each of the four groups (subject sex *x* diagnosis). Each graph is labelled by state number and group (Girls ADHD: *GA*; Boys ADHD: *BA*; Girls Control: *GC*; Boys Control: *BC*).
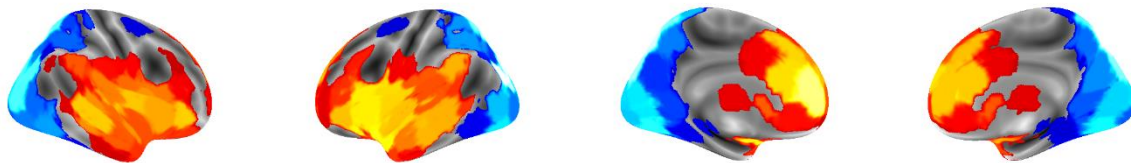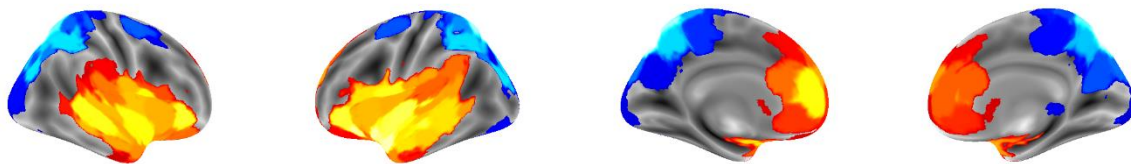
State 1
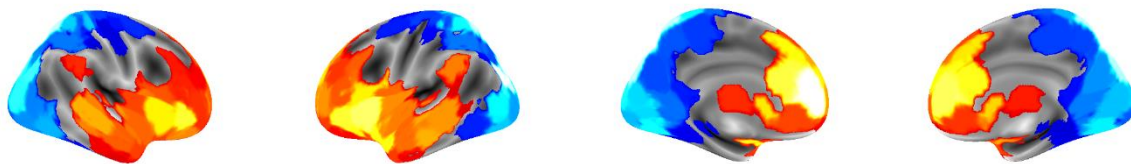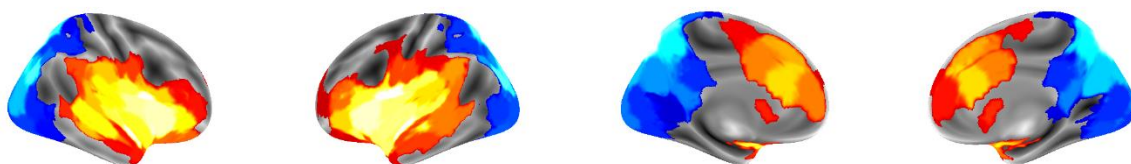
GA

