

# Measuring Motivational and Other Psychological Factors in UREs:

An 11-Year Study of Students Funded Through  
Minority Science Training Programs

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# Research Team

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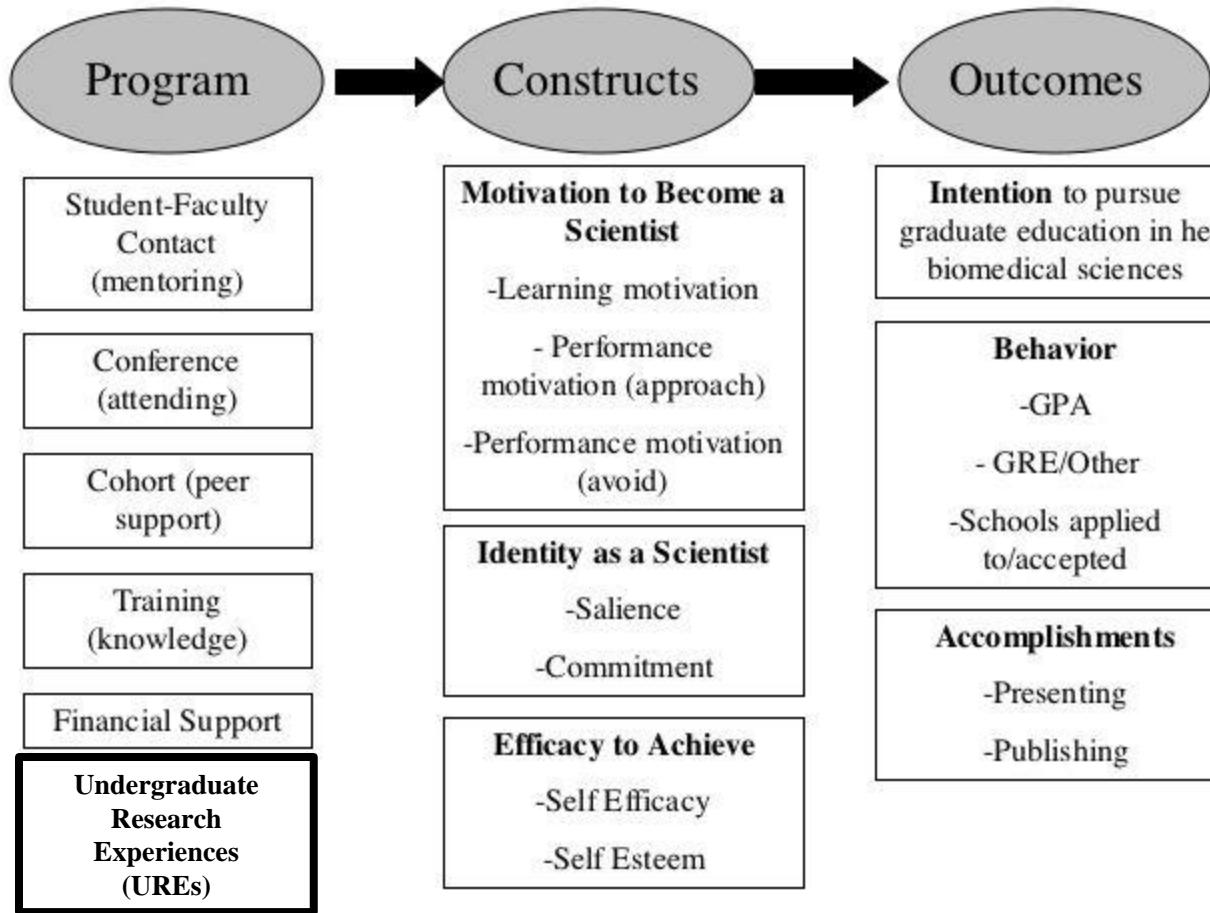


