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Exploring Environmental Racism, Quality of Life, and Inequalities in Kentucky Counties

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Abstract: *Environmental racism is the idea that people of color experience higher rates of pollution and environmental toxins as a result of systematic social and economic inequalities (Bullard, 1993; Fomo & Celedon, 2009; Mitchell et al., 2015). Landfills, manufacturing, and air pollution sources are often located next to existing communities of color in both rural and urban areas (Pulido, 2000; Rios et al., 1993; Shertzer et al., 2014). Power structures often actively choose to locate pollution and toxin-emitting sources near communities of color because of systematically decreased land values (Bullard, 1993; Hamilton, 1995). Relocating from communities after an environmental polluter is added can be difficult due to income disparities and limited renting options (Hamilton, 1995; Taylor, 2014). This results in longstanding evidence of decreased quality of life and lower health outcomes for people of color across the United States (Gwyn & Thurston, 2001). Kentucky presents an interesting opportunity to explore environmental racism. Kentucky includes a longstanding history of coal extraction which has resulted in environmental toxins and catastrophes (Gaventa, 1982; Scott et al., 2012). The state also has a comparably large White demographic overall with concentrations of persons of color largely in urban areas (Louisville and Lexington) while much of the environmental damaging activities have focused on the rural eastern, and largely White, part of the state. This study also taps into the growing awareness of Black Appalachians longstanding history and presence in the region (Brown, 2018; Fain, 2019). In this study, the researchers examined environmental racism and quality of life in Kentucky using 2020 County Health Rankings data. The study analyzed three hypotheses (using t-tests) examining how high rates of air pollution (a proxy measure of environmental toxins) relate to differences in quality of life, poverty rates, and racial demographics.*

Keywords: *Environmental racism, quality of life, Kentucky*

Literature Review

People of color are disadvantaged and susceptible to social inequalities in many ways. One example this study will be focusing on is environmental racism. Race dominates the probability of negative environmental exposure. Negative health effects from pollution levels contribute to health disparities, especially in predominantly nonwhite areas. Stewart and associates (2015) reported findings of high pollution levels in urban areas with a higher percentage of minority residents resulting in more respiratory issues. Non-whites are also more likely to live in areas with higher levels of air pollutants (Forno & Celedon, 2009).

Research continues to demonstrate that minorities remain disproportionately isolated in poor neighborhoods and exposed to pollution (Shertzer et al., 2014). Pulido (2000) proves the same by using a Los Angeles case study showing people of color are disproportionately exposed to pollution. Minorities are more likely to live near toxic dump sites, near factories that emit air pollution, and in cities with high levels of air pollutants (Rios et al., 1993). White people have secured relatively cleaner environments by moving away from older industrial cores via suburbanization (Pulido, 2000) and their white privilege affects their ability to do so. Pulido (2000) refers to this as white flight. Communities exposed to environmental hazards are faced with extensive challenges when they consider relocation, if that is even an option for them (Taylor, 2014). The residents that remain or move in may be low-income, minority residents who lack the resources to purchase a higher level of environmental amenities (Hamilton, 1995). This is linked to income and educational levels. Populations with lower socio-economic status are more at risk of being exposed to stressors like air pollution (Pratt et al., 2015). In an early environmental justice study reviewed by Mikati and associates (2018) these authors found that the U.S government reported a disproportionately high representation of socially disadvantaged populations residing in communities in close proximities to landfills, and these communities were evaluated in terms of income level and poverty as well as race and ethnicity.

Genetic susceptibility and occupational status increase one's likelihood to environmental exposures (Rios et al., 1993). A study by Pollock and Vittas (1995) demonstrates that workers in manufacturing occupations are more likely to be exposed to environmental and health hazards than any other occupations. Work occupation and underlying conditions such as

hypertension, diabetes, chronic liver disease, chronic respiratory diseases, sickle cell anemia, and AIDS are more frequent among minority populations and being a carrier of this disease causes a person to be more susceptible to environmental exposures (Rios et al., 1993). Access to adequate healthcare to treat one's disease or sickness has an impact on one's health as well. Disparities among poorer, minority communities in regard to access to routine preventative health care can cause them to be more disproportionately and widely affected by air pollution (Gwynn & Thurston, 2001). Indoor pollution affects those residing in minority communities as well. Indoor allergen levels are higher in urban households in low-income areas (Forno & Celadon, 2009). These allergens increase asthma morbidity. Asthma severity is higher in certain ethnic groups (Forno & Celedon, 2009).

Politics and power have a huge impact on environmental racism. Profit maximizing firms may choose to locate in minority areas because compensation demands and expected liabilities from operation are lower (Hamilton, 1995). Bullard (1993) used the Commission for Racial Justice's landmark study, Toxic Wastes and Race, to show that three out of five African Americans live in communities with abandoned toxic waste sites and three of the five largest hazardous waste landfills are located in predominantly African American or Latino communities. Hazardous waste facilities and cites will locate where it does the least damage because this is where compensation is the least (Hamilton, 1995).

