

Introduction

Suicide has been one of the leading causes of death in the United States for several years (CDC, 2017). Multiple studies have looked at the disparity of suicide rates across geographical location (Wilkinson, 1984; Saunderson, 1998; Morrell, 1999). These studies have shown a correlation between rural areas and higher rates of suicide. There is no one single explanation that can be used to supply reasons as to why people choose to commit suicide, but we can gain a better understanding through research. Researchers have been looking into the specific stressors that people in rural areas suffer from, more uniquely, to help mental health professionals better understand their individual stressors (Eberhardt & Pooyan, 1990; Monk, 2000). These stressors include life satisfaction, emotional strain, economics, and isolation. The last two stressors, economics and isolation, seem very similar in definition to stressors that affect individuals in urban areas. However, they differ in their application, the economic foundation of rural areas is different than in urban areas, and people in rural areas could be miles from their nearest neighbor. The purpose of this study is to determine if the trend seen decades ago can still be observed today. The Centers for Disease Control and Prevention (CDC), have published the leading causes of death in the United States from 1999-2017. The data is split to show the numbers for each of the fifty states. This data combined with the last Census, 2010, can be used to test our null hypothesis, there is no difference in suicide rates when comparing across regions.

Methods

- The dataset for the leading causes of death was obtained from the CDC
- The Census data was obtained from the Census website
- The population data for 2010 was put into the same table as the suicide deaths for 2017, except for the states of Alaska and Hawaii
 - The District of Columbia was included, as both organizations keep individual records for it
- The following formula was used to find the number of suicide deaths per 100,000 civilians, to be able to compare across states

$$\frac{\text{\# of suicide deaths in the state in 2017}}{\text{Total state population in 2010}} \times 100,000 = \text{Deaths per 100,000}$$
- This was done for all 48 continental states
- States were split placed into categories based on their geographical location (Table 1)
- Each state was placed into three of the six categories as there were three ANOVA tests ran
 - Eastern State/Western State (Figure 1)
 - Northern State/Southern State (Figure 2)
 - Coastal State/Interior State (Figure 3)
- All the categories met all the assumptions for an ANOVA test (Table 2)

Results

State	East or West	North or South	Interior or Coastal
Alabama	E	S	C
Arizona	W	S	I
Arkansas	E	S	I
California	W	S	C
Colorado	W	N	I
Connecticut	E	N	C
Delaware	E	N	C
District of Columbia	E	N	C
Florida	E	S	C
Georgia	E	S	C
Idaho	W	N	I
Illinois	E	N	I
Indiana	E	N	I
Iowa	E	N	I
Kansas	W	N	I
Kentucky	E	S	I
Louisiana	E	S	C
Maine	E	N	C
Maryland	E	N	C
Massachusetts	E	N	C
Michigan	E	N	I
Minnesota	E	N	I
Mississippi	E	S	C
Missouri	E	N	I
Montana	W	N	I
Nebraska	W	N	I
Nevada	W	N	I
New Hampshire	E	N	C
New Jersey	E	N	C
New Mexico	W	S	I
New York	E	N	C
North Carolina	E	S	C
North Dakota	W	N	I
Ohio	E	N	I
Oklahoma	W	S	I
Oregon	W	N	C
Pennsylvania	E	N	C
Rhode Island	E	N	C
South Carolina	E	S	C
South Dakota	W	N	I
Tennessee	E	S	I
Texas	W	S	C
Utah	W	N	I
Vermont	E	N	C
Virginia	E	S	C
Washington	W	N	C
West Virginia	E	N	C
Wisconsin	E	N	I
Wyoming	W	N	I

Table 1: The classification of each state into three of six categories, East/West, North/South, or Interior/Coastal.

State Classification	Shapiro-Wilk p-value
North	0.6627
South	0.805
East	0.4311
West	0.6484
Coastal	0.4579
Interior	0.6414

Table 2: The Shapiro-Wilk tests for normality result for the six classification of state.

There was a difference observed between the East and West states ($F=26.6619$, $p=0.0001$). There was a difference observed between the Coastal and Interior states ($F=16.2511$, $p=0.0002$). There was not a difference observed between the North and South states ($F=0.0107$, $p=0.9180$).

