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MOMENTUM STOPPERS AND EQUITY BLOCKERS

The Implications of Gateway Courses for Students at Their Transfer-Receiving Institutions

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This chapter explores how transfer students fare in foundational, "gateway" courses they take after the point of transfer. The chapter is an extension of our previously published scholarship focused broadly on students enrolled in gateway courses (Koch, 2017a; Koch, 2017c; Koch, 2018; Koch & Drake, 2018; Koch & Drake, 2019). That scholarship shared outcomes in gateway courses both in aggregate and disaggregated by various common demographic classifications, but it did not include transfer standing. This chapter sheds light on what we believe is a long-standing but rarely discussed issue in higher education—the fact that students who transfer to a new postsecondary institution take gateway courses at their new college or university and they do not fare as well in them as many would believe.

Wang et al.'s (2017) scholarship does suggest that classroom experiences in gateway courses taken at the community college can play a pivotal role in developing transfer student momentum. This effect is particularly evident in math courses taken at the community college; successful completion early on in math at a community college is directly related to a higher rate of credential completion (Wang et al., 2017). While Wang et al.'s research has focused on how gateway course success at the community college can lead to higher credential attainment for students in the science, technology, engineering, and mathematics (STEM) fields, it is applicable to other subjects as well. That shared, Wang et al.'s research is focused only on community college transfer-bound students in gateway courses. We have discovered no published research looking at transfer student performance in gateway courses in transfer-receiving institutions.

We share findings drawn from a sector-spanning, 36-institution data set on "DFWI rates"—the combined rates of D grades, F grades, W grades for any form of withdrawal formally listed on a transcript, and I grades for incompletes or the

equivalent thereof on a transcript—for transfer students enrolled in eight specific foundational-level "gateway" courses at the institution to which they each transferred. Four courses are from the STEM fields—college algebra, calculus, general biology, and general chemistry. Three are courses in the humanities and social sciences—English composition, U.S. history, and general psychology. The last is a course required for all business majors—principles of accounting.

For purposes of this chapter, we are drawing on the definition for *gateway courses* provided by Koch and Rodier (2014) and Koch (2017b) and used in the nonprofit John N. Gardner Institute for Excellence in Undergraduate Education (Gardner Institute) course redesign efforts (Gateways to Completion) over the past 7 years. In accordance with that body of scholarship and work, *gateway courses* are defined as courses that are:

- *Foundational:* These courses may be noncredit-bearing developmental or remedial education courses that often serve as "gateways to the gateway courses" themselves. They are also, and more commonly, college credit-bearing courses—generally at the lower-division level.
- *High-risk:* Course risk levels are identified by the rates at which D, F, W, and I grades are earned across sections of the course(s). Note that there is no set threshold or rate; what constitutes a "tolerable" rate must be defined in local institutional contexts.
- *High-enrollment:* These courses are identified by the number of students enrolled within and/or across course sections. Some institutions have a few sections of a course with each enrolling hundreds of students. Others have much smaller section sizes but offer many sections of that course. As with the "high-risk" designation, there is no set rate or threshold since context matters. All institutions, whether they enroll 400 or 40,000 undergraduates, have high-enrollment courses. What constitutes high enrollment at one institution differs from another, but the courses are a near universal feature in U.S. higher education.

As supported by the data we share and buttressed by other forms of our previous scholarship in the following discussion, gateway courses serve as a pivotal academic hurdle for students. But the deleterious implications associated with courses are disproportionately borne by students who have been historically underrepresented and/or underserved by higher education in the United States. In many disciplines, this is defined by race/ethnicity and family income (Koch, 2017a; Koch, 2017c; Koch, 2018; Koch & Drake, 2018; Koch & Drake, 2019). In the STEM fields in particular, where females are grossly underrepresented, this also includes gender (Weston et al., 2019).

This chapter, the first of our efforts to examine transfer students and gateway course outcomes, considers race/ethnicity, family income, and transfer standing as part of our overall analysis. We use the data available to us to answer the following

three questions about transfer students in gateway courses at the institutions to which they transferred—also known as the transfer-receiving institution.

1. Do transfer students have lower or higher DFWI rates when compared to their non-transfer counterparts in the courses?
2. Do transfer students of color as defined by federal race/ethnic classification have higher or lower DFWI rates when compared to both the average DFWI rates for transfers in the courses and the DFWI for their White/Caucasian transfer counterparts in the courses?
3. Do transfer students from low-income families/backgrounds have higher or lower DFWI rates when compared to their non-low income transfer counterparts in the courses?

The findings lead us to conclude that gateway courses serve as "momentum stoppers"—academic experiences that can derail baccalaureate degree aspirations—and "equity blockers"—academic experiences that deter just outcomes in a variety of academic disciplines by preventing students of color and students from low-income backgrounds from continuing in a particular field of study. But before delving into the findings that support our conclusions, we first must share a bit about our method.

Brief Methodological Overview

The data for this study are drawn from a convenience sample of 36 institutions that agreed to work with the Gardner Institute on processes to redesign their undergraduate experiences—especially the first college year and/or gateway courses. While the sample is limited by the fact that these are all institutions that have been willing to participate in broader undergraduate education redesign projects conducted by the Gardner Institute, it does have the benefit of providing a broad array of institutional types. There are 26 public institutions and 10 independent (private) institutions in the sample. Two of the independent institutions are proprietary (for-profit). The remaining 34 institutions are not-for-profit. Additionally, by Carnegie classification, the sample comprises seven associate colleges, six baccalaureate colleges, 14 master's colleges and universities of all size classifications, and nine doctoral universities of all research activity classifications.

