DIA
Higher Education Collaborators

Download today's PPT!

MOVING BEYOND GROUP DIFFERENCES

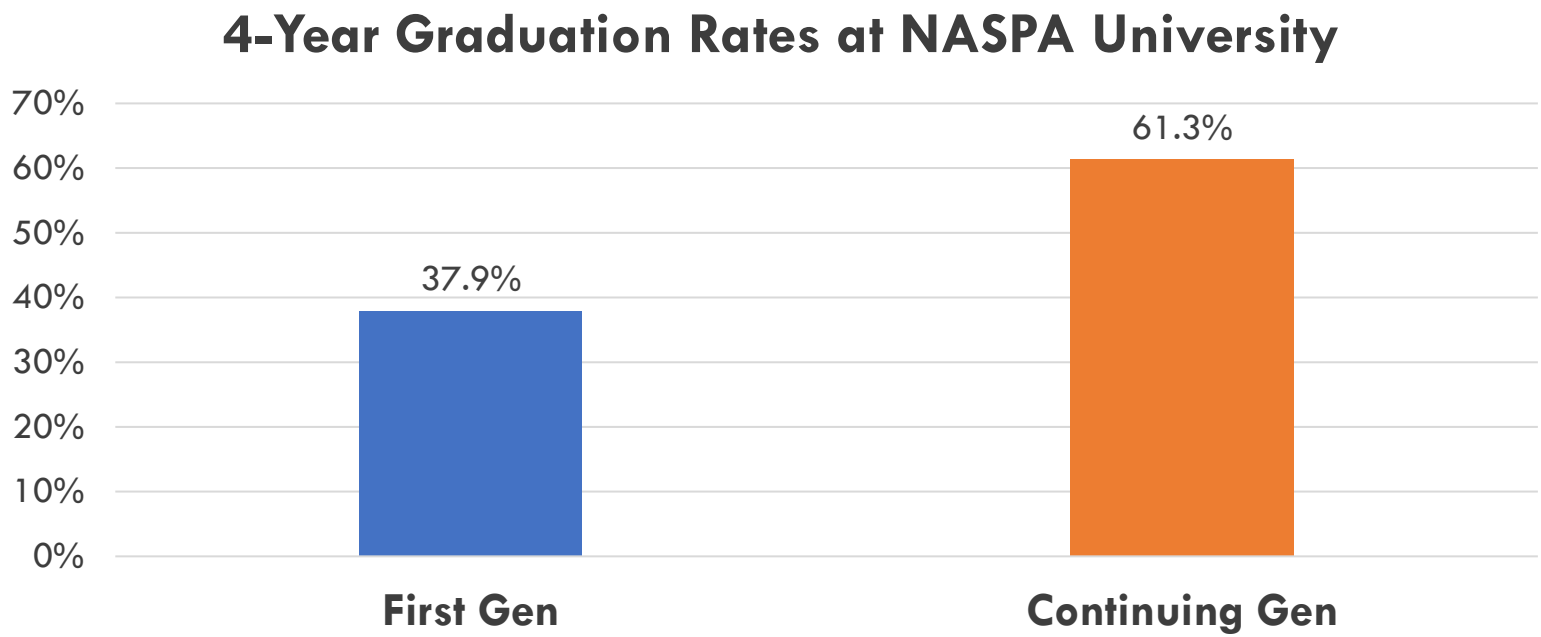
USING DATA TO TRULY UNDERSTAND SUBGROUPS AND TRADITIONALLY UNDERSERVED POPULATIONS

Andrea Pope, PhD | Director of Action
DIA Higher Education Collaborators

Ross Markle, PhD | Founder & Managing Director
DIA Higher Education Collaborators

WELCOME TO THE **FIRST-GEN FORWARD** TASK FORCE!

You've been appointed to a task force charged with developing a plan to **improve retention outcomes for first generation students.**



What additional data would you want to see/gather to inform your plan?

FROM "WHO?" TO "WHY?": **A DATA-DRIVEN APPROACH**

The task force puts out a call for data and learns that (compared to continuing generation students) first generation students…

- come to college less academically prepared. (Enrollment)
- are more likely to be Pell eligible. (Financial Aid)
- are more likely be undeclared after their first semester. (Academic Advising)
- schedule fewer advising appointments. (Academic Advising)
- visit the campus library less often. (University Libraries)
- are less likely to seek mental health services. (Counseling)
- report feeling less safe on campus. (Campus Climate Survey)
- report being less satisfied with their residence life experience. (Residence Life)
- engage less with faculty. (National Survey of Student Engagement)
- are less likely to review their notes after class. (National Survey of Student Engagement)

POTENTIAL PITFALLS OF **A DATA-DRIVEN APPROACH**

Common Pitfalls:

- Inaction due to overwhelm
- Focusing more on description than intervention
- Making causal assumptions & jumping prematurely to intervention

FROM "WHO?" TO "WHY?": **A DATA-DRIVEN APPROACH**

The task force puts out a call for data and learns that (compared to continuing generation students) first generation students…

- come to college less academically prepared. (Enrollment)
- are more likely to be Pell eligible. (Financial Aid)
- are more likely be undeclared after their first semester. (Academic Advising)
- schedule fewer advising appointments. (Academic Advising)
- visit the campus library less often. (University Libraries)
- are less likely to seek mental health services. (Counseling)
- report feeling less safe on campus. (Campus Climate Survey)
- report being less satisfied with their residence life experience. (Residence Life)
- engage less with faculty. (National Survey of Student Engagement)
- are less likely to review their notes after class. (National Survey of Student Engagement)

POTENTIAL PITFALLS OF **A DATA-DRIVEN APPROACH**

Common Pitfalls:

- Inaction due to overwhelm
- Focusing more on description than intervention
- Making causal assumptions & jumping prematurely to intervention
- Focusing on what can be measured vs. what's most important

POTENTIAL PITFALLS OF **A DATA-DRIVEN APPROACH**

Common Pitfalls:

- Inaction due to overwhelm
- Focusing more on description than intervention
- Making causal assumptions & jumping prematurely to intervention
- Focusing on what can be measured vs. what's most important

FROM "WHO?" TO "WHY?": **A RESEARCH-BASED APPROACH**

Overwhelmed, the task force decides to take a step back and research how to impact retention for first generation students. Again and again, their research points to **noncognitive skills/factors** as the most salient predictors of student retention.

