

9-23-2020

## Well-being among Older Adults in Mississippi: Exploring Differences between Metropolitan, Micropolitan, and Noncore Rural Settings

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### Recommended Citation

Adams-Price, Carolyn, Joshua Turner, and Margaret Ralston. 2020. "Well-being among Older Adults in Mississippi: Exploring Differences between Metropolitan, Micropolitan, and Noncore Rural Settings." *Journal of Rural Social Sciences*, 35(2): Article 4. Available At: <https://egrove.olemiss.edu/jrss/vol35/iss2/4>

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### Cover Page Footnote

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## ABSTRACT

It is a common belief that older adults in rural areas have high subjective well-being, despite often experiencing greater poverty and having access to fewer resources than older adults who live in urban areas, a phenomenon sometimes referred to as the “rural-urban paradox.” However, research does not consistently find high well-being in rural areas, which might be due to research not distinguishing between very rural and semi-rural (or small town) settings. This study compares the subjective well-being of older adults in micropolitan and noncore counties with the well-being of older adults in metropolitan areas in Mississippi ( $n = 659$ ). Preliminary results indicate metropolitan respondents reporting higher subjective well-being than both micropolitan and noncore respondents. However, after accounting for key covariates, micropolitan residents were found to have significantly lower levels of subjective well-being compared to metropolitan residents. Overall, our study suggests that micropolitan settings may be less conducive to healthy, successful aging when compared to metropolitan settings.

## KEYWORDS

Micropolitan, older adults, rural, subjective well-being

## INTRODUCTION

In the 1980s, researchers like Graham Rowles (1984) and Vira Kivett (1988) suggested that older adults in rural areas reported relatively high subjective well-being (from this point referred to as SWB), despite higher rates of poverty, illness, and mortality than older adults living in urban environments, a finding they referred to as the “rural-urban” paradox. Rowles (1983) argued that although rural settings are very diverse, in general, they tend to change more slowly than urban settings, giving older adults the opportunity to develop long-lasting social support systems and a sense of identity that involves strong attachment to place. Kivett (1988) made a similar argument, suggesting that older people in rural areas have high SWB because of the positive associations they assign to their environment over time and because of the people in their social networks, especially those who are available to help.

More recent theorists have suggested that although there is a widespread belief that rural settings provide the best environments for older adults to age successfully, based on the notion that such environments are safe, friendly havens, or even bucolic (Keating and Phillips 2008; Wahl 2005); this may only be a myth, as there exists little consensus as to the type of setting that is most compatible with successful aging. Some studies have argued that older adults in rural areas have the potential for lower SWB when compared to older adults in urban areas, due to reduced access to quality health care and increasing geographic and social isolation (Dudley 2019; UNECE 2017). Further, although some studies have suggested that older adults in rural areas have a more positive life outlook and greater resilience than older adults in more urban areas, due to having stronger social support systems (Bacsu et al. 2014; Evans 2009; Stark-Wroblewski, Edelbaum, and Bello 2008), others have suggested that population decline in rural areas and the tendency of young people to leave rural areas has weakened those support systems and put increasing numbers of rural older adults at risk for social isolation and depression (Huxhold and Fiori 2019).

Gerontologists such as M. Powell Lawton have long indicated the importance of studying the relationship between aging and the physical or social environment (Lawton 1985). Yet few researchers have compared older adults' well-being in rural and remote environments, as opposed to urban areas. Some research has argued that making distinctions between levels of rurality is critical in studies involving older populations, because older adults may face different challenges in rural areas when compared to urban areas (Oswald et al. 2011; Wahl 2005). These challenges are

likely to be greatest in the most impoverished and remote rural areas, where government services, health care, and retail food stores are difficult to access or missing altogether (Hash, Jurkowski, and Krout 2015).

Research comparing the well-being of older adults living in areas that differ in their levels of urbanization or rurality is lacking. One problem in conducting such research is a lack of consistency in the categorization of places as urban or rural, and the presence or absence of levels that fall in between these categories (Hash et al. 2015). For instance, Krout and Hash (2015) listed 11 different systems of categorizing rurality used by federal agencies, most of which did not distinguish between medium-sized towns and more remote areas.

One widely used method for categorizing places by levels of urbanization or rurality is the Office of Management and Budget's (OMB) system for county classification, which classifies counties into three categories: (1) metropolitan, (2) micropolitan, and (3) noncore. These three categories are distinguished by their population levels and commuting patterns. Metropolitan counties are those with an urban cluster of 50,000 people or more, while micropolitan counties are those that contain an urban cluster with a population of at least 10,000, but less than 50,000 people (Office of Management and Budget 2010). Noncore counties are isolated counties that do not meet the criteria to be considered metropolitan or micropolitan (U.S. Department of Agriculture-Economic Research Service 2012). The OMB system is ideal for the current study, because it is relatively straightforward and allows for a reasonable distribution of county-types, and data on county-based measures and information are readily available through public sources.

