NORTH CENTRAL
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FOR RURAL DEVELOPMENT

The impact of health disparities on the subjective well-being in rural communities

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Executive Summary

The relationship between the place where people live, their health, and subjective well-being represents a growing body of interest among researchers, policymakers, and stakeholders. This study examines the impacts of the health, socioeconomic, and spatial indicators on the subjective well-being of households in two types of rural places in the North Central Region: rural areas (open and/or sparsely populated countryside) and rural towns (towns with up to 10,000 inhabitants). We used data from the NCR-Stat: Baseline Survey 2022 and employed OLS regression analysis. Our findings imply that health-related factors, specifically self-reported health status, substance use disorder awareness, and mental illnesses, significantly affect the level of happiness in both examined rural locations. Socioeconomic indicators, such as income level, high educational attainment, age, and gender, significantly impact self-reported happiness only in rural towns. These outcomes highlight the importance of place-based effects, as the residential location might affect the quality of life in these places. Moreover, socioeconomic indicators suggest that the people-based effect may play a significant role in different levels of subjective well-being between people living in rural areas and rural towns.

1   Introduction

Geographic location is one of the important determinants (such as poverty, employment, economic development opportunities, etc.) to achieve health equity (Carey, 2015). Many recent studies refer to health disparities among rural and urban communities and rural communities themselves (Hege et al., 2018; Maharlouei et al., 2020; Arriola et al., 2023;) in terms of large differences in access to health resources and health outcomes (Zeng et al., 2015; Singh et al., 2014). The most important health challenges that rural areas in the U.S. face include access to health care, nutrition and weight status, mental health status and disorders, substance use disorders, physical inactivity, and diabetes and cardiovascular diseases (Bolin et al., 2015). Various factors, such as socioeconomic and demographic determinants, also contribute to differences between rural and urban communities and are related to poorer rural health. Rural residents are often older, with lower educational attainment and lower income (CDC, 2023). Many rural areas also suffer from high poverty rates and existing food deserts (James, 2014; Hartley, 2004).

In our study, we examine the impact of different health, demographic, and spatial indicators on the subjective well-being of rural households in the North Central Region (NCR). We used self-reported happiness as a proxy for subjective well-being. Contrary to many studies examining differences between rural and urban areas (e.g., Graham and Pinto, 2019; Okulicz-Kozaryn and Mazelis, 2018; Requena, 2016; Shucksmith et al., 2009; Graham and Felton, 2006), our study determines subjective well-being in two types of rural communities: rural areas as open and/or sparsely populated countryside, and towns with up to 10,000 inhabitants. We use the NCR-Stat Baseline Survey, which enables us to measure the self-reported happiness of householders in the NCR and identify the effects of the health-related and socioeconomic factors (contextual effect) in two different places of residence (place-based effect) (Hoogerbrugge and Burger, 2020; Burger et al., 2020; Ballas, 2021).

2   Related literature

2.1   The economics of happiness

In recent years, many attempts have been made to better understand, define, and measure happiness as a component of well-being (Layard, 2011 [2005]). Traditional macroeconomic indicators, such as income and employment, that are usually reported as objective well-being measures do not have the capacity to provide a complete picture of how people live and whether specific policy measures make their lives better (Nikolova and Graham, 2022). For instance, macroeconomic indicators such as economic growth and a low unemployment rate have often been used in the United States to imply well-being. However, they do not show that at the individual level, many low-income populations feel anxious, less optimistic, highly stressed, and worried (Graham and Pinto, 2019).

The literature mentions two additional kinds of well-being – psychological well-being (also called *eudaimonic well-being*) and subjective well-being (also called *hedonic well-being*). Psychological well-being concentrates on life purpose, personal growth, self-acceptance, and positive relations with others. The subjective well-being approach focuses on self-reported positive and negative effects such as work or life satisfaction and the frequency of pleasant or unpleasant emotions, including happiness (Dowling and Chin-Fang 2007; OECD, 2011). They complement objective measures and serve as proxies for utility (Clark et al., 2008). Subjective well-being impacts an individual's productivity, income, and job-related behavior and is inherently worthwhile as people usually strive to be happy and satisfied (Oswald et al., 2015).

