Diversity & Science Identity Among Community College Students

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Overview of What Will Be Covered

- The collaboration story
- Information about sample
  - Introduction to ratio of representation, and coding of students into ‘well-represented’ and ‘under-represented’ groups.
- Independent variables, dependent variables, and hypotheses of current analysis
  - Explanation of three IVs: science intentions, gender, and representation.
  - Introduction to DV: science identity.
- Results
Demographics in Our Sample

Total sample of 220 participants, from two Introduction to Biology classes at De Anza Community College. Sample is 62.3% female (n = 137), 54% ESL (n = 119), and 82% student of color (n = 172). Based on national statistics, purple signifies under-represented students (60%), green signifies well-represented (40%). Graph does not include students who identified with more than one race.
Independent and Dependent Variables

Science Intentions
- Participants indicated agree/disagree on Likert scale: “I am majoring or plan to major in Biology”

Gender
- Limited to male/female, non-binary options not included due to small sample size

Racial/Ethnic Representation – 2 Groups
- Based on ratio of representation in STEM (Lewis et al., 2009).
- White and ‘model minority’ Asian-American groups coded as well-represented, Filipino, Latino, and Black groups as under-represented.

Science Identity
- Difference between participant’s self-scores and their ratings of scientists, includes Interpersonal and Professional competencies.
- Minimum fit is 0, negative/positive scores indicate worse/better fit, respectively.
We are looking at the impact of each IV (science intentions, gender, and representation) on the DV (science identity)

We are also looking at how the three IVs interact to impact science identity
Science Identity

- Science identity is calculated by looking at two scores: the Stereotypes of Scientists (SOS) score and the Self-Score.
  - The SOS includes an Interpersonal and a Professional Competencies subscale.
  - The Self-Score mirrors the SOS, but asks participants about their opinions of themselves, rather than scientists.

- The SOS is subtracted from the Self-Score, creating the Science Identity score (SciD).

- The closer the two scores are to equal, the better the fit. Students with SciD scores below zero are the population of interest, as they have rated themselves lower than the stereotypical scientist.
Hypotheses

Hypothesis #1
• Higher science intentions will predict higher science identity.

Hypothesis #2
• Gender (male or female) will predict higher science identity.

Hypothesis #3
• ‘Better’ representation will predict higher science identity.

Hypothesis #4
• Science intentions, gender, and representation will interact with one another to predict higher science identity.
Hypotheses

Hypothesis #1
• Higher science intentions will predict higher science identity.

Supported, in opposite direction as predicted

Hypothesis #2
• Gender (male or female) will predict higher science identity.

Partial support

Hypothesis #3
• ‘Better’ representation will predict higher science identity.

Not supported

Hypothesis #4
• Science intentions, gender, and representation will interact with one another to predict higher science identity.

Supported

The interaction between the three variables and the interpersonal subscale is where the story is being told – science intentions, gender, and representation all impact science identity interactively.
Hypothesis #1
• Higher science intentions will predict higher science identity.

Supported, in opposite direction as predicted

Hypothesis #2
• Gender (male or female) will predict higher science identity.

Conditional support

A SciD score of ‘0’ is considered the ‘minimum fit’, in which participants rank themselves and scientists as approximately equal.
Hypothesis #4
• Science intentions, gender, and representation will interact with one another to predict higher science identity.

- When taken as a whole, women have lower science identity scores than do men.
  - When broken out by representation, we see that well-represented women show a mixed effect -- they scored lower than men when their science intentions are low ($M = .10, SD = .50, n = 33$), but the reverse is true if their intentions are high ($M = 0.00, SD = .56, n = 11$).
  - Under-represented women consistently score the lowest science identity of the four groups, whether their science intentions are low ($M = .07, SD = .61, n = 62$) or high ($M = -.25, SD = .47, n = 25$).

- When taken as a whole, men have mixed science identity scores.
  - Well-represented men have high science identities when science intentions are low ($M = .60, SD = .81, n = 13$) as opposed to high ($M = -.16, SD = .51, n = 11$).
  - Under-represented men have high science identity scores when science intentions high ($M = .27, SD = .41, n = 15$).
Summary

- **Hypothesis 1**: Partial support. In general, students with high science intentions had negative interpersonal fit scores, opposite of what was found in previous studies.

- **Hypothesis 2**: Partial support. Male and female students’ fit did not follow expected gendered patterns, but there was a significant difference. Men = higher interpersonal competence scores, women had lower interpersonal competence scores in our sample.

- **Hypothesis 3**: No support.

- **Hypothesis 4**: Supported. Early days, but significant interactions between science intentions, gender, and representation suggest science identity is sensitive to educational, social and cultural factors.
The current measure of science intentions is still rudimentary: a more refined version will include a scale and factor analysis.

Classification as well-represented or under-represented does not allow for in-depth analyses of how race/ethnicity may be related to science identity. Also, the personal salience of racial/ethnic identity is not explored. This is particularly relevant given the large percentage of ESL students in the sample (54%).

The study population had little exposure to advanced science, and so their intentions and identity may not be fully formed: 44% participants indicated that the class was the first science course they’d had at the college level, and 11% indicated that it was their first science course ever.

Low science identity scores may be a product of the community college setting (stigma, remedial students) and/or low exposure to science as career opportunity.
Next Steps

- For this pilot study, we need to:
  - Finish collecting and analyzing Time 2 data
  - Compare control group to intervention groups
  - Same results or significantly different by condition?

- For the next study, we plan to:
  - Develop Science Intentions scale (with a factor analysis)
  - Examine existing data for 1st and 2nd year students at R1 universities
  - Increase sample size and survey many community college settings
  - Confirm Stereotypes of Scientists Scale on diverse student populations
  - Use refined “fit” score statistics
References


Questions?

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