The Role of Postsecondary Institutional Urbanicity in College Persistence

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Students from rural areas are less likely than their urban or suburban counterparts to attend college (Adelman, 2002; Hu, 2003). Although theorists have postulated that institutional urbanicity directly affects college student outcomes (Berger & Milem, 2000), few, if any empirical studies have examined the relationship between an institution's urbanicity and the outcome of individual student persistence. This study employs multilevel modeling to examine the effect of attending a rural institution on individual student persistence. We find persistence does not differ by residential location; however, student level characteristics vary greatly by the location of the four-year institution attended. Additionally, several of the institutional level characteristics, including other structural, peer, and financial organizational factors, as well as local economic conditions, have an independent effect on individual student persistence. These characteristics vary significantly depending on if the institution is located in a rural, suburban, or urban location.

Introduction

An abundant literature exists on the multifaceted determinants of college persistence or departure in the United States (Braxton & Hirschy, 2005). Most literature highlights the important effects of demographic and individual characteristics of students, family background, high school preparation, college experiences, and institutional characteristics on persistence and degree attainment (Tinto, 2005). However, while some research has addressed the postsecondary outcomes of students who grew up in rural areas or attended rural high schools, little, if any, research has focused on the college persistence patterns of students based on the location (rural-urban) of the institution attended. This may partly be due to lack of available data to answer this question.

Research on the differences in postsecondary educational outcomes for students from rural areas, compared to those from other residential locations, has found that students from rural areas are less likely to: (a) attend college than their urban or suburban peers (Adelman, 2002; Hu, 2003), (b) choose highly selective colleges than their urban and suburban counterparts with similarly high levels of academic achievement (Holsapple & Posselt, 2010), and (c) complete college degrees at the same rate as non-rural students (Byun, Meece, & Irvin, 2012). However, students from rural areas who do make it to 4-year institutions appear to persist at similar rates as their peers from metro areas (Byun, Irvin, & Meece, 2012), indicating rural students may not face a disadvantage for college persistence compared to their urban and suburban counterparts. Some research indicates college enrollment patterns for rural racial/ethnic minorities, particularly Hispanics compared to non-Hispanic Whites, differ based on residential location (O'Connor, Hammack, & Scott, 2010).

Theorists have posited that postsecondary institutional location (in terms of factors like urbanicity) independently affects postsecondary persistence above and beyond individual level characteristics as a set of structural demographic characteristics important to the persistence process (Berger & Milem, 2000). Yet, little, if any, research has empirically tested if attending an urban, suburban, or rural postsecondary institution plays an independent role in persistence *after* students enroll in college. While longitudinal research on high school students has focused on the effects of a student's rural origins (heretofore called student urbanicity) on postsecondary outcomes, minimal college impact research (Pascarella & Terenzini, 2005) has examined the role of postsecondary institutional location (heretofore called institutional urbanicity) in affecting persistence.

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This study broadens the research literature on persistence because it examines the association of institutional urbanicity as one structural demographic institutional characteristic on individual college student persistence, within six years of when students enroll. Second, this research tests to see if the correlates of individual student persistence operate in a similar fashion for students in different institutional locations (rural, urban, suburban), controlling for other individual and structural demographic institutional characteristics. The research to date on the role of institututional location in postsecondary attainment has either: (a) described gaps in postsecondary educational attainment between residents of urban and rural areas or (b) explored how the residential location where students live during high school in terms of urbanicity influences their college aspirations, enrollment, and persistence. Although a holistic perspective on the relationship between postsecondary institutional factors and student outcomes recognizes the potential role of postsecondary institutional urbanicity in student persistence (Berger & Milem, 2000), the relationship between postsecondary institutional urbanicity and persistence has not, to our knowledge, been tested. Taken together, the focus of this research provides one of the first quantitative assessments of college student persistence based on institutional urbanicity using a unique nationally representative data source. We further argue that rural origin effects may operate through individual and demographic background characteristics to influence student persistence in addition to the location of the university attending. (See Appendix A.)

The research questions guiding this study are: What are the differences in the background characteristics and college experiences of students attending urban, suburban, and rural institutions? Is there a relationship between a postsecondary institution's urbanicity and an individual student's college persistence, when controlling for other critical individual and structural demographic institutional covariates?

Theoretical Perspectives on Institutional Characteristics and College Persistence

Tinto (1975, 1982, 1993) presented a combined approach using theories that has been termed the interactionalist theory of college student departure, which has dominated as the theoretical perspective when studying persistence or student retention (Braxton, 2000). In this theory, individual characteristics—such as a student's family background and socioeconomic status, academic preparation, and individual ability—combined with institutional commitment and characteristics, influence a student's decision to persist once enrolled. A student's integration at college is also theorized to influence persistence. Integration involves feeling a sense of membership in the university and engaging in academic and social behaviors congruent with norms in the institutional culture (Tinto, 1993). Academic and social integration work together to build the student's commitment to the institution, and higher levels of institutional commitment and personal commitment to degree attainment increase the likelihood of persistence.

Mixed empirical results regarding the influence of integration on persistence (Braxton & Lien, 2000; Braxton, Sullivan, & Johnson, 1997) have raised at least three limitations for this theoretical approach. One is the limited attention given to economic considerations for persistence, such as financial aid and work commitments (Chen, 2008; Nora, 1987; St. John, Paulsen, & Starkey, 2000). Another is that theory of integration, like many other theories of persistence, does not speak extensively to the role of non-college factors, such as the influence of family members and friends from outside of college, on persistence (Nora, 2001-2; Pascarella & Terenzini, 2005). These non-college factors could include the contextual influence of local socioeconomic conditions based on institutional rurality. Finally, integration theory gives limited attention to the role of demographic factors like race/ethnicity in shaping the meaning of integration, particularly for students from groups historically underrepresented in higher education (Rendon, Jalomo, & Nora, 2000).

Despite these limitations, Tinto's interactionalist theory has operated, in essence, as a "near-paradigmatic" theory (Braxton, 2000, p. 257), guiding higher education research on persistence (Wolf-Wendel, Ward, & Kinzie, 2009). Thus, it is important to consider how this theory, largely at the individual level, applies to how attending an institution in a rural area could influence the persistence process. For example, students attending rural institutions could have differing patterns of persistence compared to students attending urban or suburban institutions, if they are more or less engaged in campus life. Students at rural institutions could be more geographically concentrated due to limited housing options in the local area other than campus based housing, and this condition could enhance their ability to make academic and social connections on campus. If students attending rural institutions have differential knowledge about opportunities to engage in academic and social activities on campus, they may face different persistence outcomes relative to their urban or suburban peers. It is important to consider whether factors like attending an institution in a rural area, having less access to social capital, seeing fewer opportunities of turning a college degree into employment opportunities, and coming from lower socioeconomic backgrounds affect persistence. These mechanisms, largely reflective of difference in individual demographic and background characteristics of rural, urban, and suburban students may partly explain differences in student persistence.

While Tinto's theory does little to discuss the role of social capital on student persistence, Weidman's (1989) theory of undergraduate socialization, which addresses students' relationships with agents outside of college, implies that geographic context is important in shaping persistence. While such relationships could support persistence, they could also hinder persistence by posing attitudes or additional responsibilities—otherwise known as "environmental pull" factors (Nora, 2004)—that conflict with engagement in and completion of college. These factors might include the number of jobs in a rural area that require a college degree, overall local labor market conditions, and support, both financial and non-financial, from family. However, it is not known how attending college in urban or rural settings could affect the role of the environment external to the college on persistence, particularly if students do not plan to stay in the area where they attend college.

