

Co-authorship strategies of Social Networks authors

(Success stories only!)

Aliakbar Akbaritabar (Ali) Flaminio Squazzoni

University of Milan - University of Brescia - GECS

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Main questions of the study

- ▶ Is **Social Networks** co-authorship ties formed based on *gender* and *ethnicity* homophily/hetrophily?
- ▶ Who are the members of the main subset of this network (*biggest in size & most stable in time*)?
- ▶ What are the *glue* that attaches members of that main subset together?

Introduction

- ▶ *Connections* between scientists is key to scientific progress (Garvey, 1979)
- ▶ Highest level of *team-work* in science ever (Wuchty, Jones, & Uzzi, 2007)
- ▶ *Diversity* leads to better science (Nielsen et al., 2017)
- ▶ Coauthorship ties, one of the most usual ways to study scientific collaboration (Katz & Martin, 1997; Batagelj, Ferligoj, & Squazzoni, 2017)
- ▶ Studies influential on ours:
 - ▶ Moody (2004)
 - ▶ Scialbolazza, Vacca, Okraku, & McCarty (2017)
 - ▶ Zhang, Bu, Ding, & Xu (2018)
- ▶ We have a *complete* or *sociocentric* approach (Marsden, 2002)
- ▶ We have a *multi-level* approach to control for *individual* scientist attributes, along with *dyadic*, *community* and *network level* characteristics (Bellotti, Kronegger, & Guadalupi, 2016; Akbaritabar, Casnici, & Squazzoni, 2018)

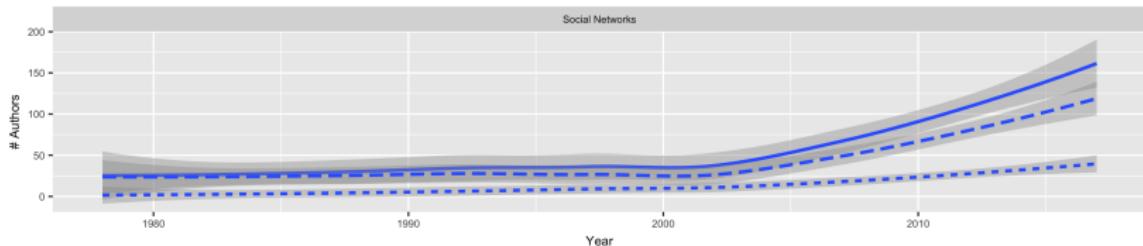
Gender & Ethnicity imputation!

- ▶ For **gender**, used authors' **first names**; send automatic requests with R scripts to a database of names extracted from social media profiles (Wais, 2016)
- ▶ For **ethnicity**, used another API, based on **US census data** (Khanna, Imai, & Jin, 2017) and **Last names** of authors, provides a probability distribution of names in: *white, black, Hispanic, Asian and other*
- ▶ Simultaneously a research assistant (RA) **hand-coded** author *gender & ethnicity*
- ▶ Any conflicting attribution case, the RA researched the online profile & photo of authors, whenever available.
- ▶ Coded any article as:
 - ▶ *Solo male, Solo female, All male team, All female team, and Cross gender collaboration*
 - ▶ *Solo white, Solo non-white, All white team, All non-white team, and Cross ethnic collaboration*

Gender patterns of authors

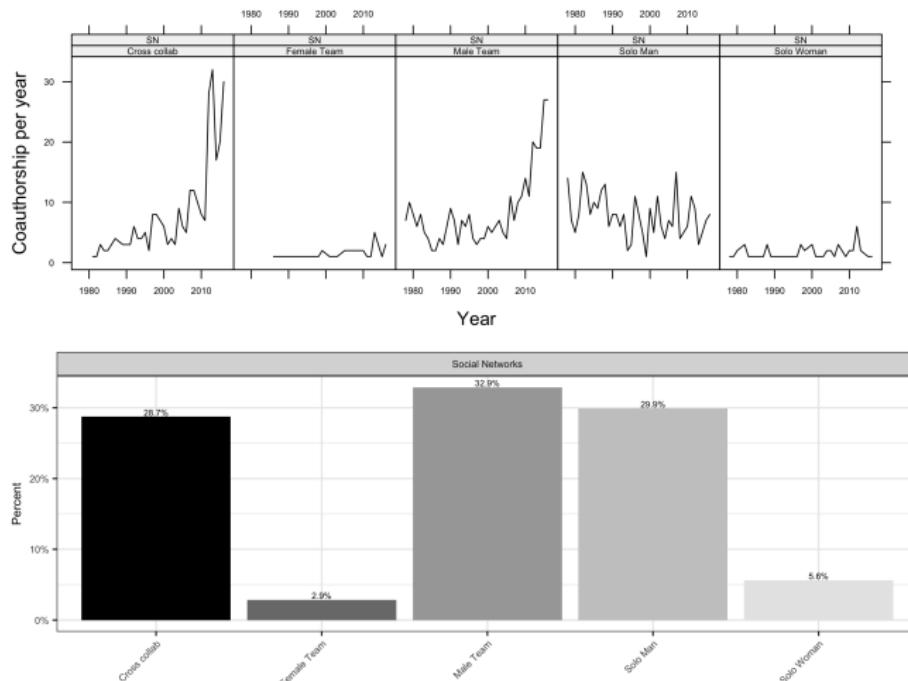
	Journal Name	# All Papers	Sample Starts	Sample Ends	# All Authors	# Men	% Men	# Women	% Women
1	SN	1014	1978	2017	2224	1693	76.12	510	22.93

	gender_machine_handcorrected	freq	percentage	administrative_info
1	female	412	45.98	46
2	male	466	52.01	53
3	NA	18	2.01	1



