

Let Icarus Fly: Multiple Measures in Assessment, the Re- imagination of Student Capacity, and the Road to College Level for All

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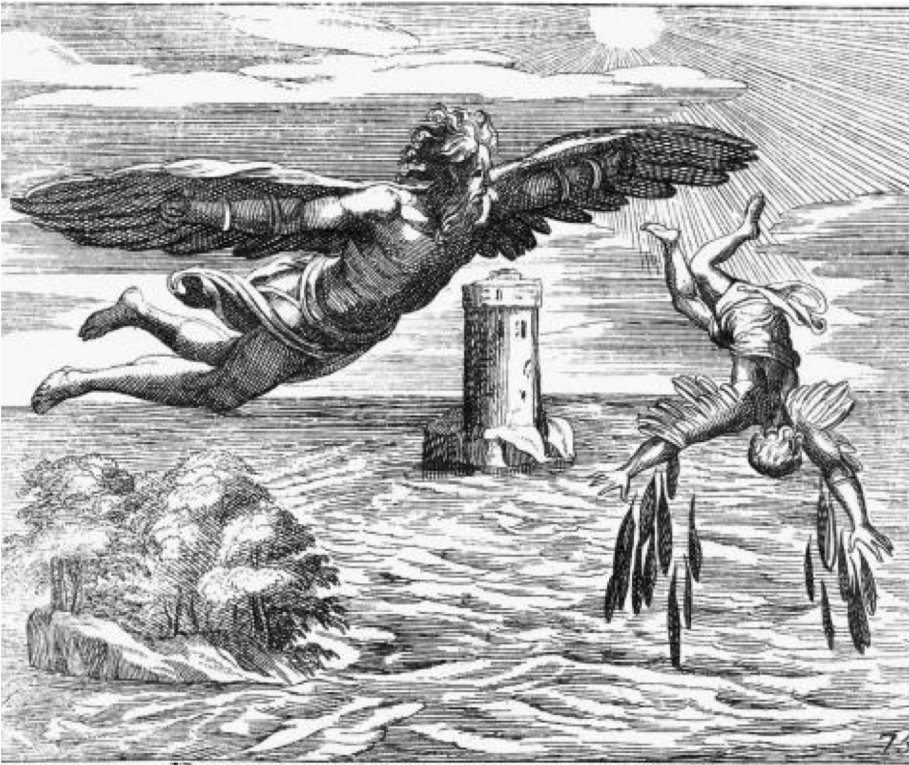
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<http://bit.ly/SUNYIcarus>

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@jjhetts #LetIcarusFly
#CollegeLevelForAll

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Daedalus and Icarus



(Indebted to Seth Godin's The Icarus Deception for inspiring this analogy)

- **Daedalus crafted labyrinth for King Minos**
- **Imprisoned in tower with his son, Icarus**
- **To escape, Daedalus built wings of feather and wax for his son Icarus and himself**
- **Don't fly too high, lest sun melt the wax and you plummet to your doom**
 - **Dangers of innovation/invention, hubris,**
 - **Importance of knowing your limits, listening to your wiser elders**
- **But most of us forget the rest of that story...**

Transition to College: Assessment and Placement

- **Community colleges and many public four-year institutions are open or near-open enrollment institutions**
 - Requires assessing and planning for educational needs of students.
- **Goal**
 - Effectively place student at most appropriate level for their skill - where challenge matches skill level
 - Zone of proximal development
 - Optimal performance, flow

Can you summarize decades of research in two different disciplines in one sentence?

- **If you think you can catch the bus, you will run for it.”**
 - **Lee Peng Yee, Singapore National Institute of Education Mathematician**

Why multiple measures are important in assessment

- **Basic assessment/measurement theory:**
 - **When you measure something you get:**
 - True score (thing you care about)
 - Systematic error (regular error or bias in measurement)
 - Single method increases vulnerability
 - Random error (temporary errors)
 - Single instance increases vulnerability

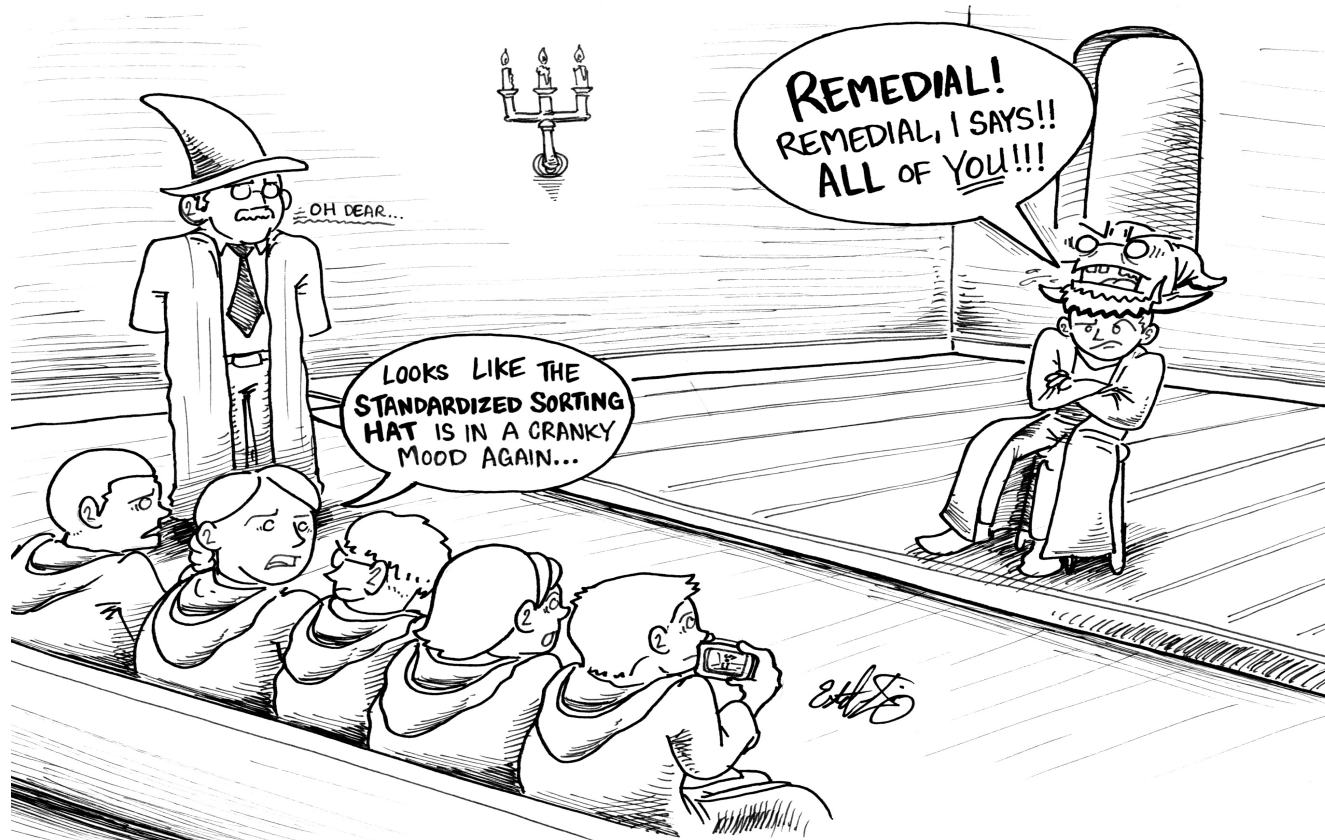
Why multiple measures are important in assessment

- **Methodological gold standard of assessment**
 - **To avoid systematic and random error, triangulate to true score through assessment across different:**
 - methods of assessment (how)
 - context of assessment (who/where)
 - content domains (what)
 - time (when)

Reality of current practice

- **Community colleges rely nearly entirely on standardized assessment**
 - >92% (Hughes & Scott-Clayton, 2011): bit.ly/Hughes2011
 - 100% (Fields & Parsad, 2012) bit.ly/NAGB2012
 - Only 27% of public CCs use anything other than test in math, 19% in reading
 - (But in 2016: 57% in Math and 51% in Reading: bit.ly/CAPR2018)
- **Majority of students placed below college-level**
 - 68% take at least one deved course (Scott-Clayton & Belfield, 2015) bit.ly/CCRCPlacementAccuracy

Standardized sorting hat has been in a cranky mood for decades



Consequences of remedial placement

- Placement below college level can be a significant barrier to completion (Bailey, Jeong, & Cho, 2010)
bit.ly/Bailey2010
 - ~30% never attempt a course in the sequence
 - Only 30-40% placed into developmental education complete sequence in six or more years
- 50-60% of equity gaps in college completion occur during assessment and matriculation (Stoup, 2015: bit.ly/STOUP2015)

What other impact can this have on students?