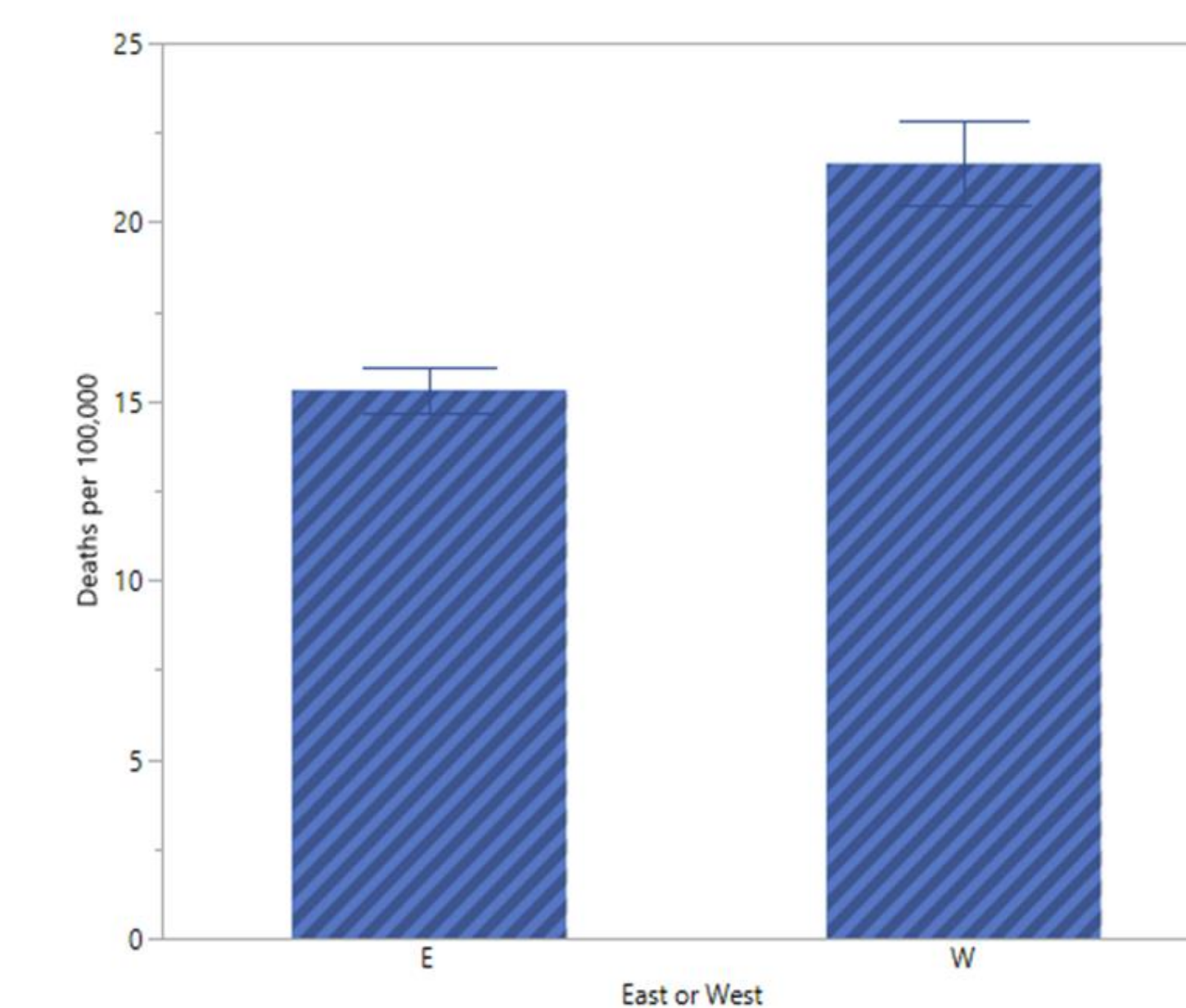


Figure 1: Deaths per 100,000 civilians in Eastern states (n=32) compared to Western states (n=17).