In their comprehensive theory of the impact of organizational culture and behavior on persistence, Berger and Milem (2000) are among the few scholars to specify an institution's location (urban or rural) as a potential independent influence on persistence over and above individual level attributes. Berger and Milem (2000) build on Tinto's interactionalist theory by proposing a multilevel theoretical model that incorporates structural and demographic institutional characteristics, as well as individual characteristics, on student outcomes known as the theory of systematic organizational behavior (Titus, 2004, 2006a; Titus, 2006b). These structural and demographic institutional characteristics include geographic location and other structural demographic characteristics such as private or public status, institutional size, selectivity, and racial diversity. However, while the role of students' urbanicity background has been examined in college persistence (e.g., Byun, Irvin, et al., 2012; Byun, Meece, et al., 2012; Yan, 2002), the role of institutional urbanicity has not, to our knowledge, been addressed in depth in empirical studies of student persistence.

Longitudinal research to date has focused on the role of students' urbanicity backgrounds in persistence, rather than the role of institutional urbanicity in persistence. Furthermore, the studies that address the role of students' high school urbanicity backgrounds largely overlook the role of critical structural demographic higher education institutional characteristics and college experiences known to significantly affect student persistence (e.g., (Astin, 1993; Pascarella & Terenzini, 2005). Examining the role of institutional urbanicity and structural demographic institutional characteristics and college experiences is critical to inform a more holistic understanding of college student persistence. Understanding the role of institutional characteristics and college experiences can inform policies and practices to support college students' persistence and degree attainment, which is a critical policy imperative given the Obama administration's goal to raise U.S. postsecondary attainment levels to prior levels (Kelly, Schneider, & Carey, 2010).

Based on these theoretical perspectives and existing research on persistence, we posit that the location of an institution should have an association with a student's persistence. This is because location impacts many of the factors (economic capital, social capital, academic and social integration, intentions, human capital and academic preparation) that can be associated with individual persistence. As such, this study addressed three research questions. First, what are the differences between students at urban, suburban, and rural institutions, in terms of: (a) sociodemographic characteristics, (b) environmental pull factors, (c) students' on or off campus residence characteristics in college, (d) academic experiences and involvement, and (e) social experiences? Second, what are the differences between urban, suburban, and rural institutions, in terms of: (a) structural demographic characteristics, (b) student peer characteristics, and (c) local demographic factors? Third, controlling for these student and institutional factors, is an institution's urban, suburban, or rural location associated with student persistence?

Methods

Data Source

Data used for this analysis come from the 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09), sponsored by the National Center for Education Statistics of the U.S. Department of Education. The BPS Longitudinal Study is unique in that it follows first-time beginning college students at two and four year institutions starting in the 2003-2004 academic year and their educational experiences as they interact with the postsecondary education system to document persistence, degree completion, and workforce entry for six years after first enrollment through the 2008-2009 academic year. Another advantage of this data source is it follows students that entered a postsecondary institution during the 2003-04 academic year, regardless of when they completed their high school degree, which makes this data source different than many postsecondary surveys that focus on students right out of high school entering selective institutions.

Information from respondents was gathered about the following areas: (a) enrollment patterns, (b) employment status, (c) financial status, and (d) demographic, family and background characteristics. Data from the Integrated Postsecondary Educational Data System (IPEDS) also provided information about institutional characteristics. Approximately 9,100 students attending four-year

institutions constitute the sample for this analysis. Due to the complex survey design of BPS:04/09, corrections must be made when calculating any test statistic. These methods are discussed more fully below.

In addition to the individual and institutional level variables taken from BPS:04/09, a unique data set was created by merging American Community Survey (ACS) data with BPS based on the county where the institution attended was located. This new dataset allowed us to also explore the associations between local demographic factors and individual student persistence as a way to better contextualize the local demographic conditions where rural, urban, and suburban institutions are housed. To capture local demographic characteristics, we used two county level measures from the ACS data for each institution, including the county unemployment rate and the percentage of the county population with a college degree or a higher education level among adults 25 years of age and older.

Variables

Student persistence served as the dependent variable in this analysis. Persistence was measured by whether a student was still enrolled or obtained a degree within six years of beginning college. Students still enrolled that had attained a degree (bachelor's or associate's degree) or not were considered persisters and given a value of 1 for the dichotomous dependent variable in this analysis. Students not currently enrolled and had not obtained a degree were given a value of 0 for this variable.

Independent variables at the individual level were grouped into five sets of characteristics for each student: *demographic and background characteristics*, *environmental pull factors*, *residence characteristics*, *academic experiences* in college and *social experiences* in college. Six measures were used to capture a student's demographic and background characteristics: (a) race/ethnicity, (b) gender, (c) age at first enrollment, (d) income, (e) parental educational level, and (f) immigration status.

The environmental pull factors concerned the role of finances and employment in students' college experiences. These factors included whether or not students: (a) had any financial assistance from parents, (b) received any financial aid, and (c) worked full-time or part-time. The student's residence characteristics included whether a student: (a) indicated choosing the college for the location, (b) attended an institution 150 miles or more from home, and (c) lived on or off campus during college.

Academic experiences were measured by whether a student delayed college enrollment by one year, and whether a student declared a major in the first year. Academic integration—a composite measure of participation in study groups, talking with faculty outside of class, meeting with an academic advisor about plans, and social contact with faculty members outside of class—was another measure of academic experiences. College GPA was also included as a measure of academic performance, reflecting academic experiences.

Social experiences included participation in community service, as well as a measure of social integration. The social integration measure was a composite of how often the student reported: (a) attending fine art activities on campus, (b) participated in intramural or varsity sports, and (c) participated in social clubs.

Variables at the institutional level were classified into structural demographic characteristics, student peer characteristics, and local demographic factors. Structural demographic characteristics included: (a) residential location of the institution in terms of urbanicity, (b) public or private institutional sector, and (c) enrollment size. Student peer characteristics included institutional selectivity and percentage enrollment of students of color (as described in BPS codebook) enrolled. Local demographic factors included both the unemployment rate and the collective education level of the county in which the institution was located. More details on how these variables were operationalized can be found in Appendix A.

Analytic Strategy

First, potential differences in the distribution of all individual level variables by residential status of institutions (urban, suburban, or rural) were assessed using chi-square tests for equal distributions. As previously mentioned, the complex survey design of BPS:04/09 requires the use of statistical adjustments in calculating the chi-square statistic; therefore the SURVEYFREQ procedure in SAS 9.2 was used to calculate the likelihood ratio chi-square statistic with design correction based on the design effects (stratification and clustering of data collection) of the proportion. Second, chi-square or f-tests for differences were estimated for the institution level variables based on the location of the institution. Lastly, hierarchal generalized linear mixed (HGLM) models were estimated in a nested manner that modeled the odds of a student persisting. The PROC GLIMMIX procedure in SAS 9.2 was used to estimate these models by first testing for the association between institutional location and student persistence to see if significant variance existed in the outcome across institutions.

The first multilevel model included all individual level covariates detailed above, while the full model incorporated all individual and institutional level covariates. Since students are nested within postsecondary institutions, the assumption of independence of observations is violated. Therefore a hierarchical model is necessary to account for

the nested structure of the data (Raudenbush & Bryk, 2001). All continuous measures at the institutional level were centered around their grand mean to ease interpretation. This approach allowed us to test the question: does the location of an institution have an independent effect on an individual student's persistence, once controls for other individual and institutional covariates are accounted for in the model? Results from these models are generalizable to first-time beginning students that enrolled in 4-year colleges and universities during the 2003-2004 academic year.