Recent studies that used the OMB system have found health-related differences as a function of county type, with the poorest health ratings found in noncore areas (Garcia et al. 2019; Henning-Smith et al. 2017; Matthews et al. 2017). Garcia et al. 2019 reported that excess death from four of the five leading causes of death tended to be higher in micropolitan and noncore areas than in metropolitan areas. Accidental death rates were found to be highest in urban areas, but potential excess deaths from heart disease were higher in micropolitan counties and lower in metropolitan counties. Henning-Smith and colleagues (2017) also reported on differences between metropolitan, micropolitan, and noncore counties nationwide on Medicare Quality Scores. They reported that the quality of care was lower in micropolitan and noncore counties than in metropolitan counties, but that only noncore counties were significantly worse after sociodemographic variables were taken into account.

Matthews et al. (2017) reported that residents of micropolitan and noncore counties engaged in fewer than five core health behaviors, including maintaining a healthy weight, not smoking, getting adequate sleep, drinking little or no alcohol, and getting aerobic exercise, when compared to residents of metropolitan areas.

In addition, evidence shows that very rural areas are more at risk for poverty and population and industry loss than small towns. One example of business loss in rural areas comes from Tolbert and colleagues (2014). They reported that rural areas have been losing their local banks for many years, and some of those local banks have not been replaced. When they have been replaced, they have been replaced by large chains banks, which are less likely than their predecessors to lend money to small local businesses, resulting in a major loss of healthy local businesses. This is one of several factors that have led researchers to believe that well-being will be lowest in the most rural areas, where there are the fewest local businesses, the poorest health, and the greatest risk for social isolation (Dudley, 2019).

The purpose of this study is to compare older adults living in these three settings (i.e., metropolitan, micropolitan, and noncore) in Mississippi, to determine whether there are overall differences in average SWB and if these differences remain when common challenges associated with everyday life in rural areas are taken into account. This study is timely given the rapid growth of the older adult population in the United States, which increased exponentially throughout the twentieth and into the twenty-first century. The older adult population is projected to show continued growth, from 16 percent in 2018 to 23 percent of the total population in 2060 (U.S. Census Bureau 2017). Historical population trends and population projections indicate that the growth of Mississippi's older adult population is expected to be consistent with national trends (U.S. Census Bureau 2014). Furthermore, the elderly population is increasing faster in rural areas than in urban areas (Huxhold and Fiori 2019). Increased demands have strained the country's already overwrought health care and social service systems, but the strain is most evident in poor states and rural areas, where limited elder services are offered and budgets are especially tight (Dudley 2019; UNECE 2017).

Comparing residents of three different settings allows us to examine whether different settings represent different challenges for older adults. Exploring these issues in a state like Mississippi is helpful because of the state's rural nature and its poor rankings on several key indicators related to healthy and successfully aging. For instance, older adults in

Mississippi consistently record some of the highest rates of senior obesity, physical inactivity, and mental distress in the nation, as well as some of the most negative ratings of self-reported health (United Health Foundation 2020). As a result, older Mississippians may be particularly vulnerable to reduced well-being and quality of life. At the same time, many older Mississippians have been living in the same rural community for most of their lives, which could make them feel attached to and satisfied with the community in which they live (Burnholt 2012). The major questions addressed in the current study are:

- 1) To what extent does the SWB of older adults in noncore and micropolitan counties differ from the SWB of older adults in metropolitan counties?
- 2) To what extent are differences in SWB linked to variables associated with rurality, such as poverty, health, and transportation problems, or are they associated with rurality itself?

#### *Subjective Well-being and Aging*

Keyes and Waterman (2003) reviewed 40 years of research on SWB and defined it as “individuals’ [own] perceptions and evaluations of their own lives in terms of their affective states and their psychological and social functioning” (p. 478). The term SWB is closely related to quality of life, but they are not identical concepts. In the past, SWB was often equated with either happiness or global life satisfaction. Psychologists today tend to use SWB to refer to a combination of global satisfaction with life, the balance of positive and negative emotional states, and the cognitive and affective self-evaluations of one’s life in multiple domains (Diener, Oishi, and Lucas 2002). This is in contrast to the concept of quality of life which refers to tangible human resources, such as finances, health, social support, adequate housing, and access to transportation (Schuessler and Fisher 1985; Smith et al. 2002). In the current study, participants are asked about their perceptions of their access to such sources, with the exception of income, which is asked more directly.

It is not uncommon for researchers to measure SWB in surveys with a single item, usually asking about overall SWB (Bowling, Farquhar, and Browne 1991; Kahneman and Krueger 2006), especially when examining SWB in databases that were created primarily for other analyses. However, an instrument with only one item can only cover one component of SWB, so a multi-item scale is preferred. Kahneman and Krueger (2006) suggest that a SWB measure with even four or five items has higher validity and reliability than one with only one item.

