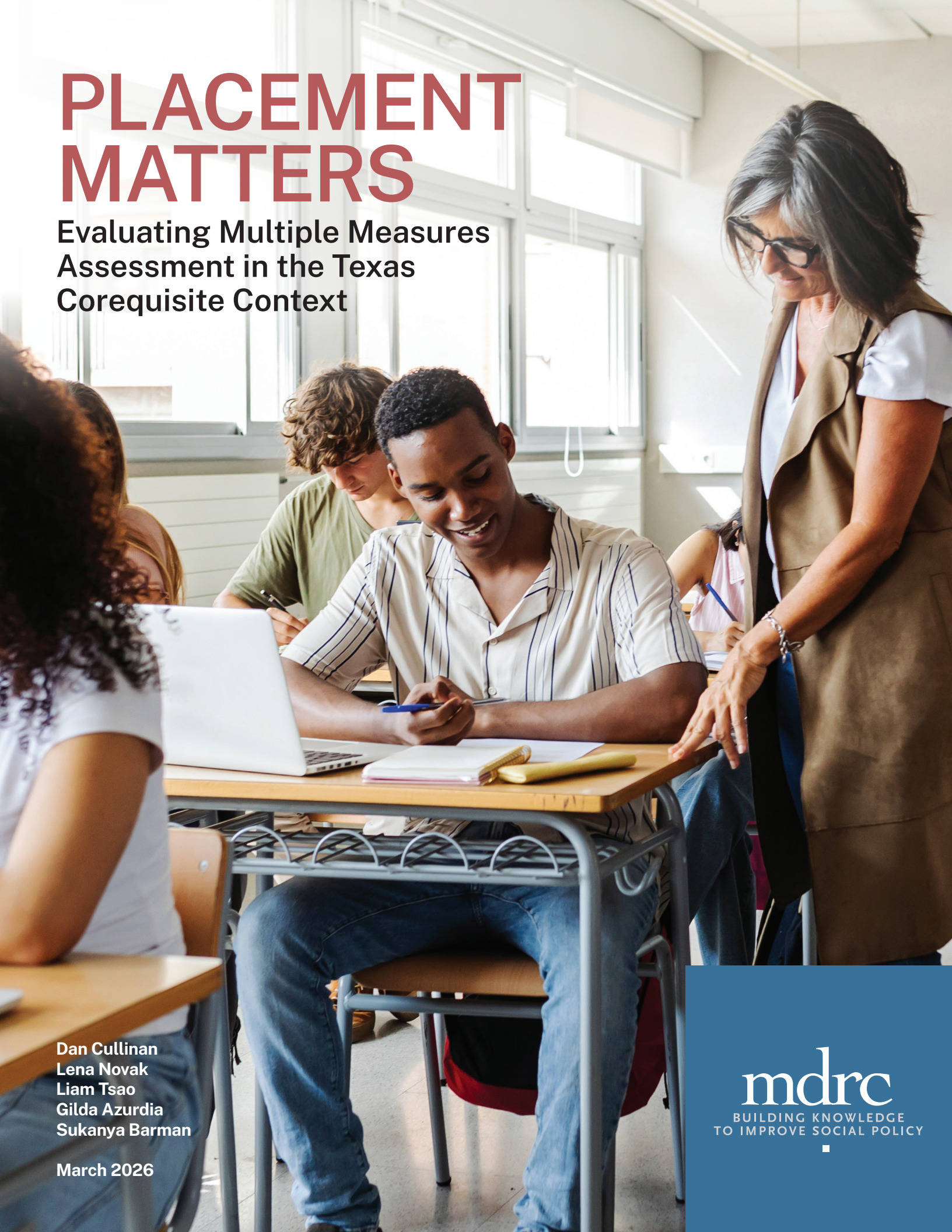

PLACEMENT MATTERS

Evaluating Multiple Measures Assessment in the Texas Corequisite Context

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March 2026

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BUILDING KNOWLEDGE TO IMPROVE SOCIAL POLICY

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OVERVIEW

In the fall of 2023, Texas' community colleges enrolled over 676,000 students, an increase of 4 percent since 2021 and a return to prepandemic levels. These enrollment numbers suggest that many students in the state still view community college as a pathway to greater educational and economic opportunities after the pandemic. However, over 60 percent of students enrolling in a Texas community college in fall 2023 were deemed not college-ready in math, reading, or writing. This statistic raises two important questions: (1) How can Texas colleges best identify students who are college-ready and (2) how can they best serve students who are not?

Currently, many incoming college students in Texas are placed into college-level coursework based only on their scores on the Texas Success Initiative Assessment 2.0, a statewide standardized test. However, evidence suggests that test-only placement systems can mistakenly assess substantial numbers of students as "not college-ready"; in other words, they may not reflect a student's true ability to succeed in college-level coursework. In recent years, multiple measures assessment (MMA) has emerged as a promising alternative. MMA is a placement method that relies on more than one indicator—such as cumulative high school grade point average, high school course-taking patterns, or standardized test scores—to assess a student's college readiness. Previous studies suggest that MMA, when used to allow more students to take college-level courses, can increase course completion and credit accumulation in college.

During the fall 2024 semester, MDRC partnered with the Texas Higher Education Coordinating Board to conduct a rigorous evaluation of MMA placement policies at two community colleges in the state. This study was designed to provide evidence on the effectiveness of MMA in Texas community colleges, with the potential to inform changes to statewide placement policies. Most past research on MMA was conducted under a prerequisite developmental education system, which required students to complete one or more non-credit-bearing courses before enrolling in college-level coursework. As of 2025, however, Texas and at least 28 other states have shifted to a corequisite model, in which students enroll in a college-level course and receive related academic support at the same time. Findings from this study will help assess the effectiveness of MMA placement policies in this corequisite course context.

The initial findings from this study demonstrate that using multiple measures to place students increased first-semester college-level math completion rates by 1.9 percentage points but had no discernable effect on college-level English completion rates. Only one semester of data were available for this report, which makes degree-completion effects impossible to observe at this time. However, college credits earned—an early indicator of progress toward a degree—showed a statistically significant positive effect of 0.4 credits. These findings suggest that MMA can be used successfully in the state of Texas.

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ACKNOWLEDGMENTS

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The Authors

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Introduction

In the fall of 2023, Texas community colleges enrolled over 676,000 students, an increase of 4 percent since 2021 and a return to the enrollment levels recorded before the start of the pandemic.[1] These enrollment numbers suggest that many students in the state still view community college as a pathway to greater educational and economic opportunities after the pandemic. However, over 60 percent of students enrolling in a Texas community college in fall 2023 were deemed not college-ready in math, reading, or writing.[2] This statistic raises two important questions: (1) How can Texas colleges best identify students who are college-ready and (2) how can they best serve students who are not college-ready?

Currently, many incoming college students in Texas are placed into college-level coursework based only on their scores on the Texas Success Initiative Assessment 2.0 (TSIA2), a statewide standardized test.[3] However, evidence suggests that test-only placement systems can misplace substantial numbers of students; in other words, they may not reflect a student's true ability to succeed in college-level coursework.[4] In recent years, multiple measures assessment (MMA) has emerged as a promising alternative. MMA is a placement method that relies on more than one indicator — such as cumulative high school grade point average (GPA), high school course-taking patterns, or standardized test scores — to assess a student's college readiness.[5] Previous studies suggest that MMA, when used to allow more students to take stand-alone, college-level courses, can increase college-level course completion and credit accumulation.[6]

During the fall 2024 semester, MDRC partnered with the Texas Higher Education Coordinating Board (THECB) on the Texas Multiple Measures Assessment Randomized Controlled Trial — a

1. Wilburn (2023).
2. Texas Higher Education Coordinating Board (2025).
3. Texas Education Agency (2023).
4. Allensworth and Clark (2020); Hodara and Lewis (2017); Attewell et al. (2022).
5. For the purposes of this study, the term "high school course-taking patterns" refers to the total number of years that students have taken English and math courses, respectively.
6. Litschwartz, Cullinan, and Hill (2024).

rigorous evaluation of MMA placement policies at two community colleges in the state.[7] This study was designed to provide evidence about the effectiveness of MMA in Texas community colleges and inform statewide placement policies. The study addresses a gap in the research on MMA in a state like Texas that primarily relies on corequisite courses, in which students enroll in a college-level course and concurrently receive related academic support, for remediation. These factors have increased the motivation for THECB to modify Texas' placement policies to better target support services to the students who may need them the most. This evaluation seeks to provide evidence on whether using MMA to determine students' college readiness can increase student completion and retention rates in the corequisite context, and if so, what enrollment policy changes could look like.

TEXAS' PLACEMENT REGIME

Texas is just one of a few states that relies on a single, statewide test to determine nonexempt students' readiness for college-level coursework. Unless they receive an exemption, all incoming college students receive course referrals using the TSIA2, which assesses readiness for college-level math, reading, and writing courses.[8] However, there is evidence that the TSIA and similar tests often place students into developmental courses when they could have been successful without them.[9]

MMA placement systems — which incorporate additional measures like a student's cumulative high school GPA in addition to their standardized test scores — can be designed to identify college-ready students who are missed by standardized tests and can potentially allow more students to enroll in and complete college-level courses without additional required support. Texas already has experience with MMA placement policies. During the COVID-19 pandemic, THECB issued a TSIA2 waiver due to the challenges associated with in-person testing. Colleges could give students course referrals using indicators like cumulative high school GPA and course-taking patterns, rather than the TSIA2 alone.[10] Although the waiver expired after the 2021-2022 academic year, this experience gave THECB and other stakeholders greater familiarity with MMA practices in Texas.

Starting in 2021, MDRC and the Community College Research Center collaborated with THECB on the Center for the Analysis of Postsecondary Readiness (CAPR) 2.0 project, which provided technical assistance to seven two- and four-year institutions in Texas as they

7. A randomized controlled trial is a type of evaluation design in which individuals are randomly assigned to either a program group (that is eligible to receive the intervention) or a control group (that is not). By comparing the outcomes of the two groups—which are similar in all ways—a study can estimate the impact of the intervention.
8. Texas Education Agency (2023).
9. Litschwartz, Cullinan, and Hill (2024). Developmental courses are non-credit-bearing support courses, usually required before taking a college-level English or math course for those students who are deemed not ready to take the college-level course.
10. Texas Higher Education Coordinating Board (2025).

developed, implemented, and sustained an MMA policy. By April 2023, three of the seven institutions had implemented MMA policies on a large scale while others were preparing for implementation, indicating active investment in MMA-driven practices. Moreover, analyses found that cumulative high school GPA did a better job of predicting which students could succeed in stand-alone, college-level English and math courses than the TSIA alone.[11]

One goal of this initial work was to expand MMA practices statewide by December 2024. However, this was not possible due to Texas' current placement policy, which only allows colleges with research waivers to use MMA placement practices. The Texas MMA Randomized Controlled Trial serves as a continuation of these efforts, aiming to provide a more rigorous evaluation of MMA in Texas.

DEVELOPMENTAL EDUCATION IN TEXAS

In 2017, Governor Greg Abbott signed House Bill 2223 into law, requiring 75 percent of Texas' underprepared college students to be enrolled in corequisite classes by fall 2020.[12] This bill was passed in line with the rising use of corequisite models across the country to improve academic outcomes for underprepared college students.[13]

Historically, students who did not qualify for college courses were required to complete one or more stand-alone, non-credit-bearing prerequisite courses before enrolling in college-level coursework. Prerequisite courses are intended to prepare students by providing foundational skills to support success in the college-level course. Unfortunately, most students assigned to these courses never complete the required prerequisite course sequence, let alone graduate.[14] Two challenges, among others, that may influence completion rates for students in prerequisite courses are the additional time and money needed to receive a degree.