- **Students' first interaction with college can communicate lack of trust in capacity**
 - Can communicate to students they don't belong
 - Often the second and third interactions as well.
- **Implies to many that most students (which often gets rounded to all) are not ready for college and likely to fail**
 - Convinced nearly everyone
 - Including many of our students

Conventional Wisdom Explaining Assessment Results

- **It is a problem with today's students**
 - Students are simply, vastly unprepared for college
 - Kids these days

That seems awfully familiar



NEWS

The Whiny Generation

BY NEWSWEEK STAFF 10/31/93 AT 7:00 PM



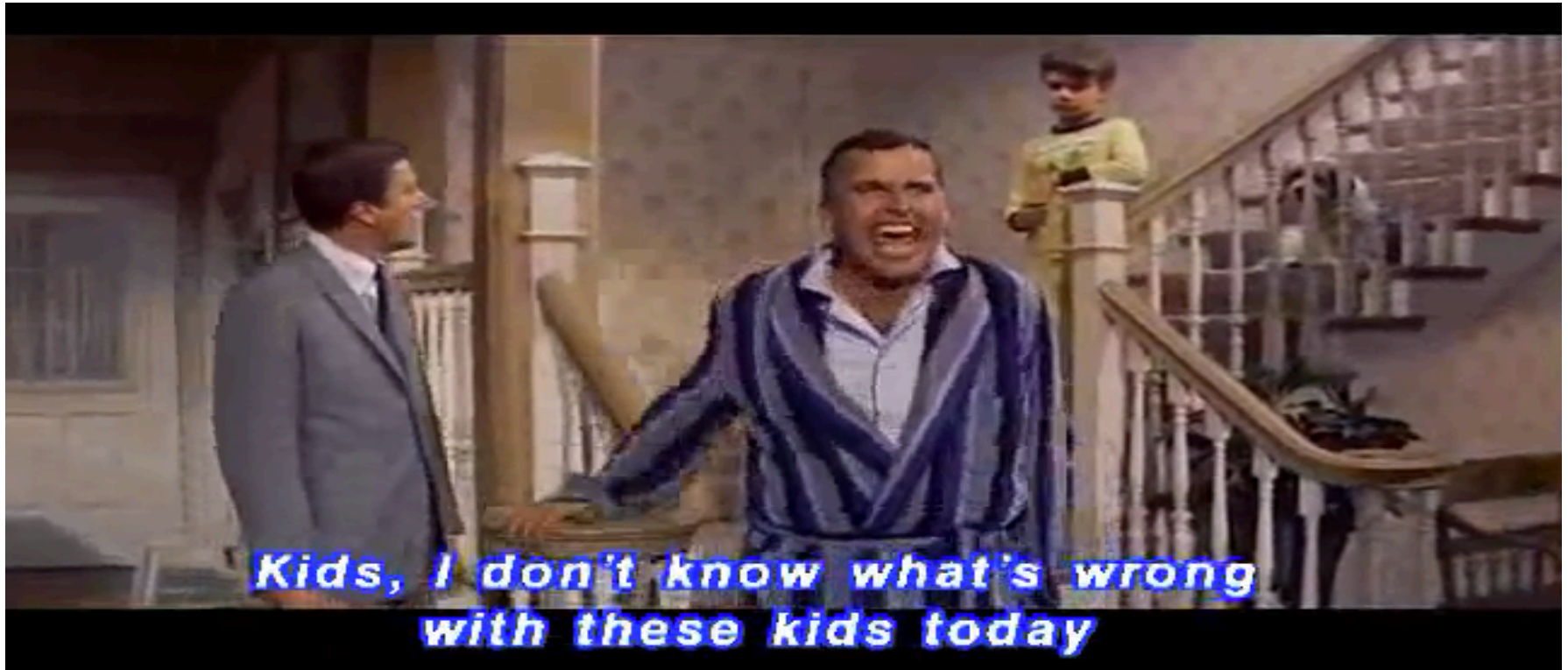
FILED UNDER: News

EVER SINCE THE PUBLICATION OF DOUGLAS COUPLAND'S book "Generation X," we've been subjected to a barrage of essays, op-ed pieces and feature articles blaming us baby boomers for the sad face of the twentysomething generation: the boomers took all the good jobs; the boomers are destroying the planet, the media is boomer-dominated and boomer-obsessed. The litany is never-ending. If you believe the Generation X essayists, all the troubles of the world can be traced to us fortysomethings.

Well, enough is enough. As a baby boomer, I'm fed up with the ceaseless carping of a handful of spoiled, self-indulgent, overgrown adolescents. Generation Xers may like to call themselves the "Why Me?" generation, but they should be called the "Whiny" generation. If these pusillanimous purveyors of pseudo-angst would put as much effort into getting a life as they do into writing about their horrible fate, we'd be spared the weekly diatribes that pass for reasoned argument in newspapers and magazines.

Let's examine for a moment the horrible fate visited on Generation X. This is a generation that was raised with the highest standard of living in the history of the world. By the time they arrived on the scene, their parents were comfortably established in the middle class and could afford to satisfy their offspring's every whim. And they did, in spades.

Too familiar (Bye Bye Birdie – 1963)



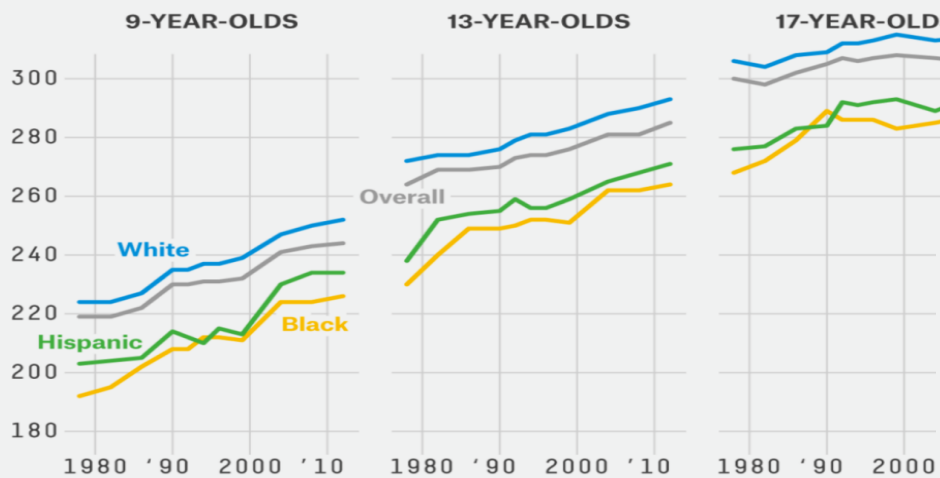
Evidence the Conventional Wisdom is Wrong

- **Substantial, long-term increase in IQ:**
bit.ly/FlynnEffectIQ
- **18-24 with HS degree: 92.4% - highest ever:**
bit.ly/2016HS18-24
- **National Assessment of Educational Progress: at or near all-time highs in virtually every demographic category, though with a slight decrease in the most recent year: see bit.ly/NAEPInfo for much more**

NAEP Math and Reading Assessments

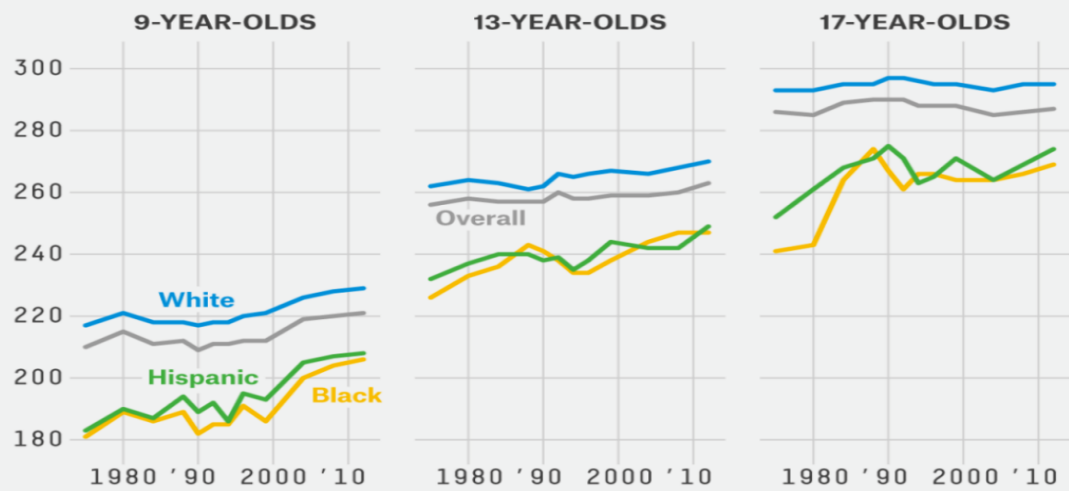
NAEP Math Score Improvement, 1978-2012

By race and age



NAEP Reading Score Improvement, 1975-2012

By race and age



Evidence the conventional wisdom is wrong

- **Research increasingly calls into question effectiveness of standardized assessment for understanding student capacity**
 - **Little relation to college course outcomes**
 - (e.g., Belfield & Crosta, 2012; Edgescombe, 2011; Scott-Clayton, 2012; Scott-Clayton & Rodriguez, 2012): bit.ly/CCRCAssess
 - **Incredible variability in cutscores and 2-year colleges often use **HIGHER** cutscores than 4-year**
 - (Fields & Parsad, 2012) bit.ly/NAGB2012
 - **Particularly underestimates capability of students of color, women, first generation college students, low SES**
 - Hiss & Franks, 2014; bit.ly/HissFranks2014
 - Geiser, 2015: bit.ly/2015Geiser

