Let Icarus Fly: Multiple Measures in Assessment and the Re-imagination of Student Capacity

Reducing Remediation Workshop

Illinois Community College Board

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http://bit.ly/ReducingRemediation

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@jjhetts #LetIcarusFly

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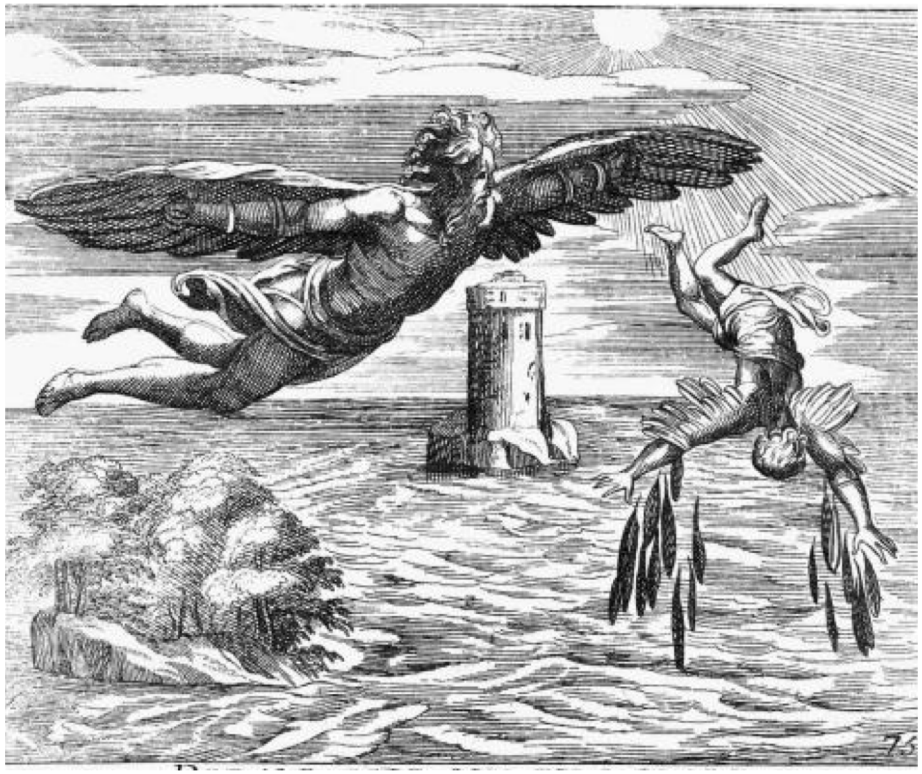
What I expected to see

bit.ly/BatmanRecord

bit.ly/SupermanRecord

Perhaps something more like?

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

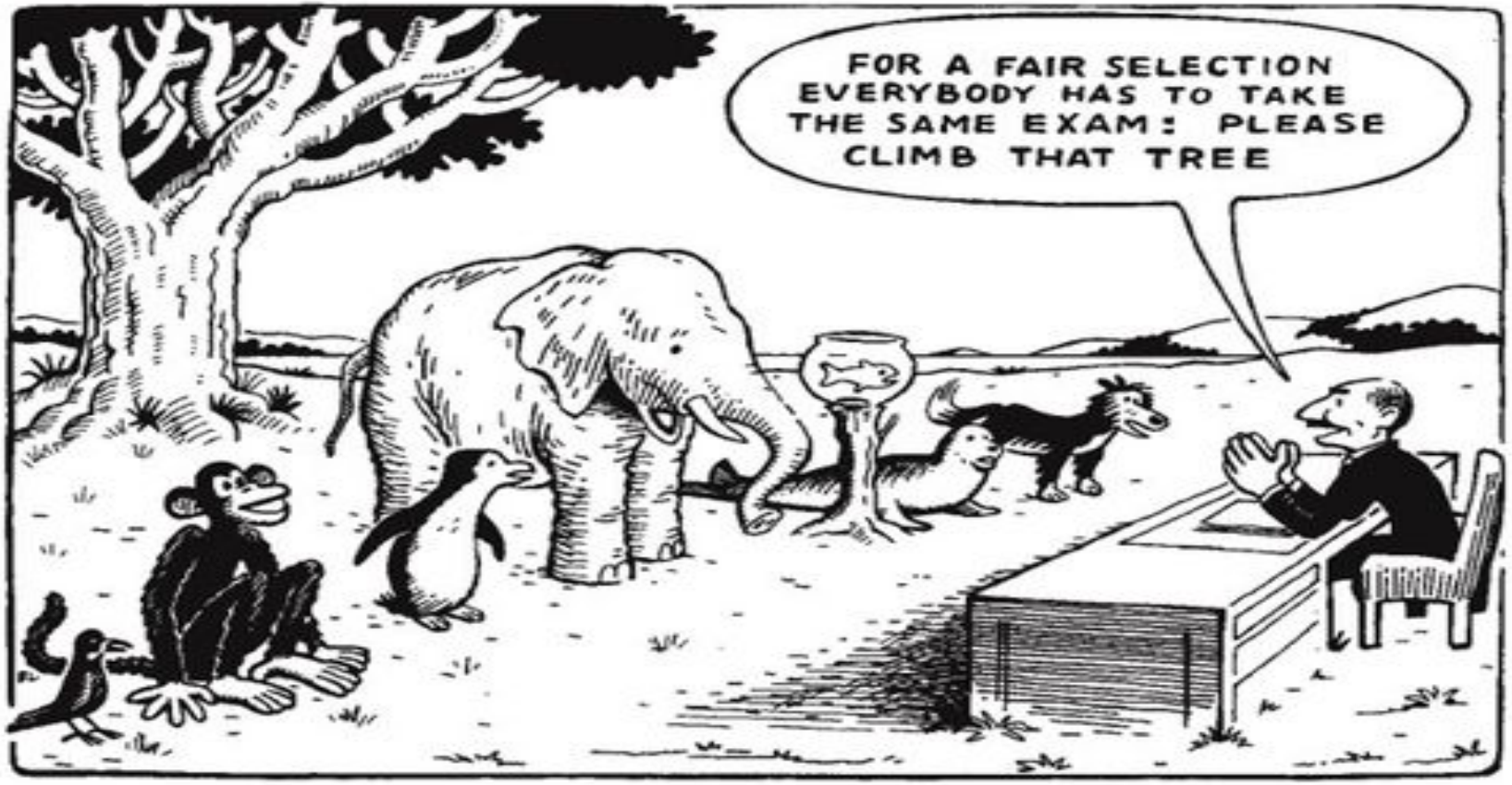
- **Community colleges and many public four-year institutions are open or near-open enrollment institutions**
  - **Requires assessing and planning for educational needs of students.**

- **Goal**
  - **Effectively place student at most appropriate level for their skill – where challenge matches skill level**
    - Zone of proximal development
    - Optimal performance, flow

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

Systematic error



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**

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 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

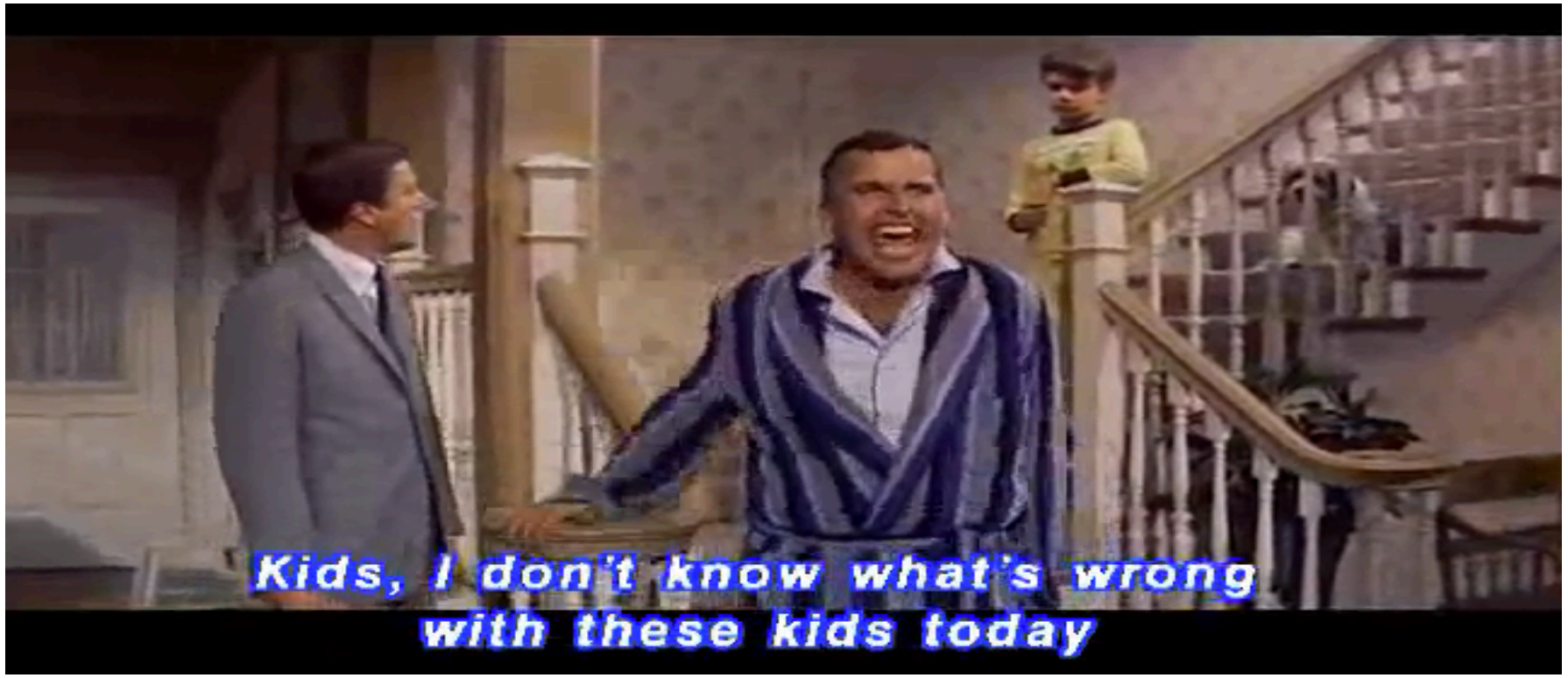
FILED UNDER: News

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.

