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Biology and Psychology: Gateway to Neuroscience

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Acknowledgements:

Jaap Hillenius
Tom Ross
Rob Dillon
Susan Kattwinkel
Pam Riggs-Gelasco
Elizabeth Meyer-Bernstein
Mindy Miley
Page Keller
Alma Hurd
Gorka Sancho

HHMI
HOWARD HUGHES MEDICAL INSTITUTE

The Institution

- Public, liberal arts and sciences university
- Located in historic downtown Charleston
- Founded in 1770
- Became part of the South Carolina State College system in 1970

The Institution

- Within two decades, the student body expanded from about 700 to its present day size of approximately 12,000
- ~65% South Carolina residents
- ~64% female
- High school GPA 3.3 - 3.7
- SAT scores 1080-1290

The Institution

- Instate tuition $10,314
- Out of state tuition $23,172
- Room and board ~$9,000.
- Parade magazine just featured the College as one of the best small public colleges in the nation.

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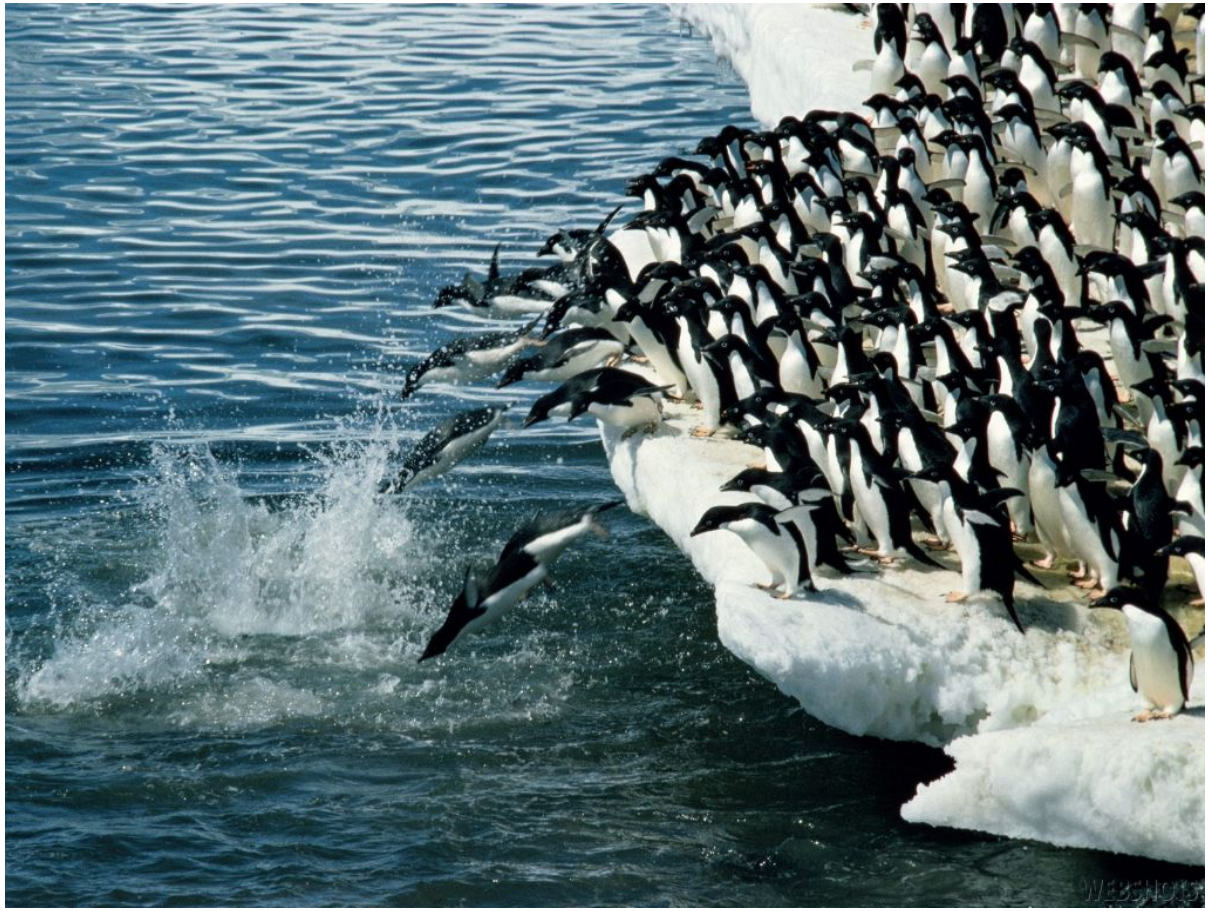
By fall 2011 all incoming freshmen at CofC will be required to take a learning community or a first year seminar.

87.3% of all American Colleges/Universities and 96% of 4 year programs offered FYE classes in 2009*

*National Resource Center for the First Year Experience and Students in Transition University of South Carolina
*Gardner Institute for Excellence in Undergraduate Education

Why target freshmen?



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Class of

- Chosen from over 13,000 applicants
- Graduated in the top 18% of their class
- Average SAT scores ~ 1185

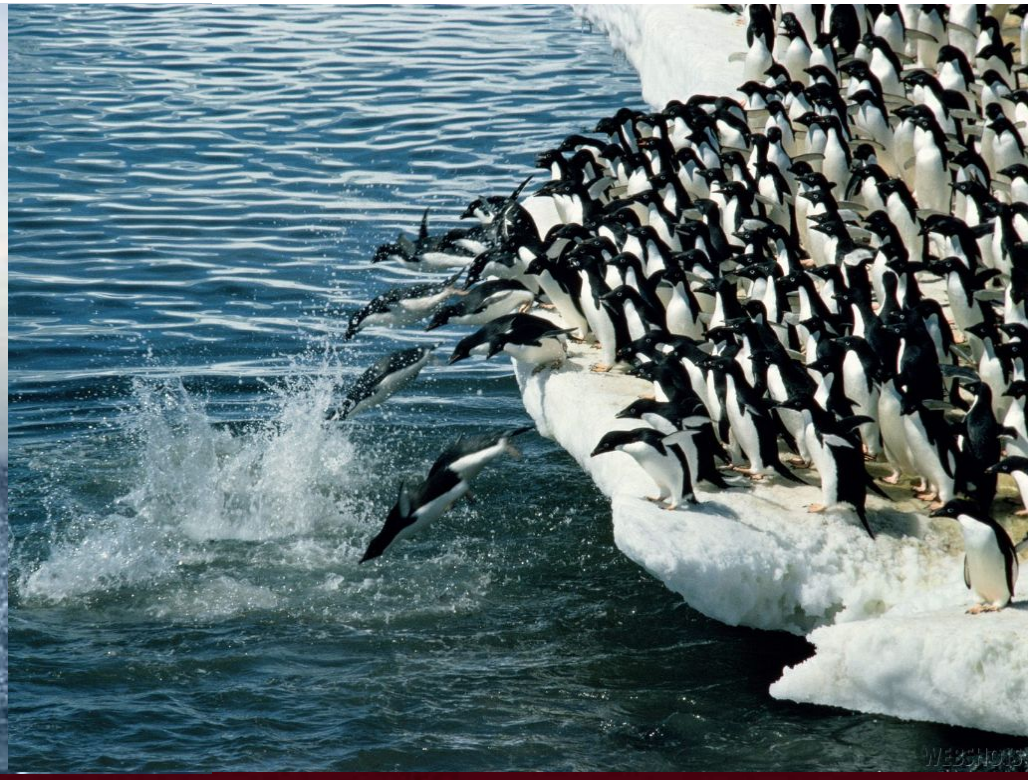
As few as 25% of US high school graduates are adequately prepared for college level work.*

- Lack:
  - Study skills
  - Critical thinking skills
  - Decision making skills
    - Social
    - Financial
  - Reading skills
  - Writing skills
  - Math skills

* ACT, Inc. 2009

Why target freshmen?