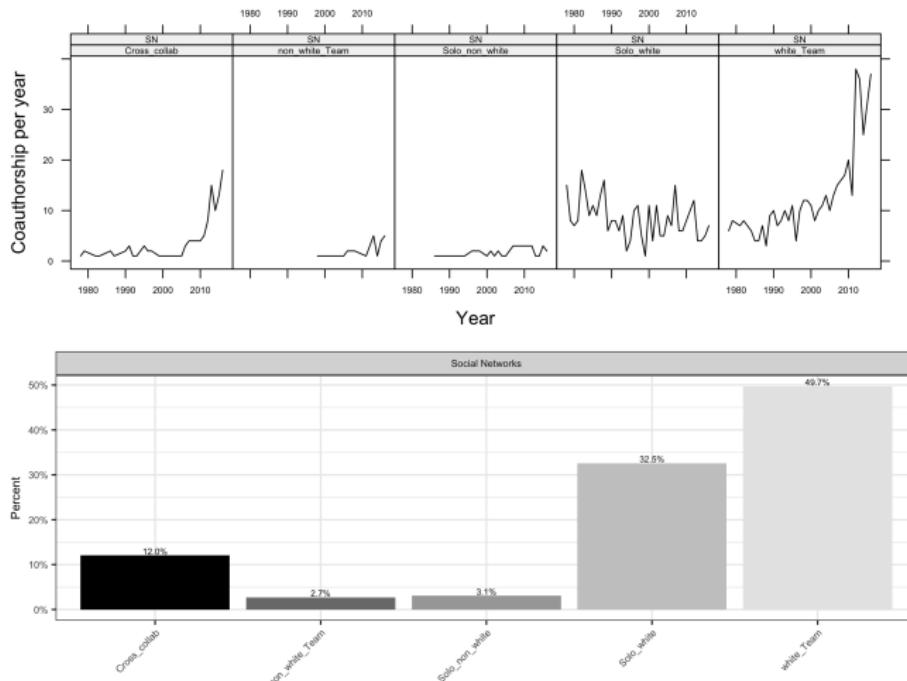
Gender composition of authors

- ▶ Cross gender collaboration and *male teams* on the rise



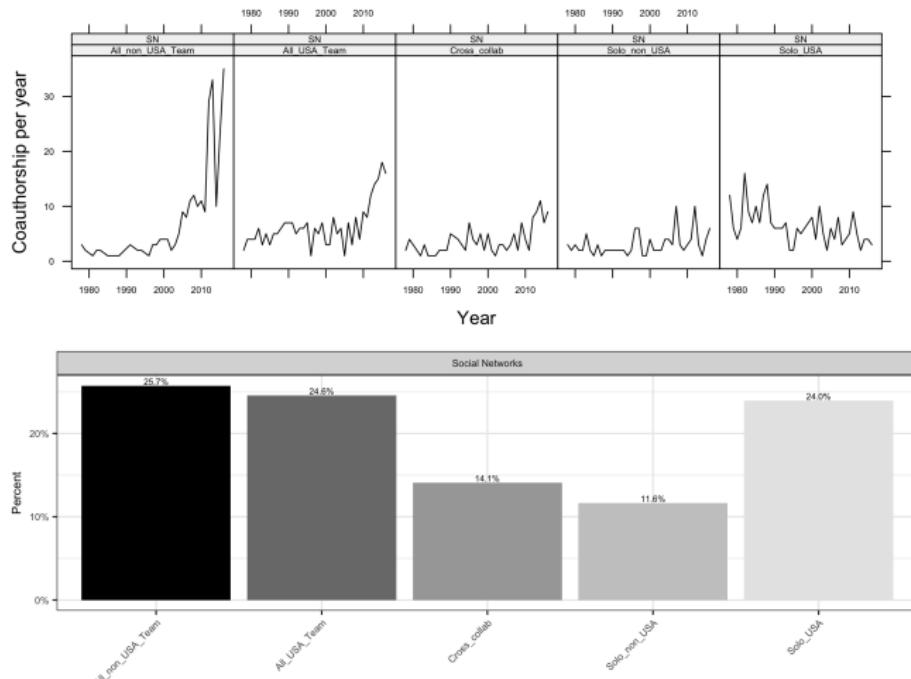
Ethnicity composition of authors

- ▶ White teams increasing, cross ethnic increasing (lower slope)



US & non-US composition of authors

- ▶ Teams on the rise

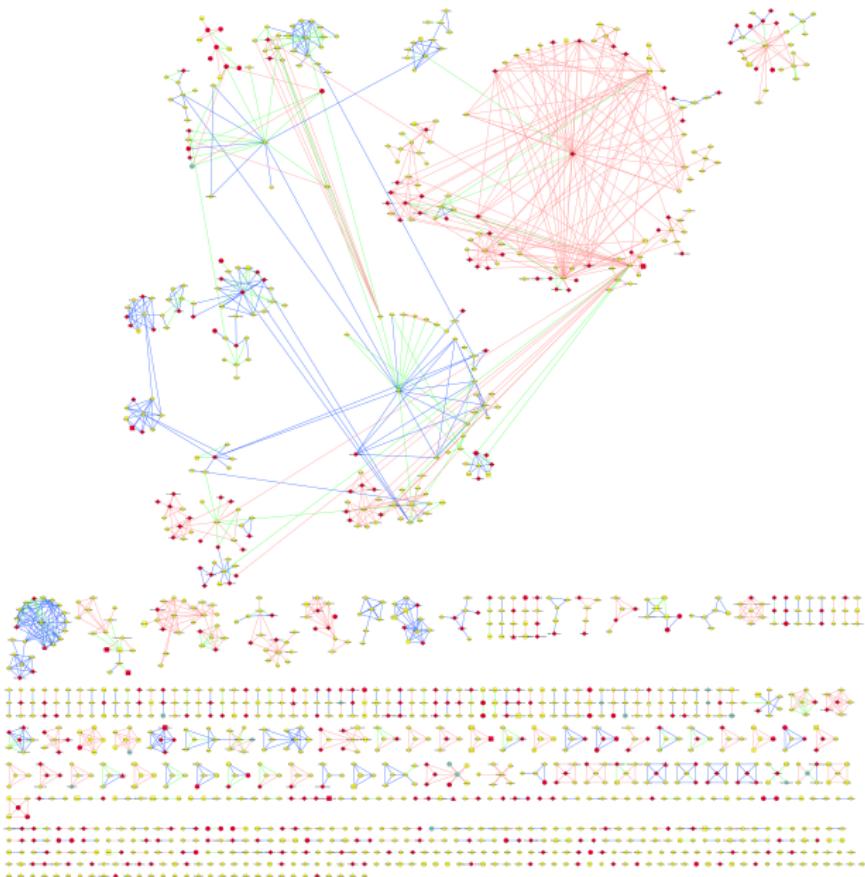


Social Networks authors & G-component

Metric	Value
1 Number of nodes	1372
2 number of edges	1827
3 Density	0.0019
4 Diameter	17
5 Number of clusters	406
6 Cluster size (avg)	3.38
7 Cluster size (sd)	16.13
8 % nodes in Giant comp.	23.54
9 % ties in Giant comp.	36.95

Metric	Value
1 Number of nodes	323
2 number of edges	675
3 Number of female authors	96
4 Number of male authors	226
5 Density	0.013
6 Diameter	17

Full SN (ethnic shape, gender node col., country tie col.)



