

## AN ABSTRACT OF THE THESIS OF

Christian B. Sinnott for the degree of Master of Arts in Interdisciplinary Studies in Psychology, Psychology, and Rural Studies presented on June 10<sup>th</sup>, 2016.

Title: Investigating Differences between Rural and Non-rural Students

Abstract approved:

---

Kathryn A. Becker-Blease

Rural students have lagged behind non-rural students in matriculation into higher education, as well as in completion of four-year degrees. The current studies sought to investigate academic readiness, academic performance, and psychological differences between rural and non-rural students at Oregon State University. Rural and non-rural students were compared during spring term of the 2014-2015 academic year, as well as during the fall term of the 2015-2016 academic year. No significant differences were observed between rural and non-rural students' levels of academic readiness prior to entering Oregon State University, nor their academic performance in introductory-level psychology courses. The only psychological difference observed between rural and non-rural students concerned grit, or a measure of one's ability to persist through hardship in completion of a goal. Implications of these findings on future research and interventions are discussed.

Keywords: *rural, rural student, student success, higher education*

©Copyright by Christian B. Sinnott  
June 10, 2016  
All Rights Reserved

Investigating Differences between Rural and Non-rural Students

By

Christian B. Sinnott

A THESIS

submitted to

Oregon State University

in partial fulfillment of  
the requirements for the  
degree of

Master of Arts in Interdisciplinary Studies

Presented June 10, 2016  
Commencement June 2017

Master of Arts in Interdisciplinary Studies thesis of Christian B. Sinnott presented on June 10, 2016.

APPROVED:

---

Major Professor, representing Psychology

---

Director of the Interdisciplinary Studies Program

---

Dean of the Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

---

Christian B. Sinnott, Author

## ACKNOWLEDGEMENTS

The author expresses sincere appreciation to the following individuals:

To Dr. Becker-Blease, for taking a chance on me and encouraging me to flourish as a graduate student. You approached me about this study two years ago, and I am glad I jumped at the opportunity. I have enjoyed working with you not only on this thesis, but on various other projects over the last two years. I owe much of my future success to you, and for that I am indebted.

To Dr. Mei-Ching Lien, for opening my eyes to the world of research. You significantly changed my career and life path in so many ways. The experience working in your lab drove me to consider graduate school in the first place, and for that I am forever grateful. I can only hope that I make you proud as I continue through my academic and professional careers.

To Dr. Kate MacTavish, Laurie Bridges, and the diverse faculty I encountered through the rural studies program; as you were a much-needed perspective outside of psychology. You all opened my eyes to a variety of methodologies and applications outside of a sterile lab environment that I had never considered.

To my friends and family: you put up with me throughout my highs and lows. I have no doubt that I would not have made it to this point in my life without all of your love and support. Thank you for holding me up when I couldn't stand.

To my cohort, Jamie Naylor, Katy Krieger, and Ameer Almuaybid, as well as the cohorts before and after me. You roped me into this, kept me in, and saw me through. May our judgment be forever questionable.

# TABLE OF CONTENTS

	<u>Page</u>
1 Recent Trends in Rural Research.....	1
1.1 Defining Rural Status.....	2
1.2 Differences between Rural and Non-rural Students.....	6
2 Motivation.....	9
2.1 Academic Readiness.....	9
2.2 College Academic Performance.....	10
2.3 Psychological Factors.....	10
3 Outcomes, Implications & Interventions.....	14
4 Study 1.....	18
4.1 Participants .....	18
4.2 Materials .....	19
4.3 Procedure.....	20
4.4 Results.....	21
4.41 Academic Readiness.....	21
4.42 Academic Success.....	22
4.43 Individual Differences.....	24
4.5 Discussion.....	27
5 Study 2.....	31
5.1 Participants.....	31
5.2 Materials.....	32
5.3 Procedure.....	33

## TABLE OF CONTENTS (Continued)

	<u>Page</u>
5.4 Results.....	34
5.41 Academic Readiness.....	34
5.42 Individual Differences.....	36
5.5 Discussion.....	38
6 Conclusion.....	42
6.1 Implications for Interventions.....	45
6.2 Future Avenues of Research .....	47
7 References.....	50
Appendices .....	58

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. NCES urban-centric rural locale category.....	5



## LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Statistics measuring academic readiness in spring term 2015.....	22
2. Differences between students' exam scores in spring term 2015.....	23
3. Differences in academic success between students in spring 2015.....	24
4. Differences between students' Big Five personality measures in spring 2015.....	25
5. Differences between students' perceived stress and grit in spring 2015.....	25
6. Significant correlations between grit and other dependent variables in spring 2015.....	26
7. Differences between students' academic success and readiness in fall term 2015.....	36
8. Psychological differences between students in fall term 2015.....	37
9. Significant correlations between grit and other dependent variables. in fall term 2015...	38

## LIST OF APPENDICES

<u>Appendix</u>	<u>Page</u>
A. Ten-item Personality Inventory (TIPI).....	58

## **Recent Trends in Rural Research**

Recent research has confirmed a troubling trend long held by educators and researchers alike: the belief that rural students are less successful than non-rural students in higher education. While rural students appear to be matriculating at rates lower than non-rural students, and also appear to be completing degrees at four-year institutions at rates lower than non-rural students (Provasnik, KewalRamani, Coleman, Gilbertson, Herring, & Xie, 2007), very little research describes the reason for these gaps. Thus, educators and researchers risk making policy and intervention decisions about rural students' needs without being fully informed. At best, these policy and intervention decisions serve to waste a large amount of money and other resources on a problem that doesn't exist; at worst, these can serve to actively harm those whom the intervention seeks to help in the first place.

Despite these consequences, or perhaps because of them, educators continue to make intervention decisions about rural students that may not actually help them. Furthermore, these decisions may be based on a minute amount of research. For example, previous research has invoked psychological factors such as stress, awareness of rural status, and lack of social involvement as explanatory factors for rural students' poorer performance (Ast, 2014). While this type of study may serve as a good starting point for future research, more research is necessary to determine what kinds of challenges, if any, rural students face in higher education. Without an adequate body of research on this topic, educators and administrators cannot hope to create properly informed and designed interventions for rural students.

One way of furthering this body of research is through use of different methodologies. Much of the previous research on this subject largely relies upon self-report and qualitative

research methods to derive these reasons for any differences without experimentally testing them. While this type of research is useful in initial investigation of any problem, larger-scale, experimental research is necessary to determine whether specific differences actually exist between rural and non-rural students. In order to address these limitations, more thorough and rigorous research should be conducted, using quantitative experimental methodologies. Only after thorough research is conducted, and any possible differences between rural and non-rural students identified, should educators and administrators begin to consider intervention design and implementation.

### *Defining Rural Status*

Rural status, by its nature, is somewhat subjective and difficult to define. Many researchers within the field of rural studies initially focused upon easily quantifiable definitions of rurality. Aspects of rural areas such as population, or county lines were used to divide areas into rural and non-rural regions. These simplistic measures were largely inconsistent between different nations or areas within a country. When some of these more simplistic measures began to be combined, more robust definitions of rurality began to emerge.

In the United States of America, these simple definitions of rurality are largely drawn from U. S. Census data. One such index of rurality is based strictly upon population, and is summed up by as follows: "all territory, population and housing units in urbanized areas" and "in places of 2,500 or more persons incorporated as cities, villages, boroughs (except in Alaska and New York), and towns (except in the six New England states, New York and Wisconsin)." would be considered urban; everywhere else rural (US Census Bureau, 1995, pg. 1). Other definitions may be used by the US Office of Budget and Management (OMB), as well as other

censuses in other nations. These definitions are not well-suited for research; they are invalid, and often dichotomous.

These definitions split areas into rural OR urban, with no regard for any intricacies or spaces in between. Due to the reliance upon population size as the sole determining factor of rurality, certain communities may be misclassified or unrepresented. In particular, isolated communities may be classified as urban despite being only slightly above this population cutoff, and hours away from any amenities provided by a truly urban community.

To help address these issues, researchers have begun to incorporate factors other than population size when creating definitions and indices of rurality. An interdisciplinary approach has been adopted: anthropologists, sociologists, economists, and educators incorporate social aspects of rural areas in order to create these newer definitions. The United States Department of Agriculture (USDA) has utilized commuting and traffic flow to help delineate urban and rural areas into various sub-county regions. These new methods serve to describe communities in greater detail. By observing traffic flow, researchers can extrapolate information about employment, amenities, and other factors that can better describe how isolated and independent a rural community may be. This type of data can help researchers determine whether a rural community is truly isolated and cut-off from many amenities (such as properly-funded schools), or if a rural community serves as a bedroom community to a larger urban area.

The USDA initially started with current US Census data, and applied the aforementioned US OMB qualifications onto this data. While this data is initially imprecise, the USDA further refined it by utilization of census tracts rather than county lines. Furthermore, researchers incorporate measures of urbanization, daily commuting, and population count and density to

further refine these measures. The result is a much more accurate portrayal of urban-rural interdependence (USDA, 2010). This portrayal is useful in order to better delineate between rural and urban communities in areas such as the periphery around an urbanized area. In these places, definition simply by population size and county size is too imprecise. This is a fine example of the refinement that rural operationalization has undergone over the last twenty years. However, this definition is not necessarily appropriate for the purposes of educational research. Many students attend schools in places where they do not reside, such as a private school, or simply a school in a different district. A coding system that focuses upon the school's status as rural or urban would mitigate this discrepancy.

Recently, the National Center for Education Statistics (NCES) formulated a new means of coding for rural and non-rural locations. Designed in 2007 strictly for educational purposes, the NCES urban-centric coding system seeks to define schools as belonging to rural areas, rather than populations or geographical regions. The NCES defines a school as qualifying into one of four groups: rural, town, suburban, and urban. These four groups are further divided into three substrata. These definitions are based primarily on distance from an urban center, as well as population size (to a lesser extent). By using the school rather than a place of residence to define rurality, researchers can better capture the experience students at a given school are having. In particular, identifying the schools themselves can serve to identify the relative lack of resources present in rural schools relative to urban ones. Additionally, this definition describes remoteness of a given area or school in an unprecedented way. One example of these definitions is displayed below in figure 1.

Figure 1: *NCES urban-centric rural locale category.*

---

***Rural***

**Fringe** Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster

**Distant** Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster

**Remote** Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster

To give another example: one school in Corvallis, Oregon, named Crescent Valley High School, is classified as a fringe rural area. This is due to its small population size *in combination with* its relative proximity to a larger, urbanized area. Monroe High School, a school placed in Monroe, Oregon, would be considered placed within a distant rural area; being relatively close to larger urbanized areas such as Corvallis or Eugene, Oregon. Frenchglen Elementary School, in the unincorporated community of Frenchglen, Oregon, is considered a distant rural area; being well over 25 miles from the nearest urbanized area of Burns, Oregon.

Similar substrata exist for the other three categories: urban, suburban, and town. The NCES urban-centric coding system has served as a good index of rurality for researchers investigating rural education. Using this definition of rurality, educational researchers can

distinguish rural student populations from non-rural ones. Typically, this research centers on differences between these two populations.