By contrast, a corequisite model has students enroll in a college-level course and concurrently receive related academic support. Corequisite models vary in practice, but perhaps the most common approach is for students to take two courses simultaneously: a credit-bearing college-level course and a support course, referred to as a corequisite course, which does not count for college-level credit. The corequisite course content varies but may include curricula to build subject-specific competencies, an introduction to campus resources, and outside tutoring sessions. In any given week, corequisite courses may function as preparatory support ahead of the paired college-level course or as a review session afterward. Compared

11. Cullinan and Biedzio Rizik (2023).
12. Texas Higher Education Coordinating Board (2018).
13. Education Commission of the States (2025).
14. Bailey, Jeong, and Cho (2010); Clotfelter, Ladd, Muschkin, and Vigdor (2015); Scott-Clayton and Rodriguez (2015).

with prerequisite remediation, studies have shown that corequisite courses can improve college-level English and math completion rates and thus help students persist in college.[15]

Community colleges in Texas largely use corequisite courses for college-level support (though as demonstrated in this study, some retain a limited number of prerequisites, particularly in math). Individual Texas colleges are responsible for providing standards and objectives for these courses.[16] However, while corequisite courses can reduce students' time to completion and allow students to enroll in courses aligned with their degree sooner, corequisites still cost additional time and money.[17] Given these additional costs, some students might be better served by forgoing corequisite courses altogether and going straight to college-level coursework. This approach can free up space in their schedules for another course.

ROADMAP TO THE REPORT

The remainder of this report highlights the study findings. Chapter 2 presents information about the evaluation, including the design of the study, the data sources used, and the primary analysis sample. Chapter 3 discusses study outcomes such as the number of students who completed English and math courses by college. Chapter 4 synthesizes findings from the study, including implications for Texas policy and future research.

15. Logue, Douglas, and Watanabe-Rose (2019).
16. Texas Higher Education Coordinating Board (2018).
17. Miller, Daugherty, Martorell, and Gerber (2022); Logue, Douglas, and Watanabe-Rose (2019).

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About the Evaluation

This study aims to evaluate the effectiveness of using multiple measures assessment (MMA) to place students — who would otherwise be referred to a corequisite or prerequisite course based on their scores on the Texas Success Initiative Assessment 2.0 (TSAI2) — into a stand-alone, college-level course instead. The students' placement would be based on their cumulative high school grade point average (GPA) and course-taking patterns. The logic model in Figure 2.1 shows the inputs, activities, outputs, and outcomes for these placement system changes. They are described in greater detail in the sections below.

STUDY DESIGN AND RECRUITMENT

To recruit colleges for the study, the Texas Higher Education Coordinating Board (THECB) sent an invitation to participate to all two- and four-year institutions in Texas. From this initial communication, the research team received notification from 11 interested institutions, including some from the 2021 CAPR 2.0 project.[1] MDRC conducted informal recruitment calls with the 11 colleges to assess institutional interest and capacity. Some institutions opted not to participate due to limited operational capacity. MDRC also looked to partner with larger institutions to increase sample sizes, enhancing the precision of the estimated effects and making the study more likely to detect effects, if they exist. Based on these criteria, Dallas College and Houston City College agreed to develop, implement, and evaluate an MMA English and math placement policy for students who are enrolling in community college for the first time.

To identify a study placement policy, MDRC presented previous research on the utility of cumulative high school GPA as a predictor of success in college-level courses to THECB and administrators from both colleges. THECB also expressed interest in including high school course-taking patterns as a factor in determining course referrals. Together, MDRC and THECB proposed these two measures to each college and collaborated with their English and math departments to develop separate criteria for each subject area. Table 2.1 includes the thresholds for placement into college-level English and math for each college, as well as the developmental corequisite and prerequisite courses affected by the study.

1. Kopko et al. (2024)

Figure 2.1. Logic Model

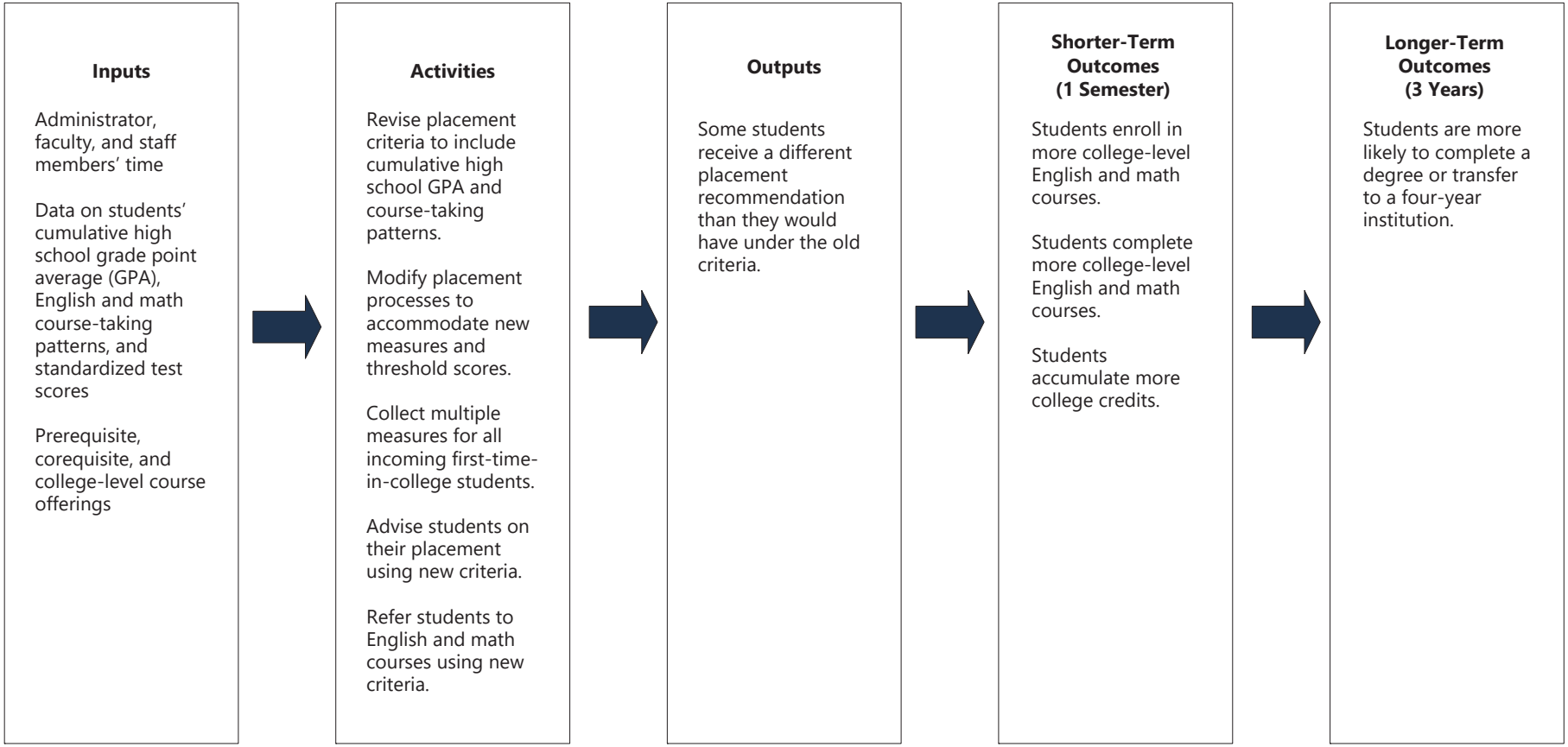


Table 2.1. MMA Placement and Courses Affected by the Evaluation

College	English	Math	Courses Affected by the Evaluation
Dallas College	Four years of high school English AND a cumulative high school grade point average (GPA) ≥ 2.75	Four years of high school math courses OR a cumulative high school GPA ≥ 2.75	English: Composition support courses Math: Algebra and quantitative reasoning support courses
Houston City College	Four years of high school English courses AND a cumulative high school GPA ≥ 2.70	Four years of high school math courses OR a cumulative high school GPA ≥ 3.00	English: Composition and reading support courses Math: Algebra and statistics support courses

After identifying the study placement policy, MDRC randomly assigned students at Dallas College and Houston City College to two groups: (1) the status quo TSIA2 course placement group (the test-only group) and (2) the MMA course placement group (the MMA group).[2] Students may have been able to infer their research group based on their measures and placement results, but staff members were instructed not to inform their group to prevent potential performance bias.

DATA SOURCES

This report uses data from several sources.

Placement records. Before random assignment, the institutions collected students' self-reported high school GPAs, course-taking history, and TSIA2 scores. As described in further detail below, these variables determined who was in the primary analysis sample of students whose placement was affected by the new criteria. These variables are missing for a large number of students who did not go through the placement testing process after admission.

Demographic records. Student demographics from college administrative data were used to describe the characteristics of the students and to explore how the intervention's effects

2. Students in the test-only group were placed in English and math courses using standardized test scores, while students in the MMA group were placed using the MMA placement criteria.

varied by race or ethnicity, gender, and Pell eligibility status.[3] Age, race, gender, and high school GPA were used as covariates in the impact analyses.[4]

College transcripts. MDRC collected transcript data from both participating colleges to analyze the effects of MMA practices on student outcomes such as college-level course completion rates and cumulative credits earned in the first semester.[5]

PRIMARY ANALYSIS SAMPLE

The primary analysis sample is made up of those students whose placement would be different under MMA placement practices compared with the traditional "test only" placement. That is, the main sample is made up of students for whom assignment to MMA placement would result in direct referral to a college-level course whereas assignment to test-only placement would result in referral to a corequisite or prerequisite course.

At both colleges, all students who required course placement in order to register for college-level English or math courses were randomized. (These students were predominantly those who were attending college for the first time.) Most of these students would have received the same placement — or in the case of those who never completed the placement process, no placement — regardless of their random assignment group. The analysis sample was made up only of students who were not exempt from developmental coursework through their TSIA2 scores but had high school GPAs greater than or equal to 2.70 (Houston City College English), 2.75 (Dallas College English and math), or 3.00 (Houston City College math). For English placement, students also needed four years of high school English in addition to meeting the high school GPA threshold. For math placement, students could also meet the threshold with four years of high school math regardless of their high school GPA. When these high school measures are collected before placement, they are baseline variables that cannot be influenced by the intervention (that is, they are exogenous). The resulting primary analysis sample can be described as the "bump-up zone," made up of students who would be bumped up from developmental corequisite or prerequisite courses to stand-alone, college-level courses in English or math because of MMA.

3. Federal Pell grants usually are awarded only to undergraduate students who display exceptional financial need and have not earned a bachelor's, graduate, or professional degree.
4. Missing values were imputed to zero and flagged with an indicator variable in regression analyses.
5. The study's prespecified analysis plan (OSF | Evaluating Multiple Measures Assessment in Texas.docx) states that the primary short-term outcome is successful completion of gateway English or math courses (within one semester), and the primary long-term outcome is credential completion or transfer (within three years). Sample members without a transcript record at the college are treated as not having enrolled and having earned zero credits.

Pooled Dallas College and Houston City College Analysis Sample

Table 2.2 shows the analysis sample of 3,507 students in the bump-up zone from the participating colleges. These students are predominantly female (55 percent), Hispanic (52 percent), and eligible for Pell grants (61 percent). More information about the proportion of students falling into this zone from each college's randomized sample, as well as an assessment of baseline differences across research groups and whether these could indicate a compromised experiment, can be found in Appendix A.

