Moving the Red Queen Forward: Modeling Intersegmental Transition

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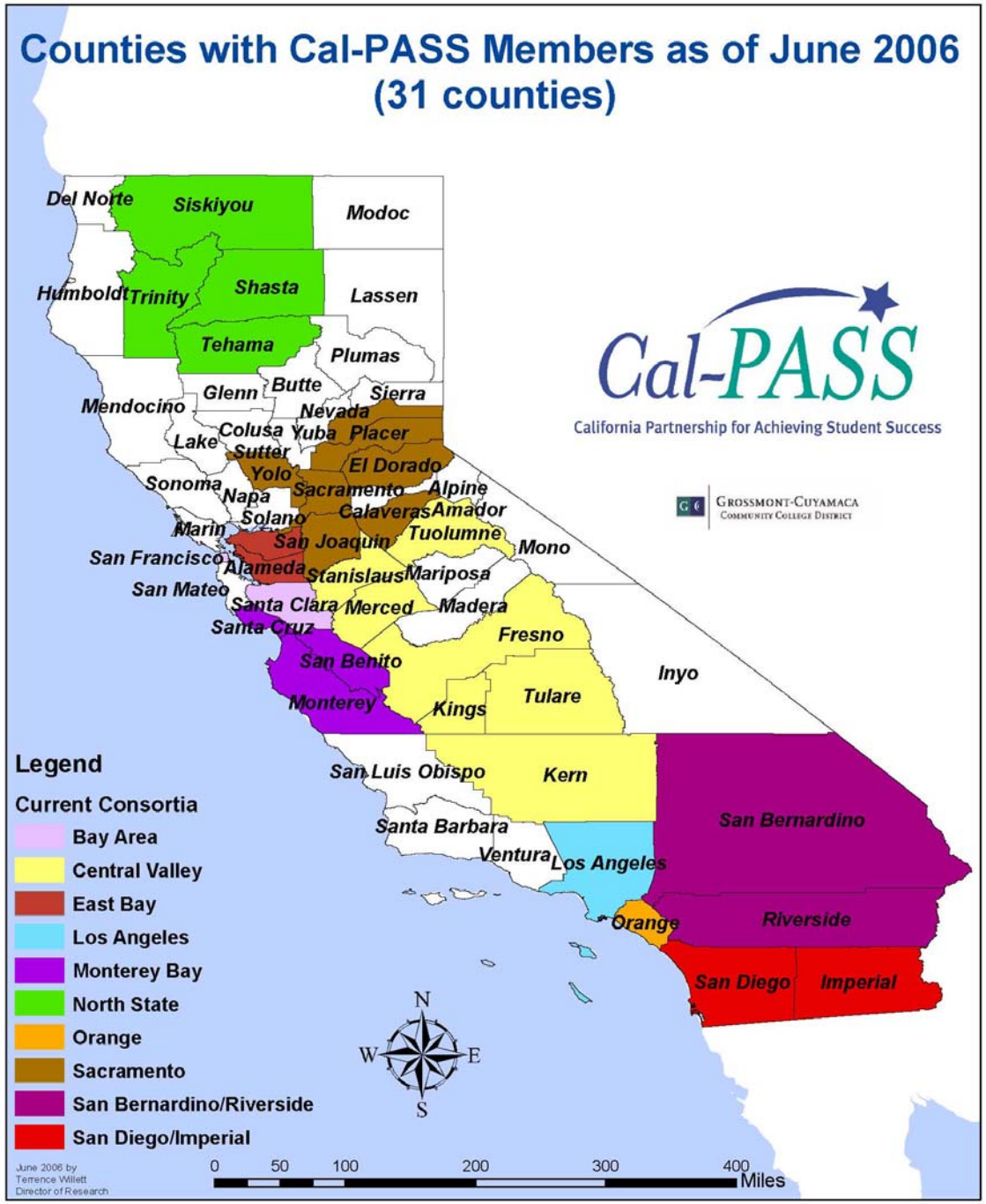
Counties with Cal-PASS Members as of June 2006 (31 counties)



What Kinds of Data are Collected?