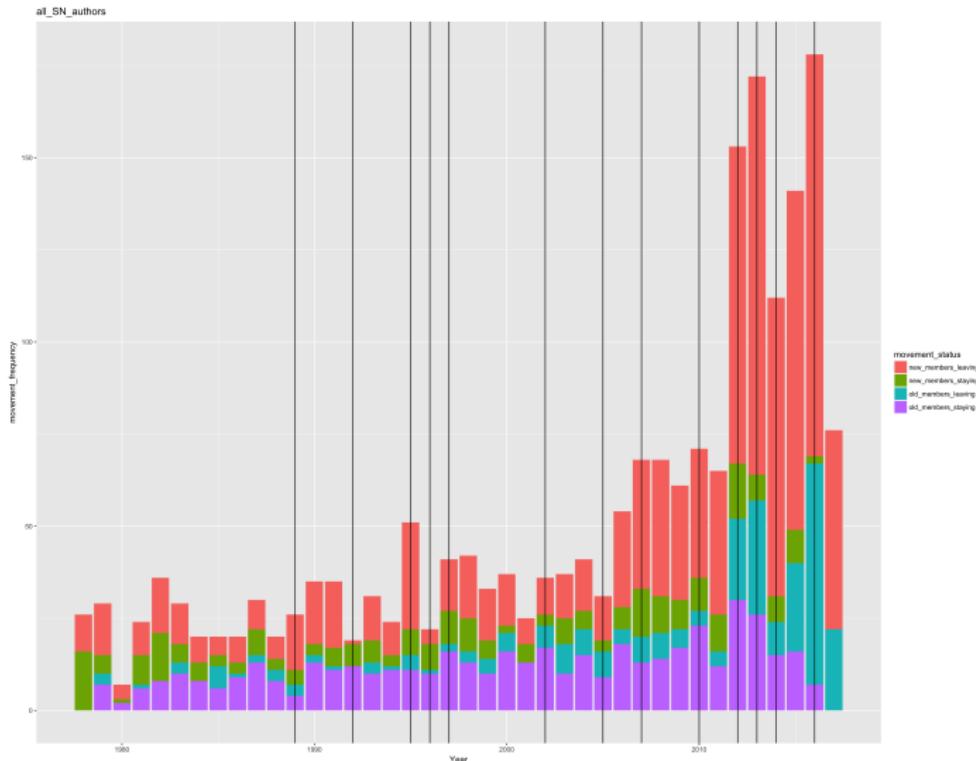
Mathematically simulated networks to compare

- ▶ Low density
- ▶ High transitivity
- ▶ High distance

Name	Size	Density	Avg.degree	Transitivity	Isolates	Diameter
Erdos-Renyi	323	0.0129800	4.179567	0.0075000	4	8
Small world	323	0.0186335	6.000000	0.1066816	0	6
Preferential attachment	323	0.0068650	2.210526	0.0134771	29	11
Social Networks authors all	1372	0.0019426	2.663265	0.5392020	153	17
Social Networks authors Giant Comp.	323	0.0129800	4.179567	0.3691619	0	17

Temporal evolution of all SN authors

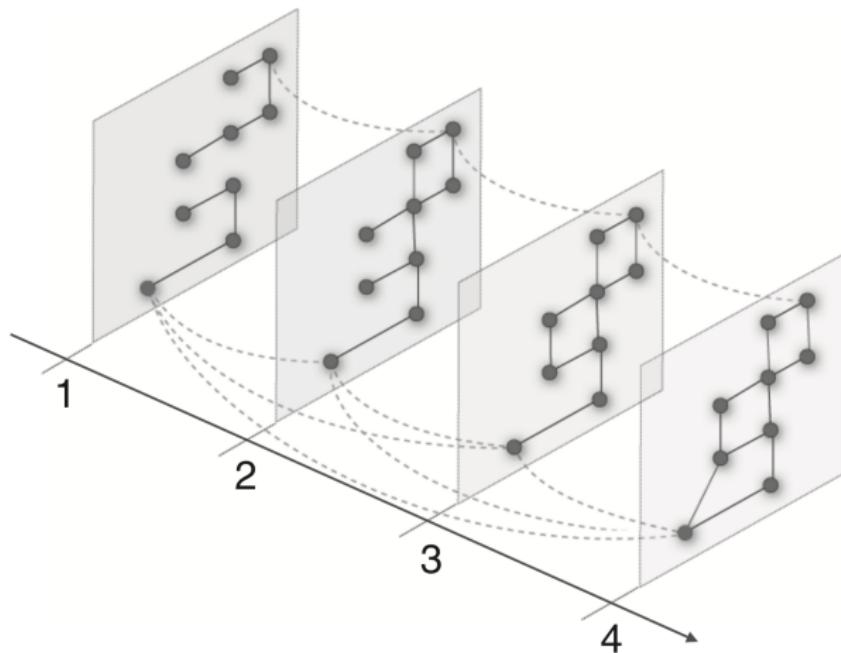
- ▶ Black vertical lines were special issues!