As a part of participation in the undergraduate education redesign processes in which they were engaged, the institutions each submitted a large set of de-identified student and course data. This included data on introductory courses across the curriculum. Those institutions were asked to use the definition for *gateway courses* provided earlier in this chapter to select the courses on which they would focus their redesign efforts. Most frequently, faculty and staff chose courses fitting the following eight course types: principles of accounting, college algebra, general biology, introductory college calculus, general chemistry, general psychology, English rhetoric and composition, and introductory U.S. history. We are choosing to focus on these eight

courses in this chapter simply because the institutions chose to focus on them for their redesign efforts.

The institutions submitted data on these courses spanning the 2005–2006 through 2015–2016 academic years—with the earlier academic year ranges allowing for analysis of 4-, 5-, and 6-year graduation rates in other studies not discussed in this chapter. The full data file, consisting of over 1.2 million records, contained the following:

- *Course data:* course type, instructor type, mode of instruction, course number, section, initial grade, final grade
- *Student registration data:* enrollment, retention, degree completion, student classification, degree type, academic program (classification of instructional programs/CIP codes), credits, credits source
- *Student demographic data:* race/ethnicity, gender, first-generation status, entry term, birth date, high school location, high school GPA, prior degrees, GED status
- *Financial aid data:* Pell grant eligibility and recipient status, FASFA filing date, grant award status

For the purpose of this study, the data was limited for each institution to the academic year prior to their implementation of any efforts associated with the gateway course redesign process in which they were involved—also known as the baseline year data. Applying this method, the baseline years for the gateway course data ranged between 2012–2013 and 2014–2015 for the 36 institutions involved in the study.

We used the baseline data to calculate a DFWI rate for each institution by course. The DFWI rate is the percentage of DFWI grades of the total grades awarded in the course. We then calculated the mean DFWI rate for a course from the institutions' individual DFWI rates. We wanted to know how aggregate DFWI rates in a specific course were similar or different to other courses in other disciplines—such as college accounting compared to college calculus—rather than knowing how DFWI rates in calculus at a specific institution differed from those outcomes at the other 30-plus institutions in the data set. As a result, we did not factor in or weight DFWI rates by institutional enrollment in a specific course.

We also decided not to factor in course enrollments at a specific institution. Had we factored in institutional course enrollments in the DFWI rates—in other words, weighted the DFWI rates by the institutional enrollments in a given course—we would have skewed the data toward a few institutions with the largest student populations in a specific course. This would potentially inflate or deflate the DFWI rate issue based on outcomes at a few institutions in the data set that were much larger than the majority of the institutions in the study.

As Table 13.1 shows, not all 36 institutions offered or provided data for all eight course subject areas we examined in this chapter. In the case of principles of accounting, 32 institutions provided data; 33 provided general biology data; 31 provided general chemistry data; 34 provided English composition/writing data; 32 provided

TABLE 13.1

Rates of D, F, W, and I Grades in Gateway Courses by Transfer and Non-Transfer Classifications

A. Course	*B. Number of Institutions*	*C. Total No. of Students Across the Courses*	*D. Average DFWI Rate All Students*	*E. Non-Transfer, First-Year DFWI Rate*	*F. Transfer DFWI Rate*	*G. Non-Transfer, Upper-Level DFWI Rate*
Principles of Accounting	32	18,217	30.1%	36.3%***	25.3%***	28.5%***
General Biology	33	24,636	29.7%	34.8%***	29.8%***	24.7%***
General Chemistry	31	20,987	29.4%	32.1%***	27.5%***	28.5%***
English Composition	34	96,258	22.8%	23.5%***	23.6%***	22.5%***
History (U.S. Survey)	32	27,666	25.1%	29.8%***	21.2%***	17.2%***
Math—Algebra	34	55,075	34.8%	34.6%***	38.2%***	31.5%***
Math—Calculus	32	13,253	34.6%	34.9%***	41.5%***	40.0%***
General Psychology	34	91,108	25.3%	28.4%***	22.3%***	20.2%***

*$p < 0.05$, **$p < 0.01$ *** $p < 0.001$

data on U.S. history; 34 provided algebra data; 32 provided data for calculus I; and 34 provided data on general psychology.

We disaggregated the data for these eight courses by race/ethnicity and family income status, as well as by transfer-student standing. Transfer-student standing is used to indicate whether a student did or did not transfer into the institution where they took the gateway courses we examined. What follows are the questions we used to guide this analysis for the eight previously mentioned courses and both the aggregate and disaggregated findings.

Questions and Findings

Three main questions about transfer student performance in gateway courses guided our research for this chapter. Each of these questions forced us to make choices about the population to which we would compare the transfer students. The three questions and the logic framing our analysis—our comparison population "choices"—follow:

1. *Do transfer students have lower or higher DFWI rates when compared to their non-transfer counterparts in the courses?* We further divided this by comparing transfers to two non-transfer populations: non-transfer, first-year students; and, non-transfer, upper-level students. We defined *non-transfer, first-year students* as any student enrolled in the courses who was not a transfer and had earned fewer than 30 earned credits at the time they were enrolled in the considered courses. We defined *non-transfer, upper-level st*udents as any student who was enrolled in the courses, and who had earned 30 or more credits at the time they were enrolled in the courses. This definition allowed us to compare transfer student performance in these courses to a largely new student population (non-transfer, first-year students) with whom they shared "new to the institution" transition characteristics. The approach also allowed us to compare the transfers to non-transfer, upper-level students with whom they often shared academic standing—that is, sophomore/second-year, junior, or senior standing.
2. *Do transfer students of color as defined by federal race/ethnic classification have higher or lower DFWI rates when compared to both the average DFWI rates for transfers in the courses and the DFWI for their White/Caucasian transfer counterparts in the courses?* Given that the previous question allowed us to compare transfers to non-transfers, for purposes of this second question—a question focused on race/ethnicity—we decided to hold transfer student classification as constant. For this reason, we did not compare transfer students of color to non-transfer students of color. Such a study has merit—it is just beyond the scope of what we were able to consider in this chapter given our two other questions and chapter length considerations.
3. *Do transfer students from low-income families/backgrounds have higher or lower DFWI rates when compared to their non-low income transfer counterparts in the courses?* As with the transfer question focused on race, we decided to limit our examination of the relationship between family income and transfer DFWI

rates strictly to transfer students. In other words, we are comparing low-income transfer students to the non-low income transfer student counterparts in the courses. We used Pell grant eligibility as the determinant as whether a student was or was not a low-income transfer student—with Pell-eligible transfers being classified as low-income, and non-Pell-eligible transfers being classified as non-low income.

