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Accelerating the Integrated Instruction of Developmental Reading and Writing at Chabot College

Nikki Edgecombe
Shanna Smith Jaggars
Di Xu
Melissa Barragan

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Address correspondence to:

Nikki Edgecombe
Senior Research Associate, Community College Research Center
Teachers College, Columbia University
525 West 120th Street, Box 174
New York, NY 10027
Email: edgecombe@tc.edu

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Abstract

This paper uses qualitative and quantitative data to compare the outcomes of students at Chabot College who participated in an accelerated, one-semester developmental English course and their peers who participated in a two-semester sequence. The sample included first-time students who entered college between summer 1999 and fall 2010; students were tracked for up to five years. Propensity score matching and regression analyses show that participation in the accelerated course was positively associated with a range of positive short-, medium-, and long-term outcomes, including entry-level college English completion, credit accumulation, grade point average, transfer to a four-year institution, and certificate and degree attainment. To better understand the quantitative findings, the authors draw on data from interviews with faculty, administrators, and staff; student focus groups; and classroom observations. The authors posit that the benefits of an accelerated course structure are amplified at Chabot College by a developmental English curriculum that is well aligned with college-level English and that develops critical academic literacy skills.

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1. Introduction

Strategies designed to accelerate students' progress through developmental education and into college-level coursework are gaining traction with practitioners and policymakers. Evaluations of various acceleration models suggest that they boost students' likelihood of completing developmental education, as well as introductory college-level math and English courses, within three years (Cho, Kopko, Jenkins, & Jaggars, 2012; Edgecombe, Jaggars, Baker, & Bailey, 2013). Less is known about longer term impacts, including long-term persistence, college-level credit accrual, and graduation. In the current paper, we present an analysis of an accelerated developmental English program at Chabot College that follows students for up to five years, thus providing critical information on the long-term effects of acceleration.

Chabot is a public two-year college that serves students living in or near Alameda County, in the East Bay region of California. In 2013, Chabot enrolled more than 13,300 students, roughly three quarters of whom were from racial/ethnic minority groups.¹ In fall 2012, 71 percent of Chabot students enrolling in college for the first time were referred to developmental English, and 83 percent were referred to developmental math. These developmental education referral rates are higher than the national average (Bailey, Jeong, & Cho, 2010; Sparks & Malkus, 2013) and suggest that Chabot's developmental education course offerings play a critical role in preparing the majority of the college's students for the rigor of college-level coursework.²

In the sections that follow, we first describe the developmental English alternatives available to students at Chabot College, which include a two-semester sequence and a one-semester accelerated course. We then discuss the origins of these courses, notably the collaborative processes that faculty engaged in to research, develop, and implement a markedly different approach to developmental reading and writing. Next, we present findings from a quantitative analysis comparing the outcomes of

¹ According to the college's preliminary fall 2013 census report, Chabot's student population is 14 percent African American, 16 percent Asian American, 8 percent Filipino, 33 percent Latino, less than 1 percent Native American, 2 percent Pacific Islander, 19 percent White, less than 1 percent other, and 7 percent unknown.

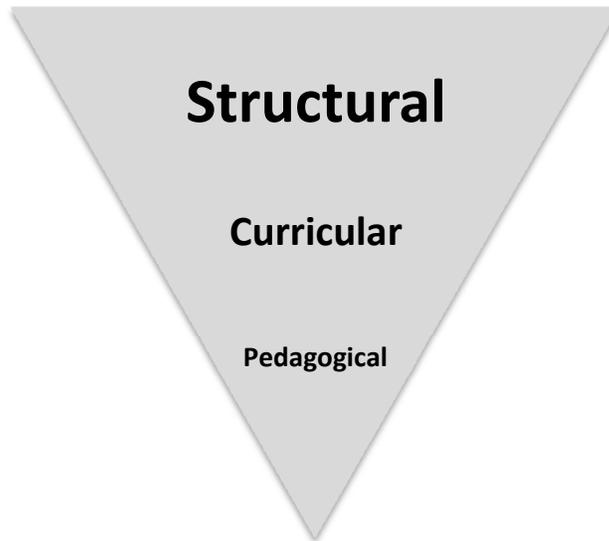
² In California, it is typical to refer to developmental education as basic skills. We use the terms "basic skills," "developmental education," and "remediation" interchangeably.

students in the two-semester sequence and the accelerated course, and we use qualitative data to discuss potential reasons for those findings. We find that students who enrolled in the accelerated course had better outcomes across a range of short- and long-term academic measures. We posit that the benefits of an accelerated course structure, which have been established in previous research, are amplified at Chabot by a developmental English curriculum that is seamlessly aligned with college-level English and that develops critical academic literacy skills that serve students long term. We conclude by discussing the implications of these findings for policy and practice in developmental education and beyond.

2. Background

Most developmental education reform models, including those designed to accelerate students' academic progress—for example, by mainstreaming developmental students into college-level courses or compressing two developmental courses into one semester—are primarily *structural*. That is, they focus on the reorganization of instructional time and course structures. Structural reforms tend to be less disruptive to classroom practice in that they generally do not ask for significant change from faculty (Edgecombe, Cormier, Bickerstaff, & Barragan, 2013). As a result, colleges are typically able to garner adequate support to adopt structural reforms, which may account for their popularity (Edgecombe, Cormier, et al., 2013). By contrast, *curricular* reforms, which focus on refining or rationalizing content, and *pedagogical* reforms, which require changes to teaching, are less prevalent though potentially quite effective (Edgecombe, Cormier, et al., 2013; Hern, 2013). These three types of developmental education reform are distinct but not mutually exclusive. Some reforms incorporate structural, curricular, or pedagogical components to varying degrees from the outset. Others may evolve, building curricular or pedagogical modifications into a primarily structural reform (see section 3 in Edgecombe, Jaggars, et al., 2013 for more on this process). Figure 1 represents the relative prevalence of structural, curricular, and pedagogical approaches based on a scan of developmental education reforms (Edgecombe, Cormier, et al., 2013).

Figure 1
Types of Developmental Education Reforms



Chabot’s accelerated course is unique in that it combines a structural reform (i.e., a one-semester pathway) with pedagogical and curricular reforms that were already established within the college’s developmental English program. The accelerated course is also distinct in that it enrolls students through an “open-access” placement approach, as we discuss in more detail below. The unique blend of curricular, pedagogical, and structural features of Chabot’s developmental English program was borne out of a course redesign process spearheaded by English faculty more than two decades ago. The comprehensiveness and longevity of the Chabot model differentiate it from many developmental education reforms and provide an important rationale for its evaluation.

2.1 Open-Access Developmental English Pathways

When students enroll at Chabot College, they are instructed to take placement tests in English, math, and sometimes English as a Second Language (ESL) to determine their readiness for college-level coursework. Their reading and writing abilities are assessed using the ACCUPLACER reading comprehension and sentence skills tests.³ Depending on the combination of scores on these tests and potentially other measures, students are referred to one of three main English coursework options: college-level

³ Our analysis includes student cohorts dating back to 1999, when Chabot College used the Descriptive Test of Language Skills in combination with other information to determine placement. Chabot began using the ACCUPLACER for placement in 2006.

English, developmental English, or ESL courses.⁴ Within developmental English, students have two primary alternatives from which they can choose. English 102 is an accelerated four-credit integrated reading and writing course, and English 101A and 101B are two four-credit integrated reading and writing courses taken over two semesters. A small number of other developmental English course options are also available (though not required), including a faculty–student tutorial course (English 115), sometimes taken in conjunction with English 102 or English 101A and 101B; a stand-alone course in English grammar (English 107); and a series of learning skills courses that target students with identified learning disabilities.

Access to English 102 and English 101A is “open.” That is, students who have been assigned to developmental English or ESL (and students who did not take a placement test) can choose between the one- and two-semester options. Counselors, course catalogs, and other academic advising resources are available to help students decide which pathway to pursue. Students who successfully complete English 102, or the two-semester sequence of English 101A and English 101B, are eligible to enroll in English 1A, Chabot College’s introductory college-level English composition course.

Although the majority of Chabot’s English faculty endorse the open-access model, their support is not unequivocal. One faculty member reflected on teaching composition courses at another college and expressed the feeling that more homogeneously grouped classes were easier to teach. But this instructor also acknowledged that there are benefits to the mixed-ability grouping of the open-access model:

Sometimes those really strong students end up being really good models for the other students. They can be really useful in the classroom. I like having them. That’s one good thing about it. Having that mix of skill levels enables you to use the students and have them help each other.

⁴ The specific placement criteria have varied during the time period under study. For example, in 2009, students with a reading comprehension score above 84 and a sentence skills score above 94 were referred to college-level English; those with a reading comprehension score below 35 were referred to a course that assesses students for disabilities; and the remainder were referred to the developmental reading/writing sequence. Students who test within five points of the college-ready cut score may have other measures of academic ability, such as high school English performance, considered in determining placement.

