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Defining Rural: The Impact of Rural Definitions on College Student Success Outcomes

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Rural students have unique characteristics that necessitate further exploration when analyzing assessment and student success data. From assessment, programming, and policy standpoints, intentionality in selection of a definition of rural is critical to prevent making inappropriate or inaccurate decisions. In this study, we sought to compare three definitions of rurality to better help understand this issue and to select a definition that we believe is most appropriate for use at a large research institution in a largely rural state.

***Keywords*: higher education, rural, student success outcomes, retention, graduation**

Southern University (pseudonym) is a large, public, land-grant research institution in a predominately rural state (regardless of the definition of rural). To support students' academic success, this institution tracks and evaluates multiple measures of student success research, including metrics for academic performance, retention, and graduation. In recent years, a strategic approach to measuring student success outcomes for students from rural areas has been implemented at Southern University. Rural students have unique characteristics that necessitate further exploration when analyzing assessment and student success data. This is particularly important when considering retention rates and graduation rates, common metrics at the university and system level for student success and institutional effectiveness, as rural students have lower attendance and graduation rates (National Student Clearinghouse, 2019).

Before arriving to college, students from rural areas are likely to face significant challenges that their suburban and urban peers may not have encountered. Rural students are more likely to have lived in poverty and to have attended a low-resource school (Brown & Swanson, 2003; Provasnik et al., 2007) with less emphasis on college readiness (Ardoin, 2017; Ditillo, 2019; Lichter et al., 2003) and fewer high-quality teachers (Demi et al., 2010; Monk, 2007). Students from rural areas are less likely than their suburban or urban counterparts to have attended a school that offered Advanced Placement courses (Gagno & Mattingly, 2016; Gibbs, 2003; Provasnik et al., 2007), to have had access to guidance counselors (Griffin et al., 2011; Provasnik et al., 2007, Wimberly & Brickman, 2014), and to have a parent (or known an adult) who attended college (Demi et al., 2010; Provasnik et al., 2007). Americans from rural areas are less likely to hold a college degree than peers from suburban or urban areas, and additionally, fewer young adults from rural areas enroll in college than peers in suburban areas (National Student Clearinghouse, 2019; Provasnik et al., 2007). These pre-college challenges may impact academic success, including retention and graduation rates, for rural students as they continue their education in college.

A number of other factors influence student success as well in addition to a student's geographic origin. When exploring student success outcomes, educational researchers often factor in academic success proxies such as SAT/ACT scores, effort proxies such as high school GPA, first term GPA in college, and personal characteristics such as gender, race/ethnicity, socioeconomic status, and first-generation college student status. A body of literature in higher education research suggests that these elements influence student success, and students' place of geographic origin may as well.

For several years Southern University has made efforts to systematically define, identify, and study students from rural areas for focus in student learning outcomes assessment and institutional student success research using a county-level rurality definition (Isserman, 2005) that we believed most accurately captures the rural character of the state. However, there are competing, and sometimes conflicting definitions of rurality (Cromartie & Bucholtz, 2008), and selection of one particular definition over another may impact outcome analysis and subsequent decisions made using the data.

Increasing student success outcomes for rural students in the state recently became a system-wide strategic planning goal for the university system in which Southern University is a part. Prior to the university system's decision to select a definition for rurality, Southern University had informally adopted a rurality definition and used it to analyze assessment data for several years. Upon implementation of the new system-wide definition and knowing that definitions of rurality can vary, we considered the importance of comparing several definitions of rurality to assess the influence each definition had on student success analyses. We believed it was important to select a definition of rurality that most accurately captured the essence of the state and student population. Hawley et al. (2016) note, "failure to clearly label and define a key theoretical construct such as rurality invites misinterpretation, which threatens the validity of inferences one may generalize from the study" (p. 4).

