Assessing Classroom Peer Effects on Student Learning

Evidence from Gateway Courses at Three Liberal Arts Colleges

Project Overview

- Three-year grant from Teagle Foundation
- Whitman, Reed, and Lewis & Clark Colleges
- Examining effects of peers on student learning in first-year core courses
- Two parallel methods of analysis
  - Statistical analysis: Effects of core-classmate admission credentials on student GPAs
  - Spring 2007 interviews with 30 core-course instructors to learn from their observations of core-course peer effects
  - Follow-up conference May 2008

Why Study Peer Effects?

- Pedagogy
  - Peers are an important part of learning at liberal-arts colleges.
  - Could learn lessons about what kinds of class mixes are likely to succeed or fail
- Economics
  - Rothschild and White (1993): “merit” aid is efficient compensation if some students contribute to teaching mission
  - Attempt to measure this contribution

STATISTICAL EVIDENCE

Previous Studies of Peer Effects

- Many in primary education
  - Often find small but significant positive effects of having more able peers
  - These studies have been used to argue benefits of bringing weaker students into classes with strong ones
- Higher education
  - Nearly all studies have used roommates (random assignment)
  - Peer effects are weak, inconsistent, and seem related to study habits and behavior more than academic ability

Our Statistical Analysis

- Outcomes
  - GPA in non-core courses (all, related, 1^{st}/2^{nd} year)
  - Graduation
- Peer variables
  - Peer quality measured by predicted college GPA
  - Average classmate quality, dispersion of quality
- Controls
  - Relevant variables in admission file (SAT, high school GPA and rank, demographics, etc.)

Our Results

- Evidence for classmate peer effects is very weak and inconsistent across schools
- (Detailed description of analysis and tables of results are in the paper)
- Classmate characteristics that we measure (admission credentials) don't affect student performance in non-core courses
- We look to the interviews to help us understand this result

INTERVIEW PROJECT

Peers Are Important

- Nearly all instructors think good peer behavior is important in aiding student learning through class discussion
- Much consensus on good and detrimental peer behaviors for making discussion work
- Less agreement on importance of peers in aiding development of writing skills
  - Evaluation in core course is often writing-based

Beneficial Peer Behaviors

- Attendance and careful preparation for class
- Maturity, leadership, and respect for peers
- Motivation to help the class succeed
- Intellectual curiosity
- Enthusiasm for class and subject matter
- Openness to new ideas
- Cooperative rather than competitive attitude
- Willingness to speak in class and take chances