The tension between these perspectives highlights the pedagogical challenges and opportunities for faculty teaching in an open-access model. It also underscores a long-standing debate on heterogeneous student ability grouping that dates back to the tracking debate of the 1970s and 1980s (Cooper, 1996; Wheelock, 1992) and has significant implications for entry assessment and placement as well as developmental course structures.

The extent to which the open-access model operates as intended depends on the availability of course sections. Like most California community colleges, Chabot has had to manage cycles of increased enrollments and reduced state funding. Administrators at Chabot report that there is more student demand for developmental English than can be accommodated in the available sections, which has the effect of limiting choice despite the open-access model.

2.2 Curriculum and Pedagogy

The curriculum and pedagogy of Chabot College's current developmental English model began their evolution in the early 1990s. Catalyzed by a Title III grant, Chabot faculty carried out a yearlong review and redesign of the college's English curriculum and delivery of basic skills. Before the redesign, the system consisted of three levels of developmental English (writing) courses and three levels of developmental reading courses. Students had difficulty completing the two parallel multi-level sequences, and feedback from English 1A faculty suggested that students were arriving in freshman composition with uneven preparation. To gather more data on these issues, the faculty members leading the redesign surveyed instructors on their experiences teaching English and used the results to identify areas of interest that merited further discussion and research. In order to better understand the issues that emerged from the survey, and to expand their knowledge of approaches that might benefit their students, the English faculty organized into small working groups, which spent an entire fall semester reviewing the research literature and attending relevant conferences. Some faculty pursued additional graduate training.

Faculty used the second half of the year to redesign the developmental English curriculum. The reorganization reflected a growing—though not universal—perspective among Chabot English faculty that reading and writing are most effectively taught

together. Momentum to integrate reading and writing grew as English faculty leaders reorganized the college's previously separate reading and writing centers into the Writing and Reading Across the Curriculum Center under the Title III grant. Faculty also reconsidered their approach to teaching explicit grammar lessons in favor of a more whole-language or holistic approach. To the extent possible, instruction in sentence structure, punctuation, and other grammar topics was embedded in writing and reading assignments, not taught in stand-alone lessons. Faculty also decided students would read complex, primarily nonfiction, full-length texts because such texts reflected the type and quantity of reading assignments students would encounter during much of their college careers. Faculty wanted students at the developmental education level to begin wrestling with ideas and using evidence from texts to support those ideas, as they would be asked to do in English 1A. According to a retired faculty member recounting the redesign process, "Our thinking was, the best way to prepare them for 1A was to give them 1A experiences."

The decision to redesign the curriculum was not without controversy. The prospect of integrating reading and writing, in particular, raised fears among faculty about having to teach a new subject. Some reading faculty had to pursue additional graduate course training to be credentialed to teach English composition. To allay fears among reading faculty that the redesign would put their positions in jeopardy, the English department leadership strategically used the expertise of reading faculty to guide discussions and more broadly to demonstrate that their input was valued.

The curriculum development process raised many pedagogical questions. Working through these questions, including what faculty believe students need to learn to succeed academically, drove the faculty to create a set of core departmental principles to guide curriculum and instruction from basic skills through college-level English courses. These principles melded specific curricular requirements (e.g., courses should include full-length works) and pedagogical requirements (e.g., instructors should not teach writing in a progression from the sentence to the paragraph to the essay) with contextual conditions deemed important for effective learning (e.g., settings that include speaking, listening and responding). While faculty have significant autonomy in terms of choosing the particular readings and writing assignments used in their courses, the core

departmental principles create coherence and consistency across all English courses, providing students who started in developmental education the opportunity for sustained practice and application of increasingly higher level literacy skills, knowledge, and habits of mind. (See Box 1 for the full list of principles as they existed at the time of our fieldwork.⁵)

Box 1
Chabot College English Department Core Principles

English courses at all levels should:

1. Integrate reading, writing, critical thinking, speaking, and listening.
2. Address directly students' reading practices. Reading is absolutely critical to academic success, and we strive to include more reading, in terms of both range and depth, in our program.
3. Approach the teaching of writing by inviting students to write prose pieces of varying length and complexity. Writing is not taught in a progression from the sentence to the paragraph to the essay.
4. Emphasize critical thinking. Critical thinking is the creation of meaning. Critical thinking is not limited to concepts of formal logic but includes grouping items/seeing patterns, drawing inferences, evaluating for purpose, synthesis and argumentation, differentiating fact from opinion, asking questions, evaluating for standards of fairness and accuracy, and making judgments. Critical thinking is broad-based, including sensing, feeling and imagining.
5. Create settings which include speaking, listening and responding that foster the building of community and forge links to critical reading and writing. Teaching those skills sometimes needs to be explicit and directed. Activities may include student presentations (solo and group/panel); small- and large-group discussions in which students speak not only to the instructor but to each other; student/teacher conferences; interviews in the class or community. We also encourage listening skills that involve note-taking and feedback/response.
6. Include full-length works, defined as any work that sustains themes, including a book of short essays by a single author. We suggest that the work(s) be integrated into the course thematically. On the pre-1A level, we recommend that non-fiction be used; that if fiction or autobiographical works are assigned, they be analyzed for issues and themes connected to other readings in the course rather than for literary aspects; that a combination of book-length works and short essays be used to provide a variety of models; and that students be asked for both personal and analytical responses.
7. Increase students' familiarity with and knowledge of the academic culture, themselves as learners, and the relationship of the two. Some ideas include: collaborative teaching and learning, using materials reflecting successful college experiences, acknowledging and validating the students' experiences while introducing them to academic culture and values, modeling academic values, and demystifying the institution.

⁵ The most recent version of the principles can be found at <http://www.chabotcollege.edu/languagearts/english/philosophy.asp>. Faculty consider the principles to be a living document that has informed a range of activities, including teaching, hiring, and evaluation.

The principles reflect a sophisticated perspective on building postsecondary reading and writing skills that is supported by the empirical literature on academic literacy. Researchers have claimed that students enter college literate but without the “critical literacies inherent in academic work” (Constable, Schneider, & Scheckelhoff, 2012, p. A-70). For students referred to basic skills courses, the absence of these critical literacies may be especially deleterious. Faculty members we interviewed provided examples of critical literacies—such as the ability to move from summarizing a text to analyzing a text, or the ability to infer meaning when an author uses metaphors or other figures of speech—and explained that most students struggle with these concepts when they first enter college. Critical literacies can be further undermined by a lack of student success skills. A full-time English instructor described students’ dearth of college know-how: “Their study skills are not good. They just don’t come to college prepared knowing what it means to be a college student. So they don’t know how to manage their time. They don’t know what are good note-taking skills.”

The pedagogical principles developed by Chabot English faculty sought to remedy students’ weak reading and writing skills while simultaneously providing them experience with the performance expectations and cultural norms of college. For example, one full-time instructor recalled that as she prepared to teach her first section of English 101A, a more seasoned faculty member emphasized the importance of “getting students comfortable in an academic setting; getting them comfortable with reading; getting them comfortable with writing; building their confidence.” But the enactment of these pedagogical principles can be challenging from both a curricular and a pedagogical perspective. Another instructor spoke of the difficult balance he tries to strike in selecting readings:

I try to find something that mixes a little narrative with abstract analysis, so they at least have that narrative to hang on to. And it makes them more willing to stick it out, and really give the book a try. I like that blend. And I look for something that will challenge them a little bit but not overwhelm them. I think that’s hard sometimes to figure out.

This instructor’s description illustrates the challenges he confronts in identifying texts that will engage his students with compelling story lines while exposing them to more

abstract concepts—which may be more difficult to understand but will help develop critical thinking skills.

2.3 Course Structures

Although the core principles underlying the English department’s approach to integrated reading and writing instruction were established in the early 1990s, it took some time for both the one- and two-semester courses to become options for all students referred to developmental English. Initially, English 101A and English 101B were the primary pathway to English 1A. A one-semester alternative, offered exclusively as part of a learning community, was available to selected students for the first few years after the redesign. Although the learning community–based course showed success, some faculty and administrators were not comfortable offering the accelerated option to the general student population. Thus, it was not until 1997 that accelerated English, or English 102, was open to all students. That year, the department offered two sections of English 102 as a stand-alone course.

The number of English 102 sections grew as instructors shared their experiences and a greater number of English faculty began to believe that students could obtain an equally rich learning experience in the one-semester course. This belief was validated by studies conducted by the college’s Office of Institutional Research and later confirmed by other internal analyses, which showed that students who enrolled in English 102 were more likely to register for and complete English 1A than students who enrolled in English 101A. By the time of our study in spring 2012, Chabot offered 27 sections of English 102 and 14 sections of English 101A; thus, the majority of incoming developmental English students were enrolling in the accelerated pathway.