Statistical Significance—Method, Findings, and Thoughts

We are adding content on statistical significance here, because, as supported by the outcomes reported in Tables 13.1, 13.2, and 13.3, the method is identical and the findings are essentially consistent for all three "slices" of the data. In this research, we compared group differences in percentage rates. For this reason, we use a Pearson's chi-square test to determine if the differences in DFWI rates were respectively independent of the students' transfer, race/ethnicity, and Pell status.

With a few exceptions, nearly all the between-group differences in DFWI rates found in each this chapter's three tables are statistically significant when compared to the other outcomes on the table row on which the rates are displayed. Many are significant at the $p < .001$ level. The only non-statistically significant outcomes were (a) the differences in DFWI rates in English composition by transfer student race/ethnicity displayed in Table 13.2; and (b) the differences in DFWI rates in both chemistry and algebra by transfer student Pell eligibility displayed in Table 13.3.

We have included this section about statistical significance here, because many readers will rightly wonder about whether the differences we display in our tables are "statistically significant." Without that evidence, some readers might be inclined to disregard this chapter and its findings. That would be a mistake—both for methodological and societal reasons.

The societal reason these data are important cannot be discounted. As educated citizens and scholars, we acknowledge that race- and income-based inequality are complex and deeply rooted social issues. Garcia et al. (2018) note that these issues are often "not readily amenable to quantification" (p. 151). Garcia et al. continue, noting that numbers are rarely if ever "neutral and they should be interrogated for their role in promoting deficit analyses that serve" dominant—frequently White and/or more affluent interests (p. 151). Further, they explain that data "cannot speak for itself"—that it must "be informed by the experiential knowledge of marginalized groups" (p. 151). Whereas most of the differences we report are, in fact, statistically significant, the meaning of the few that are not, as well as those that are significant at lower levels—such as $p < .05$ as opposed to $p < .001$—should not be dismissed. For example, just because the number of Native Americans transfers in English courses is too small to make their DFWI rate difference finding statistically significant when compared to other race/ethnicity groups, we should not dismiss the finding. In fact, the higher DFWI rate coupled with the lack of statistical significance is very meaningful—it speaks to how the legacy of extermination and forced removal manifests itself today in small Native American enrollment numbers and higher failure rates in courses.

TABLE 13.2
Rates of D, F, W and I Grades by Course and Selected Race/Ethnicity Designations for Transfers

A. Course	*B. Number of Institutions*	*C. No. of Students Across the Courses*	*D. Average Transfer DFWI Rate*	*E. African American Transfer DFWI Rate*	*F. Native American Transfer DFWI Rate*	*G. Latinx Transfer DFWI Rate*	*H. White/ Caucasian Transfer DFWI Rate*
Principles of Accounting	26	5,740	25.3%	35.6%***	**57.7%***	35.3%***	24.0%***
General Biology	29	5,802	29.8%	**37.8%***	31.2%***	33.8%***	27.2%***
General Chemistry	26	6,325	27.5%	43.6%***	**55.7%***	35.2%***	25.6%***
English Composition	29	5,753	23.6%	19.4%	**24.5%**	23.1%	20.7%
History (U.S. Survey)	27	2,532	21.2%	**43.1%***	24.5%***	22.3%***	18.1%***
Math—Algebra	28	4,674	38.2%	**54.7%***	50.0%***	37.9%***	33.3%***
Math—Calculus	26	4,278	41.5%	45.0%*	**48.9%***	46.0%*	38.2%*
General Psychology	26	7,609	22.3%	**40.6%***	26.8%***	26.4%***	17.8%***

*p < 0.05, **p < 0.01 *** p < 0.001

TABLE 13.3

Rates of D, F, W and I Grades by Course and Pell-Eligibility Statuses for Transfers

A. Course	*B. Number of Institutions*	*C. No. of Transfer Students Across the Courses*	*D. Average Transfer DFWI Rate*	*E. Pell-Eligible Transfer DFWI Rate*	*F. Non-Pell-Eligible Transfer DFWI Rate*
Principles of Accounting	26	5,740	25.3%	30.9%***	22.3%***
General Biology	29	5,802	29.8%	33.4%*	29.4%*
General Chemistry	26	6,325	27.5%	27.2%	28.2%
English Composition	29	5,753	23.6%	23.6%***	18.0%***
History (U.S. Survey)	27	2,532	21.2%	25.9%***	16.5%***
Math—Algebra	28	4,674	38.2%	36.7%	35.5%
Math—Calculus	26	4,278	41.5%	41.8%***	33.0%***
General Psychology	26	7,609	22.3%	27.0%***	16.3%***

*$p < 0.05$, **$p < 0.01$ *** $p < 0.001$

Question 1: Comparing Transfer Students' DFWI Rates to Those of Non-Transfer Students

Transfers Compared to Non-transfer, First-Year Students

As shown in Table 13.1, in five out of the eight courses—principles of accounting, general biology, general chemistry, U.S. history, and general psychology—transfer students have lower DFWI rates than non-transfer, first-year students. (See Table 13.1, column F for transfer and column E for non-transfer, first-year students.) The exceptions to this are the two math courses—college algebra and calculus I—and English composition. In those three cases, transfer DFWI rates exceed those of the non-transfer, first-year students in the courses—although in English composition the difference is only one-tenth of a percentage point (23.6% for transfers compared to 23.5% for non-transfer, first-year students).

