

Development and Validation of a Rural Stress Instrument

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Abstract

Rural stress is the physiological reaction brought upon by internal and socioeconomic stressors characteristic of rural residents. This type of stress is exacerbated by the complex issues facing rural populations and serves to inhibit the growth of vibrant, resilient communities. The current study sought to construct and validate an instrument intended to quantify perceptions of rural stress among neighbors and communities. The proposed scale was confirmed to have robust content, internal structure, and consequential validity. An exploratory factor analysis indicated one variable accounted for 57.74% of the total variance, while a one-way between subjects ANOVA found a statistically significant effect of group on scale scores under rural-urban continuum (RUC) conditions. One implication from these findings is that changes in communities may function as predictors of stress. Agricultural and extension educators hold a unique position that allows them to interact with the community on a daily basis. We recommend that they leverage this position to educate residents on the effects of stress, reduce the stigma associated with help-seeking behaviors, and discuss available stress management resources. Future research should consider modifying the instrument to focus on individual levels of stress instead of perceptions of stress within the community.

Keywords: rural stress; scale development; validity; rural-urban continuum

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Introduction

In 2019 the strict divide between cultural perceptions of rural life and the bleak reality facing rural populations became apparent through the contrasting coverage by the popular press. Some articles celebrate the homecoming of individuals who left their communities as youths to pursue better opportunities in urban areas, only to return to their roots (Anderson, 2019; Smarsh, 2019). These writings conjure up images of bucolic bliss a la *Mayberry*. Conversely Dennis and Mufson's (2019) detailed coverage of the turmoil following the closure of a coal plant in rural Ohio paint a more disturbing, yet perhaps more accurate depiction of the struggles many rural Americans face today.

Approximately 39.7 million people in the United States were living in poverty in 2017 (Fontenot, Semega, & Kollar, 2018). Concerning the difference between urban and rural poverty rates,

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non-metro areas averaged a poverty rate of 16.4%, compared to 12.9% in metro areas (“Rural poverty and well-being,” 2019). The U.S. poverty population is mainly concentrated in the historically poor areas of the deep South, including Appalachia and the Mississippi Delta (“Rural poverty and well-being,” 2019; Yoder & Hoyt, 2005). However, Native American reservations, non-metro parts of the Southwest, and communities in the northern Midwest also contain high concentrations of poverty (“Rural poverty and well-being,” 2019).

Communities with a high concentration of poverty experience numerous issues which contribute to and reinforce the seemingly endless cycle of poverty. Many rural communities for example rely on industrial recruitment to breathe vitality into the local economy (Renkow, 2003). To attract these industries, local governments offer low-interest loans, tax abatements, and cheap, accessible land for the development of infrastructure (Crowe, 2006). Enticements like those described may cause more harm to the community than good (Crowe, 2006; Renkow, 2003). For example, tax abatements lead to deficits in the tax base, which contribute to reduced funding for education and public services (Crowe, 2006; Renkow, 2003). Additionally, the recruited industries may use non-sustainable approaches to natural resources, cause damage, and later leave the area in pursuit of more abundant resources elsewhere, leaving the community to deal with the residual effects (Crowe, 2006; Renkow, 2003).

Economic insecurity is another issue prevalent in impoverished rural communities. This challenge stems from the relatively limited opportunities for economic development, which are frequently associated with years of systematic inequality “in the distribution of income, jobs, and resources within communities” (Tickamyer & Duncan, 1990, p.80). Furthermore, Tickamyer and Duncan (1990) assert, “Southern rural poverty among both blacks and whites is rooted in a rigidly stratified political and economic system that perpetuated landlessness and dependency” (p. 71). Similarly, factional politics and social divisions in Appalachia restricted the distribution of jobs to a significant percentage of the population, which persisted the dependence on welfare and discouraged self-sufficiency (Tickamyer & Duncan, 1990). Other areas simply lack stable employment, structure for asset acquisition, opportunities for upward mobility, or a heterogeneous economy, all of which handicap residents and perpetuate the cycle of poverty (Tickamyer & Duncan, 1990).

