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DEVELOPING TRANSFER ON-TRACK FOR STUDENTS AT A 4-YEAR UNIVERSITY

Susan P. Farruggia, Office of Student Affairs Assessment and Planning, University of Illinois Chicago
Vanessa Pena, Office of Student Affairs Assessment and Planning, University of Illinois Chicago
Daniel J. Wilson, Office of Student Affairs Assessment and Planning, University of Illinois Chicago

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INTRODUCTION

The notion of on-track has become established in Chicago Public Schools as a tool to help high schools increase graduation rates by focusing on the behavioral and contextual factors that are associated with students being on-track, as well as identifying students who could benefit from early intervention (Allensworth et al., 2018). Developed by the University of Chicago Consortium on School Research (Allensworth & Easton, 2005), the Freshman On-Track designation is based on two indicators: credits earned (i.e., a minimum of five, full-year course credits in the freshman year) and class failure (i.e., no more than one semester course failure in a core subject in the first year). To be on-track, students must meet both requirements.

Inspired by this work, previous research (Farruggia et al., 2020) at the University of Illinois Chicago has identified an on-track indicator for first-year college students, including earning at least a 2.4 GPA in the first-term in college, earning at least 22 credits in the first year of college, earning at least a "C" in the first course of a two-course writing sequence, and having no unresolved financial holds in the first term. This metric is highly predictive of 6-year graduation from college for those that matriculate as first-time, first-year students. Please see Farruggia et al. (2020) for a full discussion of the First-Year On-Track Index and its development.

Given the success of the First-Year On-Track metric, the question arises if an on-track indicator can be developed for transfer students. Like many universities, UIC has had a substantial increase in the number of transfer students matriculating in the past 15 years. While transfer students typically do well at UIC, one in five (20%) do not complete their degrees. This is concerning given that they

had to have been successful in their previous college/university for them to be admitted to UIC as a transfer student. Therefore, an on-track indicator for transfer students would be beneficial so universities can identify transfer students who are in jeopardy of not completing their degrees.

When conceptualizing an on-track index the starting point would be the First-Year On-Track index as the metrics of success given that grades and credits are similar. Likewise, transfer students would also potentially face financial barriers because the costs of college are the same for first-year and transfer students. However, an on-track index for transfer students is potentially more complicated compared to first-year students for a number of reasons, including:

- transfer students are coming to their new institution with a range of credits so their time to degree many widely vary;
- transfer students might study on a part-time basis so their time to degree can lengthen greatly;
- even for transfer students who start as full-time students, they are more likely to study part-time at some point making a minimum credit threshold more difficult to identify;
- transfer students do not have any common classes across the university as first-year students do with the writing sequence; and
- transfer students may have increased financial obligations compared to their previous institution as four-year colleges are typically more expensive than two-year colleges.

The Current Study

This study aimed to create an on-track index for transfer students. We focus on 5-year graduation using institutional data from full-time undergraduate college students at UIC. This five-year time frame is used as it allows for enough time for transfer students to complete, regardless of the amount of credits they transfer to UIC with. Given the accuracy of First-Year On-Track, the potential for creating a parallel index for transfer students will provide colleges a powerful tool to identify early indicators of transfer students who may not complete their degrees.

METHODS

This study utilized UIC institutional data from the Fall 2017, Spring 2018, and Fall 2018 full-time, transfer student cohorts (N = 4,452) in its primary analyses. Table 1 shows demographic characteristics for the students in the study. Unlike first-year students who only matriculate in the fall term, transfer students can matriculate to UIC in the fall or spring terms; therefore, we include students who matriculate in the fall semester for both 2017 and 2018 and the spring semester for 2018. Only full-time students were included in these analyses as successful part-time students may take longer than five years to complete their degree. To conduct confirmatory analyses that the index similarly performs with additional cohorts, we also utilize transfer students from the Fall 2016, Spring 2017, Spring 2019, Fall 2019 and Spring 2020 cohorts. As a note, the COVID-19 Pandemic began while the Spring 2020 cohort was in their first semester at UIC.

