CSS Analysis

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Locally Aggregated Structures (LAS)

- For each group $g \in G$ we generated what the literature calls Locally Aggregated Structure networks (LAS networks).

- A tie (i, j) in the LAS exists if and only if $(i, j) \in CSS_i$ and $(i, j) \in CSS_j$, i.e. if both i and j report the existance of such tie.

Percieved network vs LAS

In this set of the analysis, we compare each individual's perception of the true with generated by the Locally Aggregated Structures (LAS). This way, for each group, we have n_g different statistics.
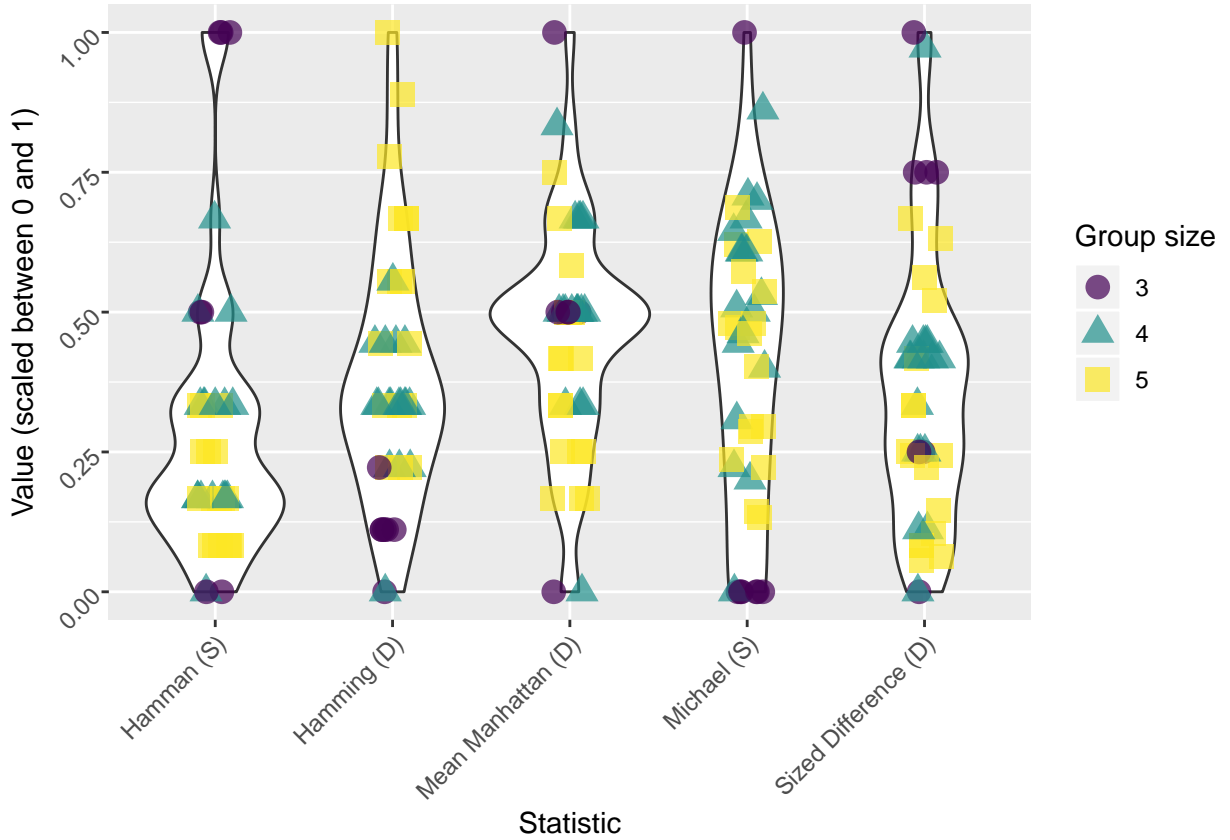

