

# Multiple Measures Only Placement

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2017 PILOT STUDY

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## TABLE OF CONTENTS

Introduction .....	3
Purpose.....	3
Multiple Measures Only Guidelines.....	3
Methodology.....	4
Data .....	4
Analyses .....	4
Transfer-Level Placement.....	4
Transfer-Level Course Outcomes.....	5
Transfer-Level Course Outcome Predictions .....	6
Results .....	7
English.....	7
Transfer-Level Placement.....	7
Transfer-level Course Outcomes .....	8
Demographic Transfer-Level Course Outcomes Prediction.....	9
Transfer-Level Course Outcome Prediction.....	9
English Subanalysis: Sweetwater Unified 2017 Seniors .....	10
Predictive Conclusions and Placement Recommendations.....	11
Reading .....	12
Transfer-Level Placement.....	12
Transfer-Level Course Outcomes.....	13
Demographic Transfer-Level Course Outcomes Prediction.....	14
Transfer-Level Course Outcome Prediction.....	14
Reading Subanalysis: Sweetwater Unified 2017 Seniors.....	15
Predictive Conclusions and Placement Recommendations.....	15
Math .....	16
Transfer-Level Placement.....	16
Transfer-Level Course Outcomes.....	17
Demographic Transfer-Level Course Outcome Prediction .....	18
Transfer-Level Course Outcome Prediction.....	18
Subanalysis: Sweetwater Unified 2017 Seniors.....	20
Predictive Conclusions and Placement Recommendations.....	21
Appendix.....	i
Current Assessment & Placement Guidelines for English and Reading .....	i

Current Assessment & Placement for Math.....	ii
Multiple Measures Only Placement for Math (2017 MM Pilot) .....	iv
2017 Multiple Measures Pilot and 2017 Pre-Pilot Demographics .....	v
Graph of English Transfer-Level Success by HS GPA .....	vi
Graph of English Transfer-Level Success by CTEP Grammar Score .....	vii
Graph of Math Transfer-Level Success by HS GPA.....	viii
Graph of Math Transfer-Level Success by MDTP Elementary Algebra Score .....	ix
Table of Enrollment Following Transfer-Level Placement.....	x
Table of Transfer-Level Math Enrollment Following Transfer-Level Placement.....	x
Table of Math Placement And Enrollments, All.....	xi
Table of Math Placement Level 6 Enrollment and Course Outcomes.....	xi
Table of Math Placement Level 5 Enrollment and Course Outcomes.....	xii
Table of Math Placement Level 4 Enrollment and Course Outcomes.....	xii
Table of Math Placement Level 3 Enrollment and Course Outcomes.....	xii
Table of Math Placement Level 1 or 2 Enrollment and Course Outcomes.....	xiii

## INTRODUCTION

### PURPOSE

The purpose of this report is to summarize and interpret results from a Multiple Measures Only pilot study conducted during the Fall 2017 assessment and placement period (March 1<sup>st</sup> – September 1<sup>st</sup>, 2017). From June 1<sup>st</sup>, 2017 – September 1<sup>st</sup>, 2017, students that underwent assessment took place in the 2017 Multiple Measures Only Pilot Study (2017 MM Pilot). All students completed a questionnaire about their educational background and took the standard tests for course placement in the designated subjects: College Test for English Placement (CTEP) for placement in English and Reading classes, and/or the Mathematics Diagnostic Testing Project (MDTP) for placement in Math classes. Students were placed into the course(s) corresponding to the highest placement as determined by either the current test assessment guidelines or the multiple measures only guidelines. The goal of this pilot study was to use multiple measures only to place students in accelerated pathways towards degree completion and transfer, with the implication that students that would normally be placed in lower-level courses based on current test assessment procedures are now being placed in higher-level courses.

This report will focus on three primary questions:

- 1) Did the multiple measures only guidelines increase the number of students placed into transfer-level courses?
- 2) Were students placed into transfer-level courses from multiple measures only guidelines as successful as students placed into transfer-level courses from current test assessment practice?
- 3) What student factors are related to academic success in transfer-level courses?

Note: Current test assessment and placement practices use a combination of test assessment (CTEP/MDTP) and multiple measures (e.g. High School GPA) to place students. A detailed description of current test assessment and placement guidelines can be found on pg. i - iii of the Appendix.

### MULTIPLE MEASURES ONLY GUIDELINES

- i. English
  - a. HS GPA
    - i. If HS GPA  $\geq$  2.6: ENGL 115
  - b. HS GPA and HS English Grade
    - i. If HS GPA  $\geq$  2.4 and HS English Grade = A or B: ENGL 115

- ii. Reading
  - a. HS GPA
    - i. If HS GPA  $\geq$  2.3: RDG 158
- iii. Math (see Appendix pg. iv)
  - a. Last Math Class & Grade Received
  - b. HS GPA

## METHODOLOGY

### DATA

Data was collected using SWC’s internal data source (BusinessObjects), fixed research files [Academic Performance (1/12/2018), Academic Summary (1/12/2018)], and the internal data source for SWC’s assessment office (CAPP: computerized assessment and placement programs).

### ANALYSES

#### TRANSFER-LEVEL PLACEMENT

This analysis aims to answer the first primary research question: did the multiple measures only guidelines increase the number of students placed into transfer-level courses? The transfer-level placement proportions from the 2017 MM Pilot Study will be compared to the transfer-level placement proportions observed during the pre-pilot period of the Fall 2017 test assessment and placement period (March 1<sup>st</sup> – May 31<sup>st</sup>, 2017). A short description of the 2017 MM Pilot and the 2017 pre-pilot period can be found in **Table 1** below. A more detailed demographic comparison can be found on pg. v of the Appendix.

**Fall 2017 Assessment & Placement**

	Pre-Pilot		Pilot	
	<i>Date Range</i>	<i>N</i>	<i>Date Range</i>	<i>N</i>
<b>English</b>	March 1 <sup>st</sup> - May 31 <sup>st</sup>	1852	June 1st - September 1st	2687
<b>Reading</b>	March 1 <sup>st</sup> - May 31 <sup>st</sup>	1875	June 1st - September 1st	2711
<b>Math</b>	March 1 <sup>st</sup> - May 31 <sup>st</sup>	1905	June 1st - September 1st	3068

*Table 1: Date ranges and student sample sizes for the 2017 pre-pilot period and 2017 pilot period.*

The conclusions derived from the comparison between the transfer-level placement rates of the 2017 MM Pilot and the 2017 pre-pilot period will indicate whether transfer-level placement was significantly greater during the MM Pilot study. To conduct comparisons, a chi-square test of independent proportions will be used.

Results from the 2016 MM Pilot Study and 2016 random samples will also be displayed and referenced throughout this report. A summary of date ranges and sample sizes for these groups are displayed in **Table 2** below.

<b>Fall 2016 Multiple Measures Pilot</b>				
	<b>2016 Random Sample</b>		<b>2016 MM Pilot</b>	
	<b>Date Range</b>	<b>N</b>	<b>Date Range</b>	<b>N</b>
<b>English</b>	July 24 <sup>th</sup> – August 20 <sup>th</sup> , 2016	833	May 23 <sup>rd</sup> – June 18 <sup>th</sup> , 2016	897
<b>Reading</b>	April 3 <sup>rd</sup> – April 30 <sup>th</sup> , 2016	920	May 23 <sup>rd</sup> – June 18 <sup>th</sup> , 2016	935
<b>Math</b>	May 1 <sup>st</sup> - May 22 <sup>nd</sup> and June 19 <sup>th</sup> – June 25 <sup>th</sup> , 2016	1036	May 23 <sup>rd</sup> – June 18 <sup>th</sup> , 2016	1013

*Table 2: Date ranges and student sample sizes for the 2016 random selection periods and 2016 MM Pilot Study.*

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## TRANSFER-LEVEL COURSE OUTCOMES

This analysis aims to answer the second primary research question: were students placed into transfer-level courses from multiple measures only as successful as students placed into transfer-level courses from current test assessment guidelines? To answer this question, we will use a logistic regression model to compare the differences in odds of success (A/B/C/P) within the transfer-level course(s) (for English, Reading, or Math) between students placed through multiple measures only (referred to as MM Only Placed) and the students placed by current test assessment (referred to as Test Assessment Placed) during the 2017 MM Pilot Study. Essentially, this test answers the following question: if we have two students and the only thing we know about these two students is that one is MM Only Placed and one is Test Assessment Placed, are their odds of success within the transfer-level course different and by how much?

Additionally, we will compare the overall proportion of students in the 2017 MM Pilot Study that successfully completed the transfer-level course, combining the outcomes of students who were MM Only Placed and students who were Test Assessment Placed, to the overall success rate from the 2016 MM Pilot Study in each designated subject. This comparison, made by using a chi-square test of independent proportions, will indicate whether the success rate significantly changed between last year’s pilot and this year’s pilot, possibly due to alterations made in the multiple measures only guidelines between these two pilot studies.

A comparison of the overall proportion of students that successfully complete transfer-level courses from the 2017 MM Pilot Study and the 2017 pre-pilot period will not be made at this time. Unmeasurable differences may exist between students that undergo assessment and placement in the first half and the second half of the fall assessment period that may relate to

academic performance. An additional analysis will be conducted following the Spring 2018 term that will utilize results from the pre-pilot students in an appropriate manner. Results will be released in Summer 2018.

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## TRANSFER-LEVEL COURSE OUTCOME PREDICTIONS

Finally, we will investigate the third primary research question: what student factors are related to success in transfer-level courses? To better understand the multitude of factors, this analysis will be divided into three sections: demographic factors, academic factors, and the interaction of academic factors. We will describe each factor and discuss how each factor relates to course outcomes. Finally, we will use the results from our academic factor predictions to suggest possible guidelines for placement into transfer-level courses.