They had one job

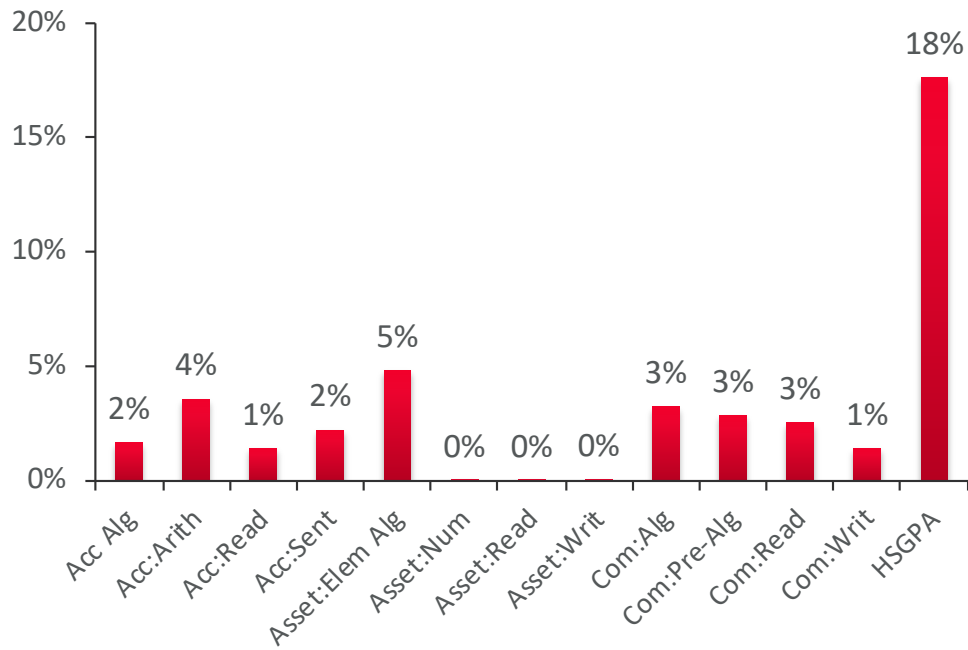


Assessment's “one” job

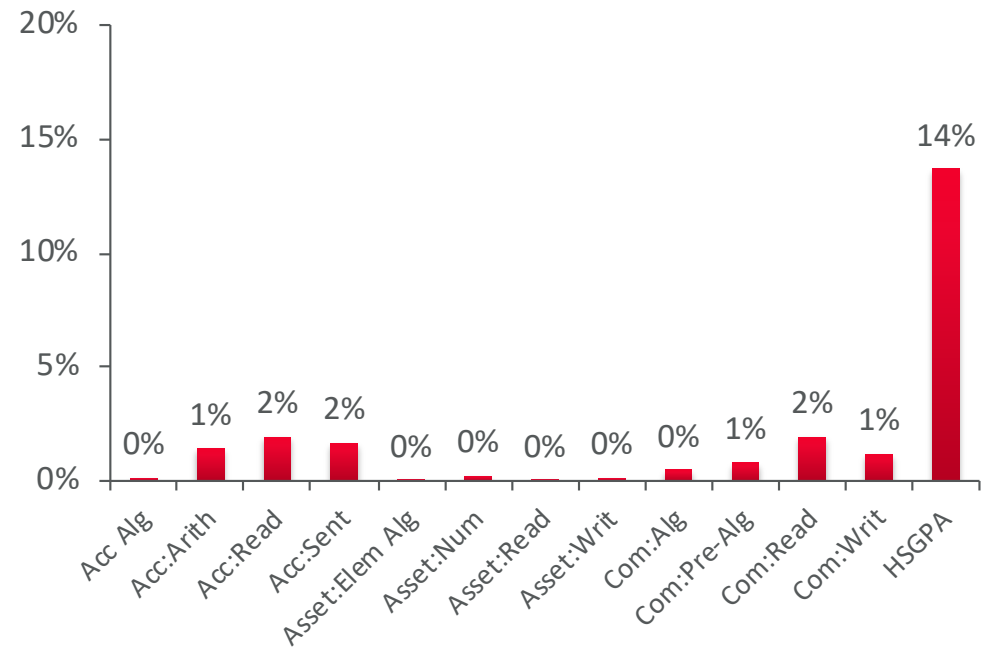
- **Measure student's capacity/predict student's performance to get students into course where they can thrive**

Variance in college level grades by Accuplacer, Compass, Asset - NC

English



Math



Adapted from Bostian (2016), North Carolina Waves GPA Wand, Students Magically College Ready adapted from research of Belfield & Crosta, 2012 – see also Table 1: <http://bit.ly/Belfield2012> (cf also Scott-Clayton, 2012)

Accuplacer, SAT, ACT - Alaska

Figure 6. Among University of Alaska students who enrolled directly in college English courses, high school grade point average explained more of the variation in college English grades than did exam scores, 2008/09–2011/12

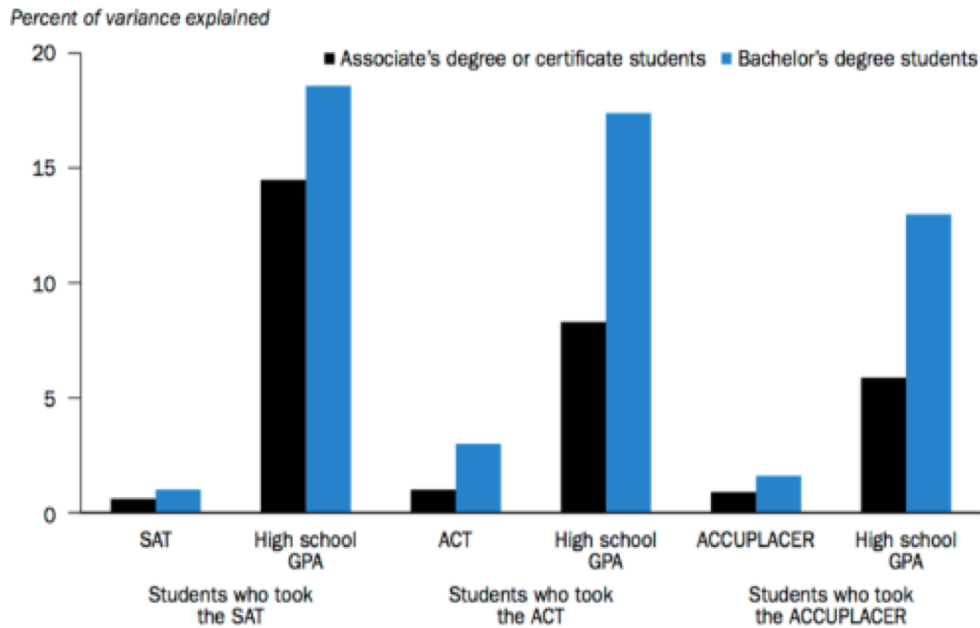
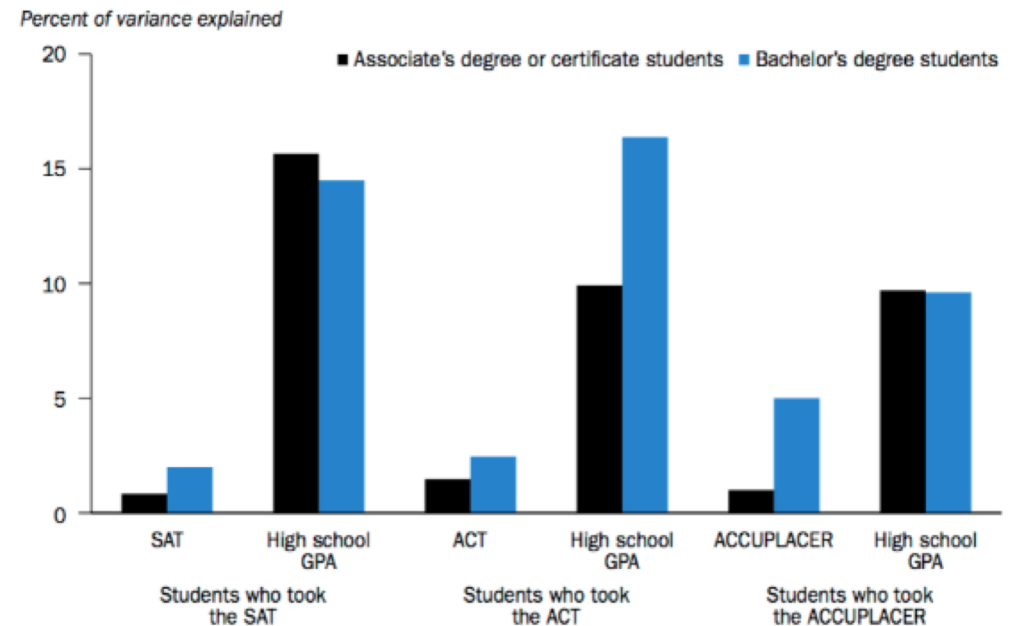


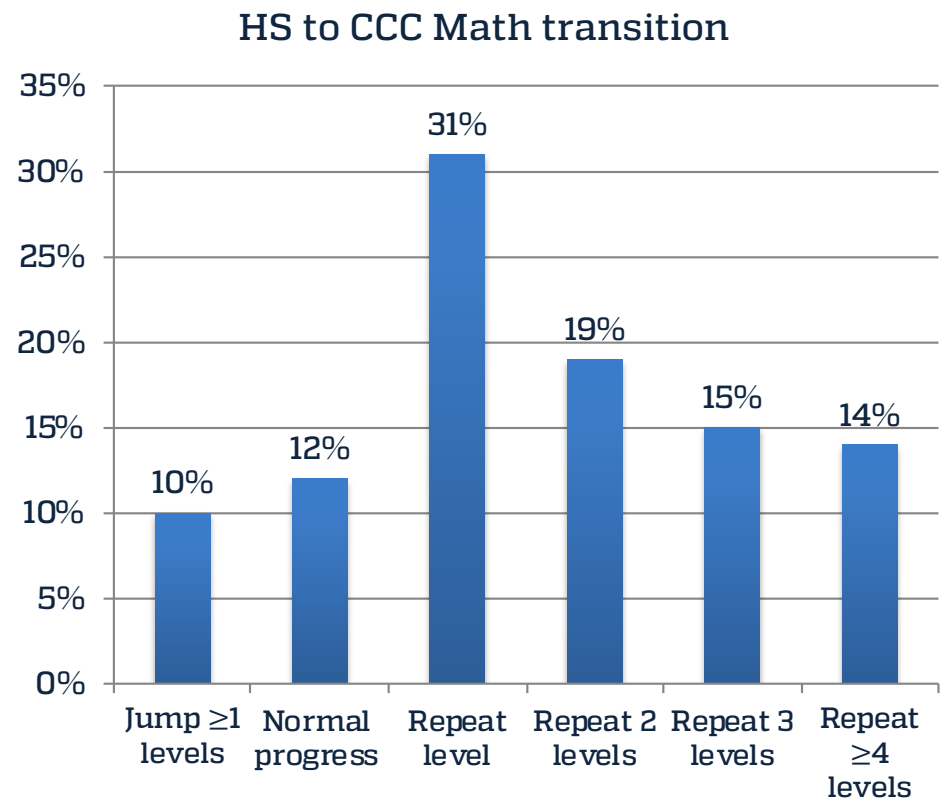
Figure 7. Among University of Alaska students who enrolled directly in college math courses, high school grade point average explained more of the variation in college math grades than did exam scores, 2008/09–2011/12