Figure 1: Distribution of Within Group Ranges of Similarity (S) and Distance (D) Statistics with respect to the LAS. Values are normalized to range between 0 and 1.
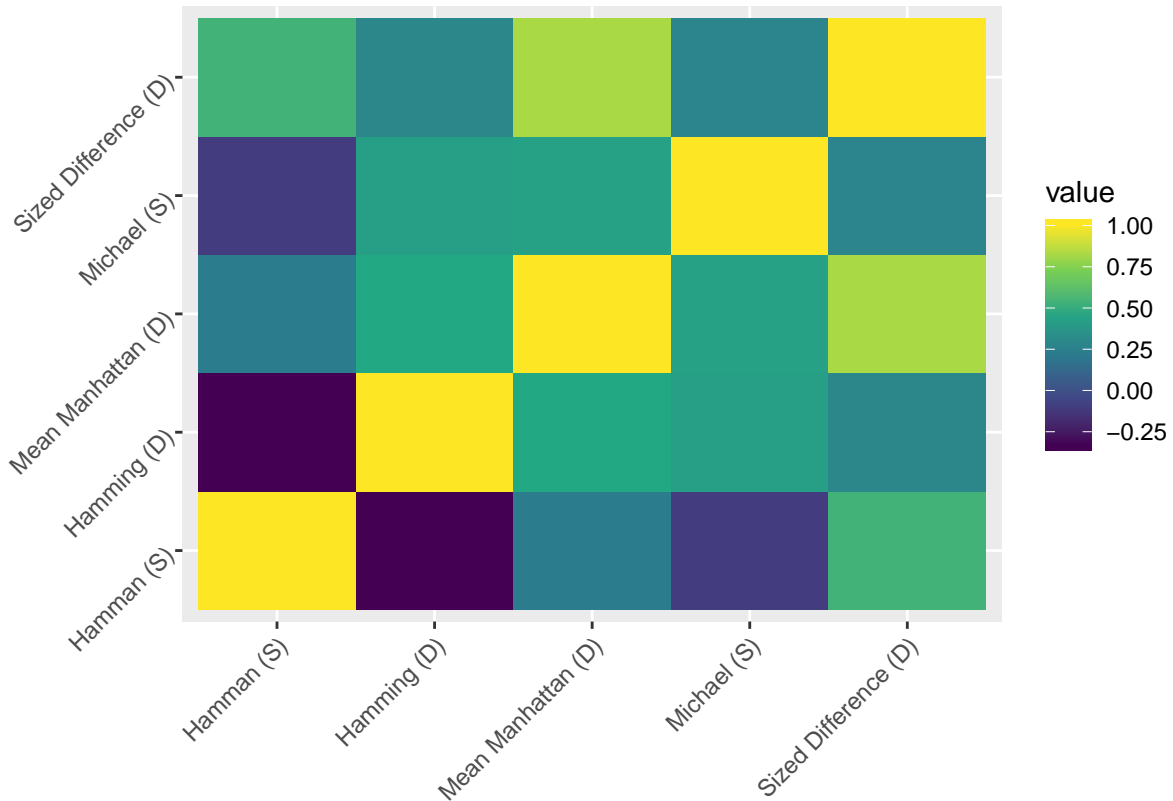
Figure 2: Correlation levels between different measurements of matrix distance or correlation comparing individuals' perception of the network with LAS.

Observation: The hamming normalized seems to be the same as the Mean manhattan (s)

Percieved i vs percieved j

In this case, instead of comparing each individuals' perception with the LAS, we compare perceptions between individuals. This measurement will be somewhat biased since, in order to be able to fully compare j and i's perception of the network, we include what they report about their own ties, this is, j and i's perception of themselves.