- On average, more than 1 in 4 won’t make it back for their sophomore year.



Our First Year Experience aims to increase the odds of academic success, not just retention.

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First Year Experience Goals:

- academic skills
- social skills
- love of lifelong learning
- appreciation for a liberal arts education

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FYE benefits

- Meet students with similar interests
- Develop academic success skills
- Work closely with faculty
- Discover the campus and the city
- Form strong peer support systems
- Utilize campus resources

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FYE benefits

Earn $2000 the first time you teach in the FYE program

What's a Freshman Seminar?

- Small (~20-25)
- Taught by roster faculty
- Focus on research and writing in the discipline
- Use group work, discussion, debate

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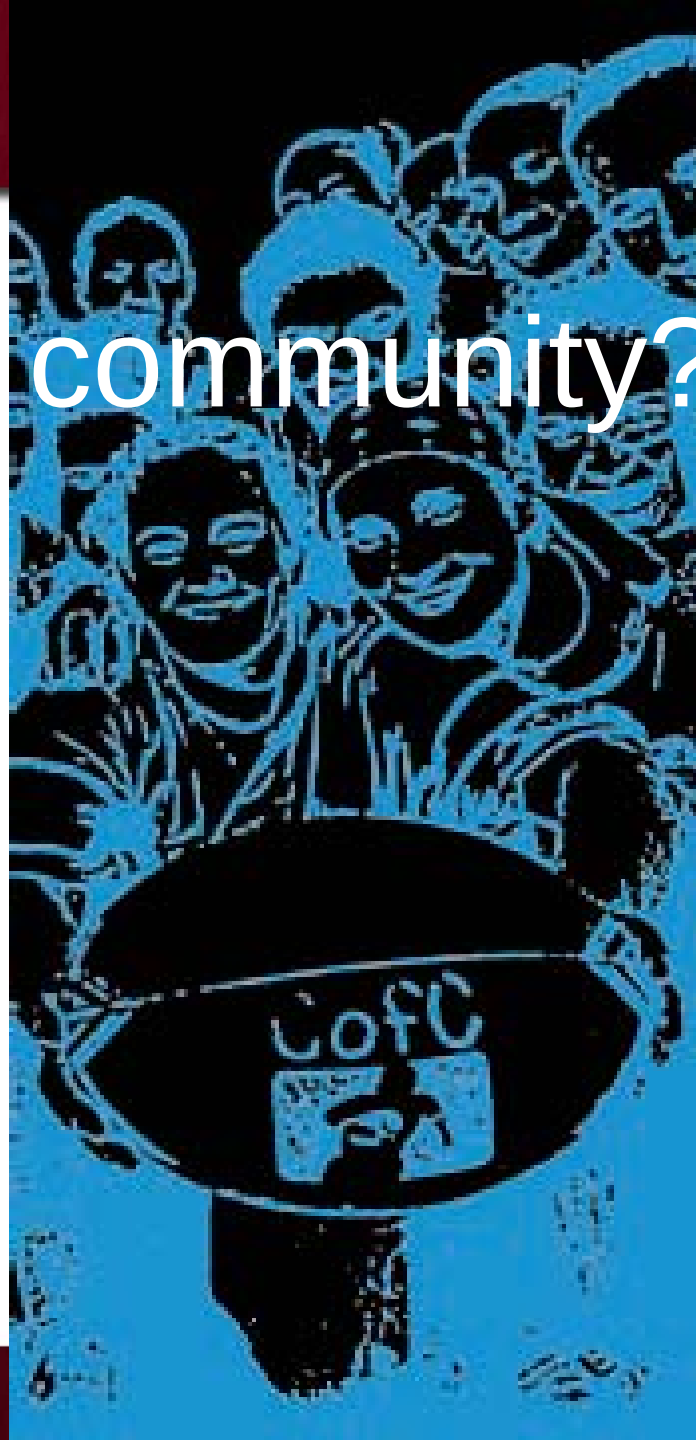
What’s a learning community?

- Links two or more courses.
- Interdisciplinary curriculum
- Uses joint class activities