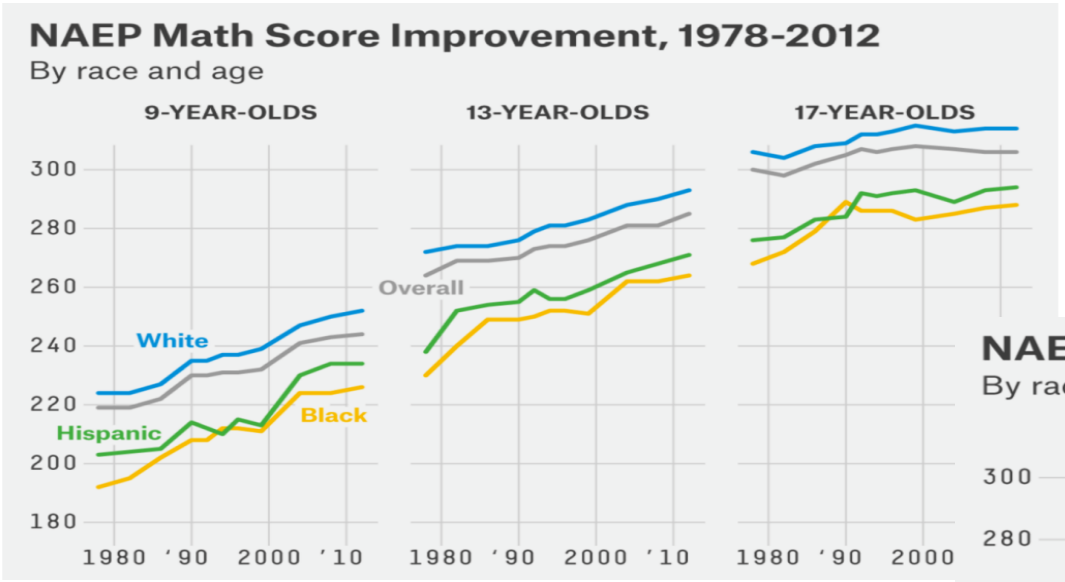
Too familiar
(Bye Bye Birdie – 1963)

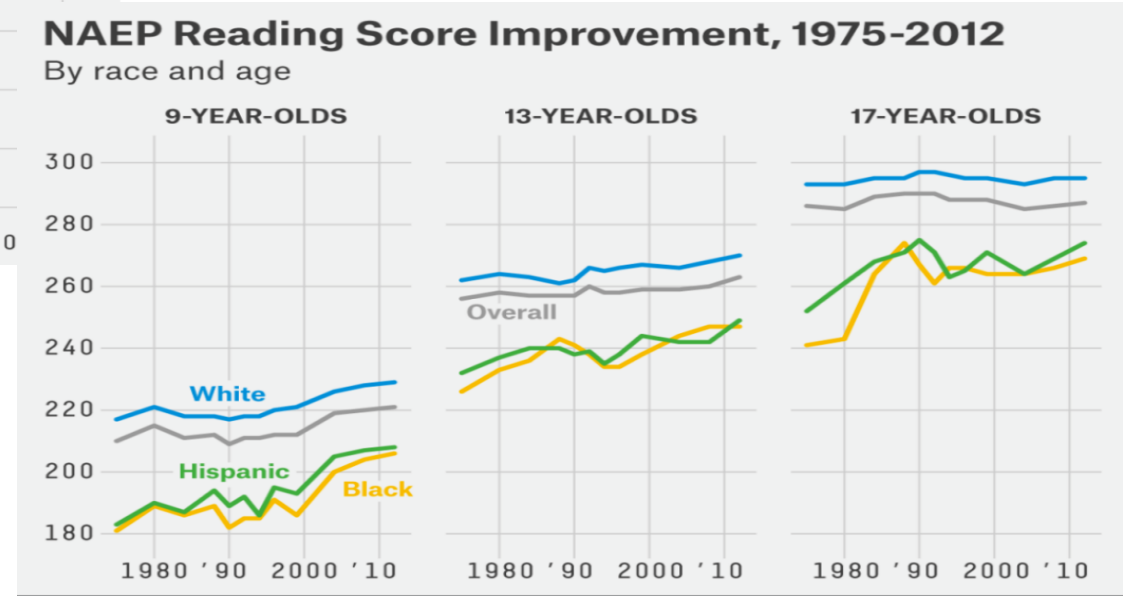


Evidence the Conventional Wisdom is Wrong

- **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





Evidence the conventional wisdom is wrong

- **Research increasingly questions 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
  - **Underestimates capability of students of color, women, first generation college students, low SES**
    - Hiss & Franks, 2014; bit.ly/DefiningPromise
    - Geiser, 2015: http://bit.ly/Geiser2015

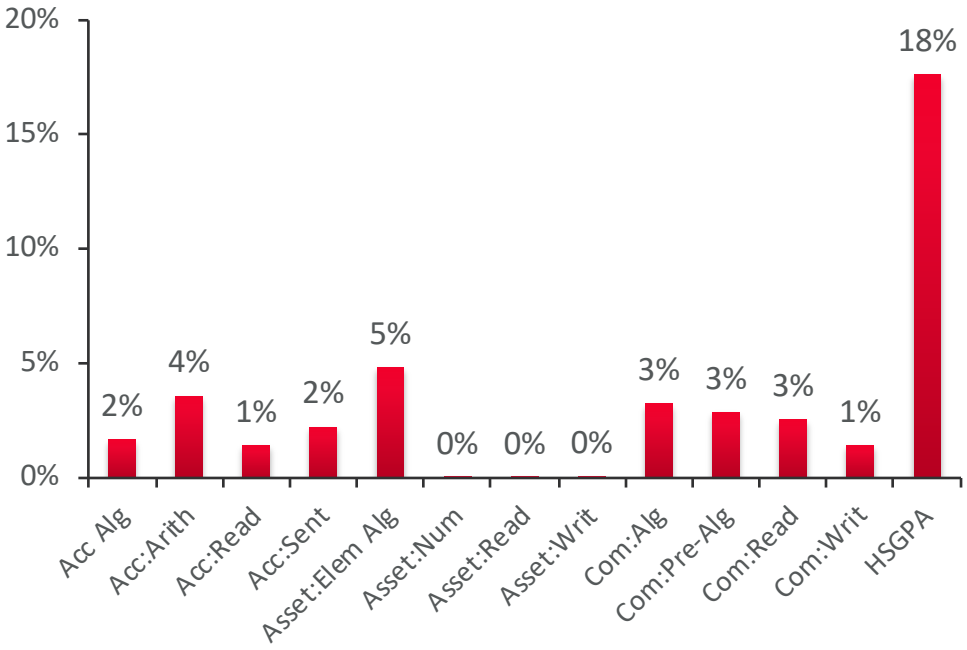
They had one job

Assessment's "one" job

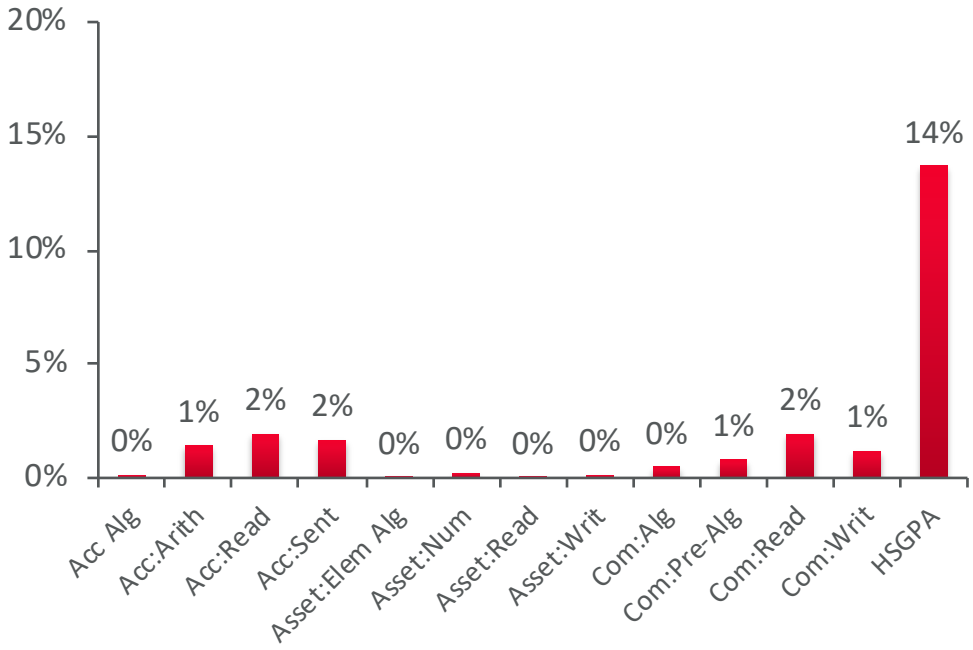
- Measure student's capacity/predict student's performance to get students into course where they can thrive