To effectively and accurately measure outcomes for rural college students, we must be able to define rurality. From assessment, programming, and policy standpoints, intentionality in selection of a definition of rurality is critical to prevent making inappropriate or inaccurate decisions. In this study, we compare three definitions of rurality to better understand how they can affect what we report, whom we serve, and decisions we make as a campus. It is noteworthy that although the three definitions may differ in how they parameterize rurality, their underlying philosophy is fundamentally similar. All three schemes view rurality through the lens of socio-geographic locality, a perspective embraced by a majority of policymakers and social science researchers (Boix-Tomàs et al., 2015; Brown & Schafft, 2011; Burton et al., 2013; Nelson, 2016). Despite acknowledging and even incorporating social, economic, and cultural factors that shape rurality, classifications that subscribe to rurality as locality naturally overemphasize the roles of geographic place and population size and density. Thus, as a social construct, rurality is defined not by the physical space but by the people who occupy it and the social, moral, and cultural values and community affiliation they view at the crux of being rural (Brown & Schafft, 2011). While recognizing the value of the social constructivist approach, it is important to note the definitions used in this study focus on rurality as a quantifiable place rather than social construct.

Defining Rural: Issues and Selected Definitions

Researchers generally agree that the extant literature has failed to establish and apply a consistent definition that accurately depicts the rural context (Isserman, 2005; Nugent et al., 2017). Instead, rural education studies typically default to commonly used rurality classification codes often with little consideration for their inherent assumptions and limitations. Faulty representations of what is rural preclude us from accurately assessing and understanding the issues rural individuals face. The consequences may be misguided policies and decisions that fail to effectively fund and support rural people and communities. In this section we provide a table comparing the criteria for each of the three

Table 1
Comparison of Rurality Definitions Used in Study

Rurality definition	Definition description
Rural–Urban Density Typology (Isserman, 2005)	• "Rural county: (1) The county's population density is less than 500 people per square mile, and (2) 90 percent of the county population is in rural areas or the county has no urban area with a population of 10,000 or more. The density requirement is the same used to distinguish urban and rural census blocks, and the urban area threshold mimics the urban cluster requirement that defines micropolitan core areas. The 90 percent requirement screens out low-density counties with substantial urban populations, but it has no official precedent or standing. • Urban county: (1) The county's population density is at least 500 people per square mile, (2) 90 percent of the county population lives in urban areas, and (3) the county's population in urbanized areas is at least 50,000 or 90 percent of the county population. The density and the 90 percent requirement serve as above, and 50,000 is the urbanized area threshold for the nucleus of a metropolitan county. The second part of the third criterion is only necessary because independent Virginia cities are treated as counties statistically; it designates as urban counties some independent cities that have fewer than 50,000 residents but are entirely or almost entirely within larger urbanized areas that spill over their borders. • Mixed rural county: (1) The county meets neither the urban nor the rural county criteria, and (2) its population density is less than 320 people per square mile. That density is two acres per person; it has no official standing but seems reasonable. • Mixed urban county: (1) The county meets neither the urban nor the rural county criteria, and (2) its population density is at least 320 people per square mile. Thus, mixed urban counties are almost two-thirds of the way from no population to the urban density threshold of 500 people per square mile." (p. 475)
USDA ERS Rural Urban Continuum Code	Metropolitan counties 1. Counties in metro areas of 1 million population or more 2. Counties in metro areas of 250,000 to 1 million population 3. Counties in metro areas of fewer than 250,000 population Nonmetropolitan counties 1. Urban population of 20,000 or more, adjacent to a metro area 2. Urban population of 20,000 or more, not adjacent to a metro area 3. Urban population of 2,500 to 19,999, adjacent to a metro area 4. Urban population of 2,500 to 19,999, not adjacent to a metro area 5. Completely rural or less than 2,500 urban population, adjacent to a metro area 6. Completely rural or less than 2,500 urban population, not adjacent to a metro area (USDA, 2013).

