Count Me In: Exploring the Relationship Between Quantitative Reasoning and Civic Engagement

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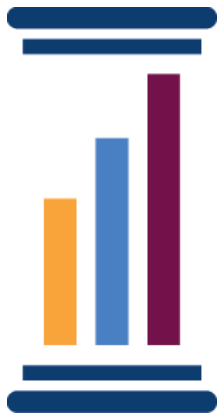Alexander C. McCormick

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Outline

- **A few words about NSSE**

- **Quantitative Reasoning (QR) on NSSE**

- **Where we find differences in QR**

- **What we mean by Civic Engagement**

- **The relationship between QR and Civic Engagement**

What is NSSE?

- **National Survey of Student Engagement**

- **NSSE gives a snapshot of college student experiences in and outside of the classroom**

- **NSSE items represent good practices related to desirable college outcomes**

- **Indirect, process measures of student learning and development**

NSSE Purpose

- **NSSE annually gathers valid, reliable information on the extent to which students engage in and are exposed to proven educational practices that correspond to desirable learning outcomes.**

Thiel College

- **Results indicate how students spend their time and what they gain from college.**

Rationale for adding QR to NSSE

- **Emphasize importance of QR/QL activities during college**

- **Address bias towards Arts and Humanities majors**

- **Existing problem set items lacked psychometric properties**

Importance of QR

- **National Assessment of Adult Literacy**

- **QR skills are needed for effective democratic participation (Steen, 2001)**

Development of QR Items

- **Review literature to develop 10 items related to QR activities**
- **Vetted items with experts in field**
- **Cognitive interviews and focus groups with students**
- **Quantitative analyses on items (EFA, CFA, IRT, etc.)**
- **Chose 3 best items to represent QR activities in college**

Pilot 2012 Survey

- **Used to update NSSE. New NSSE launches in 2013**

- **New "Engagement Indicators" like Quantitative Reasoning**

- **New "Modules" including Civic Engagement**

Sample

- **4,807 students at 14 institutions**

- **68% Female**

- **45% First-year / 55% Senior**

- **33% STEM majors**

- **96% Full-time**

- **73% White, 10% African-American, 8% Asian, 6% Hispanic, 3% Other/Multiracial**

QR on NSSE

- **Students' reported frequency of QR activities**
$(\alpha = .86; Range: 0\ to\ 100;\ \text{FY}: \bar{X} = 45, s = 26; SR: \bar{X} = 48, s = 28)$