Subjective well-being is multifaceted as it involves both happiness and life satisfaction and is typically measured by self-reported information. Usually, people were asked modifications of the following three survey questions with possible answers on a 1 to 10 or Likert-type scale (Dolan et al., 2008; Hirschauer et al., 2015):

Where do you feel you personally stand at present?
[0 – Worst possible life for you ……………10 – Best possible life for you]

All things considered, how satisfied are you with life as a whole nowadays?
[0 – Not at all satisfied………………..10 – Extremely satisfied]
[Not at all satisfied, Somewhat satisfied, Satisfied, Very satisfied]

Taking all things together, how happy would you say you are?
[0 – Extremely unhappy ………………..10 – Extremely happy]
[Very happy, Fairly happy, Not very happy, Not at all happy]

In this study, we use the third question focused on happiness to proxy for subjective well-being.

2.2   Space and place aspects in the economics of happiness

Space matters in economic activities. It is a physical barrier for moving goods and people, a geographical territory featuring different characteristics, a location with productive resources and activities, and a source of social and economic advantages and disadvantages (Capello, 2015). Adding a spatial dimension to the economics of happiness allows researchers to consider and analyze happiness and well-being depending on the place where people live. Thus, the geographical context in the analysis of happiness addresses questions about the extent to which spatial factors determine the quality of life in the place of residence *(place-based effect)* (Burger et al., 2020). Differences in the composition of the population might play a role in explaining subjective well-being differences between places *(composition effect* or *people-based effect)*. In other words, one of the economic geography approaches in the analysis of happiness is to determine whether subjective well-being, including personal happiness and life satisfaction, mirrors differences between characteristics of residents living in different places, such as rural versus urban areas, cold versus warm regions, Midwest versus South, etc. (Hoogerbrugge and Burger, 2020; Ballas, 2021).

Alternatively, *contextual effects* may also play a role, as some place-specific attributes make people happy or unhappy (Ballas and Tranmer, 2012). It means that resident's happiness is also influenced by the living environment, including social, economic, environmental, and other factors, such as community amenities, social and economic inequalities, community leadership, etc. (Hoogerbrugge and Burger, 2020; Ballas, 2021).

2.3   Definitions of rural and urban areas

Researchers and practitioners use various definitions of rural that are often used by national institutions or create their own definitions. In this section, we describe two definitions frequently used by national institutions and our own definition resulting from these national definitions.

The U.S. Census Bureau defines rural and urban areas on the basis of population size and density. Metro (urban) areas consist of urbanized areas and urban clusters. Both areas must have

a core with a population density of 1,000 people per square mile. *Urbanized areas* contain a population of 50,000 or more, and *urban clusters* have a population between 2,500 and 50,000 residents. Nonmetro (rural) areas involve open countryside with population densities of less than 500 people per square mile and places with fewer than 2,500 people (U.S. Census Bureau, 2016; ERS, 2023). Based on this definition, in 2020, urban areas in the U.S. accounted for 80% of the population, while 20% were within rural areas (U.S. Census Bureau, 2022). The U.S. Census Bureau proposed changes for the 2020 classification of urban and rural areas, adopting a 4,000-housing unit threshold approximating 10,000 people. Since the U.S. Census Bureau considers rural areas as territories not defined as urban, rural areas would be considered as areas with a population of less than 10,000 (U.S. Census Bureau, 2021).