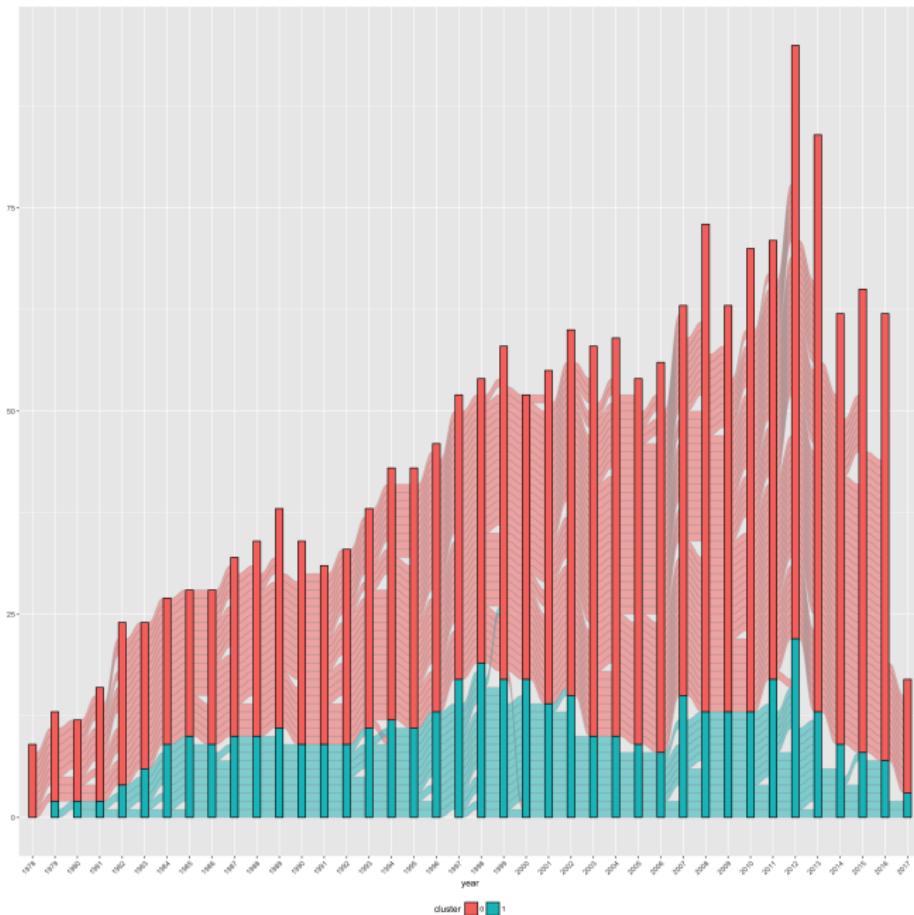
Temporal Community Detection

Photo credit: Mucha, Richardson, Macon, Porter, & Onnela (2010)

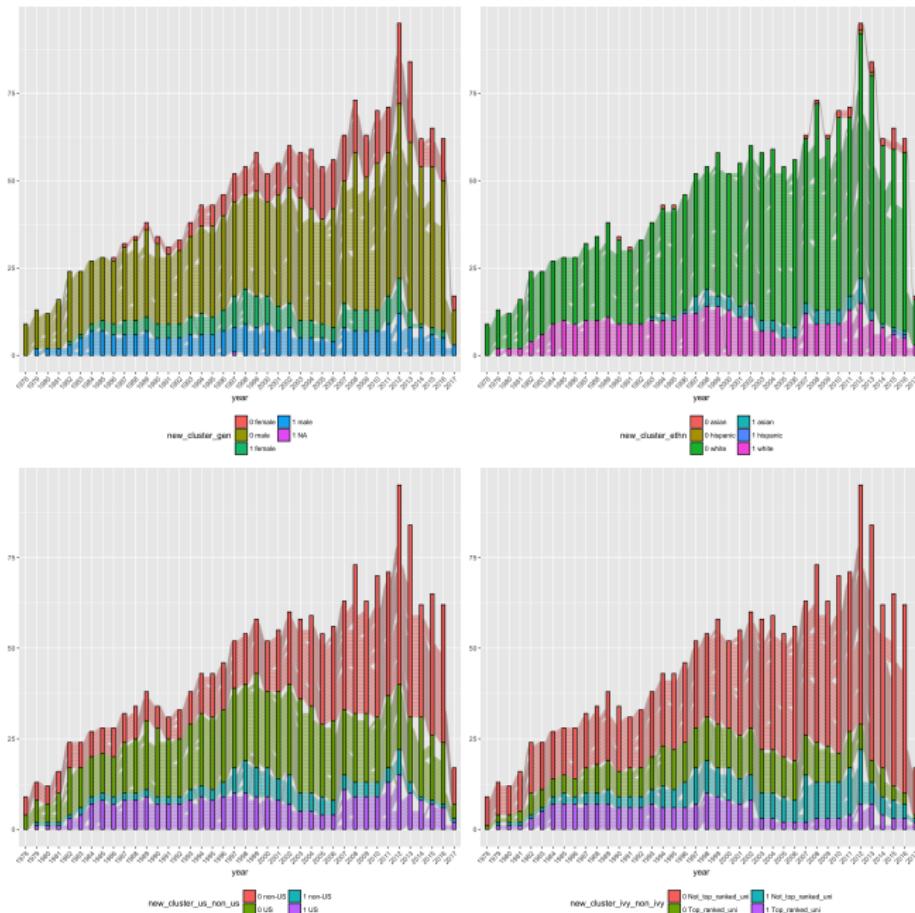
		Interslice Weight	
Resolution Parameter	high	high	low
	low	Smaller Communities - More stable	Smaller Communities - Less stable
		Bigger Communities - More stable	Bigger Communities - Less stable



Clusters detected with TCD from G-comp.