- **How often have you done the following? [Very often, Often, Sometimes, Never]**
  - **Reach conclusions based on your own analysis of numerical information (numbers, graphs, statistics, etc.)**
  - **Used numerical information to examine a real-world problem or issue (unemployment, climate change, disease prevention, etc.)**
  - **Evaluated what others have concluded from numerical information**
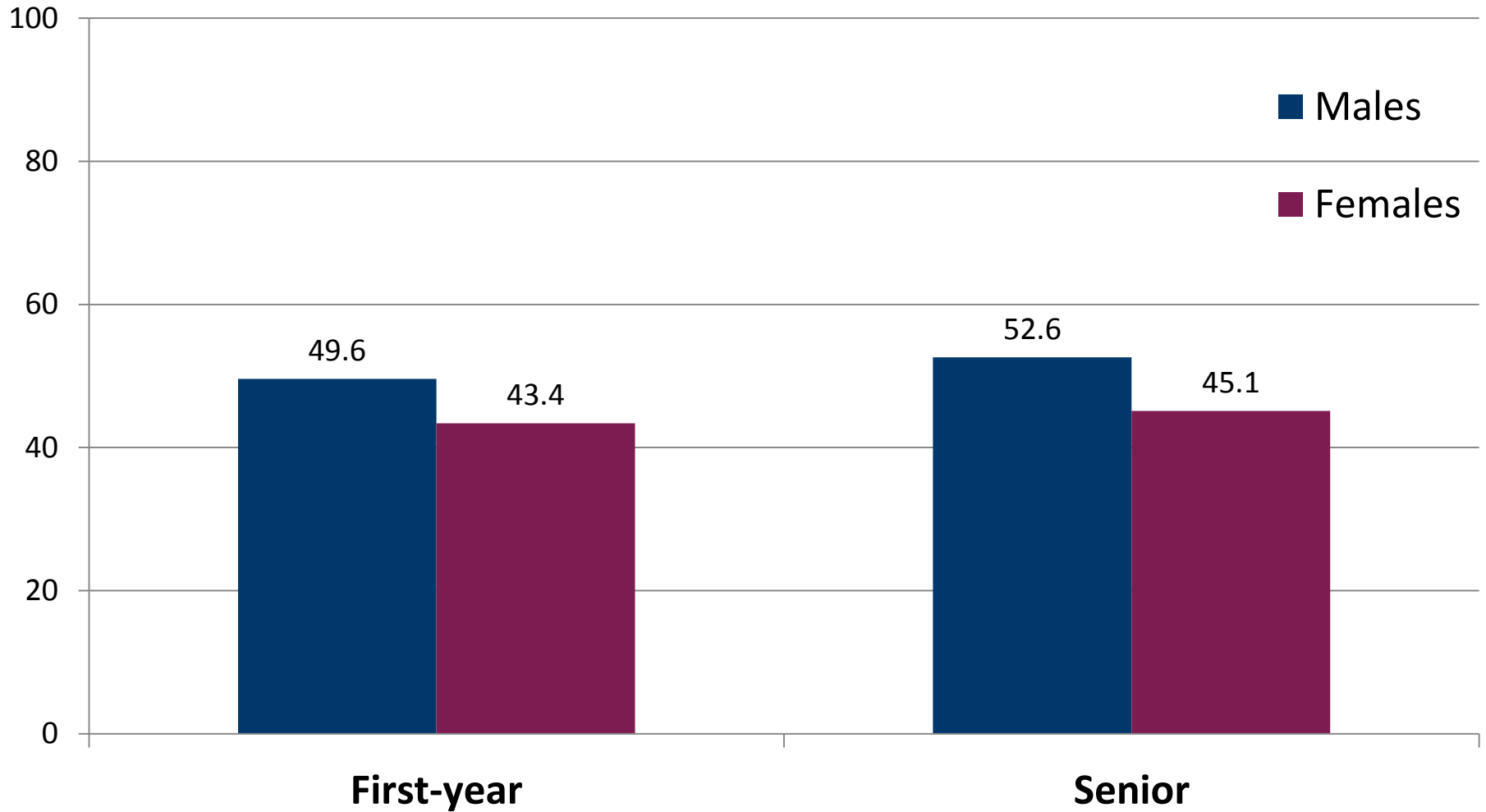
Where we see differences in QR