2.4 Summary

Overall, Chabot College’s developmental English redesign process was remarkable in its depth and scale. Faculty who were historically positioned as specialists in either reading or writing had to adopt new roles, defined by a set of ambitious pedagogical principles intended to enhance curricular alignment, instructional consistency, and rigor. Chabot’s redesign represented the rarest type of reform—that designed to transform classroom practice—and required changes in dispositions and

behaviors of many faculty and most students. The redesign process built faculty members' curricular and pedagogical knowledge and gave them experience working collaboratively. It also laid the foundation for ongoing refinement of the reform. Researchers have hypothesized that attention to both the substance of a reform (from a design perspective) and its implementation is an essential component of reforms showing strong and sustainable impacts (Edgecombe, Cormier, et al., 2013). Accordingly, we might expect to see strong impacts of a structural reform in this environment, as it is built on a strong foundation of ongoing curricular and pedagogical improvement.

Next, we present a quantitative analysis of the comparative outcomes of students enrolled in the two-semester sequence and the accelerated alternative. We then discuss potential explanations underlying the results.

3. Quantitative Analysis

3.1 Data and Analytic Approach

Chabot College provided anonymized, individual-level data on students who initially entered college between summer 1999 and fall 2010, including follow-up data on all students through fall 2010. In the appendix, we provide detailed information on the sample, the definitions of the accelerated and non-accelerated groups, the outcome measurements, and the analysis. Here, we provide a brief summary.

To define the accelerated group, we included first-time students who entered Chabot between summer 1999 and fall 2010 and took English 102 during that timeframe. To define the comparison group, we included students who entered Chabot and took English 101A during the same period. (Students who attempted both English 102 and English 101A were classified according to the type of course they first attempted.) We call the semester in which each accelerated or non-accelerated student took the designated course the “intervention term.”

Overall, accelerated students were more likely to be Asian, young, single, and enrolled in college full-time (see Table A.1 in the appendix). Although they were equally likely to receive financial aid, they tended to receive more aid than non-accelerated

students. Accelerated students also seemed to be more academically prepared; they were more likely to have graduated from high school, to have plans to complete a four-year degree, to have higher scores on both the reading and sentence skills placement exams, to have been dually enrolled prior to the intervention term, and to have more credits and a slightly higher grade point average (GPA) by the intervention term. Finally, because Chabot offered most sections of the accelerated course in a learning community format during its early years, 14 percent of accelerated students participated in a learning community prior to or during the intervention term, compared with only 1 percent of comparison students.

To explore the outcomes of accelerated students, we measured both groups' outcomes at three time points: one year, three years, and five years after their intervention term. For example, for the one-year follow-up for students whose intervention term was fall 2009, we considered their records from fall 2009 to fall 2010. We considered course performance outcomes, including whether students completed English 1A with a C or better, the number of college-level credits they completed with a C or better, and their overall GPA in college-level courses; and persistence outcomes, including whether they were still enrolled at any college, had transferred, or had graduated from any college.

Descriptively, accelerated students had stronger outcomes on nearly all measures across all three follow-up periods (see Table A.2). In order to account for the potential confounding effects of pre-existing student characteristics, we performed regression analyses as well as propensity score matching (PSM) analyses, which compared accelerated and non-accelerated student outcomes while controlling for a variety of student characteristics (see section A.3 in the appendix for details). In order to explore whether the estimates generalize to all developmental students, we then compared the results for different subgroups: (1) students who took the accelerated pathway as part of a learning community versus those who did not; (2) those who had higher versus lower placement test scores; and (3) those referred to ESL versus those who were not. Finally, given that the key outcome of English 1A completion involves two sub-outcomes (whether students enrolled in English 1A within the given time period, and among students who did enroll, whether they earned a C or better in the course), we ran additional analyses focusing on these outcomes.

3.2 Results

Detailed results, including coefficients for the regression and PSM models, are included in the appendix. Here, we summarize the overall results. Controlling for pre-existing student characteristics, accelerated students had stronger outcomes than their non-accelerated peers. For example, within the first year, accelerated students were 25 percentage points more likely to complete college-level English than their non-accelerated peers. Over subsequent years, the difference in English 1A completion rates between the two groups diminished; but even at the five-year follow-up, accelerated students were 17 to 22 percentage points more likely (depending on the model) to have completed English 1A. At the five-year follow-up, accelerated students had also earned approximately 4 more college-level credits, had GPAs 0.08 to 0.12 points higher, were 7 to 10 percentage points more likely to have transferred (or to be “transfer-ready”), and were 4 to 6 percentage points more likely to have graduated.

When we considered the results by subgroup, we found that the estimated effects of acceleration were consistent regardless of learning community participation but varied according to students’ initial placement test scores. In general, the estimated positive effects of acceleration were stronger among high-scoring and mixed-scoring students and weaker among low-scoring students. For example, among developmental English students with relatively high scores on both the reading and sentence skills exams, those who chose English 102 earned an estimated 3.38 more college-level credits than their non-accelerated peers by the one-year follow-up. In contrast, among those with relatively low scores on both exams, those who chose English 102 earned only an estimated 1.60 more college-level credits than their non-accelerated peers. In addition, at the one-year follow-up, low-scoring accelerated students were less likely to be still enrolled (or to have graduated) than their non-accelerated peers; however, this negative effect disappeared by the three-year follow-up.

Analyses of the ESL subgroup found that accelerated ESL students were 19 percentage points more likely than their non-accelerated ESL peers to complete English 1A by the one-year follow-up. Estimates for the impact of acceleration on other course performance outcomes were only mildly positive and not statistically significant for the ESL sample. However, ESL students who chose the accelerated path were 17 percentage

points less likely than their non-accelerated ESL peers to still be enrolled (or to have graduated) at the one-year follow-up.

Further investigation revealed that the lower one-year persistence rates for accelerated low-scoring and ESL students were driven almost exclusively by a group of students who completed English 1A with a C or better and *then* stopped or dropped out of college. It is not clear whether we should consider this a negative pattern (given that these students were, at least at the one-year follow-up, no longer enrolled) or a positive one (given that these students earned additional college-level credits that would readily transfer to another school if they ever chose to return to college). Given the ambiguity of the result, together with the fact that the higher dropout result dissipated by the three-year follow-up for low-scoring and ESL students, we conclude that there is no clear evidence that the accelerated pathway harms any particular subgroup of students.

When we break English 1A completion into the sub-outcomes of enrollment and pass rates (with a C or better) among those who enroll in the course, we find that the estimated effects of acceleration on English 1A completion are driven entirely by its effects on enrollment in the course. Accelerated students were much more likely to enroll in English 1A within each time period, and once enrolled, were equally likely to pass it with a C or better, compared with students who entered the course through the two-semester developmental English pathway.

4. Discussion

Our quantitative analysis leaves little doubt that enrollment in the accelerated developmental English course (relative to the two-semester course option) is associated with better short-, medium-, and long-term academic outcomes. Even ESL students and students with lower placement test scores—populations for which an accelerated model may be assumed to be less appropriate—appear to benefit in certain ways. Most notably, enrollment in the accelerated pathway is associated with positive long-term outcomes, such as earning transfer-ready status, transferring to a four-year college, and earning a certificate or degree. Unlike findings from previous studies, which were limited by shorter analysis timeframes (Cho et al., 2012; Edgecombe, Jaggars, et al., 2013), these

findings suggest that developmental education interventions experienced at the start of students' college careers have the potential to affect critical long-term outcomes, such as graduation and transfer.

To better understand our quantitative findings, we drew on qualitative data collected at Chabot College in spring 2012. During two visits to the college, we interviewed 15 faculty, administrators, and staff; observed eight English 101A and English 102 classes; and conducted three focus groups with a total of 11 students enrolled in English 101A and English 102. Analysis of the qualitative data suggests three plausible explanations for the better outcomes of students who enrolled in English 102, which we discuss in the sections that follow. First, the streamlined pathway to complete developmental English and freshman composition requirements reduces the number of exit points in the developmental sequence and helps students maintain their academic momentum. Second, the pacing and other features of the accelerated course may more effectively prepare students for the rigor of college-level coursework. Third, students who self-place into the accelerated pathway may be more motivated or have other unobservable characteristics associated with academic success. In all likelihood, these factors and potentially others are working in tandem to generate the positive outcomes presented in the previous section.