The U.S. Census Bureau's delineation of urban areas and urban clusters provides the basis for the Office of Management and Budget's (OMB) delineation of Core Based Statistical Areas or Metropolitan (metro) and Micropolitan (micro) Statistical Areas. Metro areas include urbanized areas with more than 50,000 people. Nonmetro areas are considered rural. They are outside the boundaries of metro areas and can be further subdivided into two types. *Micro areas* are centered on urban clusters of 10,000 - 49,999 people. All remaining areas are often labeled *"noncore"* areas because they are not part of "core-based" metro or micro areas (ERS, 2019). Metro and micro areas accounted for about 94% of the population, while the remaining 6% were nonmetro areas in 2016. The land area in metro and micro areas was about 47%, and the remaining 53% was noncore (U.S. Census Bureau, 2020).

Our own definition of rural considers the national definition but, at the same time, points out differences between rural and urban areas and various definitions of rural areas. Despite the widespread presumption that rural areas have unified characteristics, there is much heterogeneity within rural settlements across the United States, and populations living in rural areas have different socio-economic and health-related profiles (Hartley, 2004; James, 2014). Although living in rural areas is often linked to the availability and affordability of housing, public services, natural amenities (Phimister et al., 2000), and community attachment (Burger et al., 2020), many remote rural areas suffer from deprivation, low income, poverty, and extensive isolation (Phimister et al., 2000; Doogan et al., 2018). Small rural towns are often characterized by strong social networks and informal social contacts facilitated by homogenous residents (Okulicz-Kozaryn, 2015).

Based on the existing definitions of rural areas and differences between rural areas themselves, for the purpose of our study, we divided them into two categories: rural areas as open and/or sparsely populated countryside (rural areas) and towns with up to 10,000 inhabitants (rural towns). In this study, we aim to explore whether differences exist in the impacts of health, demographic, and spatial variables on the subjective well-being of rural households residing in rural areas and rural towns.

3 Materials and Methods

3.1 Data

We investigated the impact of health, demographic, and spatial indicators on self-reported happiness of rural households in the NCR using data from the [NCR-Stat: Baseline Survey](#) conducted by the North Central Regional Center for Rural Development (NCRCRD) in 2022. The dataset contains 4,688 households across NCR and includes variables associated with household and community social and economic development and well-being (Bednarikova et al., 2022). This dataset is cross-sectional, which represents a limitation of this study. Unlike longitudinal studies, it does not separate between a presumed cause and its possible effect. Despite this drawback, the survey provides unique data about demography, economics, health, housing, environment, and social behavior of respondents in rural and urban areas of the NCR.

3.2 Methodology and variables

Method

We used ordinary least squares (OLS) regression analysis to determine the effect of household location, self-reported health status, and health indicators on self-reported happiness while controlling for education, marital status, income level, working status, gender, race, and age of the respondents. We ran two models based on the household residential location. In the Model 1, we included households located in rural areas. Model 2 involves households living in rural towns.

Dependent variable

The dependent variable is the self-reported subjective well-being of a respondent measured on a 1–10 scale based on the question, "Taking all things together, how happy would you say you are?". We used a scale with 0 representing "extremely unhappy" and 10 as "extremely happy." Table 1 shows descriptive statistics of all variables.

Independent variables

Studies show a strong relationship between subjective well-being and physical and mental health (Shields and Price, 2005). Thus, our set of independent variables related to health and health resources includes questions about self-reported health status, type of health insurance, problems paying medical bills, substance use disorder (SUD) awareness, anxiety, and depression.

Self-reported health status *(health)* is a categorical variable where respondents answered the question, "How would you rate your health in general?" and selected from the responses 1=very good, 2=good, 3=poor. Variable *health_insurance* is a categorical variable describing the health insurance or health coverage plans of respondents and equals 1 for those with health insurance covered by employer, 2=Medicare, 3=Medicaid, 4=other, and 5=none. Variable *medical_bills* is a dummy variable where the value of 1 indicates that the respondent had problems paying family medical bills in the last 12 months, and 0 is used for otherwise. SUD awareness means that the respondent knows whether their residential community implements effective community-based

programs to prevent or reduce substance misuse and SUD. The variable *SUD_awareness* is a dummy variable taking the value of 1 if a respondent knows whether the community provides SUD programs or not and 0 if otherwise. The mental health variables are categorical variables where respondents were asked about how often they were bothered by feeling down, depressed, or hopeless (*depressed*) and feeling anxious, nervous, or on edge (*anxious*) over the last three months. The responses take values 1=not at all, 2=several days, 3=often.