- **Gender**
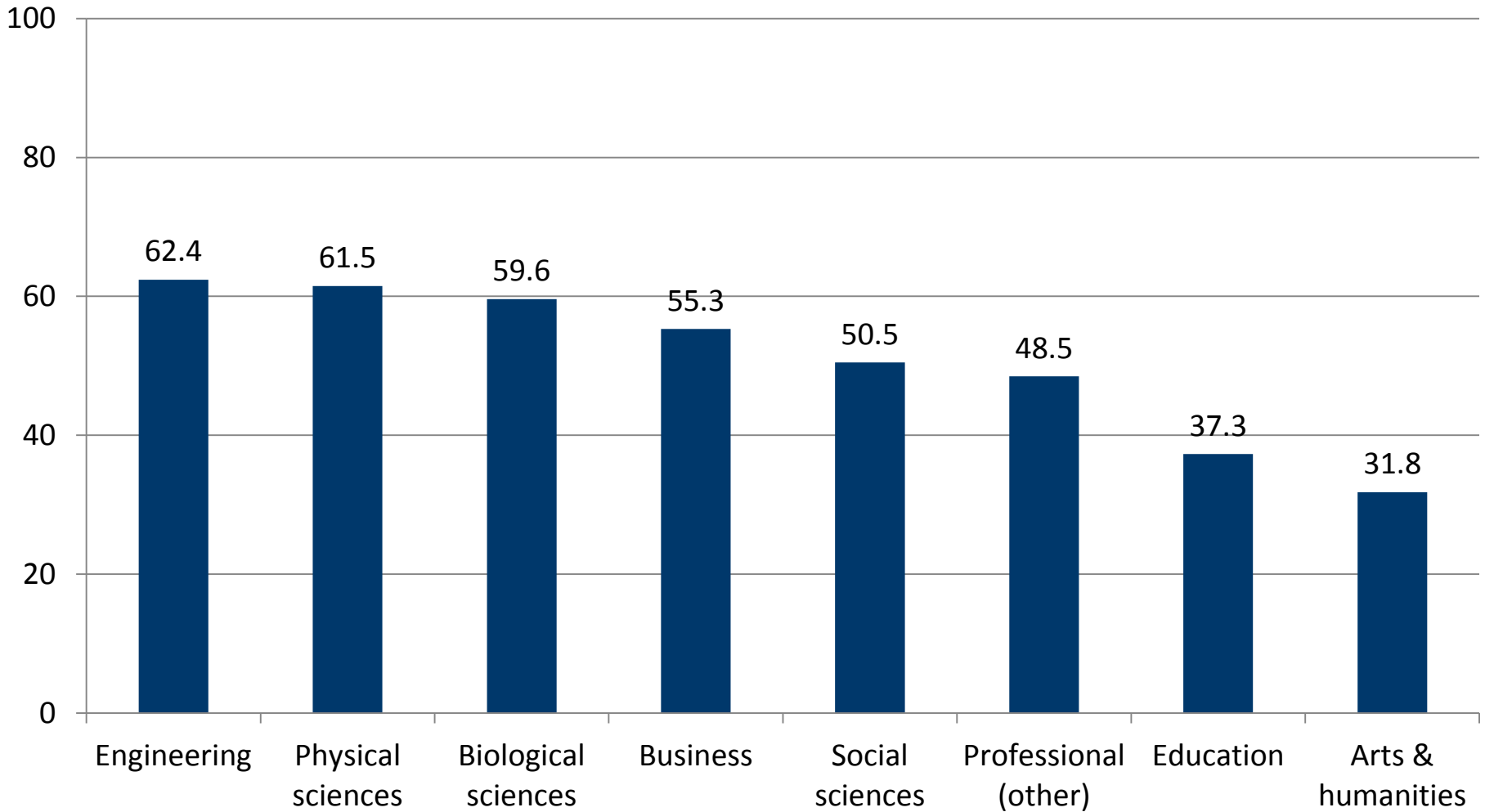 - **Males report more frequent QR activity than females (almost a quarter standard deviation more among seniors)**

- **Academic Major**
  - **Differences in academic majors account for 17% of the variability in QR activities**

Frequency of Senior QR Activity by Major Category

# Majors where students report the most and least QR activities

Top 10

1. Civil Engineering
2. Marine (life) Science
3. Chemical Engineering
4. Finance
5. Economics
6. Chemistry
7. Mechanical Engineering
8. Earth Science
9. Physics
10. Mathematics

Bottom 10

1. Art
2. English
3. Music or Art Education
4. Theater or Drama
5. Music
6. Language & Literature
7. History
8. Therapy (occupational, physical, speech)
9. Theology or Religion
10. Secondary Education