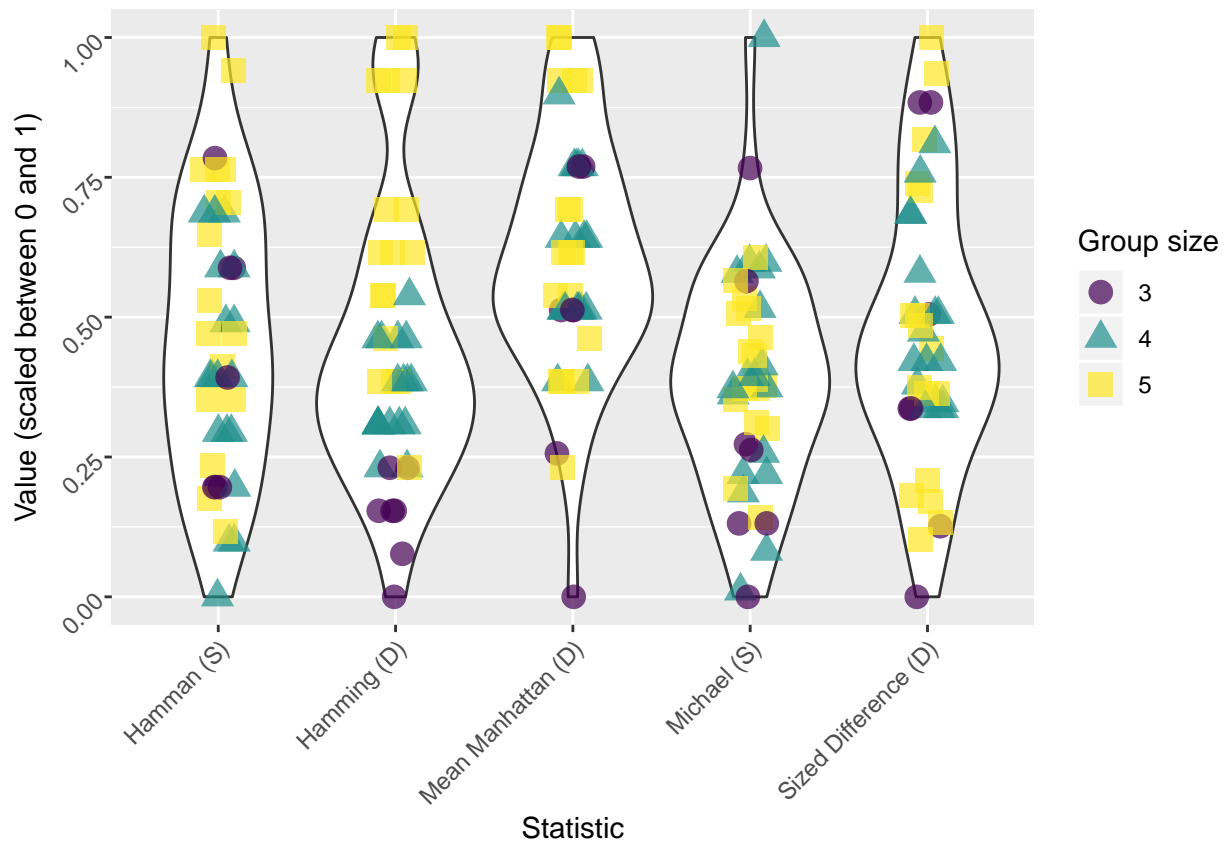# Association with collective intelligence

