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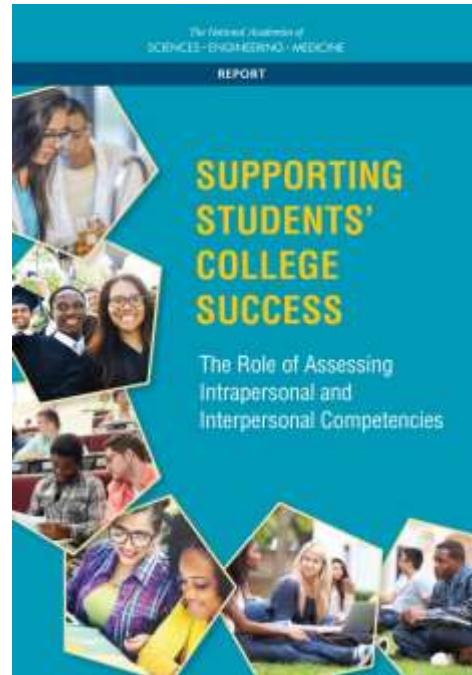
Supporting Students' College Success:
The Role of Assessment of Intrapersonal
and Interpersonal Competencies

Symposium at the Society for Research on Educational
Effectiveness (SREE) Spring Conference, March 3, 2017

Symposium Overview

- **Study Overview:** Margaret Hilton, NAS, [Study Director, Committee on Assessing Intrapersonal and Interpersonal Competencies](#)
- **Competencies for College Success:** Greg Duncan, University of California-Irvine, [Committee Member](#)
- **Meta-Analysis of Intervention Studies:** Sabrina Solanki, University of California-Irvine, [Committee Consultant](#)
- **The Importance of College Contexts:** K. Ann Renninger, Swarthmore College, [Committee Member](#)
- **Assessments of the Identified Competencies:** Joan Herman, University of California-Los Angeles, [Committee Chair](#)
- **Response:** Nicholas Bowman, University of Iowa , [Discussant](#)

Study Overview



Margaret Hilton, National Academies

Study Overview

- Sponsored by NSF Division of Undergraduate Education
- Dissemination support from the William and Flora Hewlett Foundation



Study Rationale

- Builds on the prior NSF-funded study, *Education for Life and Work*
- That study highlighted the value of educational attainment for career success, health, civic engagement.
- Recognizing the value of educational attainment, including increased graduation rates, policymakers embrace the college completion agenda.
- Policymakers are also increasingly interested in hard-to-measure cognitive, intrapersonal, and interpersonal competencies - what they are, how to assess them, their role in education, life, and work.

Study Charge

- Examine how to assess interpersonal (e.g., teamwork, communication skills) and intrapersonal (e.g., academic mindset, grit) competencies of college students.
- Identify a range of competencies that are related to persistence and success in college (especially in STEM) and that can be enhanced through intervention.
- Establish priorities for development and use of assessments of the identified competencies.

Study Committee

Joan Herman (Chair), CRESST, University of California, Los Angeles

David Bills, University of Iowa

Corbin Campbell, Columbia University

Tabbye Chavous, University of Michigan

Greg Duncan, University of California, Irvine

Sylvia Hurtado, University of California, Los Angeles

Patrick Kyllonen, Educational Testing Service

Dan McAdams, Northwestern University

Frederick Oswald, Rice University

Jonathan Plucker, Johns Hopkins University

K. Ann Renninger, Swarthmore College

Brian Stecher, RAND Corporation

Framing the Study



- Defined competency broadly to include attitudes, behaviors, beliefs, and dispositions
- Focused on competencies related to success *in college*, as measured by retention, GPA, graduation, but also considered competencies identified as desired outcomes *of college*
- Examined assessment methods, less attention to specific instruments
- Special attention to underrepresented student groups that have experienced lower college success than other groups: Low SES, first generation, black, Hispanic, and American Indian.

Competencies That Research Suggests Are Related to College Success

Greg Duncan, University of California, Irvine

Competencies for College Success



- Defined competency broadly; focused on malleable ones.
- Reviewed relevant research and best practices; commissioned 2 data analyses.
- Identified a set of competencies based on correlational and random assignment intervention studies.
- Judged strength of evidence based on intervention studies.

How to make sense out of the bewildering assortment of “non-cognitive” skills/competencies?

- Committee adopted a developmental framework
- Focus on questions students ask themselves

Broad Dispositions

What are my strengths?

Conscientiousness

Neuroticism /
Emotional stability

Extraversion

Openness to
experience
-- Need for Cognition

Agreeableness

Beliefs about College

*Do I belong here?
Can I succeed?*

Academic
Self-
efficacy

Sense of
Belonging*

Growth
Mindset*

Before College

Entering College

Completing College

Specific Motivations

*What are my goals?
What do I value?*

Utility Goals
and Values*

Intrinsic Goals
and Interest

Pro-social or
Transcendent
Goals and
Values

Identities

*Who am I?
Who do I want to
become?*

Positive
Future Self

* Indicates promising intervention
evidence

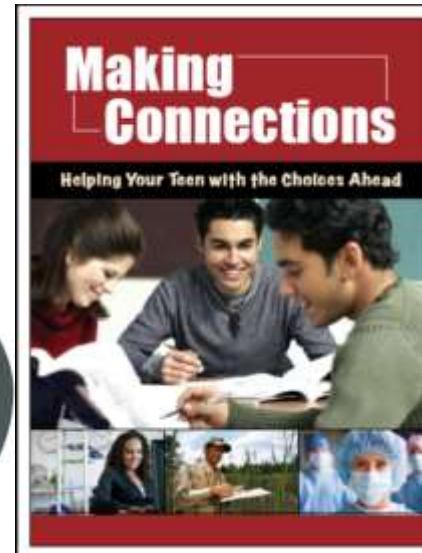
Dispositions-What are my strengths?

