Predictors of Commitment and Success of STEM Majors

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To investigate predictors of
- majoring in STEM
- success in STEM (GPA in STEM)

Goal was to understand issues that may take women out of the STEM “pipeline”

Based on Eccles’ (1983) model of predictors of achievement related choices
Figure 1. Theoretical model of achievement-related choices developed by Eccles (Parsons), Adler, Futterman, Goff, Kaczala, Meece, and Midgley, 1983.
Gender

STEM self-efficacy
- e.g., “I generally believe I will receive excellent grades in my STEM classes.”

STEM self-concept (attainment and intrinsic value)
- Attainment, e.g., “I am known to my family and friends as someone who excels in STEM disciplines.”
- Intrinsic, e.g., “I enjoy my STEM courses more than other courses I have taken.”

STEM experiences (positive and negative)
- Positive, e.g., “Observing student role models made me confident that I could do well in a STEM major.”
- Negative, e.g., “I felt like I did not fit into the culture of STEM courses.”
Method: 2 Year Longitudinal Study

Sample = incoming freshman at Rice with interest in STEM. Email sent to 460; 161 responded for a 35% response rate for Time 1. Paid $50 at the end of each year after transcripts were obtained.
Results

- Very few left the STEM major
  - Of the 102 completing, 14 reported being non-STEM
  - No gender differences in likelihood to leave the major
  - Significant differences in STEM GPA for those leaving STEM majors
  - Significant differences in positive STEM experiences for those leaving STEM major
Results – STEM Performance

- Attainment value significantly related to STEM performance (average $r = .35, p < .05$).

- Self-efficacy significantly related to STEM performance (average $r = .37, p < .05$).

- Negative experiences in STEM are significantly related to STEM performance (average $r = -.27, p < .05$).

  - Positive experiences in STEM are significantly correlated with STEM performance at the end of the second year only.

  - Intrinsic value is not significantly related to STEM Performance.
Results – Gender

- No gender differences in STEM GPA

- No gender differences in some predictor variables
  - No differences in self-concept (i.e., Attainment and Intrinsic value)
  - No differences in positive experiences in STEM
Gender differences STEM Self-efficacy favoring men for all time points, except Time 5.
- Mean levels increase slightly for women; decrease for men

Women were more likely to report negative experiences related to STEM
Summary & Next Steps

- Good news -- no gender differences in important STEM outcomes (grades & majoring in STEM)

- But, women more likely to report negative experiences related to STEM, and these negative experiences are correlated with outcomes

- Continue data analysis – test of Eccles’ model and the other variables we included
Thanks!

Jan Rinehart