Table 2.2. Baseline Characteristics, Full Analytic Sample

Characteristic	MMA Group	Test-Only Group	Difference	P-Value
Gender (%)				
Female	55.2	54.1	1.2	0.490
Male	35.6	36.4	-0.8	0.622
Missing	9.2	9.5	-0.4	0.714
Age				
Mean	20.7	20.8	-0.1	0.581
Race/ethnicity (%)				
Hispanic or Latino	52.4	49.1	3.3 *	0.051
White	7.3	7.2	0.1	0.869
Black or African American	22.2	25.0	-2.7 *	0.057
None of the above[a]	6.0	6.7	-0.7	0.421
Missing	12.0	12.1	0.0	0.971
Pell receipt (%)				
Pell recipient	60.5	60.4	0.0	0.995
Not a Pell recipient	30.4	30.0	0.3	0.822
Missing	9.2	9.5	-0.4	0.714
TSIA2 ELAR score (%)				
Below 945	64.2	65.5	-1.2	0.443
945 or higher	23.8	22.5	1.3	0.349
Missing	12.0	12.1	-0.1	0.930
TSIA2 ELAR diagnostic score (%)				
Below 5	62.5	64.1	-1.6	0.322
5 or higher	3.5	3.7	-0.2	0.703
Missing	34.0	32.2	1.9	0.243
TSIA2 math score (%)				
Below 950	93.4	93.3	0.2	0.844
950 or higher	4.3	4.1	0.2	0.783
Missing	2.3	2.6	-0.4	0.501

(continued)

Table 2.2 (continued)

Characteristic	MMA Group	Test-Only Group	Difference	P-Value
TSIA2 math diagnostic score (%)				
Below 6	93.6	93.6	0.0	0.961
6 or higher	0.3	0.2	0.1	0.579
Missing	6.1	6.2	-0.1	0.863
TSIA2 writing score (%)				
Below 5	43.0	44.2	-1.2	0.478
5 or higher	28.3	26.0	2.3	0.121
Missing	28.6	29.8	-1.1	0.458
High school grade point average (%)				
Below 2.7	17.0	16.6	0.5	0.716
2.7 or higher	80.9	80.5	0.4	0.792
Missing	2.1	2.9	-0.8	0.126
High school reading (%)				
Completed 4 years of courses	82.3	78.8	3.5 ***	0.009
Did not complete 4 years of courses	17.7	21.2	-3.5 ***	0.009
High school math (%)				
Completed 4 years of courses	80.6	77.0	3.6 ***	0.009
Did not complete 4 years of courses	19.4	23.0	-3.6 ***	0.009
Sample size (total = 3,507)	1,798	1,709		

SOURCE: MDRC calculations using baseline information and placement test data provided by Dallas College and Houston City College.

NOTES: MMA refers to multiple measures assessment. TSIA2 refers to the Texas Success Initiative Assessment 2.0. ELAR refers to English Language Arts and Reading.

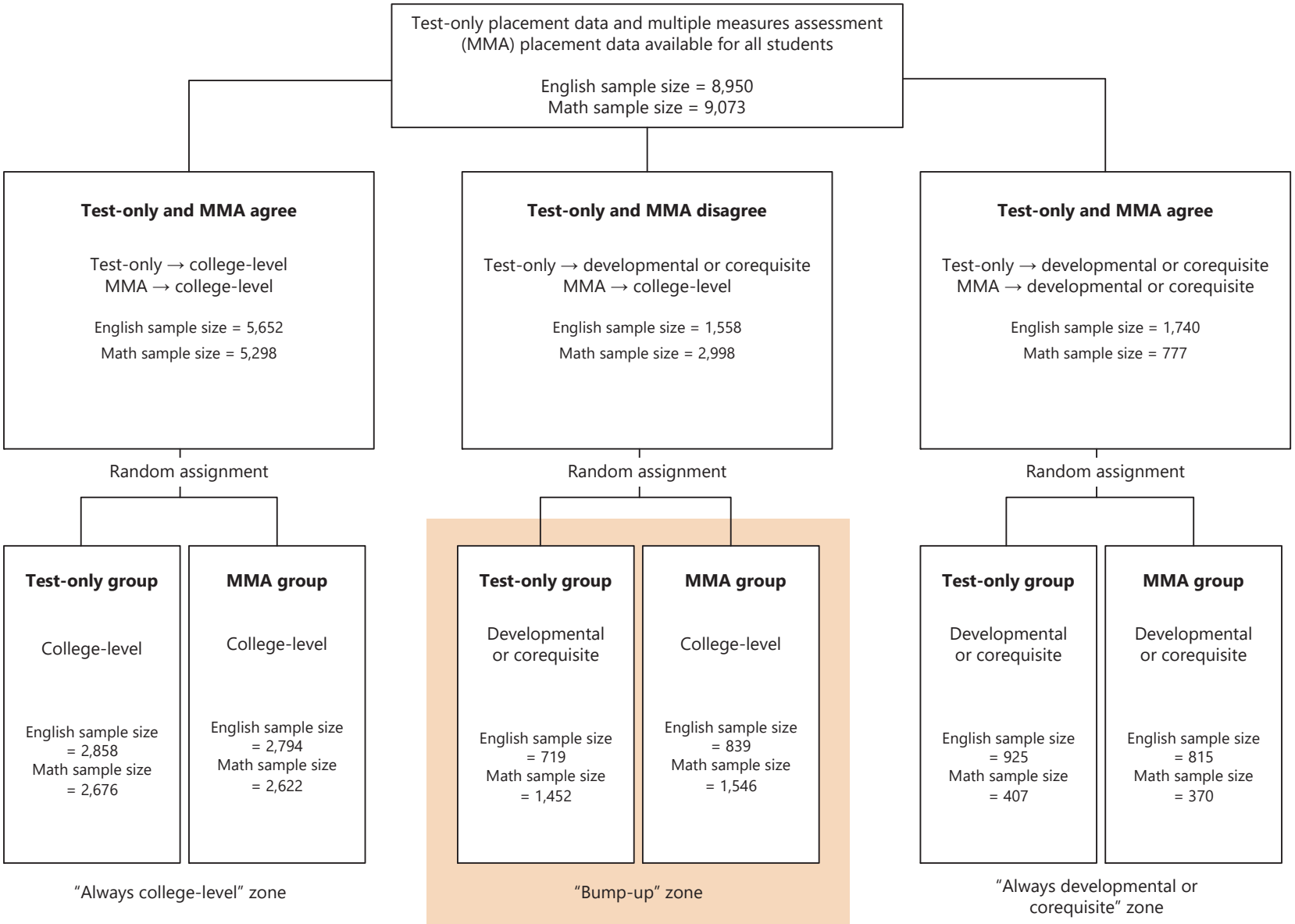
Distributions may not add to 100 percent because of rounding. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

[a]"None of the above" includes students whose race/ethnicity was classified as Asian, Pacific Islander, American Indian, Alaskan Native, or two or more races.

SERVICE CONTRAST

Most students received the same placement results using MMA and test-only placement practices. However, a substantial percentage (17 percent in English and 33 percent in math) had their course referral change due to the use of high school GPA to demonstrate college readiness in MMA placement practices. Figure 2.2 shows the placement zones resulting from random assignment: 8,950 students were placed in English and 9,073 students in math, with all but 1,409 placed in English and math. However, most students received the same referral regardless of whether they were referred based on test-only or MMA practices.

Figure 2.2. Analysis Zones Resulting from Random Assignment Outcomes



The main analytic sample is comprised of 1,558 students in English and 2,998 students in math. Notably, these analytic samples overlap—1,049 students were in the English and math analytic samples. In total, 3,507 students comprise the primary analysis sample.

Placement is only a referral or recommendation that does not necessarily lead to enrollment in a course. Table 2.3 shows the results of that referral for the analytic sample of students (that is, those in the bump-up zone). If students followed their referral, then 100 percent of the MMA group would enroll in a stand-alone, college-level course and students in the test-only group would enroll in either a corequisite or prerequisite course. However, about 55 percent of students in the English analysis sample enrolled in any English course during their first semester. And only about 33 percent of students in the math analysis sample enrolled in any math course during their first semester. Some students who were not placed in corequisite courses took them anyway, and a few took stand-alone, college-level courses despite being placed in a corequisite course.[6] Notwithstanding, in both English and math, students in the MMA group took significantly fewer corequisite courses (and significantly fewer prerequisite courses in math) than those in the test-only group. These course enrollment effects are discussed further in the next section.

6. These enrollment numbers by subject are not unlike those observed in tables ES.2 and ES.3 in Cullinan and Biedzio Rizik (2021).

Table 2.3. Course Enrollment After One Semester Among All Students in the English and Math Bump-Up Zones

Outcome (%)	MMA Group	Test-Only Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
English course enrollment						
College-level course (any)	50.5	52.7	-2.2	-6.8	2.4	0.350
Stand-alone course	32.3	6.6	25.7 ***	22.0	29.4	0.000
Corequisite course	18.1	45.9	-27.8 ***	-32.1	-23.5	0.000
Prerequisite course	4.4	3.9	0.6	-1.4	2.5	0.584
Did not enroll	45.1	43.6	1.5	-3.0	6.0	0.517
Sample size (total = 1,558)	839	719				
Math course enrollment						
College-level course	23.0	13.1	9.9 ***	7.2	12.6	0.000
Stand-alone course	14.1	1.7	12.5 ***	10.6	14.3	0.000
Corequisite course	8.9	11.5	-2.6 **	-4.7	-0.5	0.018
Prerequisite course	10.0	19.3	-9.3 ***	-11.8	-6.9	0.000
Did not enroll	67.0	67.5	-0.6	-3.9	2.8	0.743
Sample size (total = 2,998)	1,546	1,452				

SOURCE: MDRC calculations using transcript and placement data from Dallas College and Houston City College.

NOTES: MMA refers to multiple measures assessment. Rounding may cause slight discrepancies in sums and differences.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.

Estimates are adjusted by students' college, race/ethnicity, gender, and grade point average.

Students for whom placement could not be determined have been excluded from these results.

3

Effects of MMA Placement Practices on College-Level Courses

This section presents the effects of multiple measures assessment (MMA) placement practices on student outcomes after the fall 2024 semester. This study's primary prespecified short-term outcome is the successful completion of gateway English or math courses within one semester. The study found no discernable effect on college-level English course completion and a small 1.9 percentage point effect on college-level math course completion in the first semester ($p = 0.068$).[1] The study's primary long-term outcome is credential completion or transfer to a four-year college within three years. While only one semester of data was available for this report, college credits earned — an early indicator of academic progress — showed a modest positive effect of 0.4 credits ($p = 0.003$).

KEY FINDINGS

Overall, MMA placement into a college-level English or math course did not negatively affect the likelihood of completing those courses during the first semester. In both English and math, students whose placement was bumped up to a college-level course without a corequisite or prerequisite course (the MMA group) were at least as likely to successfully complete that course as their counterparts in the test-only group who were placed into a developmental corequisite or prerequisite course. Despite these similarities across subjects, there is an important difference in the interpretation of the English and math findings.

In English, Table 3.1 shows there is no discernable evidence that taking a corequisite course instead of a stand-alone, college-level course increased students' chances of completing a college-level English course. As seen in Chapter 2, students referred to a stand-alone, college-level course (the MMA group) were 26 percentage points more likely than the test-only group to take that course without remediation. Students who were referred to the corequisite

1. The p-value indicates the probability of finding the estimated effect (or larger) if a program or intervention was truly ineffective. This effect's p-value is just above the prespecified 5 percent level of significance, meaning that the probability of this effect being observed because of sampling variation and not because of a program effect is about 7 percent.

Table 3.1. Course Completion After One Semester Among All Students in the English and Math Bump-Up Zones

Outcome (%)	MMA Group	Test-Only Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
English course completion						
College-level course	34.3	35.8	-1.5	-6.1	3.1	0.526
Stand-alone course	20.3	5.3	15.0 ***	11.8	18.3	0.000
While enrolled in a corequisite course	14.0	30.4	-16.4 ***	-20.3	-12.4	0.000
Prerequisite course	3.3	3.0	0.3	-1.4	2.0	0.719
Did not enroll or complete	62.4	61.2	1.2	-3.5	5.8	0.624
Sample size (total = 1,558)	839	719				
Math course completion						
College-level course	10.8	8.9	1.9 *	-0.2	4.0	0.078
Stand-alone course	5.4	0.8	4.6 ***	3.4	5.9	0.000
While enrolled in a corequisite course	5.3	8.1	-2.7 ***	-4.5	-1.0	0.003
Prerequisite course	7.1	14.0	-6.9 ***	-9.1	-4.8	0.000
Did not enroll or complete	82.1	77.1	5.0 ***	2.2	7.9	0.001
Sample size (total = 2,998)	1,546	1,452				

SOURCE: MDRC calculations using transcript and placement data from Dallas College and Houston City College.