4.1 Streamlined Accelerated Pathway

Reducing the number of developmental courses, and thus the number of exit points in the developmental course sequence, can accelerate students' academic progress and reduce the likelihood that external forces will pull them away from school before they finish their developmental requirements (Edgecombe, 2011; Hern, 2010; Rutschow & Schneider, 2011). An analysis by Bailey et al. (2010) shows that of the students who pass a remedial reading course three or more levels below college level, 10 percent fail to enroll in the next course in the sequence. At some point in a remedial reading sequence with three or more levels, nearly a quarter of students do not enroll in the next course they are eligible to take (Bailey et al., 2010). Chabot's accelerated model combats this phenomenon by eliminating exit points: Students in the accelerated pathway enroll in and complete a one-semester course, whereas students in the non-accelerated pathway enroll in and complete a two-course sequence over two semesters. The better academic

outcomes for Chabot students who enrolled in English 102 may be attributable in large part to this shorter path to English 1A. Qualitative data suggest how the benefits of this shorter timeframe helped students to develop and maintain academic momentum.

Some English faculty attributed the success of the accelerated course at least in part to its shorter timeframe. A part-time instructor who had taught both English 101A-101B and English 102 said, “I like the one-semester idea. . . . I think when you give them two full semesters, you give them that much longer to find a reason to leave.” However, faculty were not unanimous in their support of the one-semester model. Some felt that certain students—particularly those with English language learning needs—benefitted from more time in developmental English, despite the risks associated with additional exit points. A veteran instructor argued,

Maybe ESL students do need to be taking it a little bit slower because they are not just acquiring cognitive and academic skills. What they are acquiring are language skills. . . . And you can accelerate your progress to some degree, but a certain amount of that is just going to be time.

Faculty offered similar arguments for more time in developmental education for students who entered Chabot lacking confidence in their academic abilities, particularly their reading and writing skills.

The English 102 course at Chabot provides a streamlined pathway to English 1A—eliminating exit points that derail a proportion of English 101A and 101B students. Other features of English 102 likely interact with the one-semester model to improve students’ academic outcomes. We discuss some of those features next.

4.2 Pacing and Other Course Features

Typical developmental education curricula and pedagogy have been criticized for replicating an instructional environment that failed to engage and to serve students well in the K-12 system. Grubb (2012) describes the teaching in most basic skills classrooms as “remedial pedagogy,” an:

. . . approach [that] emphasizes drill and practice (e.g., a worksheet of similar problems) on small subskills that most students have been taught many times before (e.g., solving a simple equation, subject–verb agreement, punctuation

rules, sentence-level writing, converting fractions to decimals, solving standard time-rate-distance problems). Moreover, these subskills are taught in decontextualized ways that fail to clarify for students the reasons for or the importance of learning these subskills. (p. 52)

Chabot's English department recognized the limitations of remedial pedagogy two decades ago and reshaped both what is taught in developmental English and how it is taught. Our qualitative analysis suggests that the curriculum and pedagogy of the developmental English courses, combined with the more aggressive pacing of English 102, may more quickly build the academic literacy and college success skills students need. In conjunction with the reduction in exit points afforded by the accelerated pathway, these course features may contribute to the better outcomes of English 102 students.

Chabot's English faculty designed the assignments in developmental English to mirror the tasks students are expected to perform in college-level English courses, albeit with lower levels of complexity and more scaffolding. In adherence with the pedagogical principles of the English department, a young faculty member described his instructional approach as follows:

The first step is to get them to become active readers, to see text as something that you use and work with and are part of—not just something you are viewing, like a show. The second goal is to get them to use text in their writing, textual evidence—to become writers who are not just summarizers of material but analyzers of material, writers who can form arguments. So the first step is to have them recognize argument and then form it themselves, and then to be creators of original thought, to move past reading comprehension, which is a really important step for them still; to move to reading construction—that you're using these words to make something else, the ideas to make something else. Because college writing is supposed to be original writing.

Pedagogical approaches like those of this faculty member ensured that students gained sustained practice in skills and behaviors relevant to their success in English 1A and other reading- and writing-intensive courses. Bransford and Schwartz (1999) describe understanding where and how learning is to be applied as “preparation for future learning”—a variation on traditional concepts of knowledge transfer that emphasizes

“whether [people] are prepared to learn to solve new problems” (p. 69)—and contend that preparation for future learning may be an important determinant of long-term success.

All of the English 102 instructors we interviewed indicated the most significant pedagogical difference between English 102 and the two-semester English 101A-101B sequence was the pace at which course requirements were completed. Several faculty members also suggested that the pacing in English 102 more closely resembles the instructional delivery and the associated performance expectations in college-level courses. A seasoned instructor who taught both developmental and college-level English courses acknowledged the benefits of acceleration but argued that other factors were at play in English 102 as well:

Time is the probably the biggest benefit for these guys. I think also you're giving them that college feeling. In 101A, at least for me, because of how slow it went, I didn't necessarily feel like I was giving them that college experience. But I think the rigor of 102 does provide that.

Further, she suggested that rigor in English 102 is as much about establishing expectations (e.g., “you are going to read a lot”) as it is about the difficulty level of the curriculum. She expressed that this expectation-setting process is part of essential college know-how for students.

The implications of the accelerated model for their approaches to teaching and their professional identities were not lost on faculty. Many instructors felt pressure when teaching English 102 to prepare students more quickly for college-level work. Frequently, faculty described this pressure as a constructive force. According to a veteran English teacher:

Teaching 102 and knowing the outcome is 1A is a good pressure on me to really prepare them, whereas with 101A, it was very hard for me to figure out the goal of the class. It was hard for me to wrap my mind around they're going to 101B next and what does that mean. In 102 they need to be ready to do a lot on their own.

For this faculty member, the criteria for successful completion of English 102 were more clear-cut than the criteria for successful completion of English 101A. While not all English faculty members we interviewed articulated this specific difference between the

courses, overall they tended to describe the performance requirements for students moving on to English 1A in concrete terms.

Overall, these faculty accounts suggest that certain features of English 102, particularly those that mimic college-level performance expectations, may work together with the accelerated timeframe of the course to generate better academic outcomes for students. Although the learning objectives of English 102 and the English 101A-101B sequence are identical, it appears that the structure of the accelerated course influences classroom practice in ways that produce material differences in the learning environment relative to the two-course sequence. Differences in instructional environments can influence student outcomes such as those we analyzed, as can differences in student characteristics, which we discuss next.

4.3 Unobservable Student Characteristics

Quasi-experimental analyses can provide compelling evidence of the efficacy of particular interventions. But unlike causal analyses, quasi-experimental studies cannot fully account for differences between the treatment and comparison groups that may contribute to differences in outcomes. For instance, students who self-place into English 102 may be more motivated than students who self-place into English 101A-101B. They may feel more confident in their abilities and purposefully choose the accelerated pathway. Although our analysis controlled for a variety of student characteristics and our qualitative evidence on this issue is mixed, it is possible that unobservable differences between the two groups may account for the stronger outcomes of English 102 students.

Data from our interviews with instructors and students suggest that the majority of students may not be making well-informed decisions about which developmental English pathway to pursue, making it more difficult to interpret the potential effects of unobservable student characteristics. Instructors indicated that the majority of students do not give their developmental English course options much thought. Faculty who polled their students regarding whether they knew they were enrolling in an accelerated or non-accelerated section reported that the majority of students were not aware of the options available to them. One instructor reported asking his English 101A students why they enrolled in that particular course and finding that roughly half of the students did not know English 102 was an option. He indicated that the English 101A students who were

aware of the difference between the courses viewed “all of this in one semester as too scary, too fast.”

Data from student focus groups likewise suggest that students’ developmental course choices were not usually well informed. Three of the 11 students we interviewed indicated they spoke with a counselor about developmental English, but most did not emerge with a clear understanding of the differences in course options. Only one of the 11 students we spoke with stated that he intentionally picked English 102 because it would enable him to take English 1A sooner. Faculty indicated that providing clear information to students about their course options was a departmental priority and that a faculty working group was developing resources to address the existing information gap.

Although faculty reported varying perspectives on the significance of the differences between students who enrolled in English 102 and English 101A, students’ lack of understanding of the developmental English course-taking options may have contributed some randomness to enrollments, perhaps mitigating some of the effects of differences in unobservable characteristics. A full-time instructor felt that differences between students within English 102 and English 101A-101B sections were as salient as differences between students across the courses. He said:

My perception is the students we get are different, somewhat different. Not tremendously different. I think the primary difference is that the students who take 101A have less confidence in their skills. They think they need more time. And we probably get a few more students in 101A who scored really low on the placement test. But really in both sequences, we get students who scored all over the place. . . . There’s a slight difference in the skill levels, but it’s pretty slight. You probably get a few more strong students in 102s and a few more really weak students in 101A, but I’m not sure it’s that significant. In my experience, it’s not that significant. The students are pretty similar.