Noncognitive Factors

Construct	r_{GPA}	$r_{retention}$
Academic-Related Skills	.129	**.301**
Academic Goals	.155	.212
Academic Self-efficacy	**.378**	**.259**
Institutional Commitment	.108	.206
Social Support	.096	.204
SES	.155	.212
ACT® or SAT® Scores	**.368**	.121

Robbins, et al. (2004) meta-analytic correlations with retention and GPA

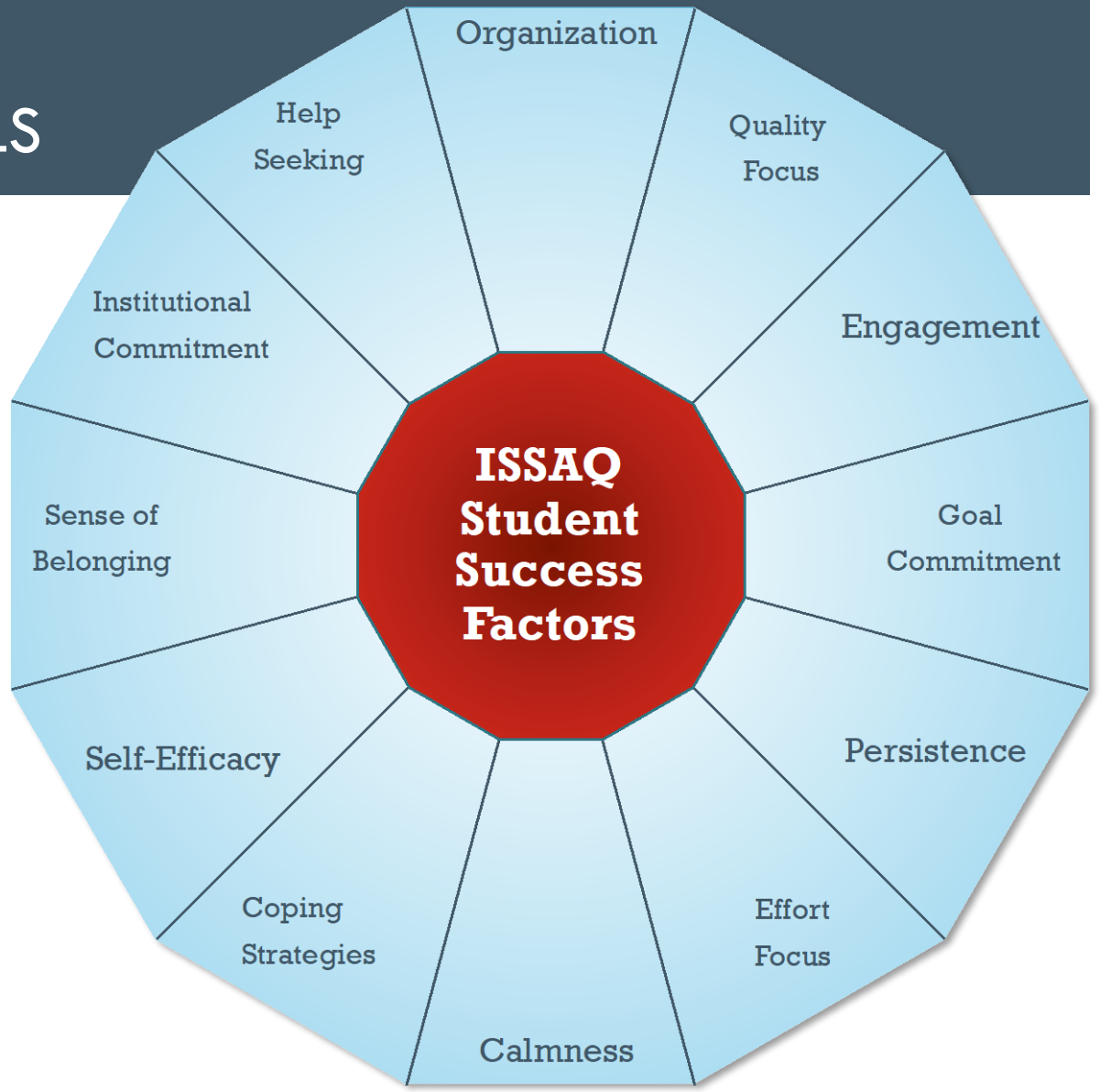
RESEARCH ON NONCOGNITIVE SKILLS

1. Noncognitive skills are meaningful predictors of academic and retention outcomes, even after controlling for prior academic achievement (e.g., test scores, HS GPA).

2. Noncognitive skills are better predictors of retention outcomes than prior academic achievement variables (which often have minimal predictive utility).

3. Noncognitive skills are even more important for those students who come in least prepared, with the greatest disadvantages.

4. We can intervene to improve students' noncognitive skills (and thus, their likelihood of success).



Dennis, Phinney, Chateco, 2005; Li et al., 2013; Markle et al., 2013; Poropat, 2009; Richardson, Abraham, & Bond, 2012; Robbins et al, 2004; Ting, 2003; Tracey & Sedlacek, 1986

POTENTIAL PITFALLS OF **A RESEARCH-BASED APPROACH**

Common Pitfalls:

- Seeing everything as a “nail”
- Assuming applicability of research findings to local contexts

FROM "WHO" TO "WHY": **AN EVIDENCE-INFORMED APPROACH**

1. Mean Differences: Do the groups differ on variables we have reason to believe (based on prior research)…
   a. are related to success?
   b. can be impacted through intervention?
2. Predictive Efficacy
   a. Do these variables relate to success at *our* institution?
   b. Do these variables have a differential relationship to success across subgroups at *our* institution?
3. Intervention Efficacy
   a. Can we move students on these variables at *our* institution?
   b. Are existing/planned interventions equally effective across subgroups at *our* institution?

MOVING BEYOND MEAN DIFFERENCES:

AN EXAMPLE WITH INTENDED NURSING MAJORS

FROM "WHO" TO "WHY": **AN EVIDENCE-INFORMED APPROACH**

1. Mean Differences: Do the groups differ on variables we have reason to believe (based on prior research)…
   a. are related to success?
   b. can be impacted through intervention?
2. Predictive Efficacy
   a. Do these variables relate to success at *our* institution?
   b. Do these variables have a differential relationship to success across subgroups at *our* institution?
3. Intervention Efficacy
   a. Can we move students on these variables at *our* institution?
   b. Are existing/planned interventions equally effective across subgroups at *our* institution?