### *Differences between Rural and Non-Rural Students*

Differences between rural and non-rural students have been studied mainly at the secondary level of education. From these populations, three main themes are often investigated by rural educational researchers. The first is the issue of high school graduation. Previous literature has posited that there are differences between rural and non-rural high school students (Provasnik et al., 2007). While this may be in line with the common view that rural students do not complete high school at the same rates as their non-rural counterparts, recent research has largely rebuked that notion, showing that any completion/graduation gap between rural and non-rural high school students has largely closed (Kusmin, 2011; National Center for Education Statistics, 2013). Data shows that rural students are graduating high school at rates equal to non-rural students.

Another main issue investigated by rural education researchers is that of matriculation into four-year universities. Most research in this specific area has indicated that rural students are entering college at lower rates than non-rural students (Provasnik et al., 2007; Byun, Irvin, & Meese, 2012). Other researchers posit that this rural enrollment gap is growing rather than shrinking (Kusmin, 2011). Other research has indicated the opposite, or that rural and non-rural students are entering at roughly similar rates (Hardre, Crowson, Debacker, & White, 2007). While the overwhelming trend seems to point towards differences being present between these two populations, it is not a point without contention within the research community (Strange,



Jonson, Showalter, & Klein, 2012). Within the literature, it isn't clear whether or not rural students are matriculating into universities at lower rates than non-rural students.

Proposed reasons for this rural enrollment gap are myriad, ranging from cultural differences between rural and non-rural communities (Bergerson, Heiselt, & Aiken-Wieniewski, 2013), first-generation student status (Chen, 2005), low socioeconomic status (Oldfield, 2007), geographic isolation (Long, 2004), and/or inadequate college preparation in high school (Holmes & Dalton, 2008). While these factors support the argument that rural students are matriculating at lower rates than non-rural students are present, sole acceptance of this research doesn't account for many of the advantages rural students may leverage. Literature also portrays a positive perspective in regards to rural students' college matriculation. The capability of prospective rural college students to leverage social capital to aid their educational achievement and matriculation into university is well-documented (Israel, Beaulieu, & Hartless, 2001; Gofen, 2009), and some argue that this ability has even closed the matriculation gap (Nelson, 2016). This rural advantage may not be captured by larger-scale, national studies which document a matriculation gap.

Another possible factor that may explain this matriculation gap is the manner in which it was measured. This gap is primarily measured through a count of students matriculating *directly* into a four-year university from high school (Provasnik et al., 2007). It does not account for alternate pathways into a four-year university, such as through a community college. Community colleges may be more appealing to rural students for a number of reasons. Reduced costs, as well as an easier transition into post-secondary education (Carter, 2014) may draw rural students to enroll and matriculate into community colleges. It is possible that rural students attending community colleges are receiving an adequate level of education or vocational training not necessitated by a four-year degree. It is also possible that rural students are also transferring into

four-year institutions from community colleges. In either case, rural students' matriculation may be erroneously underreported, resulting in a perceived matriculation gap.

One final issue researchers are concerned with is rural student achievement in higher education. While the rural enrollment/matriculation gap can be explained largely by the aforementioned differences, they do not completely explain the differences in achievement between rural and non-rural students. An achievement gap is measurable between rural and non-rural students in secondary education, with students performing worse on standardized exams (Roscigno & Crowley, 2001), however there is little research measuring for a similar gap at the post-secondary level between rural and non-rural students. Thus, it becomes necessary to measure whether or not rural students are actually performing any different from non-rural students.

Research has shown a growing gap between rural and non-rural students' rates of degree completion at four-year universities (Kusmin, 2011; Byun, Meece & Irvin, 2012). Low socioeconomic status was found to be the chief explanation behind this gap (Byun, Meece & Irvin, 2012). Researchers have also found achievement gaps in many at-risk groups overlapping with rural students. Reduced achievement and retention rates have been observed in both first-generation students (Warburton, Bugarin, & Nunez, 2001) as well as ethnic minorities (Lee, 2002): two groups of at-risk students that often come from rural backgrounds as well.

. It would appear that this degree completion gap would be partially explained by the low socioeconomic status experienced by many rural students. However, it is possible that the gaps observed are not due to rural status in and of itself, but rather other factors such as first-generation student or ethnic minority status. It is also possible that rural students are facing

challenges specific to their background while they are in a four-year university, such as stereotype threat. Due to their rural status, rural students may fear confirming negative stereotypes about their group, and subsequently proving they don't belong in higher education. Other psychological factors such as social isolation and high levels of stress may also factor into rural students' poorer performance, and lead to decreased rates of rural student retention. Before interventions are created to act upon specific challenges such as these, research must first investigate whether differences between rural and non-rural students exist at all.

## **Motivation**

### *Academic Readiness*

Should academic differences between rural and non-rural students truly exist, these differences should be quantifiable. While the high school graduation gap is largely closed, current research is divided regarding the existence of a matriculation gap between rural and non-rural students. A possible explanation for a matriculation gap may be a lack of academic readiness in rural students. Rural schools may not be as equipped as non-rural schools in preparing students for higher education. Should this be the case, rural students may have lower scores on standardized tests (as observed in Roscigno and Crowley, 2001), in addition to fewer AP courses taken (due to lower resources resulting in less courses offered in rural schools), and possibly even a difference in high school GPA.

If this is not observed, it is possible that rural students are not matriculating for other reasons not directly observable in this population. It is also possible that rural students are matriculating at rates similar to their non-rural peers. Whatever the case may be, each has its own implications for policy creation and intervention design. Thus, anyone seeking to intervene on

behalf of rural populations must investigate how rural students matriculate differently from non-rural students, if they matriculate differently at all.

### *College Academic Performance*

A gap in four-year degree completion between rural and non-rural students has also been observed in research. Should this gap truly exist, it is plausible that rural students may be performing worse than non-rural students in the classroom. Should rural students actually be performing poorly in the classroom, this should be measurable through examination of test scores, homework completion, and extra credit completion. Poorer performance in the classroom may eventually lead to rural student attrition and withdrawal from college before completion of a four-year degree.

### *Psychological Factors*

Previous research has also described potential psychological differences between rural and non-rural students. More specifically, these differences should manifest in two different themes identified by previous research (Ast, 2014). Per this previous research, researchers predict that rural students at university should report higher perceived stress levels relative to their non-rural peers. Researchers also expect to find rural students report lower levels of social interconnectedness than their non-rural contemporaries. These psychological differences could potentially explain decreased matriculation and degree completion rates observed in rural students. One possible explanation proposed for these predicted differences is stereotype threat.

Stereotype threat can be defined as “being at risk of confirming, as self-characteristic, a negative stereotype about one’s group” (Steele & Aronson, 1995). Essentially, when a person belonging to a group feels at risk of confirming a negative stereotype about their group, the

person suffers a number of negative consequences. These consequences can be emotional in nature, such as through increased self-doubt (Steele & Aronson, 1995). Other consequences may be cognitively-based, with systems like working memory (Schmader & Johns, 2003; Schmader, Johns & Forbes, 2008) being affected. Typically, when a person is undergoing stereotype threat, they also see decreased performance in the task they are completing (Steele & Aronson, 1995). While research has typically only looked at decreases in task performance relevant to stereotypes (such as test performance or academic achievement in African-Americans (Steele & Aronson, 1995), recent research has shown that this decrease in task performance can also spill outside of this constraint (Inzlicht & Kang, 2010).

A common assumption is that this stereotype must be activated explicitly, but that is not necessarily the case. This threat can be activated through subtle cues, and typically in research it is activated through cues such as wording on a test, or changing a spoken introduction prior to completion of a task. While there is research behind the anxiety felt when one feels one is the target of a certain stereotype or prejudice, it was only recently that researchers began to look into the possibility of decreased performance (among other effects) arising as a result of feeling stereotypes or prejudices. One of the pioneering studies behind stereotype threat was conducted by Claude Steele and Joshua Aronson in 1995.

In this study, Steele and Aronson documented how stereotype threat can disrupt academic performance in African-American college students while taking a version of the Graduate Records Exam (GRE). By priming African-American students with the notion that this test was diagnostic of their ability (and subsequently activating the stereotype that they had decreased intellect), African-American students scored significantly lower in this modified GRE than white students receiving the same instructions. In addition to this decreased academic performance,

they also observed other effects. Participants reported increased feelings of anxiety as well as increased rates of self-doubt and self-handicapping. This study was the first of its kind at the time. Researchers posit that this dip in performance is due to attention being paid to non-task-relevant concerns – such as the worry of confirming a stereotype. While Steele and Aronson's research centered on African-American college students, this effect is not just present in African-Americans. More recent research regarding stereotype threat has been conducted with regards to a variety of ethnicities, both within and outside of the United States of America.

One study demonstrated that this effect can be observed in Asian-American populations. Researchers found that when a participant's ethnicity was primed through instructions, it had a negative impact on performance on a mathematics test – even despite the stereotype regarding this group being positive (Cheryan & Bodenhausen, 2000). This effect has also been observed in non-minority groups; one study investigated white male students' performance on a mathematics test. Researchers found that participants' performance suffered after they were compared to another ethnic group that was stereotyped as excelling at math. Finally, another study demonstrated that stereotype threat affects Latinos as well. In a study centered on Latina women, researchers found that these participants were subject to stereotype threat based upon both ethnicity and gender stereotypes (Gonzales, Blanton & Williams, 2002). While it is clear that stereotype threat affects people of all ethnicities, this study brings light to another facet of stereotype threat: that it is not just ethnicity-based. Stereotype threat can be activated by any negative stereotype concerning a group, not just one based upon ethnicity.

A vast amount of literature exists concerning gender-based stereotype threat. This gender-based stereotype threat not only affects performance, but also can affect the threatened person's response to that performance. One group of researchers in Germany found that

stereotype-threatened women tend to attribute successes to external factors (such as luck), while internally attributing failures when attempting to complete a task. This is directly converse to non-stereotype-threatened men, who attribute success internally and attribute failure externally (Koch, Müller & Sieverding, 2008). How much importance a person places on a task may also have an effect on responses to stereotype threat as well. Lesko and Corpus find that women who identify strongly with math tend to make external attributions of failure (in this study, questioning the test's validity) while under stereotype threat compared to women who don't identify strongly with math (Lesko & Corpus, 2006). Other studies regarding female participants have shown that stereotype threat isn't just an undergraduate problem. The effects of stereotype threat have been demonstrated throughout various stages of the lifespan. Studies have observed this in females at primary educational levels (Pascal & Regner, 2007), secondary educational levels (Koch, Müller & Sieverding, 2008) as well as postgraduate education (Taylor & Antony, 2000).