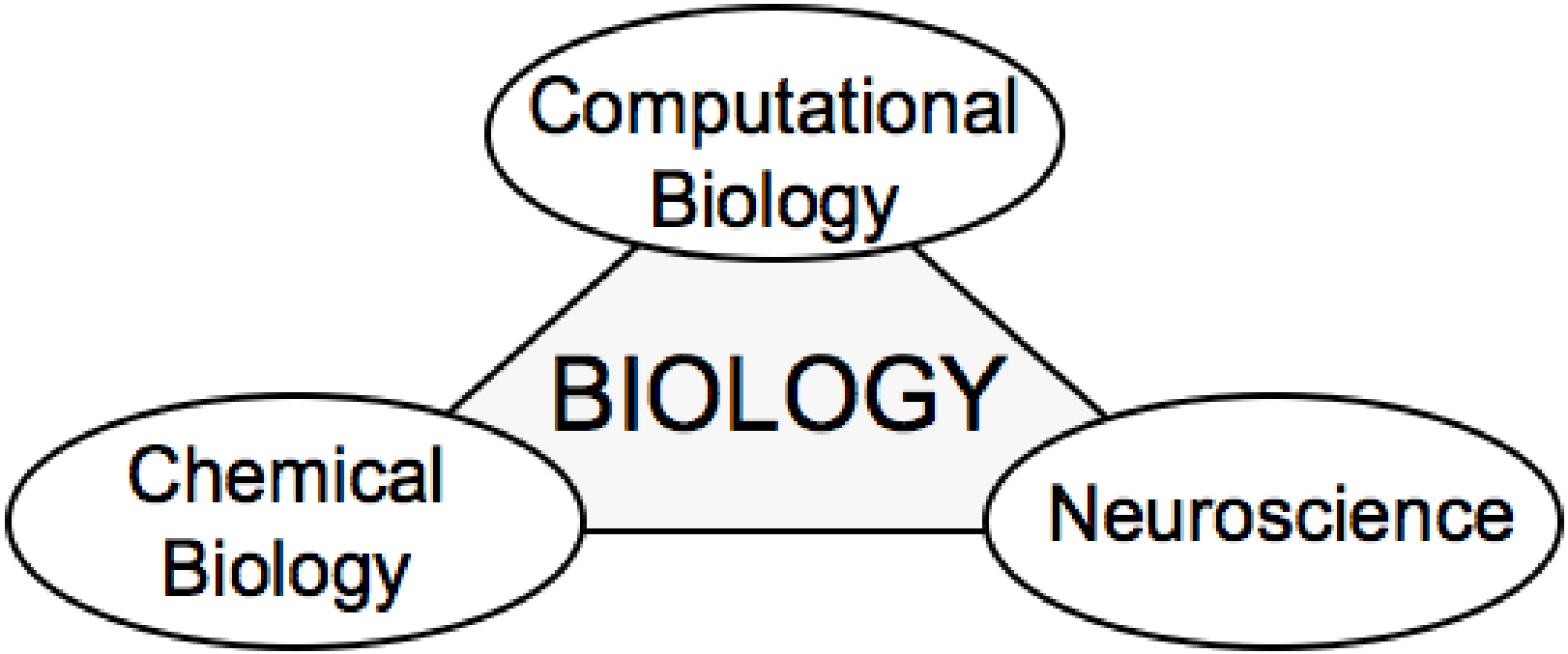


FYE

Fall 2010 – Spring 2011

37 First Year Seminars
22 Learning Communities

…more for 2011-2012


Computational Biology
BIOLOGY
Chemical Biology
Neuroscience

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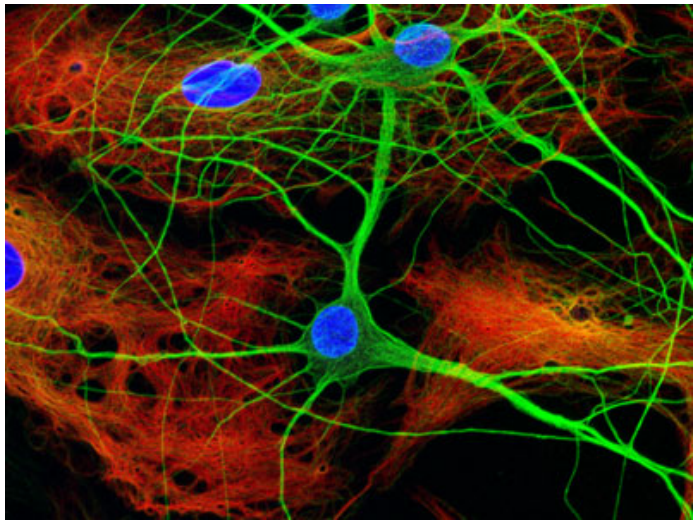

Biology and Psychology: Gateway to Neuroscience

Psychology 103 and Biology 111

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Biology 111

Introduction to Cellular and Molecular Biology

Biology Department at a glance:

- ~1000 majors
- Largest major at the College
- 40 full time faculty with diverse specialties



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Psychology 103

Introduction to Psychological Science

The Psychology Department

- ~475-550 majors
- Ranked in top 5 among largest majors at the College
- 21 roster faculty trained in diverse areas

Gateway to Neuroscience:

"This Learning Community is aimed at entering freshmen with a strong desire to enter the health professions. Students will demonstrate and reinforce the inherent, extensive connections between psychology and biology. Smaller, integrative classes emphasize critical thinking skills. Support from professors and peer upperclassmen foster a successful transition to college life."

Gateway to Neuroscience
Academic Focus:

- Emphasize the relationships between biology and psychology with respect to:
  - Physiology and Behavior
  - Biological foundations of Psychology
  - Neuroscience
  - Sensation and Perception
  - Behavioral Genetics and Pharmacology
  - Biological aspects of psychological disorders

Gateway to Neuroscience Skills Focus:

- critical thinking and problem solving
- academic resources and support services
- scientific literacy
- research and citation skills using library databases
- scientific writing
- working collaboratively
- civic engagement

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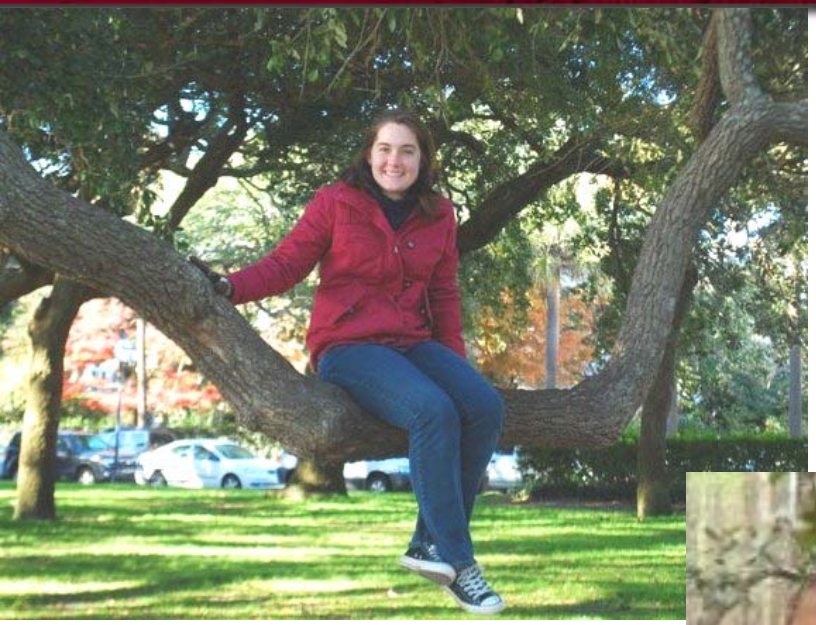
Supplemental Instruction in Biology



Amanda Cole

Si

Tell me, and I forget.

Show me, and I remember.

Involve me, and I understand.

Tracy Tholanikunnel

Gateway to Neuroscience Advising Focus:

- Peer Synthesis Seminar:
  - finding balance
  - social support and friendship
  - resume building
  - undergraduate research
  - advising for majors & minors
  - long-term career goals
  - pre-allied health advising
  - internships/fellowships

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Peer facilitators

Alexandra Bache, Alicia Bonanno, Emily Blake

2010-2011 CofC Peer Facilitators

Assessment:

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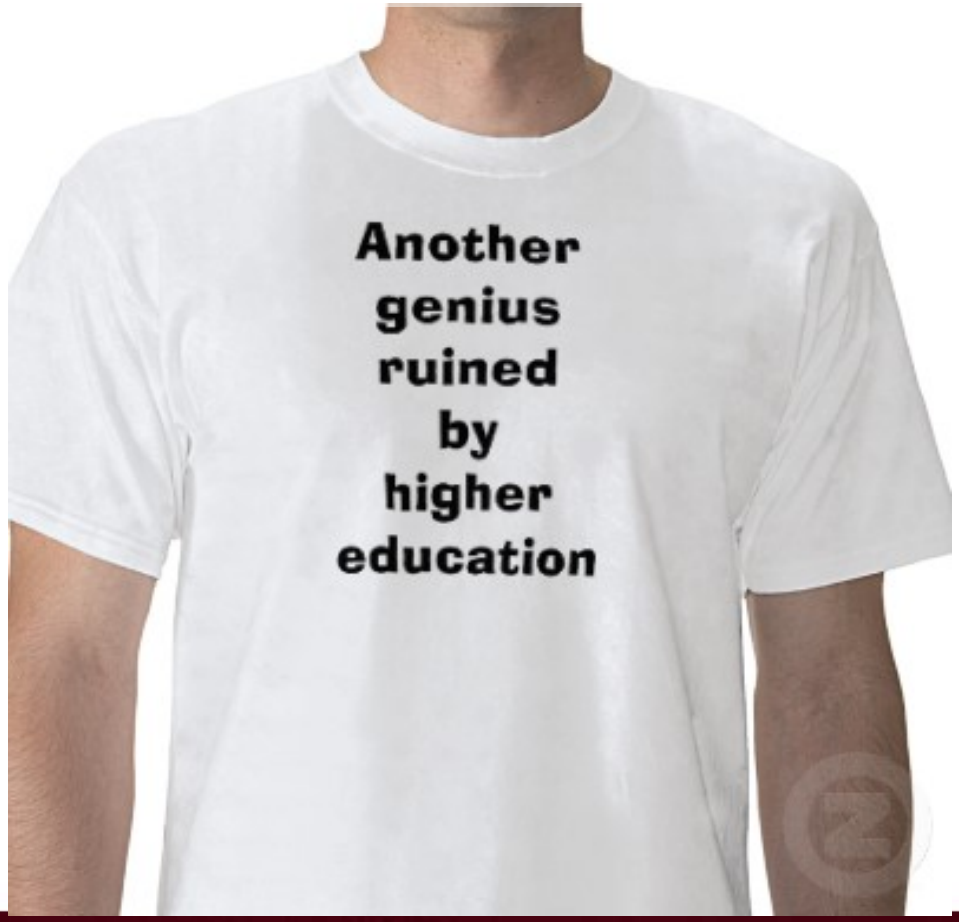
How do I know if the learning community works?



Qualitative

Positive feedback:

- "…love biology with psychology intertwined…"
- "…the learning community made my transition easier and I was able to make some friends too."
- "… did a very good job helping me adjust to college and get used to dealing with academic and social issues"
- "… very confident that Biology is the right major for me."
- "… this is a good experience for incoming freshmen."
- "…it helped a lot to have the peer synthesis seminar."
- "Because of this course, I am choosing to change my major and steer away from the sciences altogether. I am thankful it has shown me I'm not cut out for a biology major."
- "…grateful for early focus on career building"

Negative feedback

- “I don’t think SI sessions should be mandatory, some weeks I understood all of the material and didn’t need help.”
- “Instructors should do better making sure there aren’t exams and assignments due on the same days.”

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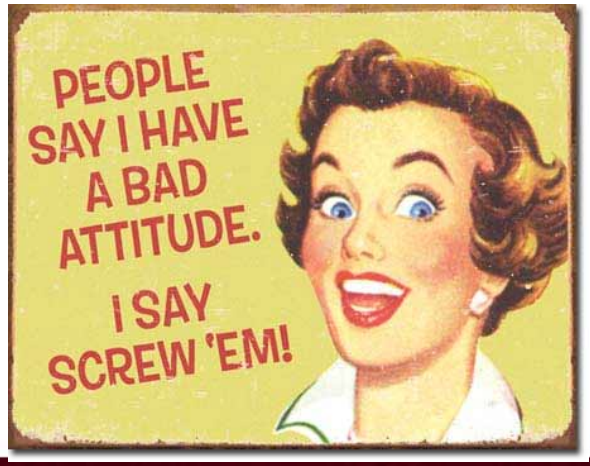
Student Surveys overall FYE:

percent agree or strongly agree that FYE positively impacts:

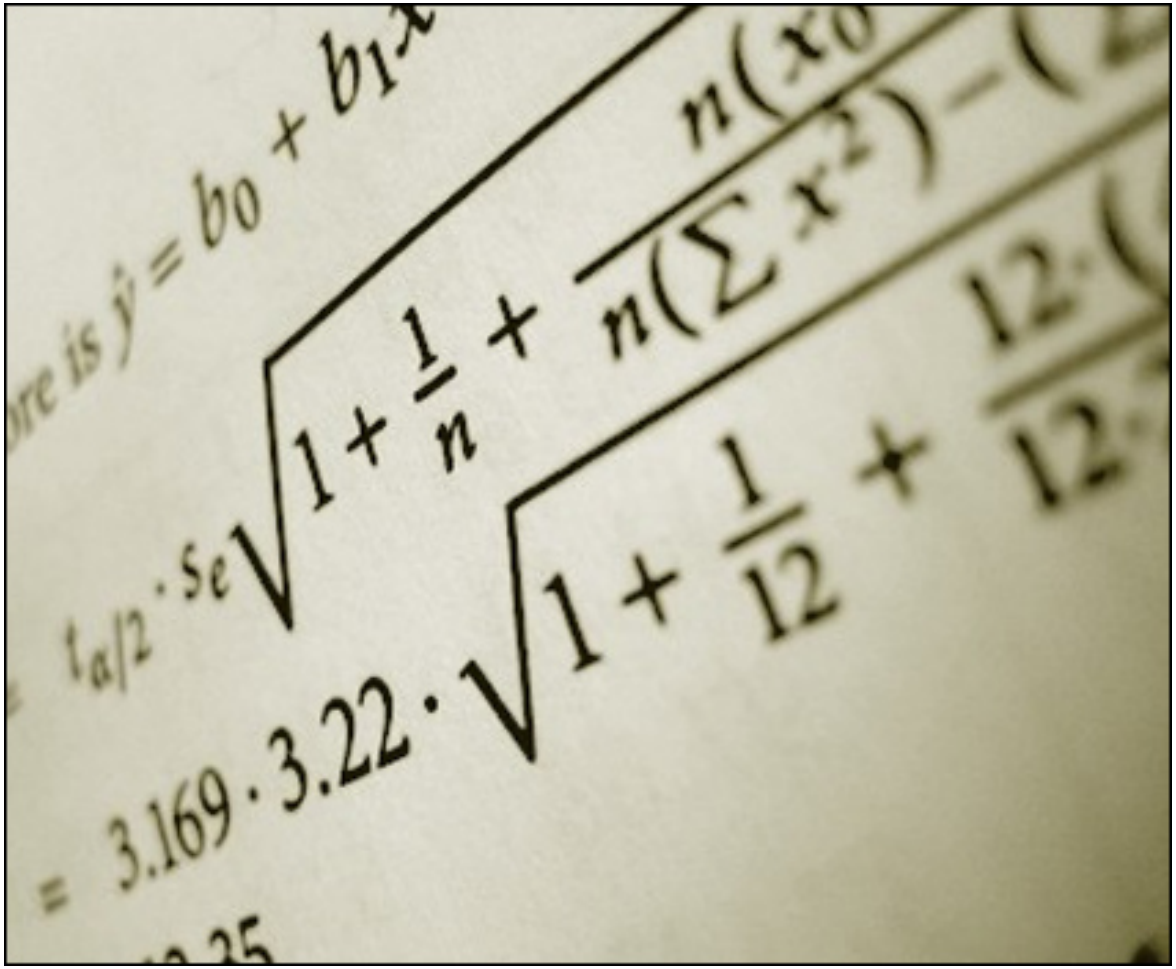
Topic:	2009
Problem solving skills	56
Analytical skills	65
Research skills	62
Team work	62
Written communication	63
Intellectual curiosity	69
Friendships & study groups	79
Ease of transition to college	59
Would recommend FYE	65