Keyes and Waterman (2003) divide SWB into three dimensions: (1) emotional well-being, which involves the balance of positive and negative emotional states, (2) positive functioning, which involves self-acceptance and mastery, and (3) social well-being, which involves positive relationships with others. The measure of SWB used in the current study included an overall self-evaluation of life satisfaction, as well as self-reported ratings of boredom, depression, and loneliness, which fit quite well with definitions of SWB offered in the work of Keyes and Waterman (2003).

Keyes and Waterman (2003) also suggest that positive SWB is a protective factor, supporting the emotional and physical health of individuals under adversity. Levy and Myers (2004) reported that older persons with high SWB are more likely to engage in more healthy behaviors, and also more likely to stay involved in activities they enjoy. Others have argued that the relationship between health and SWB is likely to be bi-directional, with good health promoting higher SWB, and higher SWB promoting better health (Diener and Chan 2011). Most previous research suggests that SWB is higher in later life than in early or middle adulthood (Scheibe and Carstensen 2010). Analyses of some recent longitudinal data have suggested that SWB declines in very late life, making it essential to control for age-related variables (Kleinspehn-Ammerlahn, Kotter-Gruhn, and Smith 2008). This is important when studying SWB in rural settings, as nonmetropolitan settings differ from metropolitan areas in their proportion of older adults (Huxhold and Fiori 2019).

An example of such a study that advocates for a related approach can be found in the work of Baernholdt and associates (2012), who in their analysis of the National Health and Nutrition Examination, compared a county-level, nationwide sample of rural, urban, and urban county-adjacent older adults on three SWB-related measures: (1) health-related quality of life, (2) social functioning, and (3) emotional well-being. They also compared participants on their number of chronic health conditions. They found that rural residents tended to have lower health-related quality of life than urban or urban-adjacent residents. Rural residents also had poorer self-perceived social functioning than residents of the other two types of counties. Despite these findings, final results indicated that emotional well-being was not lower in rural residents. Baernholdt et al. (2012) found racial differences as well, as African American and Hispanic older adults displayed lower health-related quality of life and emotional well-being than White older adults.



### *Common Problems for Older Adults Living in Rural Areas*

In order to fairly compare the SWB of older adults living in metropolitan areas with those living in micropolitan and noncore areas, it is necessary to outline the problems that may interfere with SWB in rural areas. The problems listed below are commonly associated with rural living and reduced SWB for older adults (Glasgow and Berry 2013). Examining these problems will allow us to separate differences in SWB by differing levels of rurality. We expect that older adults in the most rural areas in Mississippi will report the lowest levels of SWB, due to the fact that rural areas in Mississippi tend to have high rates of chronic poverty, fewer amenities, and higher rates of morbidity.

*Health.* In terms of rural and urban health differences, older adults in rural areas are considered to be more at risk for chronic disease and physical impairment when compared to older adults residing in urban areas (Kivett, Stevenson, and Zwane 2000; Schoenberg, Coward, and Albrecht 2001). Health risks can become amplified for older adults in rural areas, due to potential geographic isolation from health services (Averill 2003). In addition to geographic isolation from health and other essential services, research has indicated that counties in more rural areas of the country that have recorded significant growth in their older adult populations have also seen a decline in establishments designed to provide essential services (Thiede et al. 2017). Further compounding the problems stemming from a lack of service establishments, existing rural health services are often seen as inadequate due to a lack of resources that could potentially lead to challenges in providing appropriate care, often forcing rural residents to travel long distances to access specialized care (Congdon and Magilvy 2001; Yoon and Lee 2004). A perceived lack of quality in available healthcare can also potentially deter rural aging populations from seeking medical attention, which may increase their vulnerability for future health problems (Blazer et al. 1995).

*Income.* There has been extensive research focusing on the differences in financial status between rural and urban older adults (Glasgow and Brown 1998; Kivett et al. 2000; Longino 1988). McLaughlin and Jensen (1993) illustrated the economic disadvantages of rural and nonmetropolitan areas and how they affect older populations residing in these areas, by arguing that the prevalence of lower skilled and lower paying employment opportunities found in nonmetropolitan areas decreases the likelihood of accumulating assets or participating in pension plans. Lower earnings also result in lower Social Security benefits for older

adults in nonmetropolitan areas in comparison to those living in metropolitan areas.

Income levels have been found to significantly predict life satisfaction among older adults. Insufficient income levels can result in decreased participation in social activities and increased feelings of insecurity (Karatas and Duyan 2008). In addition to the direct effect on life satisfaction, the health of older adults can be compromised if financial concerns prevent them from seeking health care and other basic services (Averill 2003; Schoenberg et al. 2001). Further, low incomes are known to be related to food insecurity among rural older adults (Ziliak and Gunderson 2009).