Clusters detected & attributes



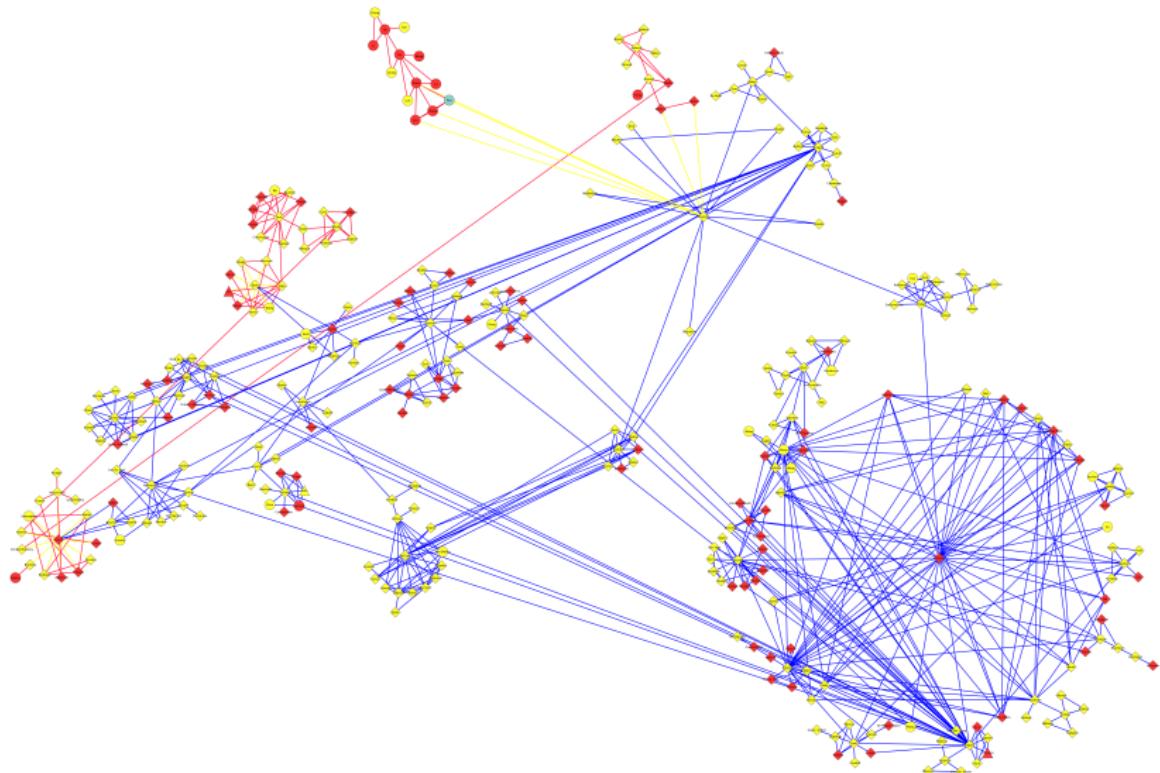
G-comp. clusters & ties described

	Within.cluster.0.edges	Within.cluster.1.edges	Between.clusters.0.and.1
1	81.93	14.37	3.7

	male.to.male.edges	male.to.female.edges	female.to.female.edges
1	51.85	37.63	9.93

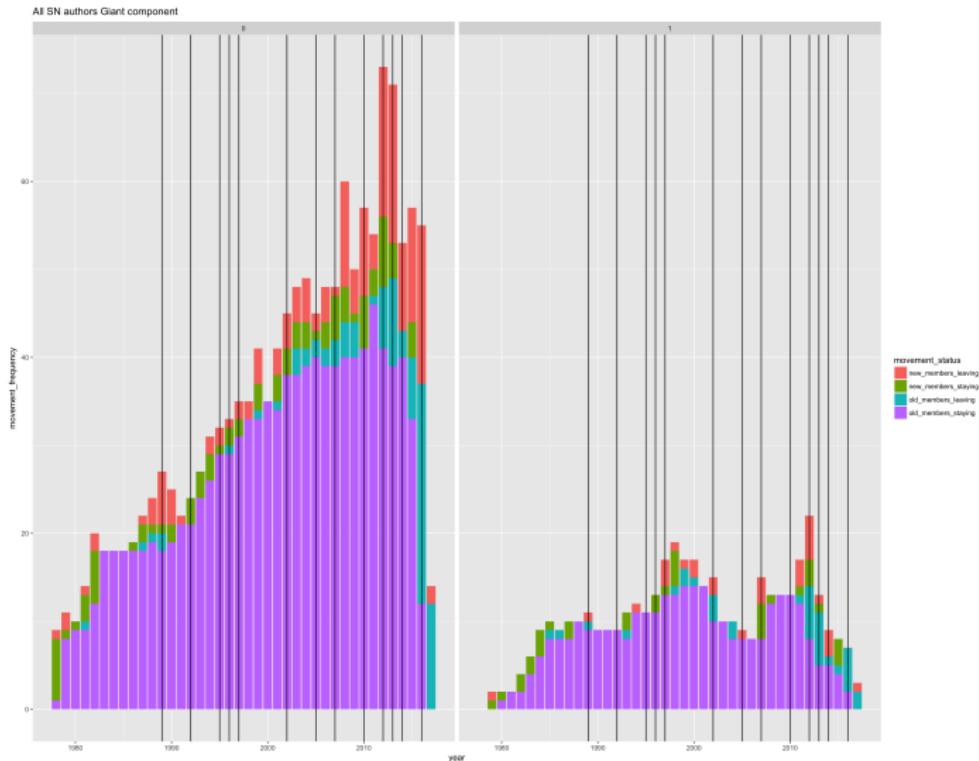
	US.to.US.edges	US.to.non.US.edges	non.US.to.non.US.edges
1	30.37	18.67	50.96

G-comp. (ethnic shape, gender node col., temporal cluster tie col.)



Temporal evolution of clusters of G-comp.

- ▶ Black vertical lines were special issues!