Another faculty member saw the contrast more starkly, stating:

My psychological guess is the student who will choose the accelerated path is one who is more motivated, feels more confident, like “I can do this.” So that level of motivation and confidence directly translates into a student’s effort and ability.

Motivation and confidence, however, are not fixed quantities; they can be strongly influenced by students' initial experiences in college (e.g., see Bickerstaff, Barragan, & Rucks-Ahidiana, 2012). To the extent that accelerated students are more confident, then, it is unclear whether their confidence predates or is shaped by their participation in the course. One full-time faculty member explained that her English 102 students "rise to the occasion ... because we do move much faster." But she also credits the success of English 102 to the community she attempts to build in her classroom. "As a teacher, you have more power than you think," she said. "You can establish, not necessarily rules, but an environment. This is the culture we want." This particular instructor reported cultivating an environment that redefines success to include not only grades but also perseverance, dedication to college, and seriousness and focus in class.

4.4 Summary

The qualitative data we collected from Chabot College faculty, students, and administrators provide plausible explanations for the stronger academic outcomes of students who enroll in English 102. Specifically, the streamlined pathway to English 1A, its pacing and other features, and unobservable student characteristics may be impacting the quantitative analysis results to varying degrees. The qualitative analysis also reveals a common (and quite rational) perspective among English faculty. That is, most faculty believe that both developmental English course options have benefits for students. Many instructors believed that English 101A and 101B are good for students with English language learning needs or for students with weak skills who lack confidence. English 102 was frequently described as a good option for students who are stronger academically and have higher levels of motivation. Our subgroup analyses indicate that English 102 has greater benefits for students with higher English and reading placement scores, but they also suggest that ESL and lower skilled students are not harmed by the accelerated model. Further research will be required to establish that acceleration is better for the Chabot student who is not currently choosing it; however, the combination of our quantitative and qualitative analyses suggests that students should be encouraged to consider the one-semester developmental English pathway.

5. Conclusions and Implications

The findings presented in this analysis affirm the existing evidence on the benefits of reforms designed to accelerate students' progression through developmental education. Enrollment in Chabot's accelerated developmental English course is associated with higher entry-level college English completion rates. The findings also shed new light on the positive long-term effects of developmental education interventions. Students who enrolled in the accelerated course earned more college credits and were more likely to graduate or transfer.

Our findings also inform ongoing debates on developmental education reform. They suggest that one-semester developmental education courses that are well aligned with college-level competencies, and that integrate instruction that supports students' efforts to master these competencies, can benefit a range of students—including those whose placement scores indicate significant academic deficits. Additionally, the results of our analysis raise interesting questions about the quantity of instructional contact hours required to prepare a developmental reader and writer for college English. Chabot's accelerated course requires four credit hours, half the instructional time required of many developmental English approaches.⁶ It is not uncommon for faculty to believe that most students need more time in basic skills courses. This view may be amplified in situations where reading and writing were historically taught separately, and when learning objectives across the two disciplines are combined. The results of the Chabot analysis suggest that extended instructional contact hours may not be necessary, particularly if the curricular and pedagogical components of the course are well designed and executed.

Chabot's "open-access" approach highlights the benefits and pitfalls of allowing students to self-place into developmental education (or potentially college-level) courses. On the one hand, students likely know more about themselves and their capabilities than can be gleaned from a placement test, so self-placement has the potential to improve placement accuracy, particularly when course enrollment decisions are guided by discussion with an advisor. Moreover, students may be more committed to acceleration if

⁶ Previous and ongoing studies conducted by the Community College Research Center reveal that there is a significant range of instructional contact hours required for students of comparable academic preparation who are referred to developmental reading, writing, or integrated reading and writing courses. Differences in instructional contact hours frequently exist within community college systems and have implications for student outcomes, as discussed in Jaggars and Hodara (2013).

they make an informed and active choice to pursue it as opposed to being placed into it. On the other hand, some students who might thrive in an accelerated model—rising to the occasion when exposed to its rigorous performance requirements—could fear the concept of acceleration and never enroll. Accurate placement in an open-access model also is highly dependent on students receiving quality information and effectively weighing their alternatives, but ensuring that students make well-informed choices remains a challenge at most community colleges. Given the weaknesses of dominant community college assessment and placement policies and practices (Hughes & Scott-Clayton, 2011; Scott-Clayton, 2012), the outcomes of this analysis suggest that the open-access approach holds promise but must be strengthened by helping students to make better informed decisions about the developmental education alternatives available to them.

In terms of teaching and learning, one potential benefit of Chabot’s approach to developmental English is its alignment with the Common Core State Standards, which are just beginning to influence discussions about developmental education and introductory college courses. Although the redesign of developmental English at Chabot predates the Common Core State Standards by nearly two decades, there are elements of the English Language Arts standards and related college- and career-readiness goals that resemble features of the Chabot curriculum and pedagogical principles. For instance, the Common Core standards for high school students emphasize the use of informational texts, in addition to literature, and instruction in how to cite textual evidence and how to identify and analyze ideas from texts. Chabot English faculty reported a similar emphasis on the use of evidence and idea development derived from nonfiction texts. The similarities between these two approaches to reading and writing may result in a smoother transition to college for recent high school graduates who have been exposed to Common Core, enter Chabot College, and require developmental English coursework.

High developmental education referral rates, together with low college completion rates, have significant educational and economic implications for students, many of whom are from traditionally underserved minority groups and are the first in their families to attend college. The findings from this analysis of Chabot College’s accelerated developmental English course provide some basis for optimism about the potential for well-designed developmental education to improve the academic outcomes

of underprepared students. While the streamlined course structure is probably the most important contributor to the superior outcomes of students who enroll in the accelerated developmental English course, its success may in part be predicated on other features of Chabot's developmental English model. Our classroom observations and the reports of students and faculty indicate that the instructional activities and settings in Chabot's developmental English classes differ materially from what Grubb (2012) characterized as typical of developmental education. Students were leading conversations, identifying and articulating evidence in support of their arguments, drawing connections across multiple sources, and questioning their own logic. These community college students were publicly wrestling with ideas as students do in the seminars typical at elite institutions of higher education. These qualitative insights speak to what students who come to college academically underprepared are capable of when held to high standards and provided the emotional and academic support they need. And they suggest that structural changes to remedial courses must be accompanied by thoughtful modifications to curriculum and pedagogy if colleges are to substantially improve outcomes for developmental students.

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Appendix: Detailed Quantitative Methodology and Results

A.1 Sample

Chabot College provided anonymized individual-level data on students who initially entered college between summer 1999 and fall 2010, including follow-up data on all students through fall 2010. To define the accelerated group, we included first-time students who entered Chabot College any time between summer 1999 and fall 2010 and took English 102 during that timeframe. To define the comparison group, we included students who entered Chabot and took English 101A during the same time period.

It was possible for students to attempt the two-semester version of the course, fail or withdraw, and then return to attempt the accelerated version; it was also possible for students to attempt the accelerated version first and then return to attempt the two-semester version. To address this problem, we designated each student's group membership according to the type of course he or she first attempted. For example, if a student took English 101A in one semester and English 102 in the next semester, the student would be categorized as attempting the non-accelerated path.

The sample was limited to students who were no younger than 17 years of age during the intervention term, were not dually enrolled high school students during the intervention term, were not enrolled at any other college prior to or during their intervention term, and were not enrolled at Las Positas College (the other community college in Chabot's district) prior to or during the intervention term. Imposing these restrictions resulted in a sample of 4,593 accelerated students and 5,231 comparison students for analysis.

As Table A.1 shows, accelerated students were slightly less likely to be White, more likely to be Asian, more interested in earning a four-year degree, more likely to attend school full-time, and more academically prepared. Accelerated students were also younger and less likely to be married. Program personnel noted that, on an anecdotal basis, older developmental students tend to be highly motivated and contribute unique perspectives to the classroom; however, they may also be less confident in their academic skills, leading them to choose the non-accelerated version of the course.