From Hodara, M., & Cox, M. (2016), *Developmental education and college readiness at the University of Alaska*: <http://bit.ly/HSGPAAK>

Students are forced to repeat courses successfully completed in HS

- **Within systems**
 - Highly reliable progression
- **Between systems**
 - CCC ~3/4 repeat ≥ 1 level, e.g.,
 - 76% of students who successfully complete Algebra 2
 - 68% of students w/B or better
 - ~1/2 repeat ≥ 2 levels, e.g.,
 - 47% of students who successfully complete PreCalculus
 - 39% of students w/B or better
 - ~30% of CSU students repeat one or more levels of math successfully completed



What if?

- What if the problem has not primarily been with limitations of our students but at least in part with limitations in how we have assessed and understood their capacity to do college-level work?

It gets worse...

- What if our incomplete/flawed method for understanding and “remediating” student capacity has actually had the opposite effect, actively undermining their progress?
 - Self-fulfilling prophecies/golem effects, stereotype threat, activation/reinforcement of negative lay theories of education

But there's good news...

- **What if one of the key barriers to our students' successful transition to and success in college is one that we fully control?**
- **That any college could begin to change right now, today, and improve outcomes for their very next cohort of students?**

Two approaches to improving assessment through evidence-based multiple measures

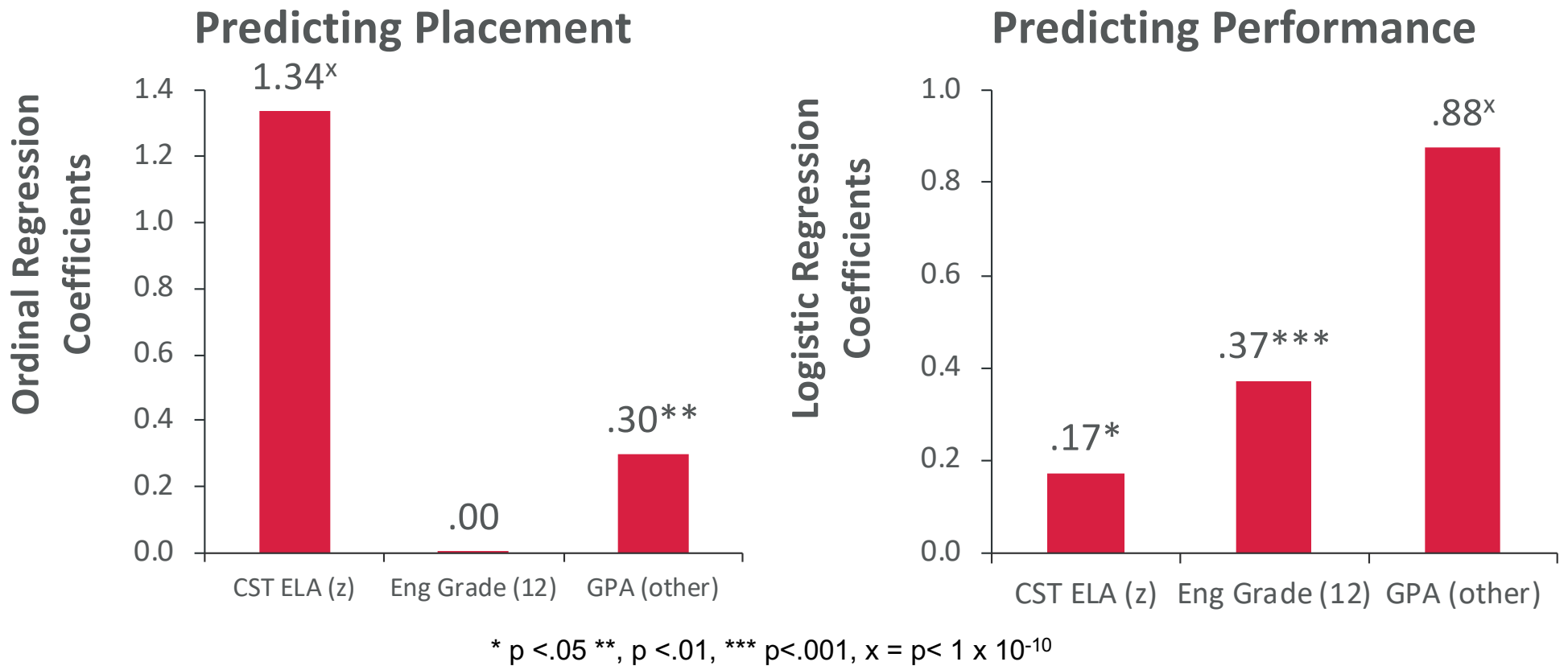
Resources/references:

- <http://www.lbcc.edu/PromisePathways>
- <http://bit.ly/MMAP2018>
- <http://bit.ly/STEPSRP>

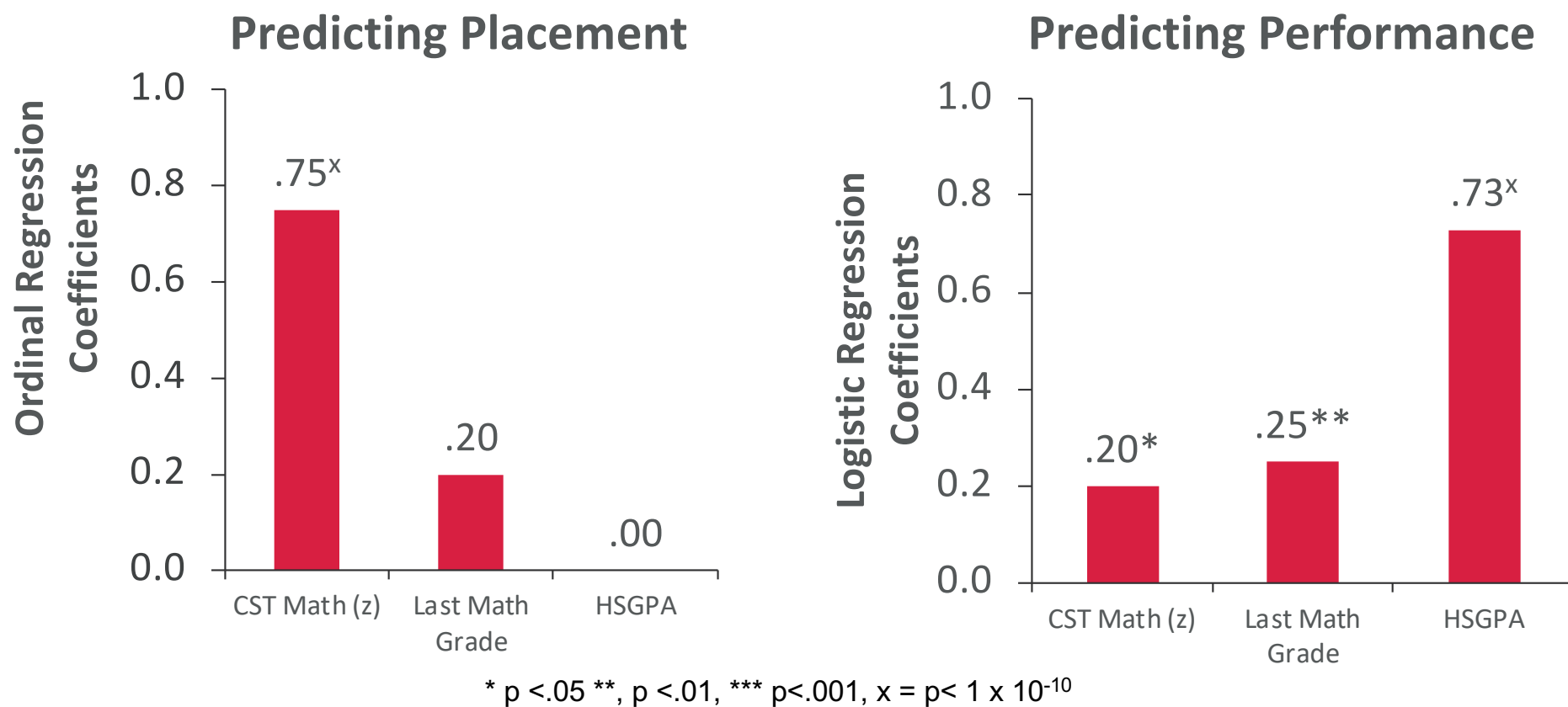
LBCC Multiple Measures Research

- **Initial research: five cohorts tracking more than 7,000 HS grads who matriculated to LBCC directly**
- **Examined predictive utility of wide range of high school achievement data for predicting:**
 - **How students are assessed and placed**
 - **How students perform in those classes**
 - **(and alignment between them)**