# RESULTS

## ENGLISH

### TRANSFER-LEVEL PLACEMENT

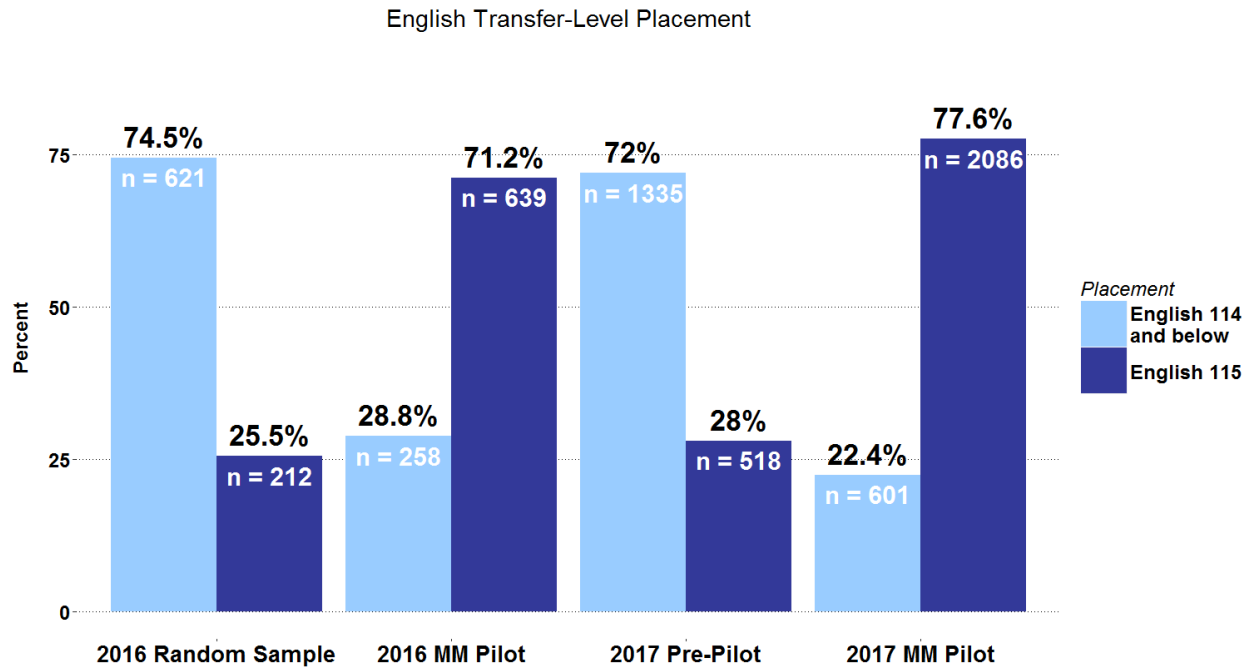


Figure 1: Graph displaying the distribution of student placement into transfer-level English (ENGL 115) and below transfer-level English (114/99/71).

#### Students Placed at Transfer-Level English

	2016 Sample	2016 MM Pilot	2017 Pre-Pilot	2017 MM Pilot
<b>Below Transfer-Level</b>	621	258	1,335	601
<b>Transfer-Level</b>	212	639	518	2,086

Table 3: Table displaying the number of students placed at transfer-level (ENGL 115) and below transfer-level (ENGL 114/99/71) English.

We find that a significantly greater proportion of students were placed at transfer-level English (ENGL 115) during the 2017 MM Pilot Study compared to students placed in the remainder of the 2017 fall testing period ( $\chi^2 = 1104.6, p < .001$ ).



## TRANSFER-LEVEL COURSE OUTCOMES

English Transfer-Level (ENGL 115) Success Rate:  
2017 Multiple Measures Only Placement Pilot Study

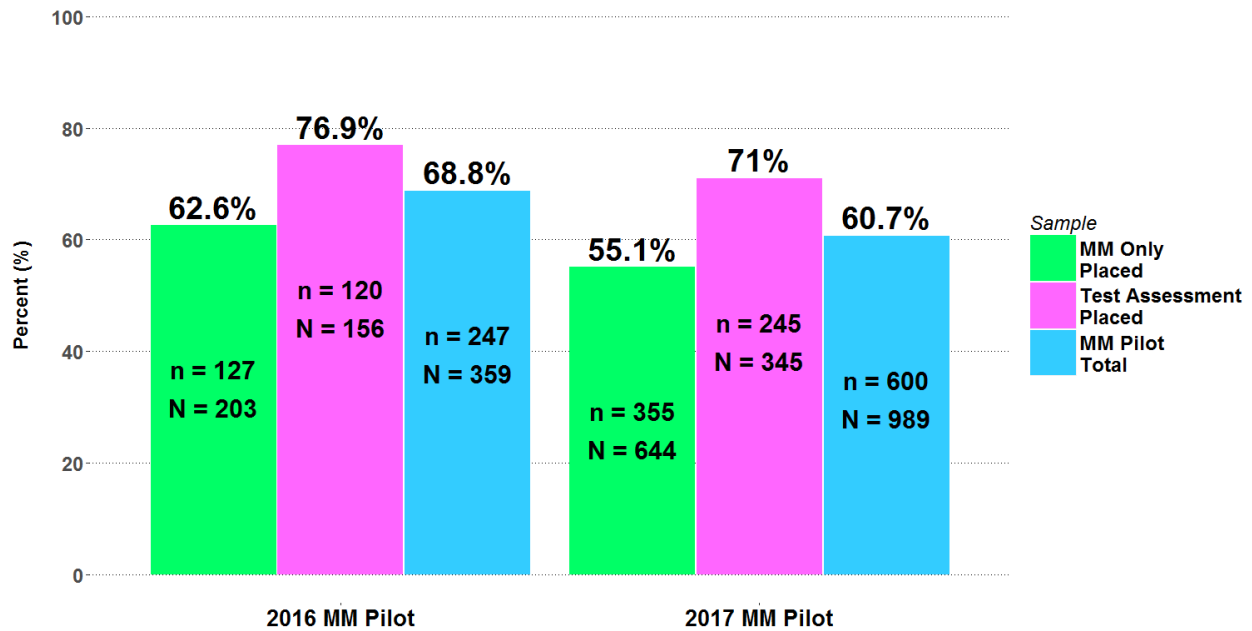


Figure 2: Graph displaying the success rate (A/B/C/P) for students placed into transfer-level English (ENGL 115) and enrolled in the transfer-level course from the 2016 & 2017 MM Pilot Studies. *N* is the number of total students included in the sample, and *n* is the number of students within that sample that completed the course with a A, B, C, or P.

### Transfer-Level English (ENGL 115) Success

	2016 MM Pilot			2017 MM Pilot		
	Test Assessment Placed	MM Only Placed	2016 MM Pilot Total	Test Assessment Placed	MM Only Placed	2017 MM Pilot Total
Unsuccessful (D, F, NP, W, I)	36	76	112	100	289	389
Successful (A, B, C, P)	120	127	247	245	355	600

Table 4: Table summarizing the number of students that successfully completed or unsuccessfully attempted or completed their transfer-level English course (ENGL 115) in the 2016 and 2017 MM Pilot Studies.

We find that students moved up into English 115 from their multiple measures were approximately 49.9% less likely to pass their English 115 course compared to students placed into English 115 from current test assessment procedures within the 2017 MM Pilot Study ( $p < .001$ ).

When comparing the 2016 and 2017 MM Pilot results for English 115 course outcomes, we can see in *Figure 2* that students in each sample (Test Assessment Placed and MM Only Placed), and consequently, the overall success rate, of the 2017 Pilot Study did not perform as well as the students from the 2016 Pilot Study. However, neither the test assessment group ( $\chi^2 = 1.609, p = .205$ ) nor the MM only group ( $\chi^2 = 3.185, p = .074$ ) did significantly worse in the 2017 multiple measures pilot compared to the 2016 multiple measures pilot. Yet, the overall success rate for the 2017 MM Pilot was significantly lower than for the 2016 MM Pilot ( $\chi^2 = 7.120, p = .008$ ).

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## DEMOGRAPHIC TRANSFER-LEVEL COURSE OUTCOMES PREDICTION

First, we sought to understand how demographic variables are related to a student's success in transfer-level English. The variables included for investigation are gender, age, ethnicity, and ESL status. For ethnicity, due to small numbers in some ethnic categories, groups were collapsed into larger categories: White (Non-Hispanic), Hispanic, Filipino/Asian, Black/African-American, and Other (Unknown, Other, Pacific Islander, American Indian/Alaskan Native).

We found that White, Non-Hispanic students were 2.5 times more likely to pass ENGL 115 compared to Hispanic students, when controlling for gender, age, and ESL status ( $p = .002$ ). There were no other significant differences found in odds of success based on these demographic factors.

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## TRANSFER-LEVEL COURSE OUTCOME PREDICTION

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### ACADEMIC FACTORS

Next, while controlling for basic demographic variables of age, gender, ethnicity, and ESL status, we investigated differences in the predictive value of several academic factors in determining success in transfer-level English (ENGL 115). These variables included high school GPA, grade in last English class, and CTEP Grammar, Syntax, and Reading scores. We found that those with HS GPA of 3.0 and above were 2.1 times more likely to succeed in English 115 compared to those with a HS GPA between 2.5 and 2.9 ( $p < .001$ ), whereas there was no difference in the odds of success between those with HS GPA below 2.5 and those with a HS GPA between 2.5 and 2.9 ( $p = .212$ ). In Addition, CTEP Grammar scores were significantly predictive of success; for every one point increase in CTEP Grammar score, the odds of success within English 115 increased by 7.7% ( $p = .002$ ). White, Non-Hispanic students remained significantly more likely to pass English 115 compared to Hispanic students, even after controlling for the academic factor differences ( $p = .005$ ). CTEP Syntax scores, CTEP Reading

scores, and grade in last English class were not significant predictors of success within English 115.

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## ACADEMIC FACTOR INTERACTIONS

Finally, we sought to understand how interactions between these academic factors may predict success in English 115. While still controlling for the basic demographic variables of age, gender, ethnicity, and ESL status, we did not find any significant interactions between high school GPA, grade in last English class, or CTEP scores. CTEP Grammar scores remained a significant predictor of success ( $p = .002$ ), while having a HS GPA of 3.0 or greater became only a marginally significant predictor ( $p = .069$ ). In addition, White, Non-Hispanic students remained significantly more likely to pass ENGL 115 compared to Hispanic students when controlling for these academic factors and their possible interactions ( $p = .005$ ).

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## ENGLISH SUBANALYSIS: SWEETWATER UNIFIED 2017 SENIORS

Among the Sweetwater Unified High School District Class 2017 that placed at transfer-level English (N = 700) and enrolled in ENGL 115 in the Fall 2017 term (n = 476), 62.6% (n = 298) passed the course. We investigated the predictive value of several academic factors derived from the data provided by SUHSD, including cumulative GPA, whether the student took an AP English course in either their junior or senior year, and the best grade received in a 12<sup>th</sup> grade English course, along with CTEP Grammar, Syntax, and Reading scores. We find that when controlling for the academic factors, there are no demographic differences in likelihood of success within English 115. The academic factors that are significant predictors of success within English 115 are cumulative HS GPA, CTEP Grammar, and CTEP Reading score. For every one unit increase in cumulative HS GPA (for instance, from a 2.0 to a 3.0), the odds of successfully completing English 115 increase by approximately 4.6 times ( $p < .001$ ). For every one point increase in CTEP Grammar score, odds of success increase by 9.4% ( $p = .012$ ), and for every one point increase in CTEP Reading score, odds of success increase by 6.97% ( $p = .020$ ).