Student identifier (encrypted)

Student file

- ★ Demographic information
- ★ Attendance

Course file

- ★ Enrollment information
- ★ Course performance

Student test file

- ★ STAR
- ★ HS exit exam

Award file

- ★ Diplomas, degrees, certificates

Optional files

- ★ Information collected on interventions

Data is anonymous – personal identifier information is removed or encrypted

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Data Issues

- Data sharing is local, not necessarily statewide
- Intersegmental matching
- Students moving out of consortium area
- Students not fitting “typical” model of progression
  - repeating grade levels
  - Concurrent enrollments
- Data quality
- K12 Students with multiple instances of same course in same year
- K-6 don’t typically have distinct courses
- Categorizing courses between segments to track progression
- Technical issues when dealing with large data sets

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Relation between last math passed at Alpha High School and first math attempted at Beta College

Red = attempted class in college lower than that already passed in high school

Gold = attempted class in college equal to that already passed in high school

Green = attempted class in college higher than that already passed in high school

		First math class attempted in community college								Total	
		Basic Math	Pre-Alg	Beg Alg	Geo	Int Alg	Stats+	Pre-Calc	Calc	%	N
Max HS math with grade of C or better	Basic Math	43%	40%	14%	0%	3%	0%	0%	0%	100%	200
	Pre-Alg	34%	36%	23%	0%	7%	*	0%	0%	100%	256
	Beg Alg	27%	39%	23%	0%	10%	*	1%	*	100%	744
	Geo	18%	37%	30%	0%	12%	1%	2%	1%	100%	1345
	Int Alg	8%	26%	39%	0%	23%	1%	2%	2%	100%	2066
	Stats+	7%	23%	26%	0%	28%	*	5%	6%	100%	111
	Pre-Calc	1%	10%	26%	0%	43%	4%	8%	8%	100%	1207
	Calc	0%	*	6%	0%	31%	11%	15%	37%	100%	336
	Total	796	1644	1824	0	1391	119	218	273		6265

Relation between last math passed at Alpha High School and first math attempted at UCX

Red = attempted class in college lower than that already passed in high school
Gold = attempted class in college equal to that already passed in high school
Green = attempted class in college higher than that already passed in high school
Blue = attempted non-STEM class in college

		First Math Class Attempted at UCX					Total	
		Int Alg	Stats/ Finite	Precalc	Calc	Higher Math	%	N
Highest level of math passed in high school	Beg Alg	*	*	*	*	*	100%	*
	Geo	14%	27%	27%	27%	5%	100%	22
	Int Alg	7%	20%	29%	41%	4%	100%	56
	Stats/ Finite	*	*	*	*	*	100%	*
	Precalc	3%	27%	23%	31%	15%	100%	162
	Calc	1%	18%	8%	45%	29%	100%	91
	Total	14	79	68	126	56		343

Relation between last math passed at Gamma Community College and first math attempted at CSU Epsilon

Red = transitioned down at least one level from Community College to CSU,
Yellow = stayed at same level in college as in Community College,
Green = transitioned up at least one level from Community College to CSU.
Blue = transitioned to CSU general education pathway from Community College STEM pathway