Direct Observations:

- Learning community students are more apt to attend office hours. This is good!
- Increasing chattiness in class.
  - Annoying! Positive? A sign of bonding?



Quantitative Assessment



Concern:

- Self selection of students?
  - Stronger students choose the learning community?
  - More out of state students in learning community?
  - Gender differences in groups?

- Student PGI, SAT or ACT scores show no significant differences between groups in 2009.
- Increase in provisional students to 31% in 2010.
- So, if anything, the LC attracts weaker students.

Concern:

- Self selection of students?
  - Stronger students choose the learning community?
  - More out of state students in learning community?
  - Gender differences in groups?

- No difference in ratio of in-state to out-of-state
- However, out-of-state students do significantly better in my biology 111 than in-state students. ($p<0.001$)

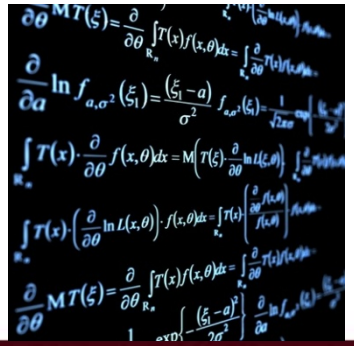
Concern:

- Self selection of students?
  - Stronger students choose the learning community?
  - More out of state students in learning community?
  - Gender differences in groups?

- No differences in gender ratios
- No gender related differences in performance

Concern:

- Competition?
  - Pre Med LC, Math-Biology-English LC
    - No difference in verbal SAT scores
    - Math-Biology English LC had higher math SATs
    - No difference in PGI (2009)



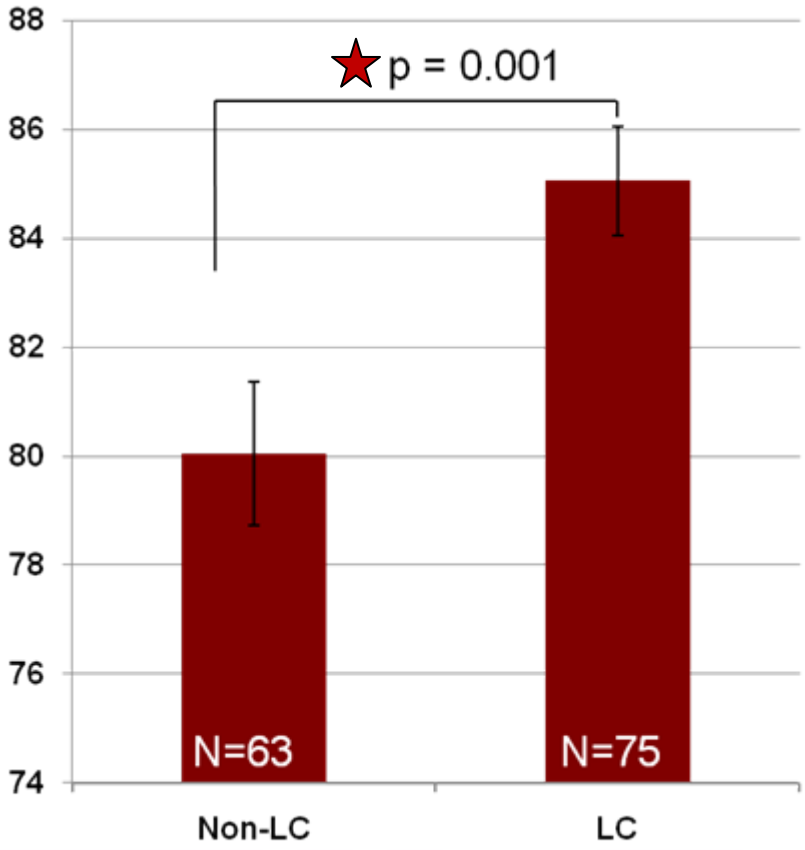
Summary:

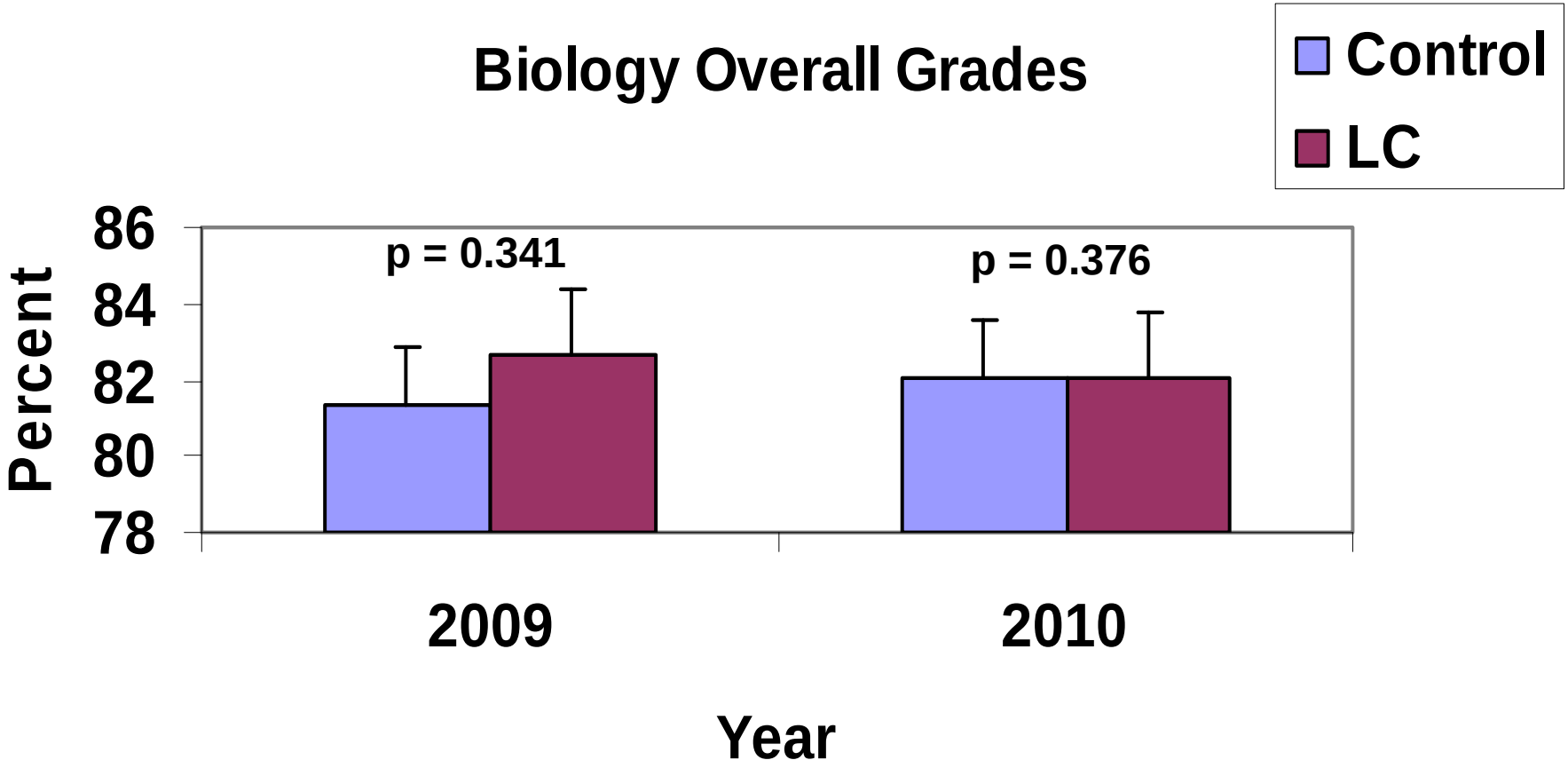
- Major concerns regarding self selection of students were alleviated.