Table A.1
Characteristics of Accelerated and Non-accelerated Students

| Characteristic | Accelerated (<i>N</i> = 4,593) | Non-accelerated (<i>N</i> = 5,231) | <i>p</i> |
|--|------------------------------------|--|----------|
| Basic demographics | | | |
| Female ^a | 0.54 | 0.53 | |
| Black | 0.17 | 0.15 | |
| Asian | 0.33 | 0.31 | ** |
| Hispanic | 0.29 | 0.29 | |
| White | 0.13 | 0.16 | *** |
| Other ethnicity | 0.09 | 0.08 | |
| Divorced | 0.12 | 0.13 | * |
| Married | 0.08 | 0.14 | *** |
| Single | 0.33 | 0.22 | *** |
| Marital status unknown | 0.47 | 0.50 | *** |
| Socioeconomic background | | | |
| Pell Grant recipient | 0.38 | 0.37 | |
| Financial aid recipient | 0.33 | 0.32 | |
| Amount of financial aid | \$1,207.99 | \$1,008.14 | *** |
| Academic information | | | |
| Ever graduated from high school | 0.86 | 0.84 | ** |
| Educational goal: 4-year degree | 0.69 | 0.61 | *** |
| Educational goal: job training | 0.04 | 0.05 | *** |
| Educational goal: 2-year degree | 0.08 | 0.11 | *** |
| Educational goal: basic skills | 0.01 | 0.02 | *** |
| Educational goal: other | 0.18 | 0.21 | *** |
| High placement scores (both > median) ^b | 0.39 | 0.28 | *** |
| Low placement scores (both < median) ^b | 0.31 | 0.43 | *** |
| Mixed placement scores ^b | 0.30 | 0.29 | |
| Intervention term information | | | |
| Enrolled full-time during term | 0.70 | 0.62 | *** |
| Dually enrolled prior to term | 0.05 | 0.04 | *** |
| Age at start of term | 19.74 | 20.12 | *** |
| Credits earned prior to term ^c | 6.28 | 4.81 | *** |
| GPA prior to term ^c | 2.12 | 2.01 | *** |
| Terms enrolled prior to term | 1.06 | 1.11 | |
| Learning community prior to/during term | 0.14 | 0.01 | *** |

p* < .10. *p* < .05. ****p* < .01.

^a Among those who had information for gender, *N* = 9,650. ^b Among those who were not missing both reading and sentence skill college placement test scores, *N* = 4,544. ^c Among those who had taken courses prior to the intervention term, *N* = 4,066.

Because all students were tracked until fall 2010, the follow-up window was longer for some students than for others. For example, if a student entered in fall 1999, we could calculate short-term, intermediate, and long-term outcomes for that student; but if a student entered in fall 2009, we could only calculate short-term outcomes for that student. We used all the students available for each timeframe, resulting in three distinct samples: (1) students who enrolled in developmental English in fall 2009 or earlier ($N = 3,853$ program students; $N = 4,757$ comparison students), followed for one year; (2) students who enrolled in fall 2007 or earlier ($N = 2,644$ program students; $N = 3,732$ comparison students), followed for three years; and (3) students who enrolled in fall 2005 or earlier ($N = 1,641$ program students; $N = 2,762$ comparison students), followed for five years.

A.2 Outcome Measurement

We used course transcript data matched with National Student Clearinghouse data to calculate student outcomes at each follow-up period. We examined the following course performance outcomes:

- *Completed English 1A with a grade of C or higher.* Students who did not enroll in English 1A at any point during the follow-up period, or those who enrolled but withdrew or earned below a C, were coded as not completing the course.
- *Number of transferable credits completed with a C or higher.* “Transferable” credits are college-level credits that transfer to the California State University System. Most college-level courses fall into this category.
- *Number of college-level credits completed with a C or higher.*
- *GPA based on college-level courses in which the student enrolled during the follow-up period.*

We also examined outcomes related to persistence, transfer, and graduation:

- *Transferred to a four-year college or earned “transfer-ready” status.* To be counted as transferring, a student must have enrolled in a four-year college for at least one semester and have *not* returned to Chabot or any other two-year college at any subsequent point in the follow-up period. “Transfer-ready”

students completed at least 60 transferable credits (including transferable credits in college-level English and math, with a grade of C or better) by the end of the follow-up period.

- *Graduated from any college.* We examined whether students earned a certificate or degree by the end of the follow-up period.
- *Still enrolled at any college during the last term of the follow-up period, or graduated from any college by the end of the follow-up period.* We combined continued enrollment with graduation in order to capture all positive persistence outcomes in one measure.

After only one year, we did not expect any students to have graduated or to have reached transfer-ready status. Accordingly, at the one-year follow-up, the persistence/transfer/graduation outcome of interest was a combined measure of whether students were still enrolled in or had received a degree from any college. At the three-year follow-up, we began to examine transfer and transfer readiness, and we began to examine graduation as a separate outcome.

Many Chabot students co-enrolled at, or permanently transferred to, other colleges at some point during the follow-up period. Specifically, 38 percent of the accelerated group and 35 percent of the non-accelerated group enrolled in a college other than Chabot after taking English 101A or English 102. Transcript information was unavailable for schools other than Chabot, and thus course enrollment and performance outcomes are underestimated for co-enrolled or transferred students. To control for the difference in transfer rates between the accelerated and non-accelerated groups, our models predicting course enrollment and performance included a control for enrollment at another school during the corresponding follow-up period, based on National Student Clearinghouse data.

A.3 Analysis

We began with a descriptive analysis comparing the raw outcomes of each group using univariate tests, as shown in Table A.2. Overall, the accelerated group appeared to have higher persistence rates, higher English 1A enrollment and completion rates, and higher credit accrual rates across all three follow-up periods. To determine whether the

differences persisted after controlling for pre-existing student differences, we conducted a variety of regression models, as discussed below. For each model, we included the variables listed in Table A.1, and for course-taking and course-passing outcomes, we also included a dummy variable for co-enrollment in any other college during the relevant follow-up period. All models also included dummy codes indicating the timing of the student's intervention term (e.g., fall 2009).

Table A.2
Descriptive Outcomes for Accelerated and Non-Accelerated Students

| Outcome | Accelerated | Non-accelerated | <i>p</i> |
|---|-------------|-----------------|----------|
| One-year outcomes (<i>N</i> = 8,610) | | | |
| Completed English 1A (with \geq C) | 0.45 | 0.18 | *** |
| Transferable credits earned (\geq C) | 12.43 | 8.42 | *** |
| College-level credits earned (\geq C) | 13.77 | 9.69 | *** |
| GPA in college-level courses ^a | 2.12 | 2.04 | |
| Still enrolled in (or graduated from) any college | 0.69 | 0.65 | *** |
| Three-year outcomes (<i>N</i> = 6,376) | | | |
| Completed English 1A (with \geq C) | 0.57 | 0.36 | *** |
| Transferable credits earned (\geq C) | 27.53 | 21.06 | *** |
| College-level credits earned (\geq C) | 30.16 | 23.82 | *** |
| GPA in college-level courses ^b | 2.12 | 2.01 | *** |
| Still enrolled in (or graduated from) any college | 0.49 | 0.43 | *** |
| Transferred or transfer-ready | 0.19 | 0.11 | *** |
| Graduated from any college | 0.07 | 0.03 | *** |
| Five-year outcomes (<i>N</i> = 4,403) | | | |
| Completed English 1A (with \geq C) | 0.60 | 0.40 | *** |
| Transferable credits earned (\geq C) | 32.45 | 26.42 | *** |
| College-level credits earned (\geq C) | 35.64 | 29.38 | *** |
| GPA in college-level courses ^c | 2.16 | 2.11 | |
| Still enrolled in (or graduated from) any college | 0.49 | 0.40 | *** |
| Transferred or transfer-ready | 0.37 | 0.25 | *** |
| Graduated from any college | 0.25 | 0.18 | *** |

p* < .10. *p* < .05. ****p* < .01.

^a Among those who had complete valid course grades, *N* = 6,465. ^b Among those who had complete valid course grades, *N* = 4,066. ^c Among those who had complete valid course grades, *N* = 3,529.

Model 1: Traditional regression. We used linear regression models for continuous outcome variables, such as number of credits accrued, and probit models for dichotomous outcomes, such as whether the student earned a certificate or degree within a given follow-up period. We estimated a separate model for each outcome at each time point, resulting in 19 regression models. Students missing gender information ($N = 174$) were excluded from the analysis, resulting in a sample of 8,454 students for analyses of one-year outcomes, 6,262 for three-year outcomes, and 4,321 for five-year outcomes.

Model 2: Propensity score matching. In addition to straightforward OLS, we also used propensity score matching to estimate the potential impacts of acceleration on student academic outcomes (Rosenbaum & Rubin, 1985). Using propensity score models allowed us to leverage the array of observed covariates to select a comparison group of non-accelerated students who *very closely resembled* the accelerated students prior to the intervention term. That is, the comparison students seemed equally likely to choose the accelerated model, but instead selected the non-accelerated model—perhaps due to lack of space in the accelerated sections, or due to lack of information about their options. The propensity score approach has two advantages over the OLS approach. Practically, the propensity score estimate addresses the student population of interest to most community colleges, by focusing only on the types of students who are *likely* to choose the accelerated path, if given the option to do so. Methodologically, propensity score matching better addresses self-selection problems by making inferences only from data on students who are similar on observed characteristics.

