

Online Appendix A: Underrepresented Minority Students

1 Combining Black and Hispanic Students as an “Underrepresented Minority” Group

For both theoretical and practical reasons, scholars often have combined black and Hispanic students into an “underrepresented minority” (hereafter, “UM”) group to pursue empirical analyses. Theoretically, black and Hispanic students share important similarities due to their minority status. For example, both black and Hispanic students on average come from lower-SES backgrounds, experience lesser academic preparation than white students, and sometimes face greater socio-emotional challenges as compared to white students while attending college (e.g. Bowen et al. 2009; Carter 2006; Charles et al. 2009). Because black and Hispanic students are together only about a quarter of American population, the sample sizes for these groups in nationally representative data sets that focus on education is often relatively small. To generate more precise results, some scholars have combined black and Hispanic students in their analyses under the assumption that the estimated coefficients for these two groups would be roughly similar (Alon 2015; Lavin and Crook 1990; Light and Strayer 2002; Rendón et al. 2000).

2 Data Considerations

To produce results comparing UM and white college students, we draw on the same data as employed in the analyses in the main text, namely, the Education Longitudinal Study (ELS): 2002 and the Integrated Postsecondary Education Data System (IPEDS). In line with our analysis of black and white students, we focus on first-time freshmen who enter four-year college by the fall of 2006. Based on this timing, we typically gain a seven-to-nine year window to observe whether students complete bachelor’s degrees (BAs). Within the ELS data, 3,280 UM students who were part of the sophomore class of 2002 earned a high school diploma or GED prior to the fall 2006, as compared with 1,570 black students and 7,410 of white students.¹ Of this group, 32.2 percent,

¹The National Center of Education Statistics (NCES) requires rounding sample counts to the nearest 10.

or 1,060 UM students, enrolled in four-year college by the fall of 2006, as compared to 37.7 percent of black students and 47.6 percent of white students similarly enrolled in four-year college.

Of the total 1,060 UM students who enroll in four-year college, 46.8 percent leave college by the censoring point in our data without earning a degree (as compared to 50.4 percent of black students and 25.4 percent of white students). While dropout is highest in students' first two years of college attendance (93 percent of students enroll by September 2004), students leave college at all points within our window of analysis. Of the nearly 1,400 students who comprise the dropout population, 8.9 percent in fact are still enrolled in college at the censoring point of the data (see Table 2). On the whole, these patterns are very similar to those we observe for black and white students.

3 Notable Differences in Results

Hispanic students historically have been less likely to enroll in four-year college than black students (Bowen et al. 2009). The gap has lessened recently (Snyder et al. 2016), but it remains present in the ELS data. At the point of selection into four-year college, the gap in entry rates between UM and white students is notably larger than that between black and white students (16 percentage points as compared to 11; the entry rate for UM students is 32 percent as compared to 37 percent for black students and 48 percent for white students).

Second, Hispanic students respond to their pre-college distribution of resources more similarly to white students than to black students at the point of college entry (see Table 3 and Figure 1, panel B). If UM students entered college in the same way as white students, the entry rate only would fall by one percentage point, from 32 to 31 percent of UM high school graduates. Instead, the distribution of pre-college resources serves as a much more important reason for the UM-white gap in four-year college entry (a Fairlie decomposition providing further support for this finding is available by request). In short, while Hispanic students' *response* to their pre-college resources more closely resembles white students' when it comes to college dropout, their actual *distribution* of pre-college resources is more similar to black students'. The net result is a more moderate impact of paradoxical persistence on the BA completion and attainment gaps: though the UM dropout rate is higher than it would be if UM students entered college in the same way

as white students (46.8 percent versus 45.9 percent), thereby slightly expanding the BA completion gap, this difference at the point of college entry increases the BA attainment rate among UM students from the counterfactual rate of 16.6 percent to the actual rate of 17.1 percent. This increase in turn lowers the BA attainment gap by 3 percent.

Third, when examining the matching process between UM students and college quality destinations, Hispanic students again appear more similar to white students than to black students in their enrollment decisions (see Figure 2). Specifically, Hispanic students' college quality destinations are more aligned with their pre-college dropout risk than black students, a pattern we also observe for white students. That said, the actual distribution of college quality destinations in fact more closely resembles that of black students, leading to similar impacts of the role of matching and college quality on the overall UM-white BA gap as we observed for the black-white BA gap.