TABLE 1

Student Demographic and Background Characteristics for the Fall 2017, Spring 2018, and Fall 2018 Cohorts (N = 4452)

STUDENT CHARACTERISTICS	PERCENTAGE
Gender	
Female	51%
Male	49%
Race/Ethnicity	
Asian American	16%
Black	8%
International	3%
Latinx	30%
Multi-Race	3%
White	39%
Other	1%
Pell-grant Eligible	50%
Transfer Institution Type	
2-Year/Community College	49%
4-year College/University	51%

The institutional data in the study included student demographic and background characteristics (see Table 1), first-term GPA, credits earned in the first year, unresolved financial holds in the first term and 5-year graduation. First-term GPA, a continuous variable, is the grade point average of all credit-bearing, letter grade earning courses in the first-term of college. Any transfer grades, pass/fail grades or satisfactory/unsatisfactory grades are not included. Credits earned in the first year, also a continuous variable, is the total number of credits earned in the first two semesters at UIC (no transfer credits included) and only for those credits earned in college-level courses. If students are in need of developmental courses, those credits are not included in this variable. For unresolved financial

holds in the first-term, a dichotomous variable, this reflects that the student had a financial hold placed on their account (due to an unpaid balance) in the first semester at UIC and it was not resolved by the end of the semester. This variable was coded as 1 = has an unresolved financial hold and 0 = no financial hold or had a hold, but was resolved before the end of the semester. This means that if a student receives a financial hold, but it is resolved prior to the start of the second semester, it is coded as a "0" on this variable. Finally, as there are no common courses among transfer students, we did not include any specific classes as was done with the first-year writing course for the First-Year On-Track index.

Analytic Plan

There were four initial steps in creating the transfer student index, all of which were based on the process used to develop First-Year On-Track. First, correlational or chi-square analyses were used to examine the association between predictor variables (those in the index) with 5-year graduation. Second, logistic regression was used to confirm that the factors would be included in the initial, comprehensive model, and that it had adequate predictiveness of graduation. Third, after this comprehensive model was identified, the indicators that were continuous needed to be dichotomized reflecting on-track thresholds. To do this, indicators were mapped onto graduation rates. Then, threshold ranges were identified based on patterns of association, using a 80% graduation rate as the target to be on track, as that is the university's 5-year graduation rate for these cohorts. Fourth, once all of the potential indicators became dichotomous, they were entered into new logistic regression models to ensure that the model fit had not decreased meaningfully in comparison to when the indicators were continuous. Also, those variables that were originally continuous were double-checked to ensure that the thresholds did not need to be adjusted once they were included in the model. This was an iterative process of trying different thresholds to ensure the best combination was included in the model. After the model was finalized, the new Transfer On-Track index was mapped onto graduation trends to ensure there was convergence between the proportion of students on-track and graduation rates. Given UIC's equity gaps based on race-ethnicity, we examined the index to ensure it worked similarly well by racial/ethnic groups.

RESULTS

Associations Between Index Factors and Graduation

The first step was to ensure that the three planned variables that were to be included in the model were associated with 5-year graduation. All were significantly associated with 5-year graduation: first-term GPA (r = .43, p <.001), first-year credits earned (r = .60, p <.001), and no unresolved financial hold in the first year (X^2 (1) = 230.67, p < .001).

Given that all of these were significantly associated with graduation, the next step was to test the on-track model using logistic regression to determine if they all remained significant when in the model together and if they accurately predicted graduation. No unresolved financial holds was only significant at p=.097 when included in the model (Table 2). Although this does not meet the typical standard of p<.05, it was decided to keep it in the at least until the next step was complete as financing college has been previously shown to be a significant barrier to college completion and the predictiveness of the other two variables may decrease once they were made dichotomous.

