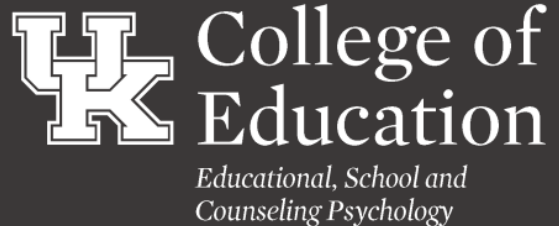


# Learning Spaces and Self-Efficacy in Undergraduate Statistics

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# Various Learning Spaces



# Various Learning Spaces



# Various Learning Spaces



# The Physical Learning Space

Perceptions of the physical environment convey social, cultural, and psychological meaning.

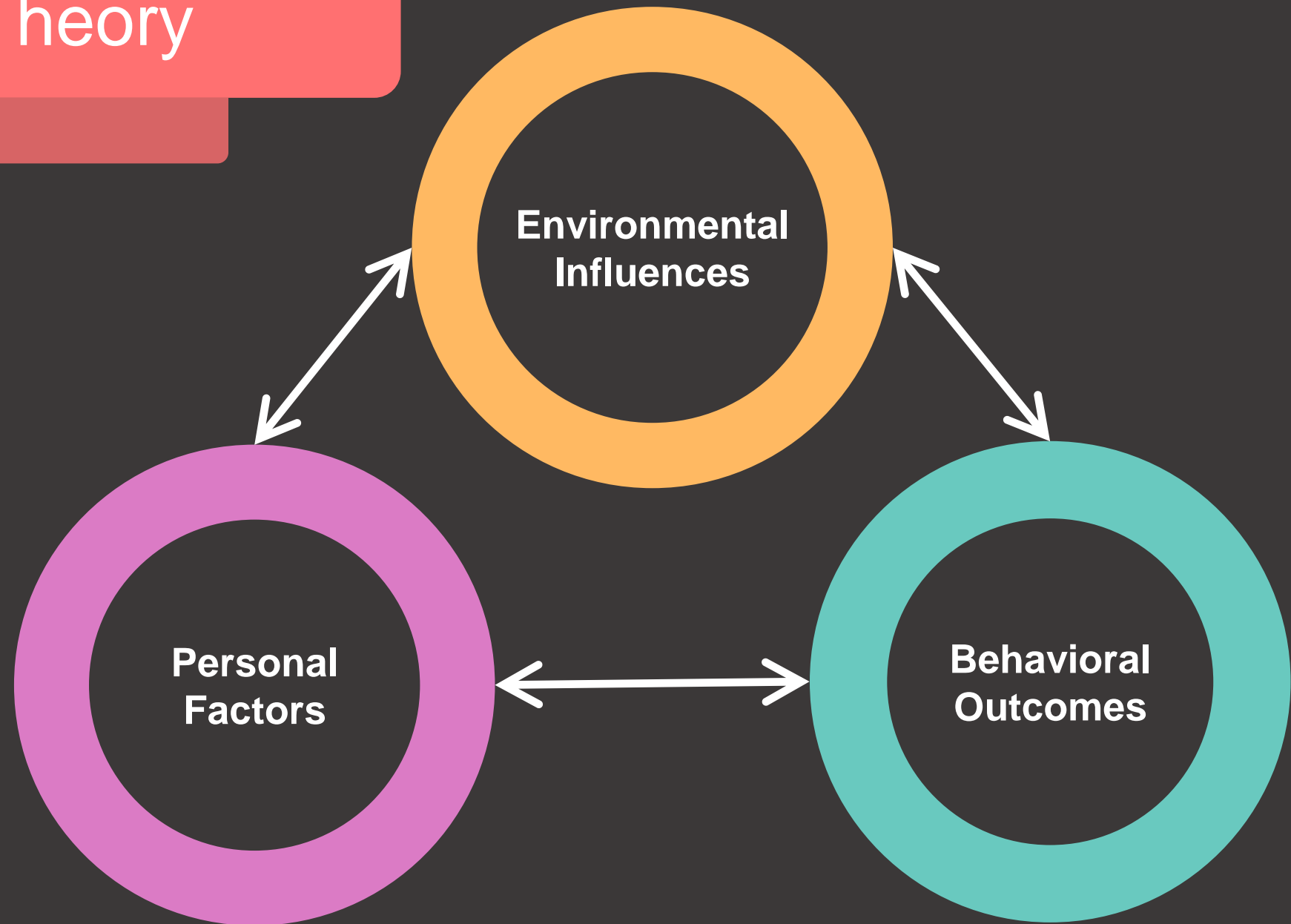
Influences perception, distraction, motivation, affect, and anxiety (Maxwell & Evans, 2002).