# Background: The *ScienceStudy*

- Prospective, propensity matched control
- Longitudinal study of students funded in NIH-funded R.I.S.E. and MARC science training programs
- Launched in 2005
- Participants from 50 campuses nationwide
- Twice yearly surveys from students
- Starting panel of 1420 students (90% Undergraduate)
  - African-American, Hispanic/Latino, Native American



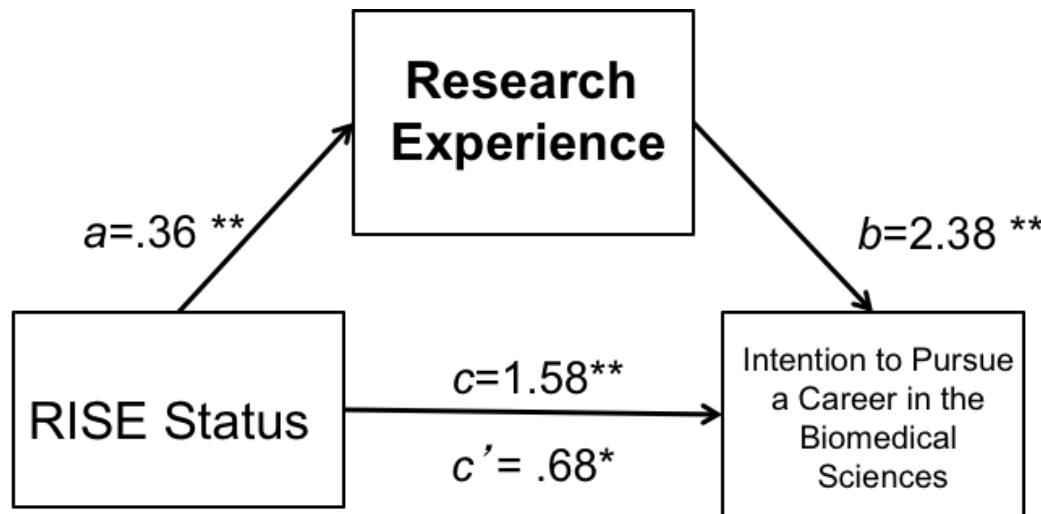
## PROCESS MODEL FOR RISE OUTCOMES



# Questions we can (begin to) answer

1. Are there elements of the RISE program that are linked with student success? (e.g., Research experience)
  - Basic effects (summative outcome):
    - Persistence
    - Graduation rates
    - Admission and completion of graduate training
2. What are the reasons for success (process)?
  - Motivation, Efficacy, Identity, & Values

# 1. Mediation: Research Experience



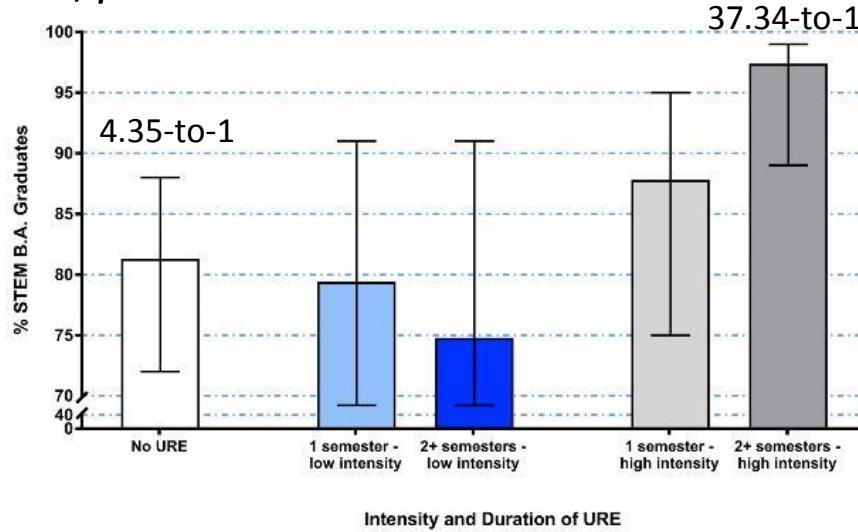
Note: a, b and c path's are unstandardized coefficients. \*  $p < .05$ , \*\*  $p < .001$