- Correlational research suggests that dispositional conscientiousness is a robust predictor of college success.
- Conscientiousness deeply ingrained and difficult to change.
- Nevertheless, a few interventions targeting specific behaviors associated with conscientiousness have shown significant but small effects on college success.

Conclusion: Correlational research has shown that intrapersonal competencies including conscientiousness predict college success and completion. Although conscientiousness tends to be highly stable over time, some interventions have successfully targeted task management and other specific manifestations of this trait.

Promising Competencies

*Conclusion: The limited intervention studies conducted to date have generated promising evidence that the competencies of **sense of belonging, growth mindset, and utility goals and values** are related to college success and are malleable in response to interventions.*



Promising Competencies

Conclusion: Available intervention studies provide more modest evidence that 5 other competencies are similarly related to college success and malleable, yielding a total of 8 identified competencies:

- *Behaviors related to conscientiousness*
- *Sense of belonging*
- *Growth mindset*
- *Utility goals and values*
- *Academic self-efficacy*
- *Intrinsic goals and interest*
- *Prosocial goals and values*
- *Positive future self*

More research is needed!

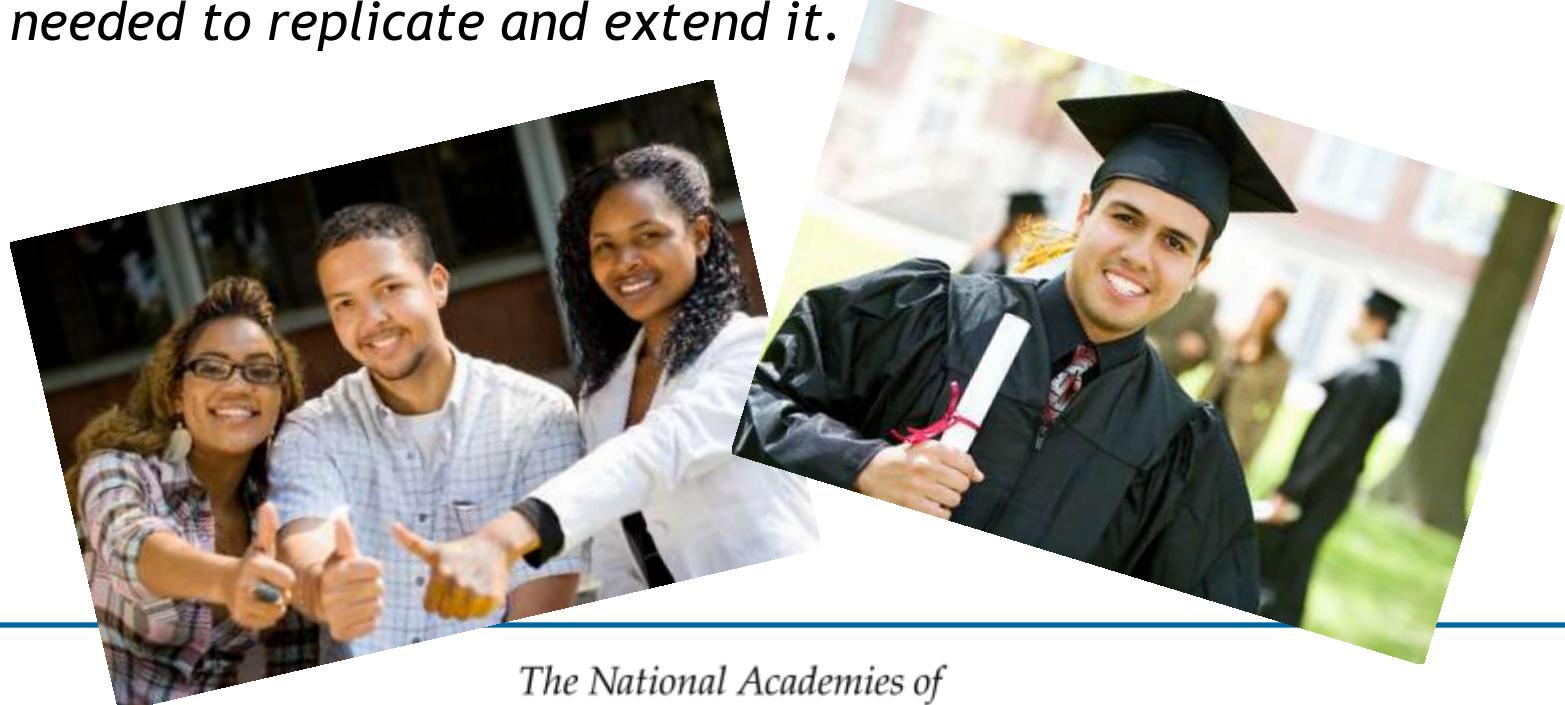
Conclusion: Only limited research has been conducted to date on the potential relationships between various intra- and interpersonal competencies and students' college success. There are major gaps in the research evidence.

Recommendation 1: Federal agencies and foundations should invest in research examining how various competencies may be related to college success. These investments should address gaps in the research base, examining:

- how interpersonal competencies may be related to student success in 4-year colleges;
- how intra- and interpersonal competencies may be related to student success in community colleges; and
- how intra- and interpersonal competencies may be related to student success in 2- and 4-year STEM programs and majors.

Research Needs - URM students

- *Conclusion: Low-cost interventions aimed at developing sense of belonging, growth mindset, and utility goals and values have sometimes generated the largest benefits for underrepresented student groups at risk for academic failure. This evidence is limited and recent, and further research is needed to replicate and extend it.*



Research Recommended

Recommendation 2: Invest in random-assignment interventions and research employing other methods to understand better how the competencies identified above are related to college success. Prioritize research on supporting the success of underrepresented student groups.