STUDYING NURSING MAJORS

A little background…

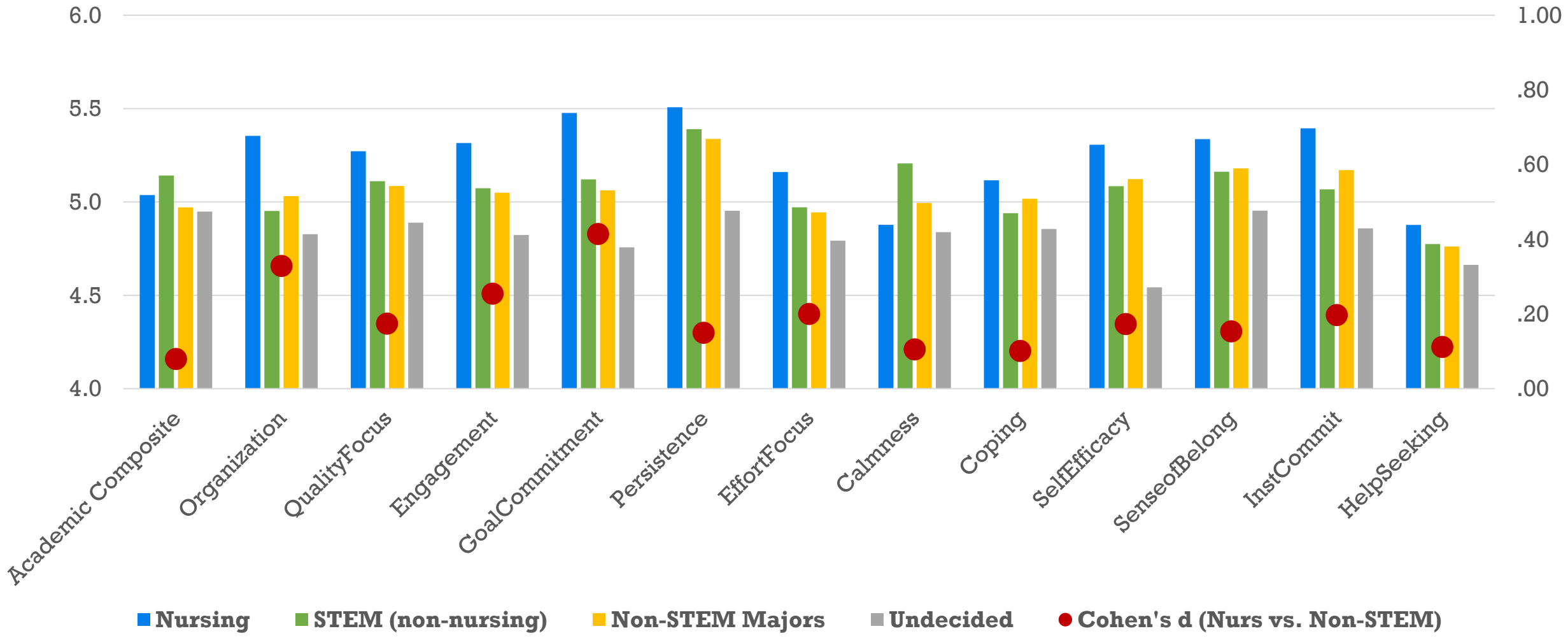
Major Questions:

1. Mean Differences
   - Do nursing students have similar or different levels of noncognitive skills?
2. Predictive Efficacy
   - Are the predictive effects of noncognitive factors similar for nursing and non-nursing students?
   - Are these effects similar or different across institutions?

STUDY SAMPLE

University/Major	***n***	**% of Institution**
School A (n = 625)		
Nursing Majors	128	18.4%
Non-nursing Majors	327	47.1%
School B (n = 654)		
Nursing Majors	190	21.5%
Non-nursing Majors	538	60.9%
School C (n = 6900)		
Nursing Majors	499	14.3%
Non-nursing Majors	1978	56.5%

ACADEMIC AND NONCOGNITIVE DIFFERENCES BY MAJOR



TECHNICAL NOTES

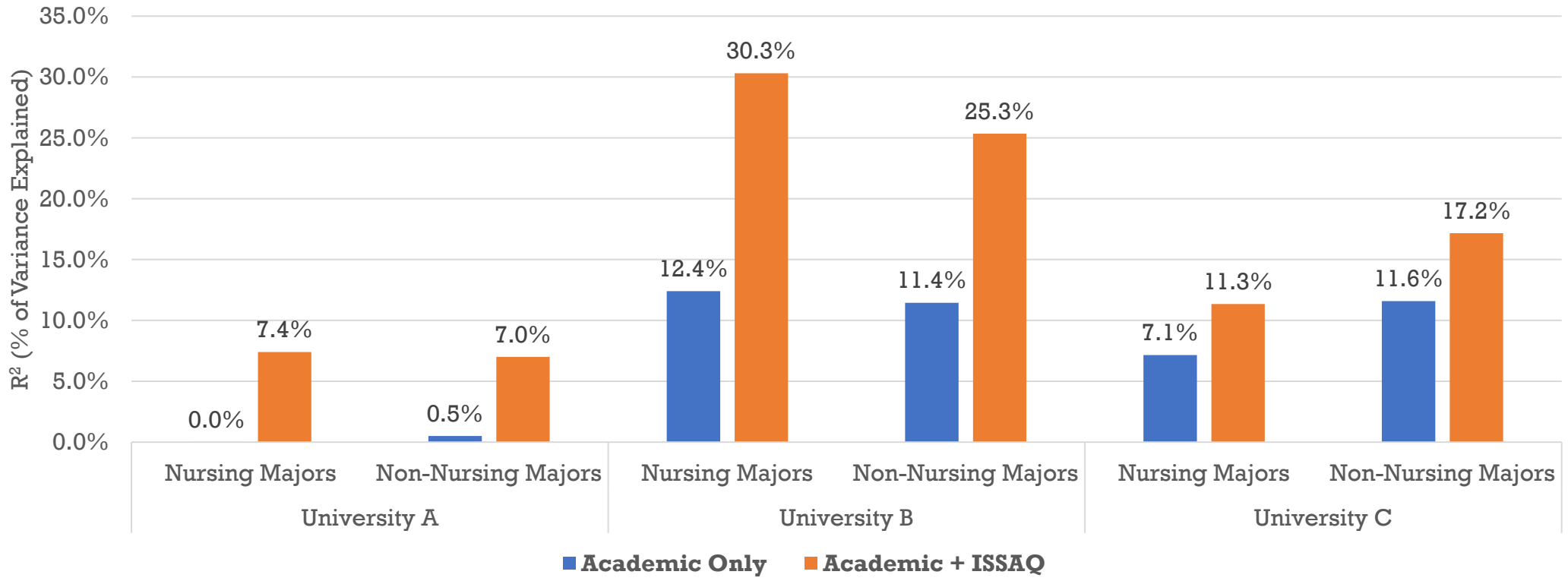
Research has generally demonstrated the effectiveness of noncognitive predictors by testing two nested regression models:

1. A model with **academic** factors only
2. A model with **academic** AND **noncognitive** factors

This practice is helpful for demonstrating (a) the predictive efficacy of academic factors alone and (b) the relative predictive efficacy – "above, beyond, and controlling for" – of noncognitive factors relative to academic ones.