Predicting placement & performance in English at LBCC

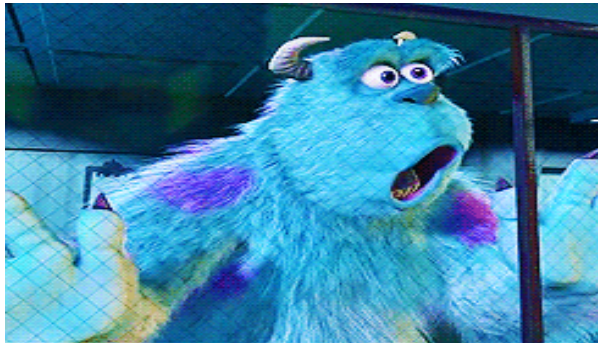


Predicting placement and performance in Math at LBCC



Key Takeaways (Warning: they may shock you)

Sample focus group responses:



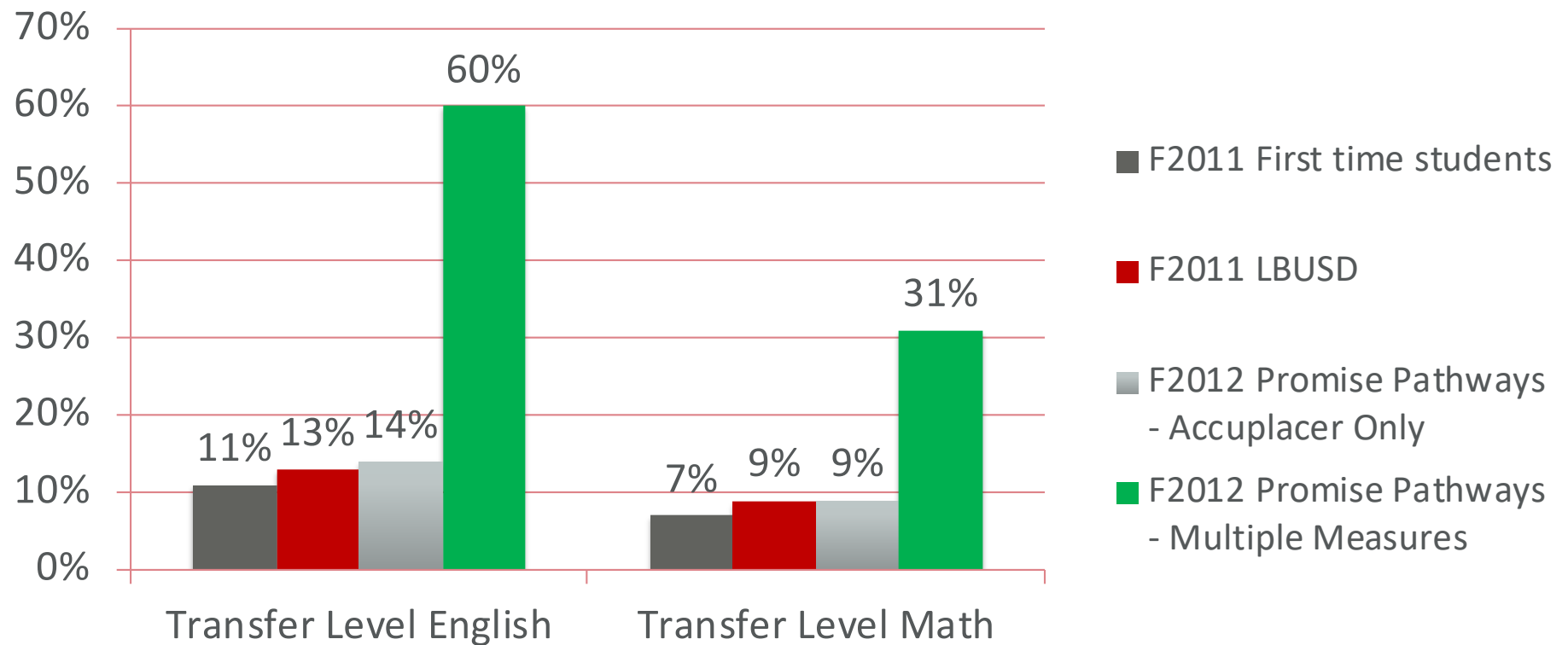
Key Takeaways

- Assessment should predict how students will perform at our colleges
- Instead:
 - Previous standardized tests predict later standardized tests
 - Previous classroom performance predicts later classroom performance
 - More information tells us more about student capacity than less information

Re-imagined student capacity

- **Reverse engineered analysis to place students using:**
 - Overall HSGPA
 - Last high school course in discipline
 - Grade in last course in discipline
 - Last standardized test in discipline (and level)
- **Placed students in highest course where predicted success rate higher than average success rate for that course.**

Implementing Multiple Measures Placement: Initial LBCC College-level Placement Rates F2012



Success rates for alternative placement were equal or higher to those for students in college level via regular placement or progression through sequence BUT gateway completion was 2-3X higher - see

Multiple Measures Assessment Project

- Collaborative effort of CCCCCO, Common Assessment Initiative (CAI), RP Group, Cal-PASS Plus (Educational Results Partnership & San Joaquin Delta College), and now >90 CCC pilot colleges
- Identify, analyze, & validate multiple measures data
 - Including HS transcript data, non cognitive variable data, & self-report HS transcript data
 - Focus on predictive validity (success in course) using classification and regression tree models (robust to missing data, non-linear effects, and interactions)
 - Very conservative approach: target $\geq 70\%$ success rate
- Engage pilot colleges to conduct local replications, test models and pilot use in placement, and provide feedback

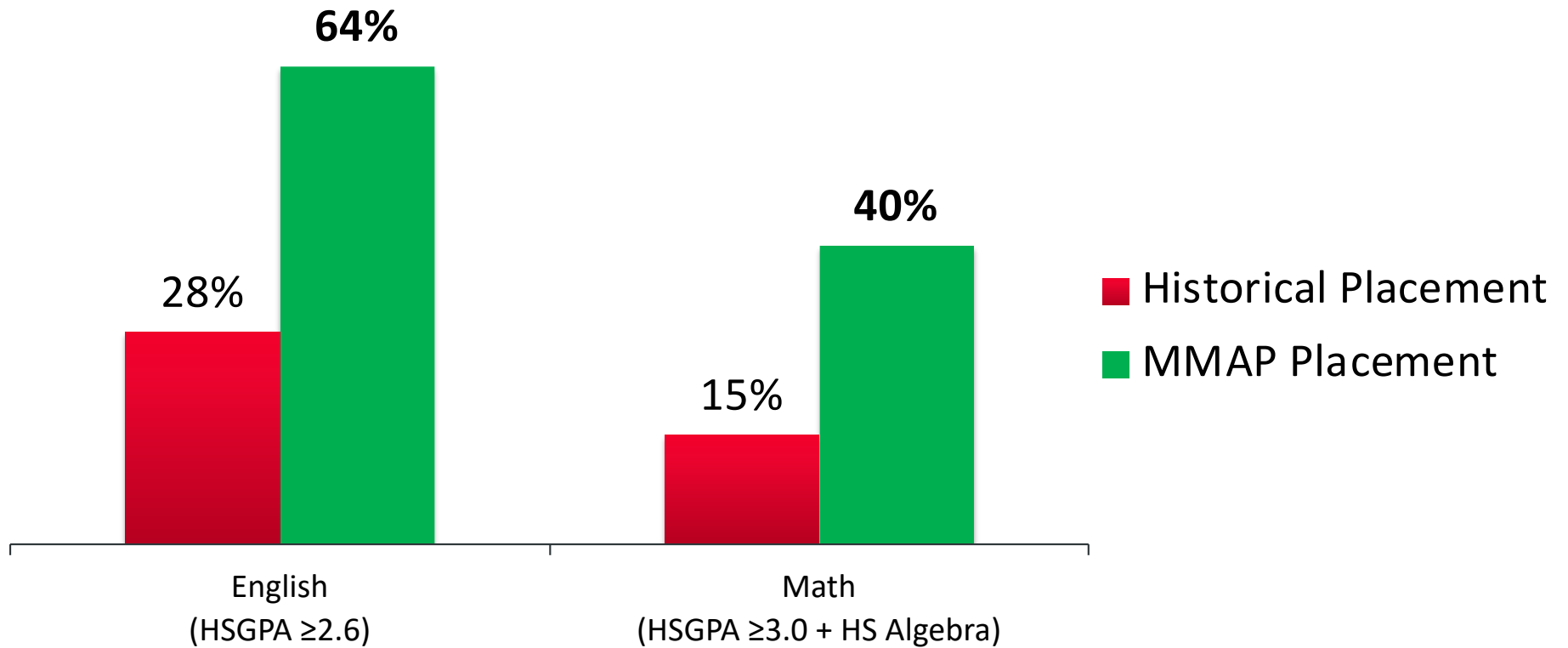
bit.ly/MMAP2019

Multiple Measures Assessment Project: CCC Placement/Support Recommendations: Mathematics

Placement	English	Statistics	Precalculus
Direct placement into college-level courses	HSGPA ≥ 2.6	HSGPA ≥ 3.0 OR HSGPA ≥ 2.3 and $\geq C$ in Precalculus	HSGPA ≥ 3.4 & Algebra 2 OR HSGPA ≥ 2.6 and enrolled in Calculus