TABLE 2.

Logistic Regression Model for Three Predictors of Transfer On-Track

VARIABLE	B	EXP (SS)
Constant	-3.87	0.02***
GPA during the First Term	0.22	1.24***
Credits Earned During the First Year	0.20	1.22***
Financial Hold Not Resolved in First Term	-0.51	0.60*

*p = .097, ***p < .001

Table 3 shows the accuracy of how well the model predicts who will and who will not graduate. Overall, the model accurately predicted 5-year graduation 87% of the time, exceeding both the Freshman On-Track rate of 80% and the First-Year On-Track rate of 75%. One important issue with the model is that while the overall accuracy is high, it is not as accurate for correctly identifying those who would not graduate as those who would graduate (50% accuracy versus 97% accuracy). This tells us that there is a disproportionate number of students who should graduate, based on their on-track status at the end of their first year at UIC, but ultimately do not. Importantly, this is a relatively small number, given the overall 87% accuracy, but still an issue for further exploration.

TABLE 3.

Predicted and Actual 5-Year Graduation Rates Using Transfer On-Track Variables

	PREDICTED		
Occurred	**Would Not Graduate**	**Would Graduate**	**Percentage Correct**
Did Not Graduate	428	436	50%
Graduated Within 5 Years	121	3449	97%
Overall Percentage	—	—	87%

Identifying On-Track Thresholds

The next step in creating the Transfer On-Track Index was to determine the thresholds for the continuous variables, first-term GPA and credits earned in the first year. To do this, thresholds are trialed in the model to determine which one best predicts 5-year graduation with all three variables in the model. Figure 1 shows 5-year graduation rates with first-term GPA ranges. Figure 2 shows credits earned in the first year with 5-year graduation. For description purposes, no unresolved financial holds in the first-term are provided in Table 4. As a note, all three of these visually demonstrate the associations between the variables and 5-year graduation. Figure 1 shows the positive relationship between first-term GPA and 5-year graduation, meaning that as first-term GPA increases, so does the likelihood that the transfer student will graduate. Figure 2 shows a positive correlation between credits earned in the first-term and 5-year graduation, meaning the greater number of credits earned during the student's first term, the more likely they are to graduate in 5 years. Table 4 shows that of the students who have an unresolved financial hold, the graduation numbers are much smaller than the "did not graduate" numbers (32 versus 90).

FIGURE 1.