University System Class definition	This definition groups counties in the state into 3 classes in terms of level of economic distress. Class One counties are the 40 counties with the highest annual distress ranking (using metrics from the below criteria), Class Two counties are the next highest 40 ranking counties, and Class Three counties are the 20 counties with the lowest level ranking. Criteria used to determine Class status: • Average unemployment rate for the most recent twelve months for which data are available (October 2016–September 2017, Department of Commerce). • Median household income for the most recent twelve months for which data are available (2015, U.S. Census, Small Area Income & Poverty Estimates). • Percentage growth in population for the most recent 36 months for which data are available (July 2013–July 2016, Office of State Budget & Management). • Adjusted property tax base per capita for the most recent taxable year (FY 2016–17, Department of Public Instruction). Automatic qualifying criteria for Class One and Class Two status: • A county with a population of less than 50,000 people Automatic qualify criteria for a Class One county • A county must be Class One for at least two consecutive years • A county with less than 12,000 people • A county with a population less than 50,000 people AND a poverty rate of 19% or greater

definitions of rurality we applied to this study: The USDA ERS Rural Urban Continuum Codes, abbreviated as USDA ERS RUCC (U.S. Department of Agriculture, 2013), the Rural–Urban Density Typology (Isserman, 2005), and the new university system Class definition. We then briefly describe the benefits and drawbacks of each.

The Rural–Urban continuum codes of the USDA ERS are the classification most frequently applied in rural education studies (Nugent et al., 2017). At the core of the USDA ERS coding lies the county-level classification of the Office of Management and Budget (OMB). Using counties as the smallest geographic unit, the OMB designates metropolitan and micropolitan areas that pivot around urbanized areas of 50,000 or more people, and urban clusters of 10,000 to 49,000 people (OMB, 2013). Together, metropolitan and micropolitan areas form core based statistical areas, and the remaining counties make up the outside core. Contiguous counties may join core areas based on employment measures. Building on OMB's metropolitan and micropolitan designations, the USDA ERS refines the classification by further dividing metropolitan areas into three metro categories according to population size (i.e., 1 million or more, 250,000 to 1 million, fewer than 250,000) (USDA, 2013). Additionally, the USDA ERS labels micropolitan and outside core areas as non-metro areas. These non-metro areas are classified into six categories based on population size (i.e., 20,000 or more, 2,500 to 19,999, and less than 2,500) and contiguity to metro areas. A benefit of these codes is that unlike some county-level definitions, they provide a higher level of population specific information per county. However, rural/urban mixture within a county is often still lost as proximity to the metro core areas can suppress a true measure of rurality in those counties as is the case in many counties in the state in which Southern University is located. In the case of many counties flagged as any of the three metro types (46%), an informed policymaker and most citizens would agree that qualitatively and practically these counties house a multitude of communities that are not metropolitan or influenced by metropolitan areas in the county. There are often cases of rural "overbounding" or "inclusion of large rural expanses

not intimately related to a metropolitan core" (Morrill et al., 1999, p. 730). Another drawback is the practical use of the nine levels of classification. In our case, working with educational data even at a large institution across multiple cohort years, there are too few students from many of the levels for statistical analysis. Thus, to have enough students per cell for analysis, we must conflate the levels, resulting in a Rural–Urban dichotomy, one which does not allow us to look at a mixture by county with a number of counties that are perhaps rural in character being pulled into the urban block.

The next definition we consider is the university system definition recently adopted by the university system of which Southern University is a part. This definition was developed by the state's department of commerce. Using rankings based on four economic indicators (unemployment rate, median household income, population growth, and adjusted property tax base per capita), the department of commerce classifies its counties into one of three classes to indicate the level of economic distress. Class One counties represent the most economically distressed counties whereas Class Three counties are the least distressed. A state statute establishes how counties are distributed across Class, with 40 counties allocated to Class One, 40 to Class Two, and 20 to Class Three. The university system's adaptation of this definition considers students as rural if they are from counties that were classified as Class One and Class Two counties in the year 2016. This definition relies on the relationship between economic development and population density to classify rurality as it was not specifically developed to be a rurality definition but rather an economic distress indicator. Given the statute requiring counties to be divided into Class Three, Class Two, and Class One in groups of 40/40/20, respectively (i.e., there must be 40 Class Three, 40 Class Two, and 20 Class One counties), rurality for many counties will be artificially constructed and limited. This definition also does not account for mixture within a county. Nonetheless, given the relationship between economic development and population density in the state, the Class One and Class Two counties are mostly (that is, fairly often but not entirely) defined as most rural by other definitions as well. However, there are a roughly a dozen Class Three counties that have a significant number of towns with small populations and/or population density that by this definition are considered urban.