While the above research is concerned with biologically-based stereotypes, research pertains to non-biologically-based stereotypes as well; particularly concerning one's socioeconomic status and first-generation student status. Croizet and Claire find that, in a task similar to Steele and Aronson's in 1995, low-SES students are susceptible to decreased performance as a result of stereotype threat (Croizet & Claire 1998). These findings have been refined and replicated in later work – one group of researchers found that low *current* SES tended to predict performance impairment (John-Henderson, Rheinschmidt, Mendoza-Denton & Francis, 2014). Similar findings have been found with regards to first-generation students as well (Stephens et al., 2012). This is of particular interest to research regarding rural students, as both first-generation students and low-SES students overlap with rural populations.

### **Outcomes, Implications and Interventions**

All of these studies suggest that stereotype threat is a real phenomenon that can hinder a variety of groups' performance on tests. However, what are the effects of stereotype threat for the individuals belonging to groups who feel threatened? On a short-term time-table, the body of work above suggests that stereotype threat can impair task performance. Outside of task performance, researchers also see increases in anxiety, self-doubt and self-handicapping behaviors (Steele & Aronson, 1995). This decrease in performance may lead to lower-expectations about one's ability to perform in a given field.

These short term-effects, prolonged over a longer period of time, may lead to more adverse long-term effects as well. Possible long-term effects of stereotype threat are discussed early within this literature, starting with Steele and Aronson's study in 1995. In it, they describe that these short-term effects may beget disidentification: that people who previously identified themselves within a given domain or field may stop identifying with it after prolonged poor performance within it. This is corroborated by later studies which demonstrate that people who identify highly with a domain face greater negative effects from stereotype threat within a domain than those who identify moderately or lowly (Keller, 2007; Good, Aronson & Harder, 2008). It is not a great stretch to assume that this disidentification caused as a result of prolonged stereotype threat may explain, at least in part, the growing disparity between genders in STEM disciplines (Oswald and Harvey, 2001), and between races in academia (National Center for Education Statistics, 2003).

Knowing that stereotype threat can cause negative outcomes for students, many researchers seek to create proper interventions to mitigate these outcomes. Various studies have



shown that there are interventions available to mitigate the effects of stereotype threat in terms of academic success. In one study, researchers demonstrate that replacement of a negative stereotype with a positive one can help decrease the gap between men and women's test scores in a class (McGlone and Aronson, 2007). An in-depth literature review published in 2008 revealed a wide-variety of interventions backed by research: reduction of stereotype salience (Spencer, Steele & Quinn, 1999), presentation of successful role models from the threatened person's group (Marx & Roman, 2002), and reduction of biases and stereotypes in the classroom were all shown to mitigate either the effects of stereotype threat, or inhibit the activation of stereotype threat itself. More recent research has suggested that certain types of intervention are more or less effective depending upon the type of stereotype – whether they target one's group or one's self (Shapiro, Williams & Hambarchyan, 2013).

The vast body of research on stereotype threat has shown its drastic consequences on those group members feeling threatened. Members of a marginalized group that feel threatened see decreases in task performance, as well as increases in negative mood relative to their non-threatened peers. Prolonged over time, these short-term consequences can lead to complete disidentification of a stereotyped group member from a given domain, which may explain why the gender gap in STEM disciplines and racial-based gaps in academia in general are growing (Oswald and Harvey, 2001; National Center for Education Statistics, 2003). It is possible that a similar phenomenon is occurring with rural students; as the gap in degree completion between rural and non-rural students is similarly growing (Kusmin, 2011).

In order to better understand how stereotype threat can hinder student performance in the classroom, it becomes necessary to better investigate how stereotype threat hampers students at a cognitive level. While social mechanisms for harm from stereotype are relatively established,

research investigating cognitive mechanisms is still in flux. With a better understanding of the cognitive consequences of stereotype threat comes a greater understanding of the academic impact of stereotype threat in the classroom. From there, researchers can begin to tailor specific interventions to alleviate the effects of stereotype threat.

However, these interventions should not come at the cost of decreased advocacy elsewhere. Rural students face a number of challenges, many of which are much more concrete (and easier to create interventions around) than stereotype threat. Gaps between rural and non-rural students may be due to other factors such as socioeconomic status, first-generation student status, ethnic minority status, or underfunded rural schools, just to name a few. Intervention upon stereotype threat in lieu of these other barriers would not change these other barriers, and thus would likely not affect positive change in rural students. This is especially true as it is unclear whether rural students face negative stereotypes (and subsequently, stereotype threat) upon entering higher education.

It is clear that a great body of research exists on the topic of stereotype threat, both in regards to the effects it has on threatened individuals, as well as possible interventions to mitigate its effects at many levels. Despite this, there is little to no research regarding stereotype threat and rural populations. The closest analogues psychological research has produced relate to low-socioeconomic status populations and first-generation status students. Although there is often overlap between these populations and rural students, very little research isolates rural status from other variables. Research outside of psychology has indicated that rural students do perceive stereotypes; such as previous education at rural schools being inferior due to inadequate funding (Ast, 2013), or that rural education and/or skills training is inferior to its urban counterpart (Gibbs, Swaim and Teixeira, 1998).

Should stereotype threat be the main culprit in any performance gap observed between rural and non-rural students in higher education, a couple trends should be observable. Rural students should be under more stress than non-rural students, and self-report measures should corroborate this. As stereotype threat can hinder performance due to levels of anxiety and thought pre-occupation, and negative stereotypes themselves can be perceived as stressors (Schmader & Johns, 2003), perceived stress should increase as well. Should these performance gaps be due to other, earlier barriers such as socio-economic status, or underfunded rural schools, than it is likely that the rural students observed in college will not report higher levels of stress relative to non-rural students. Those students adversely affected by these factors would likely not make it to college.

## Study 1

### Methods

#### *Participants*

In order to first assess the overall feasibility of a study of this type, researchers first conducted an ex post facto study. One of the largest challenges researchers face when investigating rural populations is defining rural status in a way that makes sense. One primary objective of this study was determining how easily the NCES's locale coding system could be implemented. The ease with which researchers can code data using this system would have direct implementations in regards to future research on this topic.

Drawing from an introductory psychology class in the spring of 2014, researchers tracked the entire class ( $n=301$ ) for purposes of this study. Of these students, 189 were female, 87 were male, and the remaining twenty-five were unspecified or incomplete, as the respondent may not have opted to answer this question. Participants were not compensated for their participation in this study, and participation was entirely voluntary.

The sample was then coded into each of the NCES' four locale codes. Of the total sample, 108 were coded into city, 82 into suburban, 47 into town, and twenty-six into rural. Thirty-eight students were excluded from coding and further analysis as data was missing or incomplete. This was likely due to two reasons. First, many of these students were likely international students; as enrollment data indicated their high school was outside of the United States of America. Second, some were likely due to normal student attrition; as grading information was incomplete. These students had most likely dropped the course. After this

exclusion, the remaining students were classified into a rural/non-rural binary. This study was approved by the Institutional Review Board at Oregon State University.

### *Materials*

Using admissions data from students enrolled in this introductory psychology class, researchers investigated items indicative of academic readiness. These items included cumulative high school grade point average, number of advanced placement (AP) courses taken while attending high school, and standardized SAT/ACT test scores. Student scores on Oregon State University's math placement test were also taken from students' admissions data.

Academic success was assessed through drawing data from the grade book from this course. Researchers recorded scores for each of the five exams administered during this course. Researchers also measured total scores for online homework, as well as total points earned from extra credit. Finally, researchers measured the final grade students received in the course.

Psychological measures were also administered over the course of the term. These psychological measures included perceived stress (Cohen, Kamarck, & Mermelstein, 1983), Big Five personality constructs (Gosling, Rentfrow, & Swann, 2003), and grit (Duckworth & Quinn, 2009). Perceived stress was assessed through the full fourteen-item version of the Perceived Stress Scale (PSS), first created by Cohen in 1983. Researchers also measured personality constructs through the Ten-Item Personality Inventory (TIPI) (Gosling, Rentfrow, & Swann, 2003), a reliable scale (as assessed through test-retest correlations, statistically significant  $r$ 's range from 0.65-0.87). Finally, grit was assessed with the twelve-item GRIT questionnaire (Duckworth & Quinn, 2009). All of these scales were presented to students in a single, unified packet.

*Procedure*

At the beginning of the academic term, students in our introductory psychology class were administered a number of tests. The introductory psychology course used for this study (PSY 201 - General Psychology) satisfies one of the required classes of Oregon State University's baccalaureate core. As a result, many students from outside psychology take this course to satisfy this core requirement. The battery of tests administered to students in this course included the TIPI, PSS, GRIT, and a psychology pre-test. This pre-test measured incoming students' psychological knowledge prior to the start of this introductory psychology course. For many students, this class was their first exposure to psychology. At the term's end, students also completed a knowledge post-test; these two tests were identical in content. Growth was also calculated, and defined as the difference in scores between this post-test and pre-test.

As students completed the course, they were required to complete various assignments, as well as a number of exams. For purposes of this study, researchers recorded all students' scores on each of the four midterm exams administered, a final exam, total online homework completed, as well as all extra credit completed. Finally, each student's final grade was calculated and recorded.

After the end of the term, students were initially coded into four groups per the NCES urban-centric coding system (rural, town, suburban, and urban). After this initial coding was completed, students were subsequently sorted into a binary rural/non-rural variable. "Rural" students consisted of strictly students from the NCES rural group (n=28), while "non-rural" students consisted of students from all other groups (town, suburban, and urban; n=235).

In order to code this data, researchers utilized the geographical location of each student's high school. Researchers drew this data from students' applications for admission into Oregon State University. Once this information was in hand, researchers cross-referenced high school address with the National Center for Educational Statistics' databases on both public and private high schools within the United States of America. Other demographic information (gender) was gathered at this time.

Researchers also collected other relevant data from students' applications. These data included high school grade point average, number of Advanced Placement (AP) courses taken, ACT scores, and SAT scores. In order to better compare students who had only taken one of the ACT or SAT tests, all scores were calculated using the ACT/SAT concordance charts published by ACT. All scores were converted to an SAT composite score. In cases where a student had taken both the ACT and SAT, the highest score was used. Researchers also compiled students' scores on Oregon State University's math placement test.

## **Results**

### *Academic Readiness*

No significant differences were observed in any variable measuring academic readiness. Rural students ( $M=13.20$ ,  $SD=2.77$ ,  $N=25$ ) did not score significantly different than non-rural students ( $M=13.84$ ,  $SD=3.40$ ,  $N=212$ ) on a psychology knowledge pretest ( $t(235)=0.91$ ,  $p=0.363$ ). Rural students ( $M=16.10$ ,  $SD=8.75$ ,  $N=20$ ) also did not score significantly different than non-rural students ( $M=18.58$ ,  $SD=7.81$ ,  $N=200$ ) on Oregon State University's preliminary math placement test ( $t(218)=1.34$ ,  $p=0.183$ ). Finally, no significant difference between rural students' scores ( $M=1544.78$ ,  $SD=161.24$ ,  $N=23$ ) and non-rural students' scores ( $M=1574.60$ ,  $SD=230.98$ ,

N=213) on standardized college entry exams (SAT & ACT) was observed ( $t(32.66)=0.80$ ,  $p=0.428$ ). These are summarized in the table below.