NOTES: MMA refers to multiple measures assessment. Rounding may cause slight discrepancies in sums and differences.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.

Estimates are adjusted by students' college, race/ethnicity, gender, and grade point average.

Students whose placement could not be determined have been excluded from these results.

course (the test-only group) were 28 percentage points more likely than the MMA group to take that corequisite. So, there was a near swapping of course choice based on which group students were randomly assigned to. Yet the group referred to stand-alone courses (the MMA group) and the group referred to corequisites (the test-only group) completed a college-level course at similar rates.

The lack of any discernable effect on completing college-level English is striking, since students referred to a stand-alone, college-level course saved time and tuition by not taking a corequisite support course, yet they performed just as well.

In math, Table 3.1 shows that there was a small, 1.9 percentage point effect estimate (p = 0.078) on first semester college-level math course completion. Students in the MMA group were 12.5 percentage points more likely than students in the test-only group to take that course

without a developmental corequisite or prerequisite course. However, as seen in Chapter 2, the effect of MMA on taking a developmental math course was largely on prerequisites (–9.3 percentage points, over three times the corequisite effect of –2.6 percentage points). The small effect on passing college math (1.9 percentage points) combined with the much larger effect (9.9 percentage points) on any college-level math enrollment means that there was a drop in pass rates among those students who actually enrolled in a college-level math class.

Because students who took prerequisites are expected to take a college course in subsequent semesters and do not do so in their first semester, it is premature to say whether there will be a cumulative effect on college-level math course completion after the second or third semesters. Past research shows that many of the students in the test-only group who took prerequisite courses are unlikely to follow through and complete college-level math in subsequent semesters, which suggests that the college-level math completion rate of these students is likely to remain similar across research groups.[2] A long-term follow-up evaluation will investigate this question.

There were positive effects on the completion of college credits in other subjects. Among all students in the bump-up zone, the MMA group earned 0.4 more college credits than the test-only group ($p = 0.003$, see the Credits Earned panel for college-level courses in Table 3.2). Given the small magnitude of the effects on completing college-level courses in math and English, the positive effects on college-credit completion are a result of students who did not take corequisite or prerequisite courses having space in their schedules to take an additional college-level course.

Findings by Student Characteristics

The impact estimates for the demographic subgroup categories were not statistically different. Appendix Tables B.1, B.2, and B.3 show subgroup findings by race and ethnicity, gender, and Pell status. Pell eligibility was only available for Dallas College; Houston City College provided Pell receipt instead, which could have been affected by the intervention and is not well suited for defining experimental subgroups.

Findings by College

Findings that MMA students were at least as likely as test-only students to pass college-level English or math courses were consistent at both colleges. Table 3.3 shows that the Dallas College MMA group saw a positive impact (3.9 percentage points, $p = 0.003$) on passing college-level math and no effect on passing college-level English in the first semester. Houston City College showed a null effect on both subjects. When limiting the analyses to the Houston City College sample, there is also no discernable effect on college credit accumulation, likely because of the smaller sample size and because there was little difference in course-taking patterns across groups.

2. Litschwartz, Cullinan, and Hill (2024).

Table 3.2. Outcomes in All Subjects After One Semester Among All Students in Either Bump-Up Zone

Outcome	MMA Group	Test-Only Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
Enrolled (%)	83.5	83.3	0.2	-1.5	1.9	0.823
Total credits attempted	8.75	8.75	0.00	-0.27	0.26	0.973
College-level credits	7.21	6.25	0.96 ***	0.71	1.21	0.000
English credits	1.60	1.58	0.02	-0.07	0.12	0.618
Math credits	0.68	0.42	0.25 ***	0.18	0.33	0.000
Other	4.93	4.25	0.68 ***	0.45	0.91	0.000
Developmental credits	1.54	2.50	-0.96 ***	-1.13	-0.79	0.000
English credits	0.80	1.24	-0.43 ***	-0.53	-0.33	0.000
Math credits	0.73	1.26	-0.53 ***	-0.66	-0.41	0.000
Total credits earned	5.82	6.07	-0.26	-0.57	0.06	0.109
College-level credits	4.78	4.38	0.40 ***	0.13	0.67	0.004
English credits	1.04	1.04	0.00	-0.09	0.10	0.968
Math credits	0.33	0.27	0.06 **	0.00	0.12	0.038
Other	3.41	3.08	0.34 ***	0.11	0.56	0.004
Developmental credits	1.03	1.69	-0.66 ***	-0.81	-0.51	0.000
English credits	0.54	0.83	-0.29 ***	-0.37	-0.20	0.000
Math credits	0.49	0.86	-0.38 ***	-0.48	-0.27	0.000
Sample size (total = 3,498)	1,793	1,705				

SOURCE: MDRC calculations using transcript and placement data from Dallas College and Houston City College.

NOTES: MMA refers to multiple measures assessment. Rounding may cause slight discrepancies in sums and differences.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.

Estimates are adjusted by students' college, race/ethnicity, gender, and grade point average.

Students whose placement could not be determined have been excluded from these results.

Table 3.3. Exploratory Results for Subgroups of Students in the Bump-Up Zones, by College

	Dallas College					Houston City College					
Outcome	Test-Only group	Impact Estimate	P-value	SE	Sample Size	Test-Only group	Impact Estimate	P-value	SE	Sample Size	H-Statistic P-Value
English bump-up zone											
Completed college-level English course (%)	45.5	-2.5	0.547	4.2	589	29.9	-0.7	0.793	2.8	969	0.721
Total college credits earned, any subject	4.5	1.7	0.000 ***	0.3	589	3.4	0.2	0.482	0.2	969	††† 0.000
Math bump-up zone											
Completed college-level math course (%)	5.4	3.9	0.003 ***	1.3	1,637	12.8	-0.3	0.848	1.8	1,361	† 0.056
Total college credits earned, any subject	4.9	0.8	0.000 ***	0.2	1,637	3.8	0.1	0.778	0.2	1,361	†† 0.018
English or math bump-up zone											
Total college credits earned, any subject	5.0	0.8	0.000 ***	0.2	1,735	3.7	0.1	0.752	0.2	1,763	††† 0.009

SOURCE: MDRC calculations using transcript, placement, and baseline data from Dallas College and Houston City College.

NOTES: SE refers to standard error.
Rounding may cause slight discrepancies in sums and differences.
The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.
Estimates are adjusted by students' race/ethnicity, gender, and grade point average.
Students for whom placement could not be determined have been excluded from these results.
"H-Statistic P-Value" indicates whether the difference in impacts among subgroups is statistically significant. Statistical significance levels are indicated as: ††† = 1 percent; †† = 5 percent; † = 10 percent.

When including all randomized students regardless of whether they could have been affected by the MMA intervention, the significance of the impacts is consistent with the findings for students in the bump-up zone. There was no difference in completion rates for students taking college-level courses in English and math, but students in the MMA group had an average of 0.16 fewer developmental credits (p = 0.000) and 0.11 more college-level credits (p = 0.088). (See Table 3.4.) This finding is important from a policy perspective because it reflects the overall effect of this change in placement criteria for the full entering student body.

Table 3.4. Academic Outcomes After One Semester Among Students in the Full Sample

Outcome (%)	Program Group	Control Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
English course enrollment						
College-level course	35.4	34.7	0.7	-0.6	1.9	0.313
Stand-alone course	27.2	23.1	4.1 ***	2.9	5.3	0.000
Corequisite course	8.2	11.6	-3.4 ***	-4.3	-2.6	0.000
Prerequisite course	2.1	2.1	0.0	-0.4	0.5	0.879
Did not enroll	62.5	63.2	-0.7	-2.0	0.6	0.274
English course completion						
College-level course	23.0	22.3	0.8	-0.4	1.9	0.214
Stand-alone course	17.9	14.8	3.1 ***	2.0	4.2	0.000
While enrolled in corequisite course	5.1	7.4	-2.3 ***	-3.0	-1.6	0.000
Prerequisite course	1.7	1.7	0.0	-0.4	0.4	0.890
Did not enroll or complete	75.26	76.06	-0.79	-2.01	0.43	0.204
Math course enrollment						
College-level course (any)	20.5	18.8	1.7 ***	0.5	2.8	0.004
Stand-alone course	17.9	15.5	2.5 ***	1.4	3.5	0.000
Corequisite course	2.6	3.4	-0.8 ***	-1.3	-0.3	0.003
Prerequisite course	3.6	5.6	-1.9 ***	-2.6	-1.3	0.000
Did not enroll	75.9	75.6	0.3	-1.0	1.5	0.679
Math course completion						
College-level course (any)	10.9	10.8	0.1	-0.8	1.0	0.869
Stand-alone course	9.3	8.6	0.8 *	-0.1	1.6	0.069
While enrolled in a corequisite course	1.5	2.2	-0.7 ***	-1.1	-0.3	0.001
Prerequisite course	2.5	3.8	-1.3 ***	-1.8	-0.8	0.000
Did not enroll or complete	86.6	85.4	1.2 **	0.2	2.2	0.018

(continued)

Table 3.4 (continued)

Outcome (%)	Program Group	Control Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
All subjects						
Enrolled (%)	72.44	72.50	-0.07	-1.00	0.86	0.885
Total credits attempted (N)	7.12	7.15	-0.03	-0.15	0.10	0.667
College-level credits	6.47	6.28	0.20 ***	0.07	0.32	0.002
English credits	1.07	1.05	0.02	-0.02	0.06	0.259
Math credits	0.63	0.59	0.04 **	0.01	0.08	0.015
Other	4.77	4.64	0.13 **	0.02	0.24	0.022
Developmental credits	0.65	0.87	-0.22 ***	-0.28	-0.17	0.000
English credits	0.38	0.48	-0.10 ***	-0.14	-0.06	0.000
Math credits	0.27	0.40	-0.13 ***	-0.16	-0.09	0.000
Total credits earned	4.87	4.91	-0.04	-0.18	0.09	0.532
College-level credits	4.43	4.32	0.11 *	-0.02	0.24	0.087
English credits	0.70	0.67	0.02	-0.01	0.06	0.182
Math credits	0.34	0.34	0.00	-0.03	0.03	0.921
Other	3.40	3.31	0.09	-0.02	0.20	0.114
Developmental credits	0.43	0.59	-0.16 ***	-0.20	-0.11	0.000
English credits	0.3	0.3	-0.1 ***	-0.1	0.0	0.000
Math credits	0.2	0.3	-0.1 ***	-0.1	-0.1	0.000
Sample size (total = 17,334)	8,653	8,681				

SOURCE: MDRC calculations using transcript data from Dallas College and Houston City College.

NOTES: Rounding may cause slight discrepancies in sums and differences.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. For the table above, statistical significance levels have been indicated by MDRC as *** = 1 percent; ** = 5 percent; * = 10 percent.

Estimates are adjusted by students' college, race/ethnicity, gender, and grade point average.

4

Conclusion

This section presents the main takeaways from the Texas multiple measures assessment (MMA) randomized controlled trial and its implications for enrollment practices in Texas.

MAIN TAKEAWAYS

English and math course completion rates held steady, and students earned more college credits. In both subjects, students bumped up by MMA were just as likely to complete the college-level course their first semester as the test-only group. They also substituted the credit hours they would have spent on developmental corequisites and prerequisites with other college-level courses that they completed.

In English, the intervention had no discernable effect on the college-level course completion rate (among all students regardless of enrollment) while maintaining a consistent pass rate (among students enrolled in college-level English) of about 68 percent.[1] The intervention only changed which students took corequisite courses and nothing else, and corequisites did not change the odds of passing for students in the bump-up zone with low test scores and high cumulative high school grade point averages (GPA). The test-only group spent tuition and time taking the corequisite course only to get the same rate of passing college English as the MMA group.