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## PREDICTIVE CONCLUSIONS AND PLACEMENT RECOMMENDATIONS

Using the combined results found above, we aimed to maximize the success rate and minimize failure rate. Given further graphical evidence (see Appendix pg. vi - vii), the following guidelines are purposed for placement into English 115:

1. HS GPA  $\geq$  2.6

**AND**

2. CTEP Grammar  $\geq$  16

### Outcomes following English Placement Proposed Guidelines

	Students Included	Students Excluded
Placement at English 115	1,336	750
Enrolled in English 115	689	300
Did not Successfully Complete English 115	202	167
Successfully Completed English 115	487	133
<b>% Passed</b>	<b>70.6%</b>	<b>44.3%</b>

*Table 5: Summary of English 115 course outcomes that would have been observed under the revised placement recommendations for the 2017 MM Pilot Study students.*

Note: This guideline is aimed at maximizing success and minimizing failure given the data collected on the 2017 MM Pilot students. This guideline and its relationship to AB705 legislation is to be determined by college administrators, staff, and faculty.

# READING

## TRANSFER-LEVEL PLACEMENT

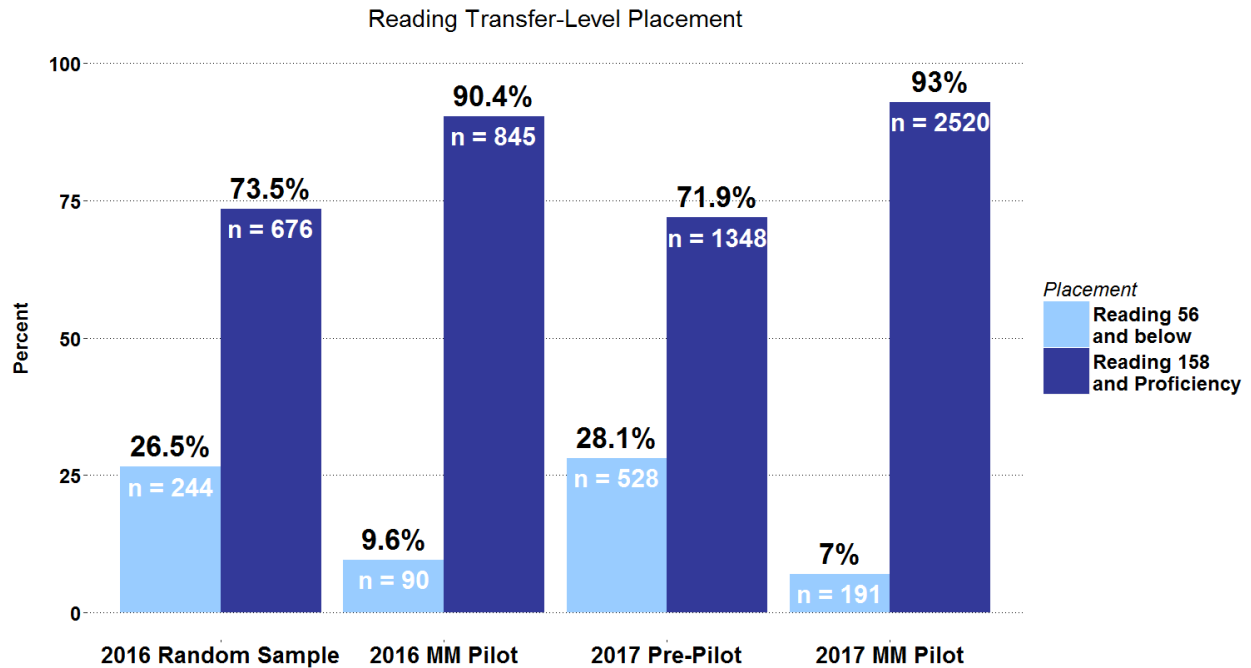


Figure 3: Graph displaying the distribution of students placed at transfer-level (RDG 158) or college-proficiency Reading and students placed below transfer-level Reading (RDG 56/54/52).

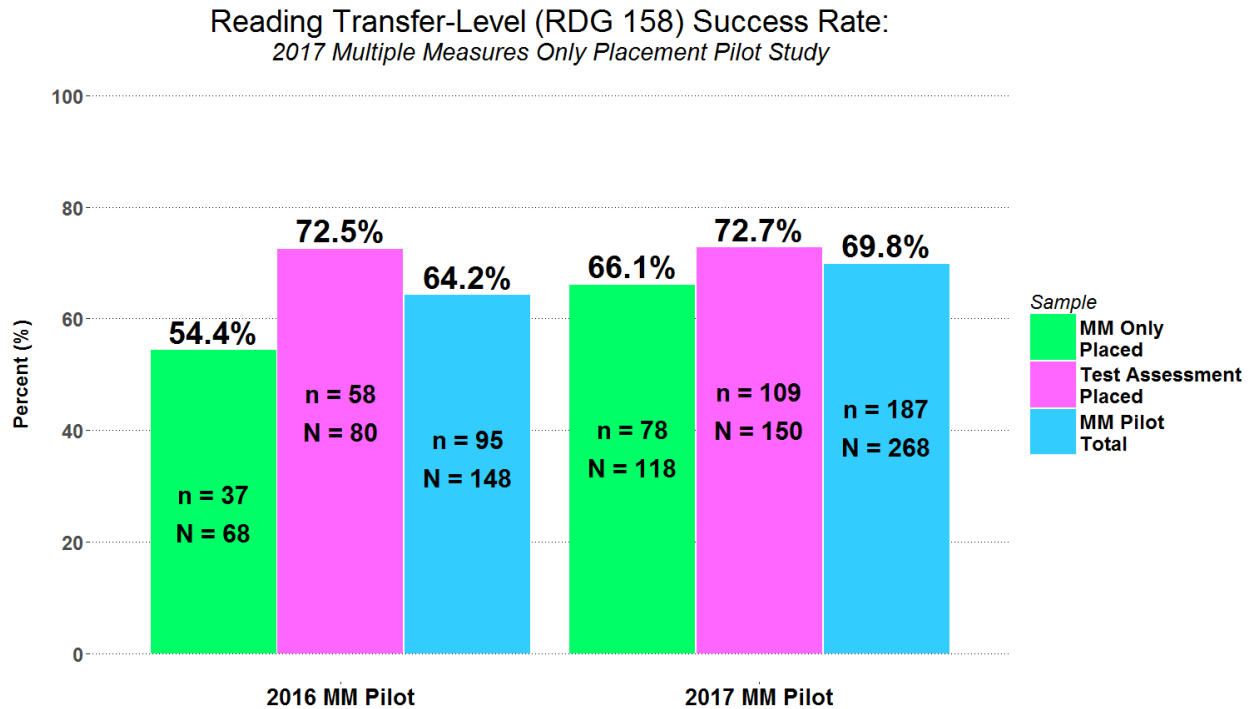
### Students Placed at Transfer-Level and College-Proficiency Reading

	2016 Sample	2016 MM Pilot	2017 Non-Pilot	2017 MM Pilot
<b>Below Transfer-Level</b>	244	90	528	191
<b>Transfer-Level</b>	676	845	1,348	2,520

Table 6: Table summarizing the number of students placed at transfer-level (and college-proficiency) Reading and the number of students placed below college-level Reading within each sample.

We find that a significantly greater proportion of students were placed at transfer-level Reading (RDG 158) during the 2017 MM Pilot Study compared to students placed in the remainder of the 2017 fall testing period ( $\chi^2 = 371.6, p < .001$ ).

## TRANSFER-LEVEL COURSE OUTCOMES



*Figure 4:* Graph displaying the success rate (A/B/C/P) for students placed into transfer-level Reading (RDG 158) and enrolled in the transfer-level course from the 2016 & 2017 MM Pilot Studies. *N* is the number of total students included in the sample, and *n* is the number of students within that sample that completed the course with a A, B, C, or P.

**Transfer-Level Reading (RDG 158) Success**

	2016 MM Pilot			2017 MM Pilot		
	Test Assessment Placed	MM Only Placed	2016 MM Pilot Total	Test Assessment Placed	MM Only Placed	2017 MM Pilot Total
<b>Unsuccessful (D, F, NP, W, I)</b>	22	31	53	41	40	81
<b>Successful (A, B, C, P)</b>	58	37	95	109	78	187

*Table 7:* Table summarizing the number of students that successfully completed or unsuccessfully attempted or completed their transfer-level Reading course (RDG 158) in the 2016 and 2017 MM Pilot Studies.

Within our 2017 MM Pilot, we do not find that those placed up into RDG 158 from their multiple measures have significantly different odds of success in RDG 158 compared to those within the pilot that placed into RDG 158 from our current test assessment and placement guidelines ( $p = 0.246$ ).

While graphical evidence leads us to conclude that the students placed from multiple measures only performed more successfully within the 2017 MM Pilot Study compared students in the 2016 MM Pilot Study, we did not find a significant difference in success rate between the two pilot studies ( $\chi^2 = 2.027, p = .155$ ). In addition, the overall success rate between the 2016 and 2017 pilot studies was not significantly different ( $\chi^2 = 1.221, p = .269$ ).

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## DEMOGRAPHIC TRANSFER-LEVEL COURSE OUTCOMES PREDICTION

First, we sought to understand how demographic variables are related to a student's success in transfer-level Reading. The variables included for investigation are gender, age, ethnicity, and ESL status. For ethnicity, due to small numbers in some ethnic categories, groups were collapsed into larger categories: White (Non-Hispanic), Hispanic, Filipino/Asian, Black/African-American, and Other (Unknown, Other, Pacific Islander, American Indian/Alaskan Native).

We found that male students were 94.6% less likely to pass RDG 158 compared to female students, when controlling for age, ethnicity, and ESL status ( $p = .046$ ). There were no other significant differences found in odds of success based on these demographic factors.

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## TRANSFER-LEVEL COURSE OUTCOME PREDICTION

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### ACADEMIC FACTORS

Next, while controlling for basic demographic variables of age, gender, ethnicity, and ESL status, we investigated differences in the predictive value of several academic factors in determining success in transfer-level Reading (RDG 158). These variables included high school GPA, grade in last English class, years out of high school, and CTEP Reading score. We found no significant differences in odds of success based on these variables. The only variable that remained a significant predictor of course success was gender, with males now 56% less likely to pass RDG 158 compared to female students after controlling for differences in these academic factors ( $p = .004$ ).

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### ACADEMIC FACOTR INTERACTIONS

Finally, we sought to understand how interactions between these academic factors may predict success in Reading 158. While still controlling for the basic demographic variables of age, gender, ethnicity, and ESL status, we did not find any significant interactions between high school GPA, grade in last English class, or CTEP Reading score. Males remained significantly less likely to pass RDG 158 compared to female students, approximately 53% less likely ( $p = .011$ ), when controlling for these academic factors and their possible interactions.

