Using Student Evaluations of Teaching to Promote Practice of Effective Teaching Behaviors:

A Case for "People-Focused" Analyses

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VIRTUAL EXPERIENCE

Background

1. Student evaluations of teaching (SETs) are ubiquitous

2. SETs are cost-effective

3. SETs reinforce biases against historically underrepresented groups

4. Interpretation of SETs is heavily influenced by "researcher degrees of freedom"

And Yet…

*…continued use of SETs enjoys **widespread support**!*

A Methodological Critique of SETs

- Virtually exclusive reliance on *variable-centered* analyses:

    a) Used to investigate effects of one variable on another

    b) Data typically collected from many subjects on one occasion (e.g. end of the semester)

    c) Common associations are identified to summarize a population

A Methodological Alternative

- *Person-centered* analyses:

  ➢ Used to:

    1. Identify sub-populations from a set of variables (e.g. – teaching behaviors)

    2. Investigate relations of sub-populations to outcomes (e.g. – effectiveness)

  ➢ Data typically collected from many subjects on one occasion (i.e., *no change in data collection protocol needed!*)

Questions?

Study Overview

Compare variable-centered vs. person-centered analyses of SETs

Study Aims

1. Identify a variable-centered model of teaching behaviors

2. Examine relations between teaching behaviors and teaching effectiveness using a variable-centered model

3. Identify a person-centered model of teaching behaviors

4. Examine relations between teaching behaviors and teaching effectiveness using a person-centered model

5. Compare: variable- vs. person centered results

Sample

- N = 19,040 SETs

- Academic Years 2010 – 2018

- Department of Psychological Science

- All courses and levels represented (*27% Introduction to Psychology*)

Variables

- Teaching Behaviors - 14 items

- Sample Items:
  - ➤ "The instructor is prepared for class."
  - ➤ "The instructor challenges me to think."
  - ➤ "The instructor treats students with respect."

- Teaching Effectiveness - 1 item

  - ➤ "The instructor was effective in helping me learn."

- Rated on 4-point Likert-type scale (*Strongly Disagree [1] – Strongly Agree [4]*)

Variable-Centered Analysis

- Exploratory Structural Equation Modeling (ESEM)

- How to assess model fit:

  1. Root Mean Square of Approximation (RMSEA) value $\lessapprox$ .06

  2. Standardized Root Mean Residual (SRMR) $\lessapprox$ .08

  3. Comparative Fit Index (CFI) value $\gtrapprox$ .95

Results: Variable-Centered Analyses

- One factor model provided the best fit

- All 14 items retained:

      RMSEA = .06

      SRMR = .05

      CFI = .95

Descriptives: Teaching Behaviors

- Sample Mean = 3.58
- Sample Standard Deviation = .56

	Mean	Standard Deviation
Introduction to Psychology	3.46[a]	.61
2000-Level Courses	3.61[b]	.54
3000-Level Courses	3.59[b]	.55
4000-Level Courses	3.70[c]	.48

Different superscripts indicate significant difference at p ≤ .001

Descriptives: Effectiveness

- Sample Mean = 3.55
- Sample Standard Deviation = .75

	Mean	Standard Deviation
Introduction to Psychology	3.39[a]	.83
2000-Level Courses	3.61[b]	.70
3000-Level Courses	3.54[c]	.76
4000-Level Courses	3.70[d]	.61

Different superscripts indicate significant difference at p ≤ .001

Predicting Effectiveness (VC)

- When predicting teaching effectiveness from behaviors:

  ➢ Standarized **β** Coefficient = .93

- Translation:

  "For every 1 S.D. increase in mean behavior score there is a .93 S.D. increase in teaching effectiveness rating."

Teaching Behaviors vs. Effectiveness

- Mean Behaviors Rating = 3.58

- Mean Effectiveness Rating = 3.55

	Behaviors	Effectiveness	Difference
Introduction to Psychology	3.46	3.39	-.07
2000-Level Courses	3.61	3.61	0.00
3000-Level Courses	3.59	3.54	-.05
4000-Level Courses	3.70	3.70	0.00

Variable-Centered Model Summary

- A variable-centered model provides excellent fit to the data

  ➢ Almost "1-to-1" correspondence between behavior and effectiveness ratings

- On average, psychology faculty are excellent instructors:

  ➢ Rated 3.6 out of 4 on teaching behaviors
  ➢ Rated 3.6 out of 4 on teaching effectiveness
  ➢ Rated 3.5 or above across course levels

  What are the best ways to use mean scores to improve teaching?

