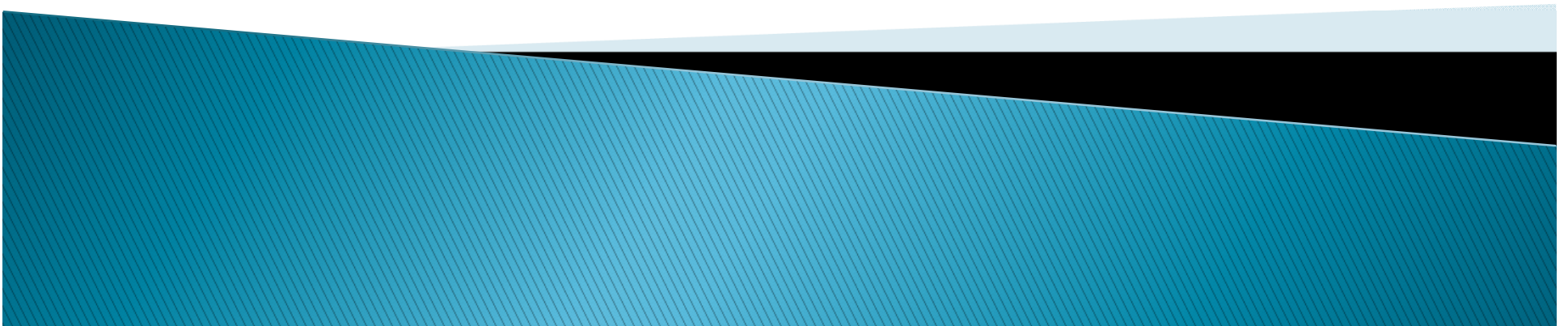


Cultural Structures

Jef, Lars, Matthew & Susan



Outline

- 1) CultuS project
- 2) Data description
- 3) General background
- 4) Results:
 - Network structure
 - Selection vs. influence
 - Multiple networks
- 5) Discussion, conclusion

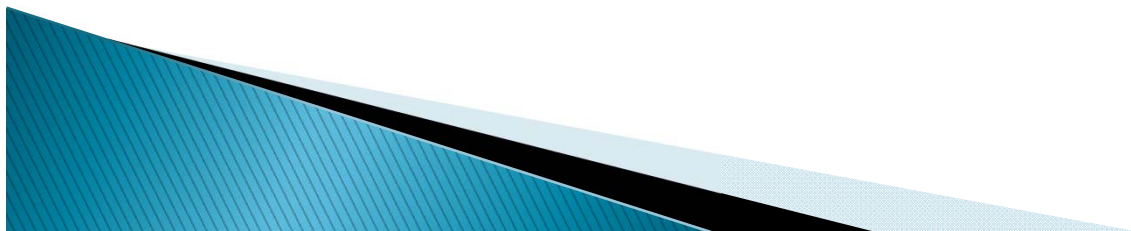


CultuS project

- ▶ 52 sociology students (2nd bachelor)
- ▶ (71 students in Political Sciences)

- ▶ Online survey
- ▶ Response rate unconfirmed
- ▶ 3 waves (October, January, June)

- ▶ Focus on friendship networks and cultural preferences / participation



Data description

- ▶ **Evolving network variables :**
 - Friendship
 - Going to a party together (~=cultural participation)
 - going to a concert/festival together, advice, emotional friendship, desired friends, undesired friends
- ▶ **Attributes:**
 - **Constant covariates:**
 - Gender (0=female)
 - Parental education (0=no/lower sec., 1=higher sec., 2=higher education)
 - **Changing covariates/dependent behavioral variable:**
 - Having a partner (0=not)
 - Highbrow music taste (between 0 and 4)
 - Lowbrow music taste (between 0 and 4) (label=pop in results)

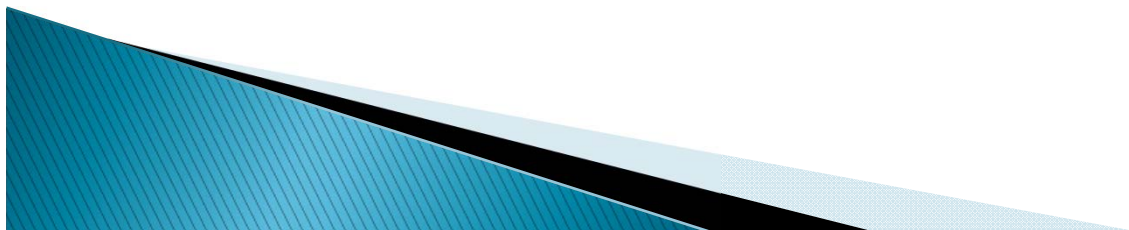
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Descriptive statistics

