

Diagnosing the Learning Environment for Diverse Students in Introductory Economics: An Analysis of Relevance, Belonging, and Growth Mindsets

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It is now well known both within and outside the economics profession that women and members of racial and ethnic minority groups are significantly underrepresented at all levels of the discipline (New York Times 2018). This underrepresentation is stark at the undergraduate level, where women and underrepresented racial/ethnic minority (URM) students together earn one-third of bachelor's degrees in economics, despite earning nearly two-thirds of bachelor's degrees overall (Bayer and Wilcox 2019).

As part of our profession's continuing efforts to understand and address the underrepresentation of women and minority students in undergraduate economics majors, this paper analyzes administrative and survey data to diagnose the learning environment in an introductory economics course. We follow two successive cohorts of students who took the course in academic years 2017-18 and 2018-19 at our institution, where 53 percent of students take introductory economics and the composition of graduating economics majors by gender and race is close to national averages.

Building on educational psychology research, we focus on three aspects of a student's introductory economics experience:

- *Relevance*: The student perceives the material to be directly relevant or useful to their own life.

- *Belonging*: The student is socially integrated in their classes and feels they belong in the department.
- *Growth Mindset*: The student believes that their ability in economics is not fixed, but a malleable quality that can improve and grow.

The literature provides evidence that these factors are related to college success and are impacted by practices of faculty and departments (e.g., National Academies of Science, Engineering, and Medicine 2017). There may be considerable scope for economists to broaden participation in their discipline through targeted efforts to increase relevance, belonging, and/or growth mindsets. Experimental interventions to draw members of underrepresented groups to economics have been encouraging (Bayer et al. 2019; Porter and Serra 2019), but much remains to be learned about the channels and durability of impacts.¹ Our paper aims to establish a framework and vocabulary for understanding the success of existing interventions and for targeting treatments in future research.

The first key contribution of our study is to document significantly lower survey measures of relevance, belonging, and growth mindsets (RBG) among women and URM students in introductory economics, relative to non-URM men.² Linking these measures

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¹Bayer et al. (2019) demonstrate that an email intervention that provides incoming first-year women and URM students with information on the diversity of people and research in economics significantly increases their completion of economics courses in the fall semester. Porter and Serra (2019) find that visits to introductory courses by alumnae speaking on the importance of economics to their careers significantly increase the likelihood that women major in economics.

²URM students are those who identify as Black or

to administrative data, we find that students with lower measures of RBG also tend to earn lower grades in the course and are less likely to declare economics as a major.

We then provide evidence on the impact of a new, low-cost initiative, which our department introduced to encourage persistence in economics among women and URM students. Coordinated each year by a member of our department, the “Visible Hands in Economics” or VHE program expands the role of undergraduate teaching assistants, emphasizing the goal of promoting an inclusive environment for all introductory students. A small and diverse group of student VHEs receive training in inclusive peer advising, run a weekly study hall open to all introductory students, and meet four times a semester to discuss progress and challenges with department faculty. Importantly, the VHEs, who reflect the diversity of the campus population and may themselves have experienced lower RBG in economics classes, read and discuss research on issues of diversity and inclusion in economics. We offered the program for the first time in the 2018-19 academic year, allowing us to compare the two cohorts to evaluate its effects on RBG among students in introductory economics. We made this intervention available to all introductory students, recognizing that non-targeted efforts to increase RBG may be especially beneficial to underrepresented students, given their lower baseline levels of RBG.

I. Data and Results

We collected survey data for two cohorts of students in an introductory economics course, which was taught in small sections of approximately 20-25 students (11 professors taught at least one section each, with only the textbook in common). The survey asked students about their experiences in their introductory economics courses, their interest in economics, and their demographic characteristics.³ We

African American, Hispanic or Latinx, or Native American. Non-URM students include those who identify as white or Asian.

³The survey instrument is available upon request.

then matched the survey responses to administrative data, which included each student’s grade, semester, and instructor for the course, class year, whether the student declared an economics major, and indicators for first-generation college students, international students, and varsity athletes.

During the two years of interest, 38 percent of all introductory economics students at our institution were female, and 16 percent were URM students, as compared to college-wide shares of 51 and 21 percent, respectively (see Appendix Table 1). The response rate to our survey was high, with approximately 58 percent of introductory students completing the survey. The 2017-18 sample contains 138 observations, and the 2018-19 sample contains 135 observations. While female students were somewhat more likely to respond to the survey than their peers, there were no statistically significant differences in response rates by minority status, or by course grade.

