Experienced NSSE Users Work Group

Thomas F. Nelson Laird
James S. Cole

Indiana University Center for Postsecondary Education
Purposes

• To spark your interest in running additional analyses on your campus’s NSSE data
• To provide examples of analyses that can be repeated and adapted for your purposes
Overview

• Introduction

• Examples
  - Example 1--Mean Differences
  - Example 2--Program Effects
  - Example 3--Interaction Effects
  - Example 4--Direct and Indirect Effects

• Discussion
Examples

• For each example we will discuss its
  – Goal(s)
  – Key variables
  – Potential methods
  – Presentation of results
Example 1: Mean Differences

- Goal:

To understand disciplinary differences in how much students report using deep approaches to learning.
Example 1: Key Variables

- Primary Major Area
  - Arts and Humanities
  - Biological Science
  - Business
  - Education
  - Engineering
  - Physical Science
  - Professional
  - Social Science
  - Other
  - Undecided
Example 1: Key Variables

- Deep Approaches to Learning

Scale created by taking the mean of three subscales:

Higher-Order Learning
Integrative Learning
Reflective Learning
Deep Approaches to Learning

Higher-Order Learning Sub-Scale

- **Analyzing** the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components

- **Synthesizing** and organized ideas, information, or experiences into new, more complex interpretations and relationships

- **Making judgments** about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions

- **Applying** theories or concepts to practical problems or in new situations
Deep Approaches to Learning

Integrative Learning Sub-Scale

• Worked on a paper or project that required integrating ideas or information from various sources

• Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments

• Put together ideas or concepts from different courses when completing assignments or during class discussions

• Discussed ideas from your readings or classes with faculty members outside of class

• Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)
Deep Approaches to Learning
Reflective Learning Sub-Scale

• Examined the strengths and weaknesses of your own views on a topic or issue
• Tried to better understand someone else's views by imagining how an issue looks from his or her perspective
• Learned something that changed the way you understand an issue or concept
Example 1: Methods

• Means table

• General linear modeling approaches
  – ANOVA
  – ANCOVA
  – Regression without and with controls
## Example 1: Deep Approaches to Learning Differences by Discipline

<table>
<thead>
<tr>
<th>Discipline</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Mean Difference From Biology</th>
<th>Effect Size w/o Controls</th>
<th>Effect Size with Controls</th>
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<tbody>
<tr>
<td>Social Science</td>
<td>7837</td>
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<td>0.51</td>
<td>0.14</td>
<td>0.27 ***</td>
<td>0.26 ***</td>
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<td>Arts &amp; Hum</td>
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<td>3.07</td>
<td>0.54</td>
<td>0.12</td>
<td>0.23 ***</td>
<td>0.23 ***</td>
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<td>3.01</td>
<td>0.49</td>
<td>0.06</td>
<td>0.11 ***</td>
<td>0.18 ***</td>
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<td>0.52</td>
<td>0.01</td>
<td>0.02</td>
<td>0.08 **</td>
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<td>-0.13 ***</td>
<td>-0.11 **</td>
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<td>0.51</td>
<td>-0.07</td>
<td>-0.14 ***</td>
<td>-0.07 ***</td>
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<tr>
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<td>-0.08 ***</td>
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<tr>
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<td>-0.30 ***</td>
<td>-0.13 ***</td>
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<td>0.53</td>
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*p<.05, **p<.01, ***p<.001
Example 1: Deep Approaches to Learning Differences by Discipline
Example 2: Program Effects

• Goal:

Testing the effect of a particular activity on selected outcomes, specifically:

*The relationship between culminating senior experiences (CSE) and self-reported gains.*
Example 2: Program Effects

Variables:

*Independent Variable:*
- Having ‘done’ a CSE. (Q7h.)

*Covariates:*
- Gender, enrollment, parental education, major, transfer status, grades, adult
Example 2: Program Effects

*Dependent variables:* Self-Reported Gains in…

**General Education**
(general learning, writing, speaking, thinking critically)

**Personal and Social Development**
(developing values, understanding self and others, citizenship and community, spirituality, learning independently)

**Practical Competencies**
(job skills, working with others, technology, quantitative skills, real-world problem solving)
Example 2: Program Effects

Sample Institution:

• A large, public, research institution
• N = 642 seniors
• 40% reported having ‘done’ a CSE.
Example 2: Program Effects