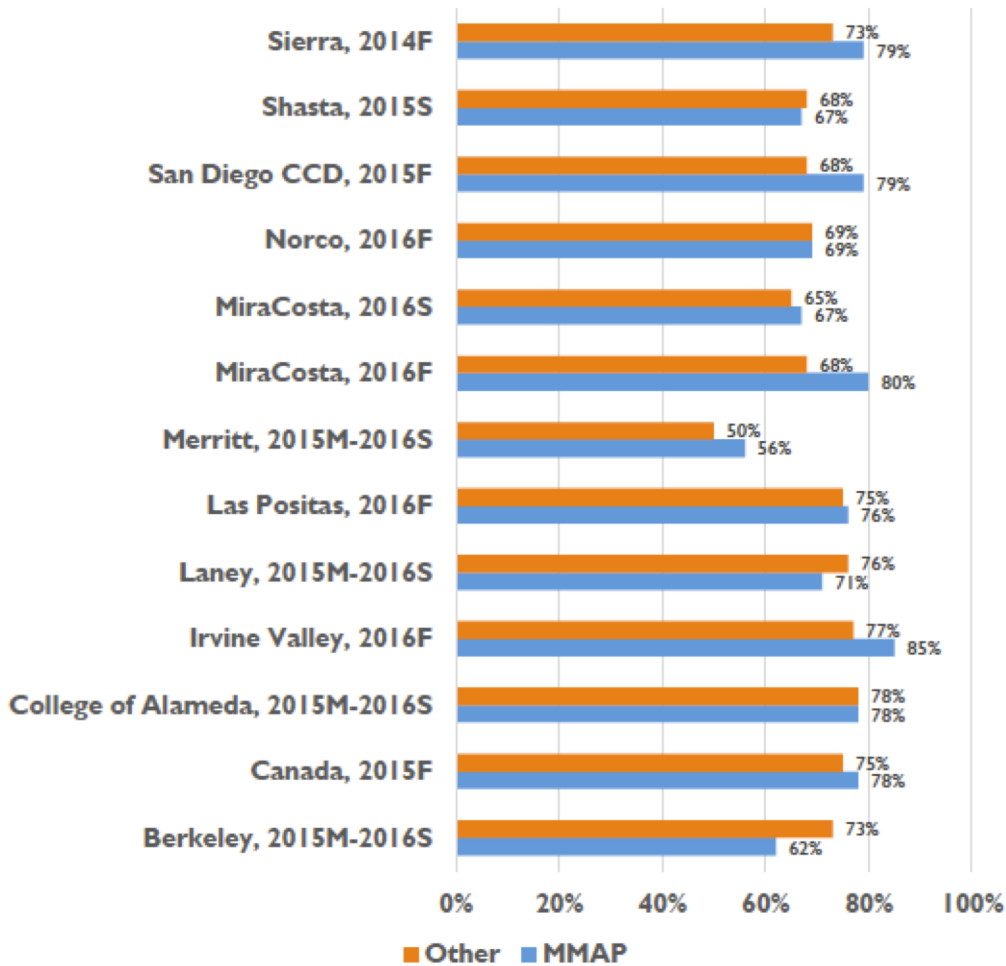
For placements throughout the English and Math sequences and classification and regression tree methods used, see bit.ly/RulesMMA and bit.ly/Bahr2017 and bit.ly/MMA2019 for lots of additional resources

Placement into college-level courses

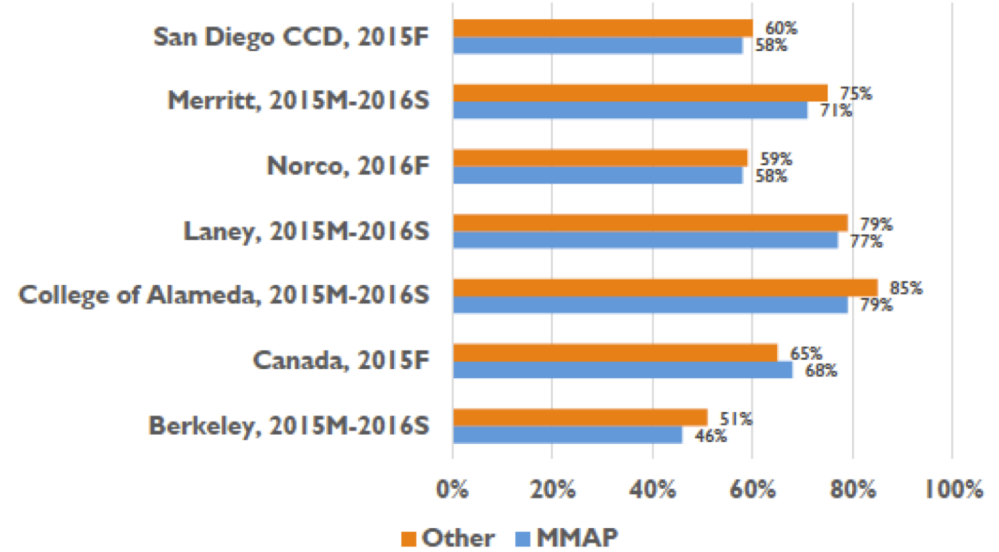


bit.ly/BSI2012 and bit.ly/MMAPProjection

Success Rates in Transfer-level English

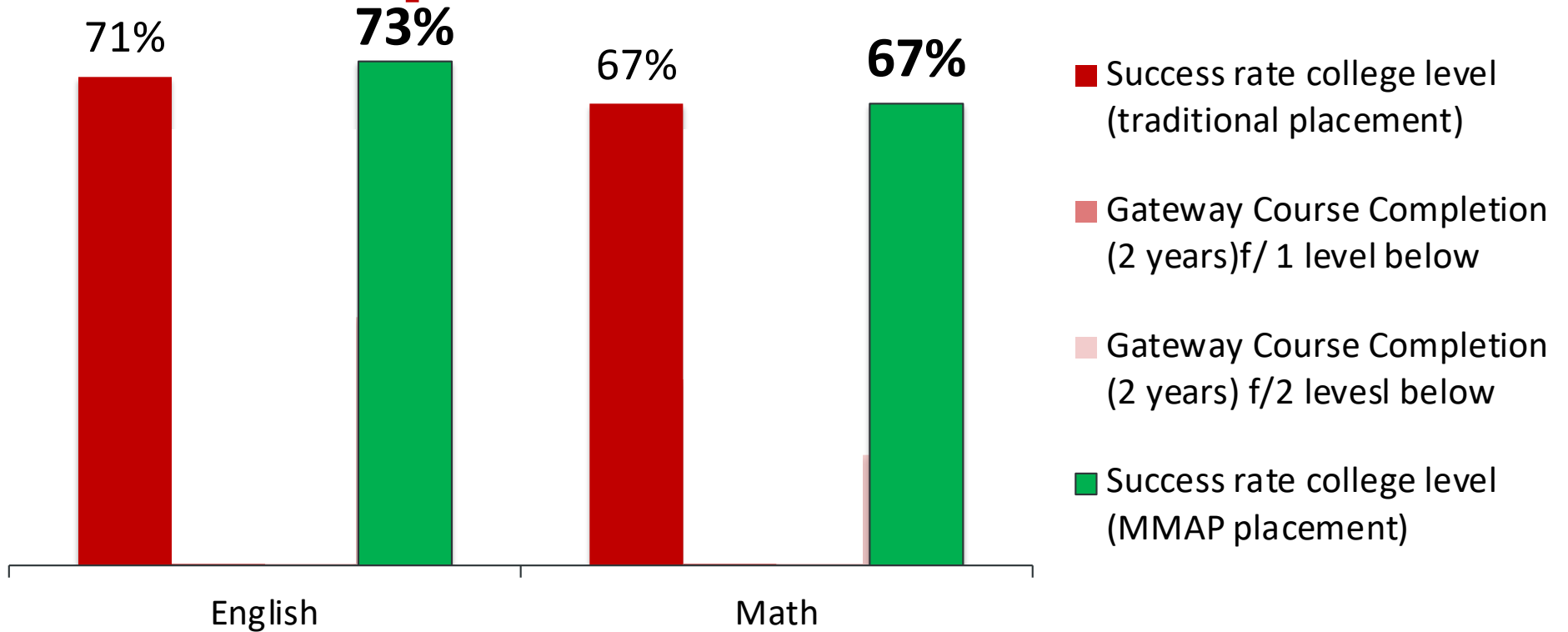


Success Rates in Transfer-level Math



bit.ly/MMAPSummary2017

College level course-completion by placement & method



MMAP: One semester success rate is \geq than traditionally placed students & gateway completion is 2-4X higher

What about everyone else? What maximizes their completion of gateway English and Math?

- Previously identified students were highly likely to successfully complete (~70% or higher)
- Can we identify any students more likely to complete gateway English or Math if they start in developmental education?
 - Let's examine the students least likely to succeed based on their HS performance