Limitations

Limitations to this research deserve some discussion. First, the BPS dataset does not include information about whether the students themselves come from rural areas, although we were able to measure whether the student attended an institution at least 150 miles from home. More generally, data are needed that provide both individual student and institutional location. However, we think many of the individual level demographic and background characteristics used in the analysis capture origin effects that reflect whether a student lived in a rural, urban or suburban area prior to entering a four-year institution. Second, although BPS includes more information about non-traditionally aged students, it also contains fewer pre-college measures and measures of family social capital before or during college. Such measures are more available in data sets like the Educational Longitudinal Study, which only sample traditionally aged students, tracking students from high school to college. Our research, however, brings to light the experiences of a broader range of college students than is normally considered in such research, particularly the experiences of non-traditional students. Third, we do not have a measure of direct costs associated with attending college, which might present a real barrier for low-income students. Further some confounding may be present with the use of measures of parental financial assistance and financial aid receipt in the models. Fourth, data used here are cross-sectional, and we cannot establish any type of causal relationships with the data and models used. We are cautious in our interpretation to only imply correlation not causation. Lastly, we include a succinct set of structural demographic variables at the institutional level in order to look specifically at the associations between institutional location and individual student persistence. We are worried about potential issues of endogeneity by including structural measures of student peer climate or learning climate like other models building on the theories discussed since we do not variables for these types of measures from a prior time period available in the data source. Future research can include more institutional level covariates, such as those related to organizational behavior and financial context (Titus, 2006a, 2006b) or peer institutional retention climate (Oseguera & Rhee, 2009).

Finally, our study examines student persistence within a six-year time frame. It is possible that these predictors could vary in the study of longer-term persistence outcomes, particularly as the time-to-degree for students may be increasing, due to factors such as reductions in classes offered (particularly at public institutions seeing budget cuts) and an increased need for students to work while in college, because of increasing tuition and limited financial aid. Tracking these students for a longer time could enable further exploration of this topic, but a future wave is not currently planned. Adding additional waves of data collection could better address the experiences of students taking a longer time to finish.

Results

Individual Level Characteristics

Roughly 80 percent of students starting their postsecondary education during the 2003-2004 academic year were still enrolled or had obtained a degree by June 2009 in the urban, suburban, and rural institutions represented in the study. There were no significant differences among institutions in different locations with respect to the percentage of students who persisted, indicating students attending a rural institution were not at a disadvantage for persistence or degree completion (Table 1). However, statistically significant differences were noted for several of the demographic characteristics, high school preparation, college performance, environmental pull factors, and college experiences based on the location of the institution. Racial/ethnic differences were also noted among the students enrolled in different institutional locations. White students were more likely to attend rural compared to urban or suburban institutions, while Hispanic students were more likely to attend urban institutions compared to suburban or rural institutions. Students of color had very low levels of representation in rural institutions, compared with urban and suburban institutions.

More first-generation immigrant students attended urban (14%) than suburban (11%) or rural (6%) institutions. A student's income varied based on the location of the institution attended. The majority of students across institutional settings had high GPAs and had declared a major during their first year. There were no differences by institutional location with regard to the measures of academic experiences. Although most students reported that the location of the college was very important to them in choosing a college, more students attending urban institutions than rural institutions indicated location as an important factor in this choice.

Table 1

Weighted Percentages of Student Characteristics of First-Time, Beginning College Students by Residential Location, Beginning Postsecondary Students Longitudinal Study 2004-2009 (BPS: 04/09), n~9,100

Variables	Urban Institution (n~5,250)	Suburban Institution (n~2,050)	Rural Institution (n~1,800)
Still Enrolled or Completed Degree in 2009 Academic Year			
Yes	80.26	78.68	80.21
No	19.74	21.32	19.79
Demographic Characteristics			
Gender			
Male	43.54	43.27	46.02
Female	56.46	56.73	53.98
Race/Ethnicity ***			
Non-Hispanic White	62.50	68.73	82.12
Hispanic	13.49	9.58	2.90
Non-Hispanic Black	11.76	10.21	7.54
Asian	6.86	6.10	2.72
Other/Multiple Races	5.39	5.38	4.72
Age at First Enrollment			
19 or Younger	84.78	85.78	86.97
20-23	6.95	5.14	6.71
24 or Older	8.27	9.08	6.32
Income Quartile **			
Low Income	21.89	16.89	18.31
Low-mid Income	23.13	24.25	23.16
High-mid Income	23.58	27.41	28.73
High Income	31.40	31.45	29.80
Parent's Level of Education			
High School Diploma or Less	27.98	29.39	25.74
Some College	17.58	18.37	19.41
College Degree or More	54.44	52.24	54.85
Immigration Status ***			
First Generation	14.28	11.12	5.99
Second Generation	2.75	3.06	2.24
Third Generation	82.97	85.82	91.77
Environmental Pull Factors			
Student Received Financial Aid			
Yes	74.70	72.94	73.18
No	25.30	27.06	26.82
Financial Assistance from Parents			
Financially Independent	11.94	11.51	9.96
No Financial Support from Parents	10.73	8.14	10.81
Some Financial Support from Parents	77.33	80.35	79.23
Work Status Outside of School †			
Full-Time	11.87	14.05	8.81
Part-Time	39.66	42.47	38.99
No Job	48.47	43.48	52.20
Residence Characteristics			
Student Attended College for Location *			
Yes	77.26	76.21	72.38
No	22.74	23.79	27.62
Student Attended An Institution 150 or More Miles Away from Home ***			
Yes	29.18	25.66	40.49
No	70.82	74.34	59.51
Where Student Lived First Year of College ***			
On Campus	51.99	55.04	69.10
Off Campus	18.79	16.85	14.69
With Parents	23.31	23.19	9.72
Attended Multiple Campuses	5.91	4.92	6.49

Table 1 (continued)

Variables	Urban Institution (n~5,250)	Suburban Institution (n~2,050)	Rural Institution (n~1,800)
Academic Experiences			
Delayed Enrollment			
Yes	13.57	12.26	12.67
No	86.43	87.74	87.33
Declared A Major			
Yes	64.68	65.81	65.50
No	35.32	35.19	34.50
Academic Integration †			
No Academic Integration	5.34	3.97	5.03
Some Academic Integration	26.39	24.28	21.39
High Academic Integration	68.27	71.75	73.58
GPA			
3.5 or Better	73.08	74.39	74.93
3.49 or Below	26.92	25.61	25.07
Social Experiences			
Student Participated In Community Service †			
Yes	52.88	54.53	57.91
No	47.12	45.47	42.09
Social Integration **			
No Social Integration	32.56	31.62	23.41
Some Social Integration	19.58	18.00	19.50
High Social Integration	47.86	50.38	57.09

Weight: wta000; †$p \leq 0.10$; *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$ for differences across residential locations on the basis of χ^2 tests for equal distributions.

Significant differences based on the institution's location with respect to where a student lived during their first year were also noted. Students attending rural institutions were more likely to live on campus than their peers attending urban or suburban institutions. This corresponds to the finding that students at rural institutions were significantly more likely (40%) than those in urban (29%) or suburban (26%) institutions to report that they were attending an institution at least 150 miles from their home.

Students at rural institutions were significantly more likely than students attending urban institutions to report higher scores on academic integration. Students at rural institutions also reported higher levels of social integration than their peers at suburban institutions. This likely reflects the differences observed in where students lived during their first year of enrollment as just noted. Marginal differences were noted in work status based on the location of the institution attended. Students attending institutions in rural locations were less likely to work than students attending institutions in urban areas. These differences may speak to higher levels of persistence for students attending rural institutions compared to urban institutions.

Institutional Level Characteristics

Significant differences were also noted for all of the institutional level variables based on the location of the institutions (Table 2). Rural institutions (91%) were more likely to be public than suburban institutions (84%). Fewer students of color were enrolled in rural institutions, compared to urban or suburban institutions. Urban and suburban institutions enrolled about twice the proportion of students of color (27 and 22%, respectively) as rural institutions (13%). Enrollment size varied based on the location of the institution. Enrollments of 15,000 plus students were more representative of urban and suburban institutions compared to rural institutions, while small enrollment sizes were more common at rural institutions. Lastly, institutional selectivity varied based on the location of the institution. Fifteen percent of rural institutions were considered most selective, compared with 25% of both suburban and urban institutions, respectively. More than half (60%) of rural institutions, compared with 46% of urban and 57% of suburban institutions, were considered moderately selective. More rural institutions (17%) than urban (11%) or suburban (7%) were considered minimally selective, and there were few open admissions institutions across the three location types.