Our set of socioeconomic and demographic characteristics includes those considered to be significant determinants of subjective happiness and well-being: income, education, working status, marital status, age (Layard et al., 2012; Clark, 2018), gender, and race (Ballas, 2021; Dolan et al., 2008). The respondent's *income* takes values 1=less than $25,000, 2=$25,000 - $49,999, 3=$50,000 - $74,999, 4=$75,000 - $99,999, and 5= $100,000 and more. The variable *working_status* is a categorical variable with the values of 1=wage-employed, 2=self-employed, 3=unemployed, 4=retired. *Education* is a categorical variable that equals 1 if a business owner's educational attainment is grade 12 or GED and less, 2=college 1 to 3 years, and 3=4-year college graduate and higher. *Marital_status* is also a categorical variable with the values of 1=married, 2=divorced/separated, 3=widowed, 4=never married, living with partner, 5=never married, living alone. *Age* is a continuous variable, measured in years. Self-identified *race* is a dummy variable where being White/non-Hispanic takes the value of 0 and 1 is non-White/Hispanic. *Gender* is a dummy variable with 1=woman and 0=man.

Table 1. Descriptive statistics of the Model 1 (rural areas), Model 2 (rural towns up to 10,000)

	Model 1 (rural areas)					Model 2 (rural towns up to 10,000)				
	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
well-being	878	6.943	2.434	0	10	1,095	6.798	2.32	0	10
i.health										
Very good	886	0.353	0.478	0	1	1,117	0.350	0.477	0	1
Good	886	0.379	0.485	0	1	1,117	0.378	0.485	0	1
Poor	886	0.267	0.442	0	1	1,117	0.270	0.444	0	1
i.health insurance										
Employer	877	0.278	0.448	0	1	1.107	0.274	0.446	0	1
Medicare	877	0.209	0.407	0	1	1.107	0.212	0.409	0	1
Medicaid	877	0.239	0.426	0	1	1.107	0.243	0.429	0	1
Other	877	0.208	0.406	0	1	1.107	0.209	0.407	0	1
None	877	0.063	0.244	0	1	1.107	0.596	0.236	0	1
medical bills	878	0.241	0.428	0	1	1,088	.218	.413	0	1
SUD awareness	893	0.551	0.498	0	1	1,120	.546	.498	0	1
i.depressed										
Not at all	880	0.428	0.495	0	1	1.099	0.414	0.492	0	1
Several days	880	0.309	0.462	0	1	1.099	0.339	0.473	0	1
Often	880	0.262	0.440	0	1	1.099	0.246	0.431	0	1
i.anxious										
Not at all	881	0.492	0.492	0	1	1.099	0.404	0.491	0	1
Several days	881	0.271	0.444	0	1	1.099	0.311	0.463	0	1
Often	881	0.318	0.466	0	1	1.099	0.283	0.451	0	1
i.income										
Less than $25,000	865	0.295	0.456	0	1	1,082	0.243	0.429	0	1
$25,000 - $49,999	865	0.306	0.461	0	1	1,082	0.378	0.485	0	1
$50,000 - $74,999	865	0.181	0.385	0	1	1,082	0.174	0.379	0	1
$75,000 - $99,999	865	0.102	0.303	0	1	1,082	0.107	0.309	0	1
$100,000 and more	865	0.113	0.317	0	1	1,082	0.096	0.294	0	1
working status										
Wage-employed	887	0.439	0.496	0	1	1,117	0.436	0.496	0	1
Self-employed	887	0.073	0.260	0	1	1,117	0.061	0.240	0	1
Unemployed	887	0.206	0.404	0	1	1,117	0.205	0.404	0	1
Retired	887	0.280	0.449	0	1	1,117	0.295	0.456	0	1
i.education										
High school or less	889	0.379	0.485	0	1	1,119	0.331	0.470	0	1
College 1 to 3 years	889	0.377	0.485	0	1	1,119	0.388	0.487	0	1
4-year college& more	889	0.242	0.429	0	1	1,119	0.279	0.449	0	1
i.marital status										
Married	886	0.477	0.499	0	1	1,107	0.412	0.492	0	1
Divorced/separated	886	0.181	0.385	0	1	1,107	0.205	0.404	0	1
Widowed	886	0.083	0.276	0	1	1,107	0.074	0.263	0	1
Not married/living alone	886	0.146	0.354	0	1	1,107	0.170	0.376	0	1
Never married / living with partner	886	0.110	0.313	0	1	1,107	0.135	0.342	0	1
age	893	51.87	17.091	18	90	1,120	49.712	18.563	18	93
gender	893	0.726	0.446	0	1	1,119	0.710	0.454	0	1
race	893	0.924	0.265	0	1	1,120	0.841	0.366	0	1

