

## In the short term we divide, in the long term we unite

Michael Mäs, Andreas Flache, Károly Takács,  
Karen Jehn

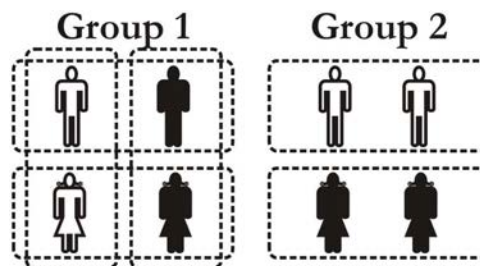


## Demographic diversity and cohesion

- Theory predicts that diversity decreases cohesion but empirical research lead to mixed results
- Lau and Murnighan (1998): effect is moderated by the strength of the demographic faultline

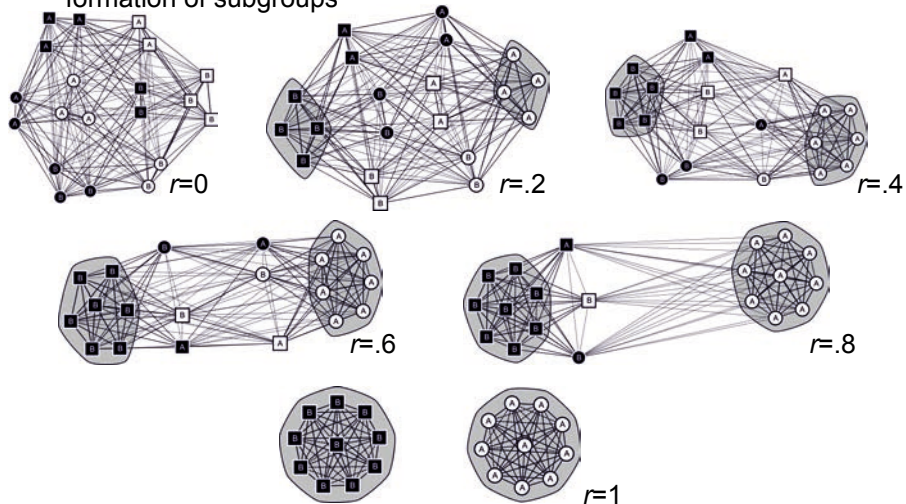


A faultline is **strong** when demographic attributes are correlated



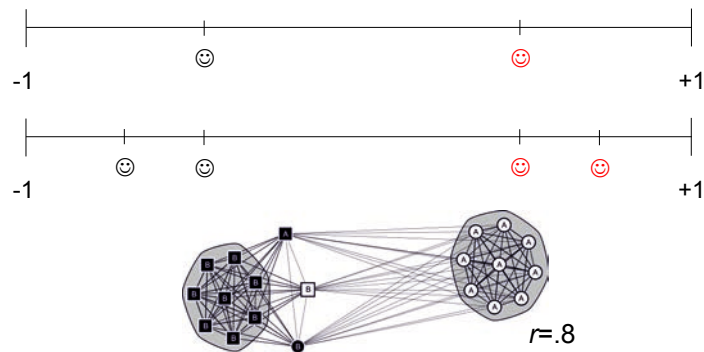
## Lau and Murnighan's faultline theory I

- First assumption: Strong faultlines and homophily result in formation of subgroups



## Lau and Murnighan's faultline theory II

- Second assumption: Interaction partners influence each others' opinions on work related issues



- “subgroups may find themselves polarizing and taking positions that become increasingly extreme” (Lau and Murnighan 1998: 332)