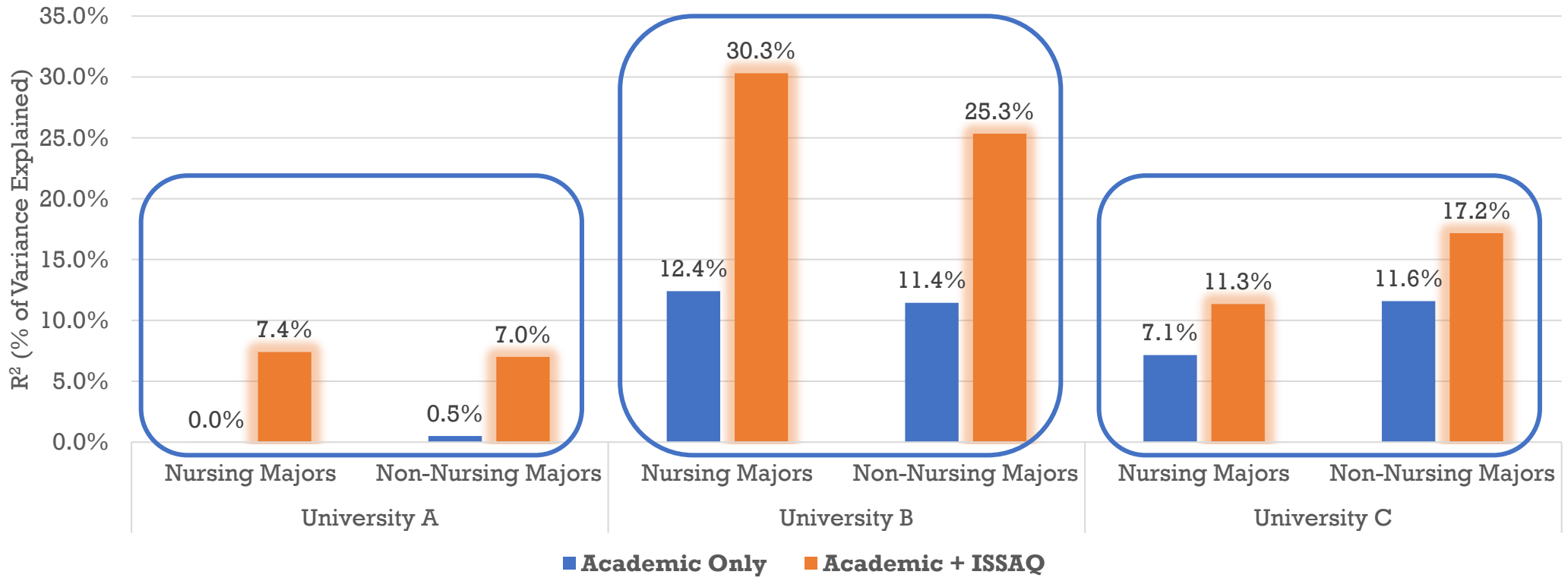
PREDICTING **GPA**

Across the board, adding noncognitive factors to the model improved its predictive power, however…



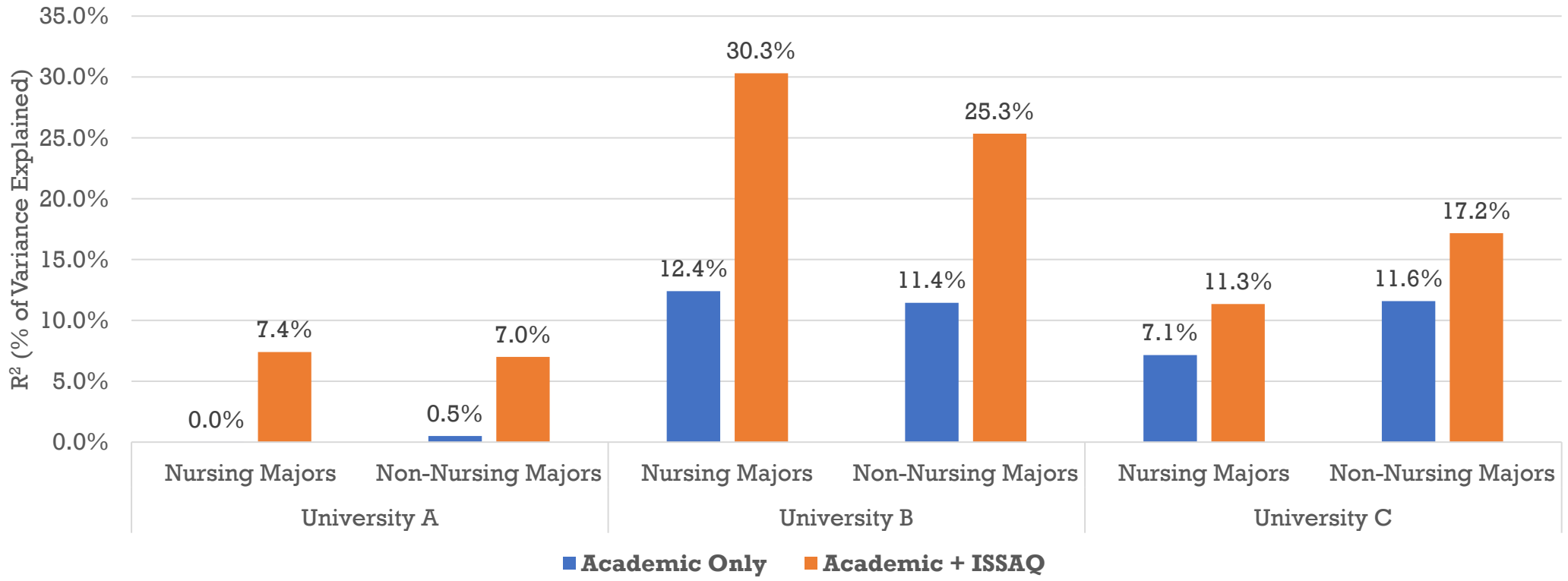
PREDICTING **GPA**

Across the board, adding noncognitive factors to the model improved its predictive power, however…