*Social interaction.* As stated earlier, one factor that is likely to be helpful in explaining rural-urban differences in SWB is the amount of social interaction with family or friends (Evans 2009; Glasgow and Berry 2013; Stark-Wroblewski et al. 2008; Wahl 2005). Some researchers find that rural older adults have more opportunity for social interaction than urban older adults (e.g., Evans 2009; Stark-Wroblewski et al. 2008), while others find less opportunity for social interaction among rural older adults (Glasgow and Berry 2013). We expect that older adults in metropolitan areas will have significantly more opportunity for social interaction than older adults in nonmetropolitan areas, based on the observation by some researchers that opportunities for social interaction for older adults in nonmetropolitan areas have decreased in recent years (Huxhold and Fiori 2019). This is consistent with past literature that found that older adults in nonmetropolitan areas have fewer immediate close social ties when compared to older adults in urban areas (Hofferth and Iceland 1998).

*Suitable housing.* According to a report by the Housing Assistance Council (2004), most adults who reside in nonmetropolitan areas own their own homes (85 percent). This is also true for older rural African Americans, who tend to be located in states like Mississippi, although their rate of home ownership is about 20 percent lower (Ford 2018). Rural homes, and especially those owned by older adults, tend to be older and more in need of repair than urban homes (Pendall et al. 2016). Thus, a study comparing the well-being of very rural and micropolitan older adults should take into account differences in housing quality, or at least, satisfaction with housing.

*Transportation and mobility.* One major indicator of the health and functional status of older adults is mobility, especially in terms of transportation and the ability to safely operate an automobile. In addition to making daily tasks easier to accomplish, the ability to drive is also

linked to personal autonomy, self-worth, and overall SWB (Dickerson et al. 2007). Mobility and access to quality transportation are also vital to meeting the needs of older adults who wish to continue living independently (Li 2006; Stavley et al. 1999). A lack of transportation resources can be especially challenging for older adults who reside in rural areas, as longer travel times can lead to decreased service utilization (Fortney et al. 2002). Furthermore, older adults in rural areas who do not drive tend to have limited access to public transportation. As such, they are forced to rely on others for transportation, which may lead to lowered SWB and autonomy (Dickerson et al. 2007). Thus, transportation problems may be one cause of lowered SWB in rural seniors.

## METHODS

### *Data and Sample*

Data were obtained from Mississippi's 2011 Older Adults Needs Assessment, a project that included a telephone survey of 1,025 randomly sampled adults aged 55 and older from all counties in the state. All telephone numbers called were landlines, which older adults use with relatively more frequency when compared to the general population (Blumenthal 2010; Christian et al. 2010). The sample was drawn and stratified based on the organization of the state's 10 Area Agencies on Aging (AAA), with at least 100 completed surveys coming from each of the state's 10 AAAs.

Survey data were collected in 2011 as part of a needs assessment commissioned by the Mississippi Department of Human Service's Division of Aging and Adult Services. The data reported in this study represent the most recent needs assessment data related to older adults residing in the state of Mississippi. The goal of the needs assessment was to gain a sense of the current and projected service needs of older adults in Mississippi and to determine their level of awareness of available services. In addition to service need and awareness, the survey also focused on the health status, daily activities, living arrangements, and the current and future concerns of respondents. An additional goal of the project was to address the growing needs of the baby boomer population, the first wave of which started entering older adulthood when this study was initiated.

For purposes of this study, we analyzed data from respondents aged 65 years and older ( $n = 659$ ), which is traditionally considered the minimum age to be classified as an older adult in the United States (Gorman 1999). Respondents were classified into one of three settings: (1) metropolitan, (2) micropolitan, or (3) noncore based on the

classification of their county of residence. All respondents were either White or African American. Non-report or missing data on key indicators utilized for analytical purposes in this study were minimal, with most measures showing rates of missing data at less than one percent. Therefore, in cases of missing data, mean substitution was used. An exception was used in the case of income, in which missing data were substituted with median values.

### *Measures*

Our dependent variable was a SWB scale using four questions, one related to general life satisfaction and three related to affective items (i.e., depression, loneliness, and boredom). Measures of depression, loneliness, and boredom were included to create a more holistic measure that accounted for other traditional indicators of life satisfaction and psychological well-being. These three affective measures were reverse coded, so scores for each of the four items ranged from 1 to 5 with a score of 1 indicating the lowest (most negative) score possible and a score of 5 indicating the highest (most positive) score possible. The averages of these four items were computed to create the SWB Index ( $\alpha = .72$ ).