Table 1

*Statistics Measuring Academic Readiness in Spring Term 2015*

<i>Variable</i>	<i>M<sub>Rural</sub>(SD)</i>	<i>M<sub>Non-Rural</sub>(SD)</i>	<i>t</i>	<i>df</i>	<i>p-value</i>
Psy. Pre-test	13.20(2.77)	13.84(3.40)	0.91	235	0.363
Math Test	16.10(8.75)	18.58(7.81)	1.34	218	0.183
SAT/ACT	1544.78(161.24)	1574.60(230.98)	0.80	32.66	0.428

*Academic Success*

A number of academic outcomes were measured over the course of the term for both rural and non-rural students. Rural students did not score significantly different from non-rural students on every exam administered in the course. This was true for midterm 1 ( $M_{\text{Rural}}=38.38$ ,  $SD_{\text{Rural}}=4.96$ ,  $N_{\text{Rural}}=24$ ;  $M_{\text{Non-Rural}}=38.52$ ,  $SD_{\text{Non-Rural}}=5.99$ ,  $N_{\text{Non-Rural}}=229$ ), midterm 2 ( $M_{\text{Rural}}=38.96$ ,  $SD_{\text{Rural}}=5.39$ ,  $N_{\text{Rural}}=26$ ;  $M_{\text{Non-Rural}}=39.33$ ,  $SD_{\text{Non-Rural}}=5.03$ ,  $N_{\text{Non-Rural}}=232$ ), midterm 3 ( $M_{\text{Rural}}=34.63$ ,  $SD_{\text{Rural}}=4.95$ ,  $N_{\text{Rural}}=24$ ;  $M_{\text{Non-Rural}}=34.95$ ,  $SD_{\text{Non-Rural}}=6.61$ ,  $N_{\text{Non-Rural}}=220$ ), midterm 4 ( $M_{\text{Rural}}=37.67$ ,  $SD_{\text{Rural}}=5.34$ ,  $N_{\text{Rural}}=24$ ;  $M_{\text{Non-Rural}}=37.95$ ,  $SD_{\text{Non-Rural}}=5.34$ ,  $N_{\text{Non-Rural}}=219$ ), as well as the final exam ( $M_{\text{Rural}}=80.29$ ,  $SD_{\text{Rural}}=7.80$ ,  $N_{\text{Rural}}=230$ ;  $M_{\text{Non-Rural}}=79.19$ ,  $SD_{\text{Non-Rural}}=9.81$ ,  $N_{\text{Non-Rural}}=232$ ). Again, these differences were non-significant on midterm 1 ( $t(30.5)=0.13$ ,  $p=0.898$ ), midterm 2 ( $t(256)=0.35$ ,  $p=0.724$ ), midterm 3 ( $t(242)=0.23$ ,  $p=0.821$ ), midterm 4 ( $t(241)=0.24$ ,  $p=0.807$ ), or the final exam ( $t(239)=-0.53$ ,  $p=0.595$ ). No significant difference was observed between non-rural ( $M=806.33$ ,  $SD=121.07$ ,  $N=230$ ) and rural students'



( $M=792.08$ ,  $SD=143.11$ ,  $N=26$ ) final grades ( $t(254)=0.56$ ,  $p=0.577$ ). These are summarized below on table 2.

Table 2

*Differences between Rural and Non-rural Students' Exam Scores in Spring Term 2015.*

<i>Variable</i>	<i>M<sub>Rural</sub>(SD)</i>	<i>M<sub>Non-Rural</sub>(SD)</i>	<i>t</i>	<i>df</i>	<i>p-value</i>
Exam 1	38.38(4.96)	38.52(5.99)	0.13	30.5	0.898
Exam 2	38.96(5.39)	39.33(5.03)	0.35	256	0.724
Exam 3	34.63(4.95)	34.95(6.61)	0.23	242	0.821
Exam 4	37.67(5.34)	37.95(5.34)	0.24	241	0.807
Final Exam	80.29(7.8)	79.19(9.81)	-0.53	239	0.595
Final Grade	792.08(143.11)	806.33(121.07)	0.56	254	0.577

There was no significant difference found between rural ( $M=17.65$   $SD=4.20$ ,  $N=26$ ) and non-rural ( $M=17.71$ ,  $SD=4.98$ ,  $N=234$ ) students' scores on a psychology knowledge post-test analogous to the pre-test administered at the beginning of the term ( $t(258)=0.06$ ,  $p=0.956$ ). There was no significant difference observed between rural students ( $M=42.35$ ,  $SD=11.94$ ,  $N=26$ ) scores on the online homework portion of the class and non-rural students ( $M=44.92$ ,  $SD=10.35$ ,  $N=230$ ,  $t(254)=1.18$ ,  $p=0.239$ ). A similar trend was observed with extra credit scores: rural students ( $M=6.00$ ,  $SD=8.64$ ,  $N=26$ ) did not score significantly different than non-rural students ( $M=6.73$ ,  $SD=8.32$ ,  $N=237$ ) on this measure ( $t(254)=0.56$ ,  $p=0.577$ ). In summation, no significant differences, statistical or practical, were observed between any of the variables assessing rural and non-rural students' academic success. These results are displayed on table 3.

Table 3

*Statistics Measuring Differences in Academic Success between Rural and Non-rural Students*

<i>Variable</i>	<i>M<sub>Rural</sub>(SD)</i>	<i>M<sub>Non-Rural</sub>(SD)</i>	<i>t</i>	<i>df</i>	<i>p-value</i>
Psy. Post-test	17.65(4.20)	17.71(4.98)	0.06	258	0.956
Online HW	42.35(11.94)	44.92(10.35)	1.18	254	0.249
Extra Credit	6.00(8.64)	6.73(8.32)	0.56	254	0.577

*Individual Differences*

Researchers also measured a number of psychological constructs to test for any potential explanatory factors for potential differences in academic outcomes or readiness. Researchers found no significant differences in each of the Big Five personality constructs. There were no significant differences between rural students' openness (M=9.11, SD=1.53, N=18) and non-rural students' openness (M=8.57, SD=2.11 N=193;  $t(23.49)=-1.38$ ,  $p=0.180$ ). No significant difference was observed between rural students' (M=9.44, SD=1.62, N=18) and non-rural students' (M=9.39, SD=2.02, N=191) conscientiousness ( $t(207)=-0.11$ ,  $p=0.916$ ). No significant difference was observed between rural (M=8.22, SD=1.48, N=18) and non-rural students' (M=8.08, SD=2.19, N=193) agreeableness ( $t(24.58)=-0.38$ ,  $p=0.900$ ). Rural students were not significantly different (M=6.50, SD=3.01, N=18) from non-rural students (M=6.88, SD=3.10, N=193) in extraversion ( $t(209)=-0.27$ ,  $p=0.916$ ). Finally, rural students were not significantly more or less neurotic (M=3.89, SD=2.54, N=18) than non-rural students (M=4.77, SD=2.66, N=192;  $t(208)=1.34$ ,  $p=0.178$ ). These trends can be observed on table 4.

Table 4

*Differences between Rural and Non-rural Students' Big Five Personality Measures.*

<i>Variable</i>	<i>M<sub>Rural</sub>(SD)</i>	<i>M<sub>Non-rural</sub>(SD)</i>	<i>t</i>	<i>df</i>	<i>p-value</i>
Openness	9.11(1.53)	8.57(2.11)	-1.38	23.49	0.180
Conscientiousness	9.44(1.62)	9.39(2.02)	-0.11	207	0.916
Agreeableness	8.22(1.48)	8.08(2.19)	-0.38	24.58	0.900
Extraversion	6.5(3.01)	6.88(3.1)	-0.27	209	0.916
Neuroticism	3.89(2.54)	4.77(2.66)	1.34	208	0.178

There was no significant difference observed between rural students' (M=40.18, SD=7.16, N=17) and non-rural students' (M=41.17, SD=7.08, N=184) levels of perceived stress ( $t(199)=0.55$ ,  $p=0.581$ ). Finally, rural students scored higher on the GRIT-S (M=34.06, SD=4.63, N=18) than non-rural students (M=30.23, SD=6.52, N=184). This difference was found to be significant ( $t(200)= -2.42$ ,  $p=0.016$ ), with a moderate effect size ( $d=0.677$ ). These analyses can be seen in table 5.

Table 5

*Differences between Rural and Non-rural Students' Perceived Stress and Grit.*

<i>Variable</i>	<i>M<sub>Rural</sub>(SD)</i>	<i>M<sub>Non-rural</sub>(SD)</i>	<i>t</i>	<i>df</i>	<i>p-value</i>
Stress	40.18(7.16)	41.17(7.08)	0.53	199	0.581
Grit	34.06(4.63)	30.23(6.52)	-2.42	200	0.016

Grit was found to be correlated with a number of Big Five personality constructs. Of all five, grit was positively associated with conscientiousness ( $r=0.51$ ,  $p<0.001$ ,  $N=223$ ,) and openness ( $r=0.25$ ,  $p<0.001$ ,  $N=224$ ), and negatively associated with neuroticism ( $r=-0.29$ ,  $p<0.001$ ,  $N=223$ ). Grit was also negatively associated with perceived stress ( $r=-0.33$ ,  $p<0.001$ ,  $N=216$ ). Regarding academic readiness, grit was positively associated with scores on the psychology knowledge pre-test ( $r=0.20$ ,  $p=0.005$ ,  $N=209$ ) and SAT/ACT test scores ( $r=0.18$ ,  $p=0.013$ ,  $N=194$ ). Finally, grit was positively associated with scores on midterm 1 ( $r=0.25$ ,  $p<0.001$ ,  $N=217$ ), midterm 2 ( $r=0.20$ ,  $p=0.002$ ,  $N=223$ ), midterm 3 ( $r=0.19$ ,  $p=0.006$ ,  $N=215$ ), midterm 4 ( $r=0.25$ ,  $p<0.001$ ,  $N=213$ ), and the final exam ( $r=0.29$ ,  $p<0.001$ ,  $N=211$ ). These results are summarized on table 6.

Table 6: *Significant Correlations between Grit and Other Dependent Variables.*

	Cons.	Open	Neuro	Stress	Pre.	SAT/ACT	M1	M2	M3	M4	Final
GRIT	0.51***	0.25***	-0.29***	-0.33***	0.20**	0.18*	0.25***	0.20**	0.19**	0.25***	0.29***

\* $p<.05$ . \*\* $p<.01$ . \*\*\* $p<.001$

Out of all non-rural students, grit was correlated with conscientiousness ( $r=0.47$ ,  $p<0.001$ ), neuroticism ( $r=-0.30$ ,  $p<0.001$ ), openness ( $r=0.23$ ,  $p=0.002$ ), perceived stress ( $r=-0.30$ ,  $p<0.001$ ), scores on the math placement test ( $r=0.21$ ,  $p=0.009$ ), psychology knowledge pre-test ( $r=0.19$ ,  $p=0.013$ ), SAT/ACT scores ( $r=0.16$ ,  $p=0.044$ ), scores on midterm 1 ( $r=0.20$ ,  $p=0.007$ ), midterm 4 ( $r=0.18$ ,  $p=0.016$ ), the final exam ( $r=0.20$ ,  $p=0.008$ ), and the final grade students received in the class ( $r=0.18$ ,  $p=0.017$ ). Of all rural students, grit was only correlated with conscientiousness ( $r=0.48$ ,  $p=0.042$ ) and online homework completion ( $r=0.58$ ,  $p=0.011$ ),

## Discussion

From this ex post facto study, the data would suggest that there are not differences at the collegiate level between rural and non-rural students. Rural students appear to be as prepared for college as non-rural students, with both rural and non-rural students scoring similarly on entrance exams. Other measures of college readiness, such as OSU's math placement test, as well as the number of AP courses taken by students in high school are similar between rural and non-rural students as well. These results do coincide with larger research; as any high school graduation gap that previously existed between rural and non-rural students has largely closed (Provasnik et al., 2007).