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

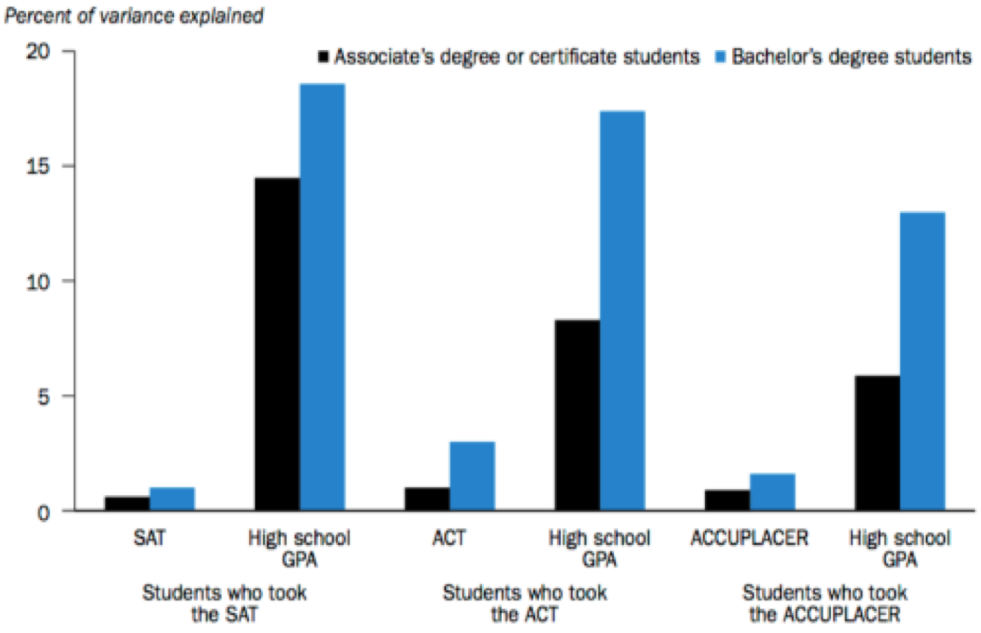
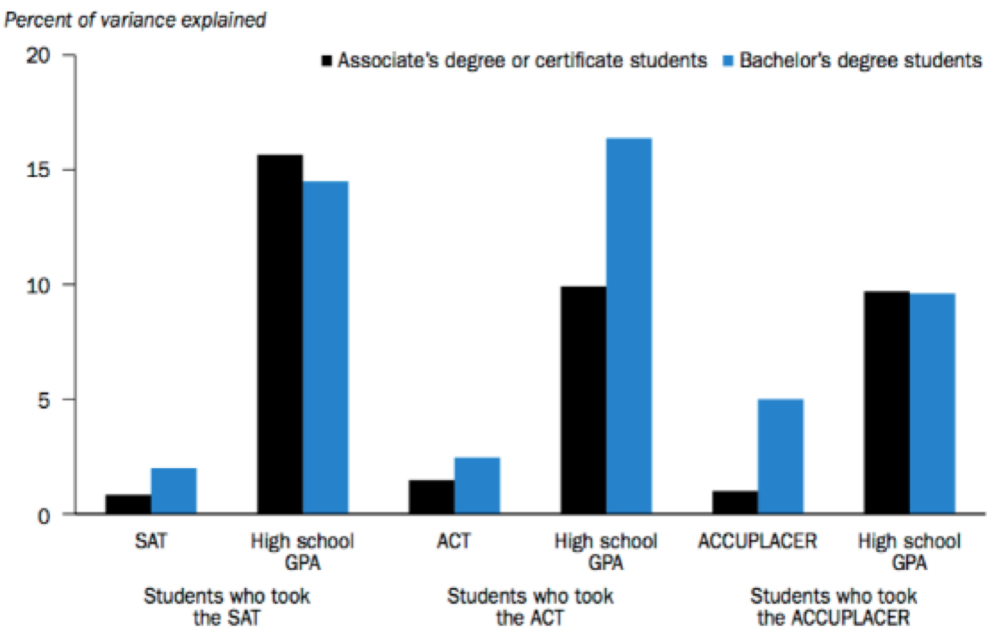


Figure 7. Among University of Alaska students who enrolled directly in college math courses, high school grade point average explained more of the variation in college math grades than did exam scores, 2008/09–2011/12



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

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 change right now, today, and improve outcomes for their very next cohort of students?

Two approaches to improving assessment through evidence-based multiple measures

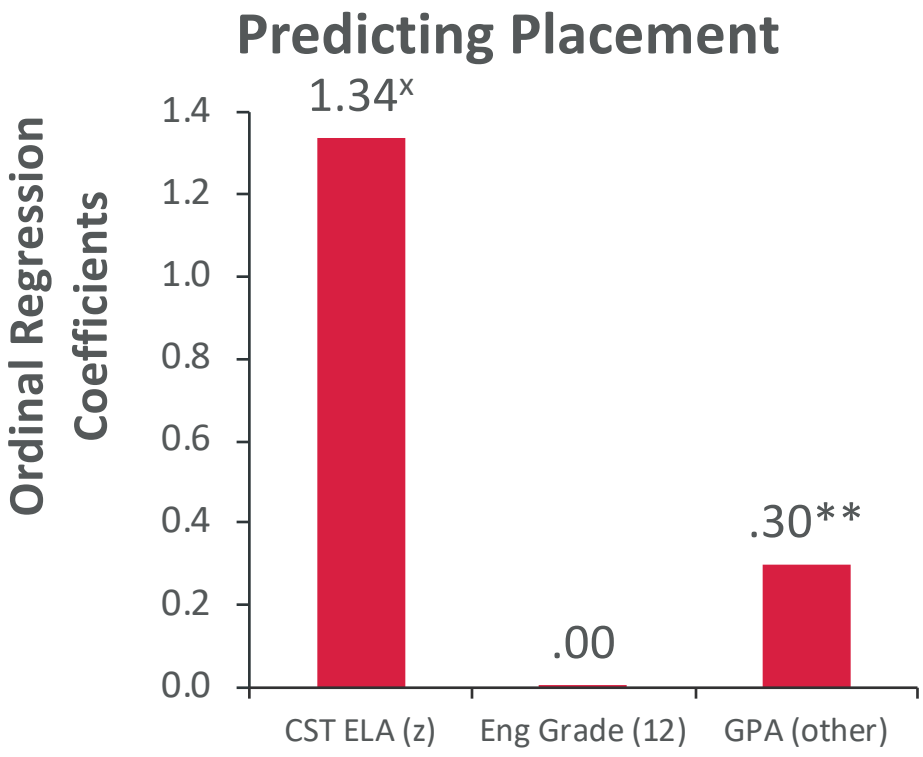
Resources/references:

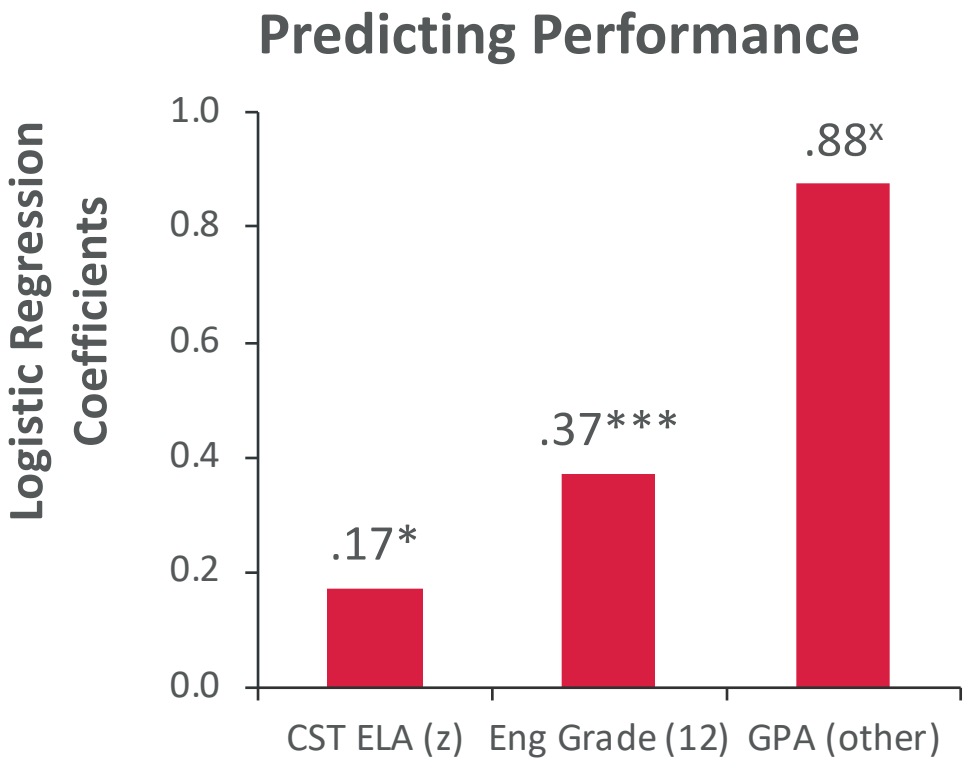
- http://www.lbcc.edu/PromisePathways
- http://bit.ly/MMAP2018
- http://bit.ly/STEPSRP

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)

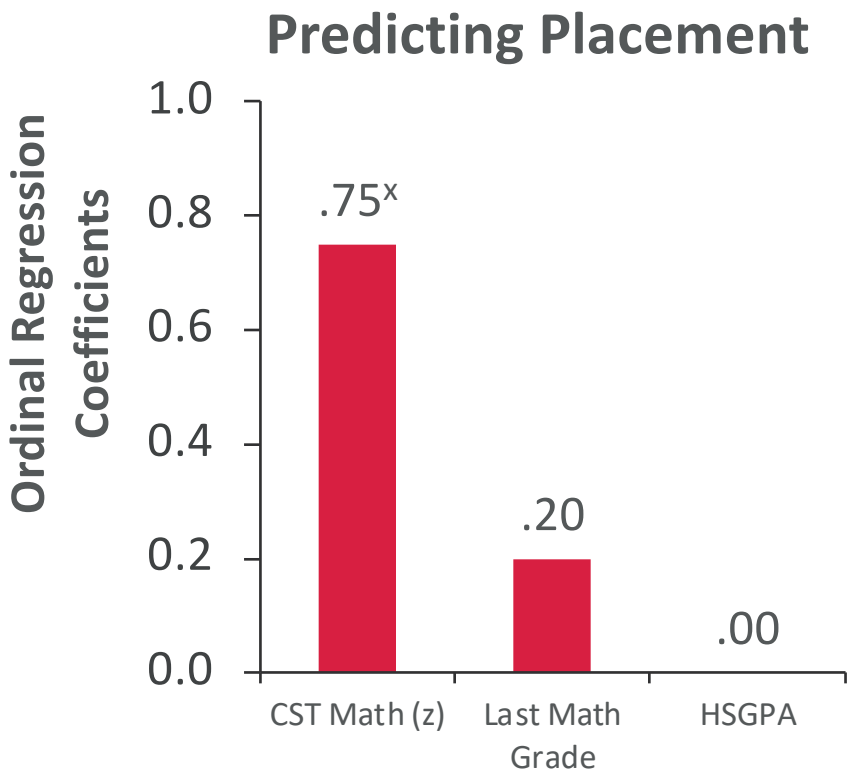
Predicting placement & performance in English at LBCC

