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?
   → 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

- Peer network
- Social integration
- Individual skills
- Social capital
- Resources
- Study success
- Wellbeing
- Employment
- Prof. commitment
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
  ▪ 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
  - 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

Access to social capital  
(Perceived) resources in the network

Use of social capital  
Emotional, instrumental support, trust, and information sharing
Self-reports versus social networks

MEASUREMENTS OF SOCIAL INTEGRATION
Self-report

I like to collaborate with my peers

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

Social network questions

I like to collaborate with...

Insight in preferences on average – not in social dynamics
Popularity SNA in research

1970-1980
SNA established in social sciences
- professional organisation (INSNA)
- annual conference (SUNBELT)
- specialized software (UCINET)
- own journal (Social Networks)

1990
Network analysis more popular in other fields
- knowledge management
- stopping spread of diseases (health)
Why SNA in educational research

> Many educational studies invoke network-related 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
Ingredients
apple pie

250 gram flour, 150 gram cold butter 125 gram brown sugar, mespunt salt, 1 egg, sliced peeled tart apples, etc.
Ingredients study success, getting a job
- Study behavior
- Self-efficacy
- Growth mind sets
- Prior achievement
- Prosocial behavior
- Willingness to share information

Peer network
- Social and academic support
- Feedback

Outcome
Study success
Well-being
Employment
When I don’t understand the study material I ask...

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

Why are Els, Ruud and Jeroen selected?

High achievers? Highly self-efficacious; Growth mind sets? Etc.
When I don’t understand the study material, I ask...

Longitudinal social network analysis:
- Insight in embeddedness of students in their network
- Selection and non-selection; selection and influence
- Social structures
- Changes over time
Lectures in ‘fixed’ small groups

Help seeking

Sharing knowledge

Collaboration

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
- Group and individual assignments; discussion
- Mentor is teacher and coach (feedback meetings)
- Learning is socially constructed Vygotsky, 1978
Mechanism in FLCs

Social capital

Resources (information; advice)

Relationships (peers; mentors)

(Academic) goals

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

› SGT positive effect on learning outcomes
  ▪ 30% of students do not benefit → why? Hockings, 2009
  ▪ Lower achievers more difficulties in asking for help? Cleland et al., 2005

› What makes small group teaching (SGT) effective for facilitating higher education students’ academic achievement?
Informal peer networks

- Emerge outside the classroom
- Spontaneously
- 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
Method

- 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

<table>
<thead>
<tr>
<th>LCs</th>
<th>Help seeking</th>
<th></th>
<th>Friends</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IN</td>
<td>OUTSIDE</td>
<td>IN</td>
<td>OUTSIDE</td>
</tr>
<tr>
<td>M popularity (SD)</td>
<td>2.88 (1.67)</td>
<td>2.33 (2.33)</td>
<td>3.02 (1.74)</td>
<td>3.09 (2.76)</td>
</tr>
<tr>
<td>M activity (SD)</td>
<td>2.88 (2.45)</td>
<td>2.33 (1.97)</td>
<td>3.02 (2.60)</td>
<td>3.09 (2.47)</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>0.43</td>
<td>0.34</td>
<td>0.49</td>
<td>0.44</td>
</tr>
<tr>
<td>Density</td>
<td><strong>0.30</strong></td>
<td><strong>0.03</strong></td>
<td><strong>0.34</strong></td>
<td><strong>0.03</strong></td>
</tr>
</tbody>
</table>

Note. LCs; semester 1

*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)

**SELECTION**

**Indegree; popularity**

**Outdegree; activity**

**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 Rsienia results

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<thead>
<tr>
<th></th>
<th>Help seeking</th>
<th>Friendship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friendship</td>
<td>1.22* (0.27)</td>
<td>0.70* (0.21)</td>
</tr>
<tr>
<td>Help seeking</td>
<td></td>
<td>0.70* (0.21)</td>
</tr>
<tr>
<td>Achievement alter</td>
<td>0.31* (0.11)</td>
<td>0.17* (0.06)</td>
</tr>
<tr>
<td>Achievement ego</td>
<td>0.80* (0.33)</td>
<td>0.45* (0.13)</td>
</tr>
<tr>
<td>Achievement similarity*</td>
<td>0.03 (0.04)</td>
<td>0.04 (0.03)</td>
</tr>
<tr>
<td>Same LCs</td>
<td>-0.29 (0.20)</td>
<td>-0.03 (0.15)</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th></th>
<th>Help seeking</th>
<th>Friendship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indegree achievement</td>
<td>-.05 (0.18)</td>
<td></td>
</tr>
<tr>
<td>Outdegree achievement</td>
<td>.04 (0.16)</td>
<td></td>
</tr>
<tr>
<td>Average achievement alter</td>
<td>0.94 (1.39)</td>
<td></td>
</tr>
<tr>
<td>Average achievement reciprocated alters</td>
<td></td>
<td>1.07 (1.58)</td>
</tr>
<tr>
<td>Reciprocated degree</td>
<td></td>
<td>-0.05 (0.16)</td>
</tr>
</tbody>
</table>
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”.

Bachelor

Master

Employment
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?


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.
Growth mindsets
T2

Academic self-efficacy
T2

Self-perceived popularity academic support network T2

Actual popularity social support network T1

Actual popularity social support network T2

Self-perceived popularity social support network T1

Self-perceived popularity social support network T2

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
Discussion

› Research at an aggregated level
› Replication is necessary with longitudinal social network analysis ("Rsiena-models")
  ▪ Selection and influence effect from cognitions on relationship formation 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

Team network

Psychological basic needs

Ego network

Professional commitment

Motivation to stay or leave (turnover)
Longitudinal mixed methods

Step 1
Team networks
Surveys (3 × 15’)

Step 2
Ego networks
Experiences

Step 3
Interviews
3 groups
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

› 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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References