The fact that transfers earn lower DFWI rates in five courses could be the result, in part, because they have "done college before"—a common refrain about transfer students, especially from those who argue that transfers need not be treated any differently than non-transfer students. But understanding what this really means is important. This could very well be a case of many transfer students not only having been in college before but also having taken these exact courses before. The failure of many institutions to award credit for prior learning may mean that the lower DFWI rate is a byproduct of transfer students having to retake courses that they already successfully passed at a previous postsecondary institution—thereby wasting money and prolonging time-to-degree. There are also many other plausible reasons for this finding; further study, especially transcript analysis, is merited here.

The differences in math also merit discussion and an attempt at explanation. In college algebra, transfers have a 3.6 percentage point higher DFWI rate—38.2% for transfers compared to 34.6% for non-transfer, first-year students. This constitutes a 10.4% higher rate of D, F, W, and I grades for transfers when compared to their non-transfer, first-year counterparts in the course. In calculus, transfers have a 6.6 percentage point higher DFWI rate—41.5% for transfers compared to 34.9% for non-transfer, first-year students. This represents an 18.9% higher rate of D, F, W, and I grades in calculus when comparing transfers to their non-transfer, first-year counterparts in the course.

The math differences in particular lead us to wonder if the lack of success has to do with, at least in part, the delay between when transfer students last took a math course, either in high school or at the transfer-sending institution, and when they took the same course as transfer students at the receiving institution. Presumably, most first-year students had taken at least 3 years of college preparatory mathematics courses—some 4. Simply stated, transfer students who may be many years removed from high school may have much larger gaps in time and perhaps also gaps in amount of preparation, between when they last took a math course and when they took it again at the transfer-receiving institution.

These gaps in time really matter. Students commonly report that knowledge gleaned in a particular course is rapidly lost once the course has ended. These self-reported perceptions are backed up by research (Conway et al., 1991; Kamuche & Ledman, 2011). In short, the more time that elapses between when a student takes a course and the next time they take a related course in the same subject area, the more knowledge from the previous course is forgotten.

This forgotten knowledge is exacerbated by anxiety—in the case of algebra and calculus, math anxiety. A growing body of research suggests that students who experience anxiety in a specific subject—particularly those who see themselves as otherwise successful students—are subconsciously motivated to forget subject matter in that subject as a coping mechanism to defend against memories that threaten their self-concept (Aronson et al., 1999; Sherman & Cohen, 2006; Tajfel & Turner, 2004). This phenomenon, known as "motivated forgetting" (Ramirez, 2017), may lead students to fail to encode threatening course content (Appel et al., 2011), reduce their interest in the field of study associated with the course (Cheryan & Plaut, 2010), or even disassociate all together with the field of study associated with the course (Osborne, 1997; Osborne & Walker, 2006; Major et al., 1998; Nussbaum & Steele, 2007; Schmader & Major, 1999).

We were not able to conduct transcript analysis for the transfer students in our examination since there were no available data of this kind from the sending institutions. However, the body of scholarship we reference in the previous paragraph gives us reason to believe that one of the reasons transfers do not do well in math courses at the receiving institution is because they had not taken math in the 1 or more years prior to transferring.

This hypothesis is applicable to more than just transfer students. It merits noting that upper-level non-transfer students also have higher DFWI rates in calculus when compared to their non-transfer, first-year counterparts. Non-transfer, upper-level students have a 40.0% DFWI rate in calculus, which is 5.1 percentage points (14.6%) higher than the 34.9% DFWI rate that non-transfer, first-year students have in the course. These findings suggest that for both upper-level, non-transfer students and transfer students, math anxiety may lead to postponement of math taking. That postponement can be associated with increased forgetting of content which, in turn, is associated with higher rates of failure in the course.

Transfers Compared to Non-transfer, Upper-Level Students

Previously, we introduced the phrase "non-transfer, upper-level students." For purposes of our research, we define *non-transfer, upper-level students* as non-transfer students who had 30 or more earned credits when they were enrolled in the course in consideration. This means they were at "sophomore-level" standing or higher. When compared to non-transfer, upper-level students, transfers have lower DFWI rates in only two courses: principles of accounting and general chemistry. (See Table 13.1, columns F for transfer and G for non-transfer, upper-level students.). Non-transfer, upper-level students have the lowest DFWI rate in five of the eight

courses considered. The three exceptions are the aforementioned calculus outcomes, where non-transfer, first-year students have the lowest DFWI rate of all groups considered, and the accounting and general chemistry courses where transfers have the lowest DFWI rate of all the groups considered.

The calculus outcome merits additional discussion. First-year students who place into calculus are generally the most "math-ready" student population. After all, they placed into calculus as an incoming first-year student and presumably did so based on placement tests, standardized test scores, and/or previous grades. Thus, one should not be surprised by the fact that they have the lowest DFWI rate in the course. This "lowest rate" should not be celebrated, however, as it still represents over a third of all students in the course (34.9%).

The fact that transfers have lower DFWI rates in accounting and general chemistry than non-transfers of all types—both first-year and upper-level—also merits some consideration. We believe that these outcomes may be the byproduct, at least in part, of the receiving institution's perception that accounting and general chemistry courses at the sending institutions were inferior, thereby resulting in the transfer students being required to retake the course at the receiving institution. The perceived inferiority of the sending institution's version of the course may be the result of prejudice but not actual evidence. As noted by Holzer and Baum (2017), community college "students have particular difficulty transferring into other programs and to institutions because the credits they have earned are frequently not accepted" (p. 160). Considering this issue, the lower DFWI rates in these two courses could be more of a byproduct of transfers essentially being forced to retake courses at the receiving institutions that they have already passed at their previous sending institutions. Further research on course-taking patterns for transfer students in these fields—and others like them—is warranted to see if what we suggest is, in fact, supported by transcript evidence.