Reduced educational attainment and quality of public services also represent significant challenges in rural areas with concentrated poverty. Due to low population density and suboptimal tax bases, the quality of education in rural areas is frequently depreciated, placing students from such environments at a disadvantage and decreasing their chances for upward social mobility (Theodori & Theodori, 2015; Dillman & Tremblay, 1977). Health care services in rural areas are typically less advanced than their urban counterparts and are manned by fewer personnel covering a wider region (“About rural health,” 2017; Brown, 1980; Clay, 2014; Dillman & Tremblay, 1977; “Leading causes of death in rural America,” 2017). Moreover, economic blight in the context of inadequate housing conditions was found to be more prevalent in small rural communities (Skobba, Osinubi, & Tinsley, 2019). The dilapidated housing, vacant housing, and low housing values of these communities reflect the overarching well-being of their residents, “remediating these issues is particularly difficult for small towns, where scale, demand, and limited financial and human capital resources are barriers to maintaining and improving local housing conditions” (Skobba et al., 2019, p. 22).

The issues outlined above provide the framework for the challenges faced by inhabitants of rural communities. This study furthers current efforts to revitalize rural communities and directly aligns with the sixth research priority of the 2016-2020 American Association for Agricultural Education (AAAE) National Research Agenda (Roberts, Harder, & Brashears, 2016). Research priority six highlights the “importance of vibrant [and] resilient communities” (Roberts et al., 2016, p. 50). These communities are characterized by providing support to attain basic needs, promoting inclusion in social,

economic, cultural, and political arenas, and offering opportunities to improve knowledge and skills (Torjman, 2001). Formalizing and quantifying the concept of rural stress is imperative to better understand the concept in an attempt to more effectively reduce the detrimental effects of rural poverty and rebuild strong, engaged communities. The following section delineates the antecedents and effects of occupational stress and how this concept can be expanded to encapsulate the rural stress precipitated by the aforementioned issues.

Conceptual Framework

The definition of rural stress as presented by the existing literature is ambiguous. This ambiguity may be due to the fact that there is no universal definition for rurality (Lobley, Johnson, Reed, Winter, & Little, 2004). The designations of rurality as created by the U.S. Census Bureau and the U.S. Office of Management and Business are the two most widely used definitions; however, they have significant differences (Vanderbroom & Madigan, 2007). According to the U.S. Census Bureau, rural areas are those not defined as urbanized areas or urban clusters (Ratcliffe, Burd, Holder, & Fields, 2016). Urbanized areas are those with at least 50,000 residents, while urbanized clusters contain between 2,500-50,000 residents (Ratcliffe et al., 2016). Alternatively, the U.S. Office of Management and Business defines rural areas as those with less than 10,000 residents located outside of metropolitan and micropolitan areas (Vanderbroom & Madigan, 2007). This study operates under the U.S. Office of Management and Business' definition of rural areas and defines rurality as the geographic location and cultural lifestyle of residents living in nonmetropolitan and nonmicropolitan communities of less than 10,000 people.

Psychological Stress

Psychological stress is defined as the physiological reactions that occur when an individual perceives the demands of their environment to be taxing or exceeding their adaptive capacity (Cohen, Janicki-Deverts, & Miller, 2007). The cycle of stress consists of four parts, including 1) a causal agent, known as a load, stress, or stressor, and 2) an evaluation that distinguishes between threatening and benign agents (Lazarus, 1993). Following this evaluation is the development of 3) coping processes used to deal with the stressor(s) and 4) the complex pattern of effects known as the stress reaction (Lazarus, 1993).