Recommendation 3: Colleges and universities should support the research proposed in Recommendation 2 by facilitating random-assignment interventions, thereby gaining valuable information about their students and building the knowledge base on effective interventions.

Meta-Analysis of Random Assignment Studies of Interventions Targeting the Identified Competencies

Sabrina Solanki, University of California, Irvine

Meta-Analysis

Estimate:

- Overall average treatment effect and its confidence level
- Influence of potential moderators
 - Type of competency
 - Type of outcome measure
 - URM group status
- Degree of publication bias

Meta-Analysis I

Inclusion Criteria

- Test an intervention aimed at manipulating one of the inter/intra competencies (directly or indirectly)
- Clearly defined treatment and control/comparison groups
- Sample size ≥ 10 and $\leq 50\%$ attrition
- Random assignment
- Academic outcome variable related to college persistence
- Target students attending a university
- Post-treatment effect sizes (ESs) are calculable
 - Hedge's g

Meta-Analysis II

Model

- Two level HLM model
- ES as unit of analysis
- Weighted by inverse of squared standard errors

Outcomes

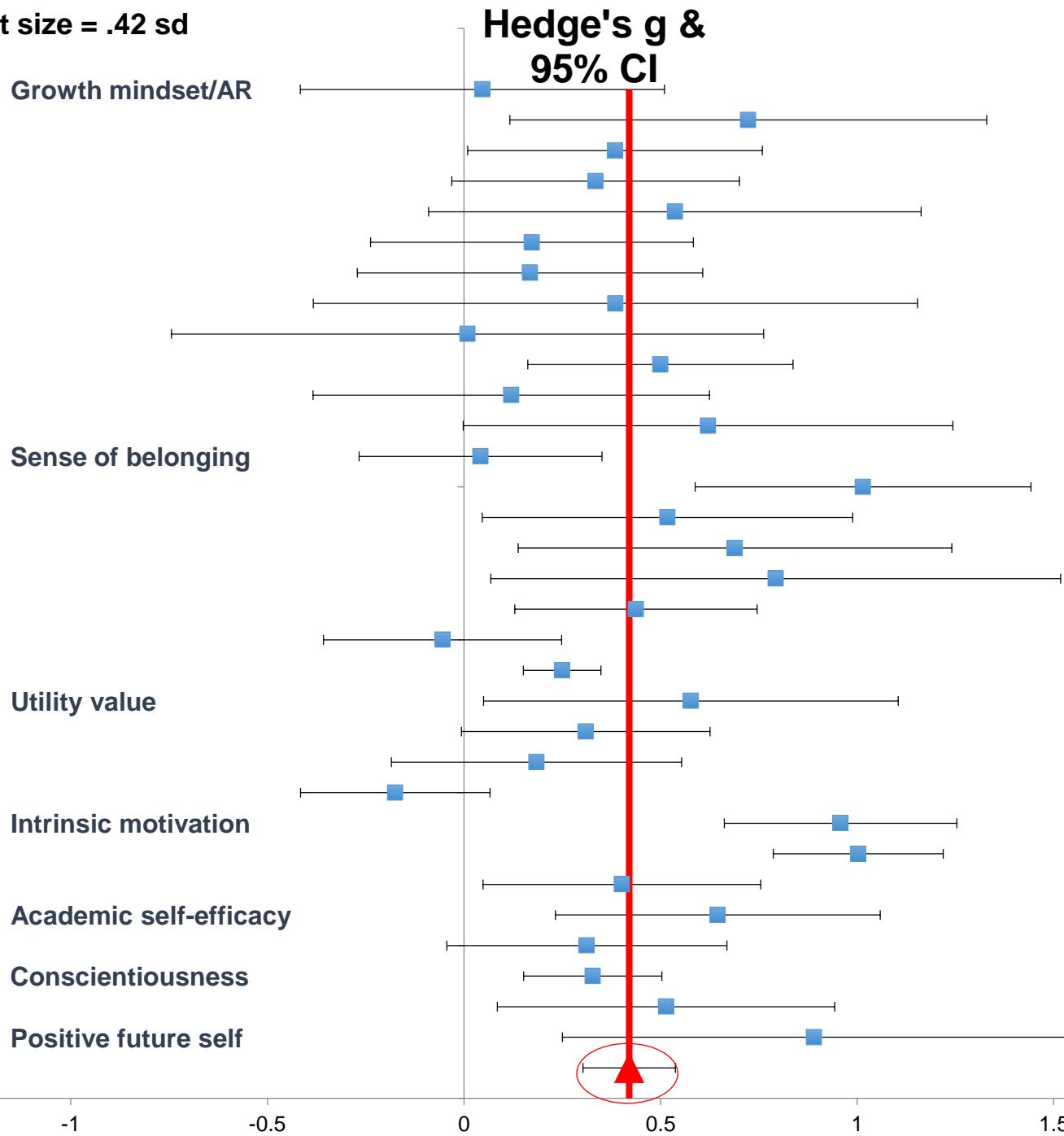
- Achievement test
- Course exam
- Course grade
- GPA
- Persistence measure

Our Meta-Analysis is Based on a Subset of Methodologically-Strong Studies

	NAS report	Meta-Analysis
<u>Identified competency</u>		
Growth mindset/ Attribution retraining	17	12
Sense of belonging	10	8
Utility value	15	4
Intrinsic motivation	3	3
Academic self-efficacy	2	2
Conscientiousness	7	2
Positive future self	5	1
Prosocial goals	2	0
Total	61	32