Source: Bednarikova et al. (2022). NCR-Stat: Baseline Survey

4   Results and discussion

Where a person lives is generally considered a crucial factor impacting a person's level of happiness (Burger et al., 2020). Table 2 provides the results of the two models based on the place of respondent's residents. The analysis revealed that the respondents in both types of examined areas who reported having a good health status *(health)* were statistically significantly happier than those with good or poor health status. This result corresponds with other studies showing a strong positive correlation between happiness and self-reported health status (Dollan et al., 2007; Maharlouei et al., 2020).

Respondents that felt depressed for several days or often during the three months in the monitored areas are statistically significantly less happy than respondents without these feelings. In addition, respondents in rural areas were statistically significantly less happy when they felt anxious often or for several days during the last three months. The physical and social isolation of rural areas, especially in remote rural areas, may result in mental health complications as many people are excluded from broader formal and informal support networks and social services (Arriola et al., 2023; Hege et al., 2018).

Substance use disorders are considered one of the most important health challenges faced by the rural population (Hege et al., 2018). Respondents in both areas who are aware of whether their residential community implements effective community-based programs to prevent or reduce substance misuse and SUD are significantly happier than those who are unaware of these community activities.

The results of descriptive and regression analyses refer to the differences in self-reported happiness in different places. People's subjective well-being is shaped by various factors, including socioeconomic and demographic characteristics, neighborhood, and social networks (Ballas, 2021). Controlling for income, respondents with higher income in rural towns are happier than those with income of less than \$25,000. The level of income is often used as a factor associated with self-reported happiness (e.g., Graham and Felton, 2006; Graham and Pinto, 2019). However, Wang (2017) argues that controlling for income level does not show the whole truth, as people living in rural areas usually have lower incomes and often adopt lower living standards.

In our study, the level of self-reported happiness strongly correlates with marital status as divorced/separated, and non-married respondents are significantly less happy than married respondents, especially in rural areas. This outcome is also broadly documented in the literature emphasizing the importance of family relationships in creating subjective well-being (Layard, 2011 [2005]).