Methods

• T-tests
• Regression
Mean Gains Score by Participation in a CSE

- General Education: Yes 73, No 68, p<.01
- Personal-Social Development: Yes 55, No 48, p<.01
- Practical Competence: Yes 72, No 66, p<.01
<table>
<thead>
<tr>
<th></th>
<th>Gains in General Education</th>
<th>Gains in Personal &amp; Social Development</th>
<th>Gains in Practical Competence</th>
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<td>Sig.</td>
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<td>-.17</td>
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<td></td>
<td>.08</td>
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<td>*</td>
<td>-.17</td>
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<tr>
<td>(Ref: prof.)</td>
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<td>soc</td>
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<td>-.05</td>
</tr>
<tr>
<td>oth</td>
<td>-.24</td>
<td></td>
<td>-.17</td>
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<tr>
<td>Culminating Senior Experience</td>
<td>.26</td>
<td>**</td>
<td>.27</td>
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</table>

***p<.001, **p<.01, *p<.05
Example 3: Interaction Effects

• Goal:

To understand how the effect of serious conversations with diverse others on students’ perceptions of the campus environment varies by race/ethnicity
Example 3: Key Variables

• Serious conversations with diverse others
  – How often students did the following

  Had serious conversations with students of a different race or ethnicity than their own

  Had serious conversations with students who are very different than them in terms of their religious beliefs, political opinions, or personal values
Example 3: Key Variables

• Supportiveness of Student Relationships
  - Quality of relationships with other students
  - Quality of relationships with faculty members
  - Quality of relationships with administrative personnel and offices
Example 3: Key Variables

• Race/Ethnicity
  - American Indian or other Native American
  - Asian, Asian American, or Pacific Islander
  - Black or African American
  - White (non-Hispanic)
  - Hispanic or Latino
  - Multiracial
Example 3: Methods

- Regression model with...
  - Standardized continuous DV and IVs
  - Dichotomized Race/Ethnicity variable
  - 5 interaction terms (race x serious conv.)
Example 3: Racial/Ethnic Variation in the Effect of Serious Conversations on Supportiveness of Student Relationships

- White slope = 0.20
- American Indian slope = 0.09
- African American slope = 0.29

Supportiveness of Student Relationships (standardized) vs. Serious Conversations with Diverse Others (standardized)
Example 4: Direct and Indirect Effects

• Goal:

To estimate relationships between student engagement measures and selected outcomes. Example:

What are the direct and indirect effects of writing amount on self-reported gains in general education?
Example 4: Key Variables

- IV: Writing Amount

Number of written pages, approximated from midpoints of the three writing items:

- Number of papers shorter than 5 pgs
- Number of papers between 5 – 19 pgs
- Number of papers 20+ pgs
Example 4: Key Variables

• Mediator: Deep Learning

Latent construct indicated by three sub-scales:

- Higher-Order Learning
- Integrative Learning
- Reflective Learning
Example 4: Key Variables

• Outcome: Gains in General Education

Self-reported progress made in
- Acquiring a broad general education
- Writing clearly and effectively
- Speaking clearly and effectively
- Thinking critically and analytically
Example 4: Methods

- Path analysis: Multiple, simultaneous linear regression equations

- Structural modeling: To represent relationships among latent factors
Example 4: Methods

Amount of Writing \rightarrow \text{Deep Learning} \rightarrow \text{Gains in Gen Ed.}

Deep Learning \leftarrow \text{Amount of Writing} \leftarrow \text{Gains in Gen Ed.}
Example 4: Methods

- Amount of Writing
- Deep Learning
- Gains in Gen Ed.

*Direct Effect*
Example 4: Methods

- **Amount of Writing** → **Direct Effect** → **Gains in Gen Ed.**
- **Indirect Effect**
  - **Deep Learning** → **Gains in Gen Ed.**
Example 4: Methods

Total Effect = Direct Effect + Indirect Effect
Example 4: Methods

Covariates: Student Characteristics

Amount of Writing \rightarrow \text{Deep Learning} \rightarrow \text{Gains in Gen Ed.}

\text{Direct Effect}

\text{Indirect Effect}

Total Effect = Direct Effect + Indirect Effect
Example 4: Results

Standardized Solution:

- **Amount of Writing** → **Deep Learning**: 0.08
- **Deep Learning** → **Gains in Gen Ed.**: 0.31
- **Deep Learning** → **Gains in Gen Ed.**: 0.64

Total Effect = 0.08 + (0.31)(0.64) = 0.27
Discussion