The scale constructed for this study accounts for traditional indicators of psychological well-being (Bowling et al. 1991) and is consistent with past research that has emphasized self-assessment in rating SWB (Diener et al. 2002). This same scale has been used in past research that has examined the SWB of older adult populations (Adams-Price, Turner, and Warren 2015; Turner, Adams-Price, and Wilmoth 2019; Wilmoth et al. 2014).

Our key independent variable of interest was residential setting. In order to compare respondents based on residential setting, respondents were grouped into three categories based on county of residence: (1) metropolitan ( $n = 149$ ) (2) micropolitan ( $n = 302$ ), and (3) noncore ( $n = 208$ ). Classifications were based on definitions established by the Office of Management and Budget (OMB) (2010) and the U.S. Department of Agriculture Economic Research Service (2012). A number of covariates that past literature has established as important influencers on SWB in older adulthood were also included (Averill 2003; Dickerson et al. 2007; Glasgow and Berry 2013; Karatas and Duyan 2008; Pendall et al. 2016). The operationalization of these covariates is described in the following sections.

*Social interaction score.* Social interactions were measured by a scale that combined two items; the first asked how often the participant

interacted with friends, and the second asked how often the participant interacted with family members. Choices for each included “daily, weekly, monthly, yearly, or never.” Choices were coded using a five-point scale, with a score of 1 indicating never and a score of 5 indicating daily. The two scores were averaged to create one social interaction score ( $\alpha = .63$ ).

*Transportation problems.* To assess transportation needs, respondents were asked to rate the extent to which they have problems with transportation on a five-point scale. A score of 1 indicated little or no problem with transportation, while a score of 5 indicated that transportation was a major problem for the respondent.

*Unsuitable housing.* Respondents were also surveyed on the extent to which suitable housing was a problem for them. A score of 1 indicated little or no problem, and a score of 5 indicated that the respondent considered housing to be a major problem.

*Race.* Race was coded as a dichotomous variable with a code of 0 representing African American respondents and a code of 1 representing White respondents.

*Self-reported health.* A one-item Likert scale was created to assess a respondent’s self-reported physical health. A score of 1 indicated poor health, while a score of 5 indicated excellent health.

*Income.* Respondents were asked to indicate their total pre-tax income from the previous year on a nine-point scale. The lowest income level was below \$10,000 per year (assigned a code of 1), and the highest was more than \$150,000 per year (assigned a code of 9). Median substitution was used to replace missing income data.

### *Data Analysis*

This study’s analysis consisted of three main components. First, we present descriptive statistics of the sample, paying particular attention to differences by setting. Next, to determine whether there were initial differences between the three settings in terms of the selected SWB domains, a preliminary analysis through a Multivariate Analysis of Variance (MANOVA) was employed. Finally, a three-step, linear regression was applied to determine if differences in SWB between residents of metropolitan, micropolitan, and noncore settings persisted after factors associated with rurality and SWB were taken into account.

## RESULTS

*Descriptive Statistics*

The mean age of respondents was 74 years for both metropolitan and micropolitan respondents versus 75 years for noncore respondents. Overall, 22 percent of respondents were African American. The majority of African American respondents (61 percent) resided in micropolitan areas. White respondents (41 percent) were most likely to reside in micropolitan areas. Micropolitan, metropolitan, and noncore settings had similar proportions of males and females (roughly one quarter male and three quarters female). Noncore settings had the highest proportion of respondents with less than a high school education (24.1 percent). Noncore, metropolitan, and micropolitan respondents were similar in terms of marital status. Metropolitan respondents reported a mean SWB score of 4.6. Micropolitan and noncore respondents reported a slightly lower SWB score of 4.4 (see Table 1).

Table 1: Demographic Characteristics by Area Type of Mississippi's 2011 Older Adults Needs Assessment Survey Respondents

	Metropolitan (n = 149)	Micropolitan (n = 302)	Noncore (n = 208)
Avg. subjective well-being (SD)	4.6 (0.6)	4.4 (0.7)	4.4 (0.7)
Avg. age (SD)	74 (6.5)	74 (7.4)	75 (7.4)
<b>Sex</b>			
Male	26.8% (40)	27.8% (84)	25.0% (52)
Female	73.1% (109)	72.2% (218)	75.0% (156)
<b>Race</b>			
White	88.6% (132)	69.8% (210)	80.8% (168)
African American	11.4% (17)	30.2% (91)	19.2% (40)
<b>Education</b>			
Less than high school	10.1% (15)	20.7% (62)	24.1% (50)
High school diploma	34.5% (51)	31.3% (94)	38.2% (79)
Some college	27.0% (40)	25.7% (77)	18.8% (39)
Bachelor's or higher	28.4% (42)	22.3% (67)	18.8% (39)
<b>Marital Status</b>			
Single (never married)	8.1% (12)	6.7% (20)	9.6% (20)
Married	49.3% (73)	45.0% (134)	48.6% (101)
Divorced or separated	8.8% (13)	10.4% (31)	7.2% (15)
Widowed	33.8% (50)	37.9% (113)	34.6% (72)

Note: Frequencies in parentheses.