Helps structure and facilitate learning and teaching.

Past research focuses on social environments, rather than the physical environment.

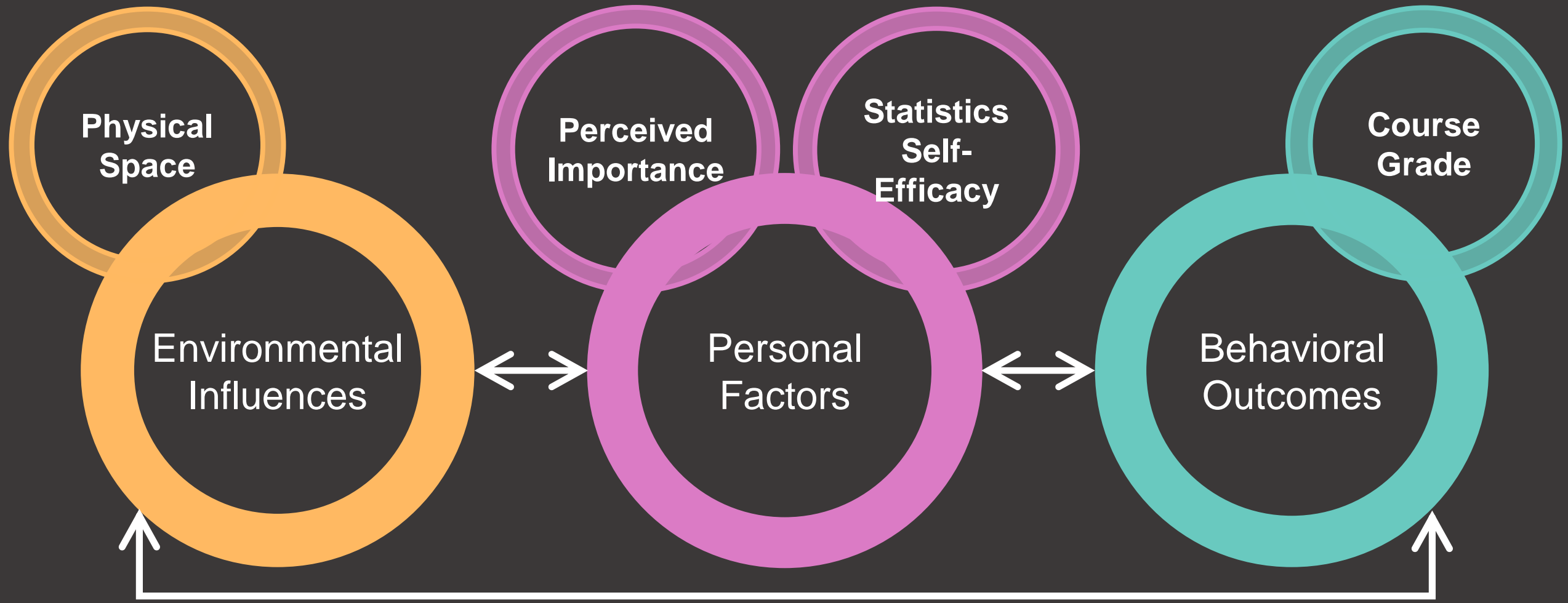
# Social Cognitive Theory

*Reciprocal Determinism*



# Social Cognitive Theory

*Reciprocal Determinism*



# Context of the Study

Two  
Entry-Level  
Statistics  
Courses

Technology-  
Enhanced  
+  
Traditional  
Classroom  
Spaces

Active  
Learning  
Pedagogy



# Context of the Study

Traditional Classroom



# Context of the Study

Traditional Classroom



# Context of the Study

## Technology-Enhanced Classroom



# Context of the Study

## Technology-Enhanced Classroom



# Context of the Study

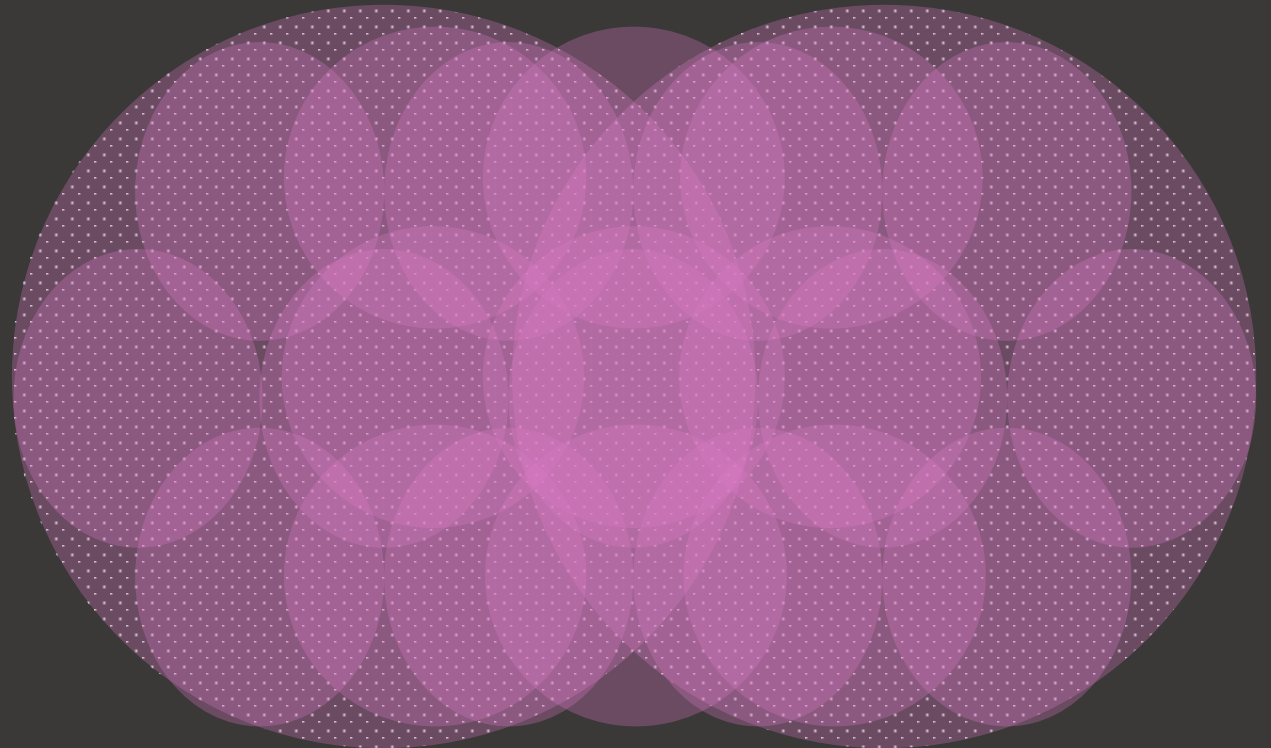