Question 2: Comparison of Transfer DFWI Rates by Race/Ethnicity Classifications

As supported by the data displayed in Table 13.2, *transfer students of color*—for purposes of our research defined as being students from African American, Native American, or Latinx race/ethnicity groups—almost always have a DFWI rate that exceeds the course average as well as the average for their White/Caucasian counterparts. (See Table 13.2, columns D, E, F, and G.) In four courses—general biology, U.S. history, college algebra, and general psychology—African Americans have the highest DFWI rates when compared to both the course average DFWI rate for transfers and the DFWI rate for transfers from all other race ethnicity groups we considered for this analysis. In the other four courses—principles of accounting, general chemistry, English composition, and calculus—Native Americans have the highest DFWI rate when compared to both the course average DFWI rate for transfers and the DFWI rate for transfers from all other race ethnicity groups we considered for this analysis. These rates are highlighted in bold.

The differences are striking in many instances. For example, in U.S. history, African American students have a DFWI rate that is 16.5 percentage points (43.2%) higher than the course average for transfers and 21.4 percentage points (64.3%) higher than White/Caucasian transfer students in the course. In general chemistry, Native American students have a DFWI rate that is 28.2 percentage points (102.5%) higher than the course average for transfers and 30.1 percentage points (117.6%) higher than White/Caucasian transfer students in the course.

These findings are consistent with other scholarship we have produced to date (c.f., Koch, 2017a; Koch, 2017b; Koch & Drake, 2018; Koch & Drake, 2019). Sadly, we must point out here the same point we made in those other publications—the race- and income-based inequity that is a part of the history of the United States continues in gateway courses. This study allows us to add that even being a transfer student—a student who has "done college before" and arguably did it successfully based on the student's ability to gain admission at the transfer-receiving institution—does not mitigate race- and income-related inequitable outcomes in gateway courses.

Question 3: Comparison of Transfer DFWI Rates by Income (Pell) Classifications

Table 13.3 shows that, like the students from the race/ethnicity groups in Table 13.2, transfer students who are eligible to receive a Pell grant—the Federal grant for students from families from the nation's lowest income backgrounds—on average do worse in the courses we examined when compared to both their transfer peers from more affluent (non-Pell) families as well as the overall course DFWI rate average for transfers. Students who are Pell-grant eligible have a DFWI rate higher than the course average for transfers in five of the eight courses included in this study—principles of accounting, general biology, U.S. history, calculus, and general psychology. These differences range between 0.3 percentage points (0.7%) higher in calculus (41.8% Pell-eligible transfers compared to 41.5% for transfers in aggregate) to 5.6 percentage points (22.1%) higher in accounting (30.9% Pell-eligible compared to 25.3% for transfers in aggregate). (See Table 13.3, columns D and E.)

The differences are even more striking when comparing Pell-eligible transfers to their non-Pell-eligible transfer peers in the same courses. With the exception of general chemistry, where Pell-eligible transfers have a DFWI rate that is 1.0 percentage point lower than their non-Pell transfer peers (27.2% for Pell-eligible transfers compared to 28.2% for non-Pell-eligible transfers), Pell-eligible transfer students always have higher DFWI rates than their non-Pell-eligible transfer counterparts. The differences range between 1.2 percentage points (3.4%) higher in college algebra (36.7% for Pell-eligible transfers compared to 35.5% for non-Pell-eligible transfers) to 9.4 percentage points (57.0%) higher in U.S. history (25.9% for Pell-eligible transfers compared to 16.5% for non-Pell-eligible transfers), as shown in Table 13.3, columns E and F.

While the differences are not as large as those seen for many of the race/ethnicity groups in Table 13.2, they do suggest that students from families with greater financial capital (non-Pell-eligible transfers) have an advantage in gateway courses

over their peers who come from less affluent and privileged backgrounds (Pell-eligible transfers). This finding is consistent with previous research on outcomes in gateway courses for students irrespective of their transfer or non-transfer status (c.f., Koch, 2017b; Koch & Drake, 2018; Koch & Drake, 2019).

Summary and Conclusions

Race/ethnicity, family income, and transfer status matter in the gateway-course passing rates detailed in this chapter. However, transfer status on its own does not mean a student is more likely to earn a D, F, W, or I grade in all of the courses we examined. The fact is, when it comes to transfers and DFWI rates in gateway courses, the outcomes frequently depend on the race/ethnicity and family-income status of the students considered.

As seen in the findings associated with our first question (Do transfer students have lower or higher DFWI rates when compared to their non-transfer counterparts in the courses?) transfers have the highest DFWI rates in only three of the eight courses considered in our analysis when compared to their non-transfer, first-year counterparts. The differences are particularly acute in math—where "motivated forgetting" and math anxiety may be factoring into the lower course-passing rates exhibited by transfers when compared to the non-transfer, first-year counterparts. The fact that transfers have lower DFWI rates in five courses when compared to their non-transfer, first-year counterparts could, in part, be explained by the fact that credit for coursework at previous institutions was not accepted at their receiving institutions. Thus, their lower DFWI rates could be due, in part, their repeating courses they may have previously taken and mastered elsewhere.

Transfers have the highest DFWI rates in six of the eight courses considered in this study when compared to their non-transfer, upper-level counterparts. The two courses where their DFWI rates are lower are accounting and general chemistry. We believe the lower rates in these two courses can also be explained, at least in part, because transfer students may have taken comparable versions of these courses before at their transfer-sending institutions but their transfer-receiving institutions did not accept the credits. Thus, unlike their non-transfer counterparts—even upper-level, non-transfer counterparts—they had a "leg up" on earning a good grade in the course before they had mastered the content at their sending institution. Admittedly, this assumption is just that—an assumption. It should be verified with another study that examines the transcripts of transfers to see if they are, in fact, repeating these courses.