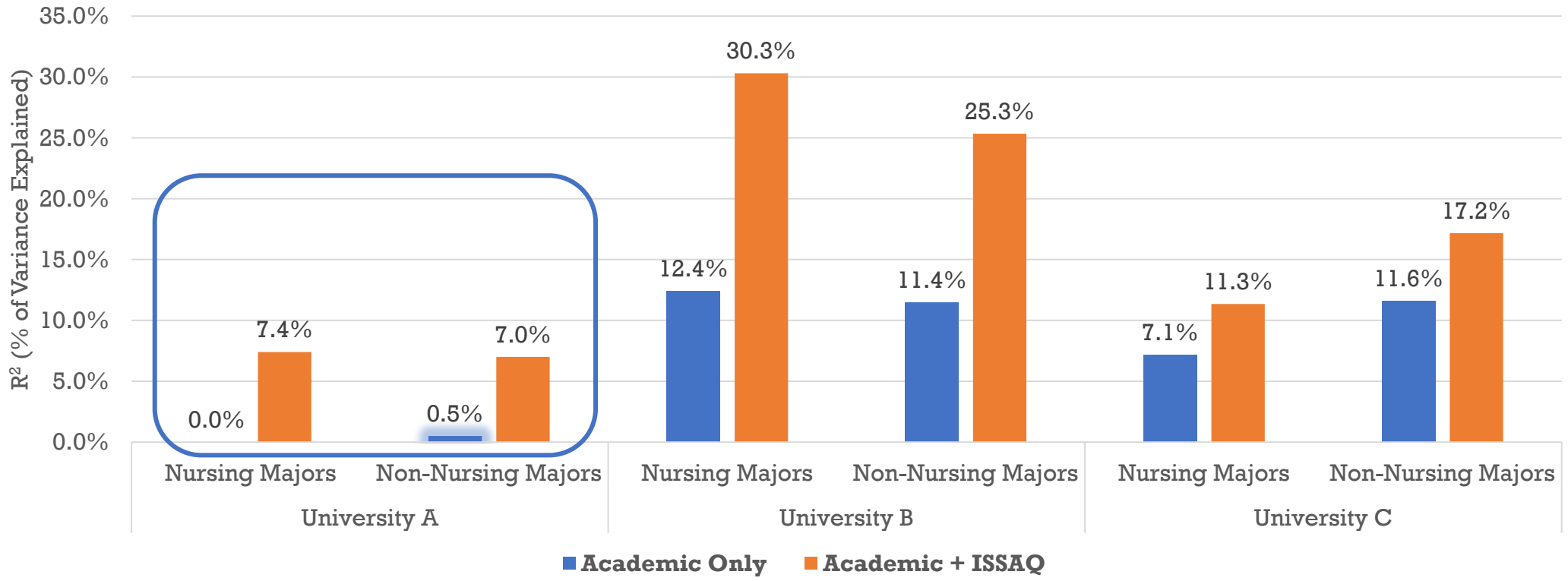
PREDICTING **GPA**

Across all three institutions, the models performed similarly for nursing and non-nursing majors.



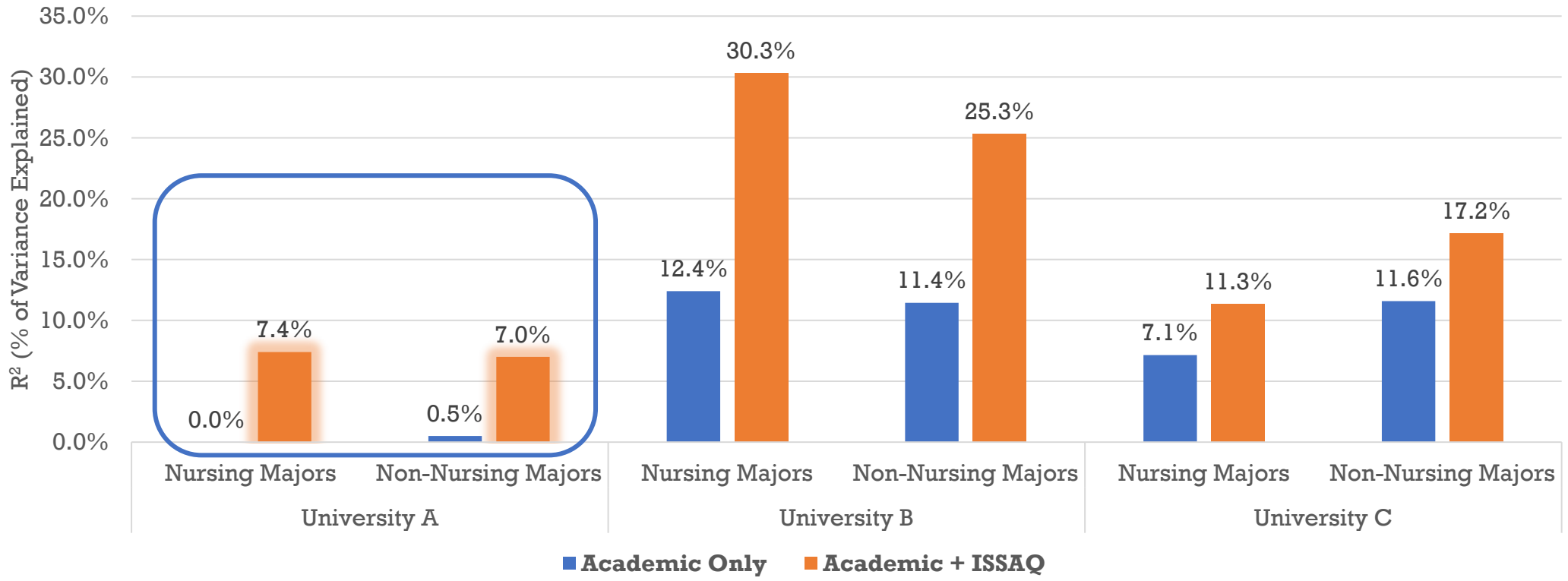
PREDICTING **GPA**

Across all three institutions, the models performed similarly for nursing and non-nursing majors.