To overcome the limitations inherent in federal urban–rural classifications, some researchers developed alternative coding schemes. Isserman's (2005) Rural–Urban Density Typology builds on OMB's urban core and census density standards to also recognize spaces where urban and rural blend. The Rural–Urban Density Typology makes classifications at the county level by creating distinctions for when counties are predominately urban, predominately rural, or a blend of the two: mixed rural or mixed urban. According to Isserman's typology, counties can be rural (fewer than 500 persons per square mile and 90% of population residing in rural places), urban (minimum 500 persons per square mile and 90% of population residing in urban places), mixed rural (fewer than 320 persons per square mile but does not meet rural county criteria), or mixed urban (minimum 320 persons per square mile but does not meet urban county criteria). Using the Rural–Urban density typology attributes 85% of the nation's 55 million rural people, as defined by the U.S. Census, to rural and mixed rural counties and only 5% to urban counties. In contrast, integrating both the Rural–Urban typology and metro/non-metro distinction places 36% of the rural population in metropolitan counties that are rural or mixed rural. Thus, a benefit of the Rural–Urban typology definition is that counties are not homogenous, and this definition accounts for admixture within counties. This helps derive a sense of the rural character of an area given the number of small towns/communities outside the influence or commuting vicinity of urban centers. However, this definition, like all, is not without flaws. Waldorf & Kim (2015) note that while the tail ends of urban and rural are well-defined (and many of those that fall in the mixed categories), there is still the issue that in many cases, "groups of counties that do not meet either the rural or urban thresholds are only differentiated by a population density threshold of above versus below 320 persons per square mile" (p. 6), and that Isserman's threshold of 320 (like any of the threshold cutoffs for any given definition) is somewhat "arbitrary."

Nonetheless when we look at the county breakdown of the state in which Southern University is located using the Rural–Urban Density Typology and considering insider knowledge of local economies, commuting patterns, and influence of urban centers, the researchers originally believed that this definition most accurately captured the rural nature of more of the state's counties. However, with this definition, one can also encounter similar issues as the USDA ERS Rural Urban Continuum Codes—depending on the population of interest for analysis, one may not have enough observations per level, in which case conflation is necessary. In most cases for analyses at Southern University, this does not present an issue. However, for the purpose of this study (as described in more detail in subsequent sections) we conflated the four-category Rural–Urban Density Typology into a rural/urban binary so that we could make a consistent rural/urban comparison across all three definitions (as noted, USDA ERS RUCC also had too few observations from each of the nine categories and the decision was made to conflate into rural/urban).

In Table 2, we offer a county-level comparison of three rurality definitions (as binary definitions) and classification of rurality. It is important to note that there is variation in the amount of overlap between all three definitions in terms of which counties are considered rural. When comparing the university system Class definition to the Rural–Urban Density Typology definition, we see that the university system Class definition classifies 15 counties as non-rural that are considered rural by the Rural–Urban Density Typology. The Rural–Urban Density Typology lists five counties as non-rural that are considered rural by the university system Class definition. The university system Class definition and Rural–Urban Density Typology have the greatest amount of classification overlap relative to the USDA ERS RUCC classification.