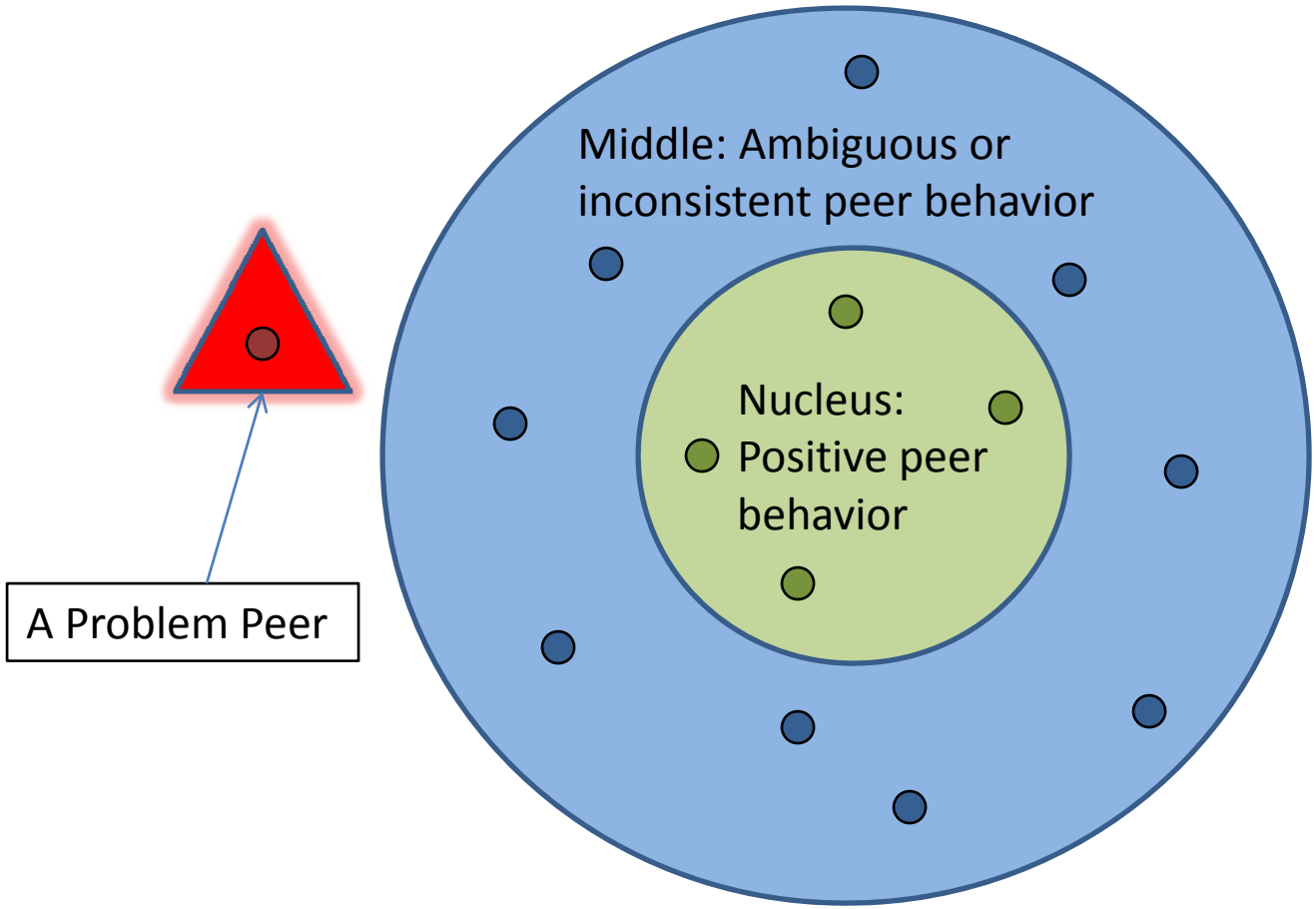
Detrimental Peer Behaviors

- Dismissive or judgmental behavior
- Rigidity of viewpoints (e.g., on religion)
- Rejection of notion of peer learning
- Won't shut up and give others a turn
- Active or ostentatious disengagement
- "Quiet peer" is not necessarily detrimental
  - But too many can be a problem
- "Nice peer" is not detrimental
  - But they may avoid opportunities for productive disagreement

Individual Peer Behavior and Classroom Peer Interaction

- What makes a successful class?
  - Obvious: More students with good peer behavior
  - But most classes have some “good peers,” some less effective peers, and perhaps one or two detrimental peers
- Is there a formula or model for combining individual peer characteristics into a measure of class effectiveness?

A Simple Picture of Peer Distribution



Key Question: How Much do Student Behaviors Change During Class?

- Is the class "personality" determined by students' characteristics when they walk in the door?
  - Our preconception was to think of pre-existing student characteristics as "inputs"
- Does student behavior evolve in important ways during the semester?
  - Is this influenced by peers?
  - Can it be guided by instructors?

Modeling Classes with Stable Student Behavior

Critical-mass model

- Need a sufficient nucleus of students with good peer behavior to make the class successful (3-6 in class of 15-20)
- Can usually live with one disruptive peer
- The class will be successful if the nucleus is large enough to keep the discussion lively and if the negative peer(s) on the periphery are not too distracting

Modeling Classes with Changing Student Behavior

Gravitational-attraction model

- Students' behavior evolves through the course
- Good peers provide positive role models that others emulate
- Sufficient nucleus of good peers can pull most of the class toward the nucleus $\Rightarrow$ outstanding class
- Detrimental peers can influence peers toward negative behavior and, in an extreme case, destroy class
- Instructor can influence peer behavior as well

Do We Want "All Good Peers" or Are There Desirable Differences?

Role-playing model

- Some behaviors are universally desirable
  - Respect, maturity, enthusiasm, preparation, etc.
- For others, a mix may be best
  - Analogy to a basketball team needing players with different skills to play different positions
  - Need one or two "first-speakers," some "responders," some "skeptics," some "translators," etc.

Fundamental Conclusion

- Most important characteristics of discussion peers relate to personality and attitude, not raw student ability
  - We heard about brilliant students who were great peers and brilliant students who were destructive peers
  - We heard about many outstanding peers who were B+ students
- No clear relationship between intellectual ability and value as peer

PUTTING THE EVIDENCE TOGETHER

Why No Statistical Evidence?

- Core courses don't matter
- Peers in core courses don't matter
- Too little variation in peers within schools
  - Syllabus and faculty expectations reflect *institutional* peer quality, don't vary across sections
- We are measuring wrong outcomes
- We are measuring wrong peer characteristics
  - Strongly supported by interview conclusions

How Could We Learn More?

- Perhaps measuring student attitudes (through surveys) along with aptitudes
- Asking students about peer effects
- Detailed examination of individual sections
  - Some have used video tape or audio recordings.
- ????