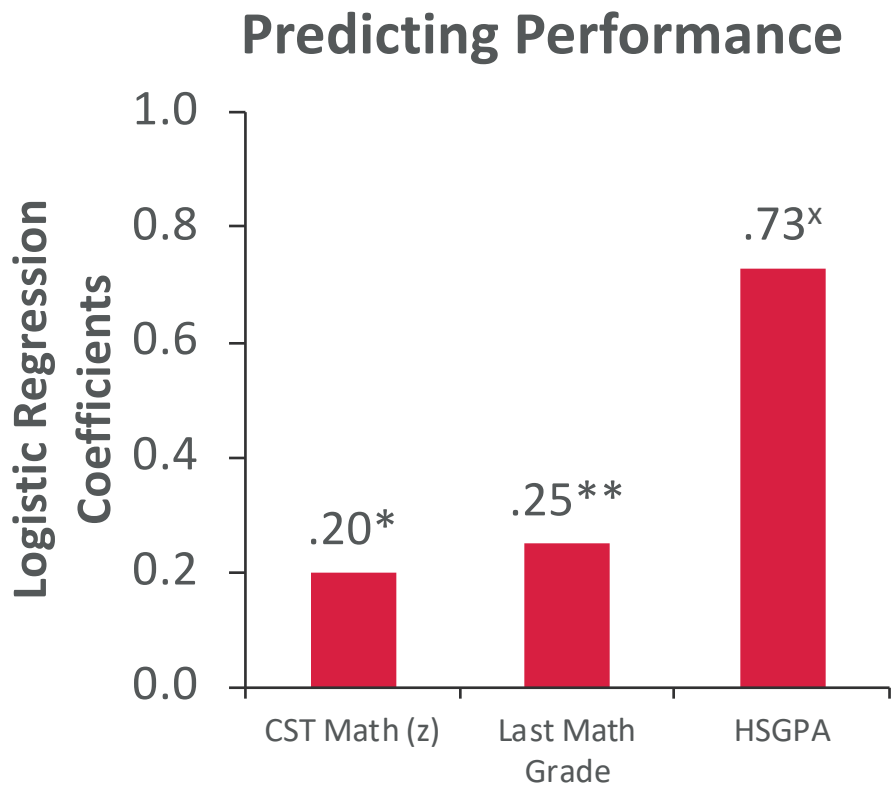




* p <.05 **, p <.01, *** p<.001, x = p< 1 x 10^{-10}

Predicting placement and performance in Math at LBCC

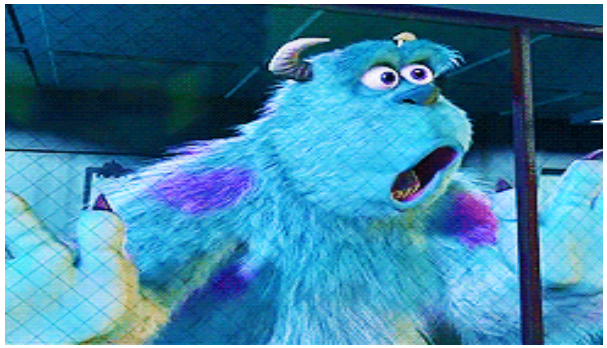


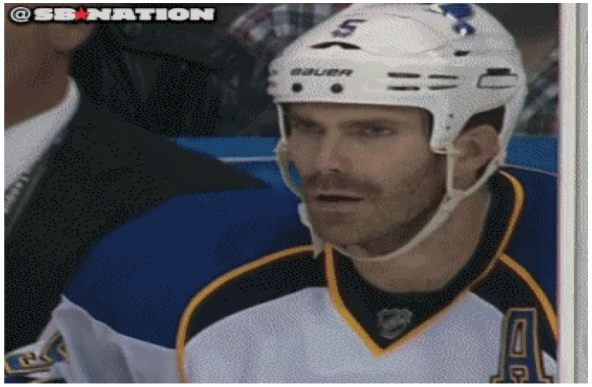


* p <.05 **, p <.01, *** p<.001, x = p< 1 x 10^{-10}

Key Takeaways (Warning: they may shock you)

Sample focus group responses:





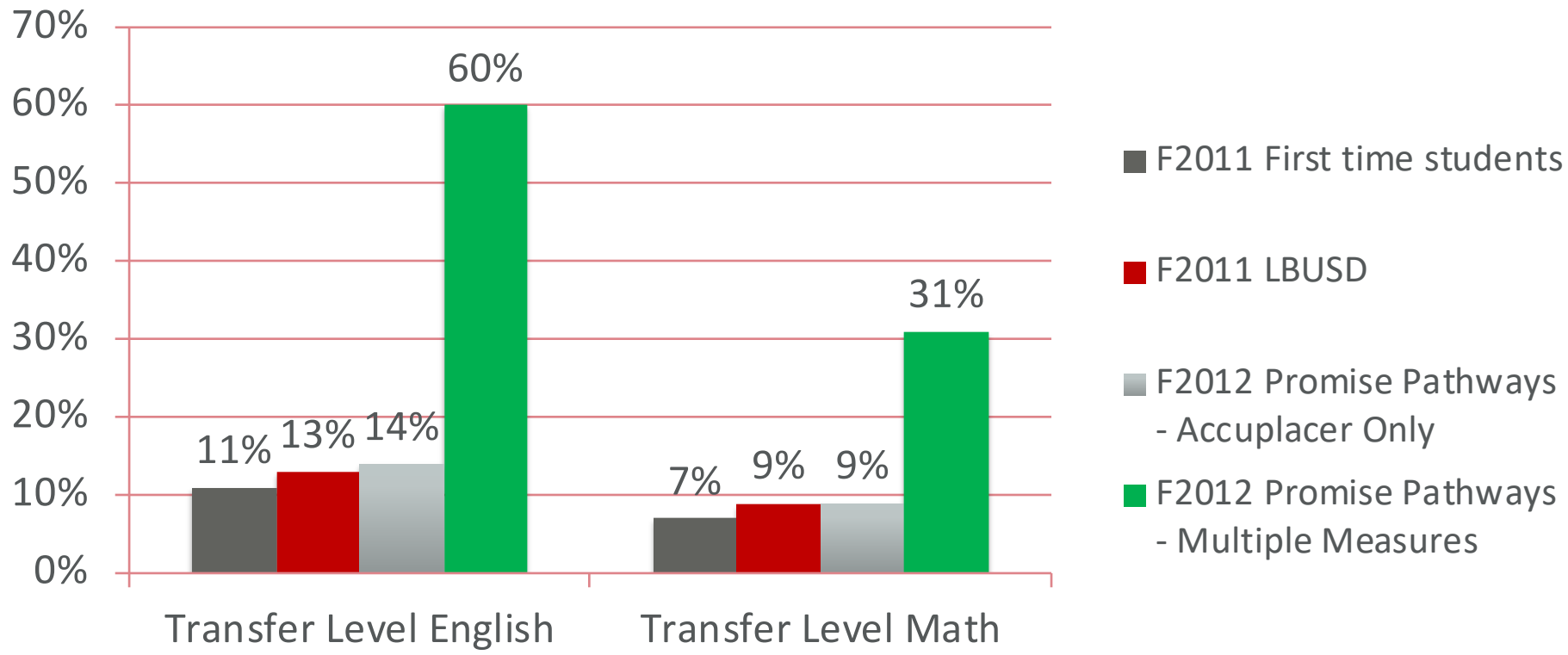
Key Takeaways

- 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



Multiple Measures Assessment Project

- Collaborative effort of CCCCO, 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 ≥70% success rate
- Engage pilot colleges to conduct local replications, test models and pilot use in placement, and provide feedback