In contrast, this data does not support the notion that rural students are doing poorly once they reach college. Researchers did not find any evidence to support the notion that rural students are performing worse than (or indeed any differently) non-rural students. Rural students performed just as well as non-rural students in the classroom: scoring similarly on all exams, online homework, and completion of extra credit. Both rural and non-rural students ended the introductory psychology course with similar final grades as well. While some research has observed that rural students are lagging behind non-rural students in terms of matriculation and four-year degree completion (Provasnik et al., 2007), the results of the current study suggest that these gaps, should they exist, are not due to poorer academic performance.

There are a couple of possible explanations for these gaps observed in previous research. One possible explanation is that OSU (as well as other universities) are simply not recruiting rural students at the same rates as non-rural students. Universities devote thousands of dollars in outreach programs recruiting students from high schools across the country. OSU is no different,

sponsoring programs meant to recruit students from schools not only in Oregon, but also Washington, California, Hawai'i, and Alaska. It is plausible that these programs disproportionately recruit non-rural students.

It is also possible that OSU's orientation programs are not particularly suited to rural students; in other words, they may not facilitate rural student's success as well as non-rural student's success. OSU's new student orientation, START, takes place on OSU's campus and is required for all first year students attending OSU. This can prove to be problematic for rural students attending OSU, as travel and overnight accommodations may be disproportionately expensive for rural families coming from low-socioeconomic status backgrounds. These orientation programs may need to be evaluated in order to determine whether or not they adequately address problems faced by rural students.

The majority of measures investigating individual psychological differences between rural and non-rural students show no differences as well. All students scored similarly on the TIPI measuring all personality constructs comprising the Big Five. All students also appeared to be experiencing similar amounts of stress as reported through Cohen's Perceived Stress Scale. Rural students did not appear to be under any more stress than non-rural students, reducing evidence pointing toward stress as a possible explanation for poorer achievement. While previous work identifies high levels of stress as part of many rural students' first years in college, this finding implies that this high level of stress is not unique to rural students.

The only significant difference observed between rural and non-rural students concerned grit as measured by Duckworth's GRIT scale. Grit is a personality construct referring to a person's ability to pursue an overarching goal of some sort, even through extreme adversity. In

the current study, rural students were observed to have a significantly higher grit score than non-rural students. It is possible that the rural students observed in these classrooms are highly motivated in their pursuit of a college degree, especially given that this was observed in spring term. Unmotivated or less "gritty" students may have left OSU at this point.

Also of particular interest is the different ways grit was related to various dependent variables depending upon whether a student was rural or not. Many moderate to strong correlations between grit and various factors, including personality, academic readiness and academic performance were observed. Conversely, only two significant correlations between grit and conscientiousness, as well as grit and online homework completion, were observed in non-rural students. It is unclear what the reason for this difference is; however, it does represent an interesting avenue of future research.

### *Limitations*

This first study is not without limitations, however. The first limitation discussed concerns the time this study took place. This study was conducted during spring term at OSU; the third term for any freshman that had started college normally in fall term. This gap between enrollment and observation is ample time for a rural student to enter college, do poorly, and drop out of college. Basically, students may have already left the university at this point - especially should researchers consider the critical "six week period" for students to drop out of university that previous literature has supported (Ast, 2014). This gap in time could also explain why rural students were observed to have more grit than non-rural students. If rural students are disproportionately dropping out from OSU, then the few rural students left by spring term are likely to be very highly motivated (and have more grit).

The second is that this study was strictly based in an introductory psychology class. While this course is required by a number of different programs at OSU, nonetheless it may not be a truly representative sample of rural students at OSU. For reasons not yet observed, rural students may be drawn disproportionately to other fields at OSU, even ones that do not require introductory psychology as part of their program. However, introductory-level psychology courses remain one of the most highly-enrolled courses across universities in the United States, and introductory psychology is required by many programs at Oregon State University.

A third limitation researchers should also consider is related to the representativeness of the rural student sample taken from application data. The first major issue is simply sample size. Of the total sample observed ( $n=304$ ), roughly ten percent were rural per our coding protocol. With such a small sample size, as well as a relatively large difference between the cell sizes for rural and non-rural student groups, validity of these analyses comes into question. More research that adequately addresses issues of power should be conducted prior to drawing meaningful conclusions.

While this data suggests that there are no differences between rural and non-rural students, it is possible that the rural students attending OSU differ from all prospective rural college students. Rural students attending OSU may be more likely to be local to the area than non-rural students, mirroring trends observed in other research (Burke, Davis & Stephan, 2015).



## Study 2

### Methods

In order to address some of the previously mentioned limitations, as well as test and replicate previous trends in rural students' experiences in higher education, researchers conducted an entirely new study. Rather than spring term, researchers conducted this study during fall term. It was hoped that this would be the first term for many of the students in our sample, giving researchers a more representative sample to work from.

Researchers sought to retest their previous hypothesis regarding stress; per Ast's work (2014) researchers predict stress will be higher in rural students compared to non-rural students. Also congruent to this research, researchers predict that rural students will report less social interconnectedness than their non-rural counterparts. One of the challenges rural students face is social isolation (Ast, 2014), and this should manifest in lower social interconnectedness scores for rural students relative to non-rural students. From Ast's work it was clear that rural students were facing these challenges, however further research was needed to determine whether these challenges were truly unique to rural students.

### *Participants*

Researchers collected data from two sections of introductory psychology during fall term 2015 at Oregon State University (n=326). Students were not compensated for their participation in this study, and their participation was entirely voluntary. Of these students, 139 were freshmen, 94 were sophomores, 44 were juniors, and thirty-one were seniors or higher. The remaining eighteen had missing data regarding class standing.

The entire sample (n=326) were coded into locale type using the NCES-locale coding system. Of this sample, 105 were sorted into the city group, 103 were sorted into the suburban group, fifty were sorted into the town group, and thirty-one were sorted into the rural group. All others (thirty-seven) did not have high school locale information available, and were excluded from further analysis. Similar to study one, this was likely due to one of two reasons. The first, being that enrollment data was unavailable for some of these students. Second, for some participants a match for their high school could not be found in the National Center for Educational Statistics' database. Next, these locales were coded into a rural/non-rural binary. Of the remaining students, 31 were coded into the rural group, while students in the city, suburban, and town groups were coded into the non-rural group.

### *Materials*

Analogous to study 1, researchers assessed participants' levels of academic readiness. This was assessed through standardized test scores on the ACT and SAT. Researchers also measured test scores on OSU's new math placement test. Additionally, the number of advanced placement (AP) courses students took in high school was recorded, as well as their cumulative high school grade point average. Academic success was also measured; primarily through performance on two tests measuring psychological knowledge at the beginning and end of the term. Cumulative grade point average at OSU was also collected for all participants. Expanded descriptions of these items, as well as reliability scores can be found in the Materials subsection of Study 1.

Researchers also continued measuring a number of psychological constructs. These constructs included perceived stress (Cohen, Kamarck, & Mermelstein, 1983), Big Five

personality constructs (Gosling, Rentfrow, & Swann, 2003), and grit (Duckworth & Quinn, 2009). While personality constructs were assessed identically as in study 1 (using the TIPI), both grit and perceived stress were measured using shorter, modified versions of the original scales (Duckworth & Quinn, 2009).

Perceived stress was assessed through the shortened ten-item version of the Perceived Stress Scale (PSS-10). Reliability for this modified version of the test is acceptable, with Cronbach's  $\alpha > 0.70$  in a review of the scale (Lee, 2012). Grit was assessed with the GRIT-S questionnaire (Duckworth & Quinn, 2009), a shortened, eight-item questionnaire. This scale was also deemed reliable ( $\alpha = 0.70$ ). Researchers utilized these shorter questionnaires in hopes of receiving more accurate answers from participants, being faster to complete and less prone to effects from fatigue.

In addition to these measures, researchers also assessed social interconnectedness. Social interconnectedness was measured through adaptation of one "quality of social interactions" indicator detailed in Lopes, Salovey, Côté, and Beers, 2005. Researchers in the current study took five questions from this indicator based upon self-report Likert scales of "socioemotional competence" (Lopes et al., 2005). All of these measures were presented to participants in a single, unified packet.

### *Procedure*

At the beginning of the term during the first week of classes, students were administered all psychological scales. These included Cohen's ten-item Perceived Stress Scale, the Ten-Item Personality Inventory, the GRIT-S scale, and the newly adapted social interconnectedness scale. At this time, students were also given the psychological knowledge pre-test. Another post-test

measuring psychological knowledge was administered at the end of the term. Both the pre- and post-test were identical in terms of content.

Items tracking performance of students in the course (such as exam scores, homework scores, etc.) were not tracked for the current study as they were in study 1. As this sample drew from two separate courses, these items would not be directly comparable across courses. Researchers did not hypothesize a difference between rural and non-rural student's performance on these items in the current study, as none was observed in study 1.

As in study 1, participants in the current study were coded into four groups following the NCES urban-centric coding system guidelines. Afterwards, participants were once again sorted into a rural/non-rural binary. As a result of this sorting, 31 participants were placed into the "rural" group, while 250 were placed into the "non-rural" group. The location used for placement into these rural and non-rural groups was drawn from participant's application data, which was cross-referenced with the NCES' public and private school databases.

Researchers also drew relevant application data indicative of academic readiness. These included standardized test scores on the ACT and SAT, scores on OSU's math placement test, number of AP courses taken while in high school, and high school grade point average. ACT test scores were converted into an SAT composite score per ACT/SAT concordance charts published by ACT. In instances where a participant had used both, the highest test score was used.