However, in math, despite similar completion rates across research groups, pass rates among college math enrollees decreased about 20 percentage points from 67 percent in the test-only group to 47 percent in the MMA group. In math, students were largely bumped out of prerequisites instead of corequisites, meaning that the math intervention significantly increased the number of students taking college-level math in their first semester, unlike in English. Indeed, in math, college-level course enrollment rates in this bump-up zone nearly doubled (by 10 percentage points from the test-only group). A corresponding increase in

1. The pass rates in this section are calculated by dividing the college-level course completion rates in Table 3.1 by the college-level course enrollment rates in Table 2.3.

the proportion of students passing college-level math, which one would expect from such an increase in enrollment in those classes, did not occur.

IMPLICATIONS FOR TEXAS POLICY

Given these findings at two large community colleges, Texas should consider moving to an MMA policy across the state, but with some changes. These early findings show that students bumped up by the MMA criteria set out in this study were just as likely to pass college-level English and math courses in their first semester if allowed to take a stand-alone course as they would have been if referred to a developmental corequisite or prerequisite course. There is also an early indication that these students accumulate more college credits when the developmental course requirement is waived. The criteria used in this study affected corequisite enrollment in English as intended, and because of this it is possible to see the effect on college-level course completion in one semester (both groups are able to take college-level courses in the same semester, with or without the corequisite). It is more difficult to assess the full impact of the math criteria in one semester because so many students moved out of prerequisite courses, meaning that students in the test-only group will need more follow-up data to determine their college-level math completion rates.

- **English placement criteria worked well, but unnecessary measures were collected.** In English, the rules used in this trial (cumulative high school GPA greater than or equal to 2.7 and four years of high school English) could be used in Texas going forward with an expectation of further success. However, because four years of high school English is already a requirement for graduation, it appears that requiring students to self-report that measure only served to exclude many who would have been eligible otherwise at Dallas College (where only about a third reported this). The MDRC team recommends dropping this measure as a placement criterion for that reason.

- **In math, more corequisites can be offered, and placement criteria can be improved.** There are still large numbers of students being placed in prerequisite courses at both of the study institutions.[2] Texas could increase the number of students going into college-level math over the current Texas Success Initiative Assessment 2.0 (TSIA2) policy and feel more confident about their college readiness in two complementary ways.

  First, replacing prerequisite courses in math with corequisite courses would get students into college-level courses right away while providing support, but without requiring them to spend a semester taking a developmental course first. There is rigorous evidence that

2. Dallas College, despite calling all of its math courses that include academic support corequisites, does have prerequisite courses (BASM 0052, DMAT 0305, and DMAT 0307) that many students are placed into.

corequisite remediation is a better alternative than prerequisite remediation for most students, yet prerequisites persist in Texas, especially in math.[3]

Second, by using cumulative high school GPA criteria such as the ones applied in this study, and also requiring four years of high school math (instead of either one or the other, as tested in this study), fewer students would be bumped up than were in this trial, and those students who were bumped up would be more likely to succeed. In this study, about 27 percent of students who were bumped up in math did not meet the high school GPA requirement, but they reported having four years of math courses in high school. Similarly, about 24 percent of those students who were bumped up met the GPA requirement but did not take a math course during their senior year. (See Appendix C.) There is substantial evidence that high school GPA can be used to identify college-ready math students.[4] High school course-taking patterns have shown to be a useful additional criterion for math placement.[5]

Corequisite courses are still costly for students and should only be recommended when remediation is necessary. Corequisite courses consist of two sections, the corequisite and the corresponding college-level course. Students who do not meet the TSIA2 criteria at the participating colleges and at other colleges in Texas often spend at least three credit hours per subject in a corequisite section in addition to their college-level English or math course section. These credit hours cost the students tuition and time. If the required corequisite section is effective at increasing their likelihood of passing that subject's college-level course compared with just entering the college-level course without support, then there is a reason for the additional tuition and opportunity (time) costs associated with the corequisite course. But for the students in the bump-up zone placed in English in this study, that does not appear to be the case.[6] They performed as well in their college-level English courses with or without the required corequisite course, and they used the time they saved to successfully complete other college courses.

Students could leave high school certified as having met Texas Success Initiative requirements. TSIA2 tests cost colleges money to administer; up to approximately $30 is charged by the college to each student with a full testing battery across both subjects. Even before applying MMA after college admission, Texas could deem all students with a 2.70 or higher cumulative high school GPA and four years of English as college-ready (TSI met) in English, and all students with a 3.0 or higher cumulative high school GPA and four years of math as college-ready (TSI met) in math. This would save those students the trouble of testing in those subjects, while saving colleges the cost of testing those students as well. This

3. Douglas, Logue, and Watanabe-Rose (2021); Meiselman and Schudde (2021); Ran and Lin (2022).
4. See Cullinan and Biedzio Rizik (2023); Caro and Kiehne (2023); Hodara and Lewis (2017); and others cited elsewhere in this report.
5. Bahr et al. (2019).
6. The 95 percent confidence interval for the effect on completion rates of English college-level courses ranges from –6.1 percentage points to 3.0 percentage points. If the true impact were on the lower end of this range, any negative effects of MMA would have gone undetected by this study.

evaluation shows that these MMA criteria benefit students in English. While a much broader criteria was used in this trial for math, requiring students to have both a high school GPA of around 3.0 and to meet high school math course-taking requirements has been shown to be predictive of student success in college courses in other states.[7] By limiting the criteria in this way and replacing math prerequisites with corequisites, the extreme increases in college-course enrollment without support (and associated drop in pass rates) seen in math in this study would be mitigated.

CONCURRENT AND FUTURE RESEARCH

In spring 2026, MDRC will publish a report that describes MMA implementation and cost findings from eight institutions across the country that offer corequisite courses (including Dallas College and Houston City College). A long-term follow-up evaluation of this Texas study will analyze graduation and transfer outcomes in 2028.

7. Bahr et al. (2019).

APPENDIX

A

Experimental Validity of the Houston City College and Dallas College Analysis Samples

Starting in April 2024, Houston City College randomly assigned 10,333 students to multiple measures assessment (MMA) placement or the business-as-usual test-only placement. Appendix Table A.1 shows that the students are predominantly female; Black, Hispanic or None of the Above; and not a Pell recipient. There are no differences in baseline characteristics across research groups at the 5 percent level of significance. There is no evidence that the experimental validity of the Houston City College randomized sample was compromised.

Appendix Table A.1. Baseline Characteristics, Houston City College

Characteristic	Program Group	Control Group	Difference	P-Value
Gender (%)				
Female	41.8	42.1	-0.3	0.782
Male	28.9	28.8	0.0	0.960
Missing	29.3	29.1	0.2	0.802
Age				
Mean	25.3	25.4	0.0	0.849
Race/ethnicity (%)				
Hispanic or Latino	26.1	26.7	-0.6	0.485
White	8.6	8.4	0.1	0.786
Black or African American	24.6	25.2	-0.5	0.535
None of the above[a]	8.8	8.4	0.4	0.446
Missing	31.8	31.2	0.6	0.538
Pell receipt (%)				
Pell recipient	37.4	36.6	0.8	0.383
Not a Pell recipient	33.3	34.4	-1.1	0.233
Missing	29.3	29.0	0.3	0.753
TSIA2 ELAR score (%)				
Below 945	14.4	15.6	-1.2 *	0.082
945 or higher	7.9	7.6	0.4	0.503
Missing	77.7	76.9	0.9	0.293
TSIA2 ELAR diagnostic score (%)				
Below 5	13.8	14.9	-1.1	0.102
5 or higher	1.1	1.2	-0.1	0.639
Missing	85.0	83.8	1.2 *	0.085
TSIA2 math score (%)				
Below 950	20.2	20.8	-0.5	0.507
950 or higher	5.6	5.2	0.5	0.284
Missing	74.1	74.1	0.1	0.953

(continued)

Table A.1 (continued)

Characteristic	Program Group	Control Group	Difference	P-Value
TSIA2 math diagnostic score (%)				
Below 6	20.1	21.2	-1.1	0.180
6 or higher	0.7	0.4	0.2	0.132
Missing	79.2	78.4	0.8	0.292
TSIA2 writing score (%)				
Below 5	9.9	9.9	0.0	0.957
5 or higher	8.5	8.6	-0.2	0.744
Missing	81.6	81.5	0.1	0.846
High school grade point average (%)				
Below 2.7	19.2	19.0	0.1	0.865
2.7 or higher	74.1	74.8	-0.6	0.483
Missing	6.7	6.2	0.5	0.330
High school reading (%)				
Completed 4 years of courses	95.6	95.8	-0.2	0.565
Did not complete 4 years of courses	4.4	4.2	0.2	0.533
High school math (%)				
Completed 4 years of courses	94.4	94.8	-0.3	0.443
Did not complete 4 years of courses	5.6	5.2	0.4	0.418
Sample size (total = 10,333)	5,133	5,200		

SOURCE: MDRC calculations using baseline information and placement test data provided by Houston City College.

NOTES: TSIA2 refers to the Texas Success Initiative Assessment 2.0. ELAR refers to English Language Arts and Reading.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

[a]"None of the above" comprises students whose race or ethnicity was classified as Asian, Pacific Islander, American Indian, Alaskan Native, or two or more races.

Appendix Table A.2 shows that among those in the Houston City College sample with placement data, 10 percent would have been placed into college-level English using either placement system and 10 percent would have been placed in math. Some 5 percent of the sample would have been placed into a developmental English course using either system and 5 percent would have been placed in math. Of the sample, 76 percent did not complete testing in English because they were exempt or did not enroll at Houston City College and 72 percent did not complete testing for the same reasons in math. The remaining students make up the analysis sample of students affected by the intervention: 969 students in the bump-up zone for English and 1,361 students in the bump-up zone for math (1,763 total students).

Appendix Table A.2. Houston City College Student Placement

Placement (%)	Program Group	Control Group	All Students
English placement			
Always placed in college-level courses	9.7	10.3	10.0
Bumped up to college-level courses by MMA	9.5	9.2	9.4
Always placed in developmental or corequisite courses	4.1	5.1	4.6
Exempt or did not complete testing[a]	76.6	75.3	76.0
Math placement			
Always placed in college-level courses	10.4	10.2	10.3
Bumped up to college-level courses by MMA	13.0	13.3	13.2
Always placed in developmental or corequisite courses	4.3	4.8	4.6
Exempt or did not complete testing[a]	72.2	71.7	72.0
Sample size	5,133	5,200	10,333

SOURCE: Placement data provided by Houston City College.

NOTES: MMA refers to multiple measures assessment. Rounding may cause slight discrepancies in sums and differences.

[a]These students largely did not complete placement tests, indicating they were exempt from placement and able to enroll in college-level coursework or they did not enroll in the fall 2024 semester.

Appendix Table A.3 shows that Houston City College students in this analysis sample for students in the bump-up zone are predominantly female; Black or Hispanic; and Pell recipients.

The academic impacts for the full randomized sample of students at Houston City College, including randomized students who would not be affected by the change in placement criteria as well as those who would, are shown in Appendix Table A.4.

Starting in July 2024, Dallas College randomly assigned 7,001 students to MMA placement or the business-as-usual test-only placement. Appendix Table A.5 shows that these students are predominantly female, Hispanic, and Pell eligible. The only differences in baseline characteristics across research groups at the 5 percent level of significance were in self-reported measures. Those students who were randomized to MMA placement were 2 percentage points less likely to be missing their high school GPA, 3 percentage points more likely to have indicated having taken four years of high school English, and 3 percentage points more likely to have indicated having taken four years of high school math. These differences are important because they suggest that the primary analysis sample (students whose placement could have been changed by MMA) was not determined completely randomly, calling into question the experimental validity of that analysis sample.