## Participants

2 courses

9 instructors

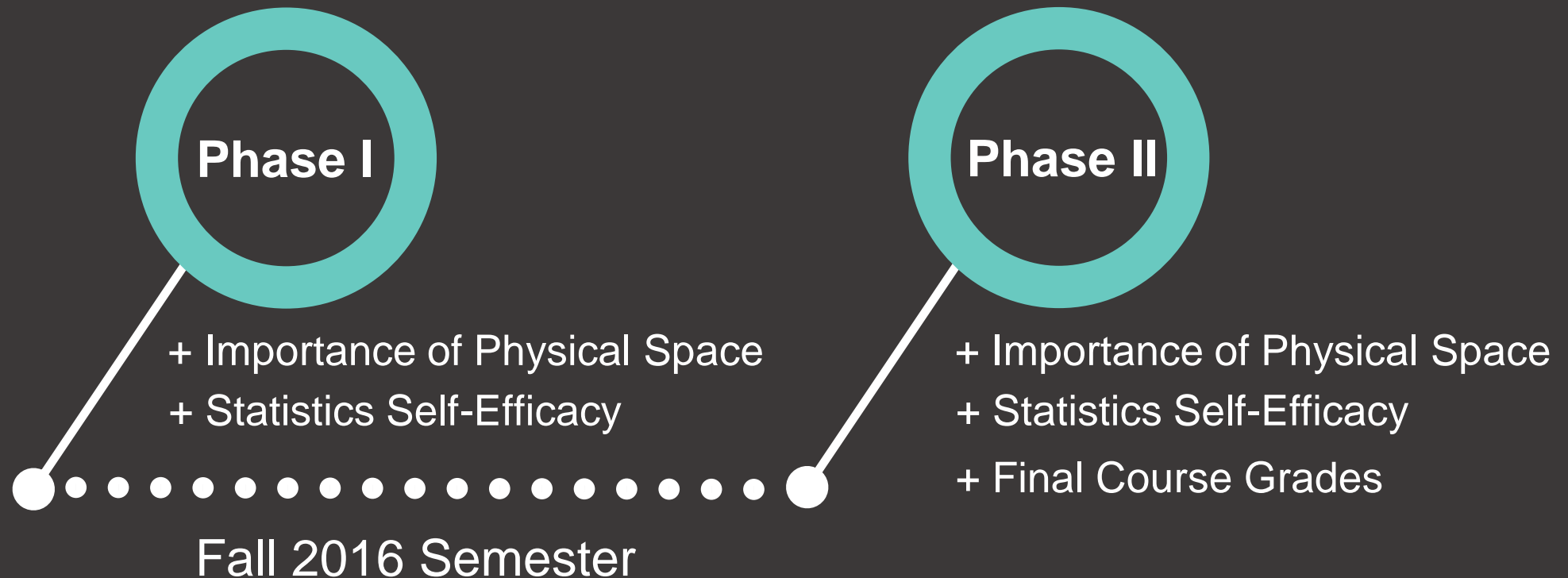
14 class sections

844 undergraduate students



# Procedure

Baseline and end-of-course surveys were administered on paper during regular class time.



# Measures

## Perceived Importance of the Physical Space

Single Item Measure

“The physical space is important to my learning.”

1 (*completely disagree*)  
4 (*completely agree*)

## Statistics Self-Efficacy

11 Item Measure

Course 1,  $\alpha = .940$  Course 2,  $\alpha = .917$

“How confident are you that you can decide if two variables are correlated?”

1 (*not at all confident*)  
4 (*completely confident*)

# Results

## *Perceived Importance of the Learning Space*

Does the physical learning space matter to students?

**No association** between classroom type and students' rating of the importance (pre) of the physical space.

$$\chi^2(3) = 2.137, p = .509$$

Space was rated as more important at the **beginning** of the semester than at the **end**.

**Pre** ( $M = 3.36, SD = .68$ )

**Post** ( $M = 3.24, SD = .77$ )



# Results

*Perceived Importance*

Higher at the end.

148

Wilcoxon Signed Rank Test

Higher at the beginning.