Fourth and finally, turning to UM students' experiences while attending four-year college, we mainly find large similarities in the results for UM students as compared to black students. However, in evaluating why UM students might achieve lower college grades than white students, we do not find that college quality plays as much of a role for the combined black and Hispanic students as we do for black students alone (see Table 12). Instead, differences in the distribution of high school grades between UM and white students serve as the main driver of the GPA differential in college.

4 Tables and Figures

Table 1: Distribution of Student Departure by Year Among Non-Completers

	Percent of Student Dropouts
June 2005	12.6
June 2006	13.8
June 2007	9.7
June 2008	9.1
June 2009	9.9
June 2010	7.8
June 2011	8.8
June 2012	8.0
June 2013	11.4
Still Enrolled	8.9
All non-completers	100.0

Source: ELS 2012 & postsecondary transcript data.

Table 2: Fairlie Decomposition of the Proportion of the Dropout Gap Explained by Pre-College Factors

	Descriptive Data
UM dropout rate	0.468
White dropout	0.254
Difference	-0.214
	Amount Explained by Factors & Variables
Female	0.0006
Pre-College SES & Family Composition	-0.02
Pre-College Academic Performance	-0.10
Pre-College Curricular Risk	-0.03
Attitudes towards College & Career	-0.001
Connection to Home	-0.03
Total Explained	-0.17 (79%)

Note: The decomposition is performed using UM students as the reference group and factors and variables are inserted into the decomposition randomly to ensure robustness of results. However, results are similar regardless of which group (UM, white, or pooled) serves as the reference and of whether variables are inserted randomly or not.

Source: ELS 2002, 2004, 2012 & postsecondary transcript data.

Table 3: Four-year College Entry Model, By Racial Group

	UM ($n=3,280$)		White ($n=7,410$)	
	<i>Coef.</i>	<i>Std.</i> <i>Err.</i>	<i>Coef.</i>	<i>Std.</i> <i>Err.</i>
Female	-0.13	0.104	-0.20*	0.086
Age	-0.26*	0.105	-0.18***	0.051
Income \$35-\$50K	0.19	0.138	0.09	0.123
Income \$50-\$75K	0.26	0.152	0.25*	0.122
Income \$75-\$100K	0.84***	0.183	0.29*	0.142
Income > \$100K	0.49*	0.211	0.51**	0.151
Parents Married	0.02	0.165	0.001	0.180
Dad Present	-0.32	0.169	-0.42*	0.191
Mother's Ed: College or More	-0.01	0.114	0.11	0.089
Father's Ed: College or More	0.28*	0.112	0.36***	0.089
HS GPA: Mid-Group	0.06	0.128	0.43***	0.111
HS GPA: Highest Group	0.37**	0.136	0.88***	0.108
HS Curric: Intense	0.32	0.181	0.13	0.153
HS Curric: Less Intense	-0.01	0.147	0.023	0.116
HS Curric: Least Intense	-0.43*	0.168	-0.50***	0.128
Academic Risk: One Risk Factor	-0.20	0.131	-0.21*	0.091
Academic Risk: Two or More Risk Factors	-0.17	0.159	-0.38**	0.136
Talk to Parents about Courses: Sometimes	0.06	0.131	0.04	0.104
Talk to Parents about Courses: Often	0.04	0.145	0.12	0.125
Hours per Week on Homework	0.01	0.028	0.03	0.026
Hours per Week on Extracurriculars	0.02	0.028	0.04	0.023
College Financial Aid Offered	1.27***	0.102	0.82***	0.086
Highest Selectivity of College Acceptance: Moderate	1.46***	0.120	1.86***	0.099
Highest Selectivity of College Acceptance: Most	1.84***	0.163	1.93***	0.125