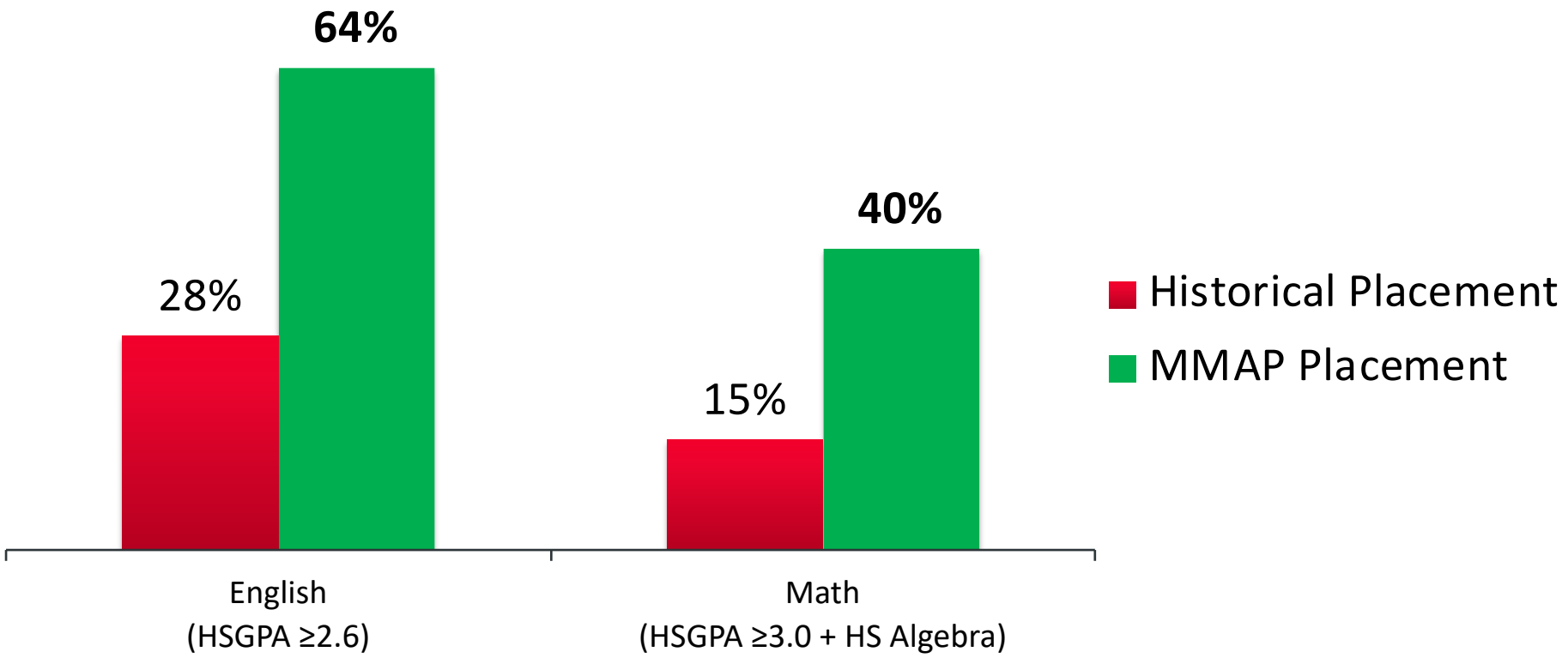
bit.ly/MMAP2018

English & Math College-Level Placement Recommendations

College Level Course	Recommended for Placement
English	HS 11 GPA >=2.6
Statistics Passed Algebra I (or better)	HS 11 GPA >=3.0 OR HS 11 GPA >=2.3 & Pre-Calculus C (or better)
College Algebra Passed Algebra II (or better)	HS 11 GPA >=3.2 OR HS 11 GPA >=2.9 & Pre-Calculus C (or better)

bit.ly/RulesMMAP

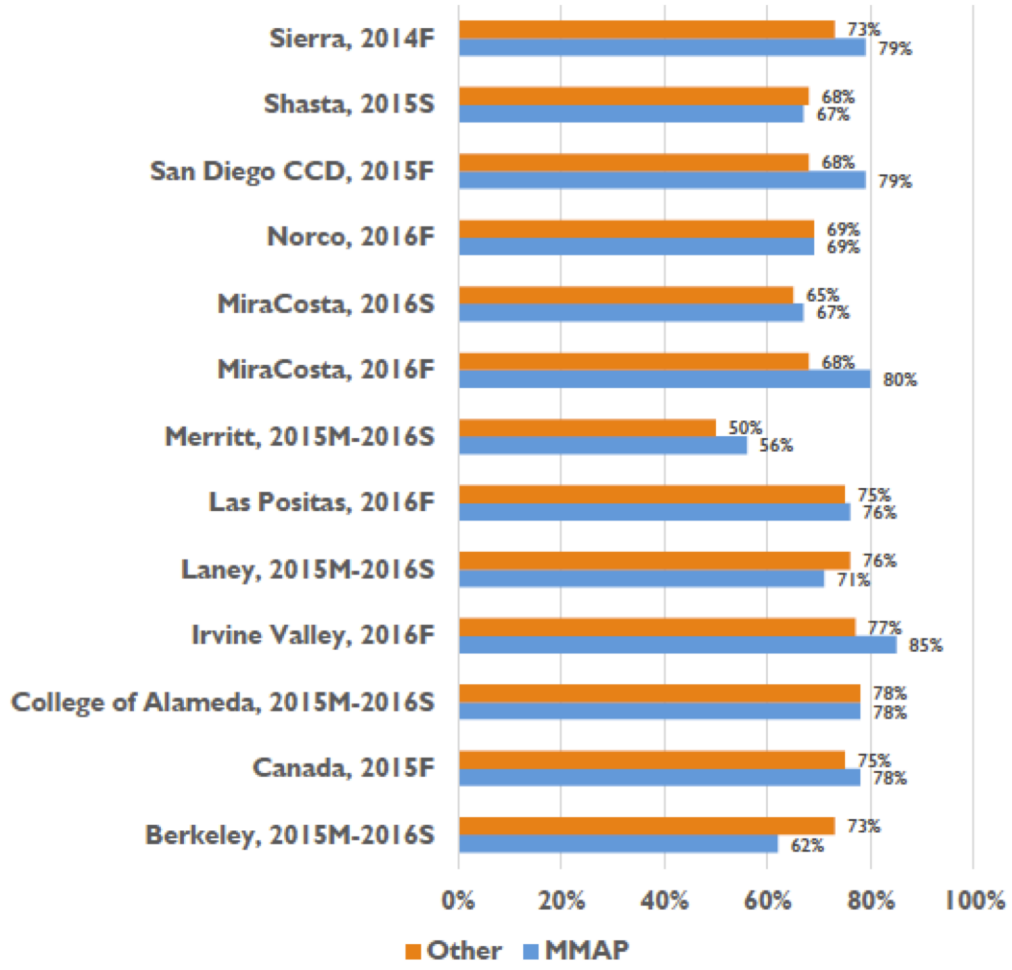
Placement into college-level courses



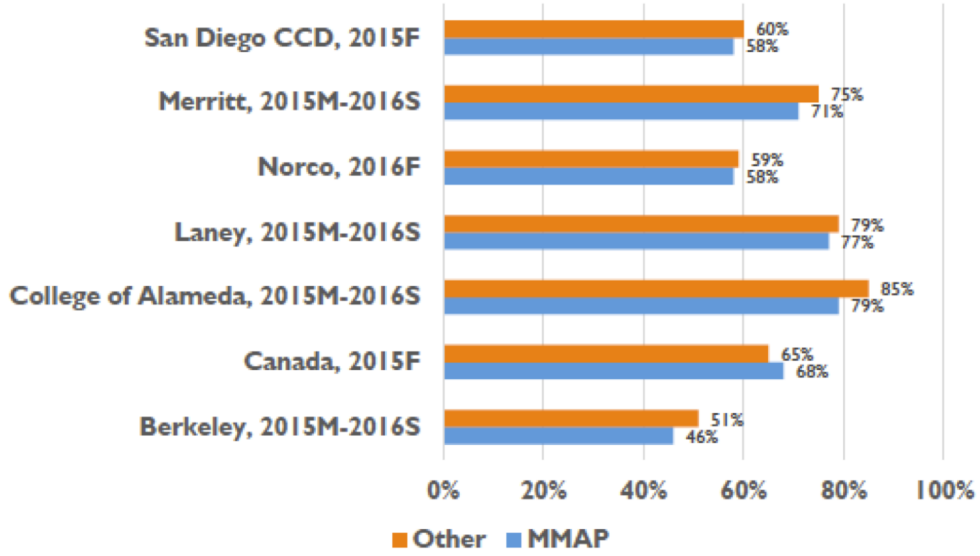
bit.ly/BSI2012 and bit.ly/MMAPProjection