Local demographic factors also varied significantly based on the location of institutions. County unemployment rates were highest for institutions located in urban areas and lowest for areas with institutions in rural areas. The reverse pattern was observed for the percentage of county residents with a college degree or more. Roughly 17% of residents in

Table 2

Mean or Percentages of Institutional Characteristics

Variables	Urban Institutions (n=570)	Suburban Institutions (n=210)	Rural Institutions (n=200)
Structural Demographic Factors			
Public Institution†			
Yes	88.25	84.13	91.00
No	11.75	15.87	9.00
Enrollment Size of Institution			
Small Enrollment Size (<=4,000) **	25.72	30.89	43.39
Medium Enrollment Size (4,001-14,999) **	39.46	38.51	22.05
Large Enrollment Size (15,000+) ***	37.95	49.94	12.11
Student Peer Characteristics			
Selectivity of Institution **			
Most Selective	25.44	24.52	15.00
Moderately Selective	45.61	57.21	60.00
Minimally Selective	10.70	7.21	16.50
Open Admissions	18.25	11.06	8.50
Percentage enrollment of students of color***	26.52	22.45	13.10
Local Demographic Factors			
County Unemployment Rate ***	5.82	5.63	4.53
County College Education Rate ***	24.56	23.96	17.25

Weight: wta000; †p≤ 0.10; *p≤ 0.05, **p≤ 0.01, ***p≤ 0.001 for differences across residential locations on the basis of χ^2 tests for equal distributions.

counties housing a rural institution had a college degree or more, while residents in counties housing an urban (25%) or suburban (24%) institution were more likely to have a college degree.

Multilevel Model Results

Table 3 presents results of the nested multilevel models. An initial multilevel model was estimated to calculate the between institution variance, and a large and significant variance component was estimated, with a value of 0.3758. The left hand column of findings in Table 3 indicates results for all individual level covariates, while modeling the between institution variance in a multilevel framework.

The results revealed that, with respect to demographic characteristics, male students were 14 percent less likely to persist than female students, holding all other variables constant. Students aged 20 or older when they began college were less likely to persist than those 19 and younger. An income gradient was noted for persistence, in that students were more likely to persist as their income increased. The relationship between parental education and persistence, however, did not appear to be linear. Students whose parents had gone to college but had not graduated were less likely than those with parents who had college degrees to persist, but first-generation college-going students had similar odds of persisting as their counterparts whose parents had college degrees. First generation immigrant students were 42 percent more likely to persist than third generation immigrant students.

There were also some differences according to certain environmental pull and residence characteristics. While receiving any form of financial aid did not appear significantly related to persistence, working full-time (compared with not working at all) was negatively related to persistence. Living off campus, with parents, or attending multiple campuses, compared to living on campus the first year of enrollment, lowered the odds of persistence.

In terms of academic experiences, students declaring a major in their first year of enrollment were three times more likely to persist than their peers who did not declare a major at that time. Students with a GPA of 3.5 or higher were 47 percent more likely to persist than students with a GPA below 3.5, controlling for all other covariates. Among social experiences, participating in community service had a significant positive relationship with persistence.

The estimate of the between institution variance component for the model with all variables included (right hand column in Table 3) indicates that the inclusion of the individual and institutional level covariates helped to reduce the total amount of variance noted above, when no variables were included in the null multilevel model. In this model, postsecondary institutional urbanicity did not appear to be significantly related to student persistence. Stated differently, individual student persistence outcomes were similar across different institutional locations (rural, urban, and suburban) when accounting for individual and institutional characteristics in a multilevel framework. Students at institutions with higher proportions of students of color were less likely to persist. In contrast, institutional

Table 3

Hierarchical Logistic Regression Models of College Persistence among First-Time, Beginning College Students, Beginning Postsecondary Students Longitudinal Study 2004-2009 (BPS: 04/09), n~9,100 (OR=Odds Ratios, 95% CI= 95% Confidence Intervals)

Individual Level Variables	Individual Level Covariates Only OR (95% CI)	Institutional and Individual Level Covariates OR (95% CI)
Demographic Characteristics		
Male (Female)	0.86 (0.76-0.96)**	0.82 (0.73-0.93)**
Race/Ethnicity (Non-Hispanic White)		
Hispanic	1.02 (0.84-1.25)	1.19 (0.95-1.49)
Non-Hispanic Black	0.92 (0.77-1.11)	1.20 (0.97-1.49)
Asian	1.08 (0.81-1.45)	1.01 (0.75-1.37)
Other/Multiple Races	1.00 (0.77-1.29)	1.04 (0.80-1.36)
Age at First Enrollment (19 or Younger)		
20-23	0.71 (0.55-0.92)**	0.70 (0.54-0.92)**
24 or Older	0.63 (0.43-0.92)*	0.61 (0.41-0.91)*
Income Quartile (Low Income)		
Low-mid Income	1.21 (1.02-1.42)*	1.15 (0.96-1.36)
High-mid Income	1.37 (1.15-1.63)***	1.28 (1.07-1.54)**
High Income	1.56 (1.30-1.88)***	1.44 (1.19-1.75)***
Parent's Level of Education (College Degree or More)		
High School Diploma or Less	0.91 (0.78-1.04)	0.94 (0.81-1.09)
Some College	0.82 (0.71-0.96)*	0.86 (0.73-1.00)†
Immigration Status (Third Generation)		
First Generation	1.42 (1.16-1.75)***	1.44 (1.15-1.81)**
Second Generation	0.94 (0.67-1.31)	0.99 (0.67-1.45)
Environmental Pull Factors		
Financial Assistance from Parents (Some Assistance)		
Financially Independent	0.93 (0.68-1.26)	0.95 (0.69-1.31)
No Financial Support from Parents	1.00 (0.83-1.21)	0.97 (0.80-1.18)
Student Received Financial Aid (Yes)	1.03 (0.90-1.19)	1.06 (0.92-1.23)
Work Status Outside of School (No job)		
Full-Time	0.81 (0.66-0.99)*	0.89 (0.72-1.10)
Part-Time	0.91 (0.80-1.03)	0.91 (0.80-1.04)
Residence Characteristics		
Student Attended College for Location (Yes)	1.05 (0.92-1.20)	1.04 (0.91-1.19)
Attended Institution More than 150 Miles from Home (1=yes)	1.06 (0.92-1.22)	1.02 (0.88-1.18)
Where Student Lived First Year of College (On Campus)		
Off Campus	0.82 (0.67-0.99)*	0.86 (0.70-1.06)
With Parents	0.82 (0.69-0.97)*	0.92 (0.76-1.10)
Attended Multiple Campuses	0.79 (0.65-0.98)*	0.84 (0.67-1.04)
Academic Experiences		
Delayed Enrollment (Yes)	0.85 (0.69-1.04)	0.96 (0.77-1.19)
Declared a Major (Yes)	3.00 (2.67-3.38)***	3.13 (2.77-3.53)***
Academic Integration (ref=No Academic Integration)		
Some Academic Integration	1.08 (0.83-1.40)	1.09 (0.83-1.43)
High Academic Integration	1.04 (0.81-1.35)	1.05 (0.80-1.37)
GPA (3.5 or Better)	1.47 (1.30-1.65)***	1.50 (1.29-1.74)***
Social Experiences		
Student Participated In Community Service (Yes)	1.15 (1.02-1.29)*	1.11 (0.98-1.26)
Social Integration (No Social Integration)		
Some Social Integration	1.13 (0.95-1.35)	1.12 (0.94-1.34)
High Social Integration	1.12 (0.96-1.30)	1.08 (0.92-1.27)
Residential Location of Institution (Rural)		
Urban		1.14 (0.96-1.36)
Suburban		1.02 (0.84-1.24)

Table 3 (continued)