A. Lower RBG for Women/URM Students

Table 1 demonstrates marked differences in measures of relevance, belonging, and growth mindsets between women or URM students and non-URM men. We present the fractions of students responding “Strongly Agree” to each statement, along with a summary index measure for each category, which is the average of the standardized values of the indicator variables in that category (Kling et al. 2007).⁴

The differences are striking. Nearly every individual measure of relevance, belonging, and growth mindset, is larger among non-URM men, and seven of the differences are statistically significant (another two are marginally so, with $p=0.130$ and $p=0.145$).⁵ Similarly, each of the three sum-

⁴For example, to create an individual’s summary index for *Belonging*, we take each 1-0 variable related to belonging, subtract its mean and divide by its standard deviation, and then average across the 8 standardized belonging variables. Variables are defined to reflect desirable outcomes, but index values can be negative because they are an average of standardized measures. We use means and standard deviations from the 2017-18 cohort, which was not exposed to the VHE program.

⁵Most statistically significant differences remain so

TABLE 1—MEASURES OF R, B, AND G AMONG INTRODUCTORY ECONOMICS STUDENTS

| | (1) Non- URM Men | (2) Women and URM Students | (3) p-value |
|--|---------------------------|-------------------------------------|----------------|
| <i>A. Fraction responding “strongly agree” (except where noted)</i> | | | |
| <i>Relevance</i> | | | |
| The textbook used examples that were relatable to my life | 0.130 | 0.104 | 0.547 |
| The professor used examples that were relatable to my life | 0.402 | 0.294 | 0.082 |
| We discussed important, real world issues in class | 0.314 | 0.314 | 0.998 |
| The class gave me a useful framework for thinking about important issues | 0.275 | 0.277 | 0.961 |
| Disagree: We overlooked important aspects of the issues we studied | 0.353 | 0.234 | 0.043 |
| <i>Belonging</i> | | | |
| My Econ 001 class was collegial | 0.284 | 0.200 | 0.130 |
| I felt that the students supported each other | 0.337 | 0.250 | 0.145 |
| I felt the prof cared about whether I was learning the material | 0.431 | 0.281 | 0.016 |
| I felt comfortable asking questions in class | 0.382 | 0.265 | 0.053 |
| I felt comfortable asking questions at TA clinics | 0.289 | 0.236 | 0.416 |
| The economics department values Swarthmore students | 0.306 | 0.237 | 0.276 |
| People like me can become economists | 0.410 | 0.207 | 0.002 |
| Answered NO: Do you feel different from the typical economics student? | 0.851 | 0.595 | 0.000 |
| <i>Growth Mindset</i> | | | |
| I felt the prof believed I could learn the material | 0.446 | 0.368 | 0.226 |
| While taking the course, I believed I could learn the material | 0.441 | 0.301 | 0.026 |
| <i>B. Summary index measures</i> | | | |
| Average of standardized variables measuring Relevance | 0.078 | -0.039 | 0.190 |
| Average of standardized variables measuring Belonging | 0.234 | -0.040 | 0.001 |
| Average of standardized variables measuring Growth Mindset | 0.058 | -0.169 | 0.038 |
| Observations | 102 | 138 | 240 |

Notes: Column 3 reports p-values from t-tests for equality of the proportions in columns 1 and 2. Only respondents with non-missing self-reports of gender and minority status are included. See text for detail regarding construction of summary index measures. Results are similar using only white men in Column 1.

many indices is negative for women and URM students but positive for non-URM men. While the difference in the relevance index is not statistically significant given the current range of practices within the course, women and URM students were less likely to report that their professors used examples that were relatable to their lives and more likely to feel the course overlooked important aspects of the issues it covered.

Differences in feelings of belonging are more dramatic, with the summary index differing between the two groups at $p=0.001$. Women and URM students were more likely to feel different than the typical economics student and were less likely to feel comfortable asking questions in class, to feel that the professor cared whether they learned the material, and to believe that

people like them could become economists. They also report lower measures of growth mindset: Only 30 percent believed they could learn the material, compared to 44 percent of non-URM men.

B. Performance, Persistence, and RBG

In Table 2 we offer evidence that stronger feelings of RBG are associated with better performance in introductory economics and greater persistence in the discipline. The key right-hand side variables are the indicator for *Female and/or URM students*, and *High RBG*, an indicator for the student having relevance, belonging, and growth summary indices that are all above their medians.⁶ While we cannot ascribe a causal interpretation to these regression results,

after correction for multiple comparisons.

⁶In results not shown, the estimated coefficient on the interaction term is statistically insignificant.

the models control for several potential confounders, including indicators for first-generation college student, international student, varsity athlete, and whether the course was taken for credit/no-credit (i.e., no letter grade),⁷ as well as instructor, cohort, and semester-of-college fixed effects. When the outcome is declaring an economics major, we also control for the student's grade in introductory economics.

The results indicate a statistically significant and positive relationship between *High RBG* and the likelihood the student earned an A- or better in introductory economics, as well as the likelihood that the student declared an economics major. These are large coefficients: Students with high RBG have a 53 percent higher probability of earning a grade of A- or better and a 49 percent greater likelihood of majoring in economics, relative to the means for the full sample.