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## READING SUBANALYSIS: SWEETWATER UNIFIED 2017 SENIORS

Among the Sweetwater Unified High School District Class 2017 that placed at transfer-level Reading (N = 432) and enrolled in RDG 158 in the Fall 2017 term (n = 104), 69.2% (n = 72) passed the course. We investigated the predictive value of several academic factors derived from the data provided by SUHSD, including cumulative GPA, whether the student took an AP English course in either their junior or senior year, and the best grade received in a 12<sup>th</sup> grade English course, along with CTEP Reading Score. We did not find any significant academic predictors of transfer-level Reading success, however, male students were 73.3% less likely to pass their RDG 158 course compared to female students holding constant all academic differences ( $p = .012$ ).

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## PREDICTIVE CONCLUSIONS AND PLACEMENT RECOMMENDATIONS

Given no significant differences in course success between students moved up from multiple measures and students placed into transfer-level Reading from current test assessment guidelines and given no remaining predictive value of several academic factors, we would recommend the continuation of the multiple measures only guidelines used in the 2017 MM Pilot for future Reading transfer-level placement: HS GPA  $\geq 2.3$  or placement via current test assessment guidelines. There were five students that did not have a HS GPA  $\geq 2.3$ , yet were still placed at the RDG 158 level (who also enrolled in RDG 158) from current test assessment procedures; all five of these students passed their RDG 158 class.



# MATH

## TRANSFER-LEVEL PLACEMENT

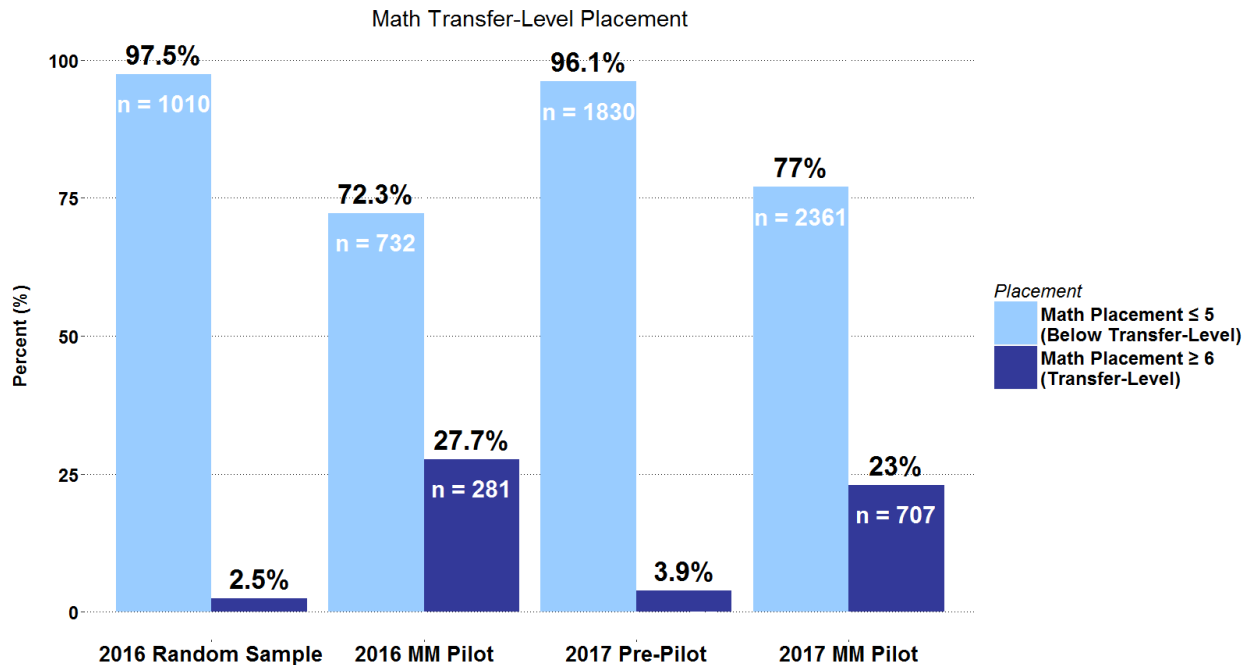


Figure 5: Graph displaying the distribution of students placed at transfer-level Math (Placement 6+: Math 101, 104, 119, 120, 121, 130, 244, 250) and below transfer-level (Placement 5 and below).

	2016 Sample	2016 MM Pilot	2017 Pre-Pilot	2017 MM Pilot
Below Transfer-Level	1010	732	1830	2361
Transfer-Level	26	281	75	707

Table 8: Table summarizing the number of students placed at transfer-level Math (101, 104, 119, 120, 121, 130, 244, or 250) and the number placed below transfer-level Math within each sample.

We find that a significantly greater proportion of students were placed at transfer-level Math during the 2017 MM Pilot Study compared to students placed in the remainder of the 2017 fall testing period ( $\chi^2 = 322.34, p < .001$ ).

## TRANSFER-LEVEL COURSE OUTCOMES

### Math Transfer-Level Success Rate: Math 101, 104, 119, 120, 121, 130, 244

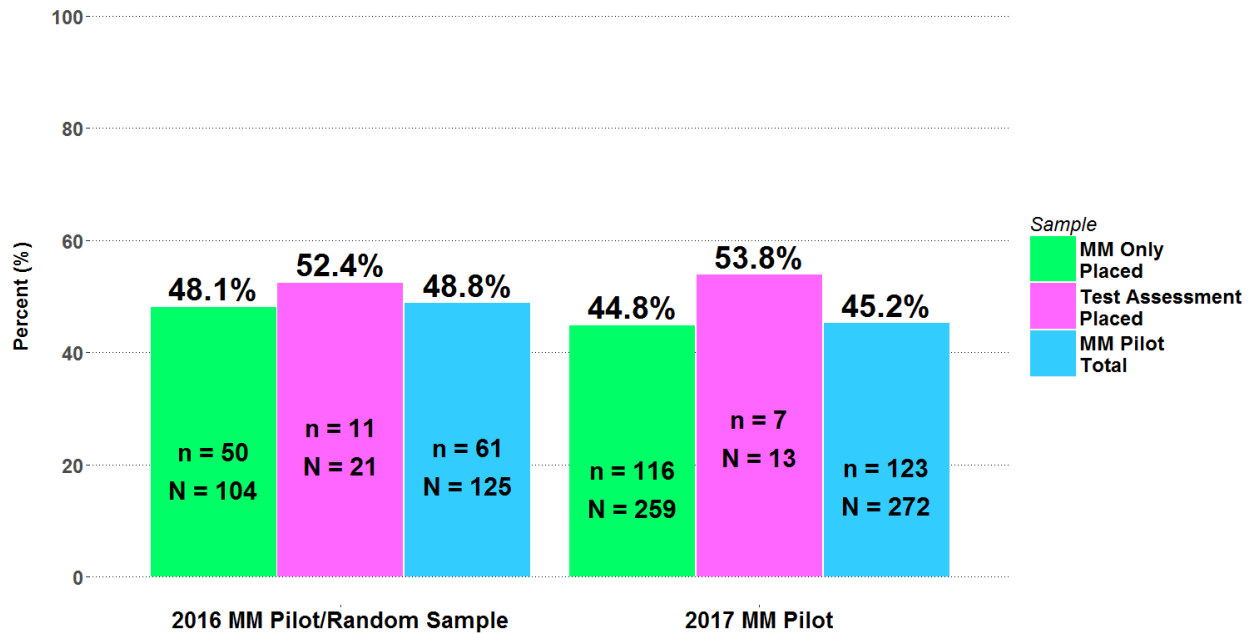


Figure 6: Graph displaying the success rate (A/B/C/P) for Level 6 Math Courses (101, 104, 119, 120, 121, 130, or 244). Students included in this analysis placed either at Level 6 or Level 8 during the 2017 MM Pilot or 2016 MM Pilot. See appendix for breakdown of course enrollment at Level 6 for the 2017 MM Pilot Study. *N* is the number of total students included in the sample, and *n* is the number of students within that sample that completed the course with a A, B, C, or P.

### Transfer-Level Math (101, 104, 119, 120, 121, 130, 244) Success

	2016 MM Pilot/2016 Random Sample			2017 MM Pilot		
	Test Assessment Placed	MM Only Placed	2016 MM Pilot Total	Test Assessment Placed	MM Only Placed	2017 MM Pilot Total
Unsuccessful (D, F, NP, W, I)	10	54	64	6	143	149
Successful (A, B, C, P)	11	50	61	7	116	123

Table 9: Table summarizing the number of students that successfully completed or unsuccessfully attempted or completed their transfer-level Math course (Math 101, 104, 119, 120, 121, 130, 244) in the 2016 and 2017 MM Pilot Studies.

Within our 2017 MM Pilot, we do not find that those placed up into transfer-level Math from their multiple measures have significantly different odds of success in a transfer-level Math course (Math 101, 104, 119, 120, 121, 130, 244) compared to those within the pilot that placed into transfer-level Math from our current test assessment and placement guidelines ( $p =$

0.524). However, due to the small number of students who assess and enroll in transfer-level math courses from the current test assessment & placement procedures, conclusions made between those moved up into transfer-level from their multiple measures and those placed into transfer-level from current test assessment guidelines should be cautioned.

In addition, we found that the multiple measures only group from the 2017 MM Pilot Study did not have a significantly different success rate compared to the 2016 MM Pilot study ( $\chi^2 = 0.205, p = .651$ ). We also did not find a significantly different overall success rate between the 2016 and 2017 MM pilot studies ( $\chi^2 = 0.309, p = .578$ ).

Due to an extremely small number of students placed at Level 8 from current test assessment procedures that enroll in Level 8 Math courses (Math 250), we could not analyze results from Level 8 placement. Thirty-six students from the 2017 MM Pilot Study were placed at Level 8 (Math 250) and enrolled in Math 250. Their pass rate was 30.6% ( $n = 11$ ).

Proceeding analyses in transfer-level Math will focus solely on success within Level 6 Math courses (MATH 101, 104, 119, 120,121, 130, or 244) [N = 272].

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## DEMOGRAPHIC TRANSFER-LEVEL COURSE OUTCOME PREDICTION

First, we sought to understand how demographic variables are related to a student's success in transfer-level Math [Level 6 course (MATH 101, 104, 119, 120,121, 130, or 244)]. The variables included for investigation are gender, age, ethnicity, and ESL status. For ethnicity, due to small numbers in some ethnic categories, groups were collapsed into larger categories: White (Non-Hispanic), Hispanic, Filipino/Asian, Black/African-American, and Other (Unknown, Other, Pacific Islander, American Indian/Alaskan Native).