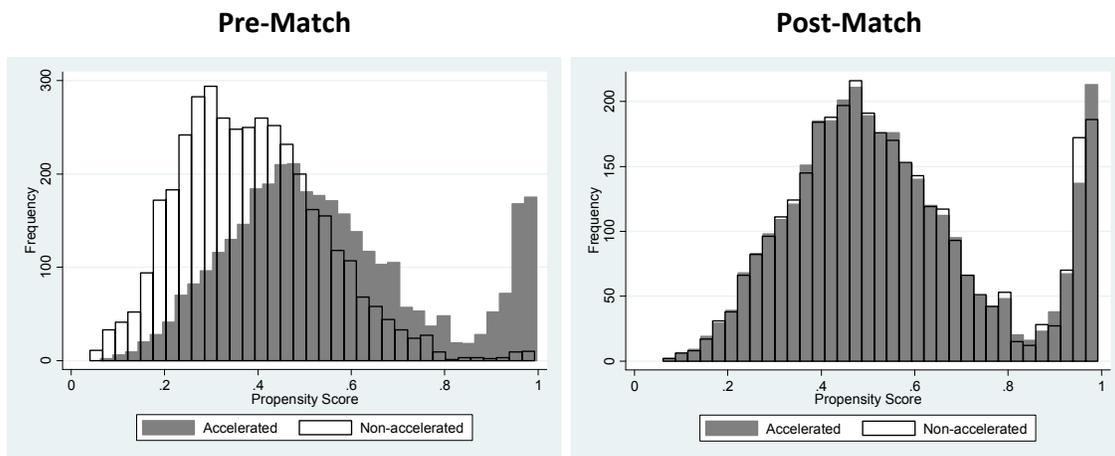
Our PSM estimation was performed in three steps. First, we used logistic regression to estimate each student’s likelihood of choosing the accelerated option based on the variables listed in Table A.1, resulting in a propensity score that ranged from zero (very unlikely to choose the accelerated option) to one (very likely to choose the accelerated option).

Second, for each outcome, we used the estimated propensity scores to find the most similar comparison student for each accelerated student, using the nearest-neighbor method with a caliper of 0.1 (Dehejia & Wahba, 2002). Students in the accelerated group who had no match in the comparison group (within 0.1 standard deviations of the propensity score) were dropped from the analysis. Only one accelerated student did not

have a close match in the comparison group and was discarded from the sample; however, many comparison students had no close match in the accelerated group. Our final sample consisted of 5,396 students for one-year outcomes, 3,705 students for three-year outcomes, and 2,358 students for five-year outcomes. The matching method resulted in a comparison group that was quite similar to the program group, representing the type of student who was likely to choose acceleration but did not do so. As an illustration, Figure A.1 shows the Chabot students' probabilities of choosing the accelerated English pathway (with accelerated students shown in grey and non-accelerated students shown in white). Before matching, the two groups' probabilities did not strongly overlap; the matching operation, however, achieved strong overlap between the two groups, resulting in excellent comparison matches for each of the accelerated students.

Figure A.1

**Frequency Distribution of Propensity Scores
for Accelerated and Non-Accelerated Student Samples**



Third, we conducted a regression analysis on the matched samples, again including all of the variables in Table A.1 as controls.

Subgroup analyses. In order to explore whether the estimates generalize to all developmental students or vary across key student subgroups, we extended model 1 to compare the estimated effectiveness of the accelerated pathway for several different groups: (1) students who took the accelerated pathway as part of a learning community

versus those who did not; (2) those who had higher versus lower placement test scores; and (3) those referred to ESL versus those who were not. We relied on model 1 because model 2 dramatically reduces sample sizes, making it difficult to reliably estimate results for smaller subgroups; moreover, as Table A.3 shows, the results of models 1 and 2 are fairly similar.

Learning community participation. In its earliest iteration, the accelerated option was offered as part of a learning community. To compare estimates between students who took the accelerated course as part of a learning community and those who took it as a stand-alone course, we added an interaction term between learning community participation and accelerated course participation.

Placement test scores. To explore whether the acceleration estimates varied according to students' placement test scores, we divided the sample into high-scoring students (students with above-median scores in both reading and sentence skills, with a median of 69 for reading and 78 for sentence skills), low-scoring students (students who received below-median scores on both tests), and mixed-scoring students (students who received an above-median score in one subject and below-median score in the other). We then created corresponding interaction terms between high-scoring students and the accelerated path, and mixed-scoring students and the accelerated path, and we added these four terms (high-scoring students, mixed-scoring students, and the two interaction terms) into model 1, using low-scoring students as the base group. More than half of the sample ($N = 5,280$) were missing placement scores for both subjects; excluding these students from the analysis resulted in a sample of 3,527 students for one-year outcomes, 1,542 students for three-year outcomes, and 127 students for five-year outcomes. As the number of observations available for five-year outcomes was too small to detect any substantive effects, we focused on the one-year and three-year outcomes for this sub-analysis.

ESL students. Finally, we explored the estimated impacts of English acceleration on students who took the ESL test (henceforth referred to as “ESL students”).⁷ Due to

⁷ In our analysis, we included both students who scored very low on the regular English placement test and were advised to take the ESL test, and those who took the ESL test without taking the regular English placement test. In a separate robustness check, we also included students who were referred to the ESL test but never took the ESL test for reasons unknown. The results resemble those presented in Table A.5.

small sample sizes for ESL students, the follow-up analyses examining this subpopulation focused only on one-year outcomes, which allowed for the largest sample size ($N = 652$).

English 1A completion sub-outcomes. English 1A completion involves two sub-outcomes: whether students enrolled in English 1A within a given time period (“English 1A enrollment”), and among students who did enroll, whether they earned a C or better (“English 1A pass rates”). To help understand whether English 1A completion results were driven by changes in enrollment, changes in students’ performance within the course itself, or both, we also ran models 1 and 2 on these subsidiary outcomes.

A.4 Results

Models 1 and 2. Table A.3 presents the estimated coefficients for the differences in the outcomes of the accelerated and comparison groups, based on both model 1 (regression) and model 2 (PSM). Positive entries indicate that the accelerated group outperformed the comparison group, while negative entries indicate that the accelerated group performed more poorly than the comparison group. For binary outcomes, such as course completion, we converted the logit coefficient for program participation into marginal effects (*ME*); that is, the table shows the difference in probability of outcome attainment in percentage points. For example, if the model predicted that 50 percent of the accelerated group would attain a given outcome, compared with only 25 percent of the comparison group, the difference would be 0.25. For continuous outcomes, the table shows the unstandardized linear regression coefficient for program participation. For example, if the accelerated group were predicted to earn 20 college-level credits, compared with 15 credits among the comparison group, the difference would be 5.00.

Table A.3
Regression and Propensity Score Matching Estimates for English Acceleration

| Outcome | Regression | PSM |
|---|----------------|----------------|
| One-year outcomes | | |
| Completed English 1A (with \geq C) | 0.24 (0.01)*** | 0.25 (0.02)*** |
| Transferable credits earned (\geq C) | 3.15 (0.22)*** | 3.00 (0.38)*** |
| College-level credits earned (\geq C) | 3.13 (0.23)*** | 2.86 (0.42)*** |
| GPA in college-level courses | 0.07 (0.03)** | 0.06 (0.06) |
| Still enrolled in (or graduated from) any college | 0.01 (0.01) | <-0.01 (0.02) |
| Three-year outcomes | | |
| Completed English 1A (with \geq C) | 0.18 (0.01)*** | 0.21 (0.03)*** |
| Transferable credits earned (\geq C) | 5.33 (0.60)*** | 4.78 (1.16)*** |
| College-level credits earned (\geq C) | 5.29 (0.65)*** | 4.44 (1.34)*** |
| GPA in college-level courses | 0.07 (0.03)** | 0.13 (0.06)** |
| Still enrolled in (or graduated from) any college | 0.04 (0.01)*** | 0.05 (0.03) |
| Transferred or transfer-ready | 0.06 (0.01)*** | 0.09 (0.01)*** |
| Graduated from any college | 0.02 (0.01)*** | 0.03 (0.01)*** |
| Five-year outcomes | | |
| Completed English 1A (with \geq C) | 0.17 (0.02)*** | 0.22 (0.03)*** |
| Transferable credits earned (\geq C) | 4.07 (0.85)*** | 4.86 (1.48)*** |
| College-level credits earned (\geq C) | 4.10 (0.92)*** | 4.49 (1.73)*** |
| GPA in college-level courses | 0.08 (0.04)** | 0.12 (0.07)* |
| Still enrolled in (or graduated from) any college | 0.07 (0.02)*** | 0.03 (0.04) |
| Transferred or transfer-ready | 0.10 (0.02)*** | 0.07 (0.03)** |
| Graduated from any college | 0.06 (0.01)*** | 0.04 (0.03) |

Note. Standard errors are in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

In some cases, the regression estimates are slightly stronger, and in other cases, the PSM estimates are slightly stronger, but overall the two models tell a similar story: Accelerated students had stronger outcomes than their non-accelerated peers in terms of course performance, persistence, transfer, and graduation. Within the first year, accelerated students completed college-level English at a rate approximately 25 percentage points higher than that of their peers. Because they were able to take one fewer developmental course and could fit an additional college-level course into their schedule, they also earned approximately three more college-level or transferable credits. Moreover, they performed slightly better in the college-level courses they took, earning a

GPA 0.06 to 0.07 points higher.⁸ However, they were no more likely to persist in college than their peers.