Overall average effect size = .42 sd

Aronson et al. 2002
Boese et al. 2013
Eskreis-Winkler et al. (S3)
2016
Hall et al. 2004
Hall et al. 2006
Ruthig et al. 2004
Hamm et al. 2014
Menec et al. 1994
Perry & Magnusson 1989
Perry et al. 2010
Struthers & Perry 1996
Wilson & Linville 1982
Brady et al. 2016
Folger et al. 2004
Martens et al. 2006
Stephens et al. 2014
Walton & Cohen (S2) 2007
Walton et al. 2015
Woolf et al. 2009
Yeager et al. 2016
Durik et al. 2015
Harackiewicz et al. 2014
Miyake et al. (females) 2010
Miyake et al. (males) 2010
Vansteenkiste et al. (S1) 2004
Vansteenkiste et al. (S2) 2004
Vansteenkiste et al. 2004
Luzzo et al. 1999
Muis et al. 2013
Liu et al. 2014
Morisano et al. 2010
Landau et al. 2014
Overall wt. avg. (es = .42)



Average ES Estimates Are Positive and Statistically Significant for Most Competencies

Growth mindset/AR n=12 studies

Sense of belonging n=8 studies

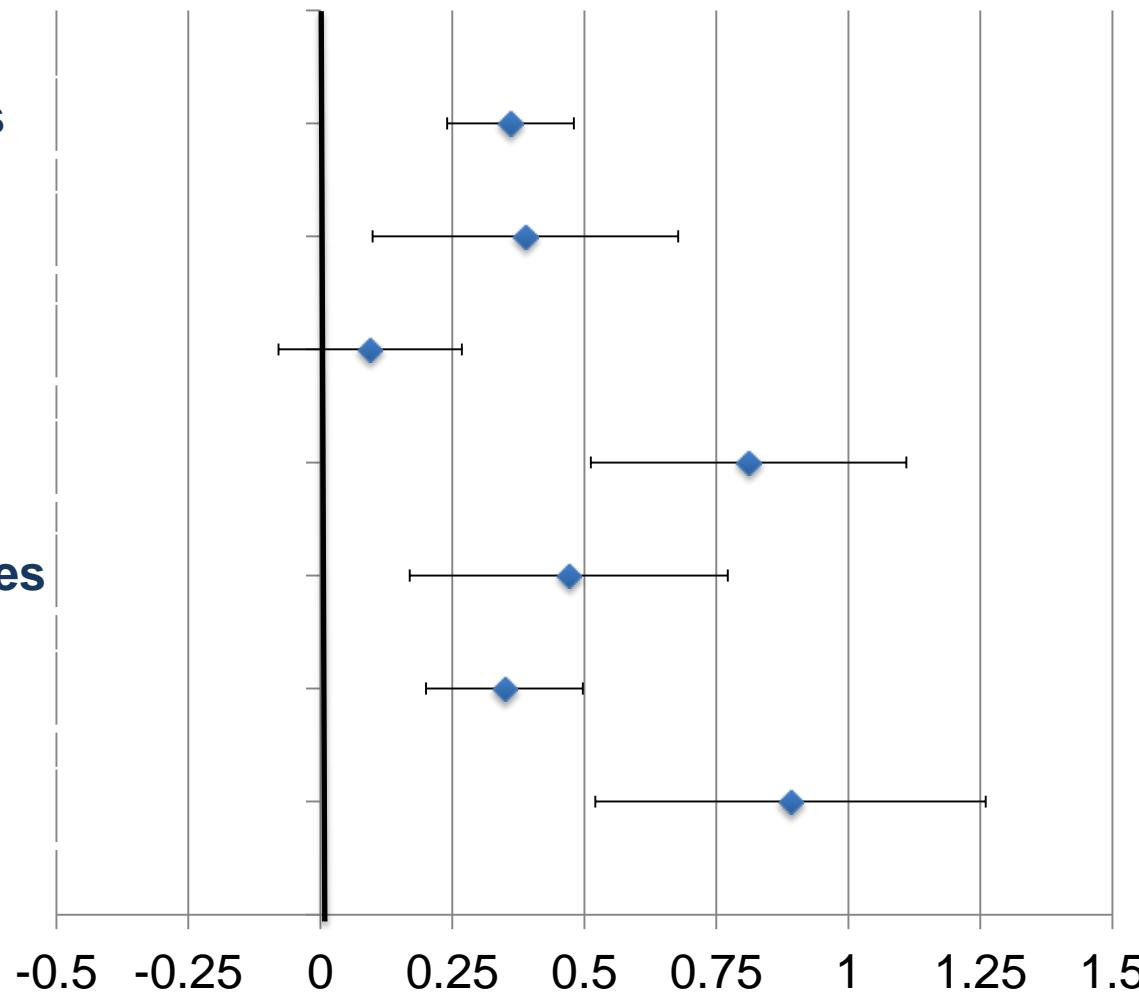
Utility value n=4 studies

Intrinsic motivation n=3 studies

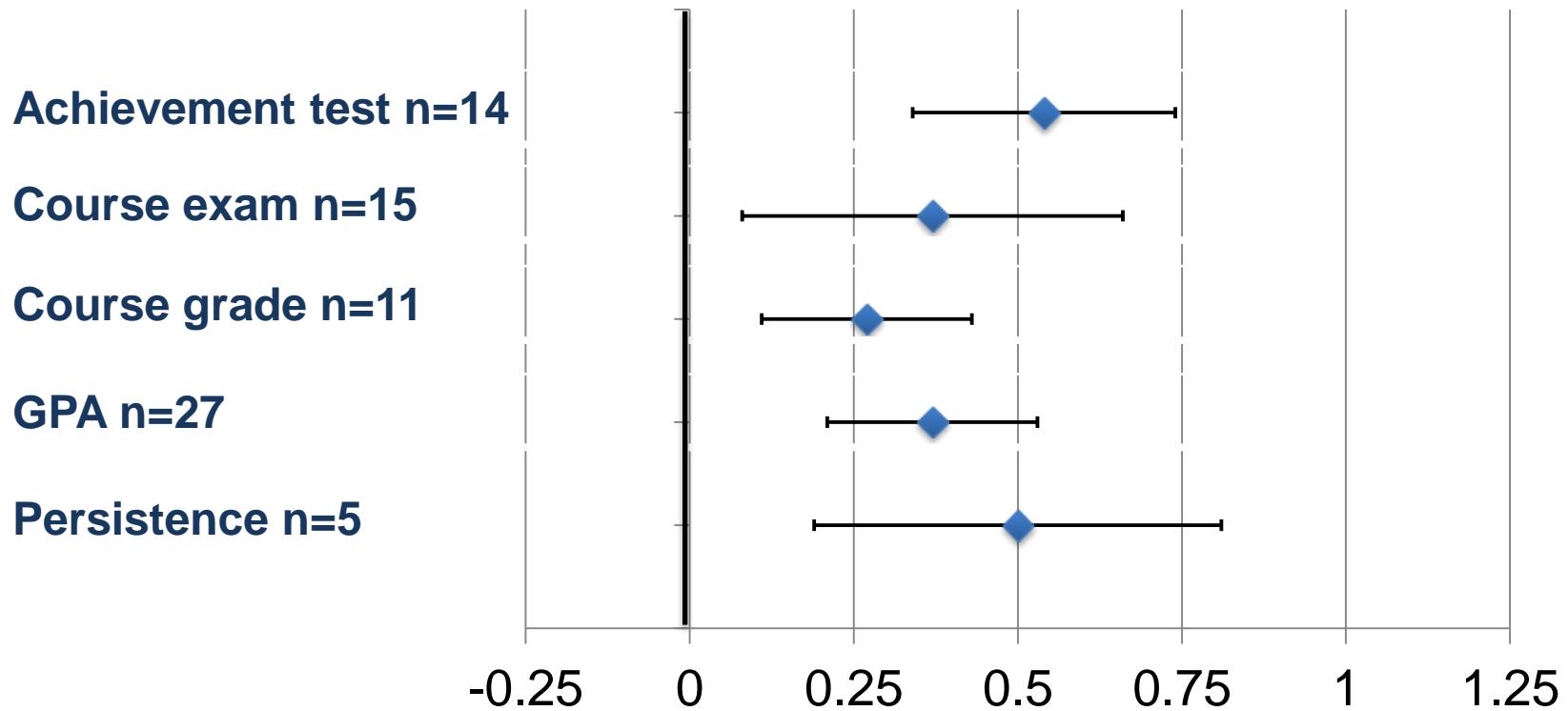
Academic self-efficacy n=2 studies

Conscientiousness n=2 studies

Positive Future Self n=1 study



Impacts on Immediate Achievement Tests Tend to be Larger than Impacts on Short Term Course Outcomes & GPA

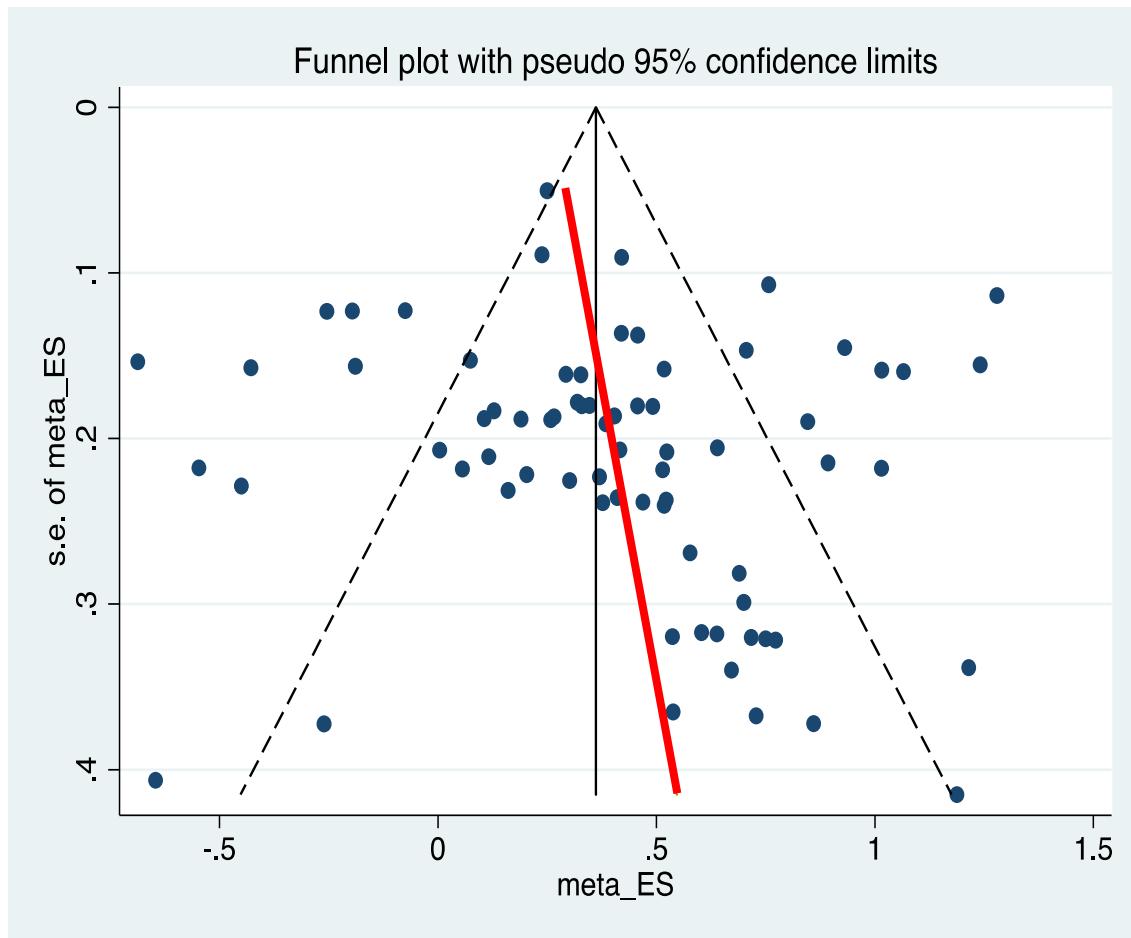


Larger Effects for URM Groups?