		First CSU Math												
		Int Alg	GE I	GE II	GE III	Pre-calc	Calc I	Calc II	Calc III	Lin Alg	Diff EQ	Upper Div	Total %	N
Last CC Math	Basic Math	0%	39%	9%	22%	0%	9%	4%	0%	4%	9%	4%	100%	23
	Pre-Alg	5%	79%	16%	0%	0%	0%	0%	0%	0%	0%	0%	100%	19
	Beg Alg	3%	71%	13%	6%	7%	1%	0%	0%	0%	0%	0%	100%	83
	Geo	0%	44%	11%	22%	7%	15%	0%	0%	0%	0%	0%	100%	16
	Int Alg	3%	47%	27%	5%	7%	8%	1%	0%	0%	1%	1%	100%	144
	GE I	1%	24%	26%	37%	2%	3%	1%	0%	1%	0%	4%	100%	1196
	Pre-calc	1%	5%	25%	6%	21%	30%	5%	1%	0%	4%	1%	100%	219
	Calc I	0%	1%	4%	3%	6%	7%	56%	6%	4%	11%	2%	100%	108
	Calc II	0%	1%	2%	2%	2%	2%	3%	19%	5%	31%	34%	100%	122
	Calc III	0%	0%	0%	0%	0%	2%	0%	1%	11%	63%	24%	100%	104
	Lin Alg	0%	0%	0%	1%	0%	0%	2%	2%	0%	13%	82%	100%	95
	DiffEQ	0%	0%	0%	0%	0%	0%	0%	9%	9%	0%	83%	100%	45
	Total	1%	21%	20%	22%	4%	6%	4%	2%	2%	7%	11%	100%	2174

Community College to University Transition

- ★ Tracked 1998-1999 Alpha County area CC students
  - ★ Students earned at least 12 units at CC before transfer to University
- ★ Compared overall CC GPA with 1st year University GPA
- ★ Compare exiting community college GPA of graduates versus non-graduates