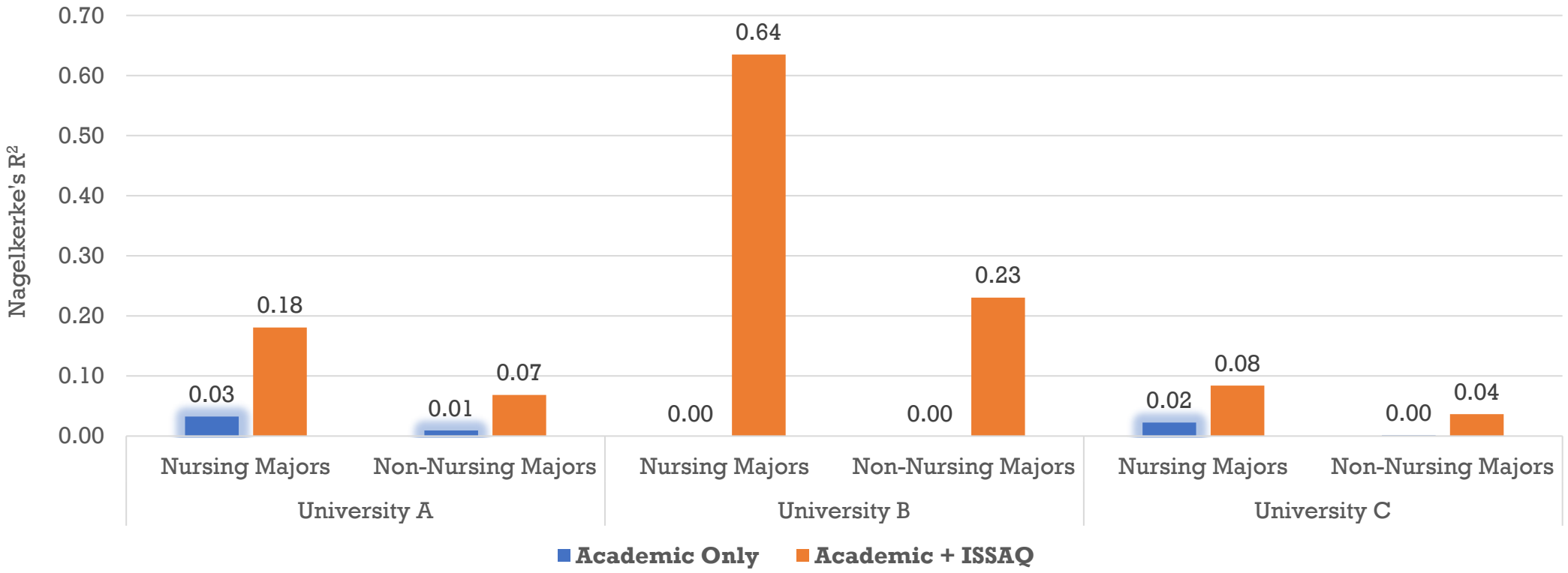
PREDICTING **GPA**

Across all three institutions, the models performed similarly for nursing and non-nursing majors.



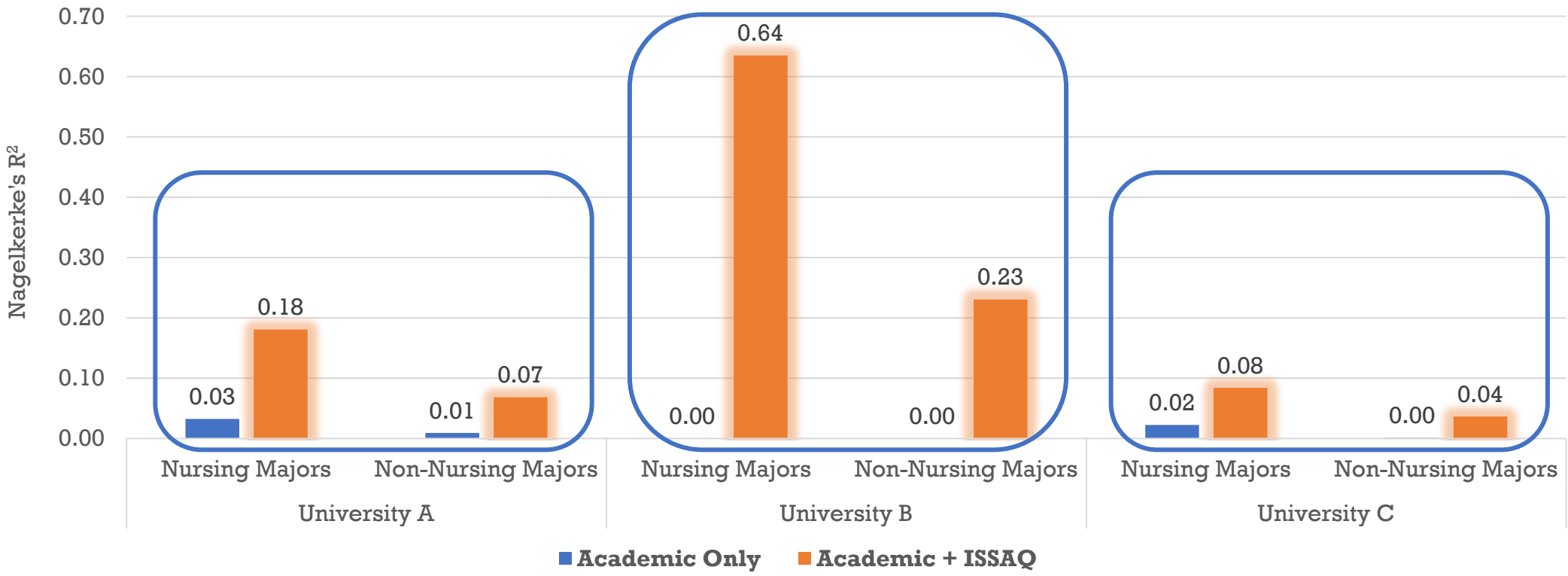
PREDICTING **RETENTION**

Across the board, academic factors did not contribute to the prediction of retention.



PREDICTING **RETENTION**

The predictive utility of noncognitive factors, however, varied substantially by institution.



WHAT MATTERS MOST?

University/Major	Key Factors (GPA)	Key Factors (Retention)
School A (*n* = 625)		
Nursing Majors	Goal Commitment Self-Efficacy Institutional Commitment	Organization Effort Focus Self-Efficacy
Non-nursing Majors	Engagement Goal Commitment Institutional Commitment	Quality Focus Goal Commitment Self-Efficacy
School B (*n* = 654)		
Nursing Majors	Engagement Academic Preparation Quality Focus	Engagement Persistence Sense of Belonging
Non-nursing Majors	Engagement Academic Preparation Persistence	Self-Efficacy Coping Strategies Calmness
School C (*n* = 6900)		
Nursing Majors	Academic Preparation Engagement Persistence	Self-Efficacy Sense of Belonging Help Seeking
Non-nursing Majors	Academic Preparation Engagement Persistence	Organization Goal Commitment Quality Focus

MOVING BEYOND MEAN DIFFERENCES:

AN EXAMPLE WITH FIRST GENERATION STUDENTS

DATA SOURCE

National study of incoming college students conducted across 10 institutions (5 two-year, 5 four-year)