Students placed by multiple measures are just as if not more successful

Success Rates in Transfer-level English

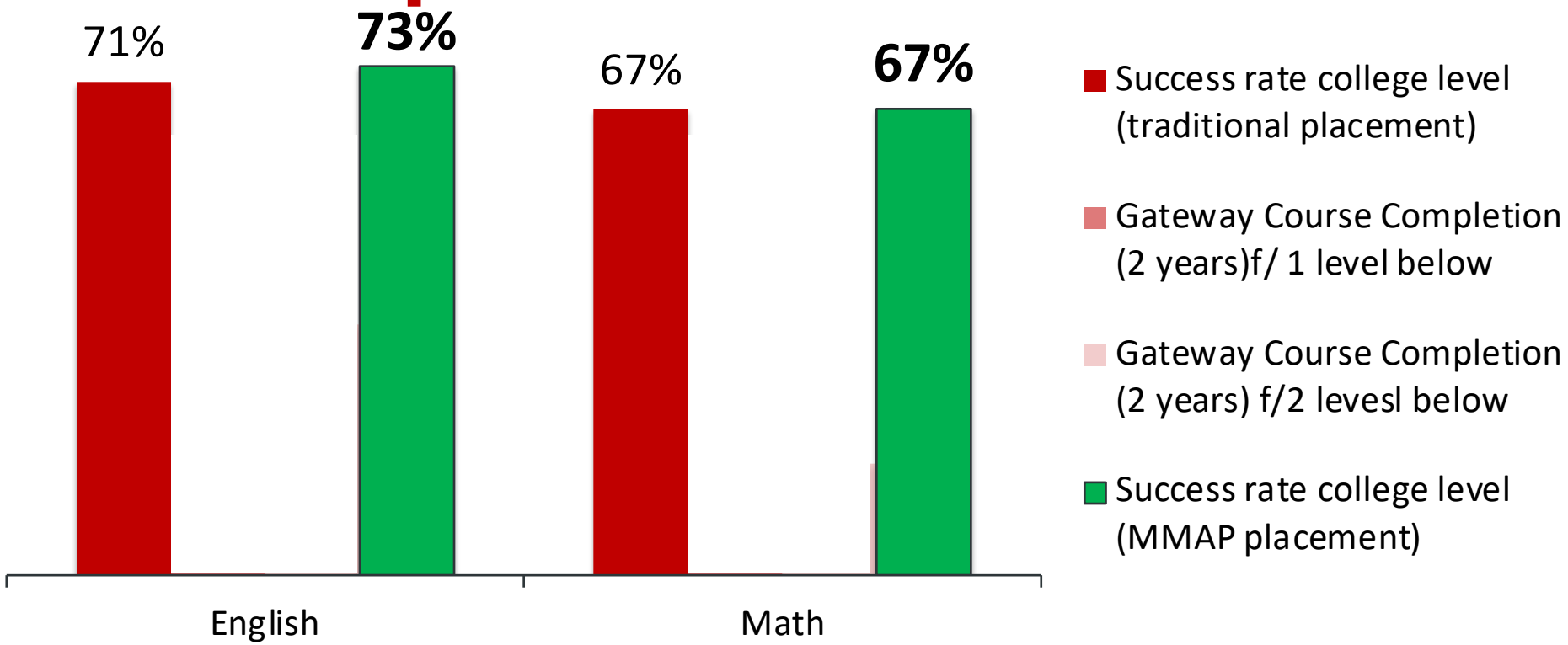


Success Rates in Transfer-level Math



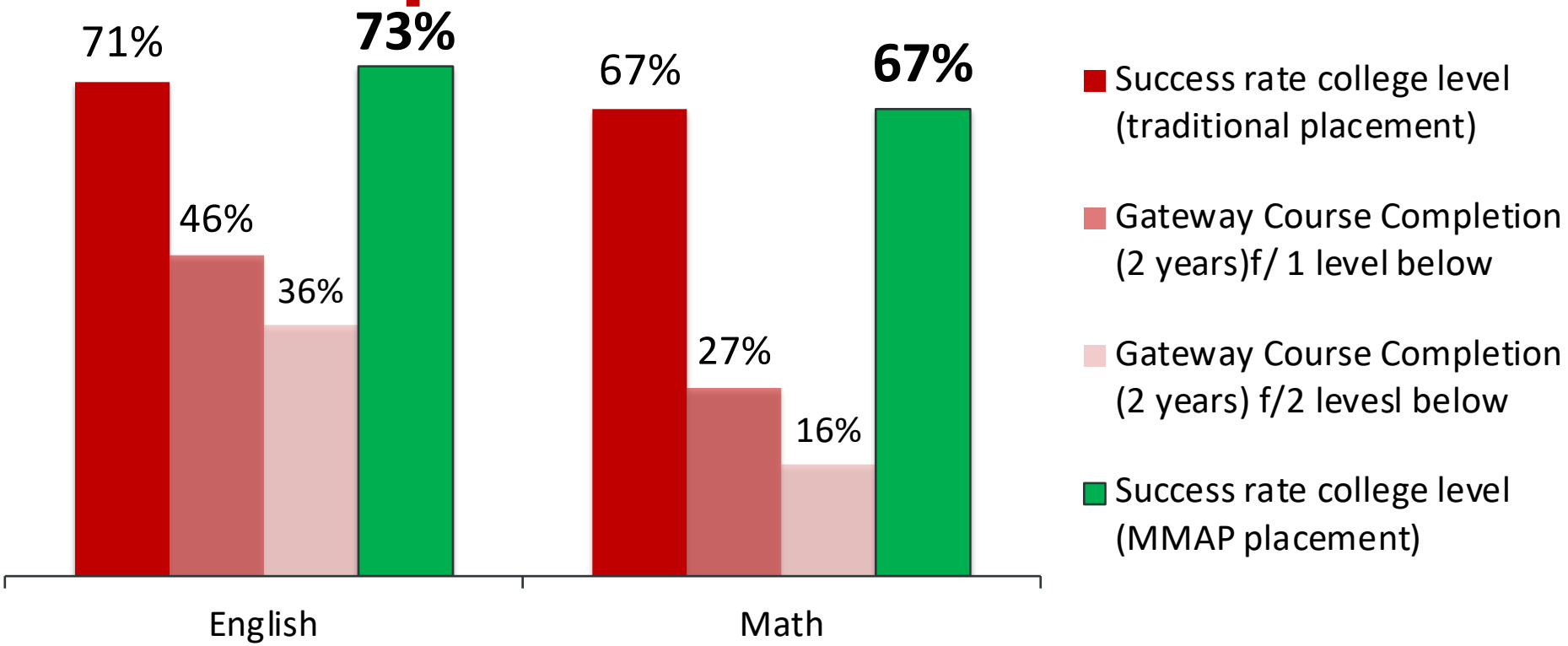
bit.ly/MMAPSummary2017

College level course-completion by placement & method



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

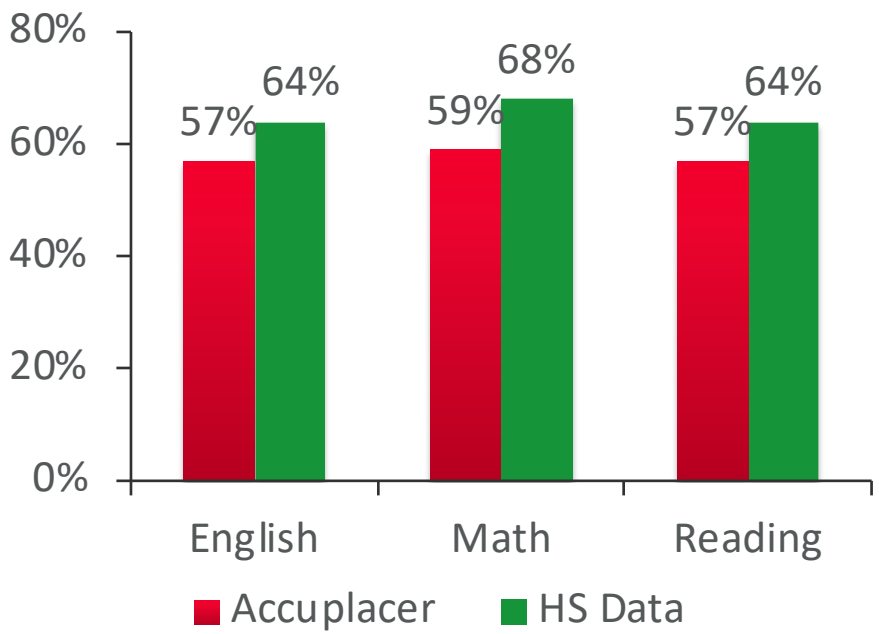
College level course-completion by placement & method



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

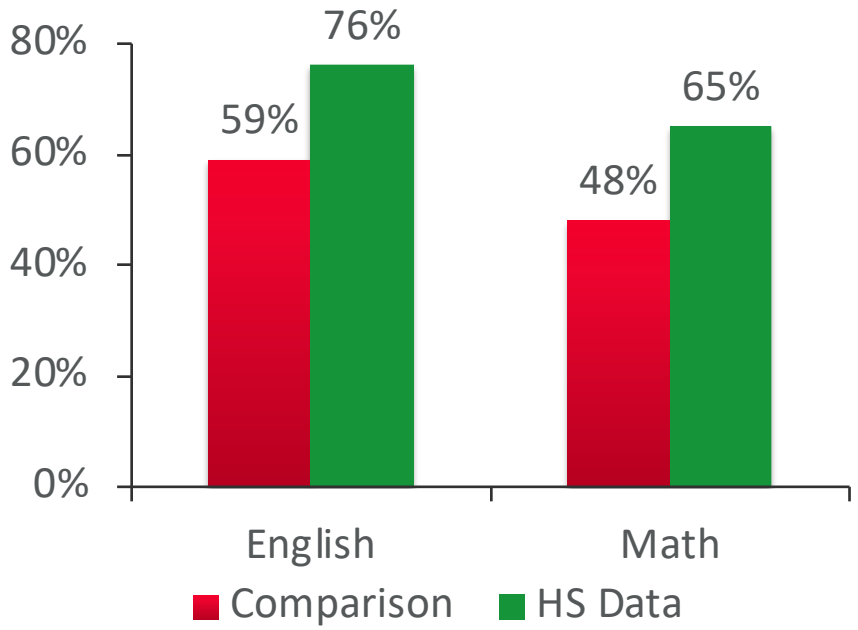
College-level course completion, recent national examples at scale: http://bit.ly/CCCSEMM

Ivy Tech 2014-2015



Rules used for English and Math: HSGPA >=2.6

Davidson County CC 2013-2015



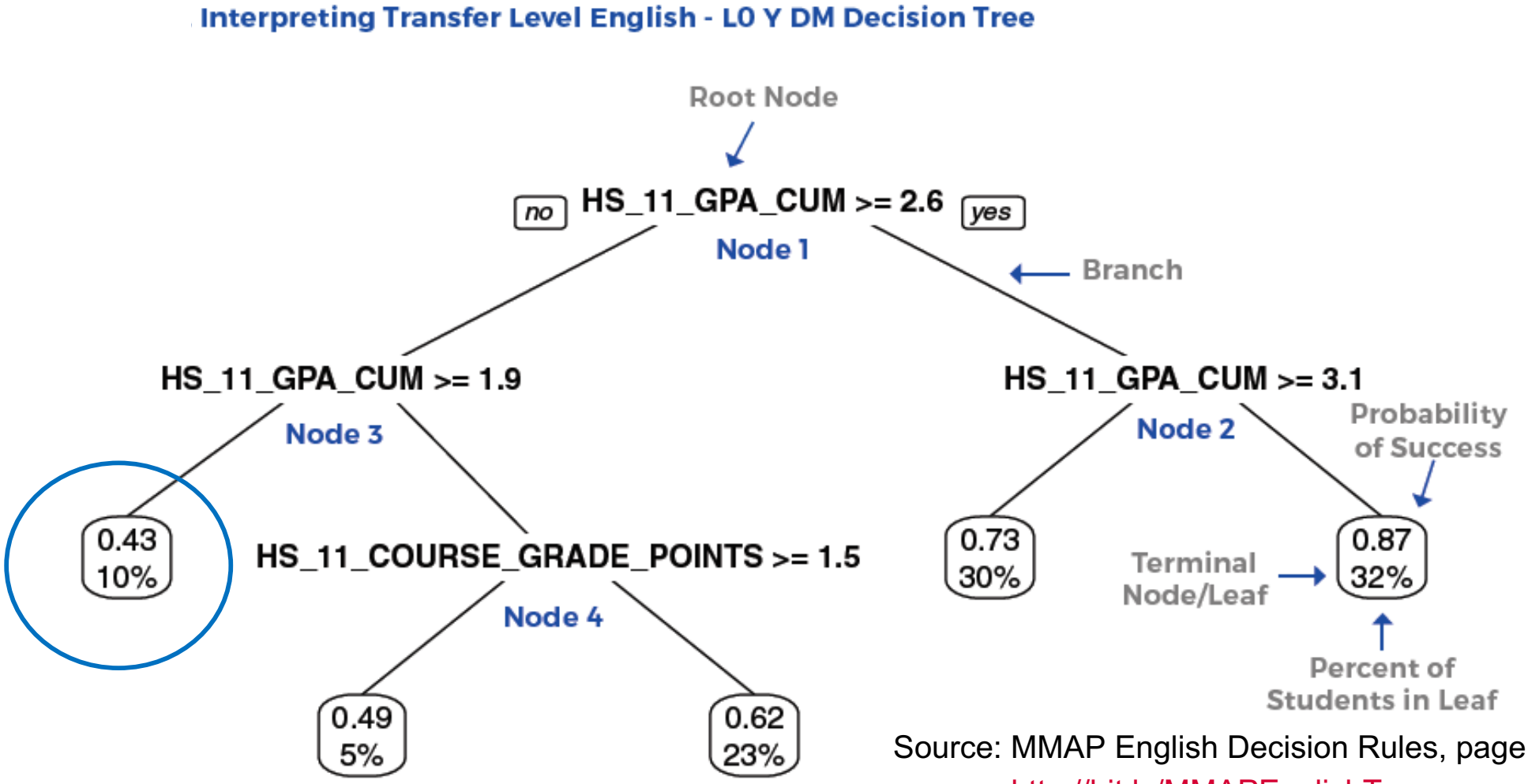
Rules used for English and Math: HSGPA >=2.6 and college directed (completion of four years of mathematics including one year beyond Algebra 2)

