



UNIVERSITY OF
SOUTH CAROLINA

**Examining the Importance of Place-based Education on
Adolescent Rural Identity: A Double Mediation Study**

Angie Starrett, Matthew Irvin, Jan Yow, Christine Lotter



1

Overview

- Examine the degree to which rural middle and high school students report that place-based education (PBE) is used in their math/science class and how it impacts their rural identity
- Draw on Expectancy-Value Theory in considering whether link between PBE in math/science and rural identity is mediated by STEM career interests and STEM class efficacy
- Why is this important?



UNIVERSITY OF
SOUTH CAROLINA



2

The Changing Landscape



- From 2008 – 2013, \$19.2 billion in capital investments with over 64,650 new jobs
- Greater need for workers with post-secondary education in STEM
- In 2016, number of rural students dropped from 40.6% to 15.9% due to change from rural to suburban designation (Showalter, Klein, Johnson & Hartman, 2017)



UNIVERSITY OF
SOUTH CAROLINA

3

Historical Youth Outmigration

- Leavers tend to be highly education more well-trained (Mills & Hazarika, 2001)
- Stayers tend to grow into adults with lower incomes and fewer skills (Brown & Schafft, 2011)
- BUT... manufacturing renaissance is creating numerous STEM opportunities in rural areas



UNIVERSITY OF
SOUTH CAROLINA

4

Expectancy-Value Theory

- According to SC Dept. of Education, 2 in 3 students graduating high school are not job ready because they cannot pass the math section on SC job-readiness test
- To change test scores, must first change motivation
- Expectancy-Value Theory: beliefs in one's abilities and the value placed on the learning activity influence engagement, effort, persistence, and performance



UNIVERSITY OF
SOUTH CAROLINA

5

The Current Gap in Understanding

- In SC, 40% of all public schools are rural
- Little research on how rural schools and educators affect transitions to adulthood, especially future aspirations
 - Teachers devalue rural identity and rural aspirations in college prep students (Burnell, 2003)
 - Rural schools and communities may push high-achieving youth to leave (Carr & Kefalas, 2009)
 - High-achieving youth have strong rural identity but leave due to limited economic opportunity (Petrin, Schafft & Meece, 2014)



UNIVERSITY OF
SOUTH CAROLINA

6

AS7

Participants

- An ethnically diverse rural sample from rural South Carolina
 - 2,765 students; $M_{age}=14.50$ years
 - 53% female,
 - 69% ethnic minority
 - 56 % of students in math classes, 44 % in science classes



7

Measures

- PBE
 - 12 items using 5-point Likert scale
 - Measured frequency students perceived classroom instruction and assignments incorporated the people, history, culture, places, business, and environment of the rural community
 - EFA/CFA confirmed 3 factors: class, community, preparation
- STEM career interests
 - EFA/CFA confirmed 3 factors: Math/Statistics, Agriculture/Forestry, Engineering/Computers
 - Measures degree of interest in future job
- Math/Science Class Efficacy
 - Average of 4 items using 6-point Likert
 - Measures student's confidence in understanding and excelling at math/science class content
- Rural Identity
 - Average of 5 items using 6-point Likert
 - Measures student's degree of pride and sense of belonging to the rural community



8

Slide 7

AS7

Delete slide

Angie Starrett, 2/23/2019

Analytic Approach

- Control variables: sex, minority status, prior grades, and parents' education (average of both parents)
- Structural Equation Model in Mplus
 - Used maximum likelihood estimation
 - Used bootstrapping for standard errors that are robust to nonnormality
- Calculated each of the 3 indirect effects, as well as the total indirect effect