Appendix Table A.3. Baseline Characteristics, Houston City College Bump-Up Zones

Characteristic	MMA Group	Test-Only Group	Difference	P-Value
Gender (%)				
Female	48.2	50.7	-2.5	0.302
Male	32.9	31.3	1.7	0.457
Missing	18.8	18.0	0.8	0.664
Age				
Mean	22.5	22.1	0.5	0.157
Race/ethnicity (%)				
Hispanic or Latino	37.6	37.5	0.0	0.985
White	6.9	5.6	1.4	0.236
Black or African American	27.3	28.3	-1.0	0.639
None of the above[a]	7.3	9.0	-1.7	0.183
Missing	20.9	19.6	1.3	0.489
Pell receipt (%)				
Pell recipient	50.1	52.6	-2.5	0.294
Not a Pell recipient	31.1	29.4	1.7	0.438
Missing	18.8	18.0	0.8	0.664
TSIA2 ELAR score (%)				
Below 945	62.8	65.3	-2.5	0.278
945 or higher	26.6	23.3	3.3	0.108
Missing	10.6	11.5	-0.8	0.577
TSIA2 ELAR diagnostic score (%)				
Below 5	60.5	63.0	-2.6	0.268
5 or higher	3.9	4.2	-0.3	0.750
Missing	35.6	32.7	2.9	0.205
TSIA2 math score (%)				
Below 950	91.0	91.1	-0.1	0.936
950 or higher	6.6	5.1	1.5	0.191
Missing	2.4	3.8	-1.4 *	0.100
TSIA2 math diagnostic score (%)				
Below 6	91.6	91.9	-0.3	0.814
6 or higher	0.5	0.1	0.4	0.171
Missing	8.0	8.0	0.0	0.975
TSIA2 writing score (%)				
Below 5	45.5	44.2	1.3	0.572
5 or higher	29.4	27.8	1.5	0.479
Missing	25.1	28.0	-2.9	0.173

(continued)

Table A.3 (continued)

Characteristic	MMA Group	Test-Only Group	Difference	P-Value
High school grade point average (%)				
Below 2.7	19.5	21.2	-1.6	0.399
2.7 or higher	76.9	74.7	2.2	0.291
Missing	3.6	4.1	-0.5	0.559
High school reading (%)				
Completed 4 years of courses	98.2	98.1	0.0	0.946
Did not complete 4 years of courses	1.8	1.9	0.0	0.946
High school math (%)				
Completed 4 years of courses	96.3	97.1	-0.8	0.346
Did not complete 4 years of courses	3.7	2.9	0.8	0.346
Sample size (total = 1,763)	865	898		

SOURCE: MDRC calculations using baseline information and placement test data provided by Houston City College.

NOTES: MMA refers to multiple measures assessment. TSIA2 refers to the Texas Success Initiative Assessment 2.0. ELAR refers to English Language Arts and Reading.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

[a]"None of the above" comprises students whose race/ethnicity was classified as Asian, Pacific Islander, American Indian, Alaskan Native, or two or more races.

Appendix Table A.4. Academic Outcomes After One Semester Among Students in the Full Houston City College Sample

Outcome (%)	Program Group	Control Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
English course enrollment						
College-level course	20.9	20.1	0.8	-0.7	2.3	0.299
Stand-alone course	16.5	14.2	2.3 ***	1.0	3.7	0.001
Corequisite course	4.4	5.9	-1.5 ***	-2.4	-0.7	0.000
Prerequisite course	2.5	2.7	-0.1	-0.7	0.5	0.653
Did not enroll	76.5	77.2	-0.7	-2.2	0.8	0.369
English course completion						
College-level course	14.7	14.2	0.6	-0.8	1.9	0.410
Stand-alone course	11.6	10.2	1.3 **	0.2	2.5	0.024
While enrolled in a corequisite course	3.1	3.9	-0.8 **	-1.5	-0.1	0.031
Prerequisite course	2.0	2.1	-0.1	-0.6	0.4	0.710
Did not enroll or complete	83.27	83.74	-0.47	-1.84	0.91	0.506
Math course enrollment						
College-level course (any)	12.7	12.2	0.5	-0.7	1.7	0.419
Stand-alone course	9.8	8.9	1.0 *	-0.1	2.1	0.075
Corequisite course	2.8	3.3	-0.5	-1.1	0.2	0.152
Prerequisite course	2.2	3.2	-1.0 ***	-1.6	-0.4	0.002
Did not enroll	85.1	84.6	0.5	-0.9	1.8	0.487
Math course completion						
College-level course (any)	7.8	7.6	0.2	-0.9	1.2	0.769
Stand-alone course	6.0	5.5	0.5	-0.4	1.3	0.305
While enrolled in a corequisite course	1.8	2.1	-0.3	-0.8	0.2	0.250
Prerequisite course	1.5	2.0	-0.5 **	-1.1	0.0	0.034
Did not enroll or complete	90.8	90.4	0.4	-0.7	1.5	0.479

(continued)

Table A.4 (continued)

Outcome (%)	Program Group	Control Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
All subjects						
Enrolled (%)	54.42	54.68	-0.26	-1.78	1.27	0.742
Total credits attempted	5.10	5.06	0.03	-0.15	0.21	0.736
College-level credits	4.62	4.50	0.13	-0.04	0.29	0.140
English credits	0.63	0.61	0.02	-0.02	0.07	0.278
Math credits	0.40	0.39	0.01	-0.03	0.05	0.631
Other	3.59	3.50	0.09	-0.05	0.24	0.213
Developmental credits	0.47	0.57	-0.10 ***	-0.16	-0.03	0.002
English credits	0.29	0.34	-0.04 *	-0.09	0.00	0.066
Math credits	0.17	0.23	-0.05 ***	-0.09	-0.02	0.001
Total credits earned	3.74	3.74	0.00	-0.17	0.17	1.000
College-level credits	3.39	3.34	0.05	-0.11	0.21	0.542
English credits	0.44	0.43	0.02	-0.02	0.06	0.395
Math credits	0.25	0.25	0.00	-0.03	0.03	0.993
Other	2.70	2.67	0.03	-0.11	0.17	0.647
Developmental credits	0.34	0.39	-0.05 *	-0.10	0.00	0.066
English credits	0.2	0.2	0.0	-0.1	0.0	0.316
Math credits	0.1	0.1	0.0 **	-0.1	0.0	0.024
Sample size (total = 10,333)	5,133	5,200				

SOURCE: MDRC calculations using transcript data from Houston City College.

NOTES: Rounding may cause slight discrepancies in sums and differences.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.

Estimates are adjusted by students' race/ethnicity, gender, and grade point average.

Appendix Table A.5. Baseline Characteristics, Dallas College

Characteristic	Program Group	Control Group	Difference		P-Value
Gender (%)					
Female	55.8	55.5	0.3		0.786
Male	44.2	44.5	-0.3		0.786
Age					
Mean	20.3	20.4	-0.2		0.261
Race/ethnicity (%)					
Hispanic or Latino	62.1	60.0	2.1	*	0.077
White	10.1	10.1	0.0		0.970
Black or African American	17.3	18.4	-1.1		0.212
None of the above[a]	5.7	6.5	-0.8		0.143
Missing	4.8	4.9	-0.1		0.916
Pell eligibility (%)					
Pell eligible	63.4	62.7	0.8		0.513
Not Pell eligible	36.6	37.3	-0.8		0.513
TSIA2 ELAR score (%)					
Below 945	31.7	30.7	1.0		0.369
945 or higher	17.4	17.5	-0.1		0.880
Missing	50.9	51.8	-0.9		0.473
TSIA2 ELAR diagnostic score (%)					
Below 5	30.7	31.2	-0.5		0.678
5 or higher	2.1	2.0	0.1		0.723
Missing	67.2	66.8	0.3		0.763
TSIA2 math score (%)					
Below 950	42.6	41.3	1.4		0.239
950 or higher	11.0	12.2	-1.1		0.140
Missing	46.3	46.6	-0.3		0.827
TSIA2 math diagnostic score (%)					
Below 6	42.3	41.4	0.9		0.443
6 or higher	1.4	1.4	0.0		0.956
Missing	56.3	57.2	-0.9		0.453
TSIA2 writing score (%)					
Below 5	18.7	19.2	-0.5		0.596
5 or higher	19.8	19.0	0.8		0.408
Missing	61.5	61.8	-0.3		0.805

(continued)

Table A.5 (continued)

Characteristic	Program Group	Control Group	Difference	P-Value
High school grade point average (%)				
Below 2.7	19.2	18.6	0.6	0.549
2.7 or higher	59.0	57.3	1.7	0.151
Missing	21.8	24.0	-2.3 **	0.025
High school reading (%)				
Completed 4 years of courses	34.3	31.5	2.8 **	0.012
Did not complete 4 years of courses	65.7	68.5	-2.8 **	0.012
High school math (%)				
Completed 4 years of courses	32.7	29.4	3.3 ***	0.003
Did not complete 4 years of courses	67.3	70.6	-3.3 ***	0.003
Sample size (total = 7,001)	3,520	3,481		

SOURCE: MDRC calculations using baseline information and placement test data provided by Dallas College.

NOTES: TSIA2 refers to the Texas Success Initiative Assessment 2.0. ELAR refers to English Language Arts and Reading.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

[a]"None of the above" comprises students whose race/ethnicity was classified as Asian, Pacific Islander, American Indian, Alaskan Native, or two or more races.

Appendix Table A.6 shows that at Dallas College, 66 percent of the sample were either exempt or would have placed into college-level English under either placement system and 60 percent would have placed into college-level math. On the other hand, 18 percent of the sample would have placed into developmental or corequisite English under either system and 4 percent would have placed into developmental or corequisite math. The remaining students make up the analysis sample affected by the intervention: 1,637 students in the bump-up zone for math and 589 for English (1,735 total students).

Appendix Table A.6. Dallas College Student Placement

Placement (%)	Program Group	Control Group	All Students
English placement			
Always placed in college-level courses[a]	65.2	66.7	65.9
Bumped up to college-level courses by MMA	10.0	6.8	8.4
Always placed in developmental or corequisite courses	17.2	19.0	18.1
Missing	7.7	7.5	7.6
Math placement			
Always placed in college-level courses[a]	59.3	61.6	60.4
Bumped up to college-level courses by MMA	25.0	21.8	23.4
Always placed in developmental or corequisite courses	4.2	4.5	4.4
Missing	11.6	12.0	11.8
Sample size	3,520	3,481	7,001

SOURCE: Placement data provided by Dallas College.

NOTES: MMA refers to multiple measures assessment. Rounding may cause slight discrepancies in sums and differences.

[a]This category includes those students who were exempt from testing at Dallas College.

There are some unusual differences across research groups in the number of students in these zones at Dallas College. Furthermore, there are several differences in baseline characteristics across research groups. Appendix Table A.7 shows that Dallas College students in the analysis sample (that is, those in the "bump-up zone") are predominantly female, Hispanic, and eligible for Pell grants. The test-only group is about half a year older on average, with a higher proportion of Black or African American students. Those students randomized to a college-level course placement were 10 percentage points more likely to have taken four years of high school English, and 11 percentage points more likely to have taken four years of high school math. These differences in baseline characteristics and research group sample sizes are important because they suggest that the primary analysis sample (those students whose placement was changed by MMA) was not determined completely randomly.

There is evidence that some of the students in the MMA (intervention) group at Dallas College had their placement measures updated after random assignment — this was not supposed to happen. This timing matters because measures that are collected after random assignment, particularly those that were probably affected by students' research group assignment, no longer have values that are independent of the intervention. If these measures are used to define the analysis sample (as they are in this case), there is no longer a guarantee that the two groups are not systematically different, or that later differences in outcomes are caused by the intervention. Most notable (and significant) are the differences in students reporting having taken four years of English or four years of math in high school, with a larger proportion of students in the MMA group reporting having taken these courses than in the test-only group.