Individual Level Variables	Individual Level Covariates Only OR (95% CI)	Institutional and Individual Level Covariates OR (95% CI)
Public Institution		0.98 (0.83-1.16)
Enrollment Size of Institution (Small Enrollment)		1.08 (1.00-1.17)
Medium Enrollment		1.02 (0.87-1.19)
Large Enrollment		1.16 (0.97-1.38)
Student Peer Characteristics		
Selectivity of Institution (Open Admissions)		
Most Selective		1.81 (1.40-2.33)***
Moderately Selective		1.23 (1.00-1.52)
Minimally Selective		0.93 (0.73-1.19)
Percentage Enrollment of Students of Color		0.75 (0.70-0.81)***
Local Demographic Factors		
County Unemployment Rate		1.16 (1.04-1.28)**
County College Education Rate		0.89 (0.81-0.97)*
-2 Residual Log Pseudo-Likelihood	44,691.20	43,684.51
Generalized Chi-Square	8,487.59	8,301.83
Generalized Chi-Square/DF	0.94	0.95

†p≤ 0.10; *p≤ 0.05, **p≤ 0.01, ***p≤ 0.001; Reference group in parentheses.

selectivity was positively related to individual student persistence, holding other factors constant. In particular, students attending highly selective institutions had 81 percent higher odds of persisting than students attending institutions with open admissions policies. Lastly, the odds of a student persisting were higher if the institution they attended was located in a county with a higher than average unemployment rate, while individual students had lower odds of persisting in counties with above average college graduates residing in the county the institution was located.

Most individual level variables operated in a similar fashion for the model which only included the individual-level covariates, compared with the model including individual *and* institutional covariates. Some variables no longer retained significance with the inclusion of the institutional level variables. These variables were: (a) coming from a low-mid income background; (b) working full-time outside of school; (c) residing off campus, with parents, or attending multiple campuses versus living on campus the first year; and (d) participating in community service activities.

Discussion

Few empirical studies have examined the relationship between the urbanicity of an institution and an individual student's college persistence. With a large gap in the percentage of college graduates between rural and urban areas in the United States (Adelman, 2002; Gibbs, 2003, 2005), it is imperative to understand what characteristics could influence college persistence once students enroll in diversely located postsecondary institutions across the US. This research addresses this issue by using a current and nationally representative data source to explore this research problem. Different theoretical perspectives helped in constructing variables and developing empirical models to test for associations between location of an institution and student persistence while considering other important variables, including student demographic and background characteristics, college academic performance, environmental pull factors, college experiences, and other structural demographic institutional characteristics. Our results provide a starting point for educational research, policies, and practices to address college persistence issues while accounting for the location of an institution.

While this research does not find statistically significant differences in the persistence rates by institutional location as proposed by Berger and Milem (2000), this study indicates that several of students' individual level characteristics vary according to the institution attended, which might be a better approach for examining this issue. First, there is a large difference in the racial/ethnic distributions of students attending urban, suburban, and rural institutions. Rural institutions have lower proportions of students of color. While the data source used did not document if students attending particular institutions were actually from these residential locations, future research would benefit from knowing which students are attracted to institutions in different residential settings and what role this location has on student persistence, as hinted to in Berger and Milem's theory (Berger & Milem, 2000).

Consistent with the finding that students in rural institutions are more likely to attend college 150 miles from home, these students are also significantly more likely to

live on campus. Meanwhile, urban or suburban students are far more likely to live with parents and slightly more likely to live off campus. Many studies have documented that living on campus is positively related to persistence (Astin, 1993; Pascarella & Terenzini, 2005). Despite reporting similar academic experiences as students in non-rural institutions, students at rural institutions report different and higher levels of social involvement, both in terms of social integration and in community service participation. This may partly be a function of their increased likelihood of living on campus and away from home. Moreover, this study suggests that college students attending rural institutions come from higher income families than their urban or suburban counterparts and are less likely to have had jobs during their college careers. Increased finances and time to devote to social activities may enable them to become more involved in the college environment. All of these individual characteristics may lead to higher persistence rates at rural institutions.

The descriptive results indicate that rural institutions are more likely than suburban institutions to be public institutions. This is probably related to the fact that several rural institutions are land grant institutions, which were initially established to serve communities, which had not previously had a higher education presence. Urban institutions in this sample have much higher proportions of students of color than rural institutions. Being located in areas with more densely concentrated populations, these institutions also have much larger enrollment sizes than rural institutions.

This study's multilevel results indicate that, independent of student characteristics and experiences, significant variation exists in persistence rates between institutions. This was expected, and helped to justify the use of structural demographic institutional level variables in a multilevel framework as proposed in the theories guiding this analysis. As is typical with many multilevel models, the inclusion of individual level characteristics in the first model presented in Table 3 significantly reduced the amount of variance noted in persistence rates. This indicates that much more variation exists between students than between institutions in the characteristics related to persistence; however, it should be noted that the inclusion of institutional level variables still helped to further reduce the amount of variance in the outcome. Since this is a first multilevel look at the role of institutional location in persistence, it will be worthwhile to explore additional institutional level variables to see if more variance in the outcomes can be explained and more fully develop the theoretical model guiding this work. Following Titus's research (2004; 2006a, 2006b), these measures could address more characteristics related to organizational behavior and financial context of the institutions, as well as the role of state policies or local labor market demands.

This study indicates that students attending an institution with a higher than average proportion of students of color have significantly lower odds of persisting than students attending an institution with an average or lower proportion of students of color. Future studies should investigate how students of color might fare in terms of persistence at institutions with higher and lower proportions of students of color, as well as testing cross-level effects to see if individual students fare differently in institutions with different proportions of students of color based on their own race/ethnicity. Including factors related to institutional peer climate and perceptions of campus support could also help to better understand the role of racial/ethnic composition of the student body in persistence (Oseguera & Rhee, 2009), and this is an important topic as the racial/ethnic composition of many rural areas is changing and will continue to change in the near future. More large national datasets including students attending minority-majority institutions will need to be available to address these issues.

With respect to measures of SES, having a higher income appears positively related to persistence. This emphasizes the importance of access to financial capital in college persistence (St. John, Hu, & Fisher, 2010; St. John et al., 2000). It is also interesting to note the non-linear association between parental education and student persistence. Although first-generation college-going status has been found to be a significant negative predictor of persistence in other studies (Nuñez & Cuccaro-Alamin, 1998), it was not found to be significant in this study, holding other factors constant. These finding could reflect the complex multidimensionality of how SES is defined and how dimensions such as income and parental education interact with one another or is transferred from parents to children to influence college persistence, as well as with other factors (Walploe, 2007).

While there is a body of work suggesting that first-generation immigrant status is positively related to K-12 academic achievement (Kao & Tienda, 1995; Portes & Rumbaut, 2001), few studies have examined the relationship between immigration status and postsecondary persistence. One unexpected finding from this study is that coming from a first-generation, compared with third-generation immigrant status background, is positively related to persistence. First-generation immigrant students face many challenges in their K-12 education and in making it to college (Suarez-Orozco, Suarez-Orozco, & Todorova, 2010). However, it could be that "immigrant optimism" (Kao & Tienda, 1995) and lack of exposure to discrimination and stereotyping (Portes & Rumbaut, 2001) influence first-generation immigrants' persistence in a positive direction. This study is the first to extend the work of K-12 scholars to the higher education arena in this manner, suggesting that if first-generation immigrant students surmount their often

significant challenges in the K-12 system (Suarez-Orozco et al., 2010), and make it to a four-year institution, they have a higher likelihood of persistence than their third-generation counterparts, even after controlling for other individual and institutional level characteristics.

Holding other factors in the model constant, declaring a major within the first year is positively related to persistence. This indicates that initial goal commitment to a major is an important part of the persistence process (Melguizo, 2011; Tinto, 1993), along with student characteristics and college experiences. Students who declare a major quickly may have better defined goals than those who do not; motivation to meet these goals may contribute to persistence.