GC

BA

BC

State 2

GA

GC

BA

BC

State 3

GA
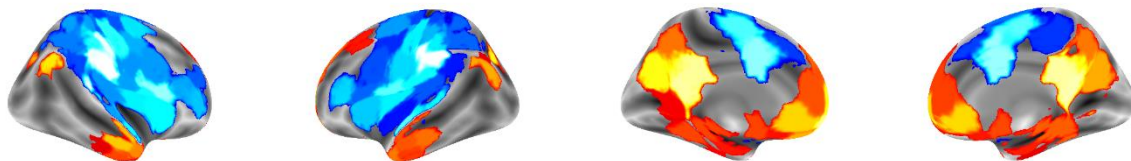
GC

BA

BC
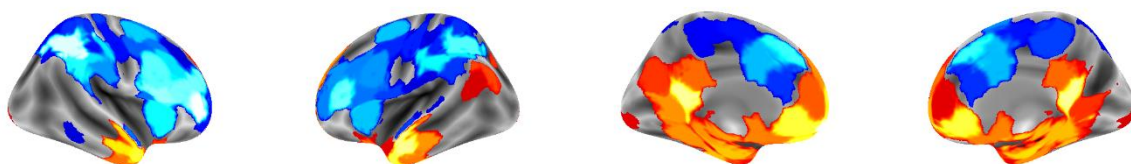
State 4

GA
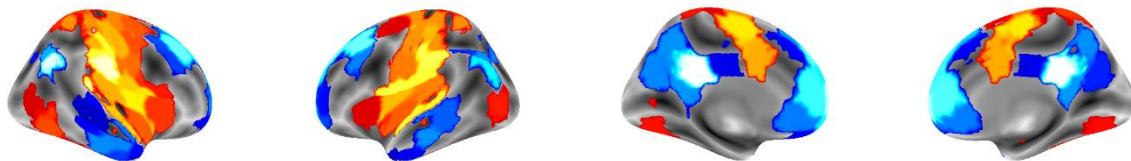
GC
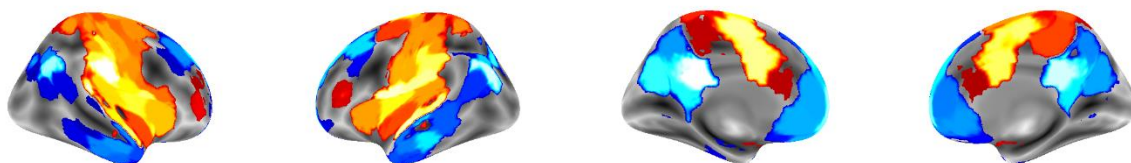
BA
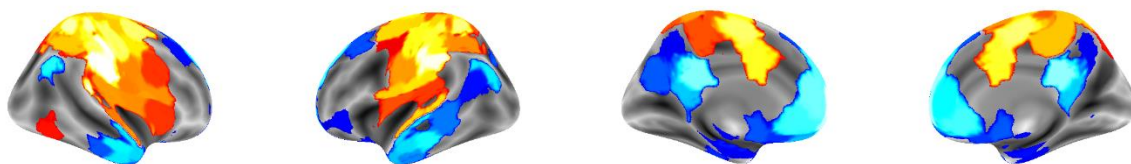
BC
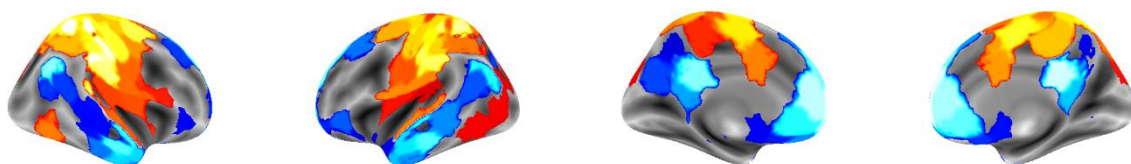
State 5

GA
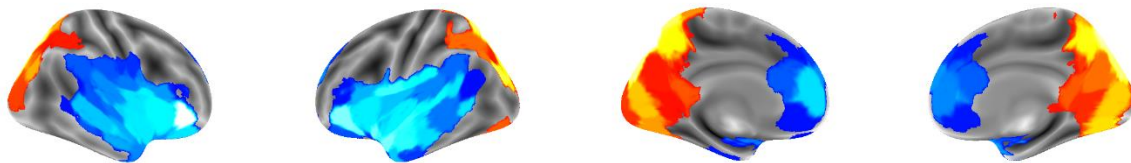
GC

BA
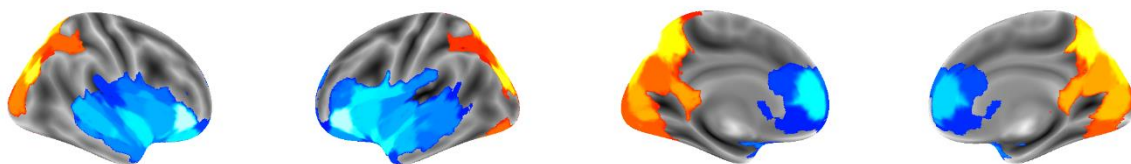
BC
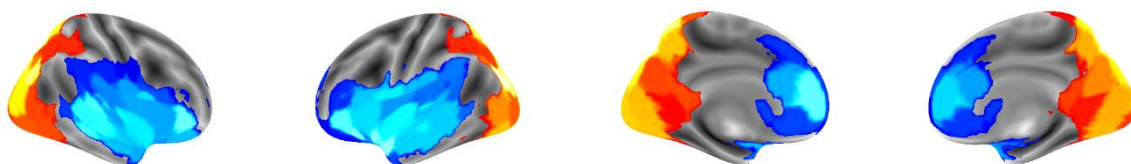
Number of Components:

Before final model fitting, the number of components to fit the HMM model was chosen by assessing log probability scores. To choose the optimal number of network states, the following steps were performed. First, the time series data we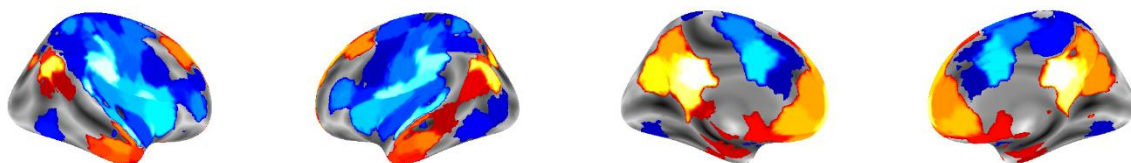re separately concatenated across subjects in their respective group (ADHD/control x boy/girl). Next, the resulting time series were z-scored and subjected to multiple HMMs, with the number of states ranging from 1 to 10. Finally, when all models were fitted, the log probability scores for each were compared visually based on diminishing improvements in fit with additional states (i.e., the elbow method). These comparisons suggested that for each of the four groups, five states captured most of time-related variation. Thus, a five-state model was optimal for all groups considered, and for each of the four final HMMs, a five component model was fit for primary data analysis.