Jones and Fletcher's (1999) identified common sources of occupational stress, including the physical working environment, employee's role within the organization, relationships with coworkers, organizational structure and climate, public image and job expectations, and the duality of work and home life. Kinman and Jones (2005) found that workplace stress manifested as an emotional or psychological reaction, a degradation of physical well-being, an impairment in cognitive functions, or a combination of all three. These findings align with previous research wherein subjects described stress as a state of tension, malfunctioning of the body, a heavy weight bearing down on them, and a depletion of vital internal resources (Helman, 1988; Hodgetts & Chamberlain, 2000; Pollock, 1988). The effects of psychological stress within the workplace can be detrimental to an employee's satisfaction or experience with an organization. Exposure to chronic stress directly affects an individual's physical, behavioral, cognitive, and psychological health and may lead to long-term or permanent impairments (Cohen et al., 2007).

Rural Stress

Although there are differences between occupational stress in urban and rural areas, these differences do not decrease the severity of rural stress nor negate the importance of researching the issue. The term rural stress is ambiguously defined in the literature (Lobley et al., 2004). In the context of this study we define rural stress to be the physiological reaction brought upon by internal and socioeconomic stressors characteristic of rural residents.

A review of the literature reveals a context in which rural communities are rife with limited opportunities for economic development and upward mobility (e.g. Tickamyer & Duncan, 1990). One reason for this economic insecurity comes from the lasting effects of the 1981-1986 financial crisis in the U.S. agricultural sector (Barnett, 2000). As the agricultural sector was integrated into global financial and commodity markets, it became increasingly vulnerable to foreign economic and political influences (Barnett, 2000). These changes sent reeling impacts through rural communities and economic sectors supporting agricultural production (Barnett, 2000).

In 2007 the United States entered the Great Recession, a collapse resulting in a large employment loss among the building trade (Hertz, Kusmin, Marré, & Parker, 2014). Businesses significantly reduced their investment in infrastructure and equipment, negatively impacting economic output and employment (Hertz et al., 2014). While rural areas had low shares of manufacturing employment, which fared worst during the recession, they still suffer from slow economic growth (Hertz et al., 2014). Employers tend to recruit labor from communities with younger and better-educated workforces, usually urban areas, which hinders job opportunities and growth in rural communities (Hertz et al., 2014). Slow population growth rate in rural areas also accounted for some of the decrease in job growth rate (Hertz et al., 2014). These factors among others work to keep economic opportunities low among rural communities, trapping residents in a cycle of economic instability and dependency (Tickamyer & Duncan, 1990).

Simultaneous to the economic and systemic challenges facing rural communities is an innate human desire for connection with other, those living in rural areas are no different (Greisman, 1980). Community enables individuals to achieve social well-being (Wilkinson, 1979) and is essential to satisfying human needs (Greisman, 1980). Community attachment is an individual's assessment of the region in which they live, interact with others, and share a sense of identity (McKnight, Sanders, Gibbs, & Brown, 2017). This attachment is imperative because it engenders community action (Beggs, Hurlbert, & Haines, 1996; Roy, Tremblay, & Robertson, 2014). When individuals share a common bond with others, they are able to use community support to mobilize and take constructive action against issues (Summers, 1986; Roy et al., 2014).

Without community rural residents suffer from the disparaging effects of isolation (Monk, 2000; Loblely et al., 2004). One of the primary ways individuals form meaningful relationships with others is through proximity, reciprocity, and similarity (Monk, 2000). Due to a lower population density in rural areas, residents have a decreased proximity to others and a reduced chance of forming intimate connections. This decreased ability to form intimate relationships may lead to feelings of cultural, physical, or social isolation (Monk, 2000). The stress of isolation was found to be detrimental for rural inhabitants with a well-established link to suicide and suicidal ideation (Monk, 2000; Isometsa, Heikkinen, Henriksson, Marttunen, Aro, & Lonnqvist, 1997; Hawton, Simkin, Malmberg, Fagg, & Harriss, 1998; Kurosu, 1991).

Those living in rural areas are vulnerable to mental health disorders, so the availability of mental health services is imperative ("About rural health," 2017). Many agrarian communities have a negative labelling associated with mental healthcare partly due to cultural values such as self-reliance, honor, and individualism (Hoyt, Conger, & Valde, 1997; Naik, 2017; Roy et al., 2014; Clay, 2014). Persons living in rural areas expressed a significantly higher level of stigma against mental healthcare services than those living in large population centers and were less likely to seek appropriate care for mental health issues (Hoyt et al., 1997; Clay, 2014).