Appendix Table A.7. Baseline Characteristics, Dallas College Bump-Up Zones

Characteristic	MMA Group	Test-Only Group	Difference	P-Value
Gender (%)				
Female	61.9	57.7	4.1 *	0.082
Male	38.1	42.3	-4.1 *	0.082
Age				
Mean	19.0	19.4	-0.4 **	0.016
Race/ethnicity (%)				
Hispanic or Latino	66.3	62.1	4.2 *	0.070
White	7.8	9.0	-1.3	0.337
Black or African American	17.6	21.3	-3.7 **	0.050
None of the above[a]	4.8	4.0	0.9	0.370
Missing	3.6	3.6	0.0	0.967
Pell eligibility (%)				
Pell eligible	70.3	69.1	1.1	0.615
Not Pell eligible	29.7	30.9	-1.1	0.615
TSIA2 ELAR score (%)				
Below 945	65.4	64.8	0.6	0.793
945 or higher	21.0	21.1	-0.1	0.979
Missing	13.6	14.1	-0.5	0.742
TSIA2 ELAR diagnostic score (%)				
Below 5	64.1	64.3	-0.2	0.932
5 or higher	3.0	3.2	-0.2	0.807
Missing	32.9	32.5	0.4	0.859
TSIA2 math score (%)				
Below 950	95.0	94.3	0.7	0.493
950 or higher	1.9	2.9	-0.9	0.219
Missing	3.0	2.9	0.2	0.837
TSIA2 math diagnostic score (%)				
Below 6	94.7	94.3	0.4	0.702
6 or higher	0.2	0.4	-0.2	0.553
Missing	5.1	5.3	-0.3	0.805
TSIA2 writing score (%)				
Below 5	39.7	42.6	-3.0	0.210
5 or higher	26.9	22.6	4.4 **	0.034
Missing	33.4	34.8	-1.4	0.536

(continued)

Table A.7 (continued)

Characteristic	MMA Group	Test-Only Group	Difference	P-Value
High school GPA (%)				
Below 2.7	14.7	11.5	3.1 *	0.053
2.7 or higher	84.6	86.9	-2.3	0.176
Missing	0.8	1.6	-0.9	0.104
High school reading (%)				
Completed 4 years of courses	67.5	57.4	10.1 ***	0.000
Did not complete 4 years of courses	32.5	42.6	-10.1 ***	0.000
High school math (%)				
Completed 4 years of courses	65.8	54.6	11.2 ***	0.000
Did not complete 4 years of courses	34.2	45.4	-11.2 ***	0.000
Sample Size (total = 1,735)	928	807		

SOURCE: MDRC calculations using baseline information and placement test data provided by Dallas College.

NOTES: MMA refers to multiple measures assessment. TSIA2 refers to the Texas Success Initiative Assessment 2.0. ELAR refers to English Language Arts and Reading.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

[a]"None of the above" comprises students whose race/ethnicity was classified as Asian, Pacific Islander, American Indian, Alaskan Native, or two or more races.

This larger proportion explains the differences in sample sizes across groups because it is consistent with a scenario in which advisers prompted MMA group students to provide their course-taking history when it was missing while not bothering to do so with test-only group students. This would result in adviser selection of some students in the MMA group. Unfortunately, it is unclear how advisers made decisions about which students to prompt for additional information on their course-taking history. If they were more likely to prompt students with certain characteristics that correlate with outcomes (as suggested by the differences in age and race mentioned above), then the analysis sample may have some systematic differences, which is to say the effect estimates in Dallas College's analysis sample may not represent unbiased causal effects. Although the impact analyses have been adjusted for age, race, gender, and high school GPA, this does not rule out the possibility that unobservable characteristics may remain different across research groups within the Dallas College analysis sample.

Fortunately, it is possible to examine the sensitivity of the main findings to this concern. Taking prerequisite or corequisite courses requires additional time and resources compared

with taking college-level courses. Consequently, unless there is evidence that student outcomes are better when students are referred to prerequisite or corequisite courses (instead of college-level courses), referral to college-level courses may generally be preferred. With that context in mind, the sensitivity test examines what the outcomes of the additional program group members would have had to have been for the evidence to show that referring students to college-level courses was harmful with respect to course completion rates at Dallas College.

Assuming that the source of the differences in research group size and baseline characteristics is adviser selection, and that the only students affected are the 121 additional students in the MMA group of the analysis sample (928 - 807 = 121) and that they should not have been in the bump-up zone, an estimate of how high their estimated college-level English and math course completion rates would need to be to mask a statistically significant (p = 0.05) negative effect of MMA placement among the experimentally selected portion of the sample can be calculated.

In English at Dallas College, 43 percent of the analysis sample's MMA group passed any college-level English course while 45.5 percent of the test-only group did so. With this base rate and a sample size of 589 students, an 11.5 percentage point impact in either direction would be statistically significant. This indication means that for the estimated mean of the 230 students in the experimental MMA group to be 11.5 points lower than 45.5 percent (that is, 34 percent), the 121 non-experimentally selected MMA group students would need a completion rate of greater than one half (60 percent) for the estimate shown to disguise a significant negative effect. Thus, the adviser-selected students would have had to complete the course at a rate over twenty-five points higher than the experimentally selected students under these assumptions. This completion rate difference would be improbably large. The bias that may have been introduced is unlikely to have caused the findings that student referral to college-level courses is not harmful.

In math at Dallas College, 9.3 percent of the analysis sample's MMA group passed any college-level math course while 5.4 percent of the test-only group did so. With this base rate and a sample size of 1637, a 3 percentage point impact in either direction would be statistically significant. That indication means that for an estimated mean of the 758 students in the experimental MMA group to be 3 points lower than 5.4 percent (that is, 2.4 percent), the 121 non-experimentally selected MMA group students would need a completion rate of greater than one half (52 percent) for the estimate shown to disguise a significant negative effect. Thus, the adviser-selected students would have had to complete the course at a rate over twenty times higher than the experimentally selected students under these assumptions. This completion rate is implausible, suggesting that the bias that may have been introduced does not explain the findings that student referral to college-level courses is not harmful.

These calculations are before factoring in about half of the pooled sample coming from Houston City College, which is experimental. Finally, these estimates assume advisers selected more capable students, which is not known. It is highly unlikely that adviser selection of the sample

at Dallas College substantively changed the primary conclusions of this report as they are presented here.

Impact analyses for the fully randomized sample at Dallas College, which is not susceptible to tampering (randomization occurred electronically behind the scenes) and did not show evidence of being compromised, can be estimated. Appendix Table A.8 presents the full randomized sample outcomes at Dallas College. These are rigorous experimental impacts which show significantly fewer English and math corequisites and fewer math prerequisites being taken by the program group than the control group without any negative effect on college-course completions in either subject during the first semester. Furthermore, students are offsetting their lower noncredit course load with college-level courses in other subjects. These findings are consistent with those shown in the Dallas College analysis sample.

Appendix Table A.8. Academic Outcomes After One Semester Among Students in the Full Dallas College Sample

Outcome (%)	Program Group	Control Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
English course enrollment						
College-level course	56.7	56.4	0.4	-1.9	2.6	0.759
Stand-alone course	42.9	36.2	6.7 ***	4.4	8.9	0.000
Corequisite course	13.8	20.1	-6.3 ***	-8.0	-4.5	0.000
Prerequisite course	1.5	1.2	0.3	-0.2	0.8	0.240
Did not enroll	41.8	42.5	-0.7	-3.0	1.6	0.562
English course completion						
College-level course	35.3	34.3	1.0	-1.2	3.2	0.377
Stand-alone course	27.3	21.7	5.6 ***	3.6	7.6	0.000
While enrolled in corequisite course	8.0	12.6	-4.6 ***	-6.1	-3.2	0.000
Prerequisite course	1.3	1.0	0.3	-0.2	0.7	0.307
Did not enroll or complete	63.45	64.71	-1.25	-3.49	0.98	0.272
Math course enrollment						
College-level course (any)	32.1	28.7	3.4 ***	1.2	5.5	0.002
Stand-alone course	29.8	25.2	4.6 ***	2.5	6.7	0.000
Corequisite course	2.3	3.5	-1.2 ***	-2.0	-0.4	0.003
Prerequisite course	5.7	9.1	-3.4 ***	-4.6	-2.2	0.000
Did not enroll	62.3	62.2	0.0	-2.2	2.3	0.981
Math course completion						
College-level course (any)	15.5	15.5	0.0	-1.7	1.7	1.000
Stand-alone course	14.3	13.1	1.3	-0.4	2.9	0.127
While enrolled in a corequisite course	1.2	2.5	-1.3 ***	-1.9	-0.6	0.000
Prerequisite course	3.9	6.4	-2.4 ***	-3.5	-1.4	0.000
Did not enroll or complete	80.5	78.1	2.4 **	0.5	4.3	0.012

(continued)

Table A.8 (continued)

Outcome (%)	Program Group	Control Group	Impact Estimate	95% Confidence Interval		P-Value
				Lower Bound	Upper Bound	
All subjects						
Enrolled (%)	99.02	98.81	0.21	-0.27	0.69	0.390
Total credits attempted	10.11	10.24	-0.13	-0.29	0.03	0.112
College-level credits	9.20	8.91	0.29 ***	0.11	0.47	0.001
English credits	1.72	1.71	0.02	-0.05	0.09	0.666
Math credits	0.97	0.88	0.10 ***	0.03	0.16	0.005
Other	6.51	6.33	0.18 **	0.00	0.35	0.045
Developmental credits	0.91	1.33	-0.42 ***	-0.52	-0.31	0.000
English credits	0.50	0.68	-0.18 ***	-0.24	-0.11	0.000
Math credits	0.41	0.65	-0.24 ***	-0.32	-0.17	0.000
Total credits earned	6.53	6.64	-0.11	-0.33	0.12	0.357
College-level credits	5.97	5.76	0.21 *	-0.01	0.43	0.062
English credits	1.07	1.04	0.03	-0.03	0.10	0.325
Math credits	0.47	0.48	0.00	-0.05	0.05	0.921
Other	4.42	4.24	0.18 *	-0.01	0.36	0.064
Developmental credits	0.57	0.88	-0.31 ***	-0.40	-0.23	0.000
English credits	0.3	0.4	-0.1 ***	-0.2	-0.1	0.000
Math credits	0.3	0.4	-0.2 ***	-0.2	-0.1	0.000
Sample size (total = 7,001)	3,520	3,481				

SOURCE: MDRC calculations using transcript data from Dallas College.

NOTES: Rounding may cause slight discrepancies in sums and differences.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.

Estimates are adjusted by students' race/ethnicity, gender, and grade point average.

APPENDIX

B

Subgroup Analyses

Appendix Table B.1. Exploratory Results for Subgroups of Students in the Bump-Up Zones, by Race

Outcome	Black Students					Hispanic or Latino Students					White Students					H-Statistic P-Value
	Test-Only Group	Impact Estimate	P-Value	SE	Sample Size	Test-Only Group	Impact Estimate	P-Value	SE	Sample Size	Test-Only Group	Impact Estimate	P-Value	SE	Sample Size	
English bump-up zone																
Completed college-level English course (%)	35.2	-2.7	0.570	4.8	402	42.6	-0.7	0.847	3.8	714	38.4	14.9	0.235	12.5	85	0.418
Total college credits earned, any subject	4.1	0.3	0.470	0.4	402	4.4	1.1	0.000 ***	0.3	714	4.7	2.4	0.034 **	1.1	85	0.116
Math bump-up zone																
Completed college-level math course (%)	8.8	-0.4	0.840	2.1	689	8.4	3.9	0.011 **	1.5	1,589	15.3	2.1	0.658	4.8	233	0.258
Total college credits earned, any subject	4.5	0.1	0.823	0.3	689	4.6	0.7	0.001 ***	0.2	1,589	6.2	0.8	0.222	0.6	233	0.260
English or math bump-up zone																
Total college credits earned, any subject	4.4	0.0	0.894	0.3	825	4.7	0.6	0.001 ***	0.2	1,778	6.2	0.9	0.116	0.6	255	0.162

(continued)

Appendix Table B.1 (continued)

SOURCE: MDRC calculations using transcript, placement, and baseline data from Dallas College and Houston City College.