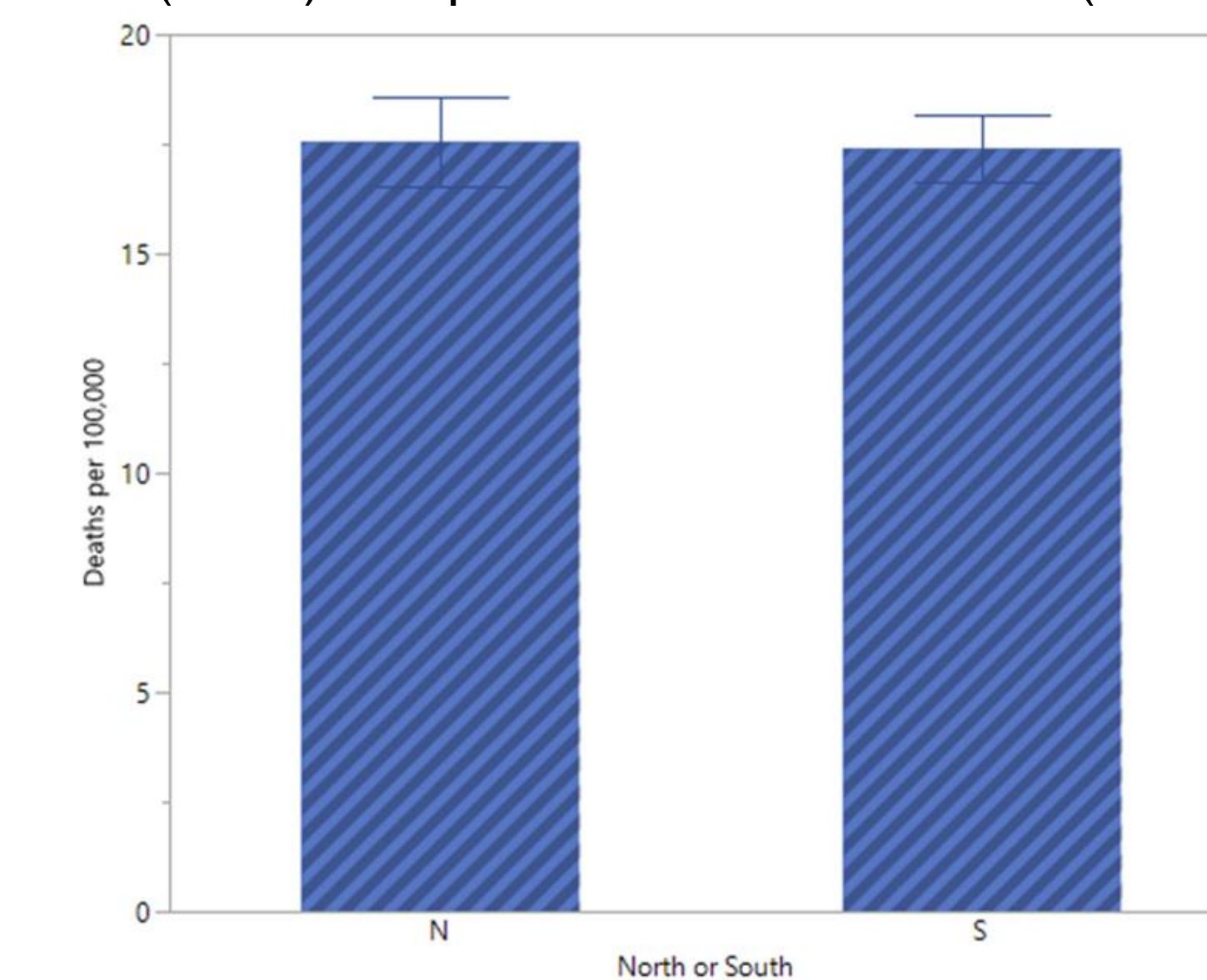


Figure 2: Deaths per 100,000 civilians in Northern states (n=33) compared to Southern states (n=16).