LAS

Descriptive statistics

Figure 3: Distribution of Within Group Ranges of Similarity (S) and Distance (D) Statistics comparing i vs j perception of the network. Values are normalized to range between 0 and 1.
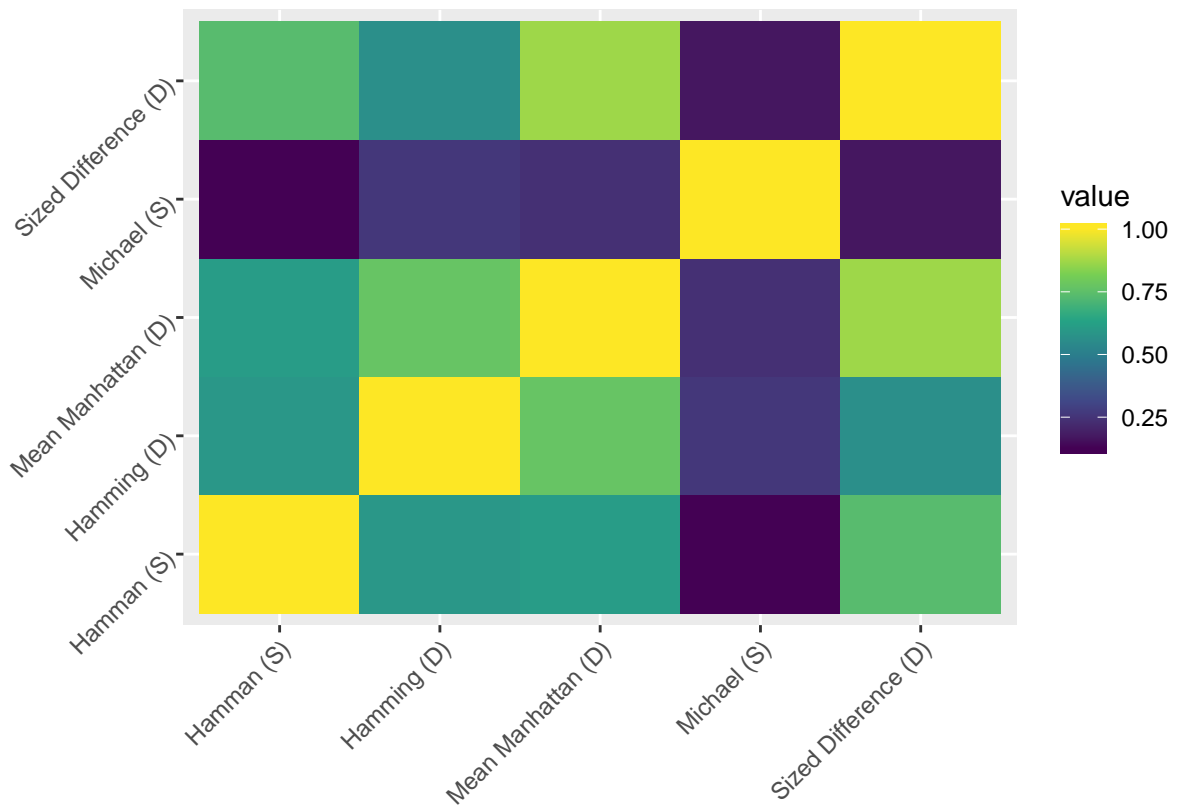
Figure 4: Correlation levels between different measurements of matrix distance or correlation comparing individuals' perception of the network with LAS.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Prop. of Males	0.10	−0.08	−0.08	−0.09	0.05	−0.09	−0.19	−0.06	−0.24	−0.08
	(0.48)	(0.45)	(0.45)	(0.45)	(0.47)	(0.52)	(0.48)	(0.48)	(0.50)	(0.50)
Prop. of Non-white	−0.09	−0.02	−0.05	−0.21	−0.11	−0.41	−0.31	−0.31	−0.57	−0.39
	(0.32)	(0.30)	(0.30)	(0.30)	(0.31)	(0.36)	(0.33)	(0.33)	(0.35)	(0.34)
Age Range	0.04	0.02	0.03	0.04	0.04	0.04	0.02	0.02	0.03	0.02
	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Avg GPA	−0.06	−0.10	−0.11	−0.09	−0.07	0.10	0.05	0.06	0.06	0.10
	(0.16)	(0.15)	(0.15)	(0.15)	(0.16)	(0.19)	(0.17)	(0.17)	(0.17)	(0.17)
Size = 4	0.27	0.47*	0.23	0.48*	0.16					
	(0.24)	(0.23)	(0.20)	(0.23)	(0.22)					
Size = 5	0.83**	1.20***	0.68**	0.97***	0.68**	0.57**	0.75***	0.45**	0.52**	0.53**
	(0.26)	(0.28)	(0.21)	(0.22)	(0.23)	(0.17)	(0.17)	(0.16)	(0.16)	(0.16)
(Intercept)	−0.23	0.35	0.68	0.28	0.21	−0.79	−0.09	−0.03	0.02	−0.53
	(1.27)	(1.19)	(1.22)	(1.19)	(1.26)	(1.32)	(1.26)	(1.26)	(1.32)	(1.28)
Distance/Similarity										
Hamman (S)	0.06					−0.11				
	(0.18)					(0.31)				
Hamming (D)		−0.11*					−0.11*			
		(0.05)					(0.05)			
Mean Manhattan (D)			−0.85*					−1.01*		
			(0.38)					(0.45)		
Michael (S)				−0.36*					−0.40	
				(0.16)					(0.21)	
Sized Difference (D)					−0.40					−0.63
					(0.33)					(0.40)
R²	0.37	0.45	0.45	0.44	0.39	0.34	0.43	0.44	0.41	0.39
Adj. R²	0.24	0.33	0.34	0.33	0.27	0.20	0.31	0.32	0.28	0.26
Num. obs.	42	42	42	42	42	35	35	35	35	35
RMSE	0.48	0.45	0.45	0.45	0.47	0.47	0.44	0.44	0.45	0.45

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 1: Regression using different distance/similarity measurements