Table 2

State County-Level Classification by Rurality Definitions

Rurality Classification by County	University System Class definition		Rural–Urban Density Typology (Isserman, 2005)		USDA Rural Urban Continuum Codes	
	N	%	N	%	N	%
Non-Rural County	**20**	**20.0%**	**10**	**10.0%**	**46**	**46.0%**
Rural County	**80**	**80.0%**	**90**	**90.0%**	**54**	**54.0%**

Table 3

Comparison of County Classification of University System Class definition and Rural–Urban Density Typology

University System Class Definition	Rural–Urban Density Typology	
	Number of Non-Rural Counties	Number of Rural Counties
Number of Non-Rural Counties	5	15
Number of Rural Counties	5	75

Comparing the university system Class definition to the USDA ERS RUCC classification, we find that the USDA classifies 30 counties as non-rural that are classified as rural by the university system definition. The university system definition only classifies four counties as non-rural that are considered rural by the USDA definition. The USDA ERS RUCC definition classifies the most counties as non-rural (falling into one of the "metro" categories) out of all three definitions. All 10 counties considered non-rural under the Rural–Urban Density Typology are also considered non-rural by the USDA definition. There are only five counties that are considered urban by all three definitions. These counties are home to four of the state's major urban centers. There are 50 counties (1/2 of the counties in the state) that are considered rural by all three definitions.

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Research Question

Our study centered on the following question: How do findings for college student success measures vary by the definition of rurality applied?

Methods

To answer our research question, we conducted logistic regression for success outcomes (second-year retention and six-year graduation) for Southern University students using three different definitions of rural: Rural–Urban Density Typology, USDA ERS Rural Urban Continuum Codes, and the university system Class definition.

The data used to answer these questions are from historical student records from in-state, full-time, first-time undergraduate students from three incoming freshmen cohorts at the institution: 2009, 2010, and 2011. Student record data included 12,079 observations from the three cohorts combined.

Table 4

Comparison of County Classification of USDA ERS RUCC and University System Class Definitions

	USDA ERS RUCC Definition	
University System Class Definition	Number of Non-Rural Counties	Number of Rural Counties
Number of Non-Rural Counties	16	4
Number of Rural Counties	30	50

In this article, we focus on findings for comparison of definitions and outcomes for second-year retention and six-year graduation as those are student success outcomes identified for improvement at the study institution. Using each definition, we constructed logistic regression models using second-year retention and six-year graduation as response variables. The response variable for retention was classified as either *retained* or *not retained* with a dummy variable value of one or zero, respectively. Similarly, six-year graduation was recorded as a value of one if the student graduated in six years and zero if not.

The logistic regression models included student demographics as well as a term to index a student's rural or urban background using one of the three definitions as covariate. The rurality covariate was derived from the county of residence provided on each student's initial application to the university. As previously noted, a number of student background characteristics and academic success and performance (effort) have been noted to influence retention and graduation in higher education literature. The control variables we included in retention and graduation models were gender, first generation college student status[i], and race/ethnicity using Integrated Postsecondary Education Data System (IPEDS) classifications along with Southern University's definition of underrepresented minority (Black or African American, Hispanic, American Indian or Alaska Native, Hawaiian or Other Pacific Islander) to create a variable underrepresented minority (URM or non-URM). In this study, we used Pell status as a proxy for low income (Cahalan & Perna, 2015) and included a variable indicating whether or not the student received a Pell grant. We also controlled for college (the first college the student entered at Southern University grouped by Science, Technology, Engineering and Math (STEM) vs. non-STEM colleges) because some colleges at the study institution, particularly STEM majors, may have slightly longer time to degree. We also included SAT score (math and verbal) as we have previously found higher SAT scores to be associated with higher rates of retention and graduation on this campus and high school GPA to represent effort/academic performance. We also included a variable for total test credits brought into Southern University. Specific to the institution, we included variables for the number of credit hours passed in the first term at Southern University and cumulative first term GPA at Southern University. There is evidence that the number of credits taken during the first semester of college can potentially impact graduation (Attewell & Monaghan, 2016), and at the study institution, internal studies have suggested that a higher number of credit hours attempted and passed in the first term is correlated with higher likelihood of graduating in less than six years. Additionally, at Southern University, student outcome analyses consistently suggest that a student's first term GPA is a strong predictor of their final GPA.

