

### Text S2. Comparing the DiProg with the H-CBN algorithm

Supplementary Table S9 contains the BIC scores for the MPNs that are learned by the DiProg from the RCC data in [10]. Again, we compare the BIC scores of the learned MPNs with  $\varepsilon = 0.2$ . The BIC scores for  $k = 3$  and  $k = 4$  are equal and both larger than the BIC score for  $k = 2$ . An inspection of the learned MPNs showed that the structures of the learned MPNs with  $k = 3$  and  $k = 4$  are exactly similar. We pick the learned MPN corresponding to  $\varepsilon = 0.2$  and  $k = 3$  or 4 as the best model. Figure 5 in the paper shows the learned MPN with the chosen parameters.

$k^a$	$\varepsilon^b$	BIC score <sup>c</sup>
2	0.05	-1352.261
2	0.1	-1317.717
2	0.2	-1308.193
2	0.3	-1308.193
3	0.05	-1352.261
3	0.1	-1317.717
3	0.2	-1306.452
3	0.3	-1303.916
4	0.05	-1352.261
4	0.1	-1317.717
4	0.2	-1306.452
4	0.3	-1303.916

Table S 9: The BIC scores of the MPNs learned from the RCC data in [10] with DiProg algorithm

<sup>a</sup> Maximum number of vertices in hyperedges

<sup>b</sup> Value of  $\varepsilon$

<sup>c</sup> The BIC score of the learned General BNs by DiProg.