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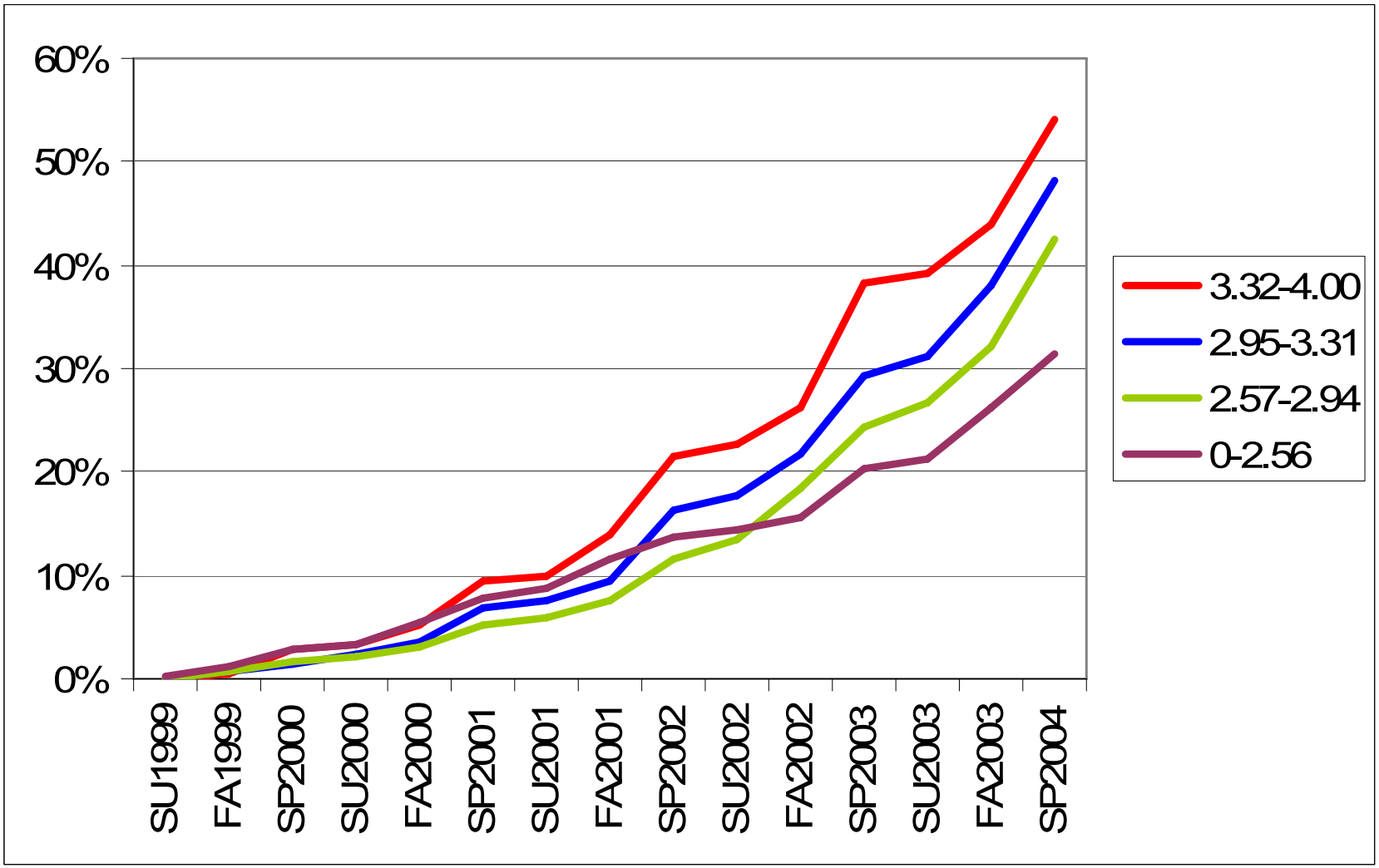
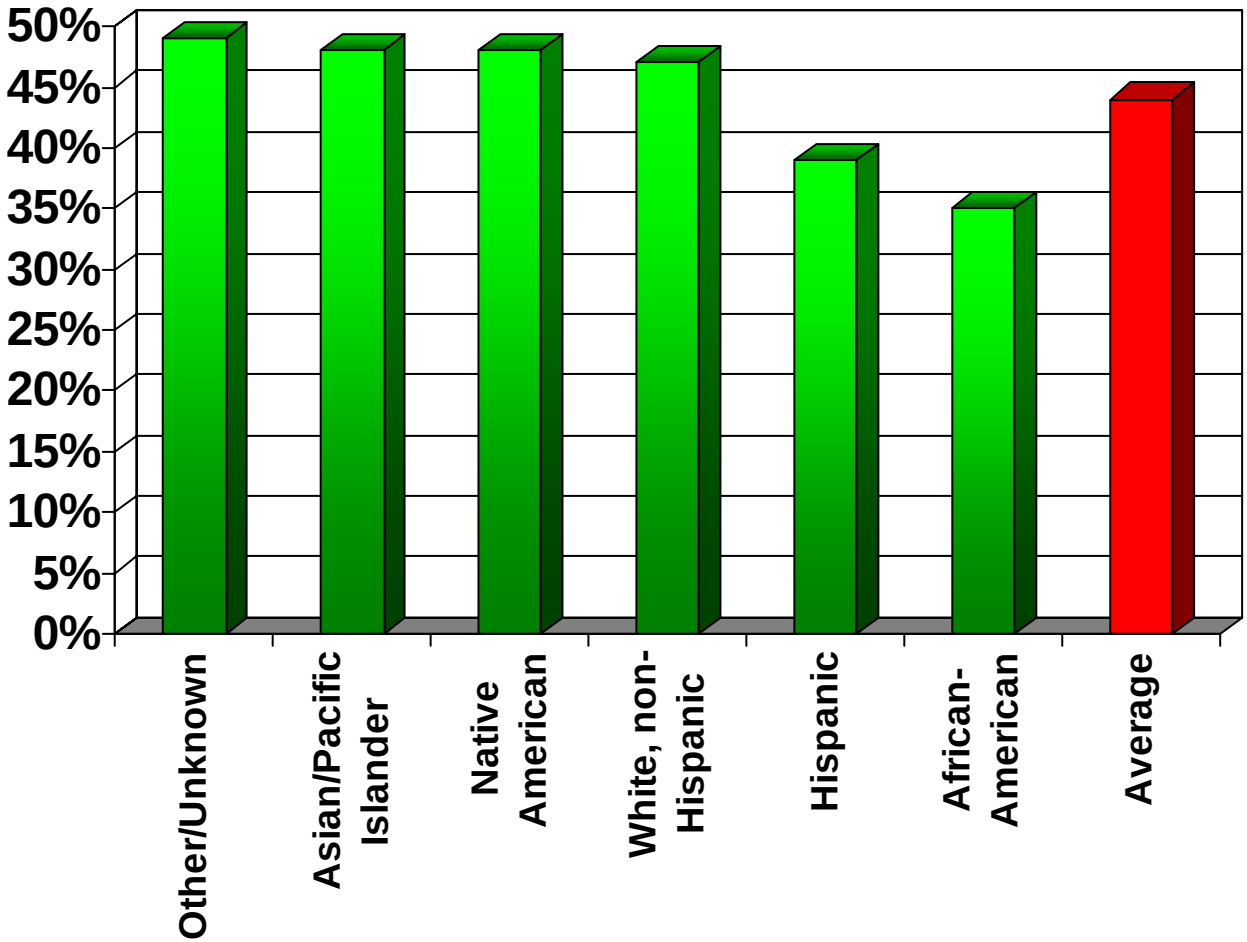
Percent of Community College transfer cohort earning Alpha State degree by Community College GPA and time