For this analysis, as noted, we made all the definitions binary for comparison. The necessity of collapsing rural categories as such when modeling using threshold definitions is a noted limitation (Waldorf & Kim, 2015). For the Rural–Urban Density Typology, we conflated rural and mixed rural into a single rural category and urban and mixed urban in to a single urban category. Similarly, for USDA ERS Rural Urban Continuum Code, we combined all six nonmetropolitan classifications into a single rural category, and all three metropolitan classifications into a single urban category. For the university system definition, following university system guidelines, Class One and Class Two counties were considered rural and Class Three counties were considered urban.

All variables listed above were initially included in models for second-year retention and six-year graduation, and a backward selection process was used to remove nonsignificant covariates in order to achieve more parsimonious models. Initial models were run without inclusion of interaction terms for variables of interest, and subsequent models included interactions between rural typology variables and other variables of interest to explore potential interactions between variables such as rurality and first-generation status, SES, etc. We compared the adjusted R2 and AIC of the models (with and without interactions) along with concordant pairs to determine the best fitting models.

Table 5

Population Captured as "Rural" in Each Definition, 2009–2011 Cohorts Combined

Rurality Definition	% of Incoming First Year Students 2009–2011 at Southern University Considered Rural (In-state students only)
USDA ERS RUCC	15% (N=1829)
University System Class Definition	34% (N=4049)
Rural–Urban Density Typology	45% (N=5468)

Findings

As demonstrated in Table 5, the number of students considered rural varies greatly by definition used, ranging from 15% of the incoming student population from 2009–2011 being considered rural with the USDA ERS RUUC non-metro category, up to 45% using the Rural–Urban Density Typology.

Using the three definitions, we compared retention and graduation outcomes for second-year retention and six-year graduation. Despite differences in the populations captured by definition, the retention and graduation rates for rural students were fairly similar across all three definitions (Table 6).

Regression Models

For second-year retention, models using the three distinct definitions tell a similar story (Table 7). In all three models, rural students, however defined, are less likely to be retained after their second year than students from non-rural areas. Additionally, all three models suggest that first generation college students are less likely to be retained, but there were no significant interactions in any of the models between first generation status and rurality. A higher first term GPA, higher number of test credits brought in, and receiving a Pell grant predicted higher likelihood of returning after the second year. Notably, across all three definitions, rural students posted a lower first term GPA, which has historically been a strong predictor of retention and graduation at the study institution.

Table 6

Second-Year Retention and Six-Year Graduation Rates by Rurality Definition, 2009–2011, First Year Cohorts Combined, Southern University

Rurality Definition	2nd-Year Retention Rural Students	2nd-Year Retention Urban Students	6-Year Graduation Rural Students	6-Year Graduation Urban Students
USDA ERS RUCC	81.5% (N=1492)	86.7% (N=8893)	62.3% (N=1141)	68.2% (N=6990)
University System Class Definition	82.7% (N=3351)	87.6% (N=7034)	63.1% (N=2556)	69.4% (N=5575)
Rural–Urban Density Typology	83.6% (N=4574)	87.9% (N=5811)	64.5% (N=3535)	69.5% (N=4596)

Table 7

Second-year retention for 2009–2011 First Year Cohorts Combined, Southern University by Rurality Definition

Variable	Estimate	Rural–Urban Density Typology	University System Class Definition	USDA ERS RUCC
Intercept	B	0.4795	0.4687	0.448
	SE	0.2676	0.2685	0.2654
	OR		.	
Total Test Credits from High School	B	0.0225	0.0221	0.0221
	SE	0.00549	0.00551	0.00548
	OR	1.023	1.022	1.022
First Term GPA	B	1.0613	1.0603	1.0649
	SE	0.0336	0.0337	0.0336
	OR	2.89	2.887	2.901
Hours Passed First Term	B	x	x	x
	SE	x	x	x
	OR	x	x	x
Rural Variable*	B	-0.1704	-0.144	-0.269
	SE	0.0588	0.0613	0.0746
	OR	0.843	0.866	0.764
Student's First College**	B	-0.1547	-0.1534	-0.15
	SE	0.0589	0.059	0.0588
	OR	0.857	0.858	0.861
SAT Verbal Score	B	-0.00262	-0.00264	-0.003
	SE	0.00045	0.000449	0.00045
	OR	0.997	0.997	0.997
SAT Math Score	B	x	x	x
	SE	x	x	x
	OR	x	x	x
First Generation Status***(First gen)	B	-0.2497	-0.2482	-0.244
	SE	0.1003	0.1003	0.1003
	OR	0.779	0.78	0.783
First Generation Status (FG Status Unknown)	B	-0.2803	-0.2858	-0.287
	SE	0.0688	0.0688	0.0685
	OR	0.756	0.751	0.751