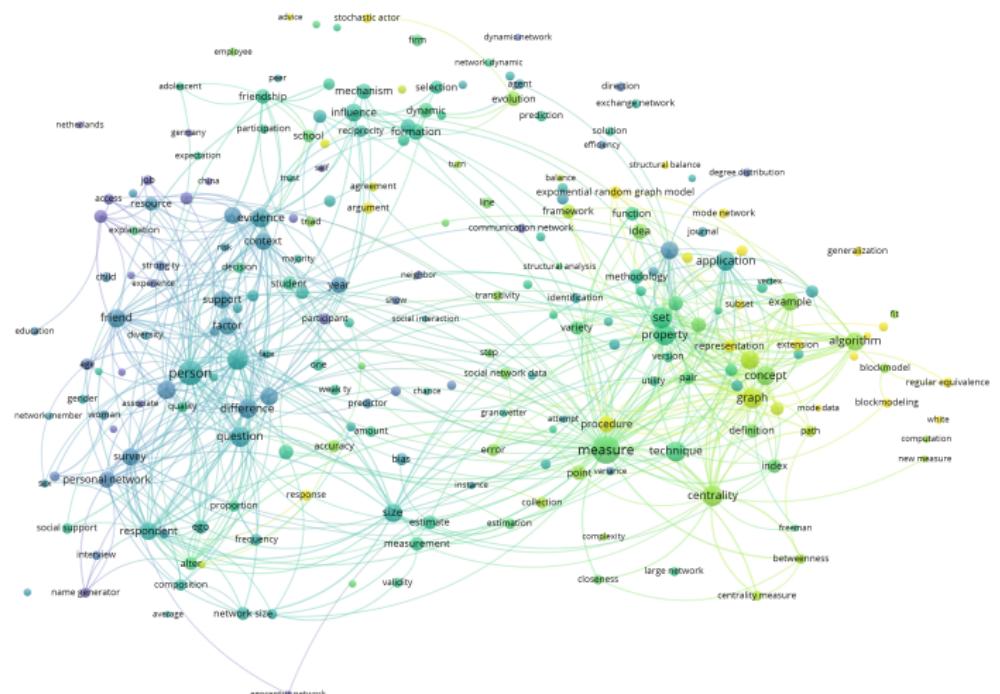


SN G-comp., top 10 members

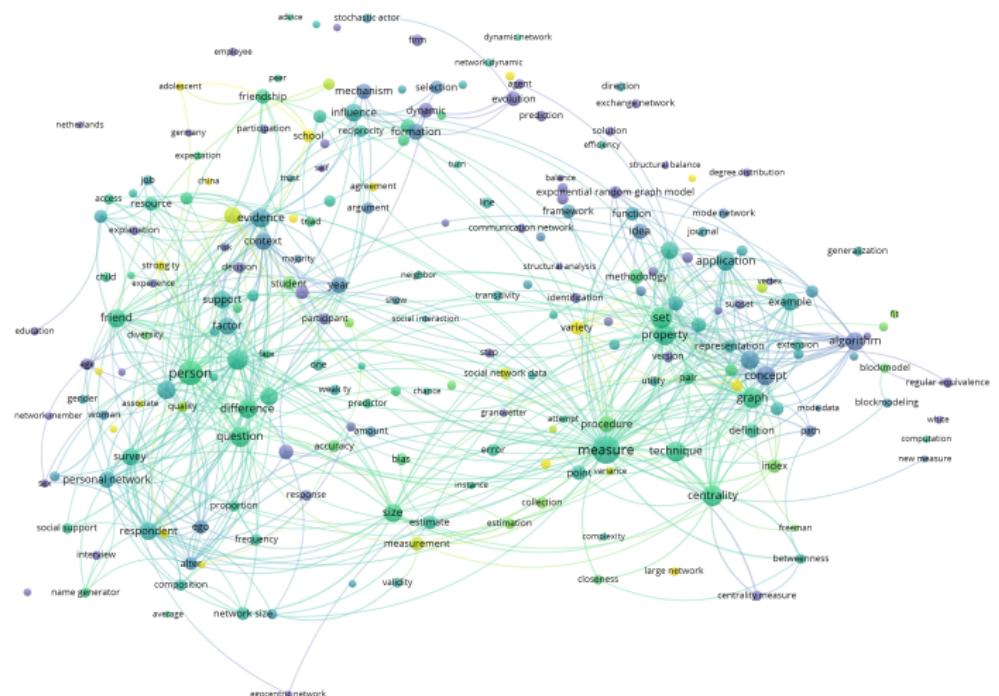
- ▶ Prominence of males on all aspects **but triangles**

Betweenness	Most Prolific	Triangles	Degree
Snijders (male)	Borgatti (male)	Pattison (female)	Snijders (male)
Borgatti (male)	Everett (male)	Robins (male)	Robins (male)
Agneessens (male)	Doreian (male)	Wang (male)	Pattison (female)
Freeman (male)	Robins (male)	Snijders (male)	Wang (male)
Brandes (male)	Pattison (female)	Daraganova (female)	Borgatti (male)
Lubbers (female)	Snijders (male)	McCarty (male)	Lazega (male)
Van De Bunt (male)	Freeman (male)	Rolls (male)	Freeman (male)
Pattison (female)	Friedkin (male)	McBryde (female)	McCarty (male)
Doreian (male)	Killworth (male)	Hellard (female)	Faust (female)
Carley (female)	Bernard (male)	Jenkinson (female)	Daraganova (female)

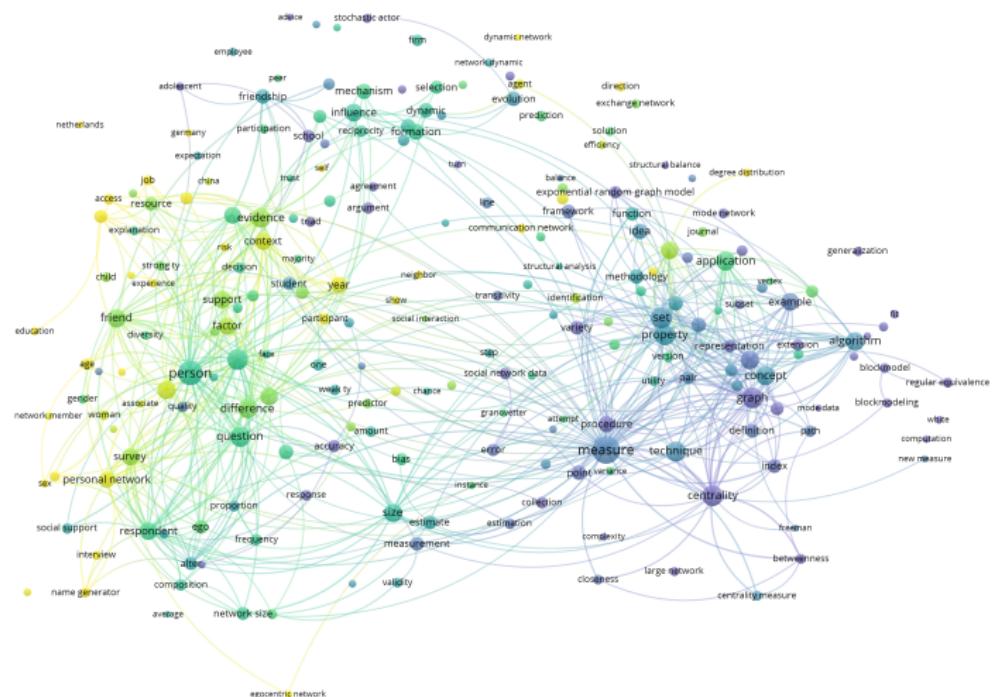
Substantive focus of cluster 0 (Technical studies)



Substantive focus of cluster 1 (Not much clear)



Substantive focus, non-G-comp (Case based studies)



ERGM model to answer how this all happened?