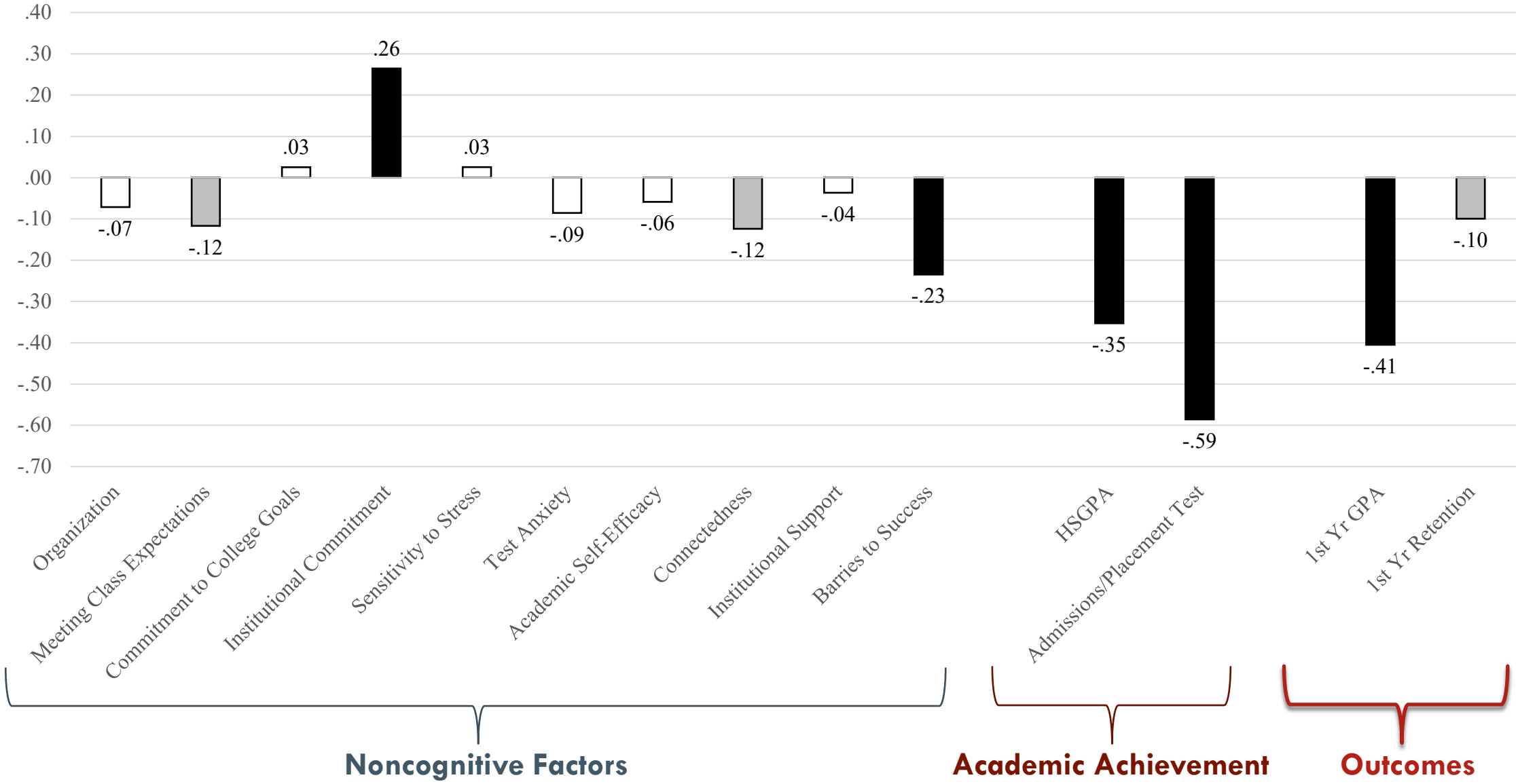
Total sample size = 4,840 with final sample including:

- 2,020 first-generation students (highest parental education of H.S. diploma or less)
- 663 continuing-generation students (highest parental education of bachelor's degree or higher)
- Excluded students whose parents had some college experience with no degree, or an associate's degree/certificate

Academic factors (test scores, high school GPA) came from either self-report or institutional report; noncognitive factors came from 93-item self-report survey

Outcomes data (first-year retention, GPA) came from institutional reports

Comparing First-Generation to Continuing-Generation Students in Noncognitive Factors, Academic Achievement, and First-Year Outcomes (Cohen's d). Note that white bars signify non-significant effects, grey bars signify statistically significant but practically small effects (|*d*|< .2), and black bars signify both statistically and practically significant effects (|*d*| >= .2).



"SINGLE MODEL" APPROACH

Multiple regression models predicting first-year GPA and retention for all students (continuing-generation and first-generation college students combined).

	First-Year GPA			*First-Year Retention*		
Model	ΔF	p	ΔR^2	ΔX^2	p	*Nagelkerke* R^2
a. Test scores	629.0	.000	.190	50.08	.000	.030
b. Test scores + HSGPA	202.9	.000	.057	27.23	.000	.044
c. Test scores + HSGPA + Noncog	18.5	.000	.049	53.61	.000	.071
d. Test scores + HSGPA + Noncog + First-Gen	4.66	.031	.001	.029	.865	.071
e. Test scores + HSGPA + Noncog + First-Gen + Interactions	.526	.899	.002	16.68	.162	.080

"SINGLE MODEL" APPROACH

Multiple regression models predicting first-year GPA and retention for all students (continuing-generation and first-generation college students combined).

	First-Year GPA			*First-Year Retention*		
Model	ΔF	p	ΔR^2	ΔX^2	p	*Nagelkerke* R^2
a. Test scores	629.0	.000	.190	50.08	.000	.030
b. Test scores + HSGPA	202.9	.000	.057	27.23	.000	.044
c. Test scores + HSGPA + Noncog	18.5	.000	.049	53.61	.000	.071
d. Test scores + HSGPA + Noncog + First-Gen	4.66	.031	.001	.029	.865	.071
e. Test scores + HSGPA + Noncog + First-Gen + Interactions	.526	.899	.002	16.68	.162	.080

"MULTIPLE MODEL APPROACH" – PREDICTING GPA

	Continuing-Generation				*First-Generation*			
	B	*SE*	β	*p*	*B*	*SE*	β	*p*
(Constant)	-3.210	.453		.000	-2.938	.297		.000
Test Scores	**.025**	**.002**	**.371**	**.000**	**.027**	**.002**	**.301**	**.000**
HSGPA	**.018**	**.003**	**.236**	**.000**	**.016**	**.002**	**.218**	**.000**
Organization	**.012**	**.003**	**.161**	**.000**	**.009**	**.002**	**.126**	**.000**
Meeting Class Expectations	.006	.004	.082	.105	**.006**	**.002**	**.090**	**.003**
Commitment to College Goals	**.005**	**.003**	**.085**	**.046**	.001	.002	.021	.435
Institutional Commitment	-.005	.002	-.076	.056	-.002	.002	-.028	.273
Sensitivity to Stress	-.004	.003	-.050	.217	**-.005**	**.002**	**-.076**	**.003**
Test Anxiety	.000	.003	.003	.932	-.002	.002	-.024	.281
Academic Self-Efficacy	-.001	.004	-.021	.692	.002	.002	.034	.271
Connectedness	.001	.003	.011	.790	-.002	.002	-.030	.232
Institutional Support	-.005	.003	-.065	.156	**-.006**	**.002**	**-.084**	**.003**
Barriers to Success	.006	.003	.083	.061	**.009**	**.002**	**.121**	**.000**