- 14 individual effect sizes categorized as URM group
- Overall average effect size
 - URM group = .45 [.28, .63]
 - Non-URM group = .38 [.26, .51]
- This difference becomes bigger and significant in the regression analysis

Publication Bias?

Funnel plot



Eggers test

- Indicates no bias ($p = .30$)

Trim and fill approach

- Imputed 18 missing estimates
- Imputed point estimate is .23 with 95% CI (.11, .34) versus .40 (.30, .50) non-imputed estimate

Preliminary Regression Results:

- Unable to detect significant differences between competencies
 - Growth mindset vs. sense of belonging vs. utility value
 - This result holds when we include all studies
- Average effect size for URM-group remains larger than non-URM group
 - The unadjusted difference is small (.45 vs. .38)
 - The difference is significantly larger adjusting for competency and type of outcome ($\beta = .57$, $se = .26$)

Conclusions

- Supports report emphasis on college *growth mindset* and *sense of belonging* interventions
- Strongest studies show smaller impacts of *utility value* interventions
- Jury still out on interventions targeting:
 - Intrinsic motivation
 - Academic self-efficacy
 - Conscientiousness
 - Positive future self
 - Prosocial goals

The Importance of College Contexts in the Development of the Identified Competencies among First Generation and Under-Represented Minority Students

K. Ann Renninger, Swarthmore College

- Diversity and inclusion were central themes in the report
 - growing diversity of the undergraduate student population, and
 - charge to focus on persistence and success especially in STEM.
- Special attention given to student groups who have historically experienced lower persistence and success in postsecondary education generally, and STEM more specifically.

- Competencies
 - Some evidence of a relationship to persistence and success
 - Malleability
- Developmental process
 - ongoing interactions with the environment (e.g. other people, classroom tasks, disciplinary-based extracurricular activities)
 - May enable or constrain

- In the context of college environment, all students are working to understand:
 - Who am I?
 - Whom do I want to become?
- Their developing identity is linked to their experience in college.

Sensitivity to Context and Subgroup Effects

Conclusion: Certain competencies develop and function differently for different groups and within different cultural and educational contexts. For example, although a strong sense of belonging in college is related to success among underrepresented student groups, members of these groups may find it difficult to develop this competency if they experience campus environments that are discriminatory or unwelcoming.

Examples of data on sense of belonging:

- Student experience of college context norms can influence engagement and persistence; sense of belonging and connectedness was positively related to motivation (Byrd & Chavous, 2009, 2011)
- Sense of belonging may be predictive of persistence and achievement for underrepresented minority students in STEM (Darling, et al., 2008)

- Students' perceptions of STEM contexts can influence their abilities to identify and make use of institutional supports to continue pursuing STEM (Chang et al., 2014; Hurtado & Carter, 1997).

Context similarly contributes to students'

- *Behaviors related to conscientiousness*
- *Academic self-efficacy*
- *Growth mindset*
- *Utility goals and values*
- *Intrinsic goals and interest*
- *Prosocial goals and values*
- *Positive future self*

- **Research indicates:**
 - Self, peer, or instructor ratings of competencies can vary based on local norms
 - Contextual variables may mediate or moderate the relationships between competences and educational outcomes

Attention to College Environments

Recommendation 4: To help reduce disparities in college success among student groups, institutions of higher education should evaluate and improve their social and learning environments to support the development of the eight identified competencies, especially among underrepresented student groups.

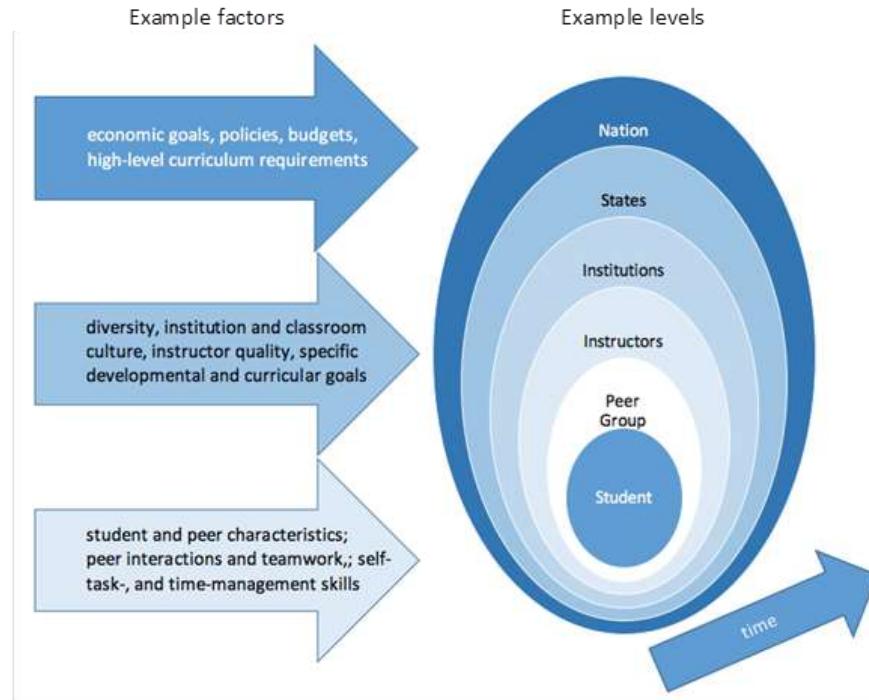


For example, Dowd (2015):

- Engaged teams of STEM faculty in analyzing:
 - Quantitative data on equity gaps in student progress toward degrees
 - Qualitative (observations, interviews, etc.) on teaching practices and departmental and institutional practices
- Catalyzed changes in practices and policy

Contextual Considerations Important

Conclusion: Appropriate interpretation of data from assessments requires consideration of contextual factors such as student background, college climate, and department or discipline.