Bootstrapped Indirect Effect: Mean = 0.68,  $CI_{99\%}$  = 1.31 to 0.45

Sobel:  $Z = 4.67$ ,  $p < .001$

# 1. Science Baccalaureate Degree

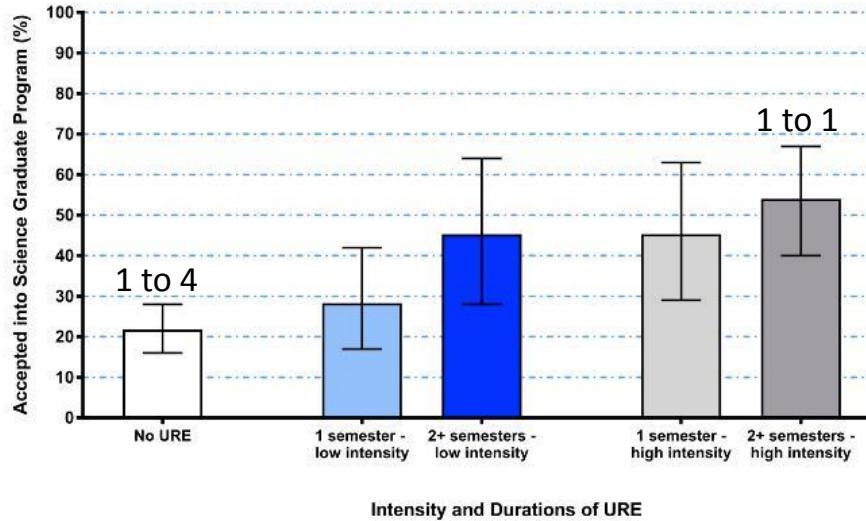
- 2+ Semesters of High-Intensity URE
- Odds Ratio 8.62,  $p < .001$



**SOURCE:** Hernandez, P. R., Woodcock, A., Estrada, M., & Schultz, P. W., (In Preparation). Broadening the scientific workforce through undergraduate research experiences

# 1. Graduate Program Acceptance

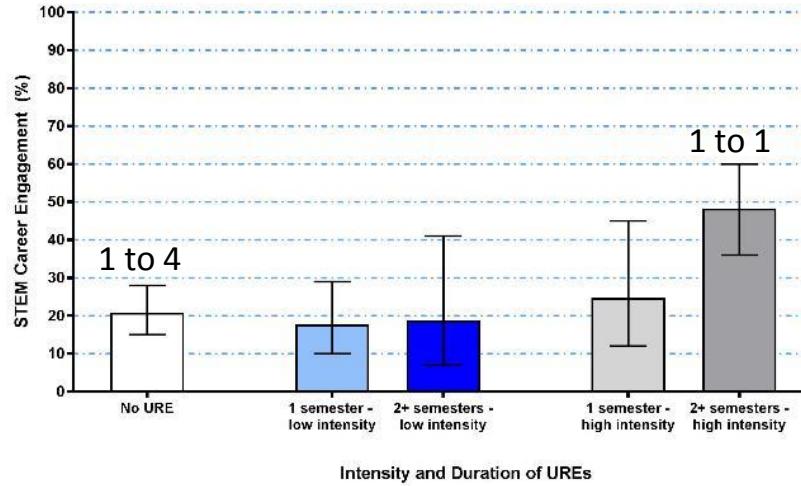
- 2+ Semesters of High-Intensity URE
- Odds ratio 4.23,  $p < .001$



**SOURCE:** Hernandez, P. R., Woodcock, A., Estrada, M., & Schultz, P. W., (In Preparation). Broadening the scientific workforce through undergraduate research experiences