- ▶ Gender: 70% female, 30% male
- ▶ Parental education:
 - No/lower sec. educ.: 14%
 - Higher sec. educ.: 12%
 - Higher education: 74%
- ▶ Partner

	Time=1	Time=2	Time=3
No partner	56%	44%	48%
Partner	44%	66%	52%



Descriptive statistics

▶ Friendship network

Tie changes between subsequent observations:

periods	0 => 0	0 => 1	1 => 0	1 => 1	Distance	Jaccard
1 ==> 2	4927	175	56	98	196	0.298
2 ==> 3	4922	61	99	174	148	0.521

▶ Cultural participation network

Tie changes between subsequent observations:

periods	0 => 0	0 => 1	1 => 0	1 => 1	Distance	Jaccard
1 ==> 2	2271	44	12	25	14	0.309
2 ==> 3	2235	48	21	48	47	0.410



Research questions

- 1) Network structure
- 2) Do musical preferences influence friendship formation (and vice versa)?
- 3) Cross network effect between cultural participation and friendship formation



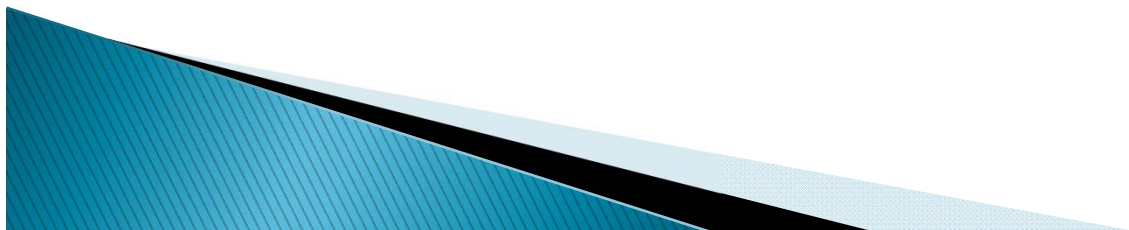
General background

- ▶ **Music preferences and social status**

- Distinction (Bourdieu)
- Highbrow music: high social status

- ▶ **Example hypotheses:**

- **Highbrow music lovers try to distinct themselves:**
 - High indegree
 - Low outdegree
 - Homophily
- **Lowbrow music lovers looking to increase their status:**
 - High outdegree
 - Low indegree
 - No homophily
- **Highbrow music lovers are more influential than lowbrow music lovers**



Network structure

		Estimate	Standard Error	t statistic
Rate parameters:				
0.1	Rate parameter period 1	7.1434	(0.8109)	
0.2	Rate parameter period 2	3.5841	(0.3638)	
Other parameters:				
1.	eval outdegree (density)	-1.6633	(0.2174)	0.0060
2.	eval reciprocity	1.8214	(0.2177)	-0.0579
3.	eval transitive triplets	0.7978	(0.0698)	-0.0201
4.	eval 3-cycles	-0.3352	(0.1607)	-0.0604
5.	eval indegree - popularity	-0.0890	(0.0361)	-0.0006
6.	eval outdegree - popularity	-0.2235	(0.0476)	-0.0397
7.	eval gender alter	0.3348	(0.1938)	0.0251
8.	eval gender ego	0.3831	(0.1982)	0.0218
9.	eval same gender	0.5499	(0.1825)	-0.0407
10.	eval educ.parents similarity	0.3392	(0.2478)	0.0082
11.	eval partner alter	0.4444	(0.1771)	0.1049
12.	eval music.high alter	0.2111	(0.1076)	-0.0064
13.	eval music.high ego	0.3149	(0.0945)	0.0591
14.	eval music.high similarity	0.3150	(0.3339)	-0.0264
15.	eval music.pop alter	0.1108	(0.0834)	-0.0735
16.	eval music.pop ego	0.2238	(0.0898)	-0.0277
17.	eval music.pop similarity	0.5223	(0.4066)	-0.0018

Total of 2584 iteration steps.