Variable	Estimate	Rural–Urban Density Typology	University System Class Definition	USDA ERS RUCC
Pell Grant Recipient ****	B	0.1661	0.165	0.1647
	SE	0.0658	0.0659	0.0659
	OR	1.181	1.179	1.179
High School GPA	B	x	x	x
	SE	x	x	x
	OR	x	x	x
Race (Non-URM is reference group)	B	x	x	x
	SE	x	x	x
	OR	x	x	x
Gender (Male is reference group)	B	x	x	x
	SE	x	x	x
	OR	x	x	x

*Different definition for each model; rural is the reference group
**Student's first college in a STEM college is the reference group
***Non-first-generation college student is the reference group
****Non-Pell Grant recipients are the reference group

Looking at six-year graduation (Table 8), we see a slightly different trend when comparing definitions. Comparing the most parsimonious models (again, those that did not include interactions between any of the variables), both the Rural–Urban Density Typology and the USDA ERS RUCC definition models include rurality as a significant factor influencing six-year graduation (rural students are less likely to graduate in six years than urban peers). The university system Class definition model does not include rurality as a significant variable. Additionally, the university system Class definition model includes Pell recipient status as a significant variable, with students who receive Pell less likely to graduate in six years than those who do not. However, despite these differences in the models, they do pattern similarly in that all three predict higher odds of graduating with more test credits brought in, higher first term GPA, higher number of hours passed first term, being female, and first college being non-STEM. All three models again suggest higher SAT verbal score as being a negative predictor of graduation in six years.

Discussion and Conclusions

All three definitions tend to capture the most rural counties in the state well. It is evident that students from the most rural counties (which are also often the most economically challenged) are not retained and do not graduate at the same rates as their peers (National Student Clearinghouse, 2019). However, some definitions, like the university system Class definition and the USDA ERS RUCC, may fail to include rural students in mixed rural/urban counties. This is notable as Isserman (2005) suggests that most counties in the U.S. have a heterogeneous mixture of rural and urban. This potential imprecision matters because students who live in small towns and rural communities in counties that contain an urban center often face similar challenges as students who lives in small towns and rural communities in counties without an urban center. For example, they might have the same feelings of being academically underprepared (Ditillo, 2019) and face challenges navigating a new environment (Ditillo, 2019; Stone, 2017). As such, we might expect similar outcomes for them in college.

Table 8.

Six-Year Graduation for 2009–2011 First Year Cohorts Combined, Southern University by Rurality Definition

Variable	Estimate	Rural–Urban Density Typology	University System Class Definition (No interactions)	USDA ERS RUCC
Intercept	B	-1.1981	-1.3613	-1.207
	SE	0.1938	0.1887	0.1913
	OR	x	x	x
Total Test Credits from High School	B	x	x	x
	SE	x	x	x
	OR	x	x	x
First Term GPA	B	0.8744	0.8777	0.8761
	SE	0.0307	0.0306	0.0306
	OR	2.398	2.405	2.402
Hours Passed First Term	B	0.0216	0.0215	0.0216
	SE	0.0024	0.00241	0.0024
	OR	1.022	1.022	1.022
Rural Variable*	B	-0.087	x	-0.162
	SE	0.0435	x	0.0581
	OR	0.917	x	0.85
Students' First College **	B	0.1552	0.1583	0.157
	SE	0.0439	0.0438	0.0439
	OR	1.168	1.172	1.17
SAT Verbal Score	B	-0.0019	-0.0019	-0.002
	SE	0.0003	0.00032	0.0003
	OR	0.998	0.998	0.998
SAT Math Score	B	x	x	x
	SE	x	x	x
	OR	x	x	x
First Generation Status*** (First gen)	B	-0.2332	-0.2219	-0.236
	SE	0.0502	0.0516	0.0498
	OR	0.792	0.801	0.79
	B	-0.1843	-0.1717	-0.183