The findings associated with our second question (Do transfer students of color as defined by federal race/ethnic classification have higher or lower DFWI rates when compared to both the average DFWI rates for transfers in the courses and the DFWI for their White/Caucasian transfer counterparts in the courses?) were, disturbing but, based on previous analyses we have conducted, on gateway course outcomes, not surprising. In short, *transfer students of color*—for purposes of this chapter defined as

African American, Native American, or Latinx race/ethnicity groups—almost always have a DFWI rate that exceeds the course average as well as the average for their White/Caucasian counterparts. In several cases, the DFWI rate differences for students from specific race/ethnicity come close to or even exceed double that of the course average and/or White/Caucasian comparison groups.

Analysis associated with our third question (Do transfer students from low-income families/backgrounds have higher or lower DFWI rates when compared to their non-low income transfer counterparts in the courses?) yielded results similar to those associated with the race/ethnicity findings. While the differences were not as extreme as the race/ethnicity comparisons associated with question 2, we found that transfer students who are eligible to receive a Pell grant—the metric we used to determine whether a student fit into the "low-income" or "non-low income" categories—on average do worse in the courses we examined when compared to both their transfer peers from more affluent (non-Pell) families as well as the overall course DFWI rate average for transfers.

There are three items that strike us most about the answers to our three questions. The first is the fact that transfer students perform better than their non-transfer, first-year counterparts in many courses, and do better than their non-transfer, upper-level counterparts in two courses. If, as we suspect, this has something to do with transfers repeating courses for which they previously earned credit at their sending institutions, then the credit acceptance and placement practices at many institutions merit examination. The academic performance of transfers is not an issue. But the fact that transfers outperform both groups of non-transfer students in two of the eight courses we examined—specifically principles of accounting and general chemistry—and that they are doing better than non-transfer, first-year students in three additional courses beyond the two already mentioned in this sentence—specifically general biology, U.S. history, and general psychology—makes us wonder if transfers are unnecessarily repeating courses and, as a result, taking longer to earn their baccalaureate degrees. Further analysis looking at demographics such as age and gender, as well as transcript analysis from the sending institutions, would shed more light on this issue.

The second item that troubles us is the challenge that transfer students appear to have with math—especially when compared to the non-transfer, first-year students enrolled in the same courses. This challenge is not unique to transfer students. Non-transfer, upper-level students also have significantly higher DFWI rates in calculus when compared to their non-transfer, first-year peers (see Table 13.1). This finding suggests that institutions need to consider employing math support strategies for students "who have done college before" if they have not had a math course for several years. Efforts such as math bridge programs, corequisite support efforts, and course-embedded support come to mind.

Last, but arguably most significant of all items in our analysis, is the fact that race/ethnicity and family income are the best determinants of whether or not a transfer student is going to succeed in a gateway course at the institution to which they have transferred. By this we mean that if a student is not White, and/or if a student

comes from a poor family, that student is much more likely to not succeed in the eight gateway courses we examined for this study. Think about that for a moment. These are students who successfully navigated postsecondary education at another college or university. They successfully transferred into a new institution with the intent to earn a degree. And they did not succeed in gateway courses at the institution to which they transferred. This is disturbing for two reasons.

First, based on prior research we conducted (Koch & Drake, 2018; Koch & Drake, 2019), we know that students who do not succeed in even one gateway course are appreciably less likely to be retained at the institution where they took the course. We also know from Adelman's 1999 publication *Answers in the Tool Box*, and his 2006 follow-up work, *The Toolbox Revisited*, that students who earned D, F, W or I grades in 20% or more of their foundational-level courses were the least likely to finish a degree—not just at the institution at which they earned these grades, but at any institution anywhere over the 8-year time period considered in each of his respective studies. While we have not yet conducted analysis of the retention and graduation implications of the DFWI rates for transfer students in this data set, if their retention outcomes are similar to those found in the other analyses of gateway course outcomes we have conducted, then we have reason to believe that transfer students who do not succeed in gateway courses at their transfer-receiving institution are at particularly high risk of attrition. Failure in gateway courses at the transfer-receiving institution may help explain, at least in part, why only 13% of students who start in a community college with the expressed intent of transferring to obtain a baccalaureate degree have actually earned that degree 6 years later (Shapiro et al., 2017). In short, lack of success in gateway courses at the transfer-receiving institutions can be a tremendous baccalaureate-degree attainment momentum blocker.

The second reason why these race/ethnicity and family income findings for transfer students in gateway courses troubles us has to do with the overall representation of students of color and students from low-income families in the community college sector. Approximately 40% of first-time, first-year students start their college experience in community colleges (Doyle, 2009; National Center for Education Statistics, 2015; Shapiro et al., 2015; Shapiro et al., 2016). Over two-fifths (42%) of those students are from low-income families (National Center for Public Policy and Higher Education, 2011). From a race/ethnicity standpoint, over two-fifths of Latinx (42.6%) students, nearly one-third of African American (31.3%) students, nearly two-fifths of Native American students (39.3%), and nearly one out of every three (29.4%) students who identify as belonging to two or more race/ethnicity groups start their collegiate experience in community colleges (Almanac of Higher Education 2018–19, 2018). In other words, some of the largest concentrations of students of color and low-income students begin their postsecondary experience in the community college sector. Jenkins and Fink (2016) found that while lower income students who started at a community college were just as likely as higher income students to earn associate degrees or certificates, they were *less* likely to earn baccalaureate degrees than their more affluent community college transfer counterparts. While there are

many reasons for this, gateway course performance at the transfer-receiving institution cannot and should not be overlooked. Based on what we found in our own exploration of existing research, transfer performance at their receiving institutions is barely discussed. It needs to be, however, as there are tremendous equity-blocking implications at work here.