Table 3: Four-year College Entry Model, By Racial Group

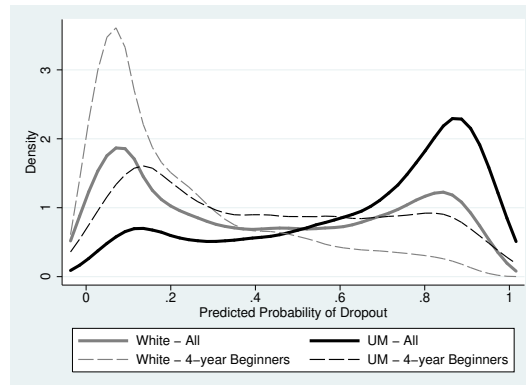
Expects blue-collar job	-0.12	0.147	-0.44***	0.110
Expects white-collar job	0.22	0.120	0.09	0.096
Importance of Getting Away: Somewhat	0.05	0.112	-0.04	0.092
Importance of Getting Away: Very	-0.11	0.135	0.06	0.111
Importance of Making Money: Somewhat	0.23	0.187	0.14	0.117
Importance of Making Money: Very	0.32	0.190	0.06	0.134
Importance of College Reputation: Somewhat	0.23	0.188	0.69***	0.131
Importance of College Reputation: Very	0.52**	0.182	0.79***	0.133
Importance of College Racial Comp.: Somewhat	0.12	0.118	0.12	0.092
Importance of College Racial Comp.: Very	0.15	0.137	-0.05	0.156
Importance of Easy Admission Policy: Somewhat	-0.22	0.130	-0.02	0.098
Importance of Easy Admission Policy: Very	-0.51**	0.150	-0.08	0.134
Importance of Living at Home: Somewhat	-0.29*	0.125	-0.43***	0.105
Importance of Living at Home: Very	-0.40**	0.132	-0.07	0.109
Hours worked per week in HS: 25 hours or less	0.14	0.110	0.12	0.090
Hours worked per week in HS: More than 25 hours	0.04	0.136	-0.10	0.120
Frequency of Hanging Out with Friends: Most days	0.02	0.132	0.22	0.147
Frequency of Hanging Out with Friends: Everyday	-0.12	0.136	0.14	0.145
Number of Friends Dropped out of High School	-0.12	0.073	-0.16*	0.063
Constant	-2.19***	0.390	-2.10***	0.320
Actual Predicted Entry Rate (percentage)	0.32	0.006	0.48	0.005
Counterfactual Predicted Entry Rate (percentage)	0.31	0.007	0.47	0.011

Note: Coefficients reported as effects on log odds; *** $z < .001$ ** $z < .01$ * $z < .05$.

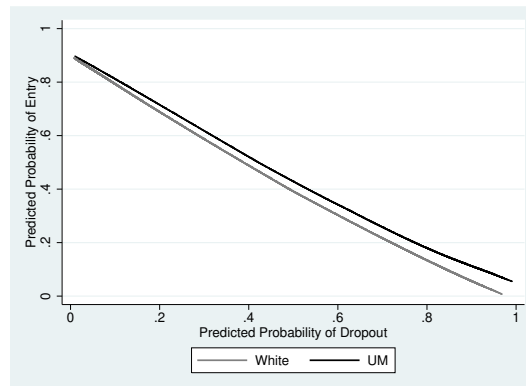
Source: ELS 2002, 2004, 2012 & postsecondary transcript data.

Figure 1: Dropout Risk and College Entry

A. The Distribution of Dropout Risk for High School Graduates and Four-year Beginners



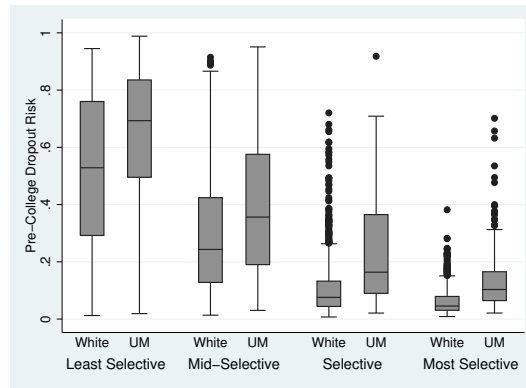
B. Entry Probability by Dropout Risk for Underrepresented Minorities and White High School Graduates



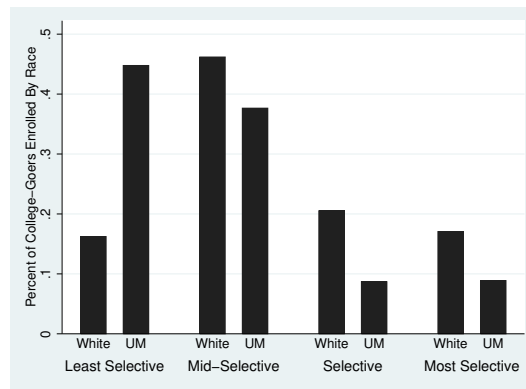
Source: ELS 2002, 2004, 2012 & postsecondary transcript data.