Selection vs. influence (1)

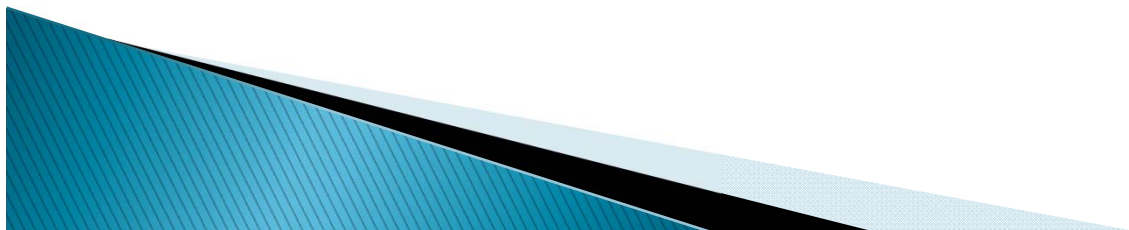
▶ Behavioural change

◦ Popmusic/lowbrow

periods	actors:	down	up	constant	missing	;	steps:	down	up	total
1 => 2		10	9	19	35			12	9	21
2 => 3		6	14	15	38			6	15	21

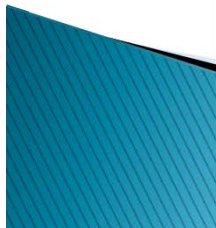
◦ Highbrow

periods	actors:	down	up	constant	missing	;	steps:	down	up	total
1 => 2		9	7	26	31			10	7	17
2 => 3		8	11	18	36			9	12	21



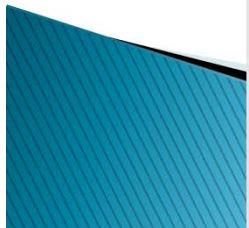
Selection vs. influence: lowbrow

	Estimate	Standard Error	t statistic
Network Dynamics			
1. rate constant friendship rate (period 1)	11.4459	(2.0743)	-0.0076
2. rate constant friendship rate (period 2)	4.7766	(0.5328)	0.0048
3. eval outdegree (density)	-1.5340	(0.2117)	-0.0439
4. eval reciprocity	1.7911	(0.1832)	-0.0630
5. eval transitive triplets	0.7507	(0.0588)	-0.0533
6. eval 3-cycles	-0.3294	(0.1375)	-0.0643
7. eval indegree - popularity	-0.0855	(0.0381)	-0.0603
8. eval outdegree - popularity	-0.2107	(0.0435)	-0.0704
9. eval gender alter	0.2348	(0.1718)	-0.0193
10. eval gender ego	0.2421	(0.1600)	-0.0152
11. eval gender similarity	0.2213	(0.1835)	-0.0074
12. eval educ.parents alter	-0.0754	(0.1279)	-0.0248
13. eval educ.parents ego	-0.0115	(0.1137)	0.0200
14. eval educ.parents similarity	0.3251	(0.2913)	-0.0093
15. eval music.pop.beh similarity	0.3143	(0.2156)	0.0124
16. eval partner alter	0.4035	(0.1528)	0.0502
17. eval same partner	0.3024	(0.1314)	-0.0403
18. eval music.high alter	0.1860	(0.0901)	0.0017
19. eval music.high ego	0.2277	(0.0779)	0.0045
20. eval music.high similarity	0.2554	(0.3164)	-0.0582
21. eval music.pop alter	0.0824	(0.0700)	0.0168
22. eval music.pop ego	0.1494	(0.0684)	0.0071
23. eval music.pop similarity	0.2947	(0.2156)	0.0124
Behavior Dynamics			
24. rate rate music.pop.beh (period 1)	1.3557	(0.4669)	0.0259
25. rate rate music.pop.beh (period 2)	1.5996	(0.5025)	0.0103
26. eval behavior music.pop.beh linear shape	0.0066	(0.1609)	0.0701
27. eval behavior music.pop.beh quadratic shape	-0.1782	(0.1976)	0.0232
28. eval behavior music.pop.beh average similarity	0.0385	(2.8514)	-0.0265