Incorporate Context Data

Recommendation 10: Higher education researchers and assessment experts should incorporate data on context (e.g., culture, climate, discipline) into their analyses and interpretations of the results of intra- and interpersonal competency assessments.



Clarifying Questions (10 minutes)

The Nature and Quality of Assessments of the Identified Competencies

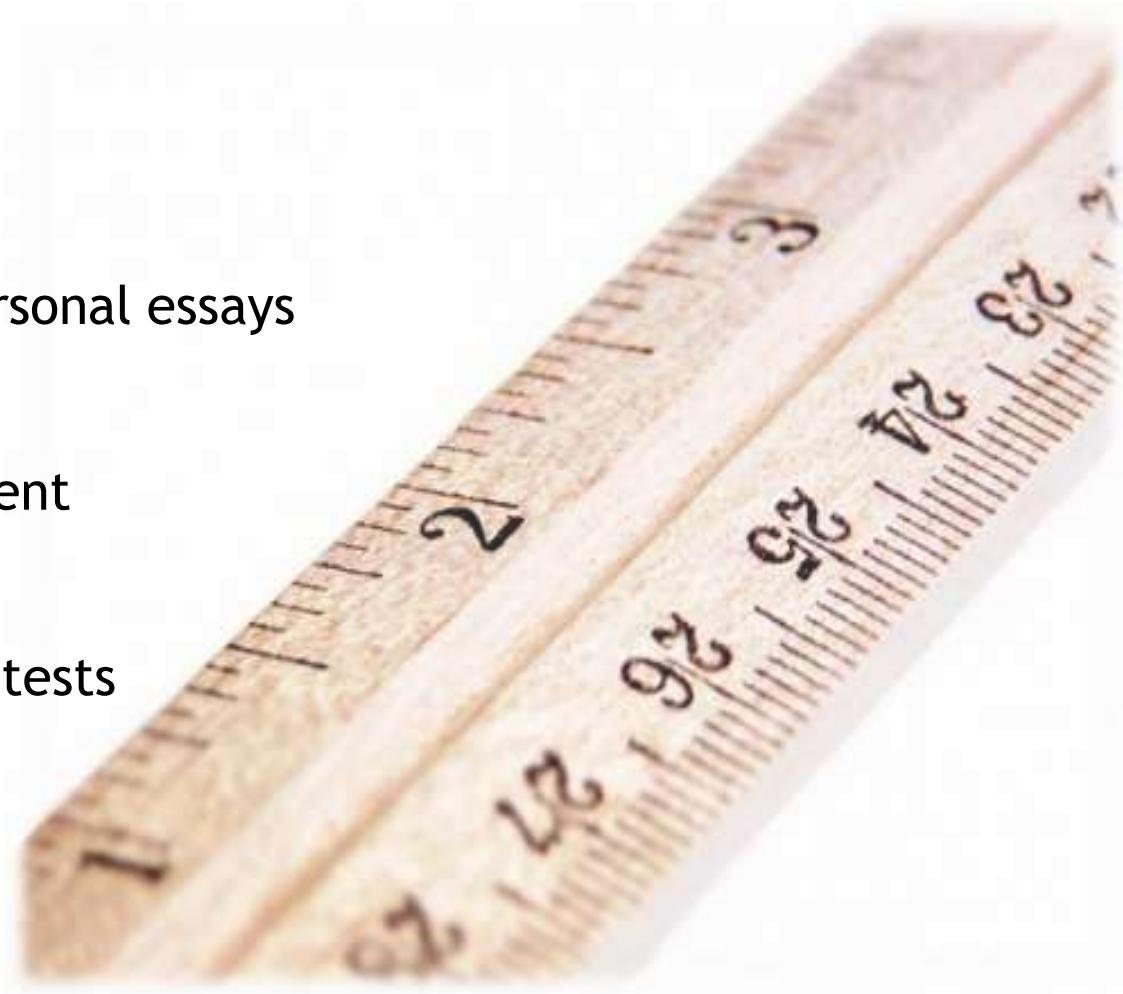
Joan Herman, University of California, Los Angeles

Assessment Methods

- Reviewed available methods for assessing intra- and interpersonal competencies
- Considered professional standards and best practices for assessment development, validation, use and interpretation
- Close analysis of existing assessments of the identified competencies

A Variety of Potential Strategies

- Self ratings
- Others' ratings
- Biographical data/personal essays
- Interviews
- Performance assessment
- Behavioral measures
- Situational judgment tests