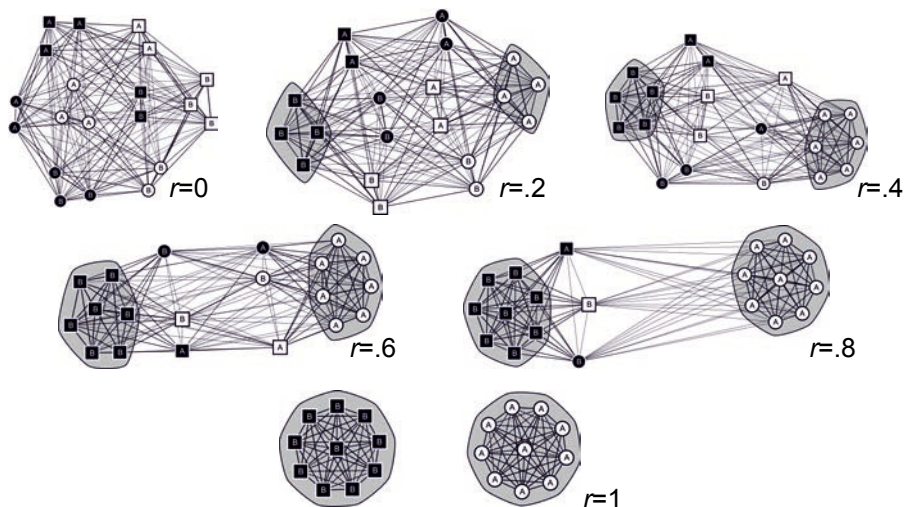
## Crosscutting cleavages

- Same prediction, different mechanism: crisscrossing actors reconcile

*"Take the case of a tension between blacks and whites. If the lines of cleavage cross, each opposition will weaken the other. But if, as sometimes happens, all the employers are white and all the employed are black men, then one antagonism reinforces the other and the rift in society is deeper then ever."* (Ross 1920: 164-165)

## Crosscutting cleavages

- Same prediction, different mechanism: crisscrossing actors reconcile

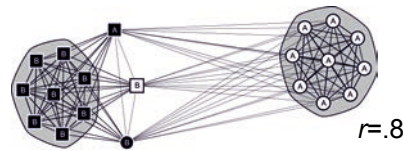


## Research question

- The theories highlight opposing forces
  - Disintegrating forces of faultlines
  - Integrating forces of crisscrossing actors

Under which conditions will one of the forces dominate?

- Conjectures: strong faultlines foster opinion polarization ...
  - ... when homophily is strong
  - ... when there is strong congruency
  - ... only in the short term



## The model

- **20 agents, each is described by:**
  - Three demographic attributes (fixed):  $a_{id}^{fix} \in \{-1;1\}$
  - Opinion on one issue (open to influence):  $-1 \leq a_{ik}^{flex} \leq +1$
  - There are 10 pro and 10 con arguments and agents base their opinion on 4 of them
  - An agent's opinion on a certain issue depends on the number of salient pro and con arguments. The more pro arguments an agent uses, the more positive his opinion will be.
- **What happens in each simulation round?**
  1. Random selection of an agent  $i$
  2. Selection of an interaction partner  $j$  – based on **homophily**
  3.  $i$  adopts one of  $j$ 's arguments – based on **persuasive arguments**

- Selection of an interaction partner  $j$ :

- ▶ Computer calculates the similarity between  $i$  and his team mates

$$sim_{i*,j} = \frac{1}{2 \cdot (D + K)} \left( \sum_{d=1}^D 2 - |a_{id}^{fix} - a_{jd}^{fix}| + \sum_{k=1}^K 2 - |a_{ik}^{flex} - a_{jk}^{flex}| \right)$$

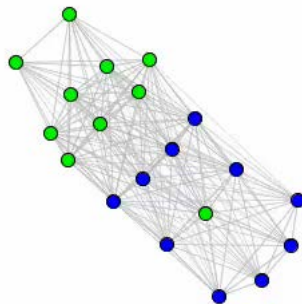
- ▶ The higher the similarity between  $i$  and  $j$ , the more likely they will interact

$$p_{j*} = \frac{(sim_{i*,j})^h}{\sum_{i \neq j} (sim_{i*,j})^h} \quad h: \text{strength of homophily}$$

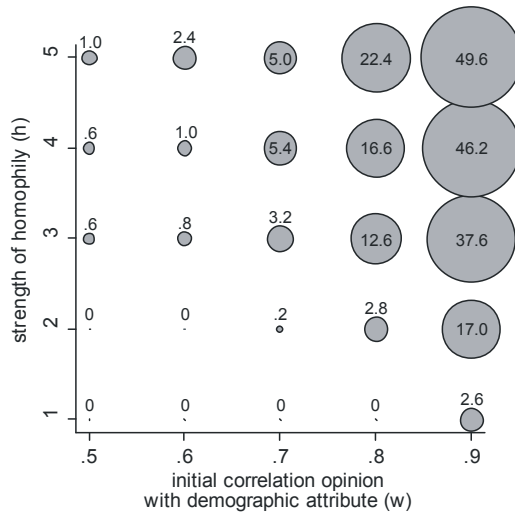
- $i$  adopts one of  $j$ 's arguments:

- ▶ Computer randomly selects one of  $j$ 's arguments to be adopted by  $i$
- ▶ If the argument is new for  $i$  then one of his initial arguments will not be salient anymore.