"MULTIPLE MODEL APPROACH" – PREDICTING RETENTION

	Continuing-Generation			*First-Generation*		
	B	*SE*	*p*	*B*	*SE*	*p*
(Constant)	-4.001	1.215	.001	.023	.005	.000
Test Scores	.010	.007	.118	**.015**	**.004**	**.000**
HSGPA	.013	.007	.064	.006	.004	.173
Organization	.009	.007	.233	.006	.005	.190
Meeting Class Expectations	-.001	.009	.931	.005	.004	.229
Commitment to College Goals	.004	.007	.605	.003	.004	.504
Institutional Commitment	.006	.006	.330	**-.017**	**.004**	**.000**
Sensitivity to Stress	.003	.008	.693	-.001	.004	.696
Test Anxiety	.002	.007	.724	-.002	.005	.693
Academic Self-Efficacy	-.002	.009	.870	.000	.004	.927
Connectedness	**.015**	**.008**	**.050**	-.010	.005	.052
Institutional Support	**-.019**	**.009**	**.032**	**.017**	**.004**	**.000**
Barriers to Success	.011	.008	.211	**.009**	**.002**	**.000**

BUILDING INTERVENTIONS THAT WORK

TYPES OF EVIDENCE

Theory & Empirical Research | Institution-Specific Data | Faculty/Staff Knowledge & Experience | Student Knowledge & Experience

What do we **believe <u>should</u> work** to improve student success?

What do we **know <u>can</u> work** to improve student success?

What's **most <u>needed</u> at your institution** to improve student success?

What is **most <u>likely to work</u> at your institution** to improve student success?

Theory (ideally relevant with respect to outcome, population, and setting)

Empirical research on the effectiveness of student support interventions

Institutional data (on students, faculty/staff, or programs/processes)

Faculty/staff knowledge & experience
Student knowledge & experience

A THREE-STEP APPROACH

1. **Specify Appropriate Distal Outcome(s)**

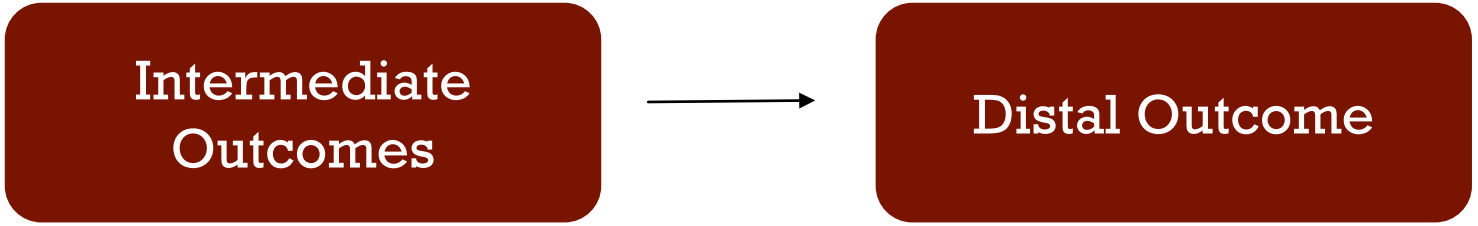
   What is the ultimate aim of your intervention? What problem do you want to solve/goal do you want to achieve?

   - Is the distal outcome **malleable** and **feasible**? (Theory/Research)
   - Is the distal outcome **relevant** and **important**? (Institutional Data; Stakeholder Insights)

2. **Specify Intermediate (More Proximal) Outcomes**

   What intermediate steps must be taken to achieve the distal outcome?

   - What is the etiology (cause/origin) of the problem? What is known about how to achieve the goal? (Theory/Research)
   - What path to achieving the distal outcome is most **appropriate** and **feasible** in your context? (Institutional Data; Stakeholder Insights)

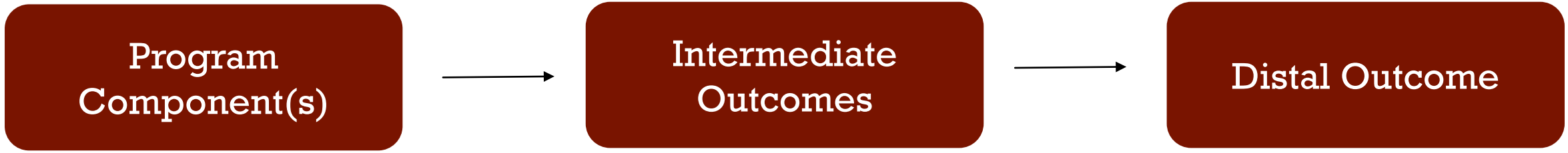


A THREE-STEP APPROACH

3. **Develop Intervention Components**

   What are the specific components of your intervention (e.g., pedagogical strategies, discussions/activities, instructor/facilitator training, tools/resources) and how will they lead to achievement of the intermediate outcomes?

   - What interventions should impact the intermediate outcomes? (Theory)
   - What interventions have been shown to impact the intermediate outcomes? For whom and under what conditions? (Empirical Research)
   - What interventions are most **appropriate** and **feasible** in your context? (Institutional Data; Stakeholder Insights)



THANK YOU! ANY QUESTIONS?

Andrea Pope, Ph.D.	Ross Markle, Ph.D.
Director of Action andrea@diahighered.com	Founder, Managing Dir. ross@diahighered.com

Download today's PPT!

DIA
Higher Education Collaborators

DEMOGRAPHICS

Variable/Group	Nursing *n*=2,091	STEM *n*=3,058	Non-STEM *n*=10,127	Undecided *n*=1,666
Gender				
Female	81.4%	41.5%	57.1%	57.5%
Male	16.5%	54.3%	38.8%	37.6%
No Response	1.0%	2.0%	1.5%	2.5%
Non-conforming	0.7%	1.1%	1.6%	1.1%
Not listed	0.2%	0.3%	0.4%	0.4%
Transgender	0.3%	0.8%	0.6%	0.9%
Race/Ethnicity				
American Indian or Alaska Native	0.2%	0.3%	0.4%	0.1%
Asian	6.5%	9.2%	5.8%	4.7%
Black or African American	17.9%	8.8%	11.5%	7.6%
Hispanic or Latino	14.6%	12.3%	14.8%	17.0%
I identify with a group not listed here	1.1%	1.1%	1.0%	1.3%
I identify with more than one of these categories	7.1%	7.9%	7.0%	7.1%
Native Hawaiian or Other Pacific Islander	0.7%	0.3%	0.3%	0.3%
No Response	1.2%	2.4%	2.1%	3.6%
White	50.7%	57.7%	57.0%	58.3%
First-Generation Status				
Continuing Generation	70.10%	78.30%	74.70%	71.40%
First Generation	29.90%	21.70%	25.30%	28.60%