5-Year Graduation and First-term GPA for the Fall 2017 to Fall 2018 Cohorts

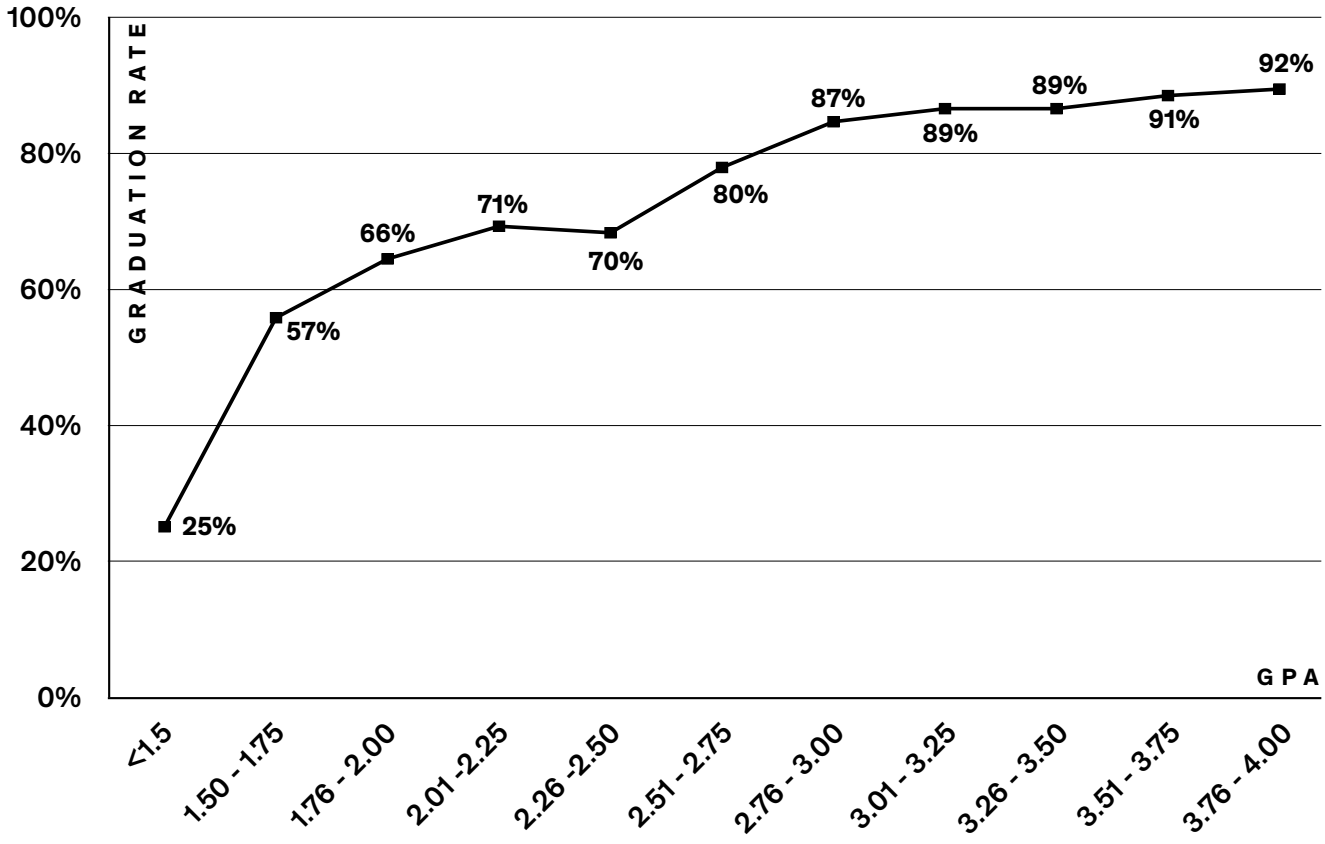


FIGURE 2.

5-Year Graduation and Credits Earned in the First Year for the Fall 2017 to Fall 2018 Cohorts