## Typical run with maximal faultline strength

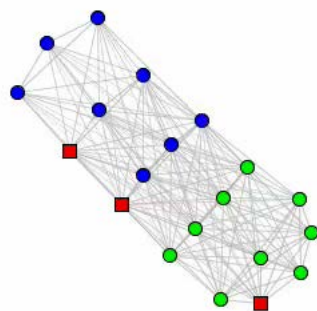


- Strong congruency
- Strong homophily
- Agents placed near to each other when opinions are similar



- Simulation experiment with maximal faultline strength
- 500 runs per condition
- Bubbles represent number of runs that ended with maximal/stable polarization

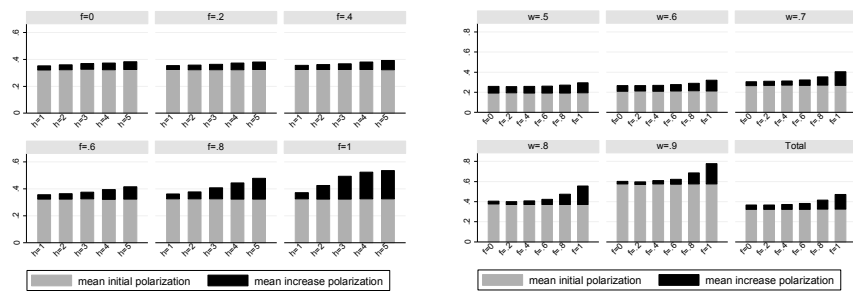
### Typical run with a strong faultline ( $r=.8$ )



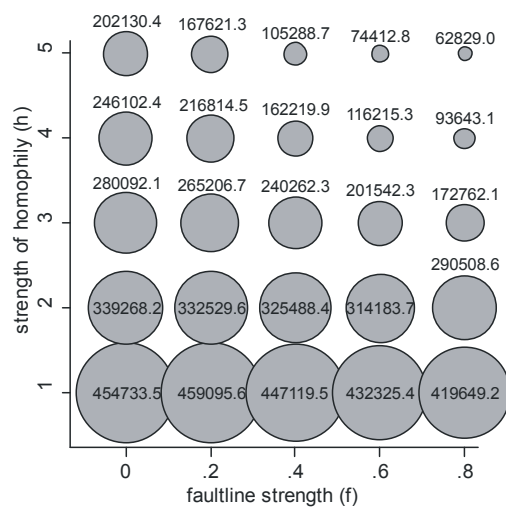
- Strong congruency
- Strong homophily
- Agents placed near to each other when opinions are similar

## Simulation results

- All runs with non-maximal faultlines ended with consensus
- Maximal degree of polarization reached in a run was high ...
  - ... when faultlines were strong
  - ... when congruency was strong
  - ... when homophily was strong



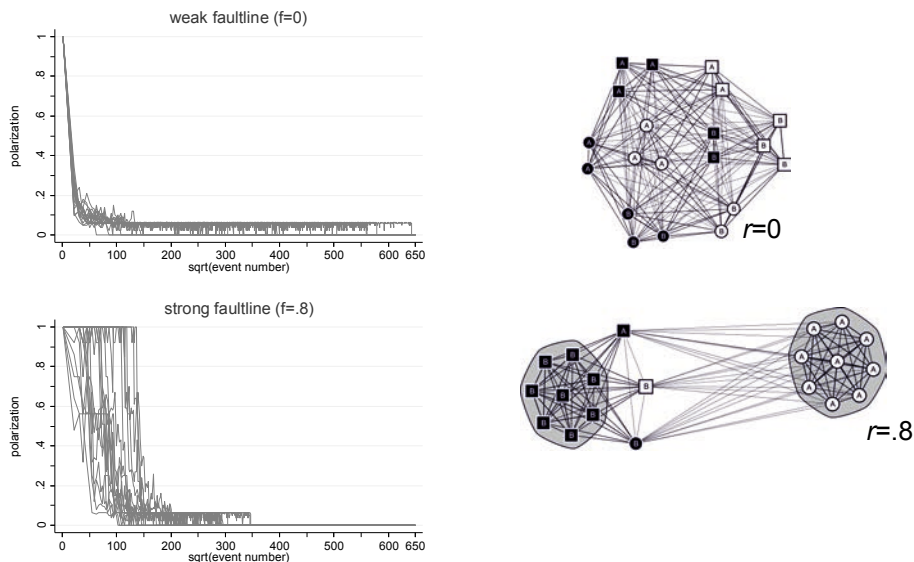
## Unexpected finding



- Bubbles represent (average) number of simulation events needed to reach consensus
- Strong faultline teams reached consensus faster



## How is this possible?



## Take-home message

- Faultline model can explain stable polarization only when faultlines are maximally strong
  - Identity processes may amplify polarization
- Even when faultlines are very strong, polarization emerges only when homophily and congruency are strong.
  - This might explain mixed empirical findings
  - Managers might have impact on these variables
- Formal models help to identify unexpected and counter-intuitive implications of complex theories.