### MANOVA

To identify any significant differences in common predictors of SWB between respondents living in the three different settings under examination, a MANOVA was computed. Results revealed statistically significant differences in study variable means based on a participant's setting,  $F(12, 1333) = 2.01$ ,  $p = .020$ ; Wilk's  $\Lambda = 0.965$ , partial  $\eta^2 = .018$ . Follow up tests showed that setting had a statistically significant effect on SWB ( $F(2, 656) = 3.30$ ;  $p = .038$ ; partial  $\eta^2 = .010$ ) and income ( $F(2, 656) = 5.85$ ;  $p = .003$ ; partial  $\eta^2 = .020$ ). (See Table 2).

Table 2: Multivariate Analysis of Variance (MANOVA) Results

	Type III Sum of Squares	df	MS	F-value	$p$	$\eta^2$
Subjective well-being	3.041	2	1.520	3.296	.038	.010
Household income	37.113	2	18.556	5.847	.003	.020
Social interaction	0.953	2	0.476	0.818	.442	.002
Transportation problems	4.348	2	2.174	2.107	.122	.006
Unsuitable housing	0.297	2	0.149	0.153	.858	.000
Self-reported health	0.807	2	0.404	0.348	.706	.001

Tukey's HSD post-hoc tests showed that mean scores for SWB were significantly different ( $p = .039$ ) between metropolitan ( $M = 4.6$ ,  $SD = 0.6$ ) and micropolitan participants ( $M = 4.4$ ,  $SD = 0.7$ ). Differences between metropolitan and noncore participants were found to be marginally significant ( $M = 4.4$ ,  $SD = 0.7$ ) ( $p = .08$ ). Mean income scores were significantly different ( $p = .002$ ) between metropolitan ( $M = 4.2$ ,  $SD = 1.7$ ) and noncore participants ( $M = 3.6$ ,  $SD = 1.7$ ), but not between metropolitan and micropolitan participants ( $M = 3.9$ ,  $SD = 1.9$ ). ( $p = .126$ ). Post-hoc tests found no other significant differences in study variable means by setting (see Table 3 for means and standard deviations of study variables).

### Linear Regression

Linear regression was employed to determine whether differences in SWB between setting (i.e., metropolitan, micropolitan, and noncore) remained when differences in household income, race, age, social interaction, transportation, suitable housing, and self-reported health were taken into account. In Model 1, setting was found to be a statistically significant predictor of SWB, with older adults residing in noncore settings showing

Table 3: Means and Standard Deviations for Study Variables by Area

	Metropolitan	Micropolitan	Noncore
Subjective well-being	4.6 (0.6)	4.4 (0.7)	4.4 (0.7)
Household income	4.2 (1.7)	3.9 (1.8)	3.6 (1.7)
Social interaction	4.3 (0.8)	4.4 (0.7)	4.4 (0.8)
Transportation problems	1.3 (0.9)	1.4 (1.0)	1.5 (1.1)
Unsuitable housing	1.4 (0.9)	1.4 (1.0)	1.4 (1.0)
Self-reported health	3.6 (1.1)	3.6 (1.0)	3.5 (1.1)

lower levels of SWB compared to those in metropolitan settings, ( $b = -.162$ ,  $p = .027$ ,  $CI\ 95\%: -.31, -.02$ ). Comparisons between micropolitan and metropolitan settings also yielded a significant difference in SWB, with those in micropolitan settings reporting lower levels of SWB when compared to those in metropolitan settings ( $b = -.168$ ,  $p = .014$ ,  $CI\ 95\%: -.30, -.03$ ). Additional analyses not shown in Table 4 revealed that SWB between noncore and micropolitan settings was not significantly different ( $b = -.005$ ,  $p = .922$ ,  $CI\ 95\%: -.13, .11$ ). For Model 1, setting explained 70 percent of the variance in SWB.

In Model 2, household income, race, and age were added. In this model, household income was a statistically significant predictor of SWB ( $b = .078$ ,  $p = .000$ ,  $CI\ 95\%: .05, .11$ ). As with Model 1, older adults residing in micropolitan settings recorded significantly lower levels of SWB when compared to older adults in metropolitan settings even after controlling for key demographic characteristics ( $b = -.152$ ,  $p = .026$ ,  $CI\ 95\%: -.29, -.02$ ). The differences between noncore and metropolitan settings became insignificant in Model 2. Model 2 yielded a statistically significant  $R^2$  change ( $\Delta R^2 = .04$ ,  $F(3,652) = 9.14$ ,  $p < .001$ ) and total explained variance increased to 4.3 percent.