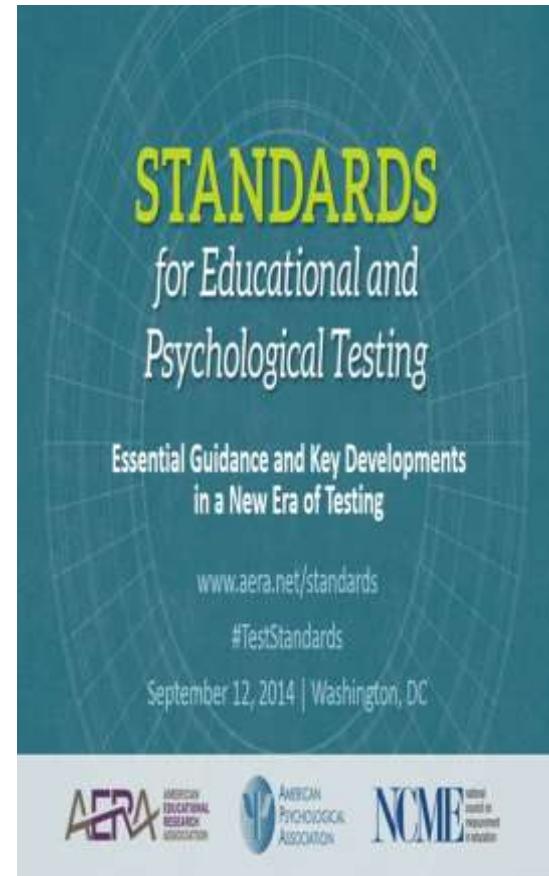


Review of Assessment Quality: Intervention Studies

Competency	No. of Studies Assessing Competency	Studies with Reliability Evidence	Studies with Validity Evidence	Studies with Fairness Evidence
Behaviors related to Conscientiousness	15	5 (0.67-0.98)	0	0
Academic Self-Efficacy	2	2 (0.76-0.95)	0	0
Growth Mindset	12	2 (0.63-0.88)	0	0
Intrinsic Goals and Interest	2	1 (.72)	0	0
Positive Future Self	3	3 (0.60-0.92)	0	0
Prosocial Goals and Values	0	0	0	0
Sense of Belonging	8	6 (0.63-0.93)	1	0
Utility Goals and Values	4	3 (0.78-0.93)	0	0

Quality of Assessments of Identified Competencies

Conclusion: Most current assessments of the identified competencies are uneven in quality, with limited evidence to date of meeting professional standards of reliability, validity, and fairness.



Inadequate Attention to Fairness

Conclusion: Attention to fairness for diverse populations is often inadequate in the development, validation, and use of current assessments of the identified competencies.

Evidence of Fairness Essential

Recommendation 9: Researchers and practitioners in higher education should consider evidence on fairness during the development, selection, and validation of intra- and interpersonal competency assessments.



High Stakes Assessment Cautions

Recommendation 5: Higher education stakeholders should comply with professional standards, legal guidelines, and best practices when developing and validating competency assessments to be used for high-stakes purposes.

Recommendation 6: Colleges and universities should not make high-stakes decisions based solely on current assessments of the 8 identified competencies.

Low Stakes Assessment Advice on Quality

Conclusion: Even low-stakes uses of competency assessments require attention to validity, reliability, and fairness, although they need not meet the high evidentiary requirements of high-stakes assessments.

Recommendation 7: Those who develop, select, or use competency assessments should pay heed to evidence of validity, reliability, and fairness as appropriate for the intended high-stakes or low-stakes uses.

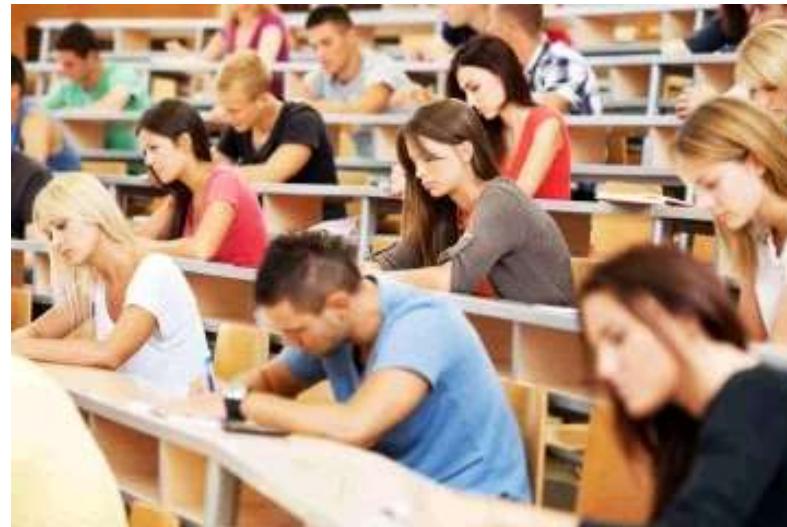
Test Development Requires Rigorous Process & Expertise

Conclusion: Developing and validating assessments of intra- and interpersonal competencies for high-stakes purposes is a rigorous, time-consuming, and expensive process that depends critically on expertise in assessment and psychometrics. Validity, reliability, and fairness are essential considerations in evaluating assessment quality.



Self-Report Measures Predominate

Conclusion: Most existing assessments use self-report measures with well-documented limitations. These limitations may constrain or preclude certain uses of the results. Innovative approaches for assessing intra- and interpersonal competencies can address these limitations.



Innovation Needed

Recommendation 8: Federal agencies and foundations should support additional research, development, and validation of new intra- and interpersonal competency assessments that address the shortcomings of existing measures.



Discussant Comments

Nicholas A. Bowman, University of Iowa

Discussant Comments

Nicholas A. Bowman, University of Iowa
SREE 2017 - Washington, DC

Overall Thoughts

- My perspective
- Importance of malleability
- Importance of measurement and uses
- Tradeoffs of exclusive focus on rigorous evidence

Contributions to Higher Education

- Directions for theory and research
- Directions for college practitioners
- How “new” are each of these competencies to practitioners?

Well-Known Competencies in Higher Ed

- Behaviors related to conscientiousness
- Sense of belonging (mostly)
- Academic self-efficacy
- Intrinsic goals and interest

Next Steps?

- Assessing college environments
- Training faculty and staff
- Conducting experimental interventions

Newer Competencies for Higher Ed

- Growth mindset/attributional retraining
- Utility goals and values
- Prosocial goals and values
- Positive future self

Questions, Discussion

For More Information

Read the full report at

www.nas.edu/supporting-students-college-success