Can Grandeur Overcome Insecurity?

Seeking Specific Astronomy Course Experiences That Can Diminish Stereotype Threat and Enhance Students' Self-Efficacy

Lindsay R. House, Ian D. Beatty, A. Aarnio
UNC Greensboro

Purpose

Introductory astronomy aims to foster scientifically literate individuals who have an interest in understanding their place among the cosmos. We claim it can also help students overcome insecurities and self-doubts.

Background

Many students in STEM courses experience self-doubt, for example fearing that the math will be too hard or that women aren't smart enough for science.

Design

We have developed a study to track astronomy students' class-by-class sense of self-efficacy, detect any changes, and determine what specific experiences or topics in the course provoked them.

"It has been said that astronomy is a humbling and character building experience."
- Carl Sagan.

Hypothesis

We hypothesize that certain elements of experiences throughout the astronomy course can have a notably strong impact on students' self-efficacy, by promoting growth mindset and allowing them to abate feelings of social categorization.

QUESTIONS?
Contact: Lindsay R. House
L_House@uncg.edu

Growth Mindset Model

What is it?

The ability to learn is not fixed and can be changed with your efforts. A growth mindset drives motivation and achievement. Can we measure when sense of grandeur is activated and overcomes uncertainty?

Questionnaire Elements

- ☆ Did today's class impact how you feel about astronomy?
- ☆ Did today's class impact how you feel about yourself?
- ☆ Did today's class impact how you feel about others/humanity?
- ☆ If so, how?

Instrument

Beginning January 2019 an initial questionnaire examining interest, motivation, and astronomy self-efficacy. Another will be a brief after-every-class questionnaire administered to gauge changes in as the semester progresses.

Exposure to Introductory Astronomy Course

Astronomy is a unique subject because it, more than any other, brings one face-to-face with the staggering scale and grandeur of the cosmos, the relative tininess of humanity within it, and the utter insignificance of our mutual differences on any cosmic scale.

Analysis

At the end of the spring 2019 semester a final post-questionnaire will be administered and data will be analyzed to detect any changes and if so, how the changes correlated to the topics in the introductory astronomy course.

References

1. Sagan, Carl. *Pale Blue Dot: A Vision of the Human Future in Space.* 1995.
2. Schmader, Toni, Michael Johns, and Chad Forbes. "An Integrated Process Model of Stereotype Threat Effects on Performance." *Psychological review* 115.2 (2008): 336–356. *PMC*. DOI: 10.1037/0033-295X.115.2.336
3. Rydell, Robert J., Richard M. Shiffrin, Kathryn L. Boucher, Katie Van Loo, Michael T. Rydell. Stereotype threat prevents perceptual learning. Proceedings of the National Academy of ßSciences, Aug 2010, 107 (32) 14042-14047; DOI: 10.1073/pnas.1002815107
4. Dweck, Carol. "Decades of Scientific Research That Started a Growth Mindset Revolution." Science Impact