Selected Characteristics by QR Quartiles for Seniors

(overall percentages in parentheses)
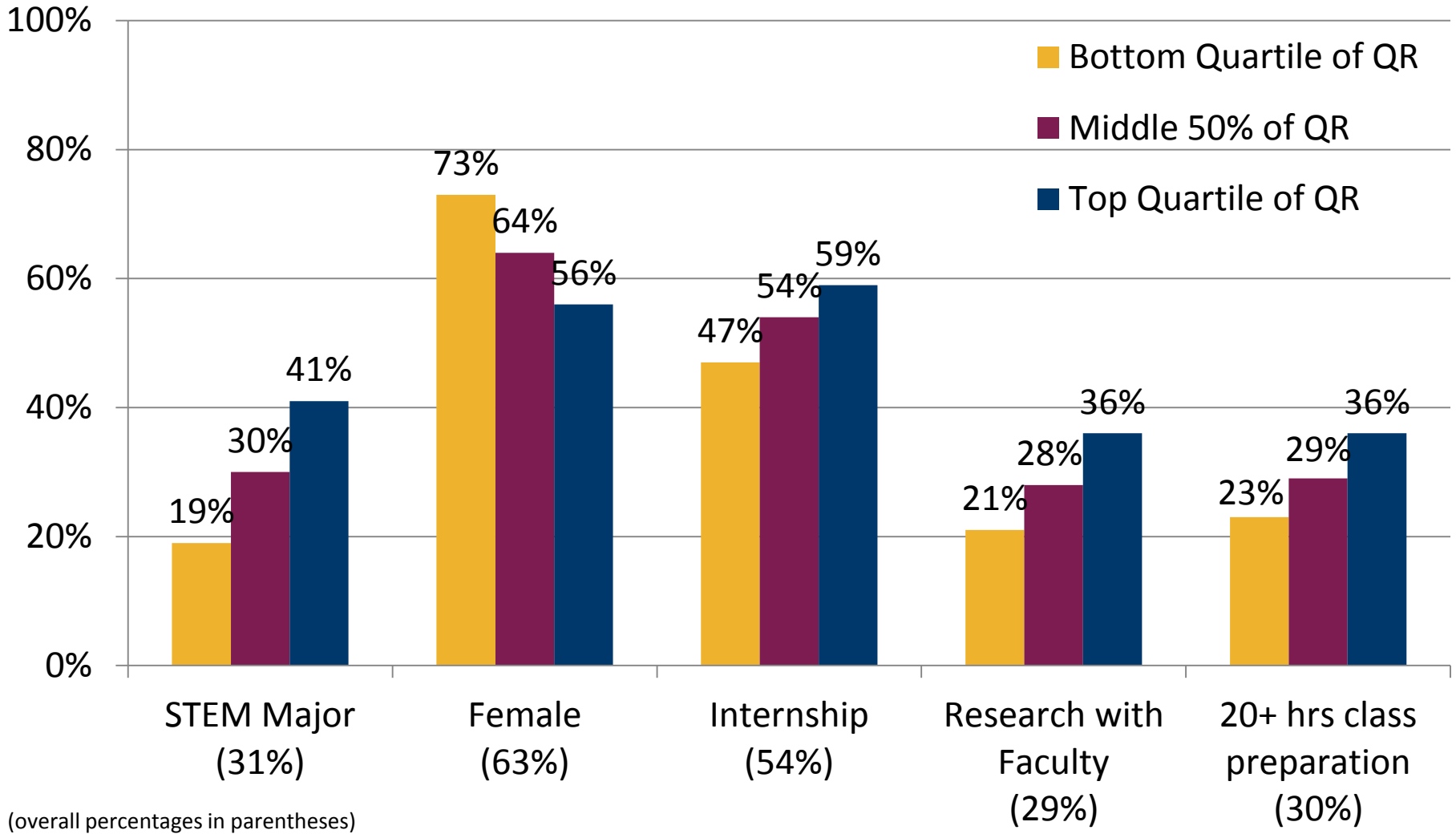
What is Civic Engagement?

- **Working to make a difference in civic life and developing the knowledge, skills, values, and motivation to make that difference (Ehrlich, 2000).**

Civic Awareness

How often have you done each of the following either in or out of the classroom?

[Very often, Often, Sometimes, Never]

- **Informed yourself about {local; regional or national; international or global} issues**

- **Discussed {local; regional or national; international or global} issues with others**

Civic Leadership/Competence

Select the response option that best represents your ability to do the following [1=poor, 2···5, 6=Excellent]:

- Help people resolve their disagreements with each other
- Resolve conflicts that involve bias, discrimination, and prejudice
- Lead a group where people from different backgrounds feel welcomed and included
- Contribute to the well-being of your community

Civic Activism

How often have you done each of the following either in or out of the classroom? [Very often, Often, Sometimes, Never]

- **Raised awareness about {local; regional or national; international or global} issues**
- **Identified others who could help address {local; regional or national; international or global} issues**
- **Organized others to work on {local; regional or national; international or global} issues**