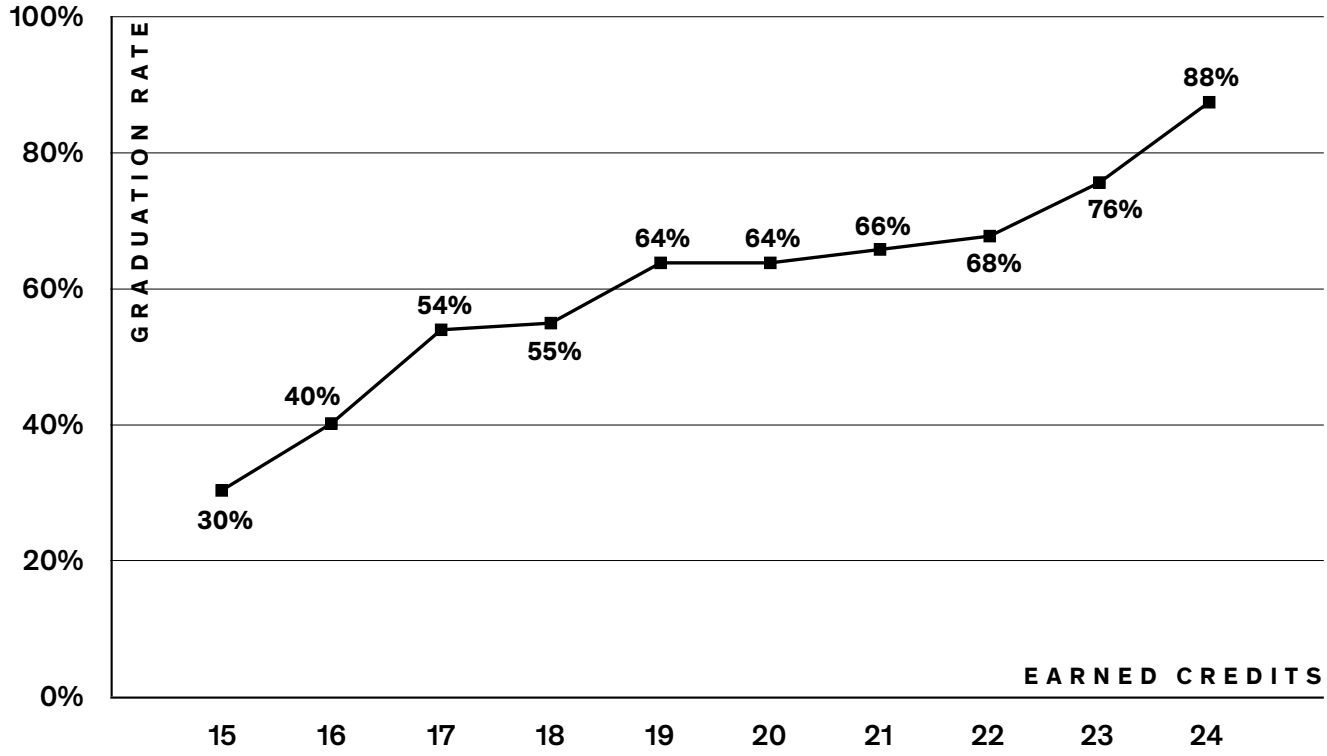


TABLE 4

5-Year Graduation and Unresolved Financial Holds in the First-Term of College for the Fall 2017 to Fall 2018 Cohorts

	NOT GRADUATED	GRADUATED	TOTAL
No Financial Hold or Financial Hold was Resolved	790	3,540	4,330
Unresolved Financial Hold	90	32	122
Total	880	3,572	4,452

Based on these, iterations of the model were examined using GPAs between 2.1 and 2.6 and credits between 20 and 25 to ensure the best overall model accuracy. Using the process described in the analytic plan, the final model was identified as seen in Table 5. The transfer on-track thresholds included: 2.2 first-term GPA, 22 credits earned in the first year, and no unresolved financial holds in the first term; no unresolved financial holds in the first term was significant in the model, $p < .001$. To meet Transfer On-Track, all of these minimums need to be met.

TABLE 5.

Logistic Regression Model for Final Three Predictors

VARIABLE	B	EXP (SS)
Constant	-0.90	0.41***
GPA during the First Term 2.2+	0.84	2.32***
Credits Earned During the First Year 22+	2.52	12.37***
Financial Hold Not Resolved in First Term	-1.14	0.32***

***$p < .001$

While using these thresholds in the model, the percentage of students predicted to graduate within five years was still high at 86% (see Table 6). This reflects that despite changing the two continuous variables to be dichotomous, there was only one percentage point decrease in accuracy; including no unresolved financial holds also helped keep the accuracy high. One important note with this is that by creating thresholds, the model better predicted those who did not graduate (now at 65%, up from 50%); however, there was some decrease in the accuracy of predicting students who would graduate (down from 97% to 91%).

TABLE 6.