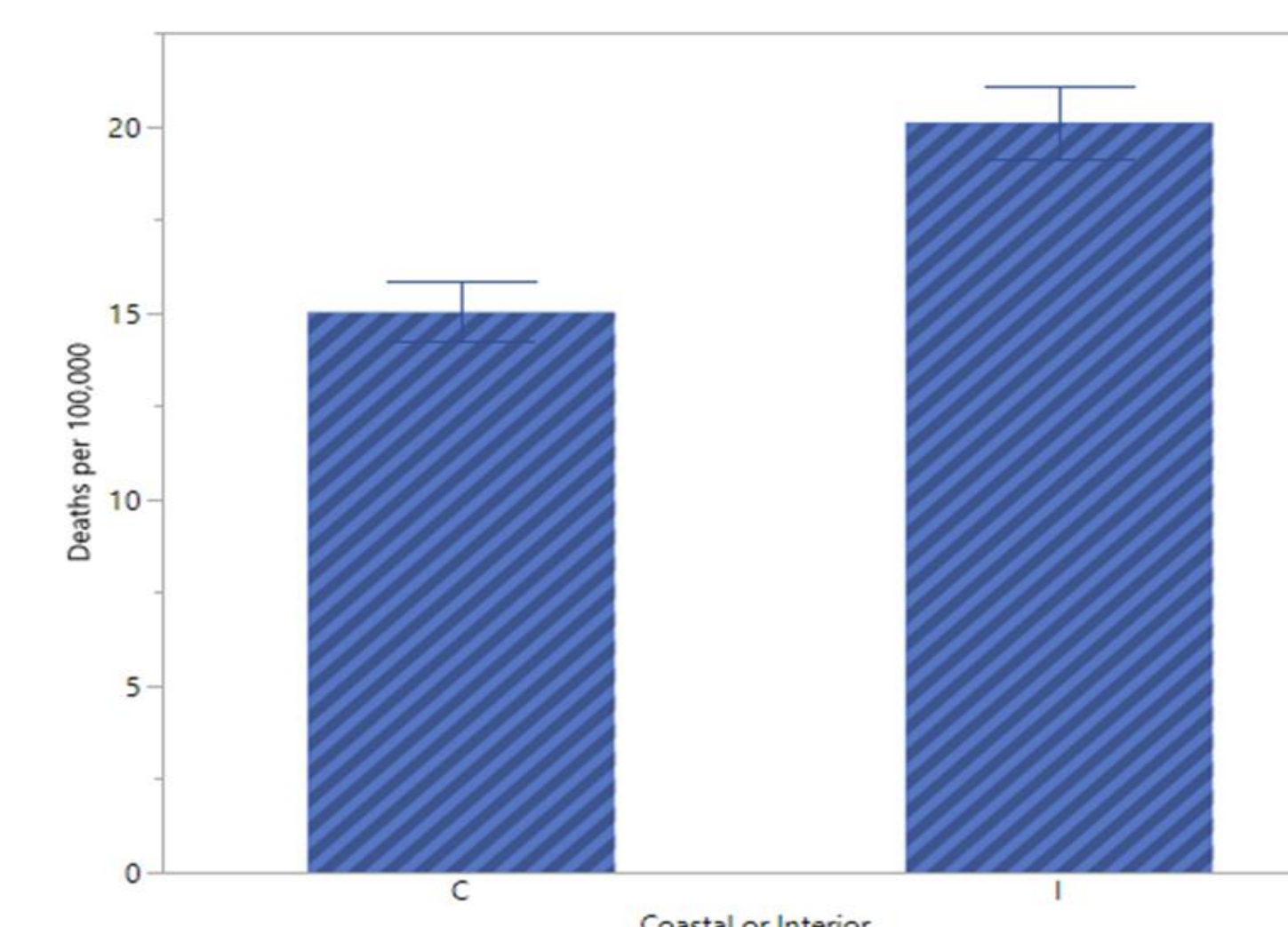


Figure 3: Deaths per 100,000 civilians in Coastal states (n=25) compared to Interior states (n=24).

Conclusions

From our results we can state that there was an actual difference in suicide rates when comparing across regions. We have sufficient evidence to state that there is a difference between Eastern and Western states, and a difference between Coastal and Interior states. There was no evidence to reject the null hypothesis when comparing the Northern states to the Southern states. These findings could be due to the difference in urbanization that exists in the East more than the West, and more on the coasts than in the interior. These findings further support the studies of (Wilkinson KP, 1984), (Monk, 2000), (Singh GK, 2002). This study does have a few problems, not using the same year for the suicide rate as the population, and a different categorization system might need to be developed. In the future, the 2020 census can be used with the 2020 suicide numbers to determine if the trend is still occurring. Also, the tests can be redone with the 2010 suicide numbers to ensure that the amount of suicides per 100,000 civilians is completely accurate. Nonetheless, these findings can be used to support what the literature has seen for decades and forces us to ask some hard questions. Eberhardt & Pooyan (1990) investigated the different factors that influence stress for farmers in rural areas, and they were able to show some of the factors were economy, isolation, and lack of access to resources. As we progress forward and urbanize, we must take into consideration our rural neighbors. Their economic structures are different, some have little contact with other people, and their lack of access to resources makes it harder for them to deal with certain problems and ailments. With the current path of progress making people in rural areas a minority, they must be accommodated for, to make sure that they live long fulfilling lives.

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