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**Student Persistence in Science:
Do Science Teacher Credentials Matter?**

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Background

Method

Results

Conclusions



- Strongly connected to the country's welfare and competitive edge in the international arena (PCAST, 2010).
- There is a serious shortage in STEM workforce endangering the nation's security and economic power (Augustine, 2007).
- Underrepresentation of certain student populations in STEM workforce still exists (NRC, 2011).

- Student persistence in STEM areas is still unsettling despite growing efforts (Crisp, Nora, & Taggart, 2009).
- Numerous studies unpacking antecedents of student persistence (e.g., Chen, 2013; Ehrenberg, 2010; Hansen, 2014).
- Studies exploring teacher-related factors affecting persistence is scarce.



- Demographics (Ehrenberg, 2010),
- Introductory math & science success (Hanson, 2014)
- AP STEM courses in HS (Museus et al., 2010)
- Collaboration with peers (Museus et al., 2010)
- STEM projects in HS (Graham et al., 2013)
- Self-efficacy (Anderson & Ward, 2013)
- Highly qualified math & science teachers (Hanson, 2014; Museus et al., 2010).

- Professional background
- Certification in science teaching
- Graduate degree in science
- Teaching experience

(Rice, 2003; Tschannen-Moran & Hoy, 2007;
Wolters & Daugherty, 2007)

To explore the relation of science teacher-related factors to high school students' persistence in STEM, science in particular.

Background

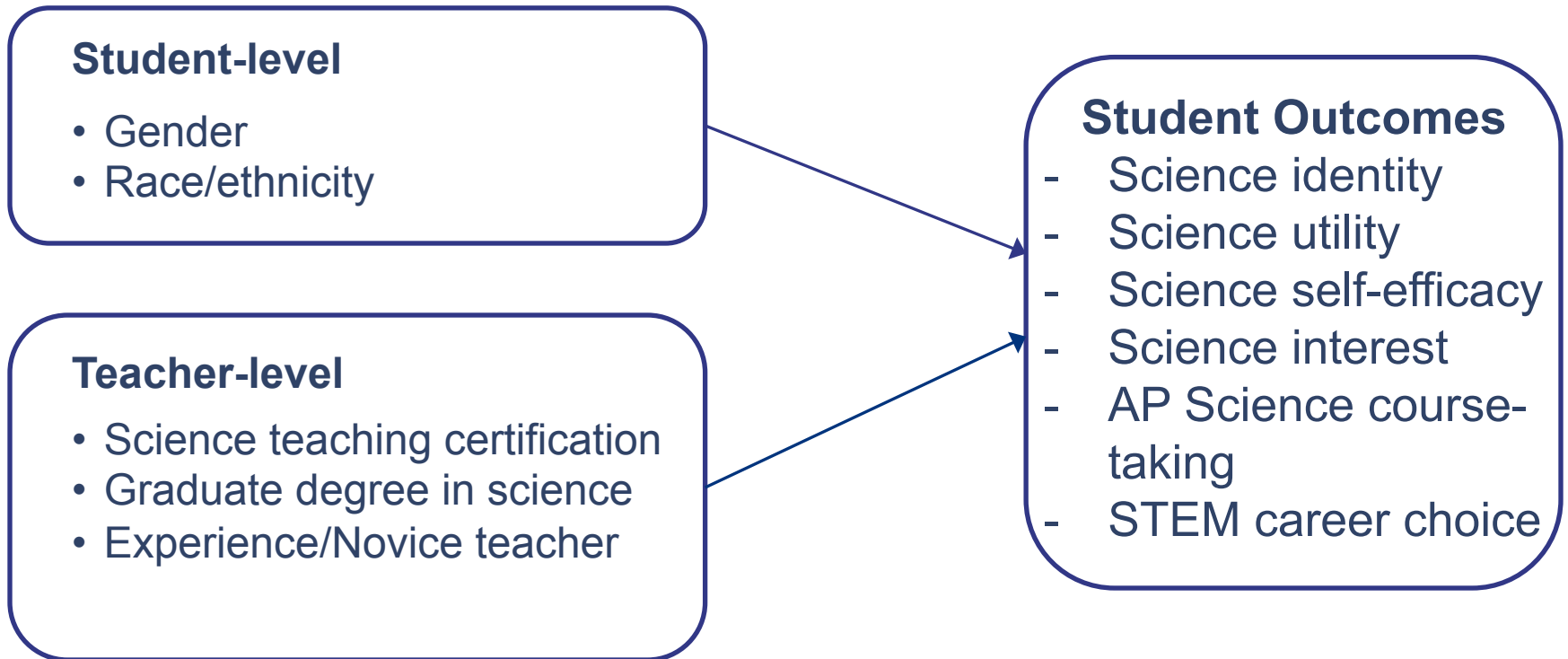
Method

Results

Conclusions



- A. To what extent do teacher level factors (i.e., academic preparation, teaching preparation, and teaching experience) predict the change in students' motivational beliefs and interest towards science?
- B. To what extent do teacher level factors (i.e., academic preparation, teaching preparation, and teaching experience) predict students' science course enrollment and whether or not they plan to choose a future career in STEM fields?



- This study included more than 23,000 representative sample of 9th graders from both public and private schools across the U.S. and their teachers.
- High School Longitudinal Study (HSLS:09; Ingels et al., 2011)

Variables	Outcome Variables (N ¹)					
	Science identity ^a (12338)	Science utility ^b (12310)	Science efficacy ^c (12131)	Science interest ^d (9596)	Advance science course ^e (6097)	STEM career plans ^f (12426)
	β	β	β	β	β	β
Step 1						
Gender	.05	.04	-.03	-.01	-.02	.03
Black (non-Hispanic)	.06	.03	-.16*	-.09	.14	-.14
Hispanic	.02	.06	-.15*	.03	.11	-.16*
Asian	.09	.03	.09	-.06	.03	.15*
Other	-.03	-.01	.05	.04	-.02	.03
Step 2						
Science teaching cert.	.03	.06	.03	-.08	.01	.07
Grad degree in science	.06	.17*	.09*	.09*	.19*	.11*
Experienced	.21*	.10	.36**	.16*	.23*	.18*

- African American and Hispanic students tend to have lower science self-efficacy
- Hispanic students think less about STEM areas as their future career
- Asian students think more about STEM areas as their future careers



Teachers

Students

Teacher's graduate degree in science

- Science utility
- Science self-efficacy
- Science interest
- Advance science course taking
- STEM career plan

Experienced teacher

- Science identity
- Science self-efficacy
- Science interest
- Advance science course taking
- STEM career plan

- Experienced teachers matter
 - Teacher retention
 - Induction support
- Background in the content area seems to matter for some of outcomes
 - Professional development for teachers
- Certification type did not matter (variability in and categorization of teacher certification programs [see, Zeichner & Conklin, 2008])

- Limitations of the dataset
 - No teacher ID's: hierarchical analyses not possible
 - Degree of teacher impact on student may vary
- Controlling variables could be extended
 - Private vs. public school
 - Socio-economic status of students



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THANK YOU !

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