## **Results**

### *Academic Readiness*

Independent-samples t-tests were conducted on both groups to determine if there were any significant differences present between rural and non-rural students' levels of academic readiness coming into Oregon State University. No significant differences were observed between rural students ( $M=3.612$ ,  $SD=.29$ ,  $N=31$ ) and non-rural students' ( $M=3.54$ ,  $SD=.37$ ,  $N=269$ ) high school grade point average ( $t(298)=-0.97$ ,  $p=0.333$ ). Researchers did not observe a significant difference between performance of rural ( $M=58.27$ ,  $SD=20.55$ ,  $N=22$ ) and non-rural ( $M=56.23$ ,  $SD=19.12$ ,  $N=180$ ) students on OSU's math placement test ( $t(200)=-0.47$ ,  $p=0.640$ ). Rural ( $M=1605$ ,  $SD=221.48$ ,  $N=24$ ) and non-rural ( $M=1580.21$ ,  $SD=230.32$ ,  $N=234$ ) students did not significantly differ on their performance on standardized college entry exams ( $t(256)=-0.50$ ,  $p=0.615$ ). No significant differences were observed between the number of advanced placement courses taken by rural ( $M=2.64$ ,  $SD=1.91$ ,  $N=11$ ) and non-rural students ( $M=3.41$ ,  $SD=1.97$ ,  $N=81$ ) in high school ( $t(90)=1.22$ ,  $p=0.226$ ).

Researchers conducted independent-samples t-tests to determine whether rural and non-rural students performed differently in the classroom. To this end, no significant differences were observed between rural ( $M=5.61$ ,  $SD=2.77$ ,  $N=31$ ) and non-rural students' ( $M=5.81$ ,  $SD=2.36$ ,  $N=277$ ) performance on a psychological knowledge pre-test ( $t(306)=0.44$ ,  $p=0.662$ ), nor did rural ( $M=6.29$ ,  $SD=3.28$ ,  $N=31$ ) and non-rural students' ( $M=6.07$ ,  $SD=2.90$ ,  $N=277$ ) performance differ on a psychological knowledge post-test ( $t(306)=-0.40$ ,  $p=0.691$ ). This can be seen in table 7.

Table 7

*Differences between Rural and Non-rural Students' Academic Readiness and Success in Fall 2015*

<i>Variable</i>	<i>M<sub>Rural</sub>(SD)</i>	<i>M<sub>Non-Rural</sub>(SD)</i>	<i>t</i>	<i>df</i>	<i>p-value</i>
HS GPA	3.61(0.29)	3.54(0.37)	-0.97	298	0.333
Math Test	58.27(20.55)	56.23(19.11)	-0.47	200	0.640
SAT/ACT	1605(221.48)	1580.21(230.32)	-0.50	256	0.615
AP Courses	2.64(1.91)	3.41(1.97)	1.22	90	0.226
Psy. Pre-test	5.61(2.77)	5.81(2.36)	0.44	306	0.662
Psy. Post-test	6.29(3.28)	6.07(2.90)	-0.40	306	0.691

### *Individual Differences*

In order to determine if any individual, psychological differences were present between rural and non-rural students, independent-samples t-tests were conducted on each of the psychological measures administered. Researchers observed no significant difference between rural ( $M=18.24$ ,  $SD=16.20$ ,  $N=30$ ) and non-rural students' ( $M=17.78$ ,  $SD=5.80$ ,  $N=262$ ) perceived stress levels ( $t(276)=-0.40$ ,  $p=0.687$ ). No significant difference was observed between rural ( $M=31.67$ ,  $SD=5.73$ ,  $N=30$ ) and non-rural students' ( $M=31.87$ ,  $SD=7.89$ ,  $N=262$ ) social interconnectedness, as well ( $t(290)=0.14$ ,  $p=0.892$ ). Finally, of all Big Five personality constructs measured, non-rural students ( $M=8.17$ ,  $SD=5.14$ ,  $N=261$ ) were not significantly more conscientious than rural students ( $M=5.53$ ,  $SD=14.93$ ,  $N=30$ ;  $t(29.79)=0.96$ ,  $p=0.344$ ). Rural and non-rural students' scores on extraversion ( $M_{Rural}=8.8$ ,  $SD_{Rural}=1.71$ ,  $N_{Rural}=30$ ;  $M_{Non-rural}=8.63$ ,

$SD_{Non-rural}=5.26$ ,  $N_{Non-Rural}=261$ ;  $t(289)=-0.18$ ,  $p=0.856$ ), agreeableness( $M_{Rural}=8.97$ ,  $SD_{Rural}=1.43$ ,  $N_{Rural}=30$ ;  $M_{Non-rural}=8.98$ ,  $SD_{Non-rural}=5.31$ ,  $N_{Non-Rural}=261$ ;  $t(289)=0.01$ ,  $p=0.992$ ), openness ( $M_{Rural}=8.4$ ,  $SD_{Rural}=1.89$ ,  $N_{Rural}=30$ ;  $M_{Non-rural}=8.44$ ,  $SD_{Non-rural}=1.65$ ,  $N_{Non-Rural}=261$ ;  $t(289)=0.14$ ,  $p=0.891$ ), and neuroticism( $M_{Rural}=9.10$ ,  $SD_{Rural}=1.60$ ,  $N_{Rural}=30$ ;  $M_{Non-rural}=8.36$ ,  $SD_{Non-rural}=5.21$ ,  $N_{Non-Rural}=261$ ;  $t(289)=-0.77$ ,  $p=0.443$ ) did not significantly differ. Finally, researchers did observe a significant difference between rural ( $M=19.33$ ,  $SD=3.99$ ,  $N=30$ ) and non-rural students' ( $M=21.11$ ,  $SD=4.46$ ,  $N=260$ ) grit ( $t(280)=2.08$ ,  $p=0.039$ ). These can be observed in table 8.

Table 8

*Psychological Differences between Rural and Non-rural Students in Fall 2015.*

<i>Variable</i>	<i>M<sub>Rural</sub>(SD)</i>	<i>M<sub>Non-Rural</sub>(SD)</i>	<i>t</i>	<i>df</i>	<i>p-value</i>
Stress	18.24(16.2)	17.78(5.8)	-0.40	276	0.687
Interconnected	31.67(5.73)	31.87(7.89)	0.14	290	0.892
Openness	8.4(1.89)	8.44(1.65)	0.14	289	0.891
Conscientious	5.53(14.93)	8.17(5.14)	0.96	29.79	0.344
Agreeable	8.97(1.43)	8.98(5.31)	0.01	289	0.992
Extraversion	8.8(1.71)	8.63(5.26)	-0.18	289	0.856
Neuroticism	9.1(1.60)	8.36(5.21)	-0.77	289	0.443
Grit	19.33(3.99)	21.11(4.46)	2.08	280	0.039

As significant differences were found between rural and non-rural students' levels of grit, a series of Pearson's correlations were conducted in order to determine any link between grit and

other variables. Of the dependent variables, grit was found to have a significant positive association with levels of perceived stress ( $r=0.38$ ,  $p<0.001$ ,  $N=286$ ). Grit was also found to have significant negative associations with social interconnectedness ( $r=-0.14$ ,  $p=0.021$ ,  $N=292$ ), number of AP courses taken in high school ( $r=-0.22$ ,  $p=0.041$ ,  $N=85$ ), and high school GPA ( $r=-0.16$ ,  $p=0.007$ ,  $N=277$ ). These findings are summarized in table 9. No other significant correlations were found between grit and any other measure.

Table 9

*Significant Correlations between Grit and Other Dependent Variables*

	<i>Perceived Stress</i>	<i>Interconnectedness</i>	<i>AP Courses</i>	<i>HS GPA</i>
<i>GRIT</i>	0.38***	-0.14*	-0.22*	-0.16**

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Of all non-rural students participating in this study at this time, grit was significantly correlated with perceived stress ( $r=0.30$ ,  $p<0.001$ ), social interconnectedness ( $r=-0.34$ ,  $p<0.001$ ), extraversion ( $r=-0.19$ ,  $p=0.005$ ), number of AP courses taken while in high school ( $r=-0.28$ ,  $p=0.014$ ), and high school grade point average ( $r=-0.16$ ,  $p=0.012$ ). Similar correlations were observed with rural students. With rural students, grit was correlated with perceived stress ( $r=0.59$ ,  $p=0.001$ ), social interconnectedness ( $r=-0.38$ ,  $p=0.043$ ), and performance on OSU's math placement test ( $r=0.38$ ,  $p=0.041$ ).

## Discussion

The trends observed in the current study would indicate that there are no differences between rural and non-rural students at the post-secondary level. Rural students that enter into



higher education appear to be equally prepared for college as their non-rural peers, evidenced by rural students leaving high school equally prepared for college as non-rural students. They are performing equally well on the SAT and ACT, as well as OSU's math placement test prior to entry into OSU. In addition to roughly equal amounts of advanced courses taken, rural students also leave high school with similar grade point averages to non-rural students. This would appear to indicate that rural students are doing as well as non-rural students in high school, a trend which is supported by other work investigating rural high school student success at a national level (Kusmin, 2011; National Center for Education Statistics, 2013).

Once rural students reach higher education, the current study would indicate that they are doing equally well, both in an academic sense as well as in a psychological sense. Rural students scored similarly to non-rural students in all of the Big Five personality constructs, as well as in levels of perceived stress and social interconnectedness. These findings directly refute the assumption that many administrators may have: that rural students are under much more stress than non-rural students, as well as the idea that rural students are much more socially isolated relative to their non-rural peers during their entry into college. While previous research has identified these as themes of rural students' first-year experiences in college (Ast, 2014), it would appear that these are common to all students' in college, regardless of rural status.

This may be explained in part by their similar academic careers prior to entry into college. Rural students appear to be coming into OSU as prepared as non-rural students, with comparable test scores and similar high school GPA's. This would appear to be counter-intuitive to many national trends research has observed; namely that rural students are entering into college and completing four-year degrees less than their non-rural counterparts. However, as the

rural-non-rural high school graduation gap has largely closed, the findings of the current study are relatively parsimonious with previous research.

A significant difference between rural and non-rural students' grit scores was observed. However, counter to study 1, non-rural students were found to have higher grit scores than rural students in study 2. Within non-rural students, grit was found to be correlated with perceived stress, social interconnectedness, extraversion, number of AP courses taken while in high school, and high school grade point average. Within rural students, grit was only correlated with perceived stress, social interconnectedness, and performance on OSU's math placement test. At this time it is unclear why this difference in grit between rural and non-rural students exists, much less why its directionality changed between studies 1 and 2.

### *Limitations*

Similar to study 1, the current study relies upon data drawn from an introductory psychology class. It is possible that only a specific portion of high-performing rural students are drawn to this class, or psychology as a field. This is somewhat mitigated by the fact that introductory psychology is required for many programs at OSU. As of the 2015-2016 academic year, PSY 201 and PSY 202 are required by many programs at OSU. Researchers believe that the large swathe of degree programs requiring these classes would largely mitigate this risk.

Another limitation to the current study regards the sample of rural students used for this study, and drawn from OSU in general. It is possible that the rural students of OSU are comprised of the very best students rural America has to offer. Larger data suggests that rural students do not matriculate into college at the same rates as non-rural students (Provasnik et al., 2007). Therefore, it is possible that the smaller amount of rural students that matriculate into any

university are highly motivated, and better prepared for university in order to compensate for any other issues rurality may cause. This would be supported by Ast's research, as her sample was largely comprised of white students from relatively wealthy households with college-attending parents (2014). These are privileges that many rural people (and by extension, potential college students) simply do not have.