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)

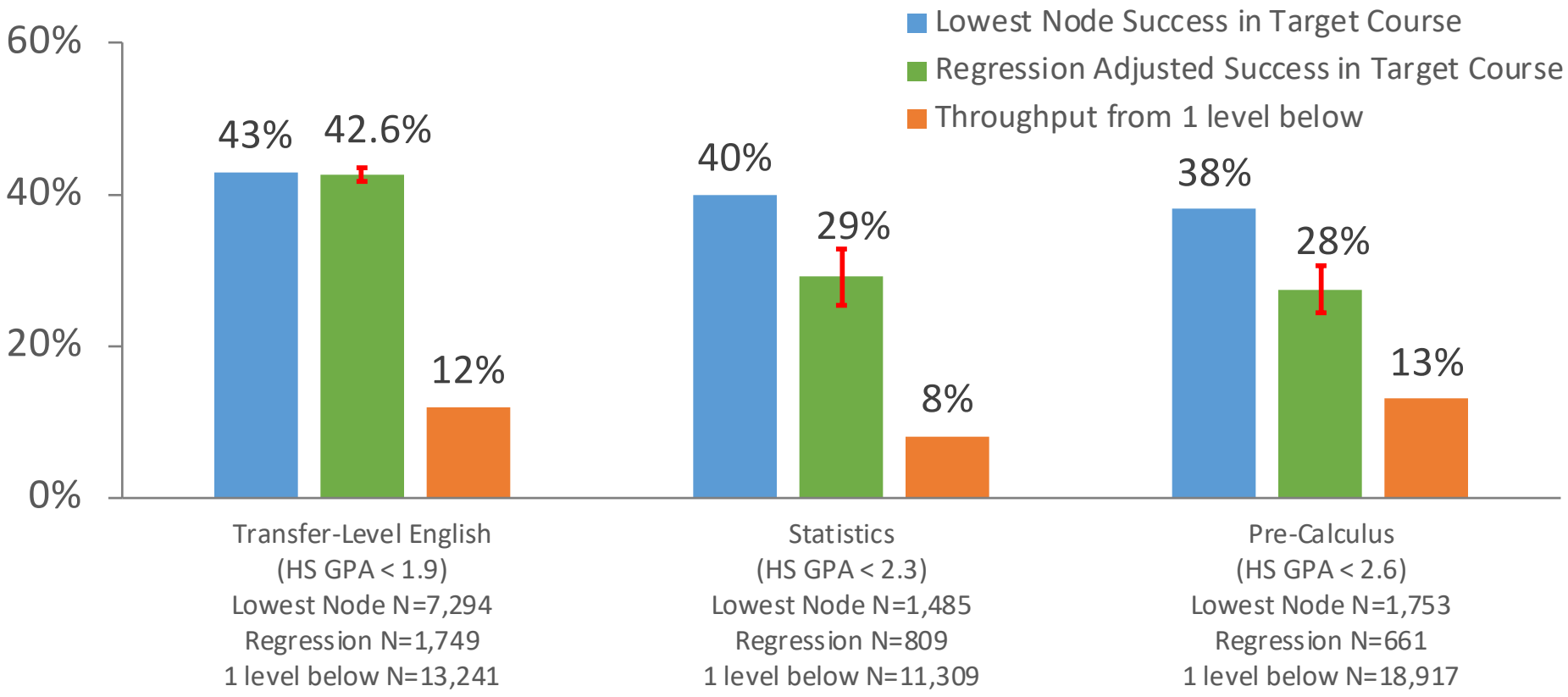
- Can we identify any students more likely to complete gateway English or Math if they start in developmental education?
  - Let's examine the students least likely to succeed based on their HS performance

How to Read a Decision Tree for English



Source: MMAP English Decision Rules, page 8:
http://bit.ly/MMAPEnglishTrees

College-Level Course Completion in One Year from First Class in Discipline (error bars represent ±1 se)



bit.ly/MMAPAB705WEBINAR

Future of (California) Placement

- 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

Placement/Support Recommendations: English

High School Performance	AB 705-Compliant Placement
HSGPA ≥ 2.6	**College-Level English Composition** No additional academic or corequisite support required
HSGPA 1.9 - 2.6	**College-Level English Composition** Additional academic and corequisite support recommended
HSGPA < 1.9	**College-Level English Composition** Additional academic and corequisite support strongly recommended

For students with high school transcripts within 10 years of enrollment at CC, excluding students locally determined to be ESL

Placement/Support Recommendations: Statistics

High School Performance	AB 705-Compliant Placement
HSGPA ≥ 3.0 **Or** **HSGPA ≥ 2.3 & ≥C in Precalculus**	**College-Level Statistics** No additional academic or corequisite support required
HSGPA 2.3–3.0	**College-Level Statistics** Additional academic and corequisite support recommended
HSGPA < 2.3	**College-Level Statistics** Additional academic and corequisite support strongly recommended

For students with high school transcripts within 10 years of enrollment at CC, completion of HS Algebra.

Placement/Support Recommendations: STEM Math

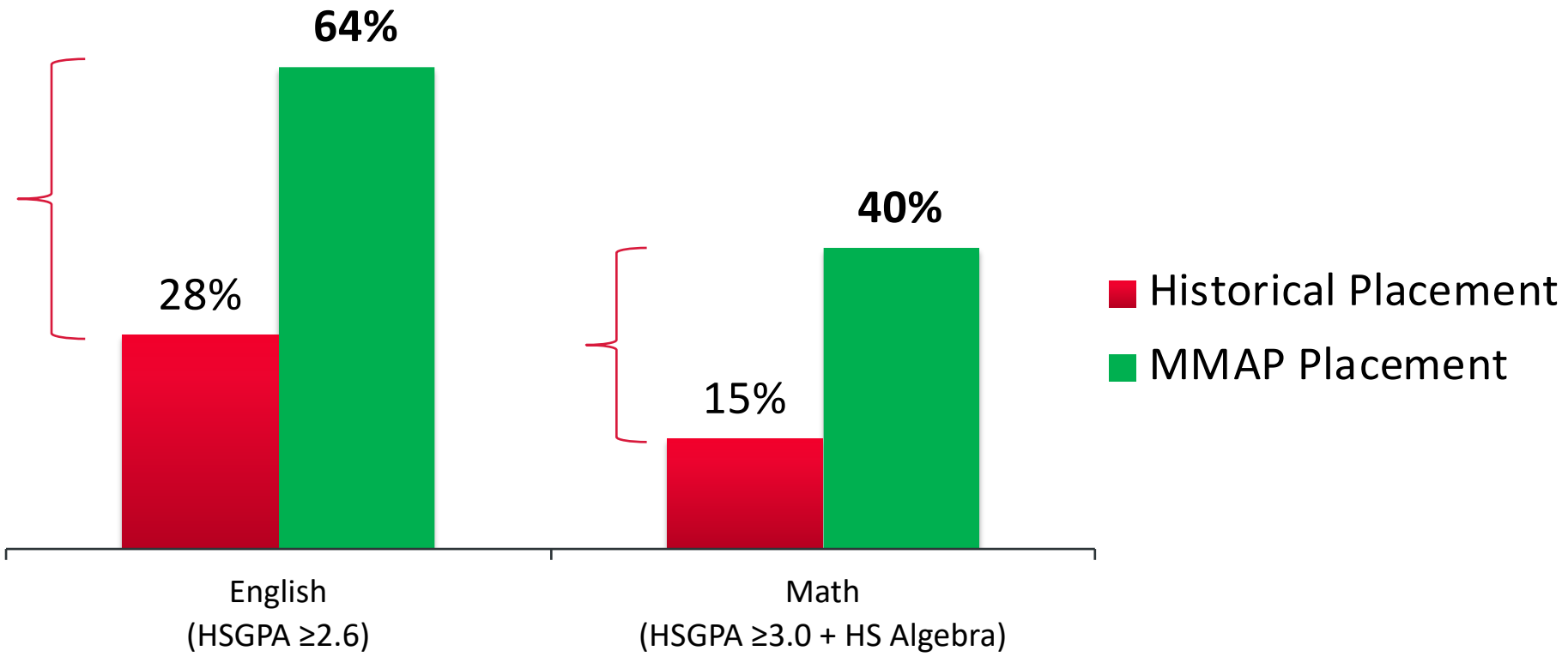
High School Performance	AB 705-Compliant Placement
HSGPA ≥ 3.4 OR HSGPA ≥ 2.6 & enrolled in HS Calculus	**College-Level Gateway STEM Math** No additional academic or corequisite support required
HSGPA ≥2.6 or Enrolled in HS Precalculus	**College-Level Gateway STEM Math** Additional academic and corequisite support recommended
HSGPA ≤ 2.6 and no Precalculus	**College-Level Gateway STEM Math** Additional academic and corequisite support strongly recommended

For students with high school transcripts within 10 years of enrollment at CC and who completed Algebra 2/Intermediate Algebra/Integrative Math 3 or higher in high school.

