

Using activity and sociability to characterise collective motion: Supplementary Information

December 1, 2017

A Correlation matrices

	S_i	T_i	D_i	C_i	R_i	A_i	N_i	G_i
speed S_i	1.000	-0.544	0.134	0.568	-0.186	0.717	-0.225	0.367
turning rate T_i	-0.544	1.000	0.041	-0.393	-0.049	-0.691	0.138	-0.412
dist. from centre D_i	0.134	0.041	1.000	-0.212	-0.038	-0.201	0.181	-0.441
speed corr. C_i :	0.568	-0.393	-0.212	1.000	-0.207	0.621	-0.458	0.577
reaction time R_i	-0.186	-0.049	-0.038	-0.207	1.000	-0.151	0.261	-0.156
n.n. align A_i	0.717	-0.691	-0.201	0.621	-0.151	1.000	-0.538	0.740
n.n. dist. N_i	-0.225	0.138	0.181	-0.458	0.261	-0.538	1.000	-0.636
group size G_i	0.367	-0.412	-0.441	0.577	-0.156	0.740	-0.636	1.000

Table 1: Correlation matrix for female data in the selection experiment.

	S_i	T_i	D_i	C_i	R_i	A_i	N_i	G_i
speed S_i	1.000	-0.662	-0.130	0.482	-0.267	0.787	-0.277	0.453
turning rate T_i	-0.662	1.000	0.060	-0.351	0.128	-0.738	0.162	-0.374
dist. from centre D_i	-0.130	0.060	1.000	0.033	-0.069	0.009	-0.214	0.147
speed corr. C_i :	0.482	-0.351	0.033	1.000	-0.217	0.559	-0.356	0.536
reaction time R_i	-0.267	0.128	-0.069	-0.217	1.000	-0.277	0.322	-0.285
n.n. align A_i	0.787	-0.738	0.009	0.559	-0.277	1.000	-0.425	0.666
n.n. dist. N_i	-0.277	0.162	-0.214	-0.356	0.322	-0.425	1.000	-0.581
group size G_i	0.453	-0.374	0.147	0.536	-0.285	0.666	-0.581	1.000

Table 2: Correlation matrix for male data in the selection experiment.

B Factor analysis: Robustness

When data was combined, the individual datasets were first centred and normalised. Larger datasets were sampled at random to equal the size of the smallest dataset. Factor tables on the left are computed using all eight measures, while tables on the right are computed without the reaction time measure. For each table, factors are ordered by the amount of variation explained.

Females: Selection (N=232)				<i>No reaction time</i>		
	Activity (27%)	Sociability (20%)	Factor 3 (18%)		Activity (36%)	Sociability (24%)
speed	0.61		0.77	speed	0.83	
turning rate	-0.99			turning rate	-0.72	
dist. from centre		-0.55		dist. from centre		-0.56
speed corr.	0.40		0.50	speed corr.	0.54	
reaction time:						
n.n. align:	0.69	0.41	0.49	n.n. align:	0.86	0.44
n.n. dist.:		-0.63		n.n. dist.:		-0.61
group size:		0.75		group size:	0.44	0.83

Females: Predation (N=624)				<i>No reaction time</i>			
	Activity (31%)	Factor 2 (13%)	Factor 3 (7%)		Activity (35%)	Factor 2 (16%)	Factor 3 (11%)
speed	0.84			speed	0.86		
turning rate	-0.93			turning rate	-0.92		
dist. from centre				dist. from centre			
speed corr.				speed corr.			
reaction time:		-0.61					
n.n. align:	0.95			n.n. align:	0.93		
n.n. dist.:			-0.55	n.n. dist.:		0.99	
group size:		0.66		group size:			0.79

Females: Sorting round 1 (N=384)				<i>No reaction time</i>	
	Sociability (26%)	Activity (22%)		Sociability (29%)	Activity (26%)
speed		0.71	speed		0.72
turning rate		-0.67	turning rate		-0.66
dist. from centre			dist. from centre		
speed corr.	0.42		speed corr.	0.42	
reaction time:					
n.n. align:	0.58	0.81	n.n. align:	0.56	0.83
n.n. dist.:	-0.95		n.n. dist.:	-0.95	
group size:	0.71		group size:	0.71	

Females: Combined (N=696)		
	Activity (28%)	Sociability (18%)
speed	0.79	
turning rate	-0.79	
dist. from centre		
speed corr.		
reaction time:		
n.n. align:	0.90	0.42
n.n. dist.:		-0.78
group size:		0.65

<i>No reaction time</i>		
	Activity (29%)	Sociability (24%)
speed	0.75	
turning rate	-0.77	
dist. from centre		
speed corr.		0.45
reaction time:		
n.n. align:	0.85	0.52
n.n. dist.:		-0.87
group size:		0.65

Males: Selection (N=224)		
	Activity (33%)	Sociability (19%)
speed	0.82	
turning rate	-0.81	
dist. from centre		
speed corr.	0.47	0.41
reaction time:		
n.n. align:	0.90	
n.n. dist.:		-0.69
group size:	0.46	0.71

<i>No reaction time</i>		
	Activity (39%)	Sociability (18%)
speed	0.83	
turning rate	-0.81	
dist. from centre		
speed corr.	0.49	
reaction time:		
n.n. align:	0.92	
n.n. dist.:		-0.65
group size:	0.49	0.71

Males: Predation (N=408)		
	Sociability (24%)	Activity (23%)
speed		0.72
turning rate		-0.95
dist. from centre		
speed corr.		
reaction time:		
n.n. align:	0.67	0.56
n.n. dist.:	-0.59	
group size:	0.85	

<i>No reaction time</i>		
	Sociability (26%)	Activity (25%)
speed		0.73
turning rate		-0.94
dist. from centre		
speed corr.		
reaction time:		
n.n. align:	0.69	0.55
n.n. dist.:	-0.60	
group size:	0.85	

Males: Combined (N=448)		
	Sociability (26%)	Activity (22%)
speed		0.74
turning rate		-0.81
dist. from centre		
speed corr.	0.44	
reaction time:		
n.n. align:	0.63	0.66
n.n. dist.:	-0.59	
group size:	0.91	

<i>No reaction time</i>		
	Sociability (27%)	Activity (25%)
speed		0.75
turning rate		-0.83
dist. from centre		
speed corr.	0.42	
reaction time:		
n.n. align:	0.64	0.64
n.n. dist.:	-0.61	
group size:	0.86	

All data (N=896)			<i>No reaction time</i>		
	Activity (25%)	Sociability (21%)		Activity (29%)	Sociability (23%)
speed	0.77		speed	0.78	
turning rate	-0.82		turning rate	-0.79	
dist. from centre			dist. from centre		
speed corr.			speed corr.		
reaction time:					
n.n. align:	0.78	0.53	n.n. align:	0.78	0.55
n.n. dist.:		-0.69	n.n. dist.:		-0.72
group size:		0.76	group size:		0.75