One limitation concerns the time this sample of students was taken. This sample was drawn and this study conducted during fall term of the 2015-2016 academic year. This time was chosen as the first term of classes has been identified as a critical period in regards to student retention in higher education (Ast, 2014). The current study, however, was not limited to sampling from solely first-year, first-term college students. It is possible that the rural students present in this class were strictly upperclassmen, and more "vulnerable" rural students had already washed out, or never matriculated into university at all

Finally, it is possible that rural students may simply be failing different points in their academic career than what were observed in the current study. While rural students appear to be performing well in the current study, it is based around an introductory, lower-division psychology course. It is plausible that rural students are performing well at this level of course, but failing later when they enter more rigorous, upper-division classes. This could be due to a couple of reasons; rural students may not be as prepared or ready for this upper-division work, for example. It is also possible that rural students may be more vulnerable to leaving university to deal with non-academic issues as they progress through their academic career.

### Conclusion

To summarize: from the current studies, it would appear that rural students are equally prepared and performing equally well as non-rural students in college. Rural students are entering OSU with similar GPAs and test scores from high school, as well as equal participation in advanced, college-preparatory high school work. More specific to psychology, both rural and non-rural students are entering this introductory psychology class with similar amounts of prior psychology knowledge.

Once rural students are in college, they also appear to be performing as well as non-rural students. Rural students performed as well as non-rural students on a number of exams throughout the introductory psychology course. In addition, both rural and non-rural students performed equally well on online homework. Finally, both rural and non-rural students completed extra credit at similar rates, and both groups scored similarly on post-tests assessing psychological knowledge.

Finally, rural students do not appear to be any different psychologically from non-rural students. Both groups scored similarly along all sub-scales of the TIPI measuring the five factors of the Big Five personality model. Both groups were also similar in surveys measuring more external factors. Rural students did not feel any more stressed, nor any more socially isolated than their non-rural peers. The only significant difference between rural and non-rural students found was in regards to grit; or the ability to persist through adversity in one's pursuit of some goal.

Of note is *how* grit differed between rural and non-rural students. In the first study, conducted in spring term of the 2014-2015 academic year, rural students were observed to be

grittier than non-rural students. During this term grit was found to be positively associated with a number of academic outcomes; scores on all five exams were positively correlated with grit, as well as performance on the psychology knowledge pre-test, and standardized college preparatory exam scores. Grit was also positively associated with two factors of the Big Five personality model; conscientiousness and openness. In addition, grit was negatively correlated with neuroticism - one of the other factors in the Big Five personality model - and perceived stress.

After analyzing the data collected in study two, conducted during fall term of the 2015-2016 academic year, researchers found that this difference actually *changed*. Non-rural students were now grittier than rural students. Subsequently in this term researchers found that grit positively correlated with perceived stress, and negatively correlated with high school grade point average, the number of AP courses students took in high school, and social interconnectedness.

It is unclear why these differences between rural and non-rural students' grit were observed. It is also unclear whether these differences are actually present in the sample, and not the result of family-wise error. Due to the large amount of dependent variables being tested both in study one (eighteen total variables were compared) and study two (13), it is possible that these significant differences in grit were due to chance. Further research is needed to verify whether differences in grit exist between rural and non-rural students.

If rural students are coming into college equally prepared as non-rural students, and are performing equally well in college as their non-rural peers, than how can researchers explain both the growing degree completion gap as well as the matriculation gap between rural and non-rural students (Provasnik et al., 2007)? The reason for these gaps may lie primarily in

matriculation; before rural students reach university. Rural students are encountering many barriers prior to their entrance into university.

Pertinent to Ast's work in 2014, researchers were not able to corroborate her findings regarding rural students' stress and social isolation. As identifies through qualitative methods that rural students entering into higher education are undergoing high levels of stress, as well as experiencing extracurricular and social isolation. Through the current studies, researchers measured perceived stress and social interconnectedness of rural students, but found that rural students were not significantly more or less stressed and socially isolated than non-rural students. While these may be challenges rural students face upon entering college, the data suggest that non-rural students are facing these challenges as well.

Another theme identified in Ast's work, that may be unique to rural students, is the awareness rural students have of their own rural identity. With the increased awareness of one's identity, it is plausible that negative stereotypes surrounding that identity may become more salient. This increased salience can lead to the anxiety and negative mood reported by people experiencing stereotype threat, which subsequently can have an impact on academic performance (such as standardized test scores; Steele & Aronson, 1995; McGlone & Aronson, 2007) through preoccupation of working memory (Schmader & Johns, 2003).

However, no real gap was observed between rural and non-rural students' academic performance. Both groups performed equally well on a number of exams, homework, and extra credit. Additionally, rural students were not under significantly more stress, nor significantly less socially interconnected than non-rural students. This is further supported by the equal academic performance observed of both rural and non-rural students. Should stereotype threat be affecting

rural students, it is likely that rural students should be significantly more stressed and more socially isolated than non-rural students. It seems unlikely that rural students are facing any sort of stereotype threat in higher education.

### *Implications for Interventions*

Rural students matriculating into universities face many challenges. Factors such as low socioeconomic status, first-generation student status, and ethnic minority status can all impede a rural student's matriculation into university. In addition, certain barriers particular to rural communities, such as remoteness, underfunded schools, or lower access to college preparatory programs can all contribute to impede matriculation as well. However, rural students also have distinct advantages when compared to non-rural students. Many come from smaller schools, and as a result enjoy many benefits associated with small teacher-to-student ratios. Rural students also are better able to leverage social capital in their smaller communities, which can greatly aid matriculation into university. Through the current studies, researchers found that those rural students that matriculate into college appear to be doing as well as anyone else in these introductory-level courses. Knowing this, it appears that resources would be better spent by narrowing interventions to two distinct points.

The first point intervention designers should emphasize is that of matriculation. Currently, a very measurable matriculation gap exists between rural students and non-rural students. Compared to suburban and urban students, rural students matriculate into college nearly 10% less (Provasnik et al., 2007). As mentioned before, rural students face many challenges: both those shared with many other prospective students, and those unique to rural places. These

barriers to matriculation may be eased by programs which alleviate the burden of these challenges on rural students.

Some barriers, such as low socioeconomic status and ethnic minority status, are being intervened upon already. Through federal, need-based programs such as the Pell Grant, and state programs such as the Oregon Opportunity Grant, many economically disadvantaged students are going to college that otherwise wouldn't be able to. It isn't clear whether or not this funding can reach all needy students, however. It also isn't clear whether most rural students (who are often first-generation students) are even aware funding like the Pell Grant exists.

This can be helped by outreach programs established by prospective universities. On a very fine level, universities could work with rural places, community by community, in order to bolster awareness of programs like the Pell Grant. A more feasible approach may be to start new partnerships, or continue existing partnerships with junior or community colleges adjacent to the university. For many students, community colleges serve as a more affordable alternative than a traditional four-year university. At some universities (such as Oregon State University), partnership programs exist in which students at community colleges can easily transfer credit into a four-year university. Increasing support for these programs (as well as increasing awareness of their existence) could help decrease the currently observed rural matriculation gap.

The second point of emphasis administrators designing interventions should consider is *sustained* rural success. As was found in the current study, rural students appear to be performing as well as non-rural students in the introductory-level psychology course. At first blush, this seems counterintuitive. Previous research has observed a growing gap between rural and non-rural students' rates of four-year degree completion (Provasnik et al., 2007). However, little



research has considered when and why these rural students are failing to complete degrees. It is possible that rather than the first-year, rural students are failing at later points in their academic career.

### *Future Directions of Research*

More research is needed to detail the causes of these rural matriculation and four-year degree completion gaps. Very little research exists regarding rural student success in higher education. Further research in this area is needed to not only detail whether or not rural students are performing poorer than non-rural students, but also elaborate on *what* rural students are performing poorer at (if they are performing poorer at all). This could be accomplished by expanding the breadth of the current studies conducted, eliminating many limitations along the way.

This could be done in a couple of key ways. One key way would be by investigating rural student success in a few different classes, not simply in one introductory level class. While the current study did not find evidence that rural students are performing poorer relative to non-rural students, it is possible that this is only truly applicable to students in this introductory-level psychology course. Put in other words; rural students could be failing in other places, or even at other times in their academic career.

Expansion of research into multiple classes would also solve a limitation faced by researchers in the current studies - statistical power. By increasing sample sizes, statistical analyses become more methodologically sound and research becomes more valid. Through increases in statistical power, future researchers and creators of interventions can be assured that they are acting and researching differences that truly exist. The current studies investigated these

differences at only one point in time in a student's academic career, during a single introductory-level course. More research investigating rural student success throughout their academic career would be useful in determining exactly when (if at all) rural students at a given institution are leaving college.

Research investigating rural student success on a longitudinal basis would be critical in determining when and where rural students may be floundering. The current study did not find evidence of poorer rural academic performance, but it is possible that a performance deficit manifests later in a rural student's academic career. Research that measures performance along the entire academic career of a rural student would be crucial in determining the point at which a rural student faces adversity and begins to fail. This research would also be critical in determining *why* a rural student may leave university. While it is certainly plausible that some are leaving for academic reasons, it is possible that others are leaving for reasons unrelated to academia. Determining why rural students are leaving is paramount to tailor interventions geared for their retention.

More research should also be conducted in order to determine the efficacy of interventions already put in place. Oregon State University already has a number of programs in place to assist underserved individuals. Oregon State University's eCampus provides an opportunity for students in remote places to pursue and complete a number of different degrees. Oregon State University's Extension Service also provides resources for many people, both rural and non-rural, in areas throughout Oregon. The Extension Service primarily disseminates research findings, but also provides services to people throughout the state, many of whom reside in rural areas. For many people in these rural, remote areas, these programs may serve as a first exposure to higher education. Whether or not programs such as eCampus help retain rural

students, or increase rural matriculation is unclear, however. Additionally, research could help provide future avenues of expansion for programs like the Extension Service into other areas such as education and academia. A program that reaches out to potential rural college students to help equip them with skills to matriculate into higher education would be invaluable.

Finally, a theme many researchers and policy makers neglect to account for is what kinds of advantages rural students have when trying to attend university. As mentioned previously, rural students are able to utilize social capital to facilitate matriculation into colleges. Many rural students also enjoy benefits from rural high schools, such as smaller class sizes. Research that continues to investigate this rural advantage as rural students attend college is sorely needed. It is not clear whether or not all rural students enjoy these rural advantages, and this knowledge would greatly further the investigation of any possible matriculation gap.

What is not clear in the research is whether the reasons for this matriculation gap are good or bad. If rural students, who want and desire to go to four-year universities, are not able to matriculate for a number of reasons as is often assumed, than this has its own set of implications for research and intervention design. However, if rural students are not attending due to alternate life paths that do not necessitate college, such as pursuit of employment not requiring a four-year education, than these should not necessarily be perceived as negative and in need of intervention. Despite the overwhelming perspective in not only research, but the media and American culture: college is not always necessary to have a good life.