Students attending rural institutions experience fewer environmental pull factors, and this is likely related to their higher levels of academic integration, social integration and community service participation. This may partly explain why there is no individual persistence disadvantage for students attending colleges in different residential locations. Working full-time is negatively related to persistence, as documented in much of the persistence literature (Astin, 1993; Pascarella & Terenzini, 2005). In addition, students attending rural institutions are more likely to live on campus, and this is positively associated with persistence, consistent with other research (Astin, 1993; Pascarella & Terenzini, 2005).

As documented in other research (Astin, 1993; Pascarella & Terenzini, 2005), GPA has a strong significant relationship with persistence. However, neither measure of academic nor social integration has a significant relationship with persistence. This suggests that these measures may not accurately capture what is meaningful in students' experiences. These findings support criticisms of Tinto's interactionalist theory (1975, 1993) that research has uncovered inconsistent results in the relationships between academic and social integration and student persistence (Braxton & Lien, 2000; Kuh & Love, 2000; Wolf-Wendel et al., 2009). This may be due to a lack of clarity in how constructs of academic and social integration are operationalized and the inability of such measures thus far to capture the full complexity of the nature of students' perceptions of, behaviors in, and interactions with, their institutions (Kuh & Love, 2000; Wolf-Wendel et al., 2009).

Participation in community service, a measure of social capital related to engagement and reciprocity with members of the broader community (Coleman, 1988; Putman, 2000) is positively related to persistence in this model. Such social and community resources could serve as an asset for students in the persistence process (Byun, Irvin, et al., 2012; Byun, Meece, et al., 2012). Similarly, our study suggests that college students in rural institutional settings score higher on social integration and community service participation. Therefore, they possibly have more access to social and community resources than students in urban or suburban institutions. While education in rural areas is often framed using a deficiency perspective (Byun, Irvin, et al., 2012), these findings indicate that students in rural colleges may have different assets in the persistence process.

Several of the institutional level characteristics warrant more discussion. Future research should explore whether the location of an institution attended has an affect over a students' entire postsecondary career to influence persistence at multiple time points. Additionally, it would be helpful to know if students attending these institutions are from similar residential locations and how this relationship might influence student persistence and ultimate degree completion. Future studies should also examine the relationship between institutional location and other outcomes related to student success and completion, particularly outcomes related to social or community service involvement, such as types of engagement that seem more prevalent among students in rural institutions and how these activities lead to degree completion.

In addressing the role of another aspect of institutional location—local economic conditions—in our model, we found that a higher average unemployment rate is associated with higher persistence odds. This result supports the warehouse hypothesis (Bozick, 2009), which posits that favorable economic conditions pull youth into the labor market and discourage enrollment in college (Grubb & Lazerson, 1982; Shanahan, Miech, & Elder, 1998; Walters, 1984). Conversely, poor local economic conditions (including a high unemployment rate) encourage students to continue high school or postsecondary enrollment (Bozick, 2009). Moreover, while local labor conditions likely have an influence on a student's decision to enroll and persist, students must also consider the opportunity costs associated with translating a college degree into gainful employment upon completion of the degree (Kienzl, Alfonso, & Melguizo, 2007). Because these opportunity costs are likely to vary in different residential settings, more research is warranted to investigate how local labor conditions influence college persistence for students in rural, urban, and suburban settings. If policy makers are interested in increasing postsecondary educational attainment among adults in a particular region, they might consider local labor conditions as an additional influence on student postsecondary persistence (Groen, 2011).

Conclusion and Implications

This study extends theories of college persistence by exploring whether institutional geographic location has an association with persistence. Our research suggests that students enrolled in rural institutions persist in college at similar rates as their counterparts in urban and suburban

institutions. This leaves questions about the application of the theoretical model used in this study. Although this study's results indicate that attending a rural institution may not affect student persistence of a cohort of first-time beginning college students differently than students at urban or suburban institutions, this research also suggests that students in rural institutions have substantially different background and environmental pull characteristics and college experiences than their counterparts in urban and suburban institutions. Moreover, the rural institutions in this study differ significantly from non-rural institutions with respect to sector (public or private), enrollment size, proportion of students of color, selectivity, and local economic conditions. As stated earlier, future research can explore the roles of additional institutional level variables. More research is also needed to understand how the persistence process might vary according to institutional location, and how institutional location might effect other college experiences and outcomes.

This research indicates that college students in rural settings, through their increased engagement in social activities and community service, could have unique advantages over their urban counterparts in developing social capital that supports their postsecondary persistence. This may be related to the close-knit community ties that can be fostered in an isolated rural setting (Byun, Irvin, et al., 2012; Byun, Meece, et al., 2012). Participation in community service and other types of social engagement can also translate into job opportunities once students complete their degrees and offer incentives for students to stay enrolled and complete college. More research is needed to explore the typically unrecognized assets that high school or postsecondary students in rural settings build to enhance their postsecondary attainment (McDonough & Gildersleeve, 2010). Special attention can be given to social capital measures as one potential pathway to the postsecondary success of students in rural higher education institutions.

This study suggests that geographic context matters in understanding college student persistence, in as much as several student and institutional factors that vary according to an institution's location are significantly associated with persistence. As theories of persistence evolve and expand to include new considerations, geographic context should be one of the factors considered. For example, introducing the consideration of geographic location in persistence studies could help counterbalance higher education persistence theories' tendency toward "dormocentric" research (Wolf-Wendel et al., 2009), that focuses on the experiences of traditionally aged, full-time students who live on campus.

Since rural institutions enroll lower proportions of students of color and immigrant students, attention must be given to the needs of these students so that limited representation of students of color does not hinder their sense of belonging in the college community (Gurin, Dey, Hurtado, & Gurin, 2002; Hurtado & Carter, 1997). For example, as Latinos increasingly migrate to certain rural communities, tension between these newcomers and their neighbors can increase (Bloom, 2001). Postsecondary institutions can serve as sites where students learn to work constructively across racial/ethnic groups, but efforts to serve students of color must be intentional, well-designed, and involve faculty and administrators across all administrative units (Smith, 2009).

Future research should seek to identify more meaningful organizational and institutional characteristics that are salient for persistence of students in different locations. Attending to the local higher education context and broader state policy context, as well as other social, historical and economic conditions, is also critical (Groen, 2011; Perna, 2006). Because rural institutions are more likely to be public, their activities will be more influenced by state policies and practices, which have been shown to be related to student persistence (Titus, 2009). Further, local economic conditions such as unemployment rates may also independently influence persistence. Taking into account these multiple contextual layers will enhance the explanatory power of Berger and Milem's (2000) framework for understanding persistence. More generally, the factors that affect college persistence according to institutional location challenge some traditional notions and expectations of current persistence theories in higher education. Practitioners, policymakers, and researchers would do well to challenge potentially deficit-oriented assumptions about influences on persistence and postsecondary attainment, particularly when addressing populations like students in rural high schools or rural 4-year institutions.

References

Adelman, C. (2002). Increasing access to college: Extending possibilities for all students In W. G. Tierney & L. S. Hagedorn (Eds.), *Increasing access to college: Extending possibilities for all students* (pp. 35-63). Albany, NY: State University of New York Press.

Astin, A. (1993). *What matters in college: Four critical years*. San Francisco: Jossey-Bass.

Berger, J.B., & Milem, J.F. (2000). Organizational behavior in higher education and student outcomes. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. XV, pp. 268-338). New York: Agathon Press.

Bloom, S.G. (2001). *Postville: A clash of cultures in heartland America*. Orlando, FL: Harcourt, Inc.

Bozick, R. (2009). Job opportunities, economic resources, and the postsecondary destinations of American youth. *Demography, 46*(3), 493-512.

Braxton, J.M. (2000). Reinvigorating theory and research in the departure puzzle. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 257-274). Nashville: Vanderbilt University Press.