Variable	Estimate	Rural–Urban Density Typology	University System Class Definition (No interactions)	USDA ERS RUCC
First Generation Status*** (First gen status unknown)	SE	0.076	0.0763	0.076
	OR	0.832	0.842	0.833
Pell Grant Recipient****	B	x	-0.0976	x
	SE	x	0.0493	x
	OR	x	0.907	x
High School GPA	B	x	x	x
	SE	x	x	x
	OR	x	x	x
Gender (Male is reference group)	B	0.2628	0.2653	0.263
	SE	0.0438	0.0438	0.0438
	OR	1.301	1.304	1.301
Race (Non-URM is reference group)	B	-0.2806	0.1219	-0.276
	SE	0.0534	0.0272	0.0532
	OR	0.755	1.276	0.759

*Different definition for each model; rural is reference group
**Student's first college in a STEM college is the reference group
***Non-first-generation college student is the reference group
****Non-Pell Grant recipients are the reference group

While second-year retention models performed similarly, the six-year graduation model using the university system Class definition suggested that *rurality is not a significant predictor of student performance*. Further exploring this finding is critical. The results generated from the Class definition may be misleading due to the fact that a number of counties with a significant number of rural communities are considered Class Three (urban) and thus are excluded from being considered rural. While the Class status might capture economic indicators for the county *at large*, it may not accurately capture the rural character of the county. This finding presents a possible issue as we assess performance indicators and make decisions about programming and interventions to support rural students. As a university level metric, the Class definitions yield graduation rates for rural students that appear higher given the omission of several key counties. However, knowing that rural students face challenges that urban students do not, by using this definition we miss out on identifying rural students for interventions. These students who then might not be targeted for interventions are still captured in the university's overall graduation rates (for example, the previously listed counties account for 12% of the population in this study; N=1432).

As previously noted, rural scholars suggest that rurality is not just about metrics; it is multidimensional and sociocultural. As Hawley et al. (2016) note, "a one-size fits all definition ranks somewhere between dictatorial and chimerical" (p. 4). Therefore, for practitioners in higher education, it may be important to use multiple measures, context, and judgment when making decisions about rural students and what definition is applied.

Considering rurality from multiple lens or definitions can more holistically assess how this element can shape both students' pre-college experiences and postsecondary education success. Definitions should be sensitive to state, county, and community knowledge. This means that any one definition will inevitably miscategorize some students who perhaps then do not receive the appropriate services and be at a higher risk for not completing.

Across definitions, our analyses suggest that outcomes are generally lower for rural students. However, as we noted, the university system Class definition's exclusion of several counties with rural populations may mask some issues tied to graduation rates and student support. The results of these analyses suggest that as we continue analyzing student success data, we must systematically identify rural students and evaluate outcomes for this population. We must also continue to be thoughtful and intentional about how we define rural and whom we might be including or excluding depending on our definition. As researchers and practitioners, we must balance efficiency and practicality when making distinctions such as defining rurality and continually reflect upon and leverage the state, county, and community level knowledge that our campus and community stakeholders can provide to develop the most accurate ways of operationalizing rurality. As the push to support rural college student access and success increases nationally, this study (although institutionally specific) may serve to spur critical thought and action among both assessment/institutional research practitioners in higher education as well as researchers as they consider how they approach defining rural students on their campuses.

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End Notes

[i] In this study we use the Federal TRIO definition: "(A) an individual both of whose parents did not complete a baccalaureate degree; or (B) in the case of any individual who regularly resided with and received support from only one parent, an individual whose only such parent did not complete a baccalaureate degree."