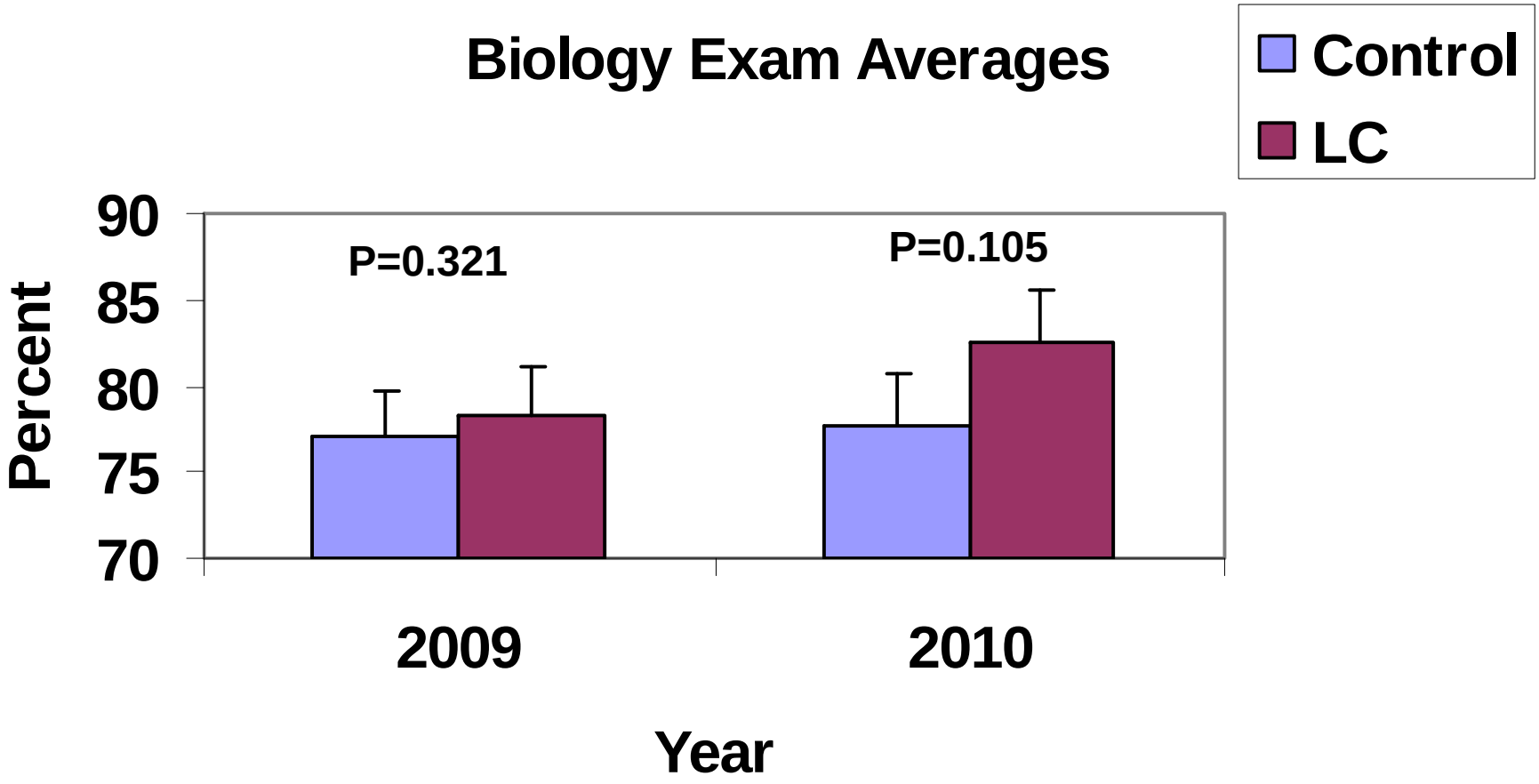
Results:

Student Performance in BIOL/PSYC Learning Community – Final Grade PSYC103

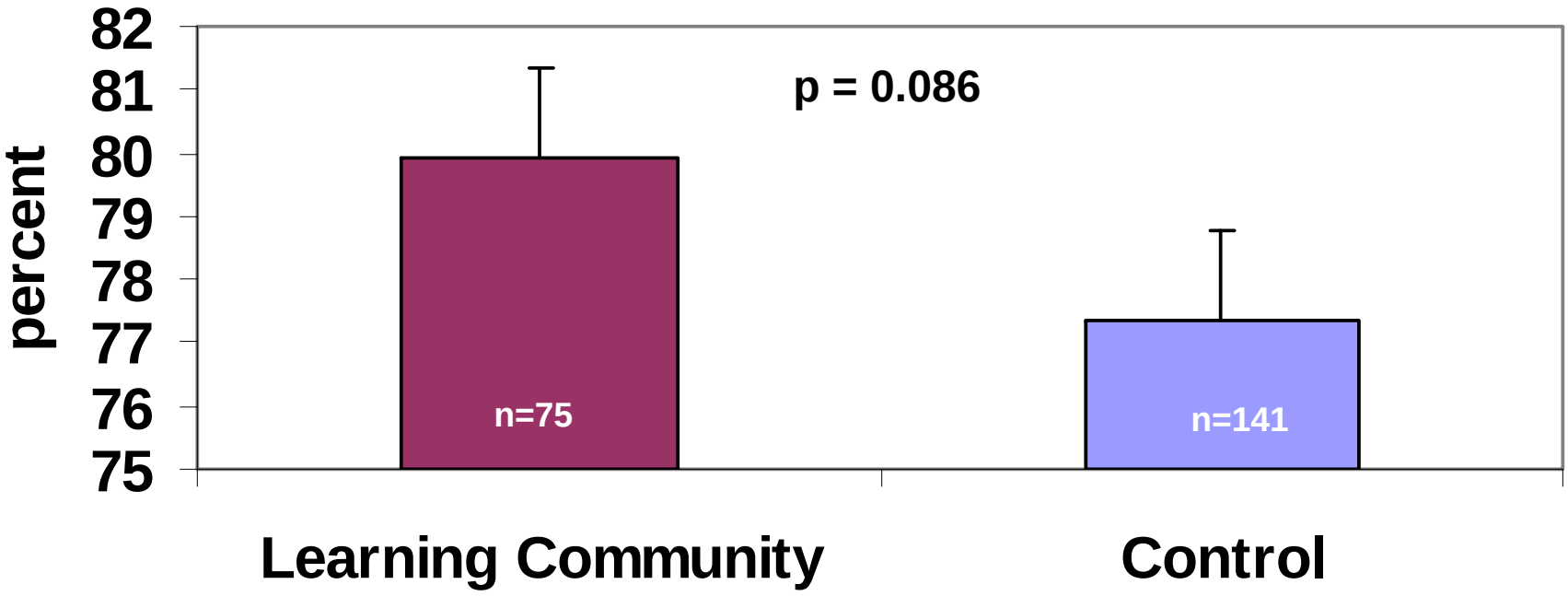
- Learning community (LC) students perform better than their non-LC counterparts with respect to the final grade in PSYC103.




Biology Overall Grades
Control
LC
Percent
86
84
82
80
78
p = 0.341
p = 0.376
2009
2010
Year

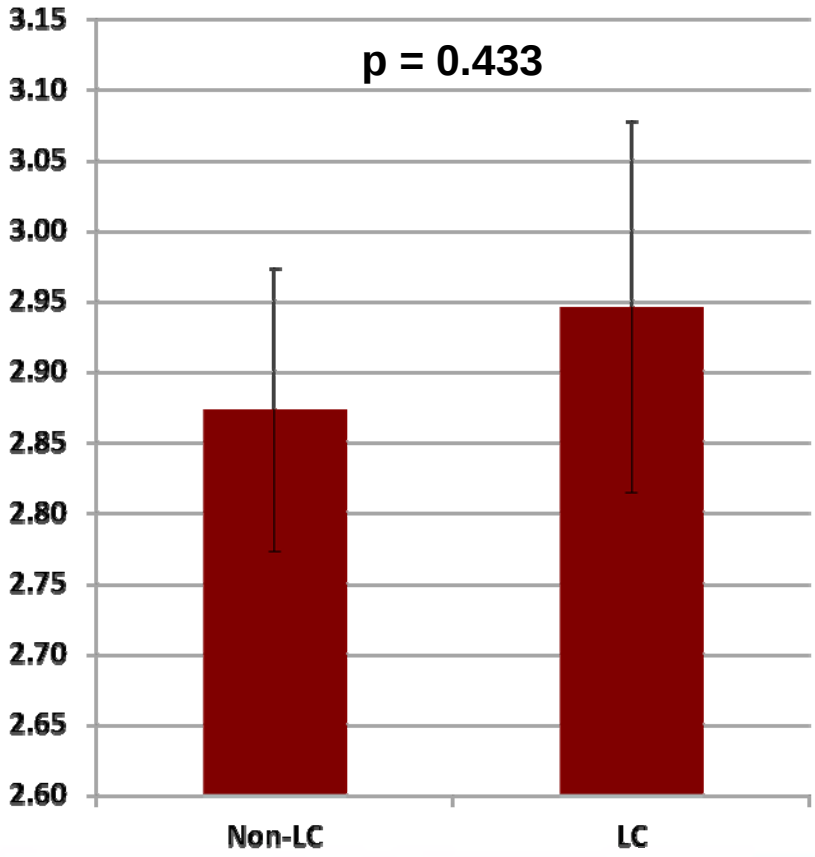

Biology Exam Averages
Control
LC
90
85
80
75
70
Percent
P=0.321
P=0.105
2009
2010
Year

Pooled Exam Average Data

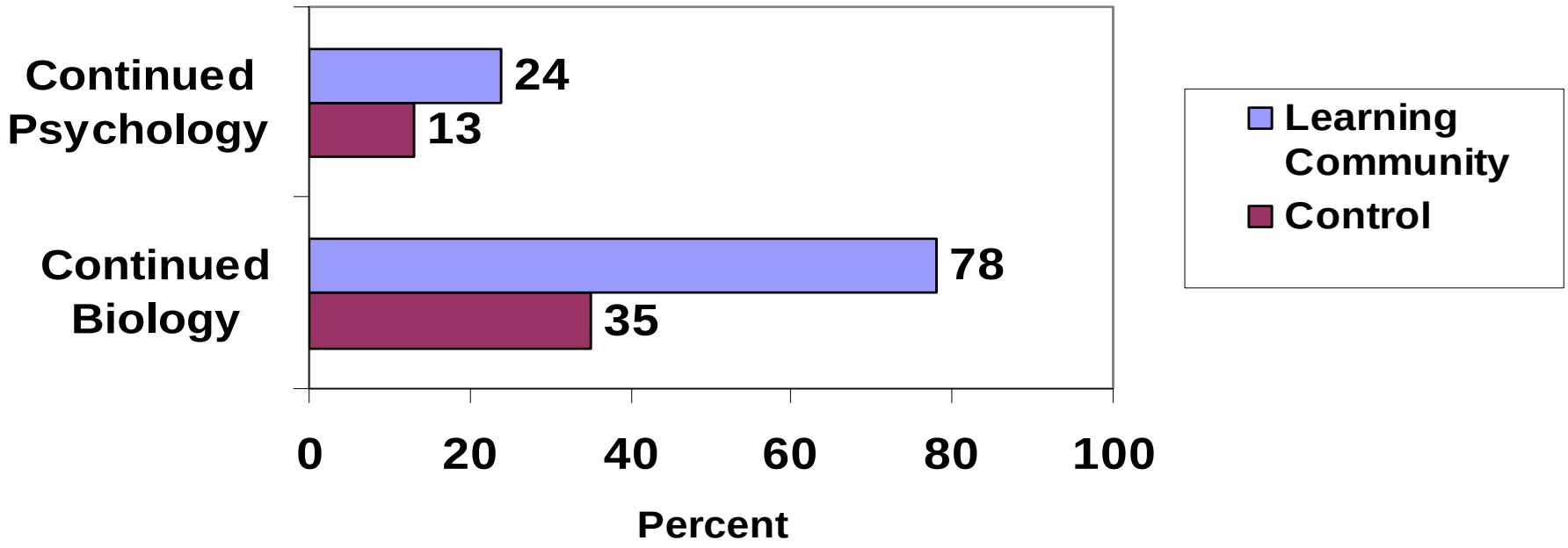


Overall GPA at the end of the First Semester

- We found no difference in overall GPA at the end of the first semester comparing non-LC and LC classes.
- There was also no difference in terms of PSYC GPA for 200 level classes between groups.