Predicted and Actual 5-Year Graduation Rates for Fall 2017 to Fall 2018 Cohorts

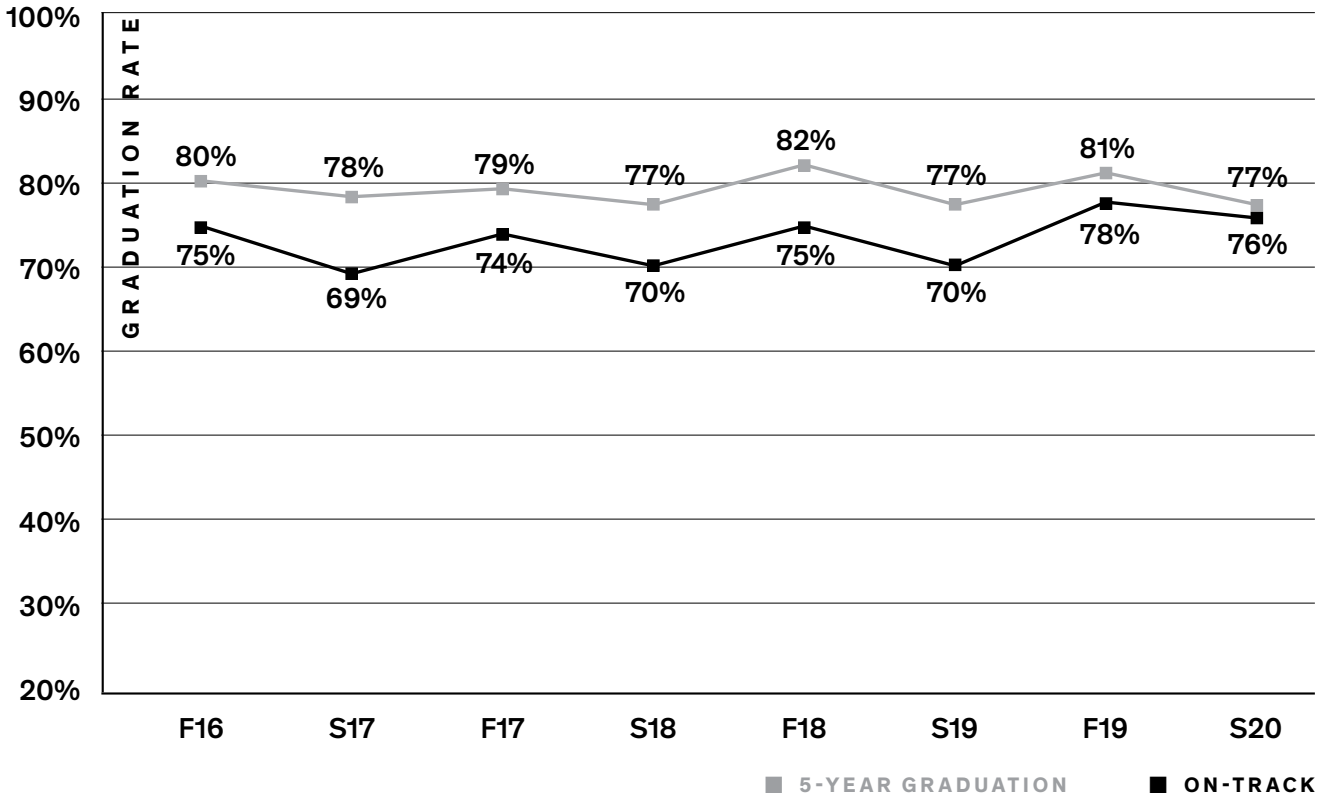
	PREDICTED		
Occurred	**Would Not Graduate**	**Would Graduate**	**Percentage Correct**
Did Not Graduate	563	301	65%
Graduated Within 5 Years	324	3246	91%
Overall Percentage	—	—	86%

Mapping to Graduation Trends

The final step was to confirm that the index for both additional cohorts as well as ensure the model works for different racial/ethnic groups. As developed using the Fall 2017, Spring 2018, and Fall 2018 transfer cohorts, we checked to see if the index worked equally well for the previous cohorts (Fall 2016 and Spring 2017) and the subsequent cohorts (Spring 2019, Fall 2019, and Spring 2020). See Figure 3.

