Exploring Profiles of Responses for the Sources of Science Self-Efficacy

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Bandura’s Social Cognitive Theory

Rooted in a view of human agency in which students are “partial architects of their own destinies.”
Science self-efficacy refers to the beliefs that students hold about their own science-related capabilities.

Science self-efficacy is related to ...

- MS, HS, and college students’ motivation and achievement.
- College students’ persistence in science-related majors and career choices.
Self-Efficacy and its Sources

Mastery Experience

Vicarious Experience

Social Persuasion

Affective States

Self-Efficacy
Most quantitative studies have not shed light on how people use the many combinatory rules when weighting and integrating all of the efficacy-relevant information that is presented.
Statement of the Problem

• Most quantitative studies have not shed light on how people use the many combinatorial rules when weighting and integrating all of the efficacy-relevant information that is presented.

• Most studies examining group differences assume that groups can be created using manifest variables. But this may or may not be appropriate.
Goals

• Explore the latent groups for how students respond to items on the sources of self-efficacy measure.

• To explore whether each of the latent groups differed as a function of race/ethnicity, gender, and grade level.
Methodology

• N = 1225 students from Grades 6, 9, and 10 (two high schools and one middle school in the same suburban school district).

• Variables for the Study:
  ✅ Sources of self-efficacy (Usher & Pajares, 2009);
  ✅ Science grade
Analysis: Rasch Component
Analysis: Mixture Models

“By attempting to describe only the average, one runs the risk of describing nobody in particular.”

Molden & Dweck (2005)

Identifying subpopulations of individuals in which the Rasch model holds true, but with different sets of model parameters among these subpopulations.
What Profiles Emerged: Mastery Experience

- Excellent Grades
- Always Successful
- Study hard do poorly
- Good grades report card
- Do well assign
- Do well diff assign

Group 1
N=561
Grade=88%

Group 2
N=471
Grade=80.4%

Group 3
N=187
Grade=76.1%

Gifted

B/H
What Profiles Emerged: Social Persuasions

- Group 1
  - N=444
  - Grade=82%
- Group 2
  - N=445
  - Grade=85.2%
- Group 3
  - N=336
  - Grade=82.8%

Logits

- Teachers Good
- People Talent
- Adults fam good
- Praised Ability
- Students good
- Classmates good

- B/H
- On-track
- Gifted
- A/W
What Profiles Emerged: Physiological States

Nervous Logits

-2

-1.5

-1

-0.5

0

0.5

1

What Profiles Emerged: Physiological States

All energy

Stressed work

Blank mind

depressed

tense

Group 1

N=727

Grade=83.2%

Group 2

N=498

Grade=83.8%

Race/Eth

Gifted status
What Profiles Emerged: Vicarious Experiences

- Adults do well
- Teacher solve prob
- Seeing kids do better
- Student solve prob
- Imagine myself, tough prob
- Compete with myself

Group 1
N=659
Grade=84.9%

Group 2
N=566
Grade=81.8%

Race/Eth
Gifted status
Discussion

• Grade differences among groups only for Mastery Experiences.
  ➢ Strongest source of SE.
Discussion

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• No compelling patterns arose.
  ➢ Not a problem with the method.
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• At the person-level (LPA) we got interesting results. But at the item-level, we do not see any patterns.

• Lesson for future research: Ed psych community does not typically look at items in this way. May be useful to do so, but need strong theoretical arguments to justify.