NOTES: SE refers to standard error.
Rounding may cause slight discrepancies in sums and differences.
The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.
Estimates are adjusted by students' college, gender, and GPA.
Students for whom placement could not be determined have been excluded from these results.
"H-Statistic P-Value" indicates whether the difference in impacts among subgroups is statistically significant. Statistical significance levels are indicated as: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Appendix Table B.2. Exploratory Results for Subgroups of Students in the Bump-Up Zones, by Gender

Outcome	Female Students					Male Students					H-Statistic P-value
	Test-Only Group	Impact Estimate	P-Value	SE	Sample Size	Test-Only Group	Impact Estimate	P-Value	SE	Sample Size	
English bump-up zone											
Completed college-level English course (%)	42.9	-0.3	0.925	3.5	827	37.7	-3.7	0.383	4.3	528	0.537
Total college credits earned, any subject	4.4	0.8	0.003 ***	0.3	827	4.5	0.8	0.038 **	0.4	528	0.868
Math bump-up zone											
Completed college-level math course (%)	9.5	3.0	0.050 *	1.5	1,676	9.5	1.0	0.599	1.8	1,087	0.397
Total college credits earned, any subject	4.7	0.7	0.001 ***	0.2	1,676	4.9	0.2	0.524	0.3	1,087	0.121
English or math bump-up zone											
Total college credits earned, any subject	4.8	0.6	0.002 ***	0.2	1,912	4.9	0.2	0.340	0.2	1,261	0.232

SOURCE: MDRC calculations using transcript, placement, and baseline data from Dallas College and Houston City College.

NOTES: SE refers to standard error.
Rounding may cause slight discrepancies in sums and differences.
The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.
Estimates are adjusted by students' college, race/ethnicity, and grade point average.
Students for whom placement could not be determined have been excluded from these results.
"H-Statistic P-Value" indicates whether the difference in impacts among subgroups is statistically significant. Statistical significance levels are indicated as: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Appendix Table B.3. Exploratory Results for Subgroups of Students in the Bump-Up Zones at Dallas College, by Pell Eligibility

	Eligible for a Pell Grant					Not Eligible for a Pell Grant					
Outcome	Test-Only Group	Impact Estimate	P-value	SE	Sample Size	Test-Only Group	Impact Estimate	P-value	SE	Sample Size	H-Statistic P-Value
English bump-up zone											
Completed college-level English course (%)	46.8	-1.5	0.760	5.0	427	42.5	-6.7	0.398	7.9	162	0.582
Total college credits earned, any subject	4.7	1.9	0.000 ***	0.4	427	4.2	0.9	0.222	0.7	162	0.211
Math bump-up zone											
Completed college-level math course (%)	5.6	4.0	0.011 **	1.6	1,137	5.0	3.7	0.108	2.3	500	0.892
Total college credits earned, any subject	4.9	0.9	0.000 ***	0.3	1,137	5.1	0.4	0.311	0.4	500	0.253
English or math bump-up zone											
Total college credits earned, any subject	4.9	1.0	0.000 ***	0.2	1,210	5.2	0.4	0.347	0.4	525	0.202

SOURCE: MDRC calculations using transcript, placement, and baseline data from Dallas College.

NOTES: SE refers to standard error.
Rounding may cause slight discrepancies in sums and differences.
The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels have been indicated as *** = 1 percent; ** = 5 percent; * = 10 percent.
Estimates are adjusted by students' college, race/ethnicity, gender, and grade point average.
Students for whom placement could not be determined have been excluded from these results.
"H-Statistic P-Value" indicates whether the difference in impacts among subgroups is statistically significant. Statistical significance levels are indicated as: ††† = 1 percent; †† = 5 percent; † = 10 percent.

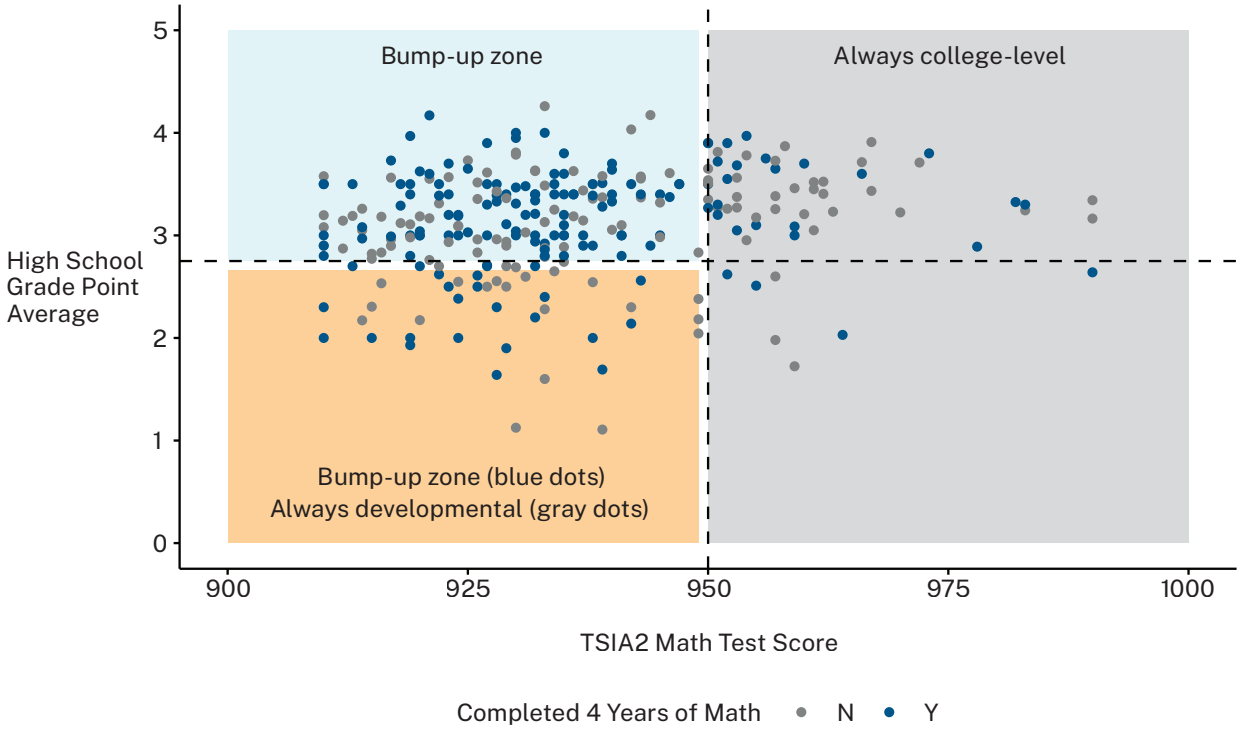
APPENDIX

C

Dallas College Math Placement Scatterplot

Appendix Figure C.1 shows a scatter plot of Dallas College students randomized to multiple measures assessment (MMA) placement in math. The vertical axis shows students' high school grade point average (GPA). The horizontal axis shows students' Texas Success Initiative Assessment 2.0 (TSIA2) math score. The four quadrants are defined by the threshold for college readiness in each measure. Those students in the right two quadrants are deemed college-ready by the current TSIA2 placement rules. Those students in the top two quadrants are deemed college-ready by the MMA high school GPA criteria at Dallas College. The remaining quadrant, the orange zone of Appendix Figure C.1, contains students who did not meet the TSIA2 or the high school GPA criteria. The blue dots in this figure represent students who met the four years of high school math criteria. Blue dots in the orange quadrant represent students who were bumped up despite having lower high school GPAs and test scores.

Appendix Figure C.1. Placement Zones (Dallas College, Math)



APPENDIX

D

Placement and Adviser Training Processes

The way students were randomly assigned to the multiple measures assessment (MMA) or test-only groups — and how advisers were trained — differed between institutions.

DALLAS COLLEGE

Dallas College created a study dashboard that contained each eligible student's cumulative high school grade point average (GPA) and course-taking patterns, as well as the student's study group code. Students self-reported their cumulative high school GPA and course-taking patterns upon admission to the college. When needed, Dallas College administrators were also able to obtain students' cumulative high school GPA and course-taking patterns through their high school transcripts. Then students who were attending college for the first time met with a success coach (the institution's term for academic adviser) to register for classes. During these meetings, success coaches used the information from the study dashboard to determine students' course placements.

To prepare for this process, the MDRC team worked with the college's Texas Success Initiative Coordinator and Student Success Professional Development team (hereafter, "Dallas College leadership team") to create a comprehensive training plan for success coaches and admissions staff members.

First, success coaches and admissions staff members completed an on-demand virtual training course that contained information about the study, placement criteria, and different student scenarios, followed by a course quiz about the material. A total of 199 success coaches completed the course and earned professional development credits, which they could apply toward their annual success coaching training standards.

Second, MDRC researchers and the Dallas College leadership team conducted an in-person training session with selected success coaches who were champions of MMA, and admissions staff members to reinforce the training material. A total of 21 success coaches and admission staff members attended the training session. Afterward, success coaches completed a written final knowledge check developed by the Dallas College leadership team to assess their knowledge of the MMA placement policies and their readiness to place students. A total of 233 staff members completed this final knowledge check and between 80 percent and 90 percent passed.

Third, the Dallas College leadership team led a two-day training session for success coaches and admissions staff members on how to navigate the study dashboards, interpret and use data effectively, and apply this knowledge through hands-on practice. A total of 177 staff members attended the first day of training and 194 attended the second.

HOUSTON CITY COLLEGE

Houston City College added a field to the ApplyTexas online application for students to self-report their cumulative high school GPA and course-taking patterns.[1] Information technology staff members then added these measures to a college-specific organizational management tool, where students were assigned a study group code. Students could either meet with an adviser or log into the college's online registration system to sign up for courses. If students met with an adviser, the adviser used their cumulative high school GPA, course-taking patterns, and study group to determine placement. If students registered for courses online, the study group code was automatically added to their course placement criteria.

To prepare for this process, the MDRC team worked with the college's Director of Instructional Quality and Department of Student Engagement and Success (hereafter, "Houston City College leadership team") to create a training plan for the college's advising, enrollment management, and testing teams. The Houston City College leadership team facilitated and recorded two identical virtual training sessions. They invited all academic and enrollment advisers, as well as the enrollment management and testing teams, to watch the training sessions.

The training sessions included background information on MMA, a step-by-step guide of the college's new organizational management tool interface, practice student placement scenarios, and best practices for speaking with students about their placements. The Director of Instructional Quality also created an MMA Teams site, which housed resources related to the study and provided a forum for advisers to ask questions about student placement.

After the training sessions, advising managers (senior advisers who supervised more junior staff members) played a key role in answering adviser questions about MMA and escalating concerns to higher-level administrators as needed.

1. ApplyTexas is a standard online application that students can use to apply to any public university in Texas, plus some community colleges and private institutions in the state.

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ABOUT MDRC

MDRC, a nonprofit, nonpartisan social and education policy research organization, is committed to finding solutions to some of the most difficult problems facing the nation. We aim to reduce poverty and bolster economic mobility; improve early child development, public education, and pathways from high school to college completion and careers; and reduce inequities in the criminal justice system. Our partners include public agencies and school systems, nonprofit and community-based organizations, private philanthropies, and others who are creating opportunity for individuals, families, and communities.

Founded in 1974, MDRC builds and applies evidence about changes in policy and practice that can improve the well-being of people who are economically disadvantaged. In service of this goal, we work alongside our programmatic partners and the people they serve to identify and design more effective and equitable approaches. We work with them to strengthen the impact of those approaches. And we work with them to evaluate policies or practices using the highest research standards. Our staff members have an unusual combination of research and organizational experience, with expertise in the latest qualitative and quantitative research methods, data science, behavioral science, culturally responsive practices, and collaborative design and program improvement processes. To disseminate what we learn, we actively engage with policymakers, practitioners, public and private funders, and others to apply the best evidence available to the decisions they are making.

MDRC works in almost every state and all the nation's largest cities, with offices in New York City; Oakland, California; and Washington, DC.