We found that Filipino/Asian students were 2.5 times more likely to pass their transfer-level Math course compared to Hispanic) students, when controlling for age, gender, and ESL status ( $p = .020$ ). In addition, students grouped into the "Other" ethnic category were 4.6 times more likely to pass their transfer-level Math course than Hispanic students ( $p = .027$ ). There were no other significant differences found in odds of success based on these demographic factors.

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## TRANSFER-LEVEL COURSE OUTCOME PREDICTION

Proceeding analyses in transfer-level Math will focus solely on success within Level 6 Math courses (MATH 101, 104, 119, 120,121, 130, or 244) for students with MDTP Elementary Algebra Test Scores [N = 242].

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## ACADEMIC FACTORS

Next, while controlling for basic demographic variables of age, gender, ethnicity, and ESL status, we investigated differences in the predictive value of several academic factors in determining success in transfer-level Math. These variables included high school GPA, grade in last Math class, highest level of Math, and MDTP Elementary Algebra Test Score. We found that high school GPA and MDTP Elementary Algebra test scores were independently predictive of success within a transfer-level Math course. Those with a HS GPA of 3.0 and above were 3.1 times more likely to pass their transfer-level Math course compared to students with a 2.5 – 2.9 HS GPA ( $p = .004$ ), whereas students with a HS GPA between 2.5 and 2.9 and those with a HS GPA below 2.5 did not have significantly different odds of success within their course ( $p = .330$ ). In addition, for every one point increase on the MDTP Elementary Algebra test, the odds of successful course completion increased by 7.7% ( $p < .001$ ).

When controlling for these academic factors, Filipino/Asian students and Hispanic students no longer had significantly different odds of success ( $p = .088$ ), however, students categorized in “Other” ethnicity remained significantly more likely to succeed in their transfer level course compared to Hispanic students ( $p = .049$ ).

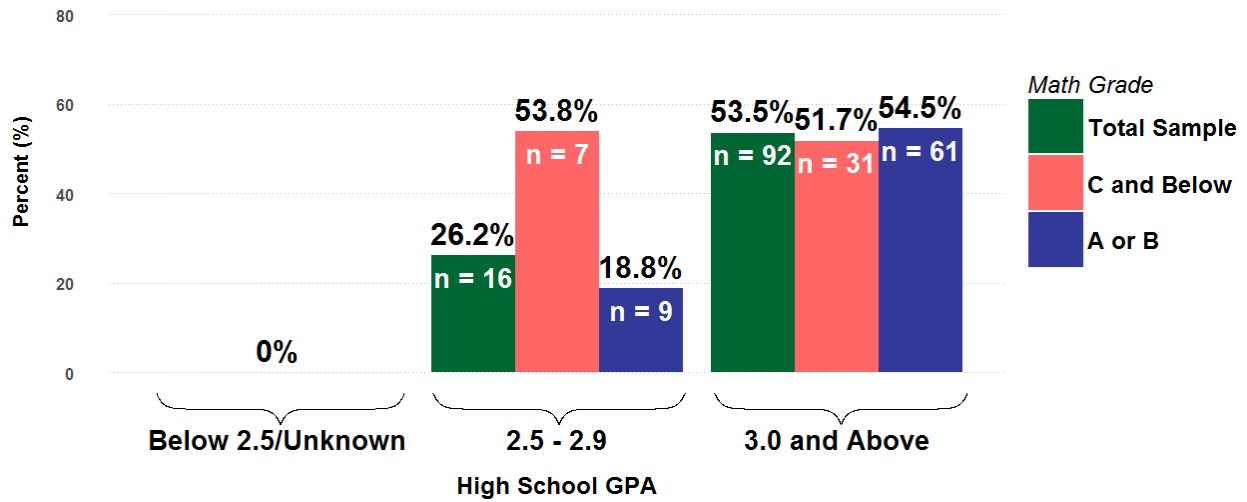
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## ACADEMIC FACTOR INTERACTIONS

Finally, we sought to understand how interactions between these academic factors may predict success in transfer-level Math. While still controlling for the basic demographic variables of age, gender, ethnicity, and ESL status, there was only one significant interaction. Those with a grade of A or B in their last high school math course compared to those with a C or below, are over 10 times more likely to pass their college Math course if they also have a HS GPA above 3.0 compared to those with a GPA between 2.5 and 2.9 ( $p < .001$ ).

## Math Transfer-Level Success Rate

*Math 101, 104, 119, 120, 121, 130, 244*



**Figure 7:** Graph describing interaction between high school GPA and grade in last Math class. Green bars represent the total success rate for each HS GPA grouping. For example, those with a HS GPA  $\geq 3.0$ , had a success rate of 53.5%. Coral bars represent the success rate for students within each HS GPA grouping with a C or below in their last Math class. Blue bars represent the success rate for students within each HS GPA grouping with an A or B in their last Math class. *n* is the number of students within that sample that completed the course with a A, B, C, or P.

However, as demonstrated in **Figure 7**, while the odds of success in transfer-level Math do increase for those with a HS GPA of 3.0 and above, compared to those with a HS GPA from 2.5 to 2.9, when their high school Math grade is also an A or B (reference: blue bar), there does not appear to be a lot of variability in the pass rates for those with a HS GPA of 3.0 and above explained by differences in high school Math grade (compare 51.7% to 54.5%). In this case, while the interaction between HS GPA and high school math grade is significant, HS GPA appears to be a better predictor of success in transfer-level Math independent of high school math grade (reference: green bars). For reference, the success rate when HS GPA  $\leq 2.4$  (0%) is based on the outcomes from nine students.

Within this interaction model, there were no longer any demographic differences in the odds of success in a transfer-level Math course.

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### SUBANALYSIS: SWEETWATER UNIFIED 2017 SENIORS

Among the Sweetwater Unified High School District Class of 2017 that placed at transfer-level Math ( $N = 293$ ) and enrolled a transfer-level Math course (Level 6) in the Fall 2017 term ( $n = 142$ ), 41.5% ( $n = 59$ ) passed the course. We investigated the predictive value of several academic factors derived from the data provided by SUHSD, including cumulative GPA, highest

level of math completed, the grade received in the highest level of math, along with their MDTP Elementary Algebra Score. We found that for every one point increase on the Elementary Algebra Test, the odds of success within a transfer-level Math course increased by 8.4% ( $p = .012$ ). Also, for every one unit increase in GPA (for instance, from a 2.0 to a 3.0), students are approximately 9.4 times more likely to pass their transfer-level Math course ( $p < .001$ ).

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## PREDICTIVE CONCLUSIONS AND PLACEMENT RECOMMENDATIONS

Using the combined results found above, we aimed to maximize the success rate and minimize failure rate. Given further graphical evidence (see Appendix pg. viii - ix), the following guidelines are purposed for placement into transfer-level Math:

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### OPTION 1 (HS GPA ONLY)

1. HS GPA  $\geq$  3.0

#### Outcomes following Math Placement Proposed Guidelines (Option 1)

	Students Included	Students Excluded
Placement at Transfer-Level Math	507	200
Enrolled in Level 6 Course (101,104,119,120,121,130,244)	187	85
Did not Successfully Complete Course	87	62
Successfully Completed Course	100	23
<b>% Passed</b>	<b>53.5%</b>	<b>27.1%</b>

*Table 10: Summary of Math Level 6 Placement (101, 104, 119, 120, 121, 130, 244) course outcomes that would have been observed under the revised placement recommendations (Option 1) for the 2017 MM Pilot Study students.*

OPTION 2 (HS GPA AND ELEMENTARY ALGEBRA TEST)

1. HS GPA  $\geq$  3.0

**AND/OR**

2. MDTP Elementary Algebra Test Score  $\geq$  26

**Outcomes following Math Placement Proposed Guidelines (Option 2)**

	Students Included	Students Excluded
Placement at Transfer-Level Math	597	73
Enrolled in Level 6 Course (101,104,119,120,121,130,244)	224	33
Did not Successfully Complete Course	111	30
Successfully completed Course	113	3
<b>% Passed</b>	<b>50.4%</b>	<b>9.1%</b>

**Table 11:** Summary of Math Level 6 Placement (101, 104, 119, 120, 121, 130, 244) course outcomes that would have been observed under the revised placement recommendations (Option 2) for the 2017 MM Pilot Study students.

Note: This guideline is aimed at maximizing success and minimizing failure given the data collected on the 2017 MM Pilot students. This guideline and its relationship to AB705 legislation is to be determined by college administrators, staff, and faculty.

CURRENT ASSESSMENT & PLACEMENT GUIDELINES FOR ENGLISH AND READING

**REVISED** Information needed for calculating

**Southwestern College placements using the CTEP**

**LATEST CHANGES ARE IN GREEN!**

**Re-coding**

Re-coding of CAPP # 12 High School GPA  
 1=7 , 2=6 , 3=5 , 4=4 , 5=3 , 6=2 , 7=1 , Blank or Multiple Responses =4

Re-coding of CAPP #11 Grade in Last English  
 1=4 , 2=3 , 3=2 , 4=1 , Blank or Multiple Responses =2

**Reading Regression Equation**

Reading Placement = Reading CTEP Score (0.05124) + Re-coded HSGPA (0.252) +  
 Re-coded Grade in Last English (0.207) + -0.397

Actual Course = Reading Course Placement= Cut Scores for Reading Placement				
English 52	= 1	= 0.00 to 1.53	0.00 to 1.64	0.00 to 1.64
English 54	= 2	= 1.54 to 1.64	1.65 to 1.99	1.65 to 1.99
English 56	= 3	= 1.65 to 1.79	2.00 to 2.24	2.00 to 2.24
English 158	= 4	= 1.80 to 2.14	2.25 to 2.35	2.25 to 5.00
Proficiency	= 5	= 2.15 to 4.00	2.36 to 5.00	2.0 or higher + score 23 or higher

**English Regression Equation**

English Placement = Reading CTEP Score (0.04211) + Grammar CTEP Score (0.05882) +  
 Syntax CTEP Score (0.00001) + Re-coded HSGPA (0.02569) + Re-  
 coded Grade in Last English (0.253) + -0.117

Actual Course = English Course Placement = Cut Scores for Reading Placement

English 71	= 1	= 0.00 to 1.99	0.00 to 2.42
English 114	= 2	= 2.00 to 2.49	2.43 to 3.05
English 115	= 3	= 2.50 to 4.00	3.06 to 5.00

**Referral to ESL Assessment**

Referral = Reading CTEP Score + Grammar CTEP Score + Syntax CTEP Score

Referral to ESL Assessment = Yes if "Referral" is less than 26.  
 = No if "Referral" is 26 or greater.

Statement: "Take ESL Assessment; contact Assessment Center."