Selection vs. influence: highbrow

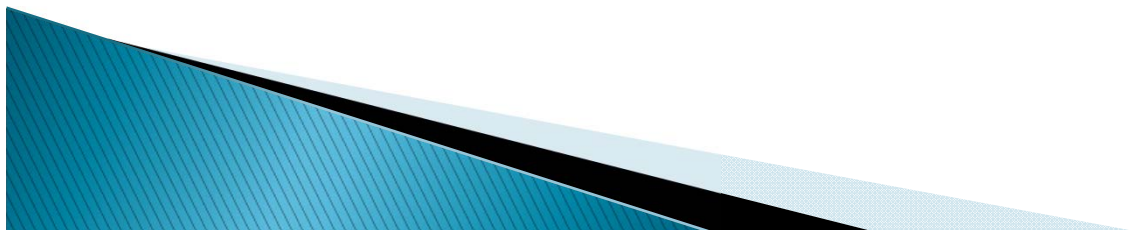
	Estimate	Standard Error	t statistic
Network Dynamics			
1. rate constant friendship rate (period 1)	11.4360	(1.5315)	-0.0181
2. rate constant friendship rate (period 2)	4.7648	(0.5562)	-0.0107
3. eval outdegree (density)	-1.5451	(0.2481)	-0.0591
4. eval reciprocity	1.7991	(0.2283)	-0.0717
5. eval transitive triplets	0.7481	(0.0649)	-0.0601
6. eval 3-cycles	-0.3277	(0.1463)	-0.0431
7. eval indegree - popularity	-0.0846	(0.0395)	-0.0653
8. eval outdegree - popularity	-0.2117	(0.0433)	-0.0560
9. eval gender alter	0.2398	(0.1756)	0.0231
10. eval gender ego	0.2411	(0.1894)	-0.0111
11. eval gender similarity	0.2215	(0.1907)	-0.0211
12. eval educ.parents alter	-0.0761	(0.1241)	0.0242
13. eval educ.parents ego	-0.0078	(0.1152)	0.0874
14. eval educ.parents similarity	0.3277	(0.3741)	0.0433
15. eval music.high.beh3 similarity	0.2107	(0.2053)	0.0320
16. eval partner alter	0.4011	(0.1630)	-0.0278
17. eval same partner	0.3115	(0.1616)	-0.0623
18. eval music.pop alter	0.0830	(0.0835)	-0.0703
19. eval music.pop ego	0.1551	(0.0730)	-0.0278
20. eval music.pop similarity	0.5105	(0.3518)	0.0334
21. eval music.high alter	0.1843	(0.0907)	0.0044
22. eval music.high ego	0.2298	(0.1061)	-0.0191
23. eval music.high similarity	0.1638	(0.2053)	0.0320
Behavior Dynamics			
24. rate rate music.high.beh3 (period 1)	0.8779	(0.2649)	-0.0142
25. rate rate music.high.beh3 (period 2)	1.6105	(0.6936)	-0.0684
26. eval behavior music.high.beh3 linear shape	-0.1762	(1.0200)	0.0686
27. eval behavior music.high.beh3 quadratic shape	-2.6747	(5.9130)	0.0243
28. eval behavior music.high.beh3 average similarity	-15.3802	(37.2684)	0.0199



Selection vs. influence: both

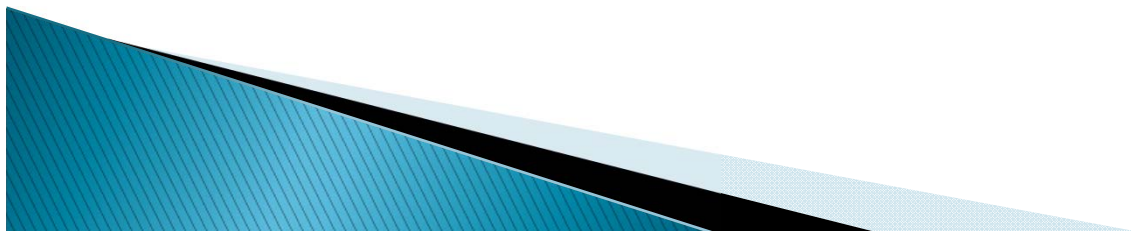
Behavior Dynamics

23.	rate <1>	rate music.pop.beh (period 1)	1.3617	(0.3911)	-0.0338
24.	rate <1>	rate music.pop.beh (period 2)	1.5998	(0.6672)	0.0529
25.	eval <1>	behavior music.pop.beh linear shape	-0.0030	(0.1582)	-0.0262
26.	eval <1>	behavior music.pop.beh quadratic shape	-0.1745	(0.1808)	0.0481
27.	eval <1>	behavior music.pop.beh average similarity	0.0130	(3.0266)	-0.0207
28.	rate <2>	rate music.high.beh (period 1)	0.8866	(0.2837)	0.0361
29.	rate <2>	rate music.high.beh (period 2)	1.6005	(0.5543)	-0.0123
30.	eval <2>	behavior music.high.beh linear shape	-0.1111	(0.8646)	-0.0101
31.	eval <2>	behavior music.high.beh quadratic shape	-2.6598	(5.0538)	-0.0156
32.	eval <2>	behavior music.high.beh average similarity	-15.3981	(32.5799)	-0.0016



Cross networks

- ▶ Cross network effects between cultural participation and friendship formation
- ▶ Cultural participation measured by ‘going to a party/fuif together’.
‘going to a festival/concert together’ problematic



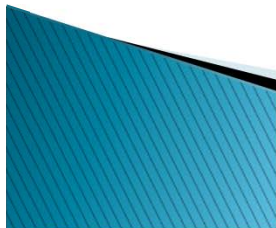
Cross networks (1)