## In the Short Term We Divide, in the Long Term We Unite: Demographic Crisscrossing and the Effects of Faultlines on Subgroup Polarization

Michael Mäs

Chair of Sociology, in particular of Modeling and Simulations, ETH Zurich, 8092 Zurich, Switzerland, [mases@ethz.ch](mailto:mases@ethz.ch)

Andreas Flache

Department of Sociology/Interuniversity Center of Social Science Theory and Methodology, University of Groningen, 9712 TS Groningen, The Netherlands, [a.flache@rug.nl](mailto:a.flache@rug.nl)

Károly Takács

MTA TK "Lendület" Research Center for Information and Network Studies (RECINS), R-1014 Budapest, Hungary, [takacs@infocenter.hu](mailto:takacs@infocenter.hu)

Karen A. Jehn

McBurnie Business School, Carleton, Victoria, 2013 Australia, [k.jehn@rvc.edu.au](mailto:k.jehn@rvc.edu.au)

**D**o strong demographic faultlines breed opinion polarization in work teams? We integrate two theories that have been used to explain faultline effects. The first, the approach of Lau and Murnighan (Lau DC; Murnighan JK (1998) Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Acad. Management Rev.* 23(2):325–346), suggests that in teams with strong faultlines the mechanisms of heterophilous selection of interaction partners and persuasive influence cause subgroup polarization, defined as the split of the team into subgroups holding opposing opinions. The second, from sociological and anthropological traditions, emphasizes that crisscrossing actors bridge faultlines because they share demographic attributes with several subgroups. Demographically crisscrossing actors help to prevent polarization in social groups. We argue that Lau and Murnighan's theory implicitly factors in the effects of crisscrossing actors. However, we show that the authors overlooked crucial implications of their theory because they did not consider crisscrossing actors explicitly. Most importantly, we demonstrate that demographic crisscrossing implies that even teams with strong faultlines will overcome polarization in the long run, although they might suffer from it in the short term. We develop and analyze a formal computational model of the opinions and network dynamics in work teams to show the consistency of our reasoning with Lau and Murnighan's theory. The model also revealed another counterintuitive effect: strong faultlines lead to structures of interaction that make teams with strong faultlines faster in arriving at a stable consensus than teams with weak faultlines.

**Key words:** group processes and performance; diversity in organizations; computer simulations; mathematical models; social networks

**History:** Published online in Articles in Advance.

### Introduction

Demographic diversity in the workplace is a major challenge for organizations and is becoming an increasingly important issue as the economy globalizes (for comprehensive reviews about theoretical and empirical research, see Bowers et al. 2000, Milliken and Martins 1996, Pelled 1996, Stewart 2006, van Knippenberg and Schippers 2007, Webber and Donahue 2001, Williams and O'Reilly 1998). For work teams, demographic diversity can be beneficial, because it broadens the social and human capital of the team. However, the benefits do not accrue automatically. Demographic dissimilarity between team members may, at the same time, cause conflict and tensions and thus threaten performance. This leads Milliken and Martins (1996) to conclude in their review of the field that "diversity thus appears to be a double-edged sword" (p. 403).

In the search for conditions that explain why diversity sometimes increases team performance and reduces it at other times, Lau and Murnighan (1998, 2005) proposed that the effects of diversity may decisively depend on the way demographic attributes, like age and gender, are distributed among team members. Their main proposition is that diversity impairs team functioning when the distribution of demographic attributes generates a *strong faultline*: "Group faultlines increase in strength as more attributes are highly correlated, reducing the number and increasing the homogeneity of resulting subgroups. In contrast, faultlines are weakest when attributes are not aligned and multiple subgroups can form" (Lau and Murnighan 1998, p. 328). They argue that diversity (demographics not aligned) increases the potential of a team for creativity and good performance, but when the diversity is in a group with a strong faultline