Finally, in Model 3, social interaction, transportation problems, unsuitable housing, and self-reported health were added and all were found to be significantly related to SWB. Positive relationships were found for increased social interaction ( $b = .116$ ,  $p = .000$ ,  $CI\ 95\%: .06, .18$ ) and more positive self-reported health and SWB ( $b = .187$ ,  $p = .000$ ,  $CI\ 95\%: .14, .23$ ). Negative relationships were found for perceived transportation problems ( $b = -.138$ ,  $p = .000$ ,  $CI\ 95\%: -.19, -.09$ ) and perceived housing problems and SWB ( $b = -.112$ ,  $p = .000$ ,  $CI\ 95\%: -.17, -.06$ ). Micropolitan setting ( $b = -.169$ ,  $p = .004$ ,  $CI\ 95\%: -.29, -.05$ ) and household income ( $b = .033$ ,  $p = .013$ ,  $CI\ 95\%: .01, .06$ ) remained significant and in the same direction. The addition of these variables resulted in a statistically



significant  $R^2$  change ( $\Delta R^2 = .247$ ,  $F(4,648) = 56.81$ ,  $p < .001$ ), increasing the explained variance to 28.7 percent (see Table 4).

Overall, in Model 3 the older adults residing in micropolitan settings, when compared to those residing in metropolitan settings, were likely to report significantly lower SWB even after controlling for important correlates. However, we found no significant difference in SWB between noncore and metropolitan residents, nor between noncore and micropolitan residents (results not shown) in Model 3. Interestingly, self-reported health had the largest effect on SWB ( $\beta = .294$ ), followed by transportation problems ( $\beta = -.202$ ), unsuitable housing ( $\beta = -.161$ ), social interaction ( $\beta = .130$ ), then micropolitan setting ( $\beta = -.123$ ).

## DISCUSSION AND CONCLUSION

Rural environments have been considered by some to be havens for older adults to happily live out their remaining years (Keating and Philips 2008). The argument that older adults who live in rural areas have higher well-being than older adults living in more populated areas has been largely unexplored (Keating and Philips 2008; Wahl 2005). The reality is that some authors argue that SWB should be higher for older adults in rural areas, due to factors like a positive outlook and strong social support systems (Bacsu et al. 2014; Evans 2009), while others argue that SWB should be lower for older adults in rural areas, due to factors such as reduced access to health care and social services and declining social networks (Dudley 2019; Hash et al. 2015, Huxhold and Fiori 2019). We actually find some support for this theory.

The purpose of this study was to examine possible differences in SWB among older adults living in Mississippi based on their residential setting (i.e., metropolitan, micropolitan, and noncore), while taking into account factors that correlate with SWB, such as income, access to transportation, and self-reported health (Schuessler and Fisher 1985; Smith et al. 2002). Consistent with the work of Keyes and Waterman (2003) and Diener et al. (2002), we used a multidimensional measure of SWB composed of measures of life satisfaction and positive and negative affective states. Mississippi was selected as an example of a particularly poor and rural state. The study's overarching hypothesis was that differences in SWB favoring metropolitan areas would remain, even after common predictors of low SWB were taken into consideration. This research is important as SWB is thought to protect the mental and physical health of at-risk individuals (Keyes and Waterman 2003).

Table 4. Linear Regression Analysis for Variables Predicting Subjective Well-being ( $n = 659$ )

Variables	Model 1			Model 2			Model 3		
	b	$\beta$	p	b	$\beta$	p	b	$\beta$	p
Micropolitan <sup>a</sup>	-.168 (-.30, -.03)	-.123	.014	-.152 (-.29, -.02)	-.110	.026	-.169 (-.29, -.05)	-.123	.004
Noncore <sup>a</sup>	-.162 (-.31, -.02)	-.110	.027	-.116 (-.26, .03)	-.079	.110	-.112 (-.24, .01)	-.076	.076
Household income				.078 (.05, .11)	.206	.000	.033 (.01, .06)	.087	.013
African American <sup>b</sup>				.042 (-.09, .18)	.026	.517	.109 (-.00, .22)	.066	.055
Age				.002 (-.01, .01)	.018	.645	.002 (-.00, .01)	.026	.442
Social interaction							.116 (.06, .18)	.130	<.001
Transportation problems							-.138 (-.19, -.09)	-.202	<.001
Unsuitable housing							-.112 (-.17, -.06)	-.161	<.001
Self-reported health							.187 (.14, .23)	.294	<.001
Constant	4.594 (4.48, 4.70)		<.001	4.135 (3.568, 4.702)		<.001	3.415 (2.83, 4.00)		<.001
Adj R <sup>2</sup>	.007			.043			.287		

Notes: 95% CI in parentheses; <sup>a</sup>Reference is metropolitan; <sup>b</sup>Reference is White.