N=1,829 students from 3 local CC's. 44% of cohort earned degree in 6 years. Each GPA category contains an approximately equal number of students.

Alpha County Area Community College Transfers: Percent Graduating CSU Alpha Within 6 Years of Starting at a Local Community College (N=2,583)



Community College to University Transition

- ★ Question
  - ★ For students completing university degrees, are certain demographic groups more likely to complete a STEM degree given they had started along the STEM pathway in community college?
- ★ Corollary Question
  - ★ Can we detect whether a student is on a university STEM degree pathway based upon community college records?

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Community College to University Transition

- Data
  - 2,589 CSU Alpha (CSUA) graduates between January 2000 and June 2004 with records of earning at least 10 units at Alpha City College (ACC)
- Method
  - Degrees grouped into 3 categories: STEM, Health, Other
  - Predict degree based upon counts of classes passed at ACC in Biology, Chemistry, Physics, Mathematics, a flag for passing Calculus at ACC, ethnicity, gender

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Community College to University Transition

- ★ Results
  - ★ Overall
    - ★ STEM degrees = 8% of sample
    - ★ Health degrees = 6% of sample
    - ★ Other degrees = 86% of sample

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	% STEM	N
Overall	8%	208
if Bio <=1 and Chem > 0 and Math > 1	41%	34
if Bio <=1 and Chem = 0 and Male	9%	64
if Bio <=1 and Chem = 0 and Female	4%	50
if Bio > 1	18%	29

CHAID analysis,
risk = 0.125

Community College to University Transition

- Results
  - No evidence of ethnicity as a strong factor
  - STEM pathways exist but are “fuzzy”
  - These findings are preliminary and require further validation

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Analysis of Student Attendance

- Questions from CSU A instructor:
  - **How many students were concurrently enrolled in a community college and a university or in multiple community colleges during the Fall 2001 and Spring 2002 semesters and in what institutions were they enrolled ?**
  - **What are the demographics of students who were concurrently enrolled in a community college and a university during the Fall 2001 and Spring 2002 semesters ?**
  - **How many units did concurrently enrolled students enroll in and successfully complete in community college and university and in multiple community colleges during the Fall 2001 and Spring 2002 semesters?**

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Analysis of Student Attendance-Concurrent Enrollment

	Fall 2001		Spring 2002	
One Community College	128949	95.9%	132994	95.3%
Two Community Colleges	5290	3.9%	6138	4.4%
Three or more Colleges	215	.15%	356	.25%