Table 2. The OLS regression models of subjective well-being

Variable	Model 1 (rural areas)			Model 2 (rural towns up to 10,000)		
	Coeff.	St. Error	Signif.	Coeff.	St . Error	Signif.
Health and health resources						
health						
(i.Very good)	.			.		
Good	-0.434	0.172	**	-0.72	0.142	***
Poor	-1.528	0.199	***	-1.488	0.168	***
health_insurance						
(i.Employer)	.			.		
Medicare	-0.297	0.251		0.188	0.205	
Medicaid	-0.086	0.216		0.155	0.177	
Other	-0.094	0.219		0.002	0.183	
None	-0.002	0.314		0.290	0.277	
medical_bills	-0.074	0.176		-0.196	0.155	
SUD_awareness	0.296	0.149	**	0.259	0.127	**
depressed						
(i.Not at all)	.			.		
Several days	-0.879	0.206	***	-0.967	0.171	***
Often	-1.453	0.267	***	-1.991	0.217	***
anxious						
(i.Not at all)	.			.		
Several days	-0.501	0.209	**	-0.268	0.173	
Often	-1.292	0.254	***	-0.515	0.213	**
Demographic characteristics						
income						
(i.Less than $25,000)	.			.		
$25,000 - $49,999	0.237	0.187		0.354	0.159	**
$50,000 - $74,999	-0.107	0.226		0.066	0.194	
$75,000 - $99,999	-0.178	0.278		0.604	0.235	**
$100,000 and more	0.029	0.287		0.383	0.249	
working status						
(i.Wage-employed)	.			.		
Self_employed	0.070	0.286		-0.432	0.264	
Unemployed	0.212	0.205		-0.029	0.172	
Retired	-0.093	0.210		0.147	0.169	
education						
(i.High school or less)	.			.		
College 1 to 3 years	0.037	0.169		-0.181	0.147	
4-year college & more	0.283	0.202		-0.285	0.167	*
marital status						
(i.Married)	.			.		
Divorced/separated	-0.666	0.207	***	-0.382	0.168	**
Widowed	-0.376	0.276		-0.202	0.240	
Not married/living alone	-0.802	0.237	***	-0.489	0.199	**
Never married/living with partner	-0.468	0.263	*	-0.414	0.216	*
age	-0.004	0.006		0.009	0.138	*
gender	-0.050	0.163		0.016	0.180	
race	0.235	0.293		-0.348	0.397	*
Number of observations			809			994
Prob > chi2			0.000			0.000
Pseudo R^2			0.344			0.355

Note: Significance of coefficients in the model according to the z-test: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Our age-related results suggest that older respondents in rural towns are significantly happier than younger respondents. As our sample includes nearly one-third of respondents aged 65 and older, this result is in line with other studies showing higher levels of well-being at older age (Dolan et al., 2008). The high educational attainment of respondents in rural towns is significantly associated with lower levels of happiness. This result might indicate that highly educated respondents would thrive better in bigger cities that offer more high-income job opportunities and other advantages (Hoogerbrugge and Burger, 2020). Nevertheless, education may be responsive to other variables in the model, and further research regarding the relationships between subjective well-being and high educational attainment would be beneficial.

Finally, the study reveals that respondents living in rural towns that indicated to be White race are significantly less happy than Other races.

5   Conclusion

Health disparities, socioeconomic factors, and spatial aspects represent important indicators influencing the level of self-reported happiness as a proxy for subjective well-being. This study provides some preliminary insights into a better understanding of the differences between two types of rural places of residency – rural areas and rural towns – in terms of health disparities.

Our findings imply that health-related factors, specifically self-reported health status, SUD awareness, and mental illnesses, significantly affect the level of happiness in both examined rural locations. However, our results suggest that socioeconomic drivers of subjective well-being in rural areas and rural towns may differ. While income level, high educational attainment, age, and gender significantly impact self-reported happiness in rural towns, these factors are not significant in rural areas. These outcomes highlight the importance of place-based effects, as the geographical location of the residence might impact the quality of life in these places. Moreover, the outcomes related to the socioeconomic indicators suggest that the people-based effect may significantly impact the subjective well-being of people living in rural areas and rural towns.

More research is needed to understand how the intersection of location, health and health resources, and socioeconomic indicators lead to different levels of subjective well-being. Findings about the bivariate relationship between happiness and geographical area are crucial not only for people in different locations but also for policymakers to make informed decisions about how to improve everyone's overall happiness, both objectively and based on how they feel about their lives.

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