	Giant component of SN		
	tmp_giant_component_sn_authors_net		
	(1)	(2)	(3)
Ties	-3.346*** (0.134)	-3.937*** (0.229)	-3.954 (4.709)
Gender Female	0.269* (0.140)		0.339 (0.655)
Gender Male	0.121 (0.084)		0.193 (0.377)
Special Editor No	-0.263** (0.114)		-0.432 (0.834)
Special Editor Yes	1.169*** (0.318)		1.438 (2.228)
Count Total Pubs	0.127*** (0.006)		0.216 (0.153)
Homophily First Pub	-0.082*** (0.006)		-0.102*** (0.032)
Homophily Last Pub	-0.110*** (0.008)		-0.125*** (0.035)
TCD cluster 0			2.057*** (0.770)
TCD cluster 1			3.275*** (0.880)
gwdegree		4.346 (3.346)	4.631* (2.600)
gwdegree decay		-0.159 (0.124)	-0.051 (0.431)
gwdsp		-0.048 (0.046)	-0.176 (0.112)
gwdsp decay		-0.717 (1.839)	-0.370 (4.752)
Akaike Inf. Crit.	6,419.066	7,203.098	5,757.344
Bayesian Inf. Crit.	6,489.938	7,247.393	5,881.370

Note:

* p<0.1; ** p<0.05; *** p<0.01

Conclusions

- ▶ Two communities of giant component:
 - ▶ Technical experts *developing* algorithms
 - ▶ Intermediaries of the two other groups!? A group mainly involved in some special issues?!
 - ▶ Those using algorithms in *applied* and *case based* articles (non-G-comp members)
- ▶ Being a member of the two communities mattered for coauthorship ties to be formed
- ▶ Preferential attachment at work
- ▶ Being *special issue editor* didn't matter significantly (though it is positive)
- ▶ Publishing in a special issue for *newcomers* could help them to join *stayers*
- ▶ Those with similar *academic age* tend to form collaboration ties
- ▶ Taking all above into account, *gender* doesn't matter!

Limitations (Success stories only!)

- ▶ Our data **do not cover** the entirety of all of the academic domain, from *education to funding and promotion*
- ▶ Looking only at publications does not help to understand even the *gate-keeping role* of journal editors, editorial boards and referees
- ▶ Our results cannot help understand editorial measures that might counterbalance these patterns
- ▶ Women and ethnic minorities may have fewer chances to be published in journal of **Social Networks**, because they **might not perform** the type of research that SN prefers (e.g., similar to findings of Teele & Thelen (2017))

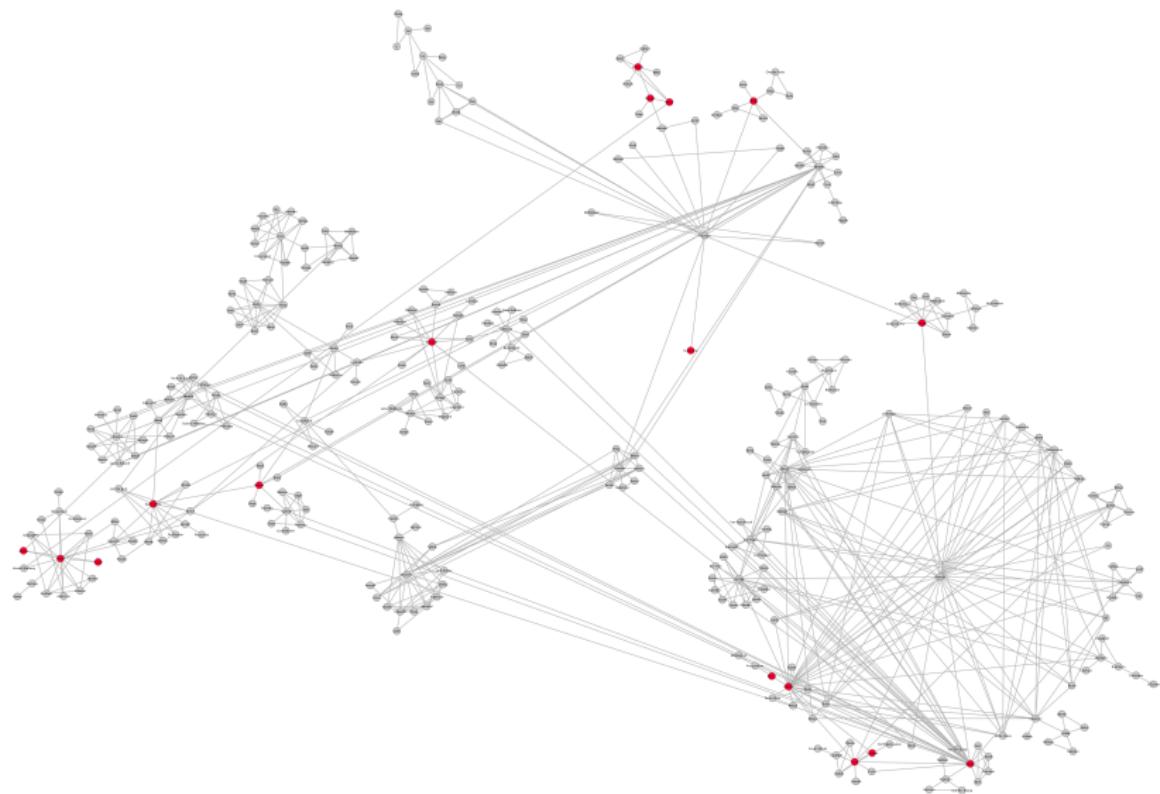
What do you think?!

- ▶ Questions, suggestions and comments are very much welcome!
- ▶ Thanks a lot for your attention
- ▶ **Email:** akbaritabar@gmail.com
- ▶ **Twitter:** @akbaritabar