Capp-progCTEPplcmnts



**SOUTHWESTERN COLLEGE ASSESSMENT  
MATHEMATICS DIAGNOSTIC TESTING PROJECT (MDTP)  
CUT SCORES**

**MDTP ALGEBRA READINESS TEST CUT SCORES**

0-20	Recommend enrolling in NC 1025; may enroll in Math 35
21-25	Math 35
26-30	Recommend enrolling in Math 48; may enroll in Math 35
31-40	Math 45 or 57
41-50	Recommend taking the Elementary Algebra Test or Intermediate Algebra Test; May enroll in Math 45 or 57

**MDTP ELEMENTARY ALGEBRA TEST CUT SCORES**

0-10	Recommend taking the Algebra Readiness Test or enrolling NC 1025; May enroll in Math 35
11-16	Recommend taking the Algebra Readiness Test; May enroll in Math 35
17-20	Recommend enrolling in Math 48; may enroll in Math 35
21-30	Math 45 or 57
31-40	Math 60
41-50	Recommend taking a higher-level test; May enroll in Math 70, 100, 110, 112

**MDTP INTERMEDIATE ALGEBRA TEST CUT SCORES**

0-18	Follow Lower Test Course Placement
19-26	Math 60
27-31	Math 70, 100, 110, 112
32-40	Math 101, 104, 119, 120, 121, 130, 244
41-45	Recommend taking the Precalculus test; May enroll in Math 101, 104, 119, 120, 121, 130, 244

**MDTP PRECALCULUS TEST CUT SCORES**

0-29	Follow Lower Test Course Placement
30-60	Math 101, 104, 244
42-60 <u>and</u> 5-7 Trig Qs <sup>1</sup>	Math 250

<sup>1</sup>Placement into Math 250 requires a score of 42-60 on the Precalculus Test and 5 or more of the Precalculus Test's 7 trigonometry questions answered correctly

**SOUTHWESTERN COLLEGE ASSESSMENT**  
**MATHEMATICS DIAGNOSTIC TESTING PROJECT (MDTP)**  
**MULTIPLE MEASURES**

**MDTP MULTIPLE MEASURES**

- **New multiple measures have been implemented in April 2008:**
  - Highest math course completed
  - Grade in the last math course completed
  - Years since the last math course was completed

**MDTP ALGEBRA READINESS TEST MULTIPLE MEASURE CRITERIA**

- **A “points added” system is being implemented for the multiple measures:**
  - **7two points added** to ART score if:
    - currently enrolled or it has been two years or less since enrollment in *Algebra 1 or a higher math course* **and**
    - earned a grade of A or B in that course.
  - **3one points added** to ART score if:
    - currently enrolled or it has been two years or less since enrollment in *Basic Math* **and**
    - earned a grade of A or B in that course.

**MDTP ELEMENTARY ALGEBRA TEST MULTIPLE MEASURE CRITERIA**

- **A “points added” system is being implemented for the multiple measures:**
  - **7two points added** to EAT score if:
    - currently enrolled or it has been less than one year since enrollment in *Algebra 2 or a higher math course* **and**
    - earned a grade of A or B in that course.
  - **3one points added** to EAT score if:
    - currently enrolled or it has been less than one year since enrollment in *Algebra 1 or Geometry* **and**
    - earned a grade of A or B in that course.

**MDTP INTERMEDIATE ALGEBRA TEST MULTIPLE MEASURE CRITERIA**

- **A “points added” system is being implemented for the multiple measures:**
  - **3two points added** to IAT score if:
    - currently enrolled or it has been less than one year since enrollment in *Algebra 2 or a higher math course* **and**
    - earned a grade of A or B in that course.
  - **2one points added** to IAT score if:
    - currently enrolled or it has been less than one year since enrollment in *Algebra 1 or Geometry* **and**
    - earned a grade of A or B in that course.

MULTIPLE MEASURES ONLY PLACEMENT FOR MATH (2017 MM PILOT)

Revised: 5/22/2017

MULTIPLE MEASURES PLACEMENT: BASED ON CAPP SELF REPORTED DATA			
If the last Math class taken was:	And received grade of:	And High School GPA is:	* Then student is eligible for any course up to:
(A) None	Any	Any	Math 35
(A) Basic Math (Arithmetic)	Any	Any	Math 35
(C) Geometry	Any	Any	Math 35 or MATH 48
(D) Integrated Math I	A, B or C	Any	Math 45 or 57
	< C	Any	Math 35
(E) Algebra I (Integrated Math II) or Financial Algebra	A or B	Any	Math 60
	C	Any	Math 45 or 57
	< C	Any	Math 35 or MATH 48
(F) Algebra II (Integrated Math III)	A or B	Any	Math 70, 100, 110, 112
	C	≥ 3.0 (B or better)	Math 70, 100, 110, 112
		< 3.0 (Below B)	Math 60
	< C	Any	Math 60
(G) College Algebra; Pre-Calculus (Math Analysis); Statistics; Trigonometry; Finite or Discrete Math.	A or B	Any	Math 100, 101, 104, 110, 112, 119, 120, 121, 130, 244
	C	≥ 3.0 (B or better)	Math 100, 101, 104, 110, 112, 119, 120, 121, 130, 244
		< 3.0 (Below B)	Math 70, 100, 110, 112
	< C	Any	Math 70, 100, 110, 112
(I) Calculus	A, B	Any	Math 250
	≤ C	Any	Math 100, 101, 104, 110, 112, 119, 120, 121, 130, 244

\* Student planning to take Math 45 or 57 may also be referred to MATH 48 or MATH 57 if a pre-major - CONSULT A COUNSELOR.

\*\* Student may be referred to Math 48

\*\*\* Student may be referred to Fast-track Math 60 and 70

2017 MULTIPLE MEASURES PILOT AND 2017 PRE-PILOT DEMOGRAPHICS

2017 Multiple Measures Pilot Study Demographics for Pre-Pilot and Pilot Students												
	English				Reading				Math			
	Pre-Pilot		Pilot		Pre-Pilot		Pilot		Pre-Pilot		Pilot	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Total</b>	1852	100	2687	100	1875	100	2711	100	1905	100	3068	100
<b>Gender</b>												
Female	938	50.6%	1273	47.4%	949	50.6%	1293	47.7%	965	50.7%	1483	48.3%
Male	909	49.1%	1405	52.3%	920	49.1%	1409	52.0%	932	48.9%	1567	51.1%
Unknown/Unreported												
<b>Ethnicity</b>												
African-American, Non-Hispanic	85	4.60%	242	9.00%	89	4.70%	241	8.90%	105	5.50%	271	8.80%
American Indian/Alaskan Native	11	0.60%	19	0.70%	11	0.60%	19	0.70%	13	0.70%	25	0.80%
Asian	57	3.10%	101	3.80%	59	3.10%	101	3.70%	62	3.30%	120	3.90%
Filipino	100	5.40%	153	5.70%	100	5.30%	156	5.80%	109	5.70%	169	5.50%
Hispanic	1375	74.2%	1808	67.3%	1390	74.1%	1825	67.3%	1383	72.6%	2040	66.5%
Other, Non-White	18	1.00%	19	0.70%	18	1.00%	20	0.70%	19	1.00%	25	0.80%
Pacific Islander	25	1.30%	42	1.60%	25	1.30%	41	1.50%	25	1.30%	51	1.70%
White, Non-Hispanic	136	7.30%	233	8.70%	137	7.30%	237	8.70%	141	7.40%	267	8.70%
Unknown/No Response	45	2.40%	70	2.60%	46	2.50%	71	2.60%	48	2.50%	100	3.30%
<b>Age (at time of assessment)</b>												
17 and younger	663	35.8%	511	19.0%	669	35.7%	510	18.8%	677	35.5%	565	18.4%
18 - 19 yrs	746	40.3%	1219	45.4%	749	39.9%	1216	44.9%	760	39.9%	1393	45.4%
20 - 24 yrs	197	10.6%	474	17.6%	197	10.5%	487	18.0%	234	12.3%	583	19.0%
25 - 29 yrs	100	5.40%	220	8.20%	107	5.70%	225	8.30%	104	5.50%	254	8.30%
30 and older	146	7.90%	263	9.80%	153	8.20%	273	10.1%	130	6.80%	273	8.90%

GRAPH OF ENGLISH TRANSFER-LEVEL SUCCESS BY HS GPA

English Transfer-Level (ENGL 115) Success Rate by HS GPA:  
2017 Multiple Measures Only Placement Pilot Study

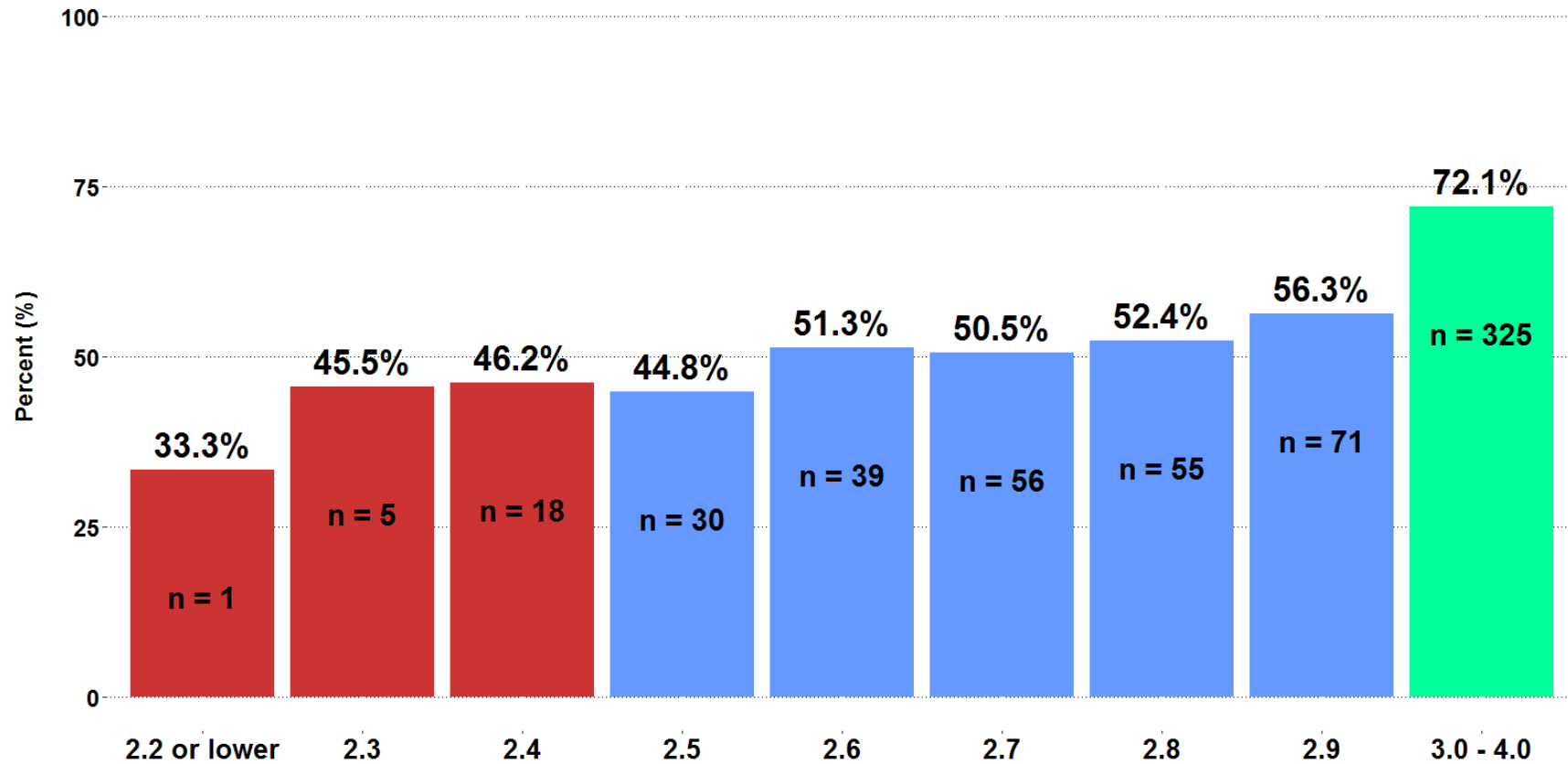


Figure 8: Graph displaying the success rate (A/B/C/P) for students placed into transfer-level English (ENGL 115) and enrolled in transfer-level course from the 2017 MM Pilot Study, grouped by self-reported HS GPA. *n* is the number of students within that sample that completed the course with a A, B, C, or P.