As would be expected, over subsequent years, some non-accelerated students caught up with the accelerated students in terms of English 1A course completion, eroding the accelerated students' 25 percentage point lead down to 17 to 22 percentage points (depending on the model and timeframe examined). Yet accelerated students maintained their lead in terms of GPA and increased their lead in terms of college-level credit accrual.

Over time, accelerated students' persistence, transfer, and graduation outcomes seemed to become increasingly strong compared to those of their peers. Whereas accelerated students were no more likely to persist through their first year, they were 6 to 9 percentage points more likely to transfer (or reach transfer-ready status) within three years and 7 to 10 percentage points more likely to do so within five years. They were also 2 to 3 percentage points more likely to graduate within three years and 4 to 6 percentage points more likely to do so within five years.

Subgroup analyses. When we examined the interaction between learning community participation and participation in the accelerated English pathway, we found no statistically significant effect; the outcome differences between accelerated and non-accelerated students were consistent, regardless of whether students were involved in a learning community. However, the sample sizes for learning community participants were small, which may have limited our ability to detect any interactive effects.

Our analyses of subgroups according to their placement exam scores revealed that the positive coefficients for acceleration tended to be stronger among high-scoring and mixed-scoring students and milder among low-scoring students. Interactive effects were statistically significant only at the one-year follow-up, when sample sizes were largest. As Table A.4 shows, at the one-year follow-up, the joint interaction effect was nonsignificant for English 1A completion, marginally significant ($p < .10$) for transferable and college-level credits earned, and statistically significant ($p < .05$) for GPA in college-level courses and for continued enrollment in (or graduation from) any

⁸ The PSM estimate for GPA in college-level courses is not significant, while the regression estimate is significant at the 5-percent level.

college. Because no joint interactions were marginally or statistically significant at the three-year follow-up, Table A.4 presents the coefficients separately by subgroup for the one-year follow-up only.

Table A.4
Regression Estimates for English Acceleration by Placement Exam Scores

| One-Year Outcomes | Subgroup | | | Joint Sig. |
|---|----------------|----------------|-----------------|------------|
| | High-Scoring | Mixed-Scoring | Low-Scoring | |
| Completed English 1A (with \geq C) | 0.21 (0.03)*** | 0.25 (0.03)*** | 0.22 (0.03)*** | |
| Transferable credits earned (\geq C) | 3.51 (0.57)*** | 2.96 (0.59)*** | 1.78 (0.55)** | * |
| College-level credits earned (\geq C) | 3.38 (0.61)*** | 3.05 (0.64)*** | 1.60 (0.59)*** | * |
| GPA in college-level courses | 0.20 (0.08)** | -0.08 (0.08) | 0.05 (0.08) | ** |
| Still enrolled in (or graduated from) any college | 0.04 (0.03) | 0.07 (0.03)** | -0.10 (0.03)*** | *** |

Note. Standard errors are in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

While accelerated low-scoring students earned 1.60 more college-level credits than their non-accelerated peers, accelerated high-scoring students earned substantially more; the latter group had 3.38 credits more than their non-accelerated peers at the one-year follow-up. In terms of GPA, the difference between accelerated and non-accelerated low-scoring students was small (only 0.05 points) and not statistically significant. In contrast, high-scoring accelerated students on average had GPAs 0.20 points higher than those of their non-accelerated peers. When we examine continued enrollment in (or graduation from) college, we see the only negative coefficient for acceleration: Low-scoring accelerated students were ten percentage points less likely to still be enrolled (or to have graduated) one year after the intervention term, compared with their non-accelerated peers. This negative estimate was substantially different from the positive estimate observed among high- and mixed-scoring students. Yet as noted earlier, by the three-year follow-up, these interactions were no longer statistically significant; moreover, after three years, the estimated coefficient for low-scoring students was slightly positive, $ME = 0.08 (0.05)$, *ns*. If the accelerated option initially had a negative impact on low-scoring students' persistence in college, this impact seemed to dissipate between the one-year and three-year follow-ups.

The low-scoring sample included ESL students. In order to determine whether ESL students were strongly influencing the one-year follow-up results for low-scoring students, we removed the ESL students and re-ran the analysis. The low-scoring students' estimates remained similar to those seen in Table A.4, with some slight improvements: For English 1A completion, $ME = 0.25$ (0.03), $p < .01$; for transferable credits, $ME = 2.25$ (0.56), $p < .01$; for college-level credits, $ME = 1.96$ (0.61), $p < .01$; for GPA, $ME = 0.08$ (0.08), *ns*; and for still enrolled/graduated, $ME = -0.08$ (0.03), $p < .01$.

Next, we specifically examined the outcomes of the ESL subpopulation. Due to small sample sizes, we focused only on one-year outcomes. Overall, the positive coefficients for acceleration were smaller for ESL students than for the typical developmental student—marginally smaller ($p < .10$) for English 1A completion and transferable credits earned, and significantly smaller ($p < .05$) for college-level credits earned. For example, accelerated ESL students were 19 percentage points more likely than their non-accelerated ESL peers to complete English 1A by the one-year follow-up; the difference between accelerated and comparison non-ESL students was 24 percentage points. Moreover, ESL students who chose the accelerated path were 17 percentage points less likely than their non-accelerated ESL peers to stay enrolled until (or graduate by) the end of the one-year follow-up. The estimated negative coefficient for acceleration among ESL students was statistically significant ($p < .01$) and significantly different from the small positive coefficient for acceleration among non-ESL students.

Table A.5
Regression Estimates for English Acceleration by ESL Status

| One-Year Outcomes | Subgroup | | Significance |
|---|-----------------|------------------|--------------|
| | ESL Students | Non-ESL Students | |
| Completed English 1A (with \geq C) | 0.19 (0.05)*** | 0.24 (0.01)*** | * |
| Transferable credits earned (\geq C) | 1.92 (0.87) | 3.38 (0.22)*** | * |
| College-level credits earned (\geq C) | 1.50 (0.93) | 3.38 (0.24)*** | ** |
| GPA in college-level courses | 0.07 (0.11) | 0.09 (0.03)*** | |
| Still enrolled in (or graduated from) any college | -0.17 (0.05)*** | 0.02 (0.01)* | *** |

Note. Standard errors are in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

It seems counterintuitive that acceleration would improve college course completion while reducing persistence rates among low-scoring and ESL students. Further exploration of the data suggests that these mixed results at the one-year follow-up were primarily driven by a small group of students who completed English 1A with a C or better and *then* stopped or dropped out of school. While this somewhat puzzling pattern was slightly more common among accelerated (versus non-accelerated) students at all placement test score levels, it was particularly pronounced among accelerated ESL students.

Among higher scoring students, accelerated students were less likely than their non-accelerated peers to drop out overall, but those who *did* do so were more likely to have successfully completed English 1A first. This is not particularly puzzling. However, among ESL students (and to a lesser extent, among other very low-scoring students), the higher dropout rates for accelerated students at the one-year follow-up were almost exclusively due to the higher numbers of students who passed English 1A and then dropped out. It is not clear why these students were more likely to exit college after their success in a key college-level course. It is also not clear whether we should judge this pattern as a negative one (given that these students were, at least at the one-year follow-up, no longer enrolled) or a positive one (given that these students earned additional college-level credits that would readily transfer to another school if they ever chose to return to college). Given the ambiguity of the result, together with the fact that the higher dropout result dissipated by the three-year follow-up, we conclude that there is no clear evidence that the accelerated pathway harms any particular subgroup of students.

English 1A completion sub-outcomes. When we break English 1A completion into the sub-outcomes of enrollment and pass rates among those who enroll, we find that the estimated effects of acceleration on English 1A completion are driven entirely by its effects on enrollment. Accelerated students were much more likely to enroll in English 1A within each time period, and once enrolled, were equally likely to pass it with a C or better, compared with students who entered English 1A through the two-semester developmental English pathway. In a forthcoming paper, we will analyze this pattern in more detail and compare the enrollment and within-course pass rates for Chabot with those for other popular acceleration programs.