# Majors where students report the most and least Civic Engagement

Top 10

1. Political Science
2. Social work
3. Journalism
4. Sociology
5. Secondary Education
6. Economics
7. Environmental science
8. Anthropology
9. Theology or religion
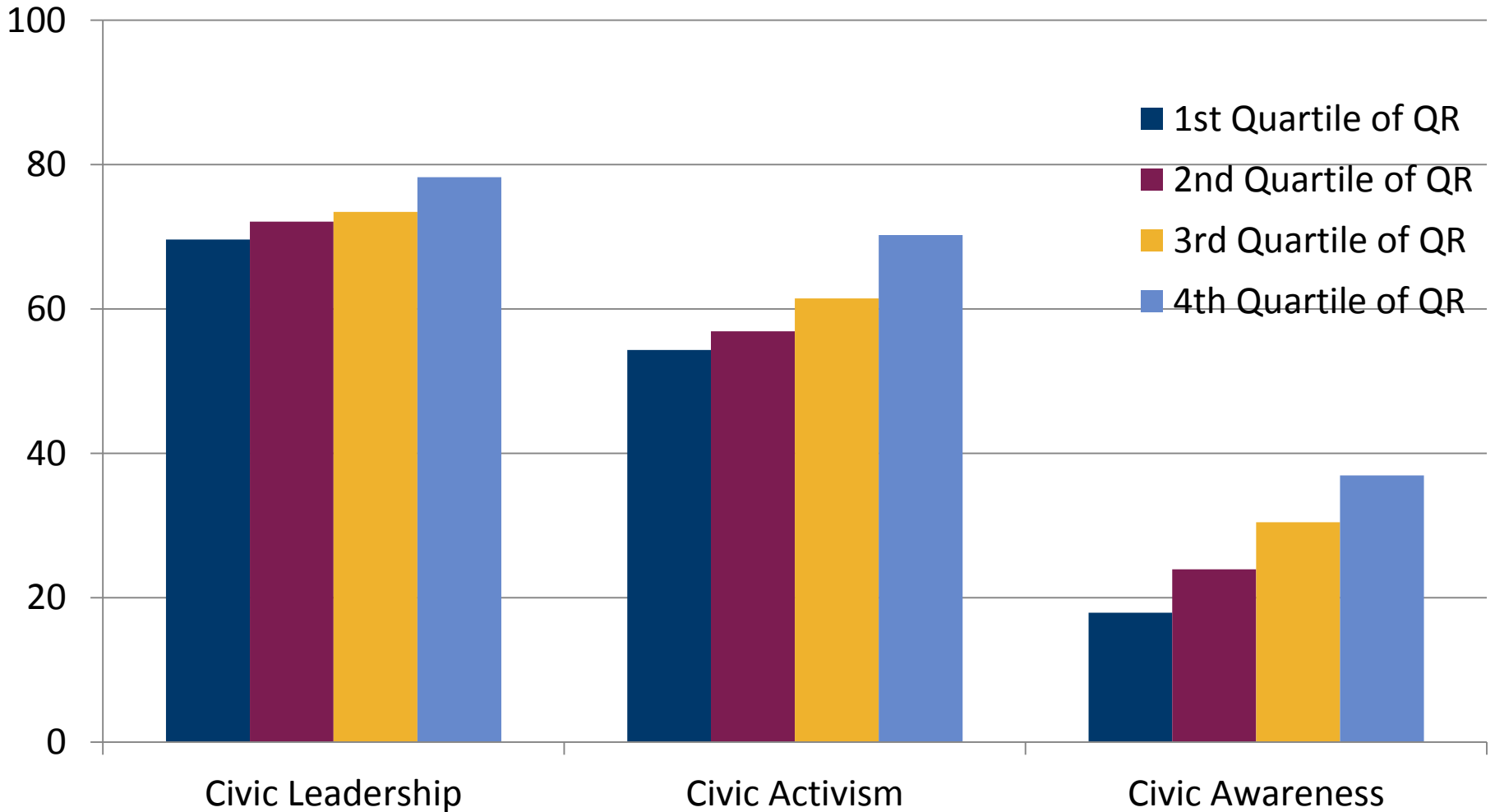10. Special Education

Bottom 10

1. Earth science
2. Electrical/electronic engineering
3. Kinesiology
4. Physics
5. Therapy (occupational, physical, speech)
6. Statistics
7. Art
8. Chemistry
9. Computer science
10. Mechanical engineering