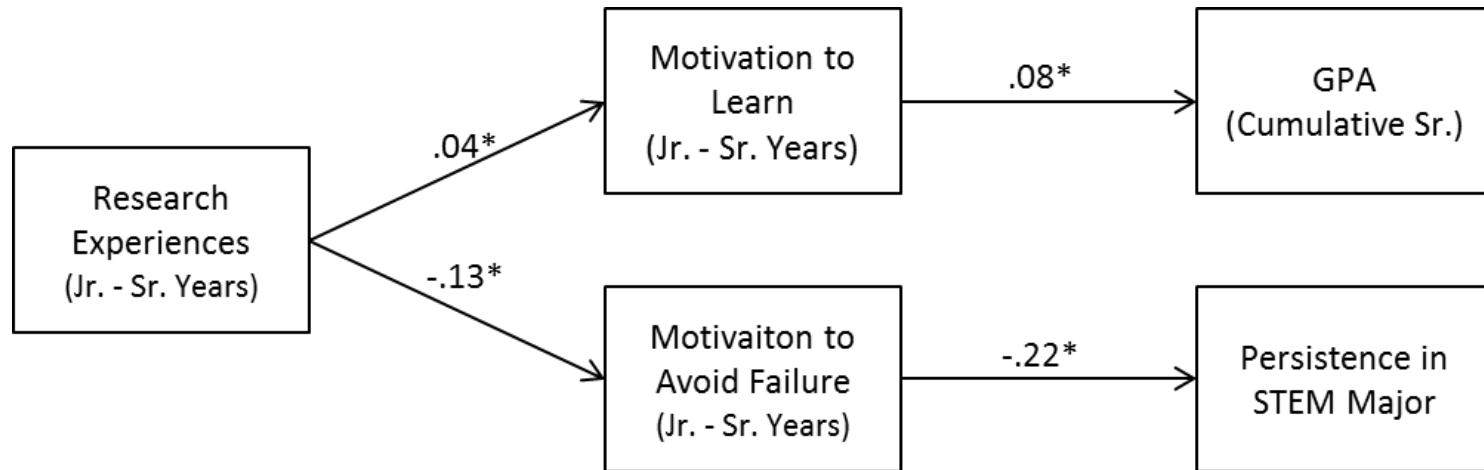
# 1. Scientific Career Engagement

- 2+ Semesters of High-Intensity URE
- Odds 3.54,  $p < .001$



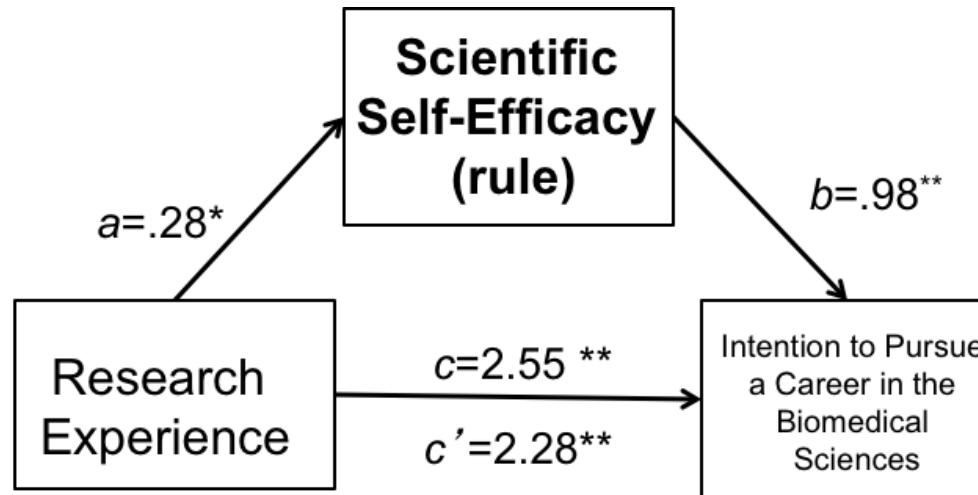
**SOURCE:** Hernandez, P. R., Woodcock, A., Estrada, M., & Schultz, P. W., (In Preparation). Broadening the scientific workforce through undergraduate research experiences

## 2. Motivation



**SOURCE:** Adapted from Hernandez, P. R., Schultz, P. W., Estrada, M., Woodcock, A., & Chance, R. C. (2013). Sustaining optimal motivation: A longitudinal analysis of interventions to broaden participation of underrepresented students in STEM. *Journal of Educational Psychology, 105*(1), 89-107.