Key intersection with corequisite support

- Both demonstrate that students have far higher capacity to successfully complete college-level work than thought
  - Existing systemic underplacement of students may underpin effectiveness of corequisites (& other acceleration approaches)
- Likely assigning too many students to corequisite support — opportunity to improve effectiveness and efficiency

Placement into college-level courses



bit.ly/BSI2012 and bit.ly/MMAPProjection

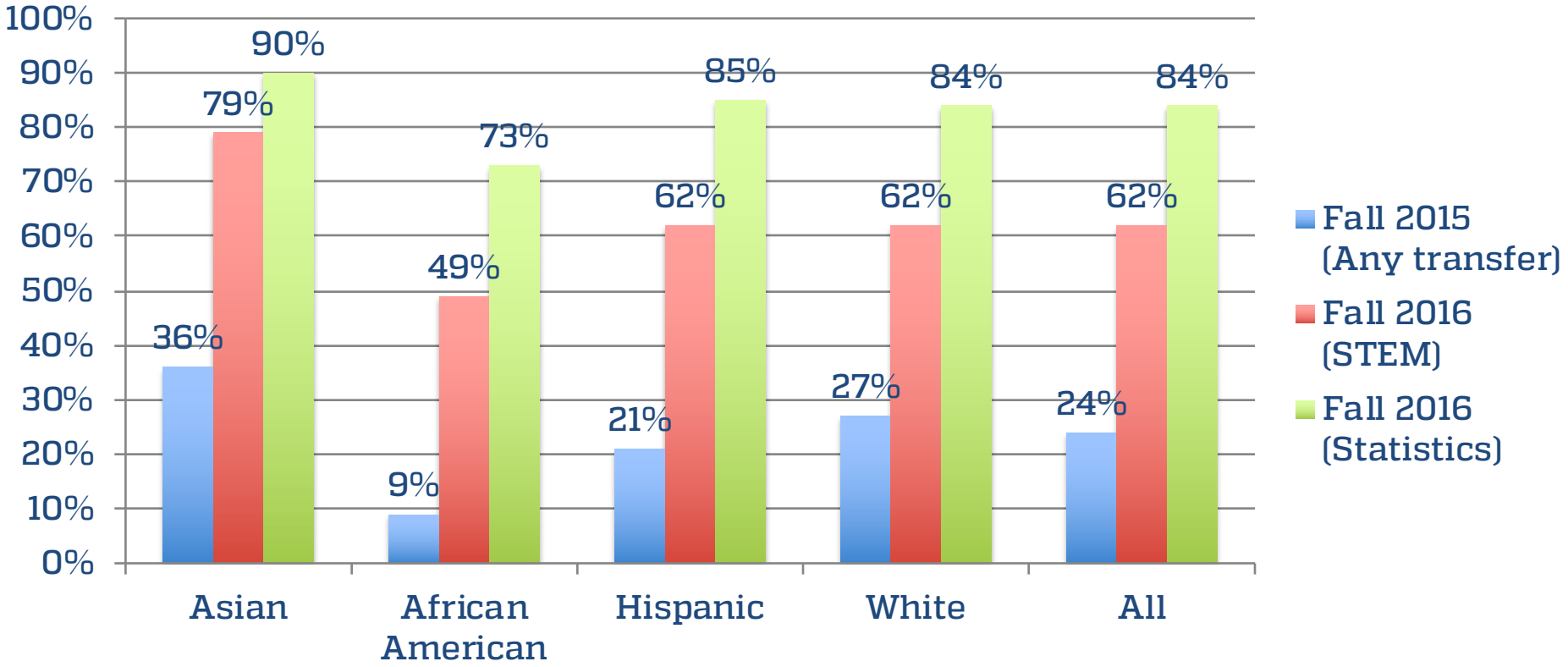
Putting it all together: Multiple Measures and Corequisite Support

- Mathematics at Cuyamaca College
- Disjunctive placement using multiple measures
  - Students get highest of test-based placement or multiple measures based placement – adapted f/MMAP
- Corequisite courses for additional support

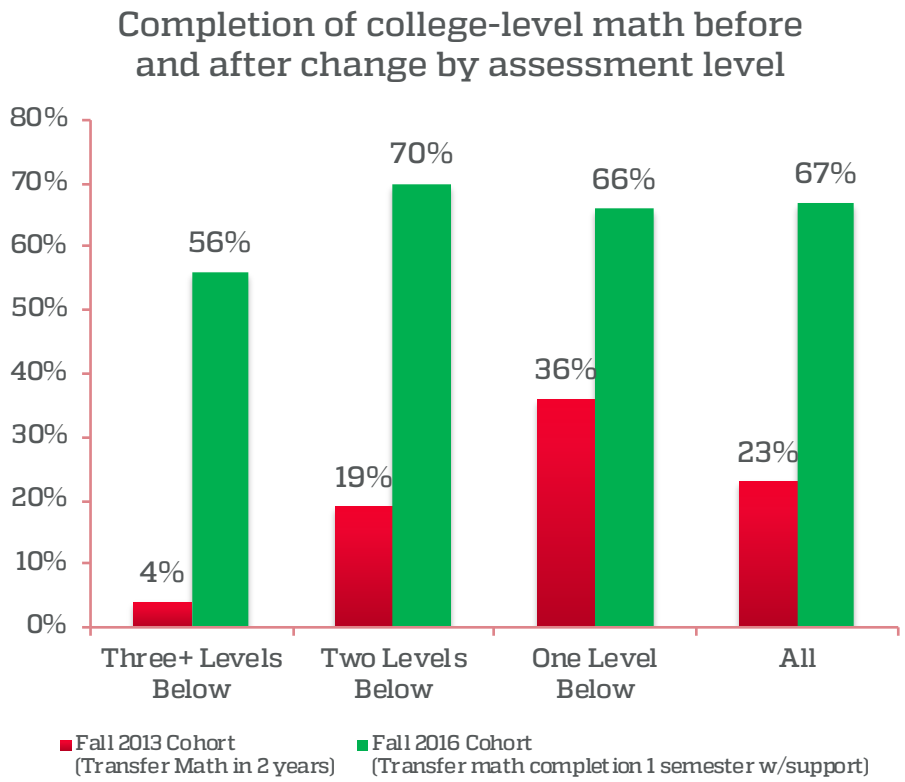
Adapted from MMAP Webinar: *Implementing and Improving Your MMAP Process - Examples from Pilot Colleges, available at http://bit.ly/WebinarsMMAP*

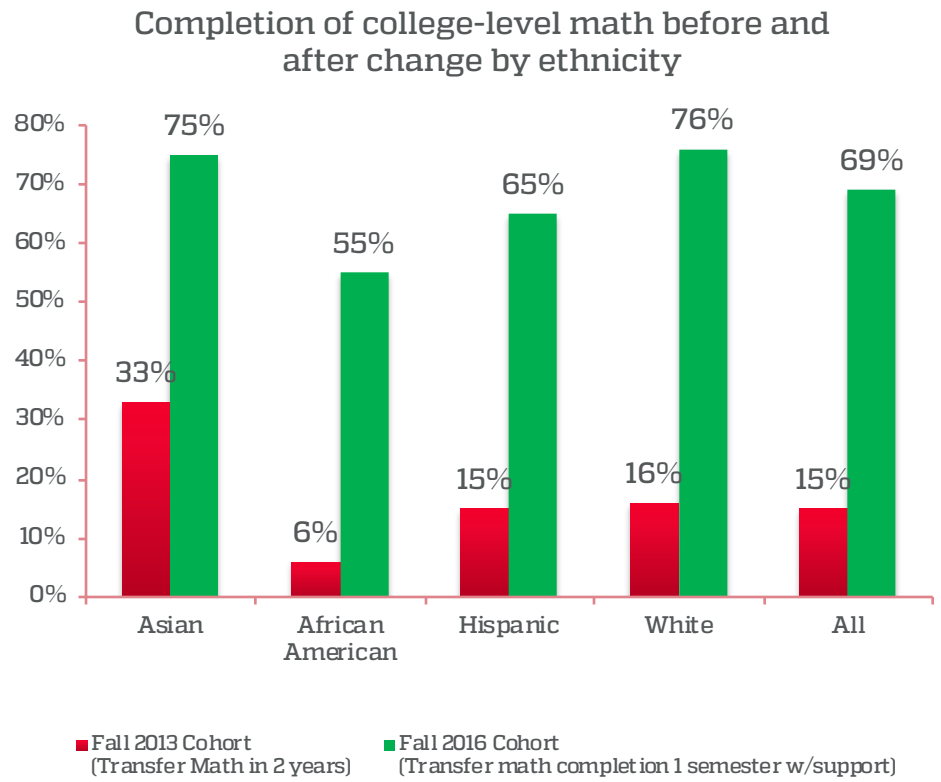
For more, please see recent publications by the California Acceleration Project: *Leading the Way:* http://bit.ly/CAPCuyamaca and *Up to the Challenge*: http://bit.ly/CAPChallenge and recent summary of early results in California by PPIC: http://bit.ly/PPICEarlyEvidence

College level placement by year/method in Math at Cuyamaca



Gateway momentum in Math at Cuyamaca





What do we gain through reimagining our students' capacity?

- **Better, evidence-based understanding of students**
  - undoing systemic & substantial underestimation
- **Transformation of student outcomes**
- **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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- Twitter: @jjhetts #LetIcarusFly

- bit.ly/MMAP2018
- bit.ly/ReducingRemediation
- bit.ly/ReimaginationResources

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.