## References

- Aronson, J., Cohen, G., McColskey, W., Montrosse, B., Lewis, K. & Mooney, K., (2009). *Reducing stereotype threat in classrooms: A review of social-psychological intervention studies on improving the achievement of Black students* (Issues & Answers Report, REL 2009-No. 076). Washington, DC: U.S. Department of Educational Laboratory Southeast.
- Aronson, J., Fried, C. B. & Good, C., (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology*, 38 (2), 113-125.
- Aronson, J., Michael, J. L., Good, C., Keough, K., Steele, C. M. & Brown, J., (1999). When white men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology*, 35 (1), 29-46.
- Ast, K., (2014). *Exploring the lived experiences of rural student college transitions*. Unpublished master's thesis, Oregon State University, Corvallis, Oregon.
- Baker, J. & Horton, S., (2003). East African running dominance revisited: A role for stereotype threat? *British Journal of Sports Medicine*, 37 (6), 553-555.
- Bergerson, A. A., Heiselt, A. K., & Aiken-Wisniewski, S. (2013). Refocusing college choice: Women's reflections on their postsecondary education choices. *NASPA Journal About Women in Higher Education*, 6 (2), 185-211.
- Byun, S., Irvin, M. J. & Meece, J. L., (2012). Predictors of bachelor's degree completion among rural students at four-year institutions. *The Review of Higher Education*, 35(3), 463-484.

Carter, S. (2014). *Access barriers to higher education for rural community college students.*

(Unpublished doctoral dissertation). University of Arkansas,

Chen, X. (2005). *First-generation students in postsecondary education: A look at their*

*transcripts* (National Center for Educational Statistics NCES-2005-171). U.S.

Department of Education.

Cheryan, S. & Bodenhausen, G. V. (2000). When positive stereotypes threaten performance: The

psychological hazards of "model minority" status. *Psychological Science*, 11 (5), 399-

402.

Croizet, J. C. & Claire, T., (1998). Extending the concept of stereotype threat to social class: The

intellectual underperformance of students from low socioeconomic backgrounds.

*Personality and Social Psychology Bulletin*, 24 (6), 588-594.

Davis, D. W. & Silver, B. B., (2003). Stereotype threat and race of interviewer effects in a

survey on political knowledge. *American Journal of Political Science*, 47 (1), 33-45.

Gibbs, R. M., Swaim, P. L. & Teixeira, R., (1998). *Rural education and training in the new*

*economy: The myth of the rural skills gap*. Ames, IA: Iowa State University Press.

Gofen, A. (2009). Family capital: How first-generation higher education students break the

intergenerational cycle. *Family Relations*, 58 (1), 104-120.

Gonzales, P. M., Blanton, H. & Williams, K. J. (2002). The effects of stereotype threat and

double-minority status on the test performance of Latino women. *Personality and Social*

*Psychology Bulletin*, 28 (5), 659-670.

- Good, C., Aronson, J. & Harder, J. A. (2008). Problems in the pipeline: Stereotype threat and women's achievement in high-level math courses. *Journal of Applied Developmental Psychology*, 29 (1), 17-28.
- Gosling, S. D., Renfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the big five personality domains. *Journal of Research in Personality*, 37, 504-528
- Hardre, P. L., Crowson, H. M., Debacker, T. K. & White, D. (2007). Predicting the academic motivation of rural high school students. *The Journal of Experimental Education*, 73(4), 247-269.
- Holmes, D. & Dalton, R. (2008) *Peak experiences: Raising aspirations and educational achievement of rural youth in Adirondack communities*. Cornwall, Vermont: Foundation for Excellent Schools.
- Israel, G. D., Beaulieu, L. J. & Hartless, G. (2001). The influence of family and community social capital on educational achievement. *Rural Sociology*, 66 (1), 43-68.
- John-Henderson, N. A., Rheinschmidt, M. L., Mendoza-Denton, R. & Francis, D. D. (2014). Performance and inflammation outcomes are predicted by different facets of SES under stereotype threat. *Social Psychological and Personality Science*, 5 (3), 301-309.
- Keller, J., (2007). Stereotype threat in classroom settings: The interactive effect of domain identification, task difficulty and stereotype threat on female students' maths performance. *British Journal of Educational Psychology*, 77 (2), 323-338.
- Koch, S. C., Müller, S. M. & Sieverding, M., (2008). Women and computers. Effects of stereotype threat on attribution of failure. *Computers & Education*, 51 (4), 1795-1803.

- Kusmin L. D., (2011). *Rural America at a glance*. Washington, DC: United States Department of Agriculture, Economic Research Service.
- Lee, E., (2012). Review of the psychometric evidence of the perceived stress scale. *Asian Nursing Research*, 6, 121-127.
- Lee, J. (2002). Racial and ethnic achievement gap trends: Reversing the progress toward equity? *Educational Researcher*, 31 (1), 3-12
- Lesko, A. C. & Corpus, J. H., (2006). Discounting the difficult: How high math-identified women respond to stereotype threat. *Sex Roles*, 54 (1-2), 113-125.
- Long, B. T. (2004). How have college decisions changed over time? An application of the conditional logistic choice model. *Journal of Econometrics*, 121, 271-296.
- Lopes, P. N., Salovey, P., Côté, S. & Beers, M., (2005). Emotion regulation abilities and the quality of social interaction. *Emotion*, 5 (1), 113-118.
- Marx, D. M. & Roman, J. S. (2002). Female role models: Protecting women's math test performance. *Personality and Social Psychology Bulletin*, 28, 1183-1193.
- McGlone, M. S. & Aronson, J. (2007). Forewarning and forearmng stereotype-threatened students. *Communication Education*, 56 (2), 119-133.
- National Center for Educational Statistics, (2013). *The status of rural education*. Retrieved from: [nces.ed.gov/programs/coe/indicator\\_tla.asp](http://nces.ed.gov/programs/coe/indicator_tla.asp)
- Nelson, I. A. (2016). Rural students' social capital in the college search and application process. *Rural Sociology*, 81 (2), 249-281.

- Nguyen, H. D. & Ryan, A. M., (2008). Does stereotype threat affect test performance of minorities and women? A meta-analysis of experimental evidence. *Journal of Applied Psychology*, 93 (6), 1314-1334.
- Oldfield, K. (2007). Humble and hopeful: Welcoming first-generation, poor, and working-class students. *About Campus*, 2-12.
- Osborne, J. W., (2007). Linking stereotype threat and anxiety. *Educational Psychology*, 27 (1) 135-154.
- Oswald, D. L. & Harvey, R. D. (2000-2001). Hostile environments, stereotype threat, and math performance among undergraduate women. *Current Psychology*, 19 (4), 338-356.
- Pascal, H. & Régner, I., (2007). Stereotype threat among schoolgirls in quasi-ordinary classroom circumstances. *Journal of Educational Psychology*, 99 (3), 545-560.
- Provasnik, S., KewalRamani, A., Coleman, M. M., Gilbertson, L., Herring, W., & Zie, Q., (2007). *Status of education in rural America* (NCES 2007-040). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U. S. Department of Education.
- Roscigno, V. J. & Crowley, M. L. (2001). Rurality, institutional disadvantage, and achievement/attainment. *Rural Sociology*, 66 (2), 268-292.
- Ryan, K. E. & Ryan, A. M., (2005). Psychological processes underlying stereotype threat and standardized math test performance. *Educational Psychologist*, 40 (1), 53-63.



Schmader, T. & Johns, M., (2003). Converging evidence that stereotype threat reduces working memory capacity. *Journal of Personality and Social Psychology*, 85 (3), 440-452.

Schmader, T., Johns, M., & Forbes, C., (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review*, 115 (2), 336-356.

Shapiro, J. R., Williams, A. M. & Hambarchyan, M. (2013). Are all interventions created equal? A multi-threat approach to tailoring stereotype threat interventions. *Journal of Personality and Social Psychology*, 104 (2), 277-288.

Smith, C. S. & Hung, L., (2008). Stereotype threat: Effects on education. *Social Psychology of Education*, 11 (3), 243-257.

Spencer, S. J., Steele, C. M. & Quinn, D. M., (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology*, 35 (1), 4-28.

Steele, C. M. & Aronson, J., (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, 69 (5), 797-811.

Steele, C. M., (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, 52 (6), 613-629.

Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S. & Covarrubias, R. (2012). Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students. *Journal of Personality and Social Psychology*, 102 (6), 1178-1197.

- Strange, M., Johnson, J. S., Showalter, D., & Klein, R., (2012). *Why rural matters 2011-12: The condition of rural education in the 50 states*. Washington, DC: The Rural School and Community Trust.
- Strayhorn, T. L., (2009). Different folks, different hopes: The educational aspirations of black males in urban, suburban, and rural high schools. *Urban Education*, 44 (6), 710-731.
- Taylor, E. & Antony, J. S., (2000). Stereotype threat reduction and wise schooling: Towards the successful socialization of African American doctoral students in education. *Journal of Negro Education*, 69 (3), 184-198.
- Thoman, D. B., White, P. H., Yamawaki, N. & Koishi, H., (2008). Variations of gender-math stereotype content affect women's vulnerability to stereotype threat. *Sex Roles*, 58 (9-10), 702-712.
- United States Census Bureau, (1995). *Urban and rural definitions*. Retrieved from:  
<http://www.census.gov/population/censusdata/urdef.txt>
- United States Department of Agriculture, Economic Research Service, (2010). *2010 rural-urban commuting area (RUCA) codes*. Retrieved from: [www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation.aspx](http://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation.aspx)
- Uwah, C. J., McMahon, H. G. & Furlow, C. F., (2008). School belonging, educational aspirations, and academic self-efficacy among African American male high school students: Implications for school counselors. *Professional School Counseling*, 11 (5), 296-305.

- Warburton, E. C., Bugarin, R. & Nunez, A. (2001). *Bridging the gap: Academic preparation and postsecondary success of first-generation students. Statistical analysis report. Postsecondary education descriptive analysis reports.* (National Center for Educational Statistics NCES-2001-153). U.S. Department of Education.
- Yeung, N. C. J. & von Hippel, C., (2008). Stereotype threat increases the likelihood that female drivers in a simulator run over jaywalkers. *Accident Analysis & Prevention*, 40 (2), 667-674.

## Appendix A: Ten-item Personality Inventory (TIPI)

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

1 = Disagree strongly

2 = Disagree moderately

3 = Disagree a little

4 = Neither agree nor disagree

5 = Agree a little

6 = Agree moderately

7 = Agree strongly

I see myself as:

1. \_\_\_\_\_ Extraverted, enthusiastic.

2. \_\_\_\_\_ Critical, quarrelsome.

3. \_\_\_\_\_ Dependable, self-disciplined.

4. \_\_\_\_\_ Anxious, easily upset.

5. \_\_\_\_\_ Open to new experiences, complex.

6. \_\_\_\_\_ Reserved, quiet.

7. \_\_\_\_\_ Sympathetic, warm.

8. \_\_\_\_\_ Disorganized, careless.

9. \_\_\_\_\_ Calm, emotionally stable.

10. \_\_\_\_\_ Conventional, uncreative.