GRAPH OF ENGLISH TRANSFER-LEVEL SUCCESS BY CTEP GRAMMAR SCORE

English Transfer-Level (ENGL 115) Success Rate by CTEP Grammar Score  
 2017 Multiple Measures Only Placement Pilot Study

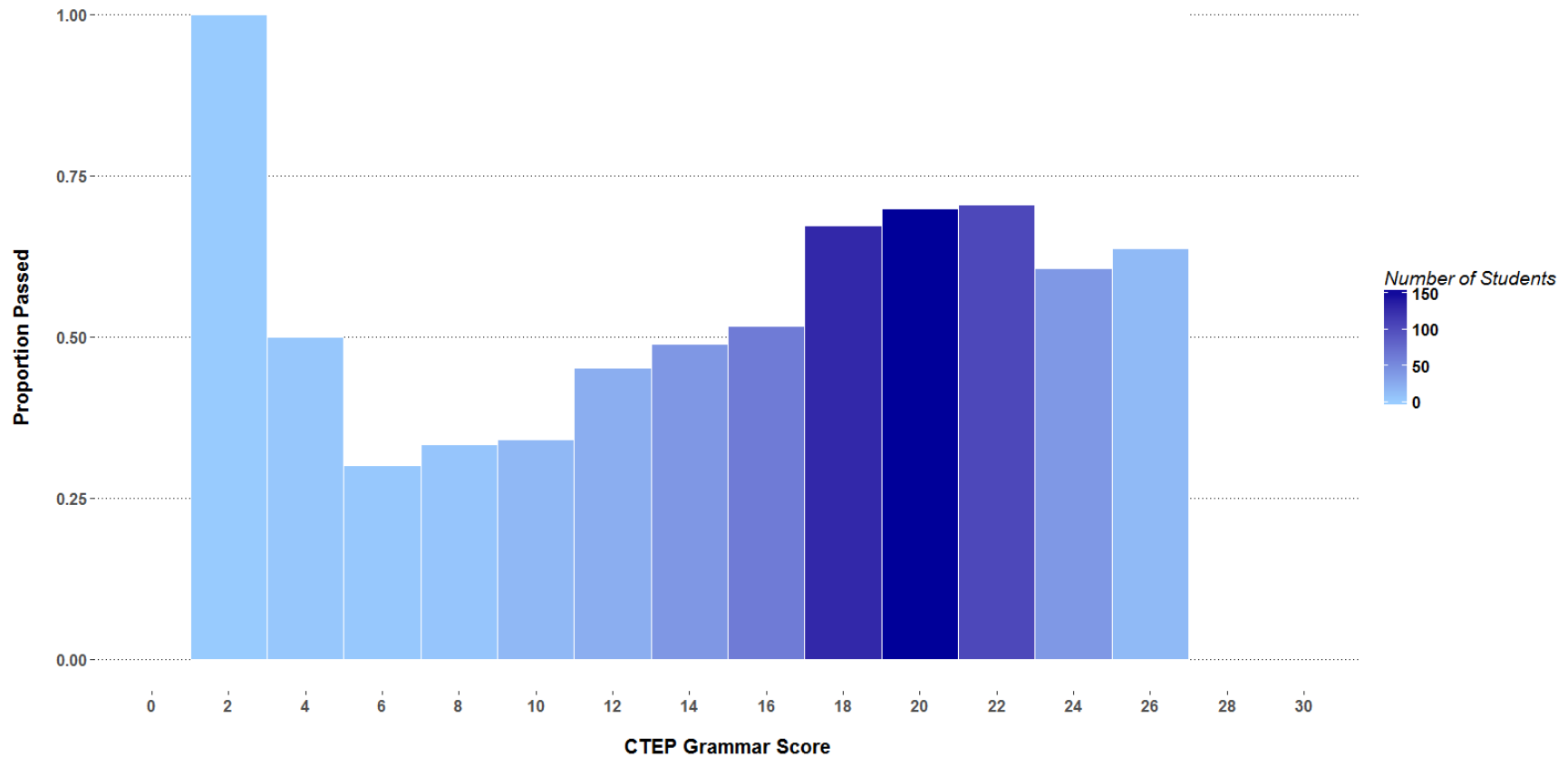


Figure 9: Graph displaying the success rate (A/B/C/P) for students placed into transfer-level English (ENGL 115) and enrolled in transfer-level course from the 2017 MM Pilot Study, grouped by CTEP Grammar Score. Color of the bar corresponds to the density of students binned within those CTEP Grammar Score ranges (see legend on the right for density sizes). For example, if we look at students that scored between a 19 and 21, represents approximately 150 students, the proportion of students that successfully completed English 115 is close to 70.0%.

GRAPH OF MATH TRANSFER-LEVEL SUCCESS BY HS GPA

Math Transfer-Level Success Rate by HS GPA:  
*Math 101, 104, 119, 120, 121, 130, 244*

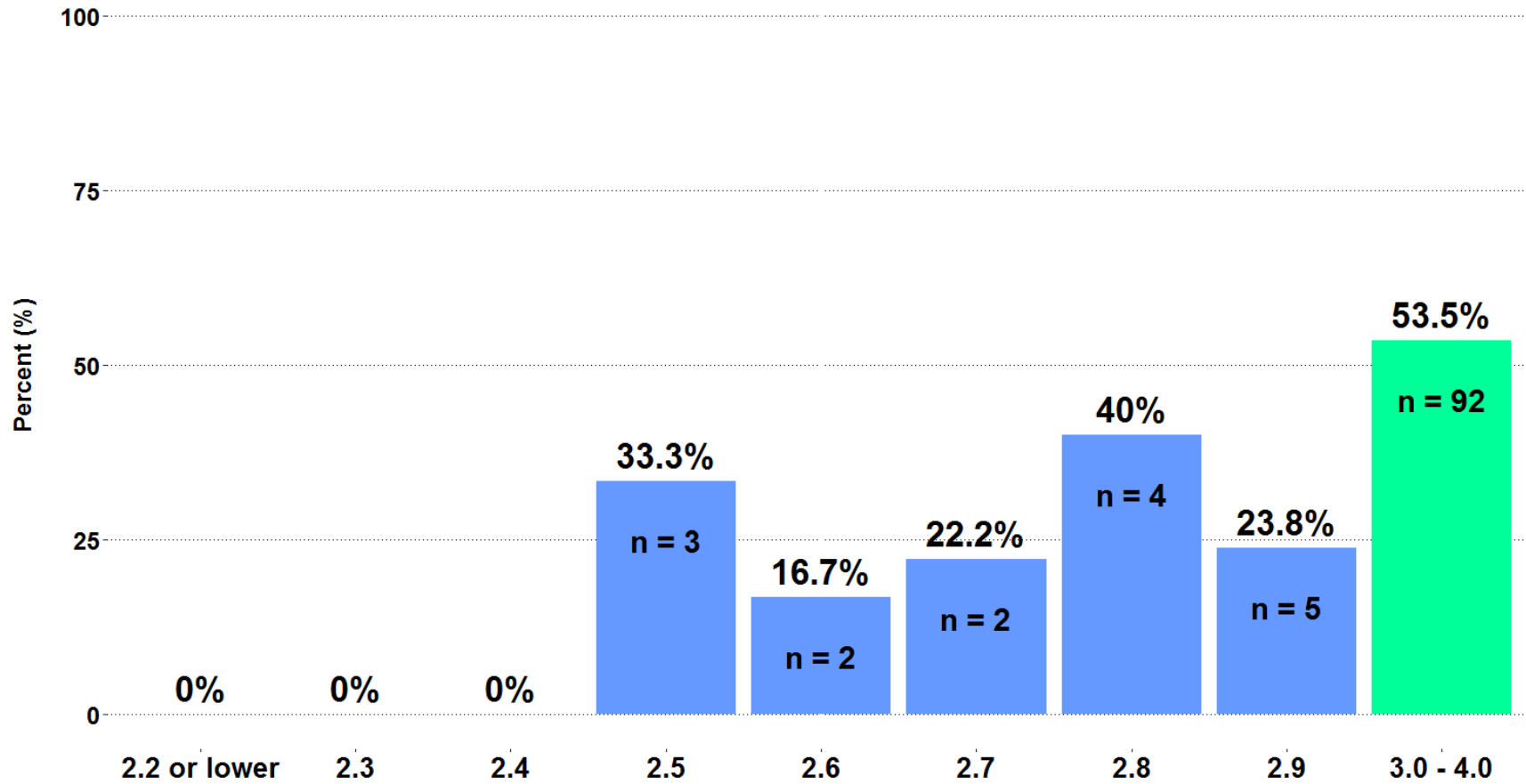


Figure 10: Graph displaying the success rate (A/B/C/P) for students placed into transfer-level Math ( $\geq 6$ ) and enrolled in transfer-level course from the 2017 MM Pilot Study, grouped by self-reported HS GPA. *n* is the number of students within that sample that completed the course with a A, B, C, or P.