Figure 2: Entry Decisions and College Selectivity

A. College Entry by Pre-College Dropout Risk and Selectivity



B. Percent of College-Goers Enrolled in College Selectivity Categories, by Racial Group



Sources: ELS 2002, 2004, 2012 & postsecondary transcript data; Barron's Profile of American Colleges, 2016.

Table 4: Effects of College Quality on Dropout Given Race and Dropout Risk

	Model 1: White Students ($n=3,520$)		Model 2: UM Students ($n=1,060$)		Model 3: Combined ($n=4,580$)		Model 4: Combined, Including Interactions ($n=4,580$)	
	<i>Coef.</i>	<i>Std. Err.</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>Coef.</i>	<i>Std. Err.</i>
UM	—	—	—	—	0.07	0.113	0.21	0.212
Female	-0.04	0.114	-0.07	0.188	-0.05	0.098	-0.05	0.097
Dropout Risk	4.87***	0.298	4.28***	0.423	4.70***	0.247	4.87***	0.298
College Quality	-0.61***	0.124	-0.30	0.183	-0.54***	0.102	-0.63***	0.124
College Quality * Dropout Risk	0.61	0.351	-0.58	0.429	0.23	0.270	0.66	0.346
UM * Dropout Risk	—	—	—	—	—	—	-0.61	0.350
UM * College Quality	—	—	—	—	—	—	0.31	0.220
UM * Dropout Risk * College Quality	—	—	—	—	—	—	-1.19*	0.554
Constant	-2.55***	0.123	-2.31***	0.228	-2.52***	0.107	-2.54***	0.116

Note: Results reported as effects on log odds; standard errors reported below for two-tailed tests;

*** $z < 0.001$ ** $z < 0.01$ * $z < 0.05$.

Sources: ELS 2002, 2004, 2012 & postsecondary transcript data; Barron's Profile of American Colleges, 2016; IPEDS, 2004-2009.

Table 5: Four-year Dropout Given Pre-College, Institution-Level, and College Experience Factors ($n=4,580$)

	<i>Coef.</i>	<i>Std. Err.</i>
<i>Demographics</i>		
UM	0.41	0.391
Female	0.31*	0.143
UM*Female	-0.11	0.268
<i>Pre-college Variables</i>		
Pre-College Academic Performance Factor	-0.31**	0.098
Pre-College Curricular Risk Factor	0.22**	0.081
Pre-College Family Structure & SES Factor	-0.12	0.079
Pre-College Connection to Home	0.16*	0.079
Pre-College Attitudes towards College & Career	-0.07	0.077
UM*Pre-College Academic Performance	0.10	0.268
UM*Pre-College Curricular Risk	-0.39*	0.165
UM*Pre-College Family SES	-0.07	0.135
UM*Pre-College Connection to Home	0.13	0.157
UM*Pre-College Attitudes	-0.07	0.133
<i>Institution-level Variables</i>		
College Quality Factor	-0.69***	0.109
College Curricular Experience Factor	0.02	0.104
College Financial Support Factor	0.11	0.095

Table 5: Four-year Dropout Given Pre-College, Institution-Level, and College Experience Factors ($n=4,580$)

College Location Factor	-0.01	0.083
Percent White	-0.07	0.126
Percent Black	-0.51**	0.177
UM*College Quality	-0.28	0.227
UM*College Curricular Experience	0.10	0.221
UM*College Financial Support	-0.13	0.152
UM*College Location	-0.23	0.154
UM*Percent White	0.21	0.184
UM*Percent Black	0.63**	0.207
<i>College Experience Variables</i>		
College GPA	-1.22***	0.115
College Curricular Risk Factor	0.45***	0.083
College Academic Integration Factor	-0.13	0.078
College Social Engagement Factor	-0.61***	0.090
STEM	-0.83***	0.199
Arts, Humanities & Social Science	-0.83***	0.205
Business, Education & Trades	-1.23***	0.179
Live at Home with Parents	0.37*	0.173
Live on Campus	-0.07	0.175
UM*College GPA	-0.44*	0.210
UM*College Curricular Risk	-0.19	0.135
UM*Academic Integration	0.03	0.147
UM*Social Engagement	0.17	0.168
UM*STEM	0.15	0.362
UM*Arts, Humanities & Soc. Sci.	-0.70	0.416