## 2. Process: Self-Efficacy

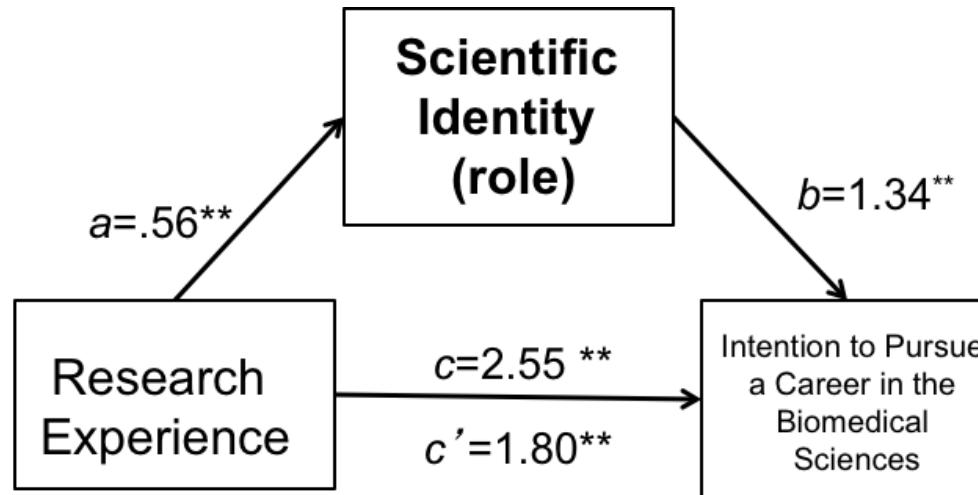


Note: a, b and c path's are unstandardized coefficients. \*  $p < .05$ , \*\*  $p < .01$

Bootstrapped indirect effect: mean = .27,  $CI_{99\%}$  .06 to .56

Sobel:  $Z = 2.57$ ,  $p < .01$

## 2. Process: Identity

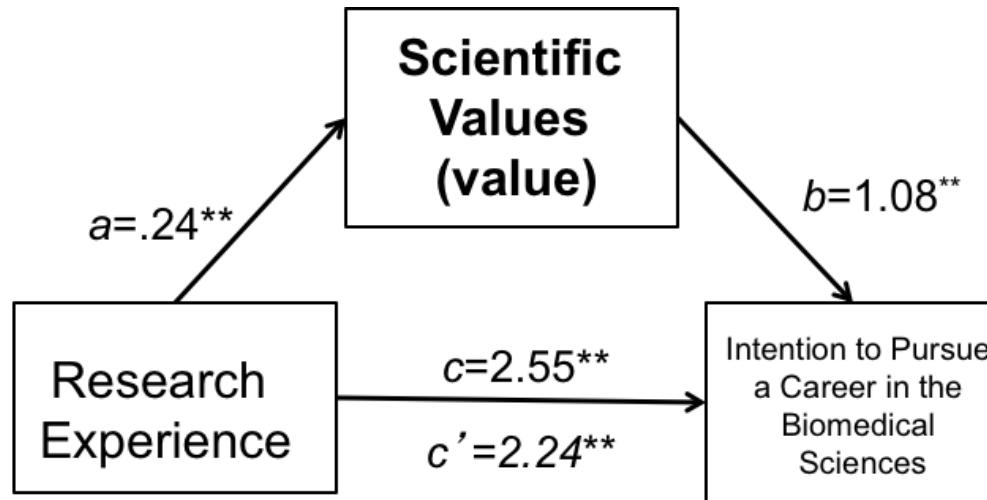


Note: a, b and c path's are unstandardized coefficients. \*  $p < .05$ , \*\*  $p < .01$