And this brings us to, arguably, the most critical implication of our study. Simply stated, if left unchecked, current conditions and passing rates in gateway courses for transfer students—particularly those from low-income and historically underrepresented race/ethnicity groups—will exacerbate an already bleak transfer student baccalaureate degree completion scenario. As Grave (2018) unambiguously points out, "Over the next 15 years, persistent trends in immigration, migration, and differential birth rates coupled with the recent acute birth dearth will markedly alter the college-age population" (p. 18). In other words, the very sample populations that historically constitute large portions of community college enrollments, and that do not do well in the gateway courses at transfer-receiving institutions in our study, will constitute the growing majority of the college-going population in both the 2- and 4-year sectors.

Educators can shrug their shoulders and yearn for the "golden age" when "better students" made teaching "a breeze." But such a reaction would be unwise, ill informed, and, ultimately, self-defeating. It would also mask the harsh reality: that for decades a more affluent and privileged college-going majority has masked failure rates among other populations. In the process of masking these rates, educators were blinded to structural racism and classism at work in gateway courses, the plight of transfer students, and the broader undergraduate experience of which transfer and gateway courses are a part.

In the contemporary era—a period during which public skepticism about the value of a college education seems to be increasing at almost the same speed with which state funding for postsecondary education is decreasing—gateway course failure rates can no longer be ignored or viewed as a badge of distinction and rigor. To do so would reward outcomes that clearly are inequitable. It would ignore the weight of the evidence about who does and does not succeed in undergraduate education broadly and gateway courses in particular and disregard the growing body of evidence about pedagogical and policy practices that can alter these outcomes.

It is beyond the scope of this chapter to discuss the strategies and policy changes that can be employed to help the 21st-century student demographic learn and grow in and through the courses that comprise the transfer experience. The study also is limited by the data set with which we were working. We may have created more questions than we answered. However, it is well within the scope and confined of this chapter to end by noting that, for the betterment of both the transfer-sending and transfer-receiving institutions, the communities they serve, and, ultimately, the transfer students themselves, we hope that readers will not ignore the weight of this evidence, and that they will make gateway courses in general and transfer student success in gateway courses in particular a primary place for action and agency.

Recommendations

Based on our work within this chapter, and the scholarship we used to write it, we recommend the following approaches for institutions seeking to learn more about and continuously improve transfer student success in gateway courses:

1. Conduct an institutional analysis to examine how transfer students perform in courses that they take at various stages of their transition into the transfer-receiving institution.
2. Once the "gateway courses" at transfer-receiving institutions are identified, conduct transcript analysis for transfers from primary-sending institutions to see what, if any, pre-transfer course taking and content mastery patterns emerge.
3. Bring together faculty, advisors, and academic leaders associated with gateway courses at the primary transfer-sending and transfer-receiving institutions to discuss the evidence collected as part of recommendations 1 and 2.
4. When and where possible, conduct recommendations 1, 2, and 3 as part of an intentional self-study and course redesign process—one that helps all involved parties learn about what is actually going on in their courses and programs of study for the transfer students who take them and subsequently supports faculty and staff as they adopt and adapt evidence-based course redesign strategies that can yield more equitable outcomes for transfer students and all other students in the gateway courses examined.

Questions to Consider

Based on our work within this chapter, and the scholarship on which we drew to write it, we recommend institutions consider the following questions as they seek to learn more about and continuously improve transfer student success in gateway courses:

1. Does your institution collect and analyze data on the performance of transfer students in gateway courses? If yes, are those data and/or their analysis sufficient? If no, why not?
2. If the institution does collect and analyze the data on transfer performance in gateway courses, how is it shared with faculty at the transfer-sending and/or transfer-receiving institutions?
3. If data are shared with faculty from the transfer-sending and transfer-receiving institutions, are those faculty supported in their efforts to interpret and apply the data to their teaching efforts? If yes, are the goals for those receiving the data clearly identified and understood? If no, why not?
4. Who else, in addition to and in concert with faculty, should be involved in efforts to improve transfer outcomes in gateway courses? How would you go about doing this?

5. How might you combine efforts to improve teaching, learning, and success for transfer students in gateway courses with other teaching and learning improvement efforts underway at the institution?
6. How might you combine efforts to improve teaching, learning, and success for transfer students in gateway courses with efforts such as reaffirmation of accreditation, program review, strategic planning, performance-based funding, general education review, and other broader institutional efforts?

References

Adelman, C. (1999). *Answers in the tool box: Academic intensity, academic patterns, and bachelor's degree attainment*. U.S. Department of Education.

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. U.S. Department of Education.

Appel, M., Kronberger, N., & Aronson, J. (2011). Stereotype threat impairs ability building: Effects on the test preparation of women in science and technology. *European Journal of Social Psychology, 41*(7)*,* 904–913. https://doi.org/10.1002/ejsp.835

Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When White men can't do mathematics: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology, 35,* 29–46. https://doi.org/10.1006/jesp.1998.1371

Cheryan, S., & Plaut, V. C. (2010). Explaining underrepresentation: A theory of precluded interest. *Sex Roles, 63*, 475–488. https://doi.org/10.1007/s11199-010-9835-x

The Chronicle of Higher Education. (2018). *Almanac of Higher Education 2018-19.* https://www.chronicle.com/specialreport/The-Almanac-of-Higher/214

Conway, M. A., Cohen, G., & Stanhope, N. (1991). On the very long-term retention of knowledge acquired through formal education: Twelve years of cognitive psychology. *Journal of Experimental Psychology: General*, *120*(4), 395–409. https://doi.org/10.1037/0096-3445.120.4.395

Doyle, W. R. (2009). Impact of increased academic intensity on transfer rates: An application of matching estimators to student-unit record data. *Research in Higher Education*, *50*, 52–72. https://doi.org/10.1037/0096-3445.120.4.395

Garcia, N. M., López, N., & Vélez, V. N. (2018). QuantCrit: Rectifying quantitative methods through critical race theory, *Race Ethnicity and Education, 21*(2), 149–157.

Grave, N. D. (2018). *Demographics and the demand for higher education*. Johns Hopkins University Press.