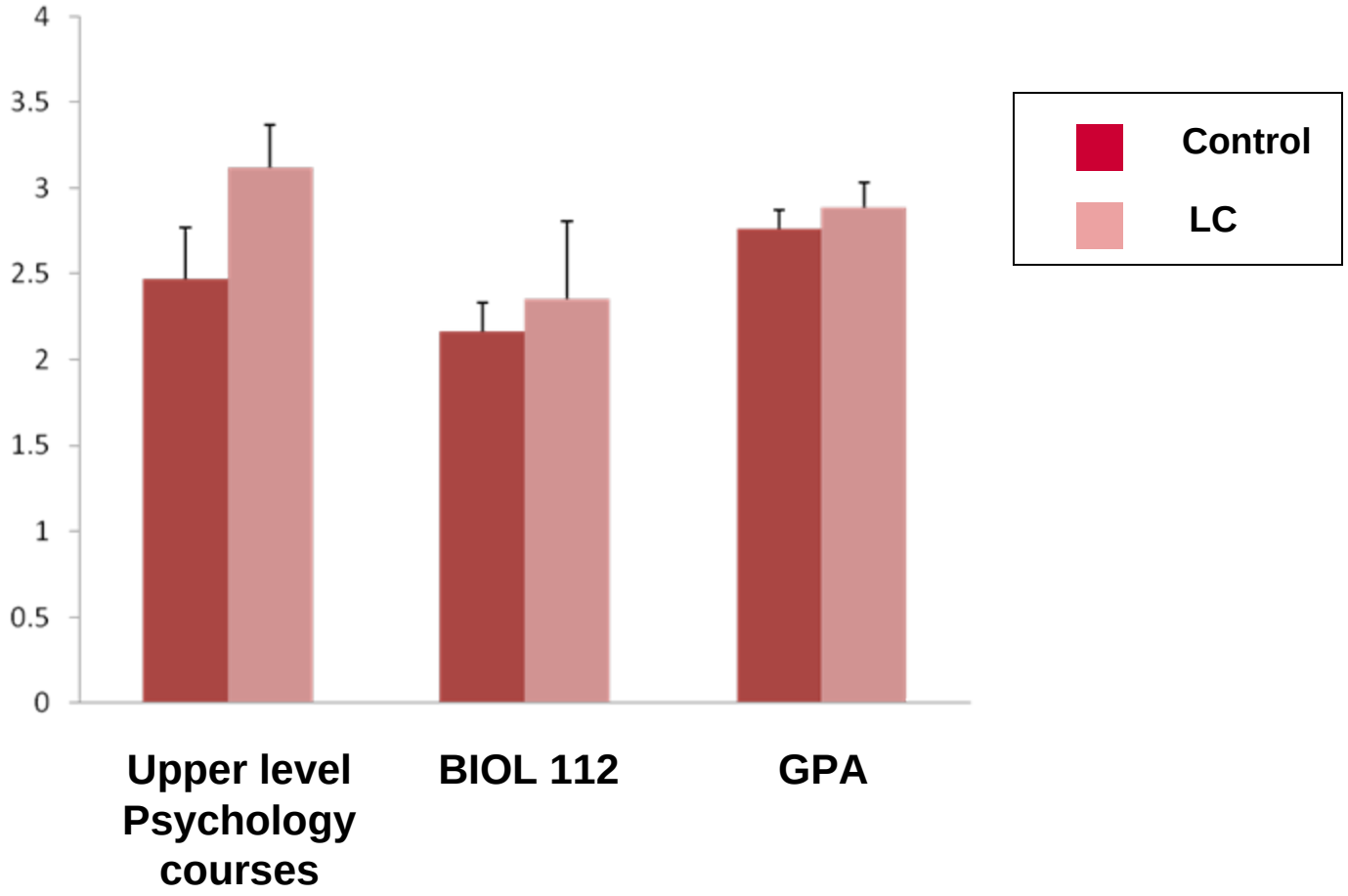


Did students take further psychology or biology courses?



Learning community students are more likely than the control cohort to move onto 200 level Biology classes at the end of the first year.

Future success…



Summary:

- Learning Community students clearly outperform control students in psychology
- Trend towards Learning Community students outperforming control students in biology
- Trend towards improved GPA
- Increased rate of sticking with biology and psychology coursework
- LC students tend to do better in upper level coursework
- Positive qualitative course evaluations and survey results

Discussion:

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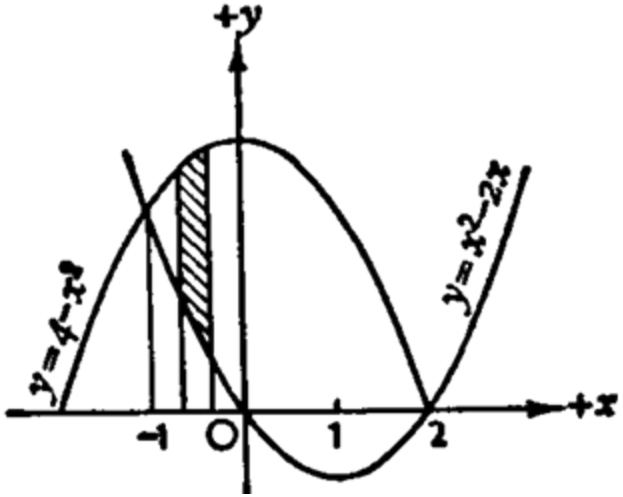
Palmetto Fellow Scholarship Enhancement

- First affected incoming 2008 freshmen
- Extra $2500 for enrolling in science and math classes.
- More provisional students are taking science courses.
- Of the 2010 LC, 30% were provisional students versus 7% in the biology control group.



I told you that you weren't coming with us, Nicole!
Mom and Dad are using you as the control group.
They want to see if taking kids on vacation
makes them happier as adults.

Control Group Students

- Control students may have been enrolled in a different learning community or first year seminar and benefited from the experience. We were unable to control for this.
- A higher percentage of incoming freshmen are enrolling in the FYE programs each year.

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Side Note: Hyper-Bonding

- When a high performing science learning community between Biology 111 and Chemistry 111 became residential there was a significant decrease in performance and attitude.
- We plan to keep our LC non-residential.

- Howard Hughes Grant continues for third year in fall 2011
- We are pleased with the results so far and look forward to encouraging our next freshmen class to succeed.

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Thank you!