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# A social network perspective on social integration within academic pathways

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# Questions

- > How is social integration defined?
- > How is social integration measured?
- > Does the importance of social integration change during the academic career?
- $\rightarrow$  From bachelor to master to employment

# Social integration

A balance between integration into the academic system and integration into the social system is a precondition for study success

Tinto, 1975;1993

Academic and social integration as social and academic interactions, to reflect students' experiences more straightforwardly

Meeuwisse et al., 2010

Using students' embeddedness in social and academic peer networks

Smith, 2015

Social integration results from peer interactions, that is, bidirectional processes that can be aptly described by sociometric nomination procedures.

Individuals seek out connections to others in their network, and others seek connections with them Brouwer, Flache, Jansen, Hofman, & Steglich, 2018

Social integration is not necessarily study-related, but associated with the exchange of personal matters, for example with friends Buote et al., 2007; Zhu, Woo, Porter, & Brzezinski, 2013

Academic integration is study-related and associated with the exchange of academic matters Nebus, 2006; Tomás-Miquel et al., 2015





#### Social network perspective



# Students' social capital



Social capital = access to valuable resources through social relations that help to attain personal goals Coleman, 1990; Lin, 1999

# Social capital theory Coleman, 1990

#### > Social capital

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- Embedded in social relationships
- Facilitation of individual actions
  - Support
  - Exchanging information
- > Human capital
  - Acquired skills/ capabilities

# Social capital theory Lin, 1999

> Access to social capital

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- Resources available in the network
  - Perceived resources available in the network of first-year students

> Use of social capital: emotional, instrumental support, trust, and information sharing

### Social capital theory Lin, 1999



# MEASUREMENTS OF SOCIAL INTEGRATION

Self-reports versus social networks



#### Self-report



- Insight in embeddedness of students in their network
- Social structures
- Changes over time

#### Social network questions



Insight in preferences on average – not in social dynamics

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# Popularity SNA in research



### Why SNA in educational research

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- > Many educational studies invoke networkrelated theories and ideas
  - Offers another way to theorize, explore, and measure of these ideas
- Describe the network structure and their node (attribute) and network outcome
- Complements other theoretical approaches, e.g., socio-cultural learning, organisational learning, collaborative learning



#### Ingredíents apple píe

250 gram fllour, 150 gram cold butter 125 gram brown sugar, mespunt salt, 1 egg , slíced peeled tart apples, etc.















- Jasperina
- ✓ Els
- ✓ Ruud
- Kim
- ✓ Jeroen
- Peter
- Ο..
- Ο...

Why are Els, Ruud and Jeroen selected?

High achievers? Highly self-efficious; Growth mind sets? Etc.





#### Longitudinal social network analysis:

- Insight in embeddedness of students in their network
- Selection and non-selection; selection and influence
- Social structures
- Changes over time







#### Help seeking



#### Collaboration



Lectures in 'fixed' small groups



Sharing knowledge



Friendship



#### **LEARNING COMMUNITY**

**Cohort of first-year students is divided** into small groups in which they follow all courses together during the first semester Lenning & Ebbers, 1999; Smith et al., 2004

- Formally embedded in the curriculum
- 'Fixed' group of 12 studenten during first semester ٠
- Group and individual assignments; discussion
- Mentor is teacher and coach (feedback meetings)
- Learning is socially constructed Vygotsky, 1978

### Mechanism in FLCs



Social capital = access to valuable resources through social relations that help to attain personal goals Coleman, 1990; Lin, 1999

### Previous literature

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- > SGT positive effect on learning outcomes
  - 30% of students do not benefit  $\rightarrow$  why? Hockings, 2009
  - Lower achievers more difficulties in asking for help?
- > What makes small group teaching (SGT) effective for facilitating higher education students' academic achievement?

# Informal peer networks

- > Emerge outside the classroom
- > Spontaneously

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- > HE-students need to initiate relationships
  - Help seeking (academic support)
  - Friendship (emotional; practical support)



### **Research questions**

How do students in LCs connect to each other in academic support and friendship networks? How do these relationships influence individual academic achievement over time and vice versa?