Holzer, H. J., & Baum, S. (2017). *Making college work: Pathways to success for disadvantaged students*. Brookings Institution Press.

Jenkins, D., & Fink, J. (2016). *Tracking transfer: New measures of institutional and state effectiveness in helping community college students attain bachelor's degrees*. Community College Research Center, Teachers College, Columbia University. http://ccrc.tc.columbia.edu/publications/tracking-transfer-institutional-state-effectiveness.html

Kamuche, F. U., & Ledman, R. E. (2011). Relationship of time and learning retention. *Journal of College Teaching and Learning, 2*, 25–28. https://doi.org/10.19030/tlc.v2i8.1851

Koch, A. K. (Ed.). (2017a). *Improving teaching, learning, equity, and success in gateway courses* (New Directions for Higher Education, no. 180). Jossey-Bass.

Koch, A. K. (2017b). It's about the gateway courses: Defining and contextualizing the issue. In A. K. Koch (Ed.), *Improving teaching, learning, equity, and success in gateway courses* (New Directions for Higher Education, no. 180, pp. 11–17). Jossey-Bass.

Koch, A. K. (2017c). Many thousands failed: A wakeup call to history educators. *Perspectives on History*, *55*, 18–19.

Koch, A. K. (2018). Big inequity in small things: Toward an end to a tyranny of practice. *National Teaching and Learning Forum, 27*(6), 1–5. https://doi.org/10.1002/ntlf.30169

Koch, A. K., & Drake, B. M. (2018). *Digging into the disciplines I–accounting for failure: The impact of gateway courses in accounting, calculus, and chemistry on student success*. John N. Gardner Institute for Excellence in Undergraduate Education.

Koch, A. K., & Drake, B. M. (2019). *Digging into the disciplines II–failure in historical context: The impact of gateway courses in history, accounting, and chemistry on student success*. John N. Gardner Institute for Excellence in Undergraduate Education.

Koch, A. K., & Rodier, R. (2014). *Gateways to completion guidebook*. John N. Gardner Institute for Excellence in Undergraduate Education.

Major, B., Spencer, S., Schmader, T., Wolfe, C., & Crocker, J. (1998). Coping with negative stereotypes about intellectual performance: the role of psychological disengagement. *Personality and Social Psychology Bulletin, 24,* 34–50. https://doi.org/10.1177/0146167298241003

National Center for Education Statistics. (2015). *Enrollment and employees in postsecondary institutions, fall 2014; and financial statistics and academic libraries, fiscal year 2014: First look (provisional data)*. Author. https://nces.ed.gov/pubs2016/2016005.pdf

National Center for Public Policy and Higher Education. (2011). *Affordability and transfer: Critical to increasing baccalaureate degree completion.* Policy Alert. ERIC Clearinghouse. http://www.highereducation.org/reports/pa_at/PolicyAlert_06-2011.pdf

Nussbaum, A. D., & Steele, C. M. (2007). Situational disengagement and persistence in the face of adversity. *Journal of Experimental Social Psychology, 43*: 127–134. https://doi.org/10.1016/j.jesp.2005.12.007

Osborne J. W. (1997). Race and academic disidentification. *Journal of Experimental Social Psychology, 89*, 728–735. https://doi.org/10.1037/0022-0663.89.4.728

Osborne, J. W., & Walker, C. (2006). Stereotype threat, identification with academics, and withdrawal from school: Why the most successful students of colour might be most likely to withdraw. *Education Psychology, 26*, 563–577. https://doi.org/10.1080/01443410500342518

Ramirez, G. (2017). Motivated forgetting in early mathematics: A proof-of-concept study. *Frontiers in Psychology*, *8*(2087). doi: 10.3389/fpsyg.2017.02087

Schmader, T., & Major, B. (1999). The impact of ingroup vs. outgroup performance on personal values. *Journal of Experimental Social Psychology, 35*, 47–67. https://doi.org/10.1006/jesp.1998.1372

Shapiro, D., Dundar, A., Huie, F., Wakhungu, P.K., Yuan, X., Nathan, A., & Hwang, Y. (2017, September). *Tracking transfer: Measures of effectiveness in helping community college students to complete bachelor's degrees* (Signature Report No. 13). National Student Clearinghouse Research Center.

Shapiro, D., Dundar, A., Wakhungu, P. K. Yuan, X., & Harrell, A. (2015). *Transfer & mobility: A national view of student movement in postsecondary institutions, fall 2008 cohort* (Signature Report 9). National Student Clearinghouse Research Center. https://nscresearchcenter.org/signaturereport9/

Shapiro, D., Dundar, A., Wakhungu, P. K., Yuan, X., Nathan, A. & Hwang, Y. (2016, November). *Completing college: A national view of student attainment rates—fall 2010 cohort* (Signature Report No. 12). National Student Clearinghouse Research Center. https://nscresearchcenter.org/signaturereport12/

Sherman D. K., & Cohen G. L. (2006). The psychology of self-defense: Self-affirmation theory. *Advances in Experimental Social Psychology, 38*: 183–242. https://doi.org/10.1016/s0065-2601(06)38004-5

Tajfel, H., & Turner, J. C. (2004). The social identity theory of intergroup behavior. In J. T. Jost & J. Sidanius (Eds.), *Key readings in social psychology. Political psychology: Key readings* (pp. 276–293). Psychology Press.

Wang, X., Wang, Y., Wickersham, K., Sun, N., & Chan, H. (2017). Math requirement fulfillment and educational success of community college students: A matter of when. *Community College Review, 45*, 99–118. https://doi.org/10.1177/0091552116682829

Weston, T. J., Seymour, E., Koch, A. K., & Drake, B. M. (2019). Weed-out classes and their consequences. In A. Hunter & E. Seymour (Eds.), *Talking about leaving revisited*: *Persistence, relocation and loss in undergraduate STEM education*. Springer.