Table 5: Four-year Dropout Given Pre-College, Institution-Level, and College Experience Factors ($n=4,580$)

UM*Business, Education & Trades	0.03	0.357
UM*Live with Parents	-0.11	0.340
UM*Live on Campus	-0.72*	0.352
Constant	-1.10***	0.183

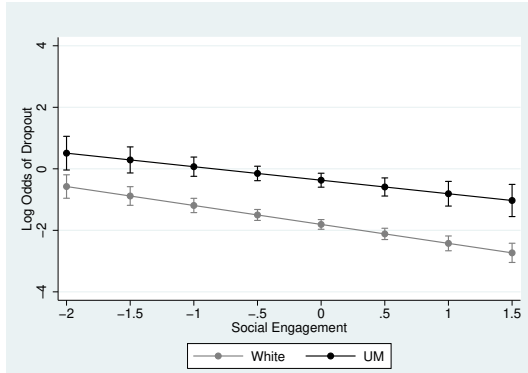
Notes: Results reported as effects on log odds;

*** $z < 0.001$ ** $z < 0.01$ * $z < 0.05$.

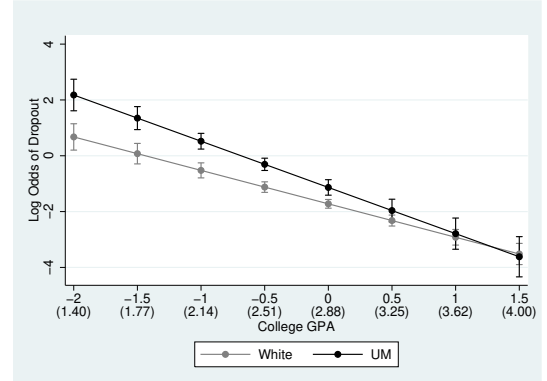
Sources: ELS 2002, 2004, 2006, 2012 & postsecondary transcript data; Barron's Profile of American Colleges, 2016; IPEDS, 2004-2009.

Figure 3: Predicted UM and White Dropout Rates Given Social Engagement and Academic Achievement

A. Social Engagement

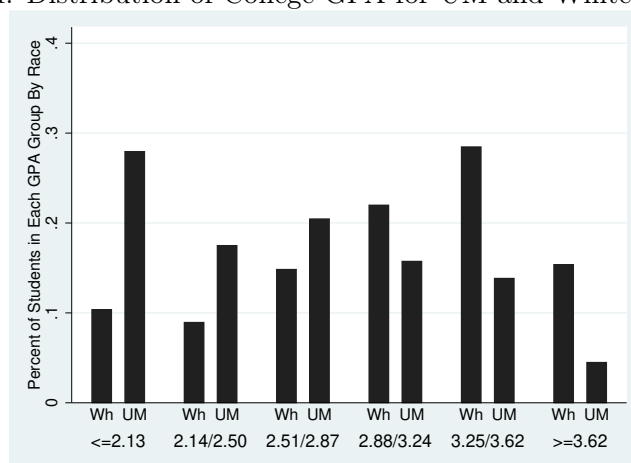


B. Academic Achievement



Sources: ELS 2002, 2004, 2006, 2012 & postsecondary transcript data; Barron's Profile of American Colleges, 2016; IPEDS, 2004-2009.

Figure 4: Distribution of College GPA for UM and White Students



Source: ELS 2006, 2012 & postsecondary transcript data.

Table 6: Fairlie Decomposition of the Proportion of the Dropout Gap Explained by Pre-College, College-level, and College Experience Factors and Variables ($n=4,580$)

	Descriptive Data
UM dropout rate	0.468
White dropout	0.254
Difference	-0.214
	Amount Explained by Factors & Variables
Female	-0.002
Pre-College SES & Family Composition	-0.01
Pre-College Academic Performance	-0.02
Pre-College Curricular Risk	-0.02
Pre-College Attitudes towards College & Career	0.004
Pre-College Connection to Home	-0.008
College Quality	-0.02
College Curricular Experience	-0.0008
College Financial Support	0.0008
College Location	0.0004
College Percent Black	0.05
College Percent White	-0.007
College Academic Achievement (GPA)	-0.10
College Curricular Risk	-0.03
College Academic Integration	0.002
College Social Engagement	-0.03
STEM Major	0.002
Arts & Humanities Major	-0.006
Business Major	-0.007
Living at Home	-0.007
Living on Campus	-0.0006
Total Explained	-0.19 (90%)

Note: The decomposition is performed using UM students as the reference group and variables are inserted into the decomposition randomly to ensure robustness of results. However, results are similar regardless of which group (UM, white, or pooled) serves as the reference and of whether variables are inserted randomly or not.