# Questions?

Person-Centered Analysis

- Latent Class Analysis (LCA)

- 14 behavior items dichotomously recoded
  - Strongly Disagree or Disagree = 0
  - Strongly Agree or Agree = 1

- How to assess model fit:
  1. Bayesian Information Criterion (BIC) value → Lower is better
  2. Entropy value > .80
  3. Lo–Mendell–Rubin (LMR) likelihood difference test
  4. Parametric Bootstrap Likelihood Ratio (BLR) test

Results: Person-Centered Analyses

- Three class model provided the best fit

	BIC	Entropy	Class Sizes	LMR	BLR
2-Class Model	97556.144	.94	15729, 2809	<.001	<.001
3-Class Model	93144.812	.90	9716, 5027, 3795	<.001	<.001
4-Class Model	92380.047	.89	3118, 14017, 203, 1199	<.001	<.001

Results: Person-Centered Graph
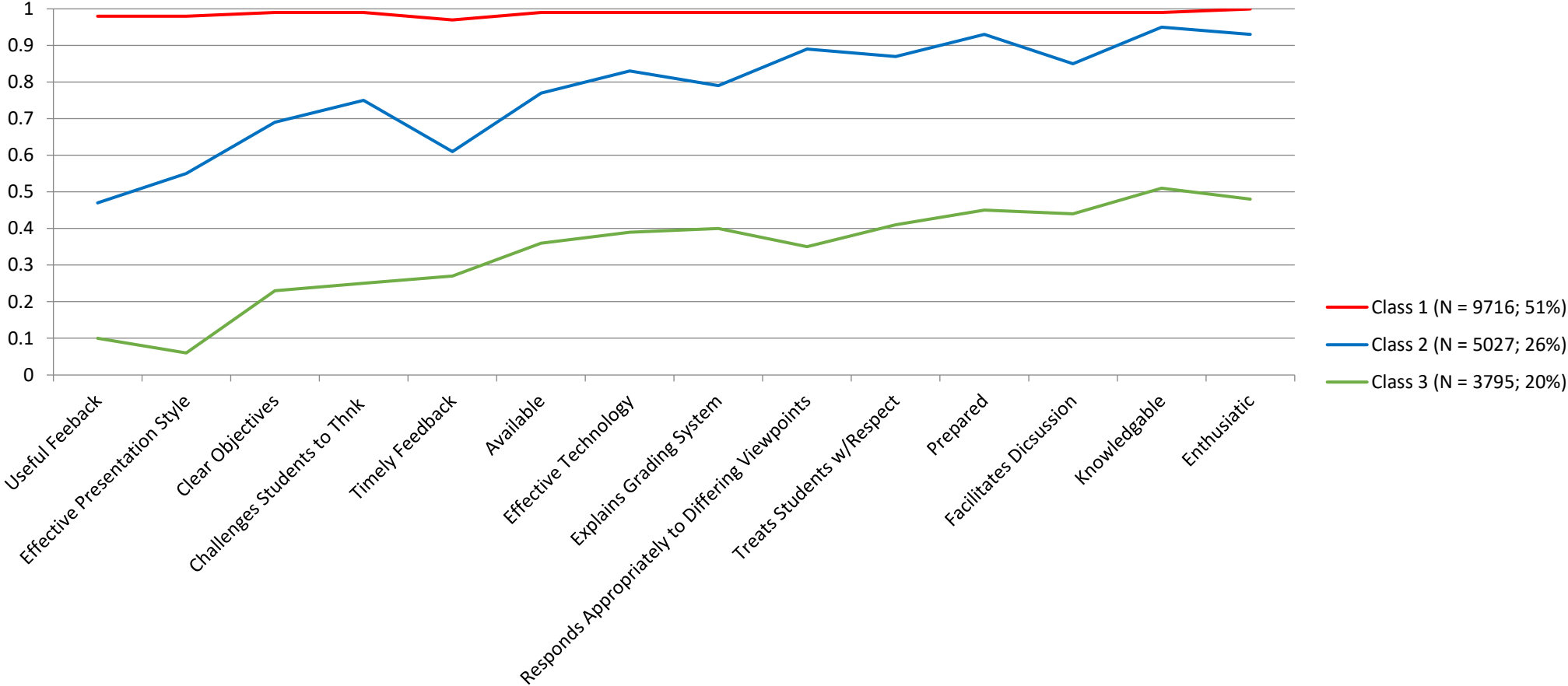
Descriptives: Teaching Behaviors (LCA)

	Mean	Standard Deviation
Class 1	3.97[a]	.06
Class 2	3.52[b]	.21
Class 3	2.67[c]	.57

Different superscripts indicate significant difference at p ≤ .001

Descriptives: Effectiveness (LCA)

	Mean	Standard Deviation
Class 1	3.96[a]	.21
Class 2	3.51[b]	.59
Class 3	2.50[c]	.83

Different superscripts indicate significant difference at p ≤ .001

Teaching Behaviors vs. Effectiveness (LCA)

	Behaviors	Effectiveness	Difference
Class 1	3.97	3.96	-.01
Class 2	3.52	3.51	-.01
Class 3	2.67	2.50	.17

Person-Centered Analysis Summary

- Identifies multiple models of class structure which fit the data

- Easy-to-understand subgroups differences

- Identifies meaningful subgroups differences at the item level

  ➢ Top 3 Behaviors:

    1. Provides useful feedback
    2. Uses effective styles of presentation
    3. Makes course objectives clear

How can we use person-centered analyses to improve teaching?

Questions?

Discussion

- Person-centered analyses yield intuitive information which can be used to promote effective teaching

- Person-centered analyses can help clarify SET differences by discipline

- Person-centered approaches can be used longitudinally to demonstrate performance over time

Limitations

- SETs from one department

- To protect anonymity, no individual level covariates (e.g. – race, gender, tenure status) were included in models

Thank You!

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