Within

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Prop. of Males	0.07	0.08	0.07	0.02	0.07	−0.16	−0.17	−0.19	−0.16	−0.33
	(0.48)	(0.51)	(0.49)	(0.46)	(0.50)	(0.52)	(0.56)	(0.56)	(0.51)	(0.56)
Prop. of Non-white	−0.11	−0.11	−0.12	−0.11	−0.11	−0.39	−0.40	−0.40	−0.40	−0.40
	(0.32)	(0.32)	(0.32)	(0.31)	(0.32)	(0.35)	(0.35)	(0.35)	(0.34)	(0.35)
Age Range	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Avg GPA	−0.06	−0.06	−0.06	−0.05	−0.06	0.09	0.10	0.09	0.10	0.12
	(0.16)	(0.16)	(0.17)	(0.16)	(0.16)	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)
Size = 4	0.23	0.24	0.24	0.30	0.23					
	(0.22)	(0.25)	(0.22)	(0.21)	(0.22)					
Size = 5	0.80**	0.81*	0.80**	0.85***	0.79**	0.63**	0.64**	0.59**	0.58**	0.58**
	(0.22)	(0.34)	(0.23)	(0.21)	(0.22)	(0.17)	(0.22)	(0.16)	(0.16)	(0.16)
(Intercept)	−0.02	−0.13	−0.06	0.17	−0.08	−0.59	−0.69	−0.60	−0.44	−0.61
	(1.28)	(1.26)	(1.30)	(1.21)	(1.28)	(1.33)	(1.33)	(1.36)	(1.31)	(1.30)
Distance/Similarity										
Hamman (S)	−0.09					−0.16				
	(0.20)					(0.21)				
Hamming (D)		−0.00					−0.01			
		(0.04)					(0.04)			
Mean Manhattan (D)			−0.15					−0.32		
			(0.61)					(0.72)		
Michael (S)				−0.43					−0.39	
				(0.25)					(0.29)	
Sized Difference (D)					−0.13					−0.65
					(0.51)					(0.62)
R²	0.37	0.37	0.37	0.42	0.37	0.35	0.34	0.34	0.38	0.36
Adj. R²	0.24	0.23	0.24	0.30	0.24	0.21	0.20	0.20	0.24	0.23
Num. obs.	42	42	42	42	42	35	35	35	35	35
RMSE	0.48	0.48	0.48	0.46	0.48	0.47	0.47	0.47	0.46	0.46

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 2: Regression using different distance/similarity measurements

Network plots

Figure 5: LAS Networks of size 3

Look if non-linear associations better fit?