FIGURE 3.

On-Track and 5-Year Graduation Rates for Fall 2016 through Spring 2020 Cohorts



Interestingly, despite the high accuracy of the Transfer On-Track index, it consistently under-predicts graduation, as seen by the discrepancy between on-track and graduation for each cohort. The difference was one to seven percentage points, depending on the cohort. Given this, it was warranted to further explore if one of the variables in the index was driving the discrepancy or if it was a function of all of the variables in the model.

To understand why, the individual on-track indicators rates were examined across cohorts. As seen in Table 7, earning at least 22 credits in the first year at UIC was consistently the least likely to be met. This pattern was typically more profound for students who entered UIC in a spring semester.

TABLE 7.

Percentage of On-Track, Indicators Met, and Graduation for Fall 2016 through Spring 2020 Cohorts

	F16	S17	F17	S18	F18	S19	F19	S20
Graduation	80%	78%	79%	77%	82%	77%	81%	77%
On-track	75%	69%	74%	70%	75%	70%	78%	76%
GPA During the First Term 2.2+	87%	85%	84%	82%	85%	85%	87%	92%
Credits Earned During the First Year 22+	78%	72%	80%	77%	81%	74%	83%	79%
Financial Hold **Not Resolved in First Term**	97%	96%	98%	97%	97%	97%	98%	100%

Based on this, the question arose as to whether a lower credit threshold should be used for the Transfer On-Track metric. Three factors led to the decision to retain the current threshold. First and most importantly, the index was highly predictive of graduation, so we would want to use caution to change this to something not as predictive. Second, the index under-predicts graduation versus over-predicts. From an intervention perspective, it is better to under-predict as this means that intervention efforts would be less likely to "miss" students in need of support. Third, and specific to this population, transfer students are more likely to reduce their status to part-time, even for a semester or two, as compared to first-year students. A proportion of the students, and again a relatively small proportion, do not meet the threshold but do graduate. It is likely the case that the students move to part-time, but ultimately still do graduate.

As this model was retained, the final step was to determine if the index worked well for various racial/ethnic groups. This was an important step as UIC's equity gaps in graduation rates are largest by racial/ethnic groups. Table 8 shows the on-track rates compared to 5-year graduation by race/ethnicity.

TABLE 8.

On-Track Rates and 5-year Graduation by Race/Ethnicity

	TRANSFER ON-TRACK	5-YEAR GRADUATION
Asian American	79%	89%
Black	61%	69%
International	74%	83%
Latinx	70%	78%
Multi-Race	73%	76%
White	78%	82%

As with Transfer On-Track for all students, similar patterns emerged when looking at the patterns by race/ethnicity. Transfer On-Track predicted 5-year graduation, although it continued to under-predict by all racial/ethnic groups. Given that the under-prediction is roughly equivalent by race/ethnicity, the model is again confirmed.

DISCUSSION AND NEXT STEPS

This study successfully identified an on-track index for transfer students, including three variables: 2.2 first-term GPA, 22 credits earned in the first year of college, and no unresolved financial holds in the first term of college. This index was highly predictive of 5-year graduation with 86% accuracy. As a reminder, this index was developed for full-time students, or at least students who are full-time in their first semester. Additional analyses should be conducted to determine how the index would change, e.g., the number of credits earned in the first year for students attending college part-time.

One difference that was identified between Transfer On-Track and First-year On-Track was the GPA threshold. For transfer students, it was a 2.2 GPA, whereas for first-year students, it was 2.4 GPA. While the reason for this is not certain, it may be the case that transfer students likely had that high of a first-year GPA, just in their previous institution. The importance of a 2.4 GPA (versus a 2.0 GPA which typically keeps students in good academic standing) likely reflects both the need for a strong foundation in introductory and general education courses. Transfer students would have gained that in their previous institution.

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