Given all of the research detailing the significant stressors faced by rural residents, it is surprising that rural populations are routinely not classified as vulnerable, even though they meet much of the criteria (Hawley, Chang, Risser, & Zhang, 2002; Flaskerud, Lesser, Dixon, Anderson, Conde, Kim, et al., 2002). Rural environments contain numerous stressors which place significant, yet often overlooked, burdens on the population (Lovelace, 2004). Thus, the development of a rural

stress instrument is imperative. There is a sufficient need to quantify perceptions of stress among rural residents with the hopes that this data can be used to reduce and alleviate the substantial problems facing individuals in these environments.

Purpose and Objectives

The purpose of this study was to develop and validate a comprehensive rural stress scale. This study was also motivated by the following research objectives:

1. Develop a robust rural stress scale
2. Confirm content validity of the rural stress scale
3. Confirm internal structure validity of the rural stress scale
4. Explore the consequential validity of the rural stress scale

Methods

To meet these research objectives, a descriptive study was employed. A convenience sample of 4-H alumni from the state of Georgia served as the population for the study. The sample was selected based on representation across the state of Georgia including both rural and urban locations. The alumni database was provided by the state 4-H office and included the names and email addresses of 1,418 individuals. Within the database a total of 157 email addresses were non-deliverable for a net of 1,261 potential respondents.

The potential respondents were invited to participate in the research survey as part of a larger evaluation project, of which the rural stress scale was included. The data were collected using an online survey tool and the tailored design method (Dillman, Smyth, & Christian, 2008) was employed to encourage participation. The methodology included a pre-notice message sent from the state 4-H program director, an initial invitation from the researcher, as well as four additional reminder messages prior to closing the survey. A total of 481 responses were obtained for a total project response rate of 38%. Of the obtained responses there were 355 responses retained for analysis in this study for an effective response rate of 28%. Individual responses were removed if the individual did not currently live in the state of Georgia or if the individual was under the age of 18. To participate in the evaluation project these criteria were acceptable for consideration; however, to focus on the validation of the rural stress scale only adults living in the state of Georgia met the study criteria. Nevertheless, the 28% response rate was considered acceptable given established social science response rate thresholds within the literature (Baruch & Holtom, 2008).

The rural stress scale included eight items developed through an extensive literature review and input from a panel of experts familiar with rural stress, scale development, and rural populations. The scale included the following instructions, "In the county where you live, how concerned are your friends and neighbors regarding:," respondents were then presented a list of the eight items which included the following: 1) the ability to cash-flow one's operation (cash_flow), 2) the ability to get financing needed to continue their operation (finance), 3) crop and livestock prices (prices), 4) weather-related issues (weather), 5) market and trade issues (market), 6) the ability to make ends meet (ends_meet), 7) levels of stress among individuals and families in the county (families), and 8) mental and behavioral health (health). Responses were rated on a five-point, Likert-type scale, with possible responses including *1-None*, *2-A little*, *3-A moderate amount*, *4-A lot*, *5-A great deal*. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were calculated to determine the individual item characteristics including frequency of responses across options as well as skewness and kurtosis analysis. Internal structure validity was also calculated using Cronbach's alpha as a measure of internal consistency. Additionally, exploratory factor analysis (EFA) was conducted to examine the nature of the observed data. Lastly, a one-way ANOVA test was

employed to examine the relationships between rurality and perceived levels of rural stress. Respondent rurality was determined based on self-report of current county of residence matched to the USDA Economic Research Service (ERS) 2013 Rural-urban Continuum Codes (RUC) (USDA ERS, 2015). The ANOVA analysis was conducted to examine whether the rural stress scale was able to differentiate between various levels of rurality therefore establishing preliminary indications of consequential validity (Messick, 1995).