The following graph shows log probability scores for each component (1-10 states), plotted separately for each group.
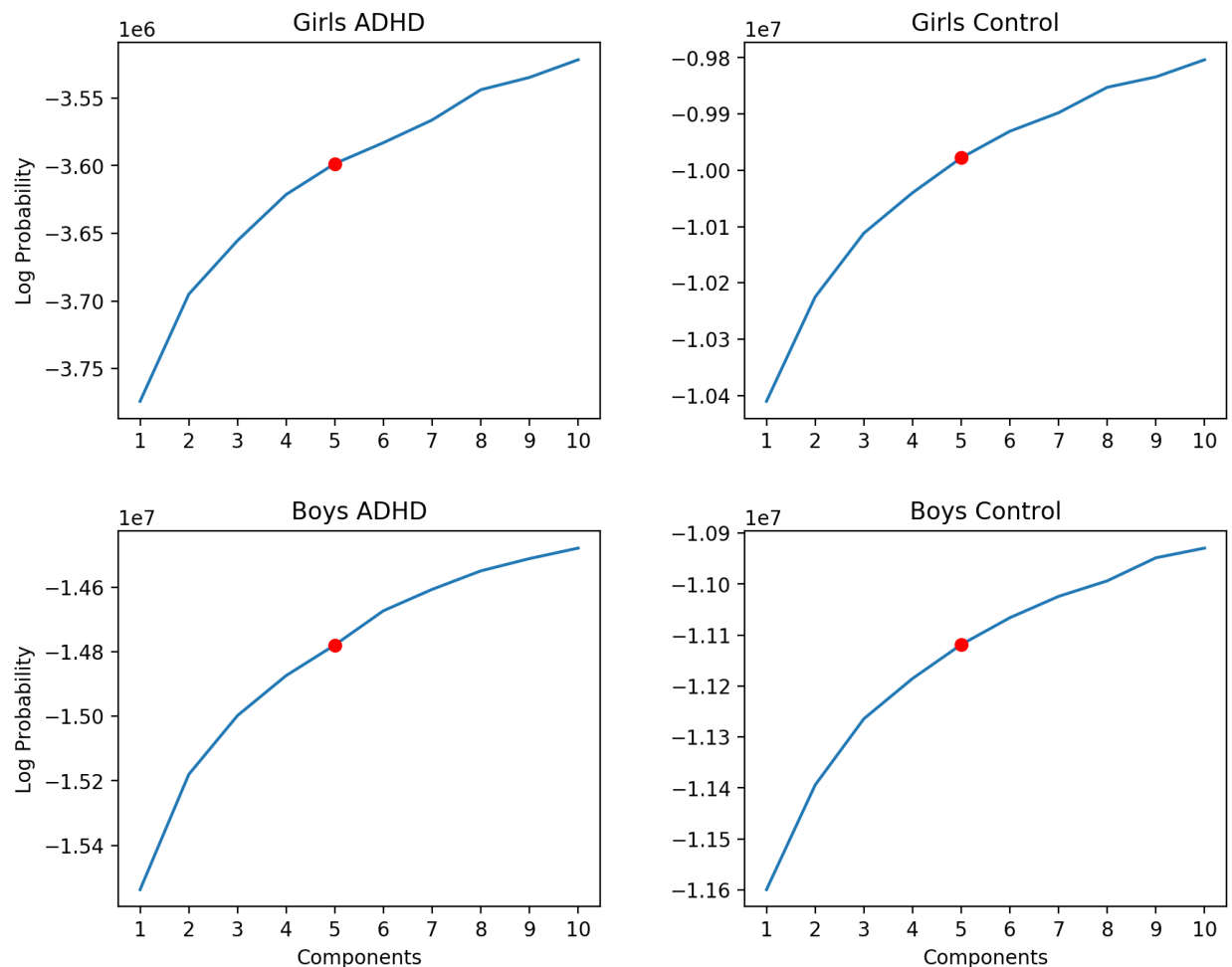
Based on visual inspection, we aimed to retain the simplest component structure based on diminishing model fit improvements. The table below shows difference scores between a current model and a model with $n + 1$ components. For example, higher values in the 2 vs. 1 column would indicate that a 2 component model provides better model fit than a 1 component model. As can be seen in the table, model fit improvements diminish or do not show stable decreases when adding more than 5 components. Thus, a 5 component model was chosen to be the simplest model.

Log Probability Difference Scores

	2 vs. 1	3 vs. 2	4 vs. 3	5 vs. 4	6 vs. 5	7 vs. 6	8 vs. 7	9 vs. 8	10 vs. 9
Girls ADHD	79088.3	39611.5	34072.4	**22827.1**	15481.9	16780.2	22340.2	9112.29	13065.4
Girls Control	185353	113182	71732.1	**62023.3**	47285.4	32830.6	45160.1	18496.4	30476.8
Boys ADHD	356799	182166	123943	**94800**	106106	66143.6	57273.7	38077.9	32467.8
Boys Control	205333	129880	78994.5	**66602.2**	52725.2	41837.5	30485.4	45280.5	18987.1

Suggested Reading for a discussion on alternative ways to model variability in time series:

Jahng, S., Wood, P. K., & Trull, T. J. (2008). Analysis of affective instability in ecological momentary assessment: Indices using successive difference and group comparison via multilevel modeling. *Psychological Methods*, *13*(4), 354-375.