Creative Engagement:
A New Way to Conceptualize and Measure the Middle School Experience

[1,2]Ross Anderson, [1,2]Christine Pitts,
& [3]Keith Smolkowski
[1]Educational Policy Improvement Center
[2]University of Oregon
[3]Oregon Research Institute

This research was supported by a U.S. Department of Education grant (PR/Award No. U51D1400633

epic

UNIVERSITY OF OREGON

Should we care about creativity?

- Fast-growing creative class (Florida, 2002; 2011; 2012)
- Important leadership competency (Bronson & Merryman, 2010)
- Hollowing out of the economy (Blinder, 2009; The Aspen Institute, 2012)
- Inverse relationship between entrepreneurial activity/potential and PISA scores (Zhao, 2012)
- Assertion—Success of students may depend on capacity to engage creatively with world

Do schools *kill* creativity?

- Declines as students age through system (Kim, 2011)
- Only–one–right–answer didactic focus (Beghetto, 2010)
- Fragile balance of unconventional ideas with structural disciplinary knowledge (Beghetto, 2016)
- Teachers' implicit biases about creativity are incoherent with existing theories (Gralewski & Karwowski, 2016)
- Homogenized concept of achievement; a narrowing of curriculum (Darling-Hammond, 2010; Zhao & Gearin, 2016)

Middle School

I've never run into a person who yearns for their middle school days.

– Jeff Kinney, author of *Diary of a Whimpy Kid* series

- Developmental appropriateness of middle school structure/transition in question (Goldin, 1999)
- Identity and self-efficacy formation during the middle years at a critical stage (Meeus et al., 2010)
- Some evidence that indicates middle school does harm (Juvonen, Kaganoff, Augustine, & Constant, 2004)

Program of Inquiry

- *Academically Integrated Arts* — one recent solution employed as a school improvement initiative
- Disrupt fossilized curriculum via multidisciplinary combos
- Some evaluations from past decade suggest some effects on test scores and other related factors
- Mechanisms at play still unknown
- Our aim—detect causal relationships, longitudinal effects, and growth trajectories

Creative Engagement

The entire future of humanity will be attained through creative imagination.

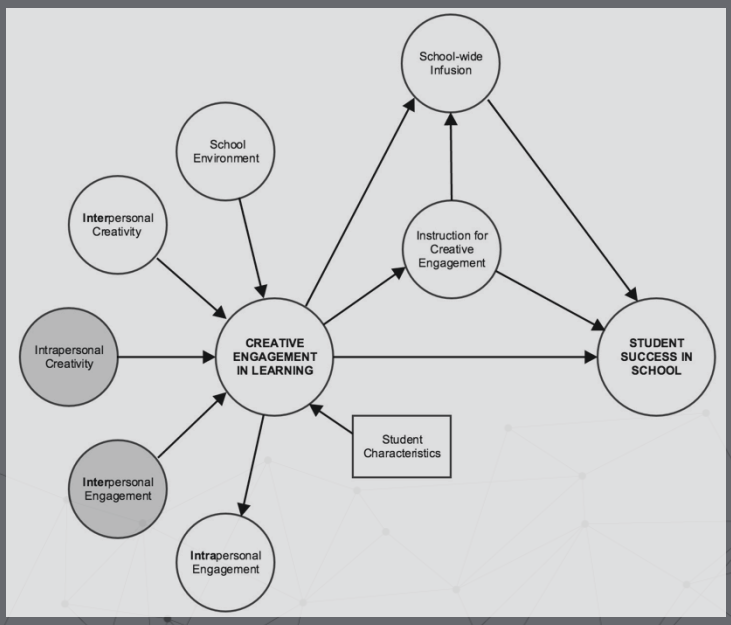
— Vygostky, 1967/2004

Creativity (Beghetto, 2016; Dewey, 1910; Wallas, 1926, Glăveanu, 2013)

- *intra*psychological and cognitive processes meet—
- *inter*psychological conditions to produce both novel and effective possibilities and express new meaning
- Idea fluency and flexibility are two dimensions

Engagement (Fredricks et al., 2004; Wang & Eccles, 2012)

- Autonomy, support, control
- Belonging, relevance, absence of anxiety
- Competence, aspiration, flow, drive



Study Goal & Research Questions

To generate robust, validated measures for longitudinal research

1. Do measurement models from our pilot study appear adequate?
2. If inadequate, can we reconfigure, improve fit and cross-validate with two additional samples?
3. Are structural configurations invariant between second and third samples?