Results

Several methods were employed to validate the internal structure of the rural stress scale. The response frequencies of each item are displayed in Table 1. In particular, the skewness and kurtosis of each individual item were analyzed to determine the approximate normality of the distribution. Each item had a skewness value less than two and a kurtosis value less than seven. According to established thresholds, these values were deemed acceptable and approximate normality of the distribution was confirmed (West, Finch, & Curran, 1995; Fabrigar, Wegener, MacCallum, & Strahan, 1999).

Table 1

Scale Item Descriptive Statistics

Items	<i>N</i>	1	2	3	4	5	Skewness	Kurtosis
Cash_flow	342	25	58	153	77	29	-0.09	-0.19
Finance	340	21	65	150	78	26	-0.04	-0.20
Prices	339	67	73	104	58	37	0.15	-0.91
Weather	341	29	69	126	75	42	-0.02	-0.61
Market	339	33	66	134	75	31	-0.06	-0.48
Ends_meet	341	18	59	105	97	62	-0.22	-0.72
Families	340	10	43	136	98	53	-0.13	-0.37
Health	340	20	64	141	76	39	0.00	-0.40

Internal structure validity was examined using a measure of internal consistency as well as an EFA. A high level of internal consistency was observed, as demonstrated by a Cronbach's alpha value of 0.90. For the EFA the Kaiser-Meyer-Olkin test for sampling adequacy yielded a value of 0.84, which indicated that a factor analysis of the scale variables was justified. Furthermore, Bartlett's test of sphericity yielded a chi-squared statistic ($X^2=1576.00$) that was significant at the 0.01 alpha level.

Accordingly, a principal component factor analysis was conducted for the rural stress scale, which comprised eight items related to well-being in rural communities. The results of the EFA were analyzed relative to the parameters established by Kaiser (1960), specifically determining whether emergent factors had eigenvalues greater than 1 (K1). A single factor emerged which accounted for 57.74% of the total variance (Table 2).

Table 2

Exploratory Factor Analysis

Items	Factor 1	Communalities
Cash_flow	0.79	0.64
Finance	0.83	0.70
Prices	0.65	0.79
Weather	0.78	0.76
Market	0.75	0.70
Ends_meet	0.78	0.67

Table 2

Exploratory Factor Analysis Continued...

Families	0.77	0.73
Health	0.72	0.65
Eigenvalues	4.62	—

To analyze consequential validity of the rural stress scale a one-way between subjects ANOVA was conducted to compare the effect of group on scale scores under RUC conditions. There was a significant effect of group on scale scores at the $p < .05$ level for the conditions [$F(8, 344) = 2.12, p = .03$]. Specific results are presented in Table 3. The lowest score was observed in the Metro - Counties in metro areas of 1 million population or more condition ($M = 2.84, SD = .79$), the highest scale score was observed in the Nonmetro - Urban population of 20,000 or more, not adjacent to a metro area condition ($M = 3.68, SD = .53$). To analyze the differences between each condition a Bonferroni analysis was conducted. No statistically significant differences between pairs of conditions were observed.

Table 3

Rural Urban Continuum Code Analysis

Condition	<i>N</i>	<i>M</i>	<i>S.D.</i>
Metro - Counties in metro areas of 1 million population or more	54	2.84	0.79
Metro - Counties in metro areas of 250,000 to 1 million population	30	3.10	0.75
Metro - Counties in metro areas of fewer than 250,000 population	76	3.21	0.92
Nonmetro - Urban population of 20,000 or more, adjacent to a metro area	21	3.36	0.70
Nonmetro - Urban population of 20,000 or more, not adjacent to a metro area	5	3.68	0.53
Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area	72	3.04	0.78
Nonmetro - Urban population of 2,500 to 19,999, not adjacent to a metro area	61	3.25	0.81
Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area	9	3.38	0.46
Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area	25	2.93	0.48

Conclusions, Recommendations, and Implications

The above results indicate strong content validity for the rural stress instrument as demonstrated by desirable response frequency distributions represented within the skewness and kurtosis analysis (West et al., 1995; Fabrigar et al., 1999). The EFA which indicated a single factor accounted for 57.74% of the total variance and a robust Cronbach's alpha value both indicated internal validity for the scale. Furthermore, the results from the one-way ANOVA test demonstrated a statistically significant effect of group on scale scores under RUC conditions.