Bootstrapped indirect effect: mean = .75,  $CI_{99\%}$  .33 to 1.23

Sobel:  $Z = 4.37$ ,  $p < .001$

## 2. Process: Values



Note: a, b and c path's are unstandardized coefficients. \*  $p < .05$ , \*\*  $p < .01$   
Bootstrapped indirect effect: mean = .27,  $CI_{99\%}$  .01 to .60  
Sobel:  $Z = 2.43$ ,  $p < .01$

# Acknowledgments

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- Our appreciation goes to *TheScienceStudy* research team and *TheScienceStudy* panel members.

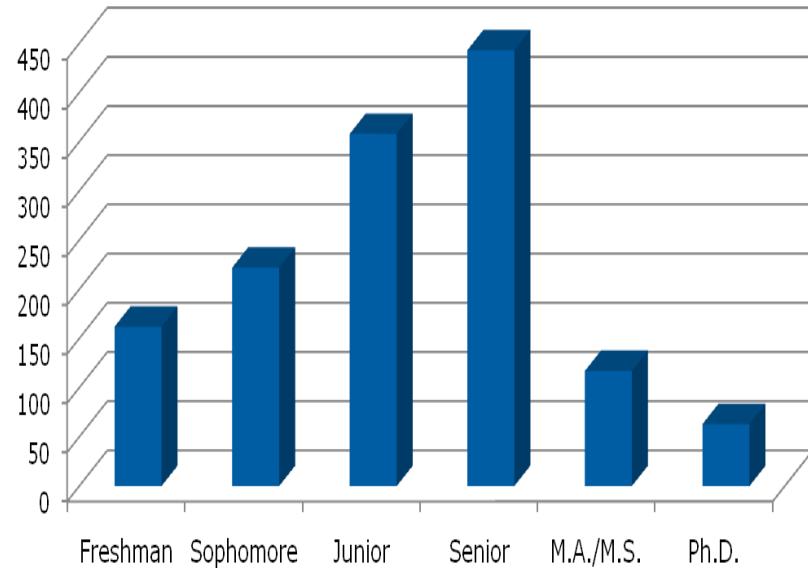
# Thank you!

Questions?



# Longitudinal Panel

- 72% Female
- Ethnicity/Race:
  - 49% African American
  - 39% Hispanic/Latino(a)
  - 10% Other
  - 1% Native American
- Major (at Wave 0):
  - 63% Biological Sciences
  - 21% Natural Sciences
  - 12% Behavioral & Social Sciences
  - 4% Mathematics & Engineering



# Key Publications

- Woodcock, A., Hernandez, P., & Schultz, P. W. (2016). Diversifying science: Intervention programs moderate the effect of stereotype threat on motivation and career choice. *Social Psychological and Personality Science*.
- Estrada, M., Woodcock, A., & Schultz, P. W. (2014). Tailored panel management: A theory-based approach to building and maintaining participant commitment to a longitudinal study. *Evaluation Review*. 38, 3-28.
- Hernandez, P. R., Schultz, P. W., Estrada, M., Chance, R., & Woodcock, W. (2013). Sustaining optimal motivation: A longitudinal analysis of interventions to broaden participation of underrepresented students in STEM. *Journal of Educational Psychology*, 105, 89-107.
- Woodcock, A., Hernandez, P., Estrada, M., & Schultz, P. W. (2012). The consequences of chronic stereotype threat: Domain identification and attrition. *Journal of Personality and Social Psychology*, 103, 635-646.
- Merolla, D., Serpe, R., Stryker, S., & Schultz, P. W. (2012). Structural precursors to identity processes: The role of proximate social structures. *Social Psychology Quarterly*, 75, 149-172.
- Schultz, P. W., Hernandez, P., Woodcock, A., Estrada, M., Chance, R., Aguilar, M., & Serpe, R. (2011). Patching the pipeline: Reducing educational disparities in the sciences through minority training programs. *Educational Evaluation and Policy Analysis*, 33, 95-114.