220

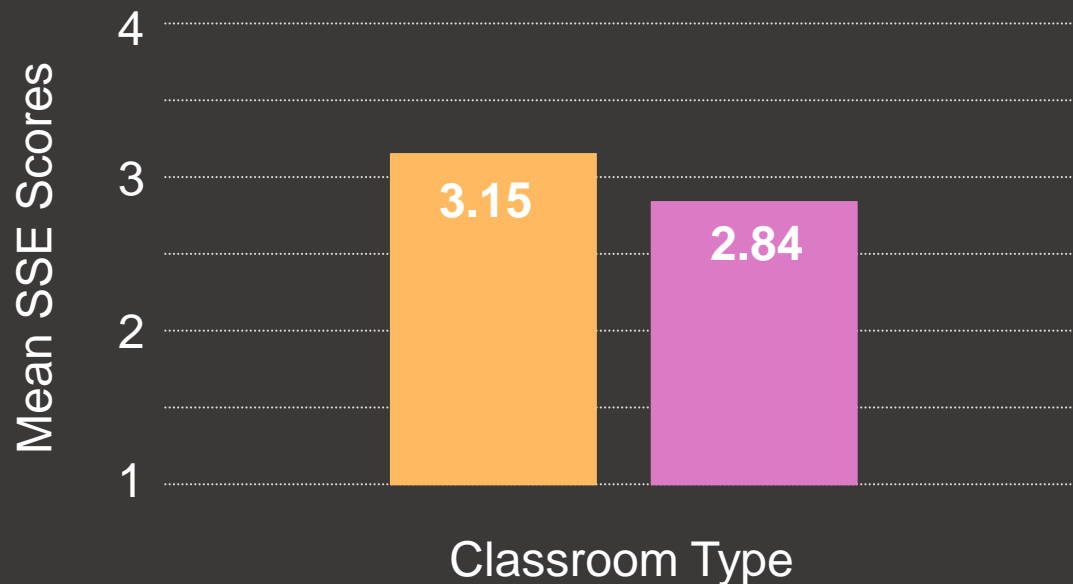
Same rating at the beginning and end.

476

# Results

## Statistics Self-Efficacy and Classroom Type

How do students report statistics self-efficacy based on the physical space?



**Traditional** ( $M = 3.15$ ,  $SD = .57$ )  
**Technology** ( $M = 2.84$ ,  $SD = .66$ )

$F(1, 343) = 24.45$ ,  $p < .001$ ,  $d = .50$

# Results

## *Statistics Self-Efficacy and Course Grades*

Is there a relationship between statistics self-efficacy scores and course grades?

**Course 1** ( $r = .361, p < .001$ )

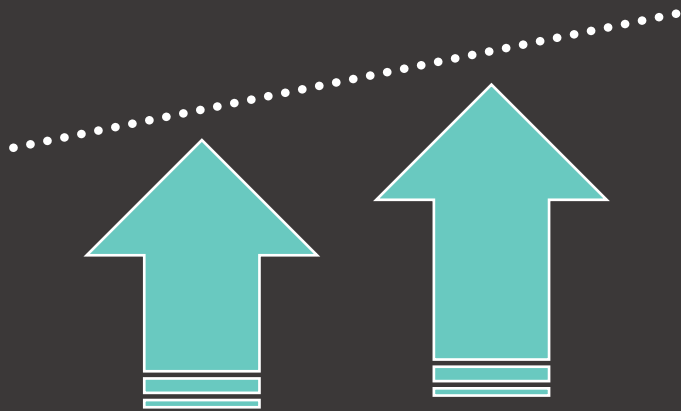
**Course 2** ( $r = .434, p < .001$ )

There was a statistically significant and positive correlation between self-efficacy scores and final course grades reported at the end of the semester.

# Results

## *Statistics Self-Efficacy and Course Grades*

Do statistics self-efficacy scores predict course grades?



$$\beta = (3.33, p < .001)$$

Course grades increased as statistics self-efficacy increased. A one-point increase in statistics self-efficacy is associated with a 3.33 increase in grades, on average.

# Future Directions

Is there a relationship between ratings of importance at the end of the semester and classroom type?

Do perceptions of importance of the physical space influence academic outcomes?

Why did students enrolled in the traditional classroom course have higher statistics self-efficacy?

Questions?



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