	Estimate	Standard Error	t statistic
1. rate constant friendship rate (period 1)	16.3985	(3.8581)	0.0164
2. rate constant friendship rate (period 2)	5.2868	(0.6127)	-0.0530
3. eval friendship: outdegree (density)	-1.5088	(0.1881)	-0.0085
4. eval friendship: reciprocity	1.7288	(0.2831)	-0.0308
5. eval friendship: transitive triplets	0.7056	(0.0671)	-0.0400
6. eval friendship: 3-cycles	-0.3284	(0.1960)	-0.0313
7. eval friendship: indegree - popularity	-0.0810	(0.0367)	-0.0098
8. eval friendship: outdegree - popularity	-0.2079	(0.0403)	-0.0159
9. eval friendship: gender alter	0.2798	(0.1607)	0.0202
10. eval friendship: gender ego	0.1557	(0.1621)	-0.0226
11. eval friendship: same gender	0.3851	(0.1348)	-0.0437
12. eval friendship: educ.parents similarity	0.1457	(0.1862)	0.0717
13. eval friendship: partner alter	0.2999	(0.1533)	0.0447
14. eval friendship: fuif	1.3025	(0.4820)	0.0175
15. rate constant fuif rate (period 1)	1.7523	(0.9577)	0.0250
16. rate constant fuif rate (period 2)	3.9092	(1.6190)	0.0103
17. eval fuif: outdegree (density)	-4.5593	(2.1249)	0.1148
18. eval fuif: reciprocity	1.1711	(0.8407)	-0.0041
19. eval fuif: transitive triplets	2.6053	(2.6791)	0.0039
20. eval fuif: 3-cycles	0.1037	(1.4997)	-0.0115
21. eval fuif: indegree - popularity	-0.1314	(0.2605)	-0.0147
22. eval fuif: outdegree - popularity	-0.4645	(0.9636)	0.0035
23. eval fuif: friendship	4.1694	(2.4676)	-0.0003

Total of 2729 iteration steps.

Cross networks (2)

	Estimate	Standard Error	t statistic
1. rate constant friendship rate (period 1)	15.9663	(3.3565)	-0.0512
2. rate constant friendship rate (period 2)	5.1814	(1.3271)	-0.0187
3. eval friendship: outdegree (density)	-1.5597	(0.3069)	-0.0302
4. eval friendship: reciprocity	1.7403	(0.2322)	0.0315
5. eval friendship: transitive triplets	0.7165	(0.0751)	0.0659
6. eval friendship: 3-cycles	-0.3413	(0.1562)	0.0744
7. eval friendship: indegree - popularity	-0.0794	(0.0475)	-0.0329
8. eval friendship: outdegree - popularity	-0.2078	(0.0651)	-0.0014
9. eval friendship: gender alter	0.2886	(0.2926)	0.0133
10. eval friendship: gender ego	0.1749	(0.1662)	-0.0810
11. eval friendship: same gender	0.4119	(0.1862)	0.0234
12. eval friendship: educ.parents similarity	0.1484	(0.1998)	-0.0044
13. eval friendship: partner alter	0.2345	(0.1994)	0.0048
14. eval friendship: fuif	1.3039	(0.5316)	-0.0739
15. rate constant fuif rate (period 1)	1.7578	(0.8447)	0.0535
16. rate constant fuif rate (period 2)	3.3600	(0.6611)	-0.0482
17. eval fuif: outdegree (density)	-13.5496	(31.0283)	0.2154
18. eval fuif: reciprocity	1.9232	(4.7355)	-0.0877
19. eval fuif: transitive triplets	9.1126	(24.5085)	-0.0741
20. eval fuif: 3-cycles	1.0120	(7.1792)	-0.0660
21. eval fuif: indegree - popularity	-1.7009	(5.1391)	0.0405
22. eval fuif: outdegree - popularity	-1.1303	(3.0773)	-0.0213
23. eval fuif: partner alter	8.3049	(24.7876)	-0.0577
24. eval fuif: partner ego	2.3899	(5.3692)	-0.1286
25. eval fuif: music.high alter	-0.9058	(3.8285)	-0.0050
26. eval fuif: music.high ego	1.9578	(5.3653)	-0.1225
27. eval fuif: music.high similarity	9.8453	(26.3263)	-0.0251
28. eval fuif: music.pop alter	1.0717	(3.3701)	-0.0152
29. eval fuif: music.pop ego	0.5050	(1.6344)	-0.0080
30. eval fuif: music.pop similarity	19.3612	(58.5110)	-0.0768
31. eval fuif: friendship	12.7018	(26.2287)	-0.1410



- ▶ Discussion

- ▶ Questions?