Despite the inclusion of several control variables, the impact of RBG may be confounded in Table 2 by reverse causality or unobservables. A strong grade in introductory economics, for example, may influence reported levels of RBG, or a pre-existing intention to major in economics might generate both a high level of RBG and the observed choice of major. To (partially) address this concern, we control in columns 3 and 6 for the student reporting that they were likely or very likely to become an economics major *before* taking the introductory course. Notably, adding this control does not meaningfully affect the estimated relationships between *High RBG* and these measures of performance and persistence.⁸

C. An Intervention to Enhance RBG

The VHE program was offered for the first time in 2018-19, with the primary goal of providing a more inclusive and supportive environment in introductory economics, particularly for women and URM

students. All students taking our introductory course were made aware of the VHEs and the weekly VHE study hall as resources available to them, but they were not told about the program's goals for inclusivity and probably did not realize that the program was new.

Rates of exposure to the program were generally high (Appendix Table 3). Attendance was slightly higher among women and URM students. Fifty-seven percent attended the study hall at least once (compared with 37 percent of non-URM men, $p=0.04$), and 45 percent attended at least a few times during the semester (not statistically different from the 33 percent of non-URM men who did so).

To provide evidence on the results of this program, we compared students who were exposed to the pilot to similar students in the prior year. This analysis should not be interpreted as definitively estimating causal impacts because there is likely to be non-random selection into exposure to the VHE program (e.g., students with higher levels of RBG may be more likely to attend the VHE study halls), and there were also other changes between 2017-18 and 2018-19, including which professors were teaching the introductory course (Appendix Table 4). We attempt to reduce the influence of selection and time trends by matching students on observables and limiting the sample to those taught by a professor who taught the course both years (results in Appendix Table 5). While we hesitate to draw any strong conclusions from this analysis, our results suggest the program likely had some positive effects, primarily on feelings of belonging among introductory students.

II. Discussion and Conclusions

A primary contribution of this paper is to document significantly lower measures of relevance, belonging, and growth mindset (RBG) among women and URM students, relative to non-URM men, in introductory economics. We also provide evidence that higher levels of RBG are associated with better performance in introductory economics and greater persistence

⁷When students take the course for credit/no-credit, they are given a "shadow grade" by their professor. We use that shadow grade in columns 1 and 2 but include the control because shadow grades tend to be lower than if the student had taken the course for a letter grade.

⁸Similarly, Appendix Table 2 finds no strong correlation between ex-ante interest and RBG.

TABLE 2—RBG AND PERFORMANCE AND PERSISTENCE IN ECONOMICS

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|-----------------------|-----------------------|-----------------------|-------------------|-------------------|-------------------|
| | Grade A- or Better | Grade A- or Better | Grade A- or Better | Declared Major | Declared Major | Declared Major |
| Female or URM | -0.087 (0.065) | -0.057 (0.064) | -0.076 (0.065) | -0.227 (0.091) | -0.206 (0.091) | -0.114 (0.090) |
| High RBG | | 0.259 (0.077) | 0.274 (0.078) | | 0.189 (0.114) | 0.157 (0.109) |
| Likely to major in Econ before taking intro course | | | -0.144 (0.080) | | | 0.394 (0.109) |
| Control for grade in intro econ? | — | — | — | Yes | Yes | Yes |
| Observations | 240 | 240 | 240 | 129 | 129 | 129 |
| R^2 | 0.207 | 0.246 | 0.257 | 0.264 | 0.282 | 0.361 |

Notes: Results from linear probability models. See text for discussion of controls and differences across columns. Sample in columns 4-6 is students who took the course in the first 4 semesters of college, as major is declared near the end of the second year.

in the discipline. Our evidence suggests that interventions to increase RBG may help to increase the rates at which women and URM students pursue economics beyond the introductory level.

To this end, our institution piloted the Visible Hands in Economics (VHE) program in 2018-19, as a low-cost intervention to enhance inclusivity in our introductory course. Despite our not being explicit about its purpose during the trial year, the VHE program may have enhanced feelings of RBG among introductory students by creating a common space for discussing economics and by introducing students to a diverse set of peer mentors (called VHEs) who had already completed the course successfully. Importantly, the program also sought to increase RBG and persistence in economics among the VHEs themselves, who were selected to be a more diverse group relative to the composition of past economics majors. In their own survey responses, over 85 percent of the VHEs reported that participation in the program strengthened their interest in pursuing economics and increased their confidence that they could be successful in upper-level economics courses. Moving forward, we plan to develop the VHE program further and to announce its objectives as well as its availability.

More broadly, we conclude that economists can increase diverse students' interest and performance in economics by explicitly pursuing the goal of creating a

learning environment that offers relevance, belonging, and growth mindsets for all students.

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