Disentangling selection from influence



# Hypotheses

- Students connect with fellow students in the same FLC during the first semester (rather than with fellow students outside their FLC)
- > Proximity principle Katz et al., 2004
  - Daily interaction contributes to relationship formation
- Students connect to similar achieving friends (rather than higher achievers)
- > Homophily principle Brouwer et al., 2018; McPherson, Smith-Lovin, & Cook, 2001
  - Becoming friends is even more likely when students are similar in their personal characteristics and achievement level
  - Students may become more similar in their achievement
    over time Lomi, Snijders, Steglich, & Torló, 2011



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- 95 bachelor student social sciences (58 females; 37 males)
- 8 FLCs (12-14 students)
- Complete longitudinal social networks
  - End semester 1; end semester 2
- Complete cohort
  - Inside FLCs outside FLCs (study programme)



## Method

#### > Social networks

- I ask this fellow student (name) for help when I don't understand the study material
- What kind of relationship do you have with (name)...? (best friend, friend, friendly relationship)

#### > Personal attributes

- Gender
- Achievement level (semester 1)
  - Weighted average mark
    - (Grades\*ECTS)/ maximum ECTS in the programme at the end of each semester
    - ECTS = credit points





### **Results: network descriptives**

	Help seeking		Friends	
LCs	IN	OUTSIDE	IN	OUTSIDE
M popularity(SD)	2.88 (1.67)	2.33 (2.33)	3.02 (1.74)	3.09 (2.76)
M activity (SD)	2.88 (2.45)	2.33 (1.97)	3.02 (2.60)	3.09 (2.47)
Reciprocity	0.43	0.34	0.49	0.44
Density	0.30	(0.03)	0.34	0.03
Note I Cs: semester 1	> factor 10			

*Probability is 10 times greater that a specific student establish a relationship with a specific fellow student in the FLC than with a specific student outside of it* 

Density: actual ties/ possible ties; proportion of actual ties

#### Help seeking Semester 1

FLCs are cohesive sub groups in the study programme

FLCs contribute to peer relationship formation in the first semester



#### Help seeking Semester 2



### Stochastic actor based modeling

- Appropriate statistical technique to handle interdependence of network relations in network change; test causal relations (in Rsiena)
- Student characteristics influence change of network relations and vice versa
  - help request/ friendship from *i* to *j* more likely if *j* achieves better than *i*? or if *i* and *j* are more similar in their achievement?
  - Help request/friendship from i to j influences achievement?
- > relation in network  $X \rightarrow$  change relation in network Y?
  - help request from *i* to *j* more likely if *i* and *j* are friends?

See for more information Snijders, Van de Bunt, & Steglich (2010)

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**Brouwer, J**., Jansen, E.P. W. A., Flache, A., & Hofman, W. H. A. (2018). Longitudinal peer network data in higher education. In J. Huisman & M. Tight (Eds.), *Theory and Method in Higher Education Research* (Vol. 4) (pp. 145-162). Bingley: Emerald Publishing Limited. ISBN 978-1-78769-278-7/ doi: 10.1108/S2056-375220180000004010

**SELECTION** 



Indegree; popularity

**Alter**= receiver effect; received nominations

**Ego**= sender effect; given nominations

#### Achievement alter

Achievement influences the number of nominations received; covariate-related popularity

#### Achievement ego:

Achievement influences the number of given nominations; covariate-related activity

"Similarity achievement"







### Selection: Main Rsiena results

	Help seeking	Friendship
Friendship	1.22* (0.27)	
Help seeking		0.70* (0.21)
Achievement alter	0.31* (0.11)	0.17* (0.06)
Achievement ego	0.80*(0.33)	0.45* (0.13)
Achievement similarity*	0.03 (0.04)	0.04 (0.03)
Same LCs	-0.29 (0.20)	-0.03 (0.15)

\*Achievement ego \* achievement alter (as indication for achievement similarity): the more the achievement level of ego is positively associated with the achievement level of alter, the more likely they are to have a relationship

Control for endogeneous networks effects (e.g., reciprocity, transitivity, reciprocal transitivity, indegree-popularity, outdegree-popularity, indegree-activity) and gender

#### INFLUENCE



#### Indegree achievement; popularity

The more incoming connections, the higher the achievement level becomes over time



#### Outdegree achievement; activity

The more outgoing connections, the higher the achievement level becomes over time



#### Average achievement alter ("similarity")

Effect of average fellow-students/friends' grades on the grades of focal student.

Over time the performance level becomes more similar to those of the connected fellow-students/ friends



#### Average achievement recipocated alters

When students have a mutual relationship it is more likely that they are influenced by the average achievement level of their fellow-students.