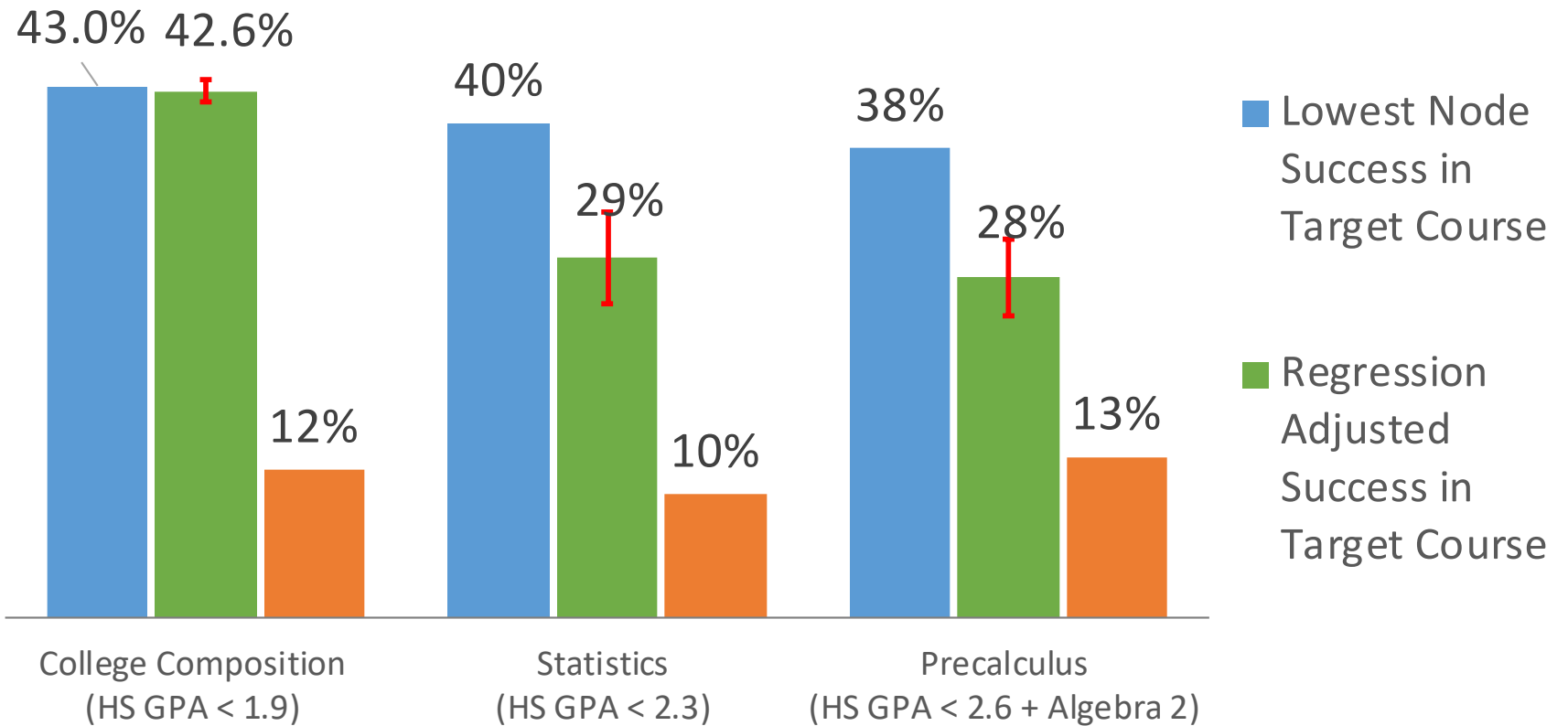
What about everyone else?

Regions of likelihood of success

Placement	English	Statistics	Precalculus
Highly likely to succeed (Direct placement)	HSGPA ≥ 2.6	HSGPA ≥ 3.0 OR HSGPA ≥ 2.3 and $\geq C$ in Precalculus	HSGPA ≥ 3.4 & Algebra 2 OR HSGPA ≥ 2.6 and enrolled in Calculus
Everyone in between	HSGPA = 1.9 to 2.6	HSGPA 2.3 to 3.0	HSGPA ≥ 2.6 & Algebra 2 or enrolled in Precalculus
Least Likely to Succeed	HSGPA ≤ 1.9	HSGPA < 2.3	HSGPA ≤ 2.6 and no Precalculus

For classification and regression tree methods used, see bit.ly/RulesMMAp and bit.ly/Bahr2017 and bit.ly/MMAp2019 for lots of additional resources

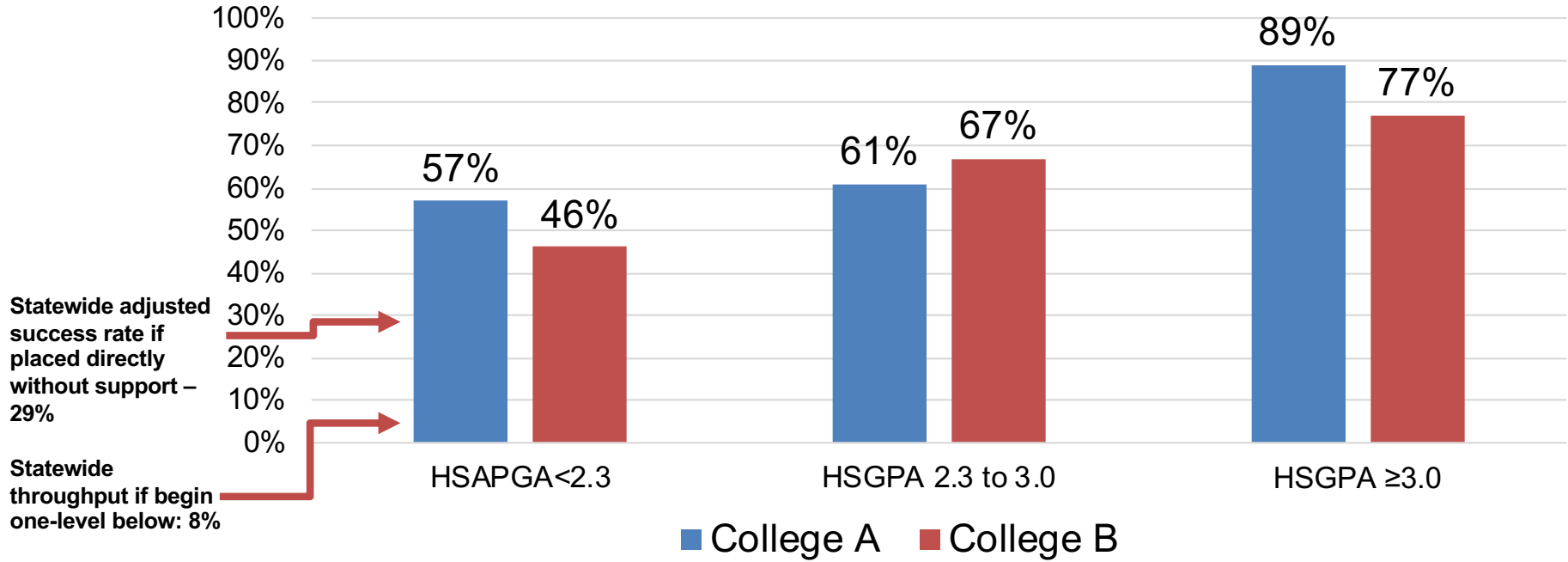
Even lowest performing HS students more likely to complete college level if placed there directly



CA statewide success rates in first attempt at college level (no support) vs. one year throughput for students least likely to succeed in course. (error bars represent ± 1 se). For details see: bit.ly/AB705Adjustments and bit.ly/MMAPAB705WEBINAR

But that's with _no changes or additional support ... what happens if we support them?

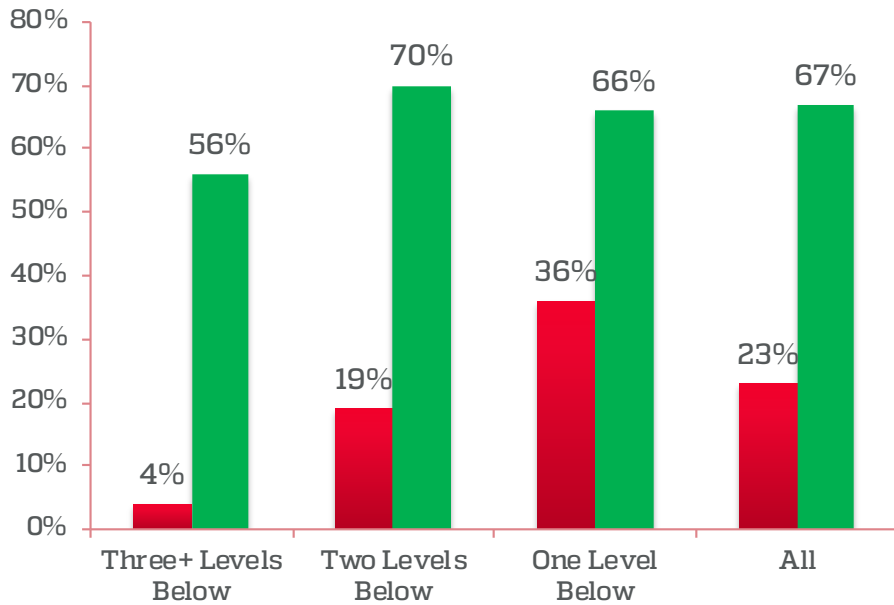
Preliminary findings on corequisite success rate by GPA Band – Statistics Corequisite (College A and B)



Students with high school transcript data available in CalPASS Plus with verified enrollments in either Statistics AND a simultaneous corequisite course – n = 498