Average First-Year Civic Engagement by QR Activities
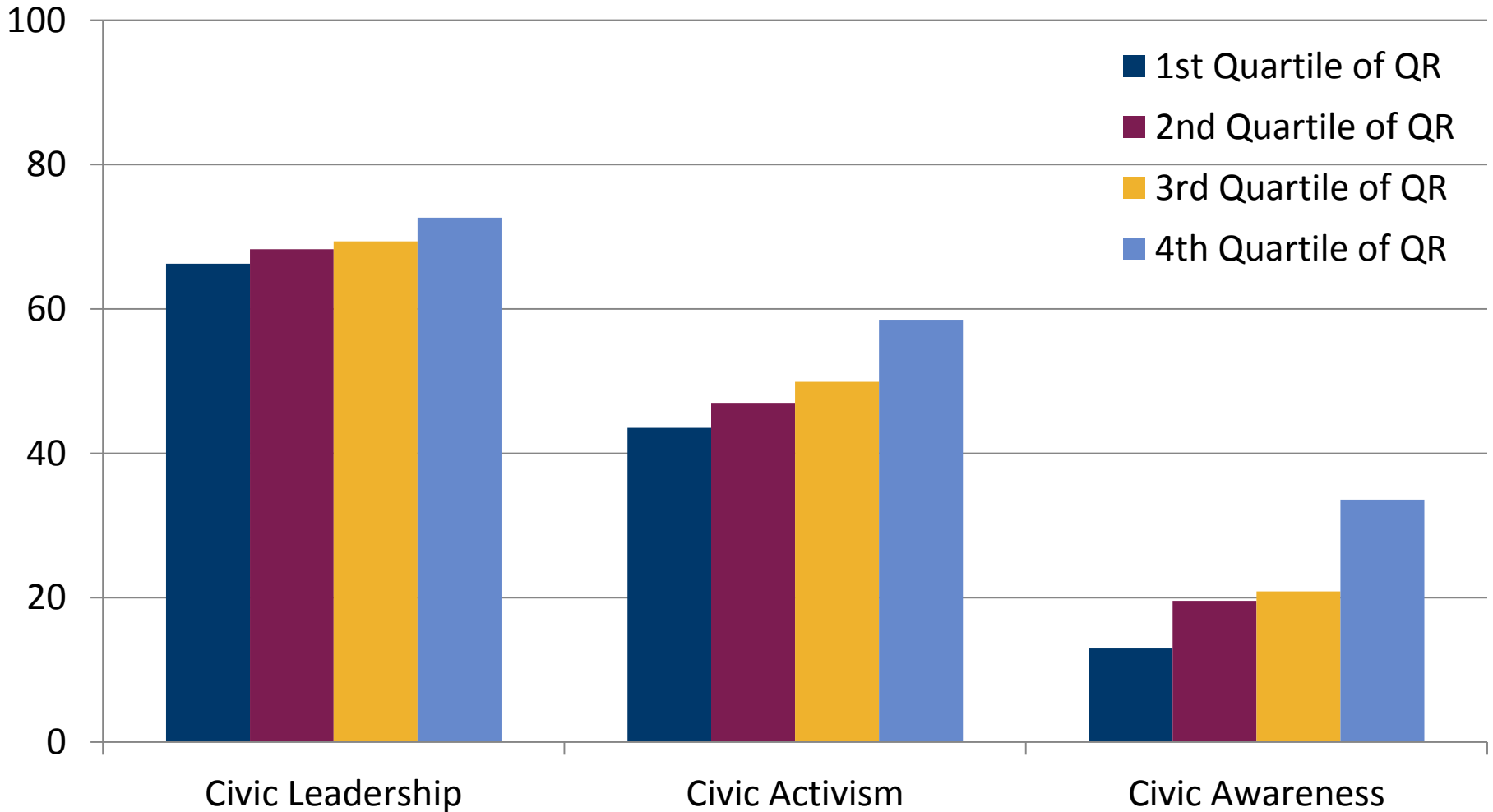
Average Senior Civic Engagement by QR Activities

Regression Results

- **Controlling for student characteristics** (gender, race/ethnicity, ACT/SAT scores, enrollment status, age, transfer status, parental education, STEM/non-STEM major, hours spent volunteering, service-learning) **and institutional characteristics** (enrollment size, control) **frequency of QR activity was positively associated with all three Civic Engagement indicators.**

Regression Results

	QR - B	QR - β	R^2
Civic Awareness	.22	.24	.22
Civic Activism	.22	.26	.15
Civic Leadership	.11	.17	.06
All significant at the p<.001 level			

Implications

- **Programs to increase students' QR activities also gives students the tools to become more productive and active citizens**

- **Given the gap in QR activities across majors, it is important for all disciplines to incorporate QR activities**

Questions

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