- ★ **A bit less than 5% of students attend multiple community colleges.**
- ★ **Students are much more likely to attend multiple colleges in multi-college districts**
- ★ **Co-enrollment rates between CC's and CSU A range between .2% and 1.6%**
- ★ **Co-enrollments rates between CC's and CSU B range between .04% and .9%**

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Analysis of Student Attendance-Demographics

	Asian	Black	Hispanic	White	Other	Total
1 college	12.6%	5.9%	24.9%	46.7%	9.9%	128949
2 colleges	21.2%	8.1%	16.2%	43.9%	10.6%	5290
3+ colleges	34.0%	10.2%	12.1%	34.9%	8.8%	215

★ What are the demographics of these students?

- ★ **Asian and Black students are more likely to attend multiple community colleges or a community college and a CSU**
- ★ **Other demographic factors are unremarkable**

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Analysis of Student Attendance-Units Taken

	Units Attempted			Units Completed			
	Mean	Median	Mode	Mean	Median	Mode	Total
1 college	7.16	6	3	4.74	3	0	128949
2 colleges	10.84	11	12	7.47	7	0	5290
3 colleges	14.68	14	12	9.76	10	12	215

★ How many units attempted and completed?

★ Concurrently enrolled students attempt and complete more units

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Analysis of Student Attendance-Reverse Transfers

- What courses did students take at community college after transfer to a University?
  - Most frequent course title-Elementary Statistics
  - Other frequent courses-Spanish, Tutoring, Biology, Calculus
  - Most frequent department-Math, followed by Languages, History, and Psychology

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A Typical Project – *Science Pathways*

- Science Professional Learning Council (PLC) develops questions:
  - What is the success rate in Transfer-level Biology compared to grade in highest Math or English course in community college and/or high school?
  - What are the science pathways above the Community College level?
  - Compare middle school grades in English, math, and science with success in high school Biology and Chemistry.
  - Correlate Biology, Chemistry, and Physics California Standards Tests (CST) to grades in respective courses.
  - Compare high school Chemistry grades with community college chemistry grades.

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A Typical Project – *Science Pathways*

- Method
  - Select for consortium schools with established sharing permission
  - Write SQL script to extract raw data from the Cal-PASS Research Database
    - Data availability
    - Data integrity
  - Analyze in SPSS, BrioQuery, or Other Program