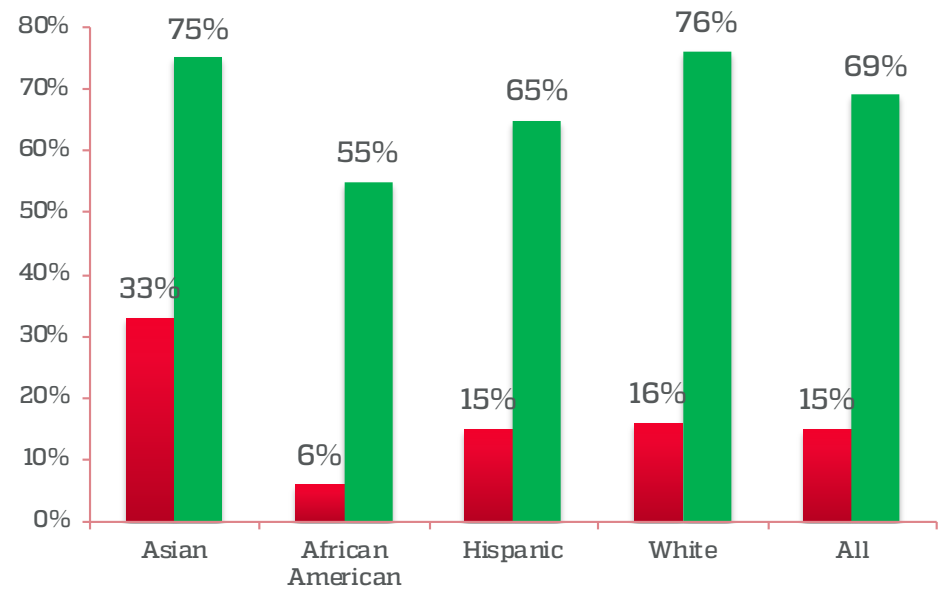
Gateway momentum in Math at College A

Completion of college-level math before and after change by assessment level



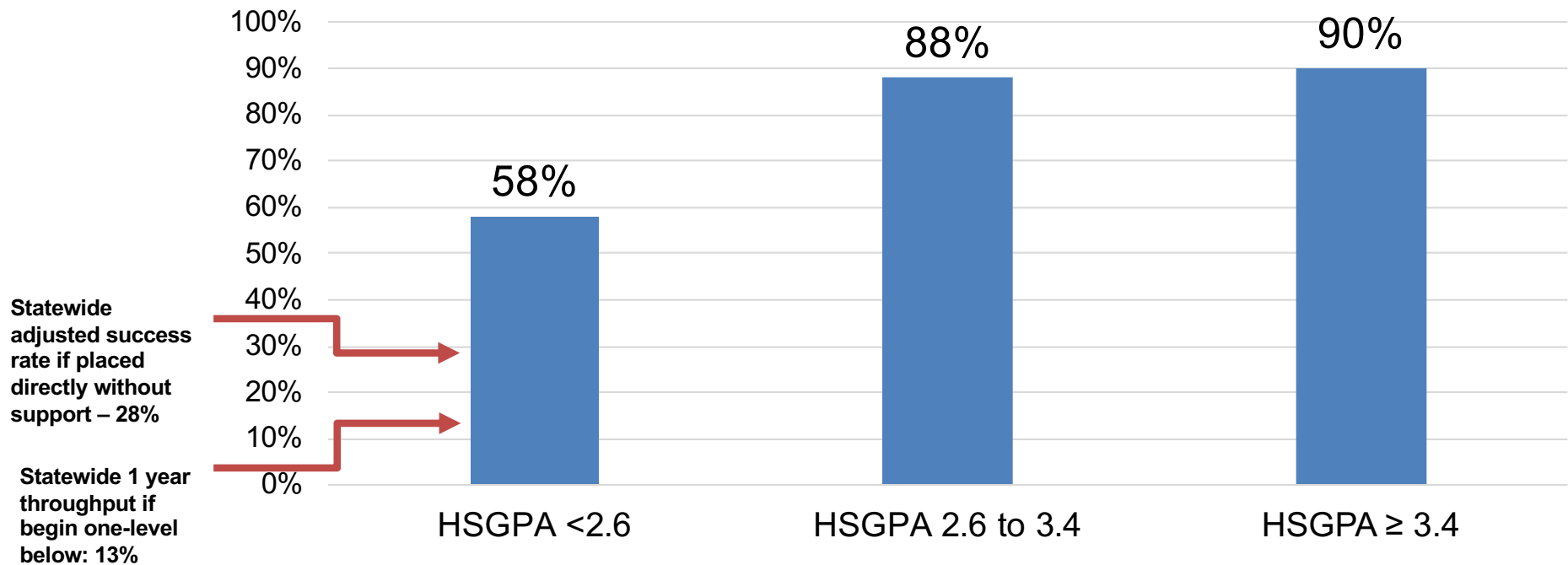
■ Fall 2013 Cohort (Transfer Math in 2 years) ■ Fall 2016 Cohort (Transfer math completion 1 semester w/support)

Completion of college-level math before and after change by ethnicity



■ Fall 2013 Cohort (Transfer Math in 2 years) ■ Fall 2016 Cohort (Transfer math completion 1 semester w/support)

Very preliminary findings on corequisite success rate by GPA Band – BSTEM Corequisites (College A)

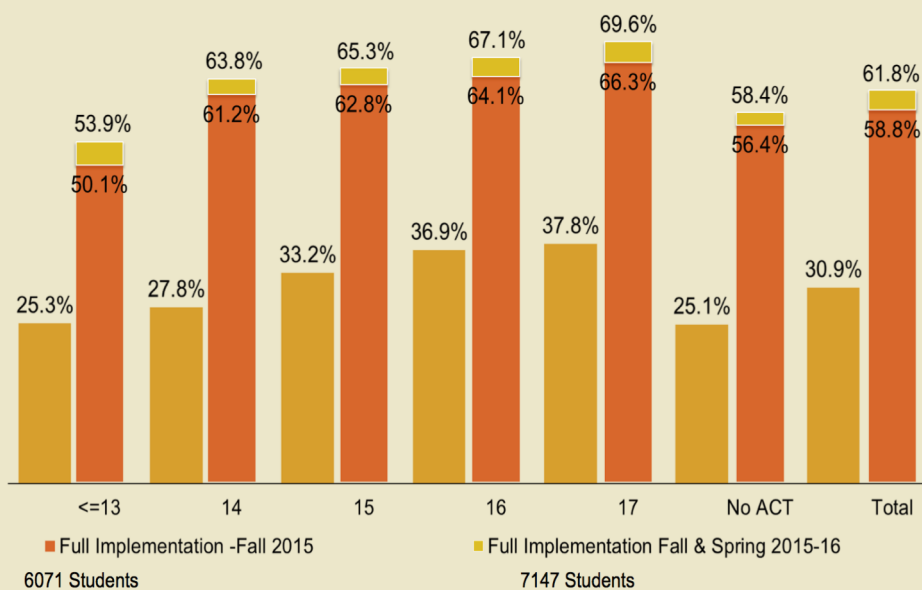


Students with high school transcript data available in CalPASS Plus with verified enrollments in either Business Calculus or Pre-Calculus AND a simultaneous corequisite course – n = 63

Tennessee Results by ACT Score

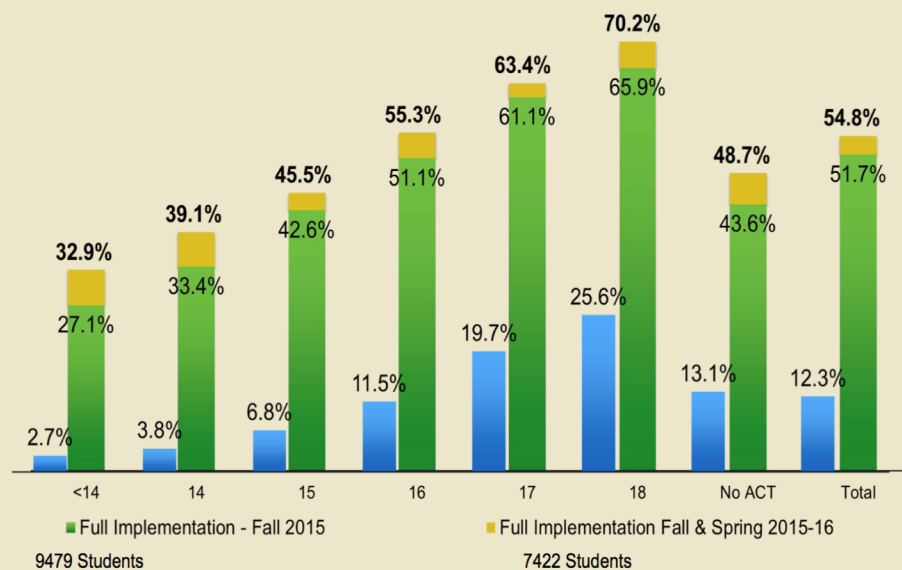
Completion of Gateway English by ACT Sub-score

TBR Co-requisite Full Implementation



Completion of Gateway Math by ACT Sub-score

Pre-requisite Model vs. Co-requisite Model TBR Co-requisite Full Implementation



from: bit.ly/Denley2017 See also: bit.ly/TBROutcomes

Future of (California) Placement: College Level for All

- Moderate to high performing high school students placed directly into college-level courses.
- Even lowest performing HS students more likely to complete college-level English & math if placed in college-level work (especially with additional supports).
- Flipped our understanding & responsibility
 - Students no longer have to prove their way in to college level
 - We have to provide evidence that pre-college level placement will improve college level completion

What do we gain through reimagining our students' capacity?

- **Better, evidence-based understanding of students**
 - undoing systemic & substantial underestimation
- **Transformation of student outcomes**
- **Tremendous reduction in direct and opportunity costs**
- **Powerful levers to address student equity gaps**
- **Renewed opportunities to:**
 - collaborate with K-12 colleagues
 - stop meeting students at front door and imply that they may not belong
- **A reminder of Daedalus' second instruction to Icarus**
 - It's just as important not to fly too low.

Thank you!

Contact Information

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#CollegeLevelForAll
- bit.ly/MMAP2019
- bit.ly/PlaceRes

The Fierce Urgency of Now

- ~Two million new community college students per year
- “We are now faced with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this unfolding conundrum of life and history, there "is" such a thing as being too late. This is no time for apathy or complacency. This is a time for vigorous and positive action.”
 - Dr. Martin Luther King, Jr.

Final thoughts

- A different “what if” to consider...
- What if we were designing assessment, matriculation, foundational sequences, and our colleges’ front door experiences for our children, for our families, for ourselves...
- How might we approach it differently?
Design it differently?



<http://bit.ly/AcuraTheTest>

WHEN YOU DON'T THINK OF THEM AS DUMMIES,
SOMETHING AMAZING HAPPENS.