Last step, see if the individual level accuracy relates to other domains of intelligence.
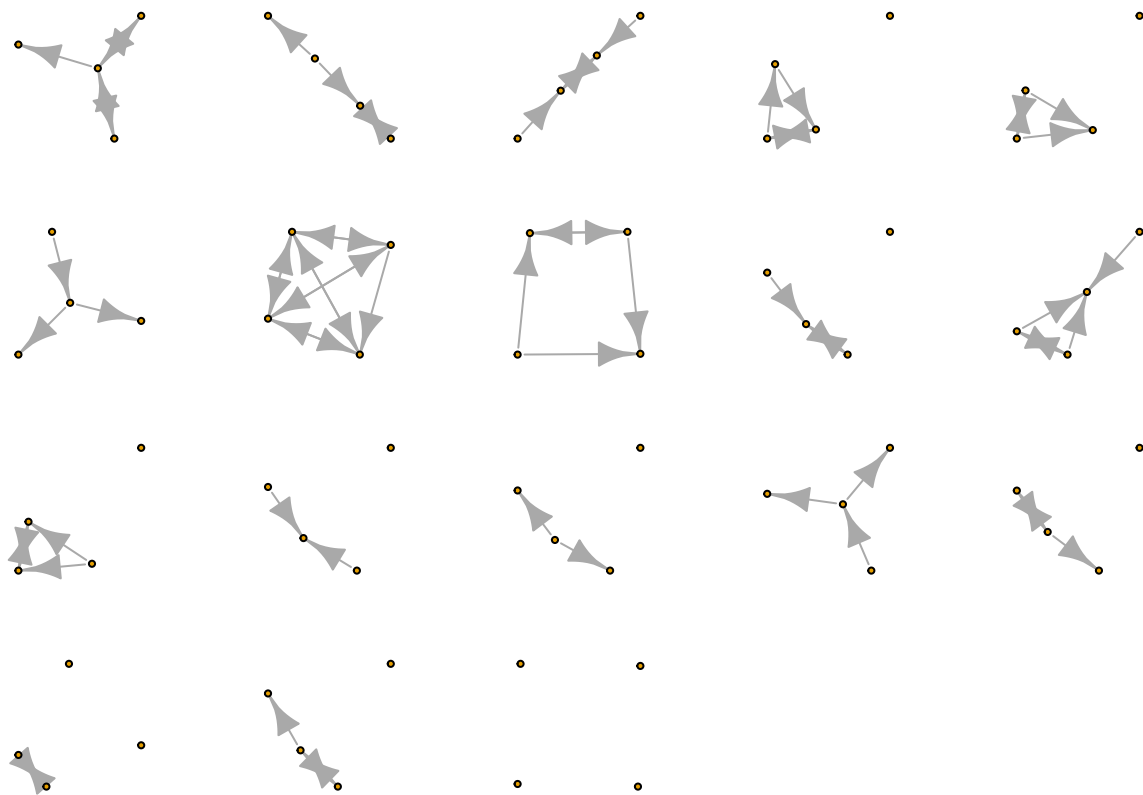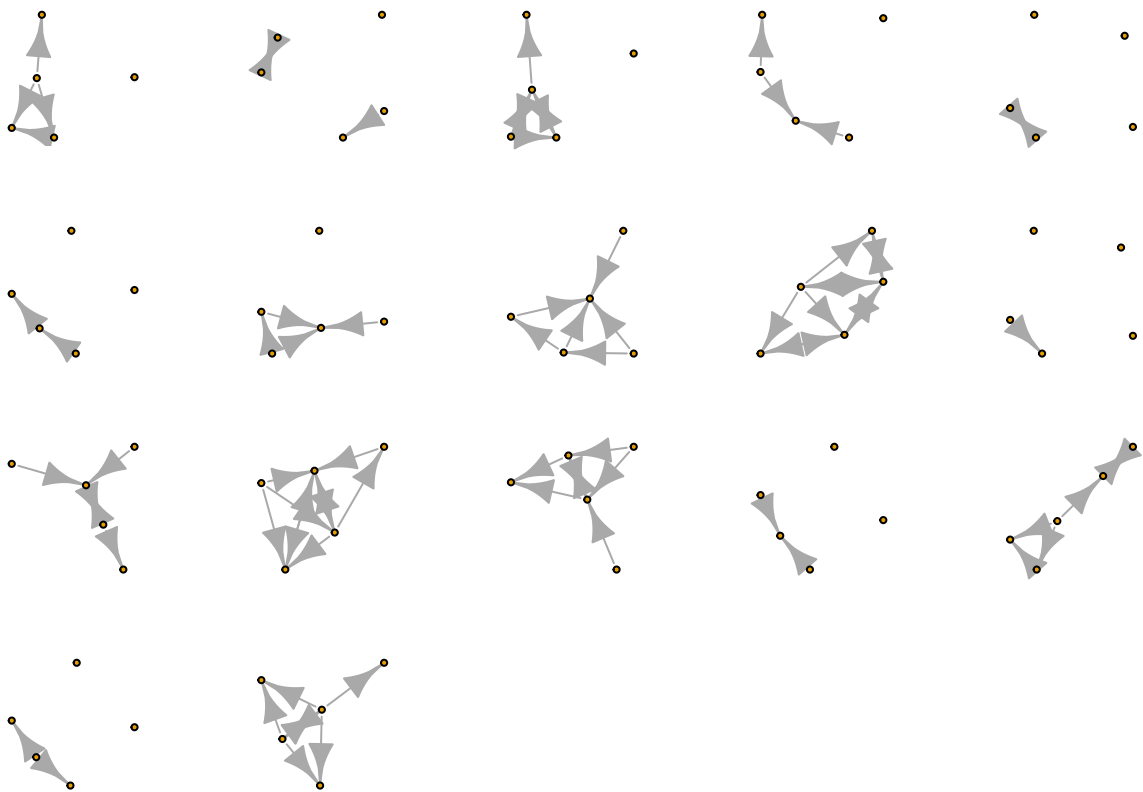
Figure 6: LAS Networks of size 4.

Figure 7: LAS Networks of size 5.