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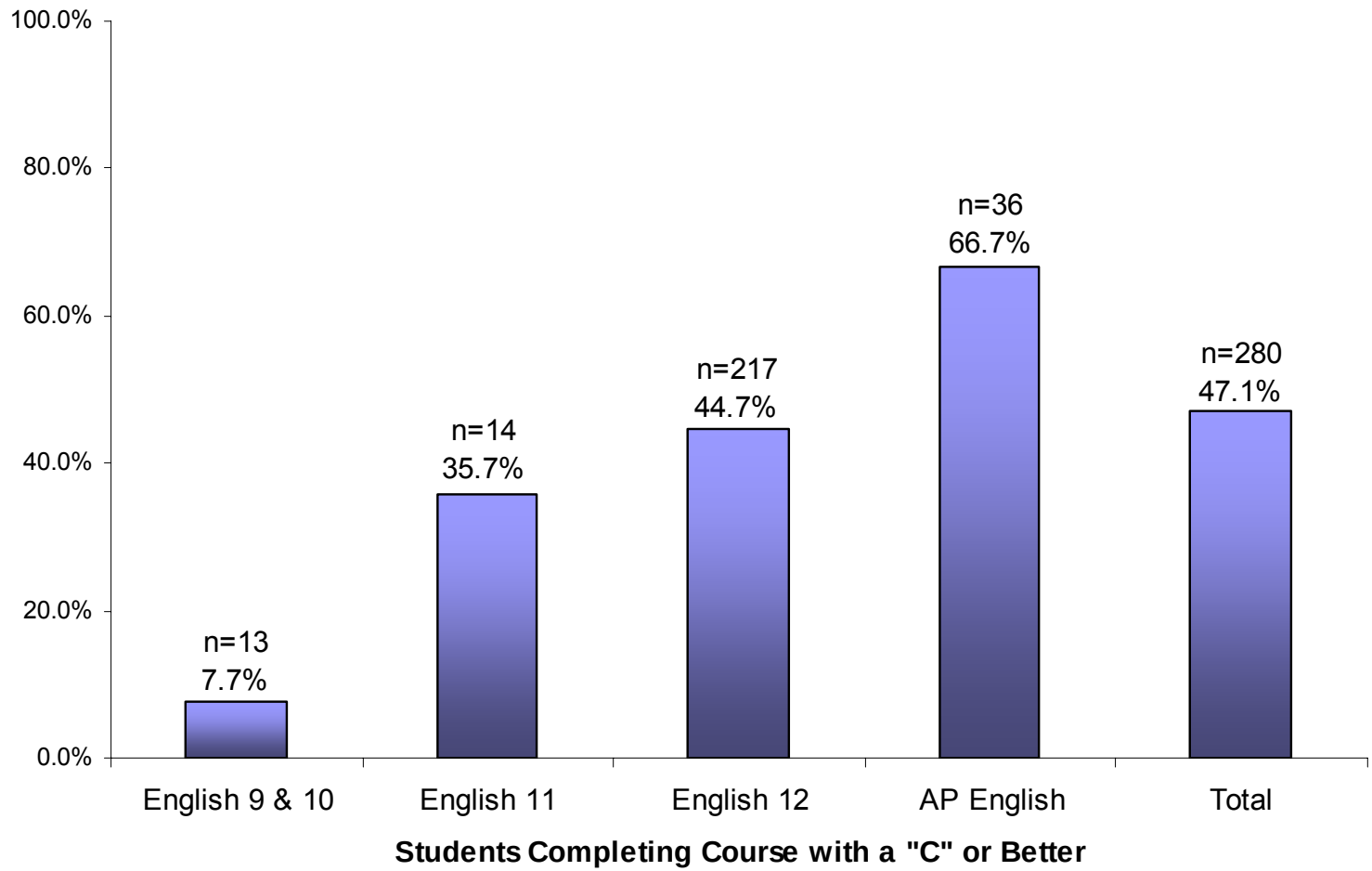
A Typical Project – *Science Pathways*

★ Findings (example)

★ **Success in Transfer-level Biology at a Community College by Highest High School English Completed with a Grade of C or Better**



A Typical Project – *Science Pathways*

- ★ Report
  - ★ Written report is give to Science Professional Learning Council (PLC)
  - ★ Council reviews and submits comments and follow up questions
  - ★ Cal-PASS PLC coordinator helps Councils take steps to use research to make changes in processes and curriculum