Data & Measures

- Sample (n = 1,025)
  - Convenience sample of 6th grade students across 8 middle schools in Pacific NW
  - 77% white, 52% male
  - Higher proportions of economically disadvantaged and racial/ethnic minority students than county averages
- Measures
  - *Runco Ideational Behavior Scale for Children (RIBS-C)* (Runco, 2015)
    - Some validation with adult version
  - *Student Engagement Instrument (SEI)* *(Appleton et al, 2006)*
    - Predictive and concurrent validity

Analytic Rationale

Factor analysis (FA)
(Spearman, 1904; Kline, 2016)

Pilot study Spring '15

- Theoretical models did not fit data
- Employed exploratory FA

Refined measures taken with new Fall '15 cohort

- Split full sample into three random samples

Step 1

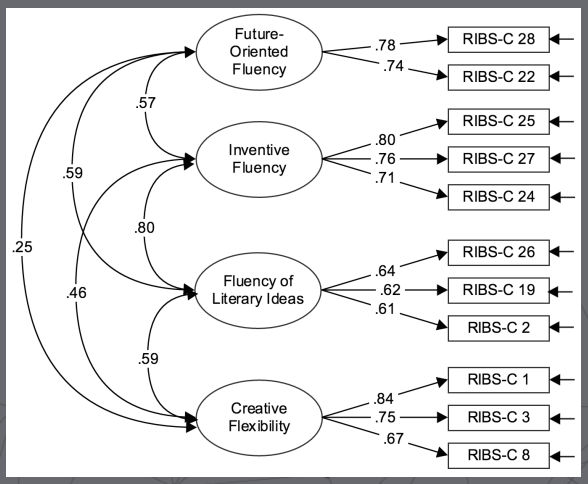
- Initial confirmatory FA with sample 1

- Step 2
  - Local fit-testing and exploratory FA, if needed
- Step 3
  - Cross-validation with samples 2 & 3
- Step 4
  - Invariance testing

Results: RIBS-C

Model	*df*	χ^2	*SRMR*	*CFI*	*RMSEA* (90% C.I)
Runco Ideational Behavior Scale for Children					
Sample 1 Exploratory CFA (n = 301)					
5-factor (15 items)	80	159.45*	.052	.93	.057 (.04, .07)
4-factor (12 items)	48	88.75*	.045	.96	.053 (.04, .07)
4-factor (11 items)	38	61.03*	.037	.98	.045 (.02, .07)
Sample 2 cross-validation CFA (n =317)					
4-factor (11 items)	38	65.25*	.040	.96	.048 (.03, .07)
Sample 3 cross-validation CFA (n = 312)					
4-factor (11 items)	38	94.08*	.042	.94	.069 (.05, .09)

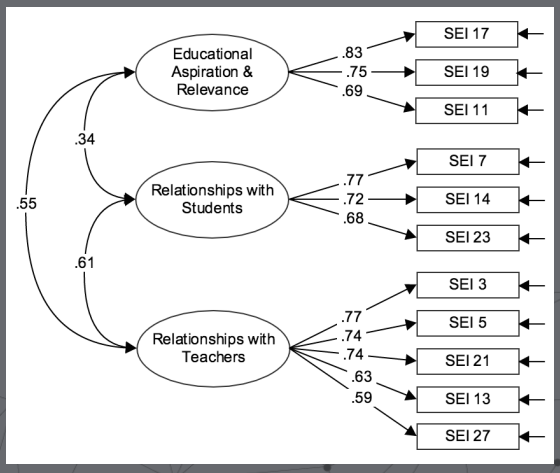
RIBS-C Structural Configuration



RIBS-C Discriminant Validity

	Structure Coefficients			
Item	Factor 1	Factor 2	Factor 3	Factor 4
Ideas about future (RIBS-C22)	**.744**	.427	.439	.185
Ideas for 10 years from now (RIBS-C28)	**.799**	.447	.460	.194
Ideas about an invention (RIBS-C25)	.437	**.762**	.609	.347
Ideas for something to sell (RIBS-C27)	.456	**.795**	.636	.362
Ideas about a movie plot (RIBS-C24)	.407	**.710**	.567	.323
Ideas for a better book title (RIBS-C19)	.357	.484	**.606**	.355
Ideas for better book ending (RIBS-C2)	.368	.498	**.624**	.366
Ideas for stories, poems, art (RIBS-C26)	.375	.508	**.635**	.372
Think of several solutions (RIBS-C3)	.209	.383	.493	**.841**
Look at problem in different ways (RIBS-C8)	.165	.303	.390	**.665**
Take time to explore solutions (RIBS-C1)	.187	.343	.441	**.752**

SEI Structural Configuration



Invariance Testing

3-Step Process

1. Constrained pattern coefficients (Λ fixed)
2. Factor variances and covariances (Λ, Φ fixed)
3. Item residual variance (Λ, Φ, Θ_{δ} fixed)

RIBS-C

- Partial invariance found
- Issues: Coefficient for creative flexibility item 8, two factor covariances, and 1 factor variance
- Invariance of residuals

SEI

- Partial invariance found
- Issues: 1 covariance, 1 variance, all item residuals
- Invariance of coefficients

Discussion

Measurement

- Challenges: diverse sample, smaller samples in pilot exploratory phase, differential order effects
- CFA supports inductive reasoning, but not incontrovertible
- Need to explore:
  - Domain-specific flexibility / fluency factors
  - Factors of autonomy, student choice & voice

Practice

- RIBS-C as a scan for levels of creative ideational behaviors
- Creative flexibility and fluency are distinct
- Fully latent growth models will test mediating and moderating patterns among creative engagement latent constructs
- Test theories:
  - Role of future-oriented fluency on educational aspiration
  - inventive vs. literary fluency and effect on relationships with teachers

Thank you

Ross Anderson
@UpEduvate
ross_anderson@epiconline.org
www.artcorelearning.org

artcore