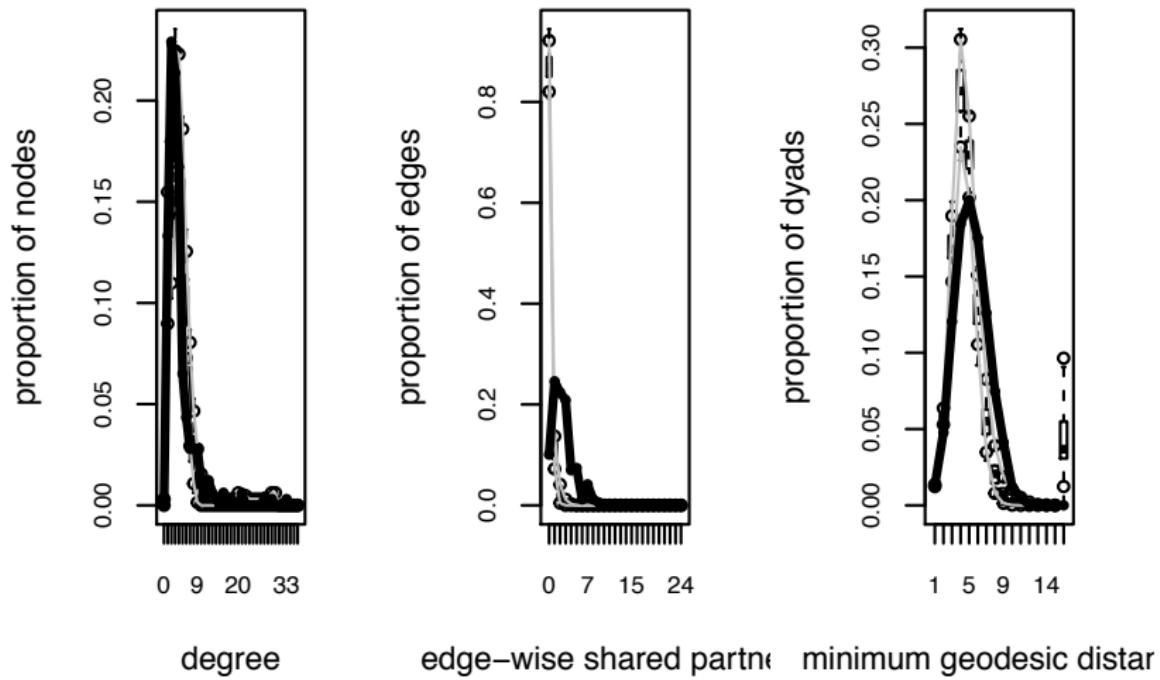
All special issues of SN in our sample

- ▶ Multilevel Social Networks; Mark Tranmer, Garry Robins, Alessandro Lomi, 10 February 2016
- ▶ Political Networks; Scott D. McClurg, David M. J. Lazer, January 2014
- ▶ Advances in Two-mode Social Networks; Filip Agneessens, Martin G Everett, May 2013
- ▶ Dynamics of Social Networks (2); Patrick Doreian, Tom A.B. Snijders, July 2012
- ▶ Capturing Context: Integrating Spatial and Social Network Analyses; jimi adams, Katherine Faust, Gina S. Lovasi, January 2012
- ▶ Dynamics of Social Networks; Patrick Doreian, Tom A.B. Snijders, January 2010
- ▶ Personal Networks; B. Wellman, July 2007
- ▶ Advances in Exponential Random Graph (p^*) Models; Garry Robins, Martina Morris, May 2007
- ▶ The Dynamics of Personal Networks; C. Bidart, A. Degenne, October 2005
- ▶ Ethical Dilemmas in Social Network Research; Ronald L. Breiger, May 2005
- ▶ Honoring the Contributions of A. Kimball Romney; D.D. Brewer, J.C. Johnson & S.C. Weller, July 2002
- ▶ Change in Networks; J. Jill Sutor, Barry Wellman, David L. Morgan, January 1997
- ▶ Social Network and Discrete Structure Analysis; Douglas R. White, Vincent Duquenne, August 1996
- ▶ Social networks and infectious disease: HIV/AIDS; Alden S. Klov Dahl, July–October 1995
- ▶ Location of Power in Exchange Networks; September–December 1992
- ▶ Blockmodels; March–June 1992
- ▶ Non-Human Primate Networks; September 1989

Special issues editors visualized on G-comp.



Goodness-of-fit diagnostics



Comparing authors gender composition over Ivy-Leagues

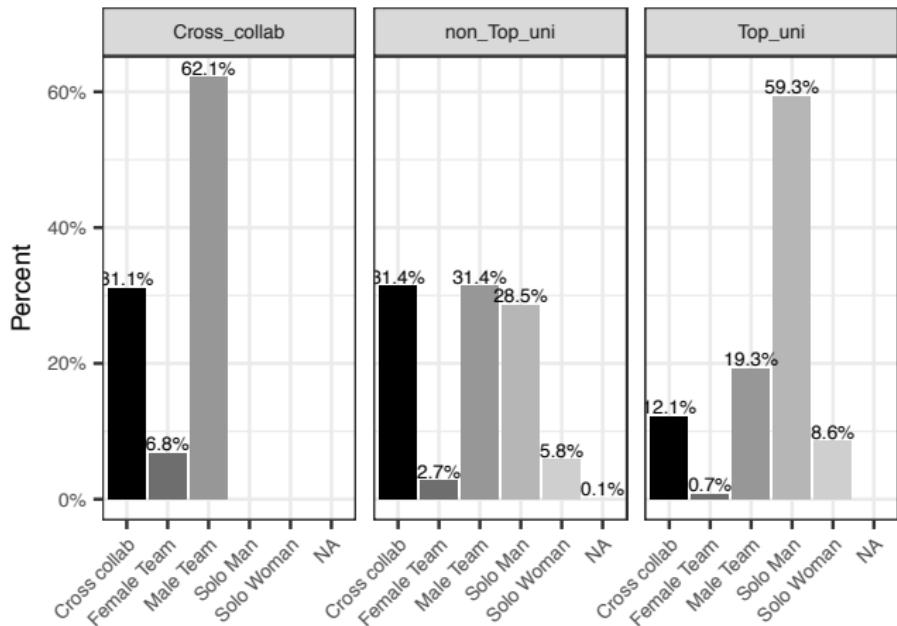


Table of the names of authors from community 1 in G-comp.

x	x	x
Romney	Son	Pan
Hussong	Nakao	Kimball Romney
Verdery	Ma	Boessen
Yang	Orbach	Entwistle
Crouch	Nagle	Webster
Anderson	Wong	Holbert
Wang	Lee	Lovasi
Muelder	Rindfuss	Moody
Lakon	Jose	Smith
Osgood	Acton	Johnson
Ruan	Gest	Hipp
Kirke	Leung	Galaskiewicz
Brewer	Wasserman	Bauman
Felmlee	Weller	Miller
Spiro	Ennett	Feinberg
Runger	Crnovrsanin	Lin
Lai	Li	Faris
Boster	Foshee	Walsh
adams	Dai	Brynilsen
Morgan	Zhang	Zhang
	Lu	
	Sawangdee	