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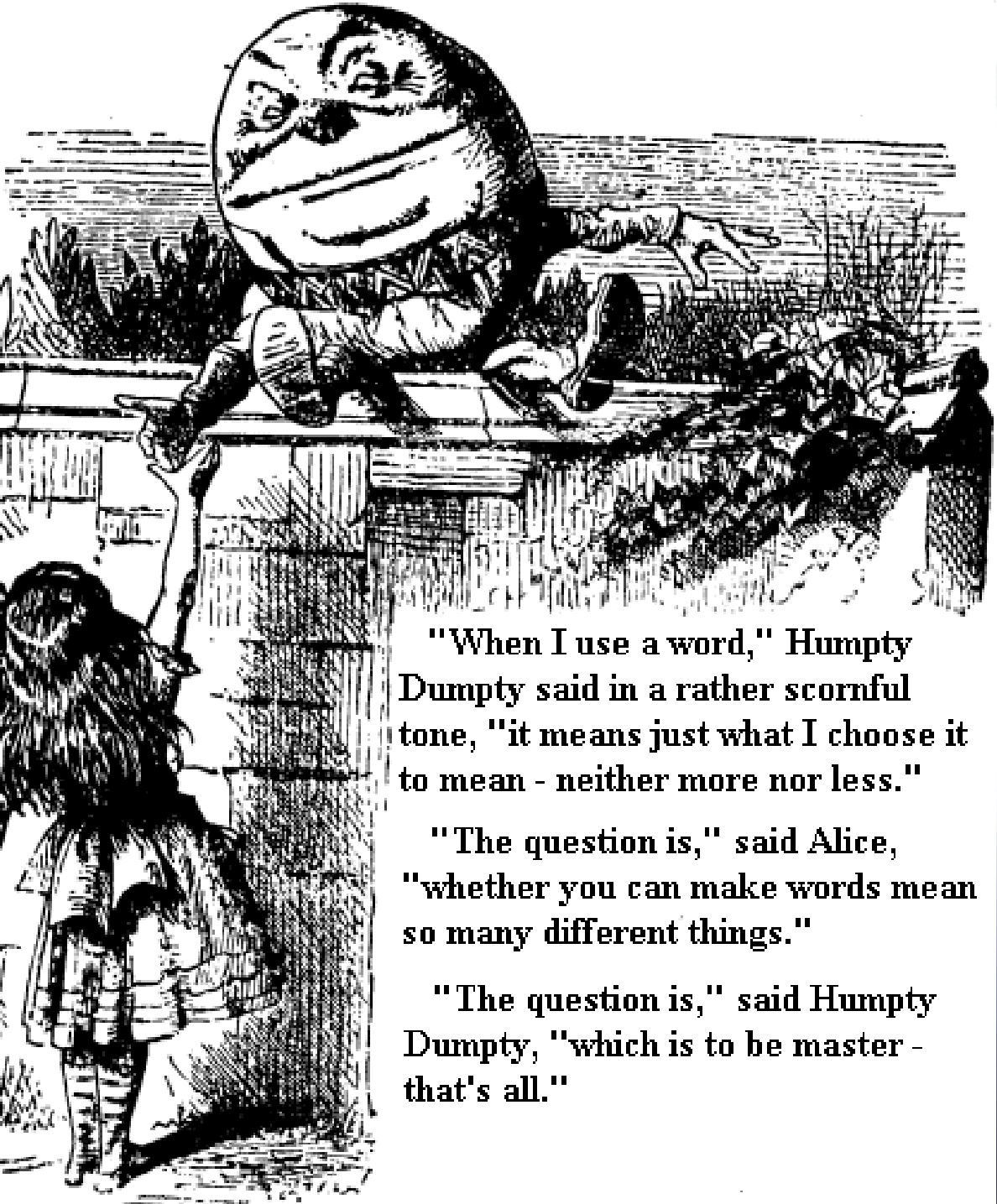
Testing the tests

Part 1: The pencil is sharpened

2004-2005 Correlations with:		CST Math Score	CST Lang Score	CST Science Score	CST Social Science Score
Beginning Algebra	r	0.37**	0.20**	0.07	.20**
	N	624	621	452	533
Geometry	r	.57**	.46**	.40**	.24**
	N	2741	2738	2190	1808
Remedial English	r	.17**	.19**	.27**	0.08
	N	1247	1368	278	242
Regular English	r	.35**	.44**	.35**	.38**
	N	9351	9941	6033	4927

**p < 0.01. Note: Yellow shading indicates weak correlations (r < 0.3) while orange shading indicates stronger correlations (r ≥ 0.3).

Next Steps



"When I use a word," Humpty Dumpty said in a rather scornful tone, "it means just what I choose it to mean - neither more nor less."

"The question is," said Alice, "whether you can make words mean so many different things."

"The question is," said Humpty Dumpty, "which is to be master - that's all."

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Thank you!

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