Our results indicated that there were some differences between older adults living in noncore and micropolitan counties and older adults living in metropolitan counties, particularly in income, but we found no significant differences in SWB between older adults in the two kinds of nonmetropolitan areas. Further, no differences were found between the groups in self-reported health, social interactions, transportation problems, or suitable housing.

Most of the factors expected to predict lower SWB were indeed associated with lower SWB in the present sample. Low income, poor health, transportation problems, and housing problems were negatively associated with SWB, while social interactions were positively associated with SWB. Race (African American versus White) was not associated with SWB, which was not especially surprising, given that differences in health and income were already controlled.

Intriguingly, on average, our results indicated lower SWB in noncore residents than in metropolitan residents before controlling for important covariates. However, only differences between metropolitan areas and micropolitan rural areas were significant after predictors of SWB were considered. These results suggest that micropolitan settings may be less conducive to positive SWB among older adults. Our null finding between metropolitan settings and noncore could suggest that very rural settings are not detrimental to the SWB of older adults, or it could be that differences in health and income swamped differences in SWB.

Past literature on urban-rural differences suggests that older adults residing in more rural areas are less healthy, less affluent, and at a greater disadvantage in terms of access to resources and services when compared to their urban counterparts (Averill 2003; Kivett et al. 2000; Schoenberg et al. 2001), suggesting lower SWB. The current study suggests lower SWB in micropolitan settings and not necessarily very rural, noncore settings. However, some differences in SWB became nonsignificant when quality of life factors associated with remote areas were removed. This leads to two possibilities; either the differences in income and health dwarf the differences in SWB, or older adults in the most rural areas have factors like strong attachment to place that compensate for some of the challenges to their SWB (Rowles 1983; Kivett 1988). The generalizability of these data to rural aging in other states needs to be explored.

One unique feature of the present study was the use of the OMB categories to classify the different settings under analysis (OMB 2010). Previous studies have failed to differentiate between different types of

nonmetropolitan areas. Studies that compare SWB in metropolitan and nonmetropolitan areas, but do not differentiate between small-to-medium sized towns (i.e., micropolitan settings) and places that are more remote (i.e., noncore settings), will find fewer differences in SWB. The micropolitan category was included because micropolitan settings have some features that are similar to metropolitan places and some that are similar to noncore settings. For example, recent changes in the banking system have made it much harder to open or maintain very small businesses in noncore areas than in micropolitan areas (Tolbert et al. 2014). However, the lack of significant differences found between micropolitan and noncore settings was interesting. The two types of settings seem to differ more in degree than in type, at least in Mississippi. Future research should examine differences between the same settings in other states.

The current study was not without its limitations. First, the study was conducted in Mississippi, which, as one of the poorest states in the United States is not very representative of the country as a whole. A nationwide study of rurality and well-being in later life needs to be conducted to investigate how rural older adults cope in states that are more affluent. It may be that the SWB of older adults in affluent rural communities is much higher, or noncore older adults in other parts of the United States are at less of a disadvantage, when compared to their micropolitan and metropolitan counterparts. We also recognize that the metropolitan-nonmetropolitan distribution and the racial composition of the survey data are not necessarily representative of the state of Mississippi. This is not unexpected, however, given that the main stratification criteria (which was mandated by the project stakeholders) was primarily concerned with ensuring that data were collected from a near equal number of participants residing in each of Mississippi's 10 Area Agencies on Aging (AAA).

Second, only two levels of rurality were used in the study, micropolitan and noncore. More differentiated categories of rurality are in existence, especially the Frontier and Remote (FAR categories) (Hart 2012), which provide opportunities for future studies to explore. Furthermore, while the three OMB categories do not completely describe the environments in the included counties, they do allow for generalizations that could be used for policy (Henning-Smith et al. 2017). Lastly, the current study employed relatively basic self-reported measures of health, transportation, housing, and social interactions; a more

comprehensive study would be well served to use more multi-item measures.

Additional research needs to be conducted to explain why SWB was shown to be low for older adults in the most rural areas, after controlling for income and health. Some factors to consider in future studies include patterns of social interaction, regional differences, and attachment to place. The results of this exploratory study warrant further investigation into the domains that have the greatest impact on the SWB of older adults as a function of the low population density and remoteness of their residences.

In addition, future research should take into account the model of aging and the environment postulated by Wahl and associates (2012). Their model could be used to explain why older adults are reluctant to move from environments that no longer foster their independence, such as some very rural environments. They suggest that attachment to place (i.e., belonging) may increase over time, even while independence decreases. Ultimately, this information could be used to design interventions to improve the health, well-being, and quality of life for older adults residing in diverse settings with varying levels of urbanization and rurality.

#### ACKNOWLEDGMENTS

We thank the National Strategic Planning and Analysis Research Center for use of this data set, originally collected by the second author while he was employed at the center.

#### DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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