#### **Reciprocated degree**

It is more likely when students have reciprocated relationships that these relationships influence grades



### Influence: Main Rsiena results

	Help seeking	Friendship
Indegree achievement	0.05 (0.18)	
Outdegree achievement	0.04 (0.16)	
Average achievement alter	0.94 (1.39)	
Average achievement reciprocated alters		1.07 (1.58)
Reciprocated degree		-0.05 (0.16)

# Conclusions

#### Selection

- Students are more likely to ask friends for academic support
- When students seek academic support, it is more likely that they become friends
- Higher achieving students are more popular (more incoming nominations) and active (outgoing nominations) in both networks

#### Influence

- LCs are often implemented to improve the overall academic achievement
- Individual achievement seems not to be influenced by help seeking and friendship relations



### Discussion

#### Brouwer et al. (2018)

- Selection model only
- Achievement semester 1 as a covariate (fixed)
- LCs: frequent meetings in semester 1
- Positive ego and similarity effect for achievement in both networks

#### **Co-evolution model**

- Achievement over time (across two semesters)
- Second semester less meetings in LCs
- Only selection effects for ego and alter
- No "similarity" effect for selection and influence
  - Lomi et al. (2011)
  - "Students tend to "assimilate" the average performance of their friends and their advisors".

Brouwer, J., Flache, A., Jansen, E., Hofman, A., & Steglich, C. (2018). Emergent achievement segregation in freshmen learning community networks. Higher Education, 76(3), 483-500. doi: 10.1007/s10734-017-0221-2





### **Research questions**

How do self-efficacy and growth mind sets relate to integration in support networks in seminar groups of master students? How do perceived integration influence actual integration in support networks in seminar groups of master students and vice versa?

Zander, L\*, **Brouwer, J.**, Jansen, E. P. W. A., Crayen, C., & Hannover, B. (2018). Academic self-efficacy, growth mindsets, and university students' integration in academic and social support networks. *Learning and Individual Differences, 62*, 98-107. doi: 10.1016/j.lindif.2018.01. Shared first authorship



# Hypotheses

- > Academic self-efficacy is a person's perception that he or she will succeed in a certain task or domain and can be influenced by others Honicke & Broadbent, 2016; Siciliano, 2016; Usher & Pajares, 2008
  - Unclear whether highly self-efficacious students are more attractive as providers of academic support.
- Students with growth mindsets (incremental theorists) believe that effort can improve intellectual abilities and are more popular Dweck, 1999, 2006; Yeager & Dweck, 2012.
- > Integration in both networks are related and perceived and actual integration are related



580 master students social sciences (58 females; 37 males)

# Conclusions

#### Cognitions

- Self-perceived popularity contributes positively to actual popularity in the academic support networks
- Self-efficacy beliefs contribute to self-perceived popularity
- Growth mind sets beliefs contribute to actual popularity in the academic support network
- So, different cognitions contribute to academic integration

#### Integration

- Actual popularity in the help-seeking network contributes to the actual popularity in the social support network
- So, academic integration contributes to social integration (no evidence for the other way around) are often implemented to improve the overall academic achievement



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- > Research at an aggregated level
- Replication is necessary with longitudinal social network analysis ("Rsiena-models")
  - Selection and influence effect from cognitions on relationshipformation and vice versa
  - Differential effects for high and low scores on the cognitions and relationship formation
  - . Investigate changes over time





# Employment

- > Social network project in health care
- The role of integration in team networks and ego networks for professional commitment and turnover



# Getting a job

- > The strength of weak ties
- > The value of weak ties for getting a job
- > Granovetter (1973)
- > Weak ties can be local bridges
- > More information spread through the network
- > Different (new) information



#### The Strength of Weak Ties



CONNECTIONS THROUGH STRONG TIES



CONNECTIONS THROUGH WEAK TIES

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#### Social network perspective







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#### Longitudinal mixed methods





# Recommendations for policy

- Acknowledge that education is a social and complex process
  - Different methods should capture this
  - Taking a whole longitudinal network approach can provide insight in changes over time
- Decisions should be based on scientific research and not on assumptions
  - Do not search for confirmation, but investigate education open-minded and from different perspectives
  - Take a critical approach when innovations need to be evaluated; start on time with planning the evaluation!
  - Collaborate with researchers from different fields
- > Create awareness in students of their social capital
  - Social capital building starts in the first year
  - Social capital is important for finding jobs

### Take-home message

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- > Take decisions based on scientific research:
  - capturing different perspectives and methods
  - using a longitudinal design
  - starting on-time to evaluate innovations
- > To move forward the field of higher education, we need new perspectives and approaches
- > Sometimes this research of mechanisms and underlying processes is risky....but worthwhile!

# Thank you!

#### Further reading

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- > Brouwer, J., Flache, A., Jansen, E., Hofman, A., & Steglich, C. (2018). Emergent achievement segregation in freshmen learning community networks. *Higher Education*, *76(3)*, 483-500. doi: 10.1007/s10734-017-0221-2 (open access)
- > Brouwer, J., Jansen, E., Flache, A., & Hofman, A. (2018). Longitudinal Peer Network Data in Higher Education. In J. Huisman, & M. Tight (Eds.), *Theory and Method in Higher Education Research* (Vol. 4, pp. 145-162). Emerald Group Publishing Limited.

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