Despite the promising observations associated with the study there are limitations that must be acknowledged. One limitation of this study is that the survey was completed by a small convenience sample taken from 4-H alumni from Georgia and may not be representative of the entire population. A recommendation for further research would be to increase the number of observations across other groups and include respondents from the broader population in the state of Georgia, not solely those involved with 4-H. The distribution across RUC conditions was not equal because the study did not target a set number of respondents from each RUC. Respondent rurality was defined by matching self-report of current county of residence to corresponding USDA ERS RUC codes. Thus, the study did not have control over where the respondents were from, so future research may want to consider an alternative method of data collection to ensure adequate variety in respondent location and rurality.

Limitations notwithstanding, the results of study provide some insights which warrant further investigation and implications for practice. The highest levels of rural stress were reported in Nonmetro – Urban population of 20,000 or more, not adjacent to a metro area condition. The lowest levels of rural stress were reported in the Metro – Urban population of 1 million or more condition. However, the second lowest levels of rural stress were observed in the Nonmetro – Urban population less than 2,500 or completely rural, not adjacent to a metro area and the Nonmetro – Urban population less than 2,500 or completely rural, adjacent to a metro area conditions which was unexpected. It was assumed at the beginning of this study that these two RUC conditions would have the highest rural stress levels or at least levels comparable to other rural areas. This surprising finding may be due to the fact that industrial recruitment is more prevalent in communities classified as Nonmetro – Urban population less than 2,500 or completely rural, not adjacent to a metro area. While industrial recruitment does provide some short-term benefits such as rapid employment growth and increased level of publicly-financed services, this method of rural economic development has been found to sometimes have a deleterious effect on the surrounding communities (Crowe, 2006; Renkow, 2003). Specifically, the effects of industrial recruitment once the industry leaves the community may lead to higher levels of rural stress among residents. An implication of this finding for agricultural and extension educators is that changes in communities may serve as bellwethers for stress. This is particularly true when local industries are closing or reducing workforces, single industry communities may experience ripple effects with stress increasing accordingly.

In an attempt to create more vibrant and resilient communities (Roberts et al., 2016) agricultural and extension educators are encouraged to have discussions with those in their communities about the dangers of stress and the resources that are available to individuals that are coping with stressful situations. While it is not the role of an agricultural or extension educators to serve in a clinical manner, educators are frequently on the front lines of communities and interact with community members on a daily basis. Therefore, serving as a resource and helping to ameliorate the stigma associated with help seeking behaviors may have a positive impact. From a practical perspective the results of the present study may also provide empirical data to help inform such conversations, specifically, that individuals that are feeling the impacts of stress, that many others are struggling with similar challenges; however, there are resources available to help.

From a methodological perspective, while this study did conduct an exploratory factor analysis, a recommendation for future research is to increase the size and diversity of the respondent base and increase the statistical power associated with the data set. A more robust set of data would support additional analyses such as confirmatory factor analysis (CFA). Running a CFA may be of value as it can be used to determine the relations between the eight individual items included in the instrument as well as the overall latent factor of rural stress. An additional recommendation for future research is to consider modifying the rural stress instrument to focus on individual levels of rural stress as opposed to perceptions of rural stress within the community. The questions within the current survey sought to measure how individuals perceived their friends and neighbors to be concerned with factors contributing to rural stress, instead of directly asking whether the respondents themselves were

concerned with these factors. The questions were phrased in this way to reduce response bias, as individuals may be inclined to respond dishonestly or withhold information due to the sensitive nature of the question and to help ensure privacy and anonymity. Thus, the answers may not be representative of measures of rural stress among individual respondents. Therefore, further research is encouraged to examine individual levels of rural stress.

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