9

SEM Results

Table 1
Slopes and p-Values for Structural Equation Model on Rural Identity

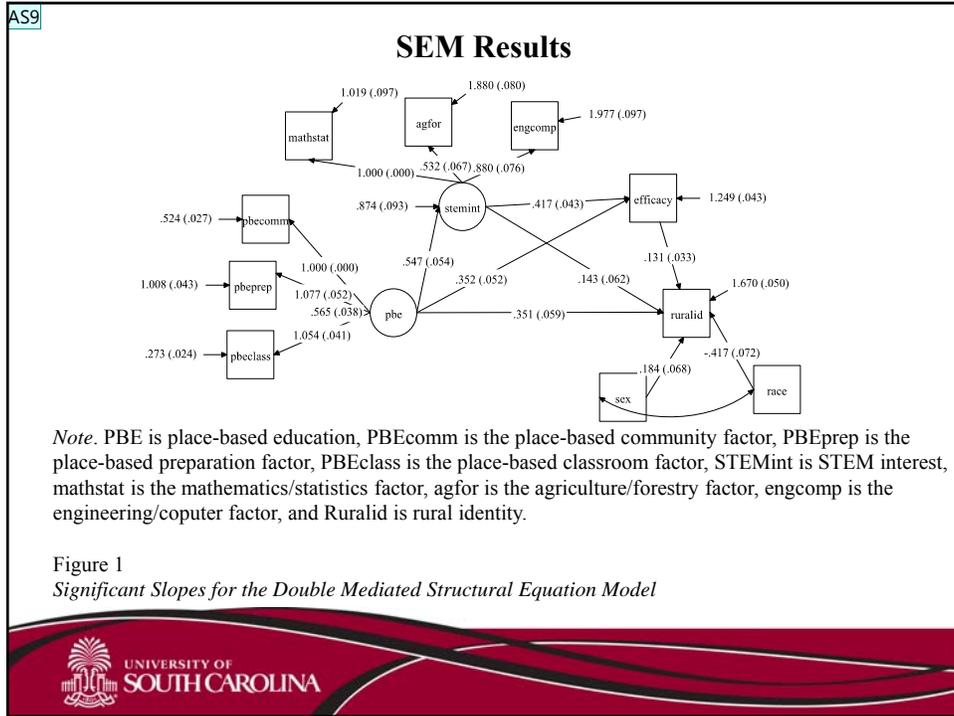
Dependent Variable	Independent Variable	Estimate	Standard Error
STEM Interest	Place-Based Education	0.547**	0.054
	Class Efficacy	0.417**	0.043
Rural Identity	Place-based Education	0.352**	0.052
	STEM Interest	0.417**	0.043
	Place-Based Education	.351**	0.059
	STEM Interest	0.143*	0.062
	Class Efficacy	0.131**	0.033
	Gender	0.184**	0.068
	Race	-0.417**	0.072
Parents' Education	-0.006	0.022	
Prior Grades	0.002	0.033	

*p<.05; **p<.01

- Fit statistics suggest adequate fit
 - RMSEA = .10
 - CFI = .75
 - SRMR = .07
- R² for rural identity = 13%



10



11

Calculating the Indirect Effects

Table 2

Indirect Effects for Structural Equation Model on Rural Identity

Path	Estimate	Standard Error
PBE-STEM Interest -Rural ID	0.078*	0.033
PBE-Class Efficacy-Rural ID	0.046**	0.013
PBE-STEM Interest-Class Efficacy-Rural ID	0.030**	0.009
Total Indirect Effect	0.154**	0.032

* $p < .05$; ** $p < .01$

12

Slide 11

AS9 Here you want to discuss that z-scores were calculated with the conditional response means to quantitatively differentiate the profiles. The average class in both subjects was made the referent group for the ANOVAs.

Angie Starrett, 2/25/2019

Discussion

- First study to quantitatively show the importance of PBE
- Further validates expectancy-value theory in that PBE leads to more STEM interest which in turn leads to higher class efficacy that results in greater rural attachment
- Confirms importance of community involvement with constructivist pedagogies for the rural classroom
- Gives rural schools and math/science educators the ability to make a positive difference in the retention of rural youth in their community



UNIVERSITY OF
SOUTH CAROLINA

13

Questions



UNIVERSITY OF
SOUTH CAROLINA

14