GRAPH OF MATH TRANSFER-LEVEL SUCCESS BY MDTP ELEMENTARY ALGEBRA SCORE

Math Transfer-Level Success Rate by Elementary Algebra Test Score  
2017 Multiple Measures Pilot Study

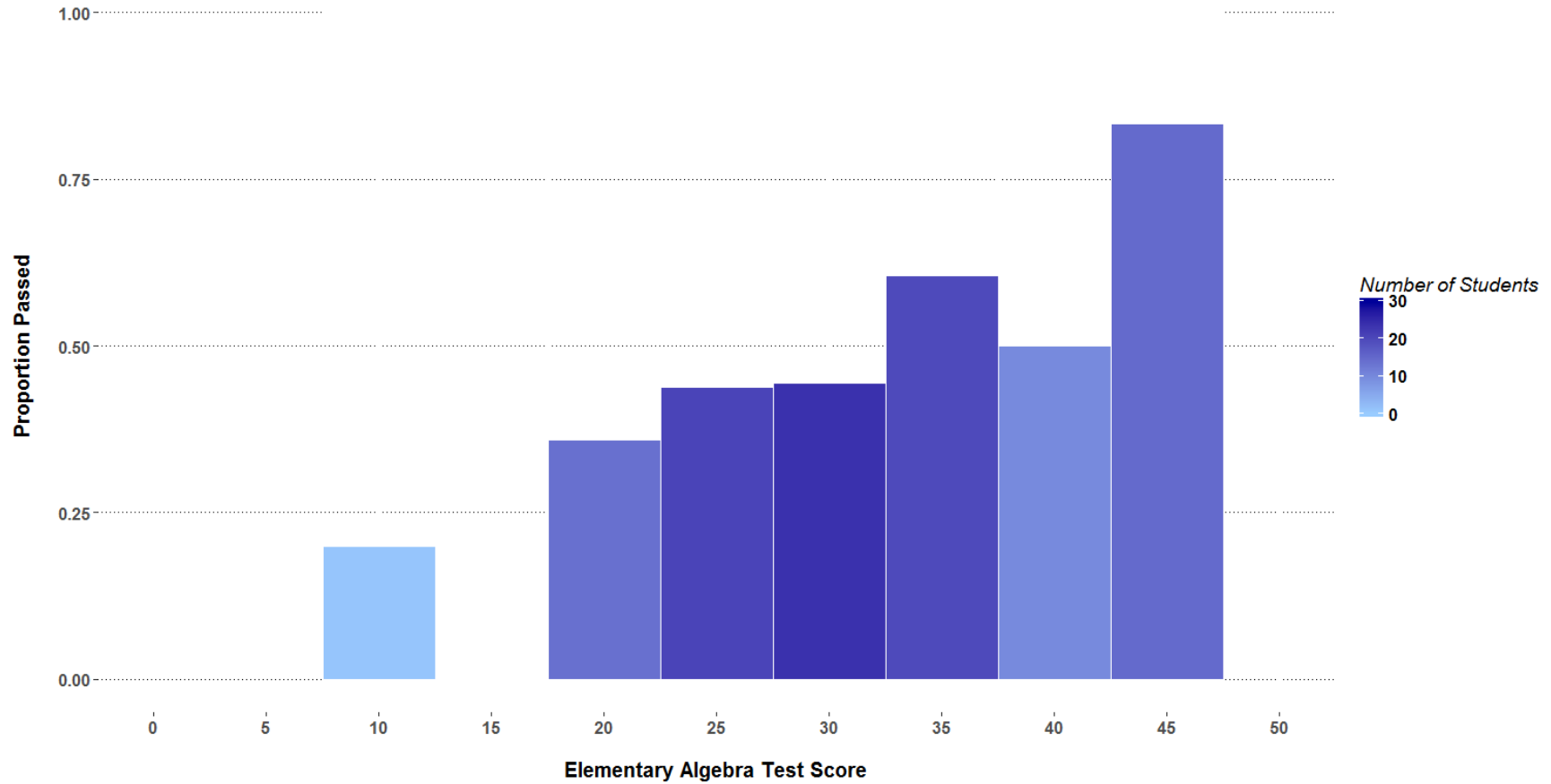


Figure 11: Graph displaying the success rate (A/B/C/P) for students placed into transfer-level Math ( $\geq 6$ ) and enrolled in transfer-level course from the 2017 MM Pilot Study, grouped by MDTP Elementary Algebra Score. Color of the bar corresponds to the density of students binned within those Elementary Algebra Score ranges (see legend on the right for density sizes). For example, if we look at students that scored between a 37 and 42, represents approximately 10 students, the percent of students that successfully completed English 115 is close to 50.0%.



TABLE OF ENROLLMENT FOLLOWING TRANSFER-LEVEL PLACEMENT

**Enrollment following Transfer-Level Placement**

	English (115)		Reading (158)		Math	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
<b>Total Tested during MM Pilot</b>	2687	100%	2711	100%	3068	100%
<b>Placed at Transfer Level {for Reading: RDG 158 only considered}</b>	2086	77.6%	1317	48.6%	707	23.0%
<b>{Of those placed at Transfer Level} Enrolled at Transfer Level</b>	989	47.4%	268	20.3%	314	44.4%

TABLE OF TRANSFER-LEVEL MATH ENROLLMENT FOLLOWING TRANSFER-LEVEL PLACEMENT

	Math Level 6 {MATH 101, 104, 119, 120, 121, 130, 244}		Math Level 8 {Math 250}	
	<i>N</i>	%	<i>N</i>	%
<b>Total Tested during MM Pilot</b>	3068	100%	3068	100%
<b>Placed at Transfer Level 6 {MATH 101, 104, 119, 120, 121, 130, 244}</b>	582	18.97%	125	4.1%
<b>{Of those placed at Transfer-Level} Enrolled at Transfer Level 6</b>	255	43.8%	17	13.6%
<b>{Of those placed at Transfer-Level} Enrolled at Transfer Level 8</b>		0.2%	42	33.6%

TABLE OF MATH PLACEMENT AND ENROLLMENTS, ALL

	Placement Summary		Enrolled in Any Math Course		Of those who enrolled, Enrolled in Given Placement Level Math Course		Of those who enrolled, Enrolled in One Level below placement	
	N	%	N	%	N	%	N	%
<b>2017 MM Pilot Total</b>	<b>3068</b>	<b>100%</b>	<b>1364</b>	<b>44.5</b>	<b>1221</b>	<b>89.5%</b>	<b>74</b>	<b>5.4%</b>
Placed at Level 8 (Math 250)	125	4.10%	65	52.0%	41	63.1%	17	26.2%
Placed at Level 6 (Math 101, 104, 119, 120, 121, 130, 244)	582	18.97%	286	49.1%	255	89.2%	19	6.64%
Placed at Level 5 (Math 70, 100, 110, 112)	781	25.5%	307	39.3%	283	92.2%	8	2.60%
Placed at Level 4 (Math 60)	696	22.7%	310	44.5%	277	89.4%	20	6.40%
Placed at Level 3 (Math 45, 57)	400	13.0%	185	46.2%	164	88.6%	10	5.40%
Placed at Level 2 or 1 (Math 35, 48)	484	15.8%	211	43.6%	201	95.3%	NA	NA

TABLE OF MATH PLACEMENT LEVEL 6 ENROLLMENT AND COURSE OUTCOMES

**Math Level 6 Enrollment & Course Outcome Breakdown (2017 MM Pilot)**

	Enrollment (A, B, C, D, F, I, P, NP, W)		Completed Course (A, B, C, D, F, I, P, NP)		Successfully Completed Course (A, B, C, P)	
	N	%	N	%	N	%
<b>Total Placed at Level 6</b>	582	100%				
<b>Enrolled in Level 6 Course *some students had multiple enrollments</b>	255	43.8%	179	70.2%	112	43.9%
<b>Math 101</b>	57		35	61.4%	22	38.6%
<b>Math 104</b>	15		13	86.7%	11	73.3%
<b>Math 119</b>	91		67	73.6%	46	50.5%
<b>Math 120</b>	20		15	75.0%	10	50.0%
<b>Math 121</b>	26		19	73.1%	11	42.3%
<b>Math 130</b>						
<b>Math 244</b>	54		36	66.7%	19	35.2%

TABLE OF MATH PLACEMENT LEVEL 5 ENROLLMENT AND COURSE OUTCOMES

**Math Level 5 Enrollment & Course Outcome Breakdown (2017 MM Pilot)**

	Enrollment (A, B, C, D, F, I, P, NP, W)		Completed Course (A, B, C, D, F, I, P, NP)		Successfully Completed Course (A, B, C, P)	
	N	%	N	%	N	%
<b>Total Placed at Level 5</b>	781	100%				
<b>Enrolled in Level 5 Course</b> *some students had multiple enrollments	283	36.2%	194	68.6%	94	33.2%
<b>Math 70</b>	267		179	67.0%	89	33.3%
<b>Math 100</b>	16		15	93.8%		
<b>Math 110</b>						
<b>Math 112</b>						

TABLE OF MATH PLACEMENT LEVEL 4 ENROLLMENT AND COURSE OUTCOMES

**Math Level 4 Enrollment & Course Outcome Breakdown (2017 MM Pilot)**

	Enrollment (A, B, C, D, F, I, P, NP, W)		Completed Course (A, B, C, D, F, I, P, NP)		Successfully Completed Course (A, B, C, P)	
	N	%	N	%	N	%
<b>Total Placed at Level 4 (Math 60)</b>	696	100%				
<b>Enrolled in Level 4 Course (Math 60)</b>	277	39.8%	159	57.4%	61	22.0%

TABLE OF MATH PLACEMENT LEVEL 3 ENROLLMENT AND COURSE OUTCOMES

**Math Level 3 Enrollment & Course Outcome Breakdown (2017 MM Pilot)**

	Enrollment (A, B, C, D, F, I, P, NP, W)		Completed Course (A, B, C, D, F, I, P, NP)		Successfully Completed Course (A, B, C, P)	
	N	%	N	%	N	%
<b>Total Placed at Level 3</b>	400	100%				
<b>Enrolled in Level 3 Course</b>	167	41.8%	119	71.3%	65	38.9%
<b>Math 45</b>	159	95.2%	113	71.1%	64	40.3%
<b>Math 57</b>						

TABLE OF MATH PLACEMENT LEVEL 1 OR 2 ENROLLMENT AND COURSE OUTCOMES

**Math Level 1 or 2 Enrollment & Course Outcome Breakdown (2017 MM Pilot)**

	Enrollment (A, B, C, D, F, I, P, NP, W)		Completed Course (A, B, C, D, F, I, P, NP)		Successfully Completed Course (A, B, C, P)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
<b>Total Placed at Level 1/2</b>	483	100%				
<b>Enrolled in Level 1/2 Course</b>	201	41.6%	163	81.1%	93	46.3%
<b>Math 35</b>	151	75.1%	127	84.1%	80	53.0%
<b>Math 48</b>	50	24.9%	36	72.0%	13	26.0%