Sources: ELS 2002, 2004, 2012 & postsecondary transcript data; Barron's Profile of American Colleges, 2016; IPEDS, 2004-2009.

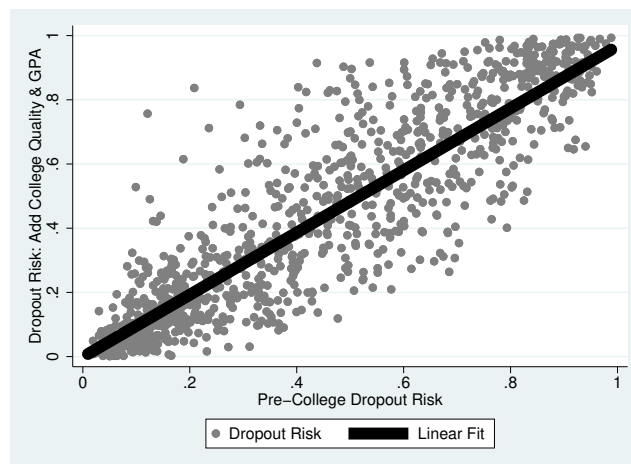
Table 7: The Effect of Race, Pre-College Factors, and College Quality on College GPA ($n=4,580$)

	<i>Coef.</i>	<i>Std. Err.</i>
UM	-0.36***	0.044
Female	0.30***	0.030
Pre-College Academic Performance Factor	0.34***	0.023
Pre-College Academic Risk Factor	-0.06**	0.018
Pre-College Family Structure & SES Factor	0.04*	0.017
Pre-College Orientation towards Home Factor	-0.04*	0.019
Pre-College, College Expectations Factor	-0.09***	0.018
College Quality	0.03*	0.015
Constant	-0.14***	0.026

*Note: Results reported as effects on log odds; *** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$.*

Sources: ELS 2002, 2004, 2006, 2012 & postsecondary transcript data; Barron's Profile of American Colleges, 2016; IPEDS, 2004-2009.

Figure 5: Pre-College versus Post-College-Entry Risk Distributions



Sources: ELS 2002, 2004, 2006, 2012 & postsecondary transcript data; Barron's Profile of American Colleges, 2016; IPEDS, 2004-2009.

References

- Alon, Sigal. 2015. *Race, Class, and Affirmative Action*. New York, NY: Russell Sage Foundation.
- Bowen, William G, Matthew M Chingos, and Michael S McPherson. 2009. *Crossing the finish line : completing college at America's public universities*. Princeton, N.J.: Princeton University Press.
- Carter, Deborah Faye. 2006. "Key issues in the persistence of underrepresented minority students." *New Directions for Institutional Research* 2006:33–46.
- Charles, Camille Z., Mary J. Fischer, Margarita A. Mooney, and Douglas S. Massey. 2009. *Taming the River: Negotiating the Academic, Financial, and Social Currents in Selective Colleges and Universities*. Princeton, N.J.: Princeton University Press.
- Lavin, David E. and David B. Crook. 1990. "Open Admissions and Its Outcomes: Ethnic Differences in Long-Term Educational Attainment." *American Journal of Education* 98:389–425.
- Light, Audrey and Wayne Strayer. 2002. "From Bakke to Hopwood: Does Race Affect College Attendance and Completion?" *Review of Economics and Statistics* 84:34–44.
- Rendón, Laura I., Romero E. Jalomo, and Amaury Nora. 2000. "Part II: New Theoretical Directions: Theoretical Considerations in the Study of Minority Student Retention in Higher Education." In *Reworking the Student Departure Puzzle*, pp. 125–156. Vanderbilt University Press.
- Snyder, Thomas D., Cristobal de Brey, and Sally A. Dillow. 2016. "Digest of Education Statistics 2014." Technical report, U.S. Department of Education.