Braxton, J.M., & Hirschy, A.S. (2005). Theoretical developments in the study of student departure. In A. Seidman (Ed.), *College student retention: Formula for student success* (pp. 61-87). Westport, CT: Praeger Publishers.

Braxton, J.M., & Lien, L.A. (2000). The viability of academic integration as a central construct in Tinto's interactionalist theory of college student departure. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 11-28). Nashville: Vanderbilt University Press.

Braxton, J.M., Sullivan, A.S., & Johnson, A. (1997). Appraising Tinto's theory of college student departure. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 12, pp. 107-164). New York: Agathon.

Byun, S.Y., Irvin, M.J., & Meece, J.L. (2012). Predictors of bachelor's degree completion among rural students at four-year institutions. *Review of Higher Education, 35*(3), 463-484.

Byun, S.Y., Meece, J.L., & Irvin, M.J. (2012). Rural-nonrural disparities in postsecondary educational attainment revisited. *American Educational Research Journal, 49*(3), 412-437.

Chen, R. (2008). Financial aid and student dropout in higher education: a heterogeneous research approach. In J. C. Smart (Ed.), *Higher education handbook of theory and research* (Vol. XXIII, pp. 209-239). London: Springer.

Coleman, J.S. (1988). Social capital in the creation of human-capital. *American Journal of Sociology, 94*, S95-S120.

Gibbs, R. (2003). Rural education at a Glance *Rural development research report* (Vol. 98, pp. 1-6). Washington, DC: Economic Research Service, United States Department of Agriculture.

Gibbs, R. (2005). Education as a rural development strategy. *Amber Waves, 3*(5), 20-25.

Groen, J.A. (2011). Building knowledge stocks locally: Consequences of geographic mobility for the effectiveness of state higher education policies. *Economic Development Quarterly,, 25*(4), 316-329.

Grubb, W.N., & Lazerson, M. (1982). Education and the labor market: Recycling the youth problem. In H. Kantor & D. Tyack (Eds.), *Work, youth, and schooling: Historical perspectives on vocational education* (pp. 110-141). Stanford, CA: Stanford University Press.

Gurin, P., Dey, E.L., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review, 72*(3), 330-366.

Holsapple, M.H., & Posselt, J.H. (2010). *The best in the country?: High achieving rural students' enrollment in America's top-ranked colleges and universities*. Paper presented at the American Educational Research Association, Denver, CO.

Hu, S. (2003). Educational aspirations and postsecondary access and choice: Students in urban, suburban, and rural schools compared. *Education Policy Analysis Archives, 11*(14), 1-13.

Hurtado, S., & Carter, D.F. (1997). Effects of college transition and perceptions of the campus racial climate on Latino college students' sense of belonging. *Sociology of Education, 70*(4), 324-345.

Kao, G., & Tienda, M. (1995). Optimism and achievement - The educational performance of immigrant youth. *Social Science Quarterly, 76*(1), 1-19.

Kelly, A.P., Schneider, M., & Carey, K. (2010). Rising to the challenge: Hispanic college graduates as a national priority. Washington, DC: American Enterprise Institute.

Kienzl, G. S., Alfonso, M., & Melguizo, T. (2007). The effect of local labor market conditions in the 1990s on the likelihood of community college students' persistence and attainment. *Research In Higher Education, 48*(7), 751-774. doi: 10.1007/s11162-007-9050-y

Kuh, G.D., & Love, P.G. (2000). A cultural perspective on student departure. In J. Braxton (Ed.), *Rethinking the departure puzzle: New theory and research on college student retention* (pp. 196-212). Nashville, TN: Vanderbilt University Press.

McDonough, P. M., & Gildersleeve, R. (2010). The golden cage of rural college access: How higher education can respond to the rural life. In K. Schafft & A. Y. Jackson (Eds.), *Rural education for the twenty-first century: Identity, place, and community in a globalizing world*

(pp. 191-209). State College, PA: Pennsylvania State University Press.

Melguizo, T. (2011). A review of the theories developed to describe the process of persistence and attainment. *Handbook of Theory and Research in Higher Education, 26*, 395-424.

Nora, A. (1987). Determinants of retention among Chicago college students: A structural model. *Research In Higher Education, 26*(1), 31-59.

Nora, A. (2001-2). The depiction of significant others in Tinto's "rites of passage": A reconceptualization of the influence of family and community in the persistence process. *Journal of College Student Retention, 3*(1), 41-56.

Nora, A. (2004). Access to higher education for Hispanic students: real or illusory. In J. Castellanos & L. Jones (Eds.), *The majority in the minority* (pp. 47-70). Sterling, VA: Stylus.

Nuñez, A.-M., & Cuccaro-Alamin, S. . (1998). First-generation students: Undergraduates whose parents never enrolled in postsecondary education (NCES Report 98-082 ed.). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

O'Connor, N., Hammack, F.M., & Scott, M.A. (2010). Social capital, financial knowledge, and Hispanic student college choices. *Research In Higher Education, 51*(1), 195-219.

Oseguera, L., & Rhee, B.S. (2009). The influence of institutional retention climates on student persistence to degree completion: A multilevel approach. *Research In Higher Education, 50*, 546-549.

Pascarella, E.T., & Terenzini, P.T. (2005). *How college affects student* (Vol. 2nd Volume). San Francisco: Jossey-Bass.

Perna, L.W. (2006). Studying college access and choice: a proposed conceptual model. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. XXI, pp. 95-157). Cambridge, MA: Springer.

Portes, A., & Rumbaut, R.G. (2001). *Legacies: The story of the immigrant second generation*. Berkeley, CA: University of California Press and Russell Sage Foundation.

Putman, R. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.

Raudenbush, S.W., & Bryk, A.S. (2001). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Rendon, L.I., Jalomo, R.E., & Nora, A. (2000). Theoretical considerations in the study of minority student retention in higher education. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* Nashville, TN: Vanderbilt University Press.

Shanahan, M. J., Miech, R. A., & Elder, G. H. (1998). Changing pathways to attainment in men's lives: Historical patterns of school, work, and social class. *Social Forces, 77*(1), 231-256. doi: 10.2307/3006016

Smith, D.G. (2009). *Diversity's promise for higher education: Making it work*. Baltimore, MD: Johns Hopkins University Press.

St. John, E.P., Hu, S., & Fisher, A.S. (2010). *Breaking through the access barrier: How academic capital can improve policy in higher education*. New York: Routledge.

St. John, E.P., Paulsen, M.B., & Starkey, J.B. (2000). Economic influences on persistence reconsidered: How can finance research inform the reconceptualization of persistence models? In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 29-47). Nashville, TN: Vanderbilt University Press.

Suarez-Orozco, C., Suarez-Orozco, M., & Todorova, I. (2010). *Learning a new land: Immigrant students in american society*. Cambridge, MA: Belknap.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*(1), 89-125.

Tinto, V. (1982). Limits of theory and practice in student attrition. *The Journal of Higher Education, 53*(6), 687-700.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.

Tinto, V. (2005). Foreword: College student retention: Formula for student success. In A. Seidman (Ed.), *College Student Retention: Formula for Student Success* (pp. ix-x). Westport, CT: Praeger Publishers.

Titus, M.A. (2004). An examination of the influence of institutional context on student persistence at 4-year colleges and universities: A multilevel approach. *Research In Higher Education, 45*(7), 673-699.

Titus, M. A. (2006a). Understanding college degree completion of students with low socioeconomic status: The influence of the institutional financial context. *Research In Higher Education, 47*(4), 371-398. doi: 10.1007/s11162-005-9000-5

Titus, M. A. (2006b). Understanding the influence of the financial context of institutions on student persistence at four-year colleges and universities. *Journal of Higher Education, 77*(2), 353-+. doi: 10.1353/jhe.2006.0009

Titus, M.A. (2009). The production of bachelor's degrees and financial aspects of state higher education policy: A dynamic analysis. *Journal of Higher Education, 80*(4), 439-468.

Walpole, M.B. (2007). Economically and educationally challenged students in higher education: Access to outcomes. *ASHE-Higher Education Report Series, 33*(3), 1-113.

Walters, P.B. (1984). Occupational and labor-market effects on secondary and postsecondary educational expansion in the United States - 1922 to 1979. *American Sociological Review, 49*(5), 659-671.

Weidman, J. (1989). Undergraduate socialization: A conceptual approach. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 5, pp. 76-102). New York: Agathon.

Wolf-Wendel, L., Ward, K., & Kinzie, J. (2009). A tangled web of terms: The overlap and unique contribution of involvement, engagement, and integration to understanding college student success. *Journal of College Student Development, 50*(4), 407-428.

Yan, W. (2002). *Postsecondary enrollment and persistence of students from rural Pennsylvania*. Harrisburg, PA: Center for Rural Pennsylvania.

Appendix A

Categories of Multilevel Forces Related to Persistence in Theory

Theoretical Concepts	Variables Used in Empirical Model
Student Level Concepts	
Student's Family Background and Socioeconomic Status (Becker 1964, Coleman 1988; Titus 2006a: Walpole 2007)	Family income, parent's level of education, immigrant status
Individual Ability (St. John et al 2010; Tinto 1993)	Cumulative GPA
Institutional Commitment (Tinto 1993; Weidman 1989)	Student attended college for location, institution within driving distance to home, student housing first year of enrollment
Student's Integration at College (St. John et al. 2010; Tinto 1993; Wolf-Wendel et al 2009)	Delayed enrollment from HS graduation, major declared, academic integration (participates in study groups, talks with faculty outside of class, met with academic advisor, had social contact with faculty outside of class)
Economic Considerations (Titus 2006a: Walpole 2007)	Financial assistance from parents, student financial aid, work status outside of school
Demographic Characteristics	Gender, student race/ethnicity, student's age at first enrollment, immigrant status
Social Capital (Coleman 1988; Stanton-Salazar 2001, 2004; Wolf-Wendel et al 2009)	Engages in community service, social integration (attends fine art activities on campus, participates in intramurals or varsity sports, participates in social clubs)
Institutional Level Concepts	
Geographic Context (Berger and Milem 2000)	Rurality of Institution Attended
Environmental/Economic Pull Factors (Kienzl et al. 2007; Walters 1984)	Local unemployment rate, local college education rate
Social Capital (Bowen et al. 2009; Melguizo 2010, 2011; Oseguera and Rhee 2009)	Selectivity of institution, percentage enrollment of students of color
Structural Demographic Characteristics (Melguizo 2010, 2011; Titus 2006b)	Public or private institution status, enrollment size of institution

Appendix B

Description of Variables and Measures

Variable Name	Description and Coding
Outcome—Persistence	Still enrolled or obtained degree by 2008-2009 academic year=1, not enrolled by the 2008-2009 academic year and no degree obtained=0
Student Level Variables	
Socio-demographic Variables	
Gender	Binary variable coded 1 as male 0 as female
Race/Ethnicity	5 category dummy variable representing five different racial/ethnic groups (Non-Hispanic White*, Non-Hispanic Black, Hispanic, Asian, Other/Multiple races)
Student's age at first enrollment	3 category dummy variable measuring the students age in years when they first enrolled at a post-secondary institution (19 or younger*, 20-23, 24 or older)
Income quartiles	4 category dummy variable based on whether the student was financially independent or not. For financially dependent students, adjusted incomes corresponded to the following income quartiles: low income* (between $0 and $30,999, reference); low-mid income (between $31,000 and $56,999); high-mid income (between $57,000 and $88,999); and high income (equal to or greater than $89,000). For financially independent students, adjusted incomes corresponded to the following income quartiles: low income* (between $0 and $7,999, reference); low-mid income (between $8,000 and $19,999); high-mid income (between $20,000 and $37,999); and high income (equal to or greater than $38,000).
Parent's level of education	3 category dummy variable that corresponds with the highest level of education completed by either parent of the sampled student (high school diploma or less, some college, a college degree or more*)
Immigrant status	3 category dummy variable that represents the student's immigrant generational status (first generation, second generation, third generation*)
Environmental Pull Factors	
Financial assistance from parents	3 category dummy variable corresponding to the amount of financial report received from parents (financially independent, no financial support from parents, some financial assistance from parents*)
Student financial aid	Binary variable coded 1 if the student received financial aid and 0 otherwise
Work status outside of school	3 category dummy variable representing the average number of hours worked during the first year of college (full-time work: worked more than 20 hours per week, part-time work: worked less than 20 hours per week, did not work*)
Residence Characteristics	
Student attended college for location	Binary variable coded 1 when student selected location as primary reason for attending institution and 0 otherwise
Attended institution more than 150 miles from home	Binary variable coded 1 when student attended a post-secondary institution more than 150 miles from their permanent residence and 0 if the institution was less than 150 miles from their permanent residence. 150 miles is the maximum distance a student could be expected to commute daily
Where student lived first year of college	4 category dummy variable representing where the student lived their first year of enrollment (off campus, with parents, attended multiple campuses, on campus*)
Academic Experiences and Involvement	
Delayed enrollment one year	Binary variable coded 1 if the student delayed enrollment after 1 year high school graduation or 0 otherwise
Student declared a major	Binary variable coded 1 if the student had declared a major by the end of their first year of enrollment and 0 otherwise

Appendix B (continued)

Variable Name	Description and Coding
Academic integration	The academic integration index was constructed from responses to the following questions regarding how often a student did the following things: 1) participated in study groups; 2) talked with faculty outside of class; 3) met with their academic advisor about academic plans; and 4) had social contact with faculty members outside of class. The number of responses were summed and multiplied by 100 to create an index. From these values 3 category dummy variables were created to correspond to the level of academic integration for the student (some integration, high integration, no integration*)
Cumulative GPA	Binary variable coded 1 if the student had a 3.5 or better GPA by the end of the 2008-2009 academic year and 0 otherwise
Social Experiences	
Community service	Binary variable coded 1 if the student participated in community service activities during the 2003-2004 academic year and 0 otherwise
Social integration	Students were asked how often they: 1) attended fine art activities on campus; 2) participated in intramural or varsity sports; and 3) participated in social clubs. The number of responses were summed and multiplied by 100 to create an index. From these values 3 category dummy variables were created to correspond to the level of social integration for the student (some integration, high integration, no integration*)
Institutional Level Variables	
Structural Demographic Characteristics	
Residential location of institution	3 category dummy variable representing the population size of the residential location where the institution is location (urban, suburban, rural*); These categories are based on Census Bureau designation of places by the size of their MSA population. Urban includes central cities of the MSA and incorporated places within the MSA designated as urban; suburban includes incorporated places outside the MSA with populations greater than 2,500; rural includes any place designated as rural by the Census
Public institution	Binary variable coded 1 if the institution was public and 0 if private
Enrollment size of institution	3 category dummy variables representing the total enrollment size of institution of student's first enrollment (small enrollment – Less than 4,000 students*; medium enrollment – 4,001-14,999 students; large enrollment – 15,000 students or more)
Student Peer Characteristics	
Selectivity of institution	Based on a composite variable of the GPA and SAT/ACT scores of incoming freshman and the percentage of students admitted relative to those that applied. 4 category dummy variable representing selectivity (most selective, moderately selective, minimally selective, open admissions*)
Percentage enrollment of students of color	Percentage of undergraduate enrollment in 2003-04 who were students of color, including students that are: Black, non-Hispanic; Hispanic; Asian/Pacific Islander; and American Indian/Alaska Native
Local Demographic Factors	
County Unemployment Rate	Percentage of county residents unemployed of total county residents in 2009, based on American Community Survey data
County College Education Rate	Percentage of county residents 25 years of age or older with a college degree or more in 2009, based on American Community Survey data