Pollock and Vittas (1995) used data from the 1990 census and focused on the demographic profiles in Florida Communities. They then took into consideration the race, ethnicity, economic and occupational status for those in close proximities of hazardous sites and facilities. They found a lack of justice in potential exposure of racial groups. Similarly, Mikati and associates (2018) used the American Community Survey Population and focused on the burden of PM emissions across racial and ethnic groups and poverty status. They found that disparities from PM-emitting facilities exist at multiple geographic scales and that disparities for people of color are more common than the disparities for poverty status. Stewart and associates (2015) used statistics from a geographically based health survey. They then focused on pollution intensities and individual and neighborhood characteristics to predict one's health issues. They found that respiratory issues are correlated significantly with pollution levels.

The nature of labor in our society also relates to how areas with environmental toxins may form. The dual labor market is a theoretical perspective created by Michael Piore and Peter Doeringer that argues there are two different spheres or categories of the American economy. These consist of the primary sector and the secondary sector. The primary sector consists of jobs that require higher education, provide better pay, more job security, and clean and safe working conditions that ultimately create better quality of life for the people within this sector. The secondary sector consists of low-status jobs that require little to no education or skills and pay very little with little opportunity for promotion. These jobs are typically physically demanding and operate in poor, unsafe working conditions which create a lower quality of life for the people within this sector.

Blue-collar, white-collar, and service industry workers all make up the dual labor market and a person's class status and location can determine what sector they fall into. Rural areas in Kentucky have jobs that fit into both the primary sector and the secondary sector. Having industry present within an area creates more job opportunities thus creating lower rates of poverty. Industry or factory work will most likely fall into the secondary sector. Workers with little to no education or skills will qualify for these jobs. They will also most likely be paid very little and the work will be physically demanding. These workers are more likely to be exposed to hazardous chemicals and unclean air because of the unsafe, rough working conditions. They will also be more likely to be exposed to the air pollution created by the factories. This will lower their quality of life in relation to living conditions. However, industrial jobs are valuable to the economy and help provide a decent, stable income for people without a lot of education.

Similarly, the loss of air pollution can be indicative of the loss of industry. Deindustrialization is the process of removing or reducing the amount of industrial or manufacturing jobs in an area or region. Particularly eastern Kentucky's economy is now in a state of transition as it moves away from extractive industries while also experiencing deindustrialization (Maples, 2021). This impacts the amount of industrial activity within a region. Because this is happening in Kentucky, we may see areas with more industry having higher quality of life simply because there are more jobs available, which leads to lower poverty, higher health insurance availability, and so forth. However, fewer jobs available within these areas over time which can then create change to the poverty level declining a person's quality of life.

This study examined three hypotheses to better understand how environmental pollutants impact quality of life, poverty, and the racial demographics of persons living nearby.

H1: Counties with higher levels of air pollution will have higher rates of poverty compared to counties with lower rates of air pollution.

HA: There is no relationship between air pollution and poverty.

H2: Counties with higher levels of air pollution will have lower rates of quality of life compared to counties with lower rates of air pollution.

HA: There is no relationship between air pollution and quality of life.

H3: Counties with higher levels of air pollution will lower percentages of white residents compared to counties with lower rates of air pollution.

HA: There is no relationship between air pollution and race.

Method

Data for this study are from the 2018 County Health Rankings Dataset for Kentucky counties. The data included measures of air pollution rates, the percentage of those in poverty per county, and the percentage of residents who list white as one of their race categories. The researchers utilized air pollution as a proxy measure for environmental toxins and as the study's independent variable. Air pollution is listed as the daily amount of fine particulate matter in micrograms per cubic meter. For analysis this is recoded as a dichotomous dummy variable where rates over 10.63 (the mean of the variable) are equal to one and indicate high levels of pollution compared to the rest of the state. All other cases are coded as zero`. The researchers chose to use the mean to separate groups instead of a higher marker because it was the middle ground.

The quality-of-life dependent variable is a scale created within the County Health Rankings dataset. This scale includes measures of the percentage of persons in the county with poor or fair health, number of poor physical health days per year, number of poor mental health days per year, and percentage of low birthweight births in the county. The dataset organizers created a quality-of-life scale expressed as a z-score where a higher score equals more quality of life problems and a lower score indicates fewer quality of life problems. The remaining dependent variables are logically coded. Poverty is listed as the percentage of children living in poverty in the county. The percentage of child poverty was used in place of general poverty because statistics of general poverty was not accessible to the researchers. The measure of race (the percentage of persons identifying as white in the county) is used to understand how racial composition is correlated, if at all, with environmental pollution.

Results

Table 1 describes variables analyzed in this study. The first variable, air pollution, is expressed as a dichotomous dummy variable and can be read as a percentage: 50% of counties in Kentucky had particulate rates of 10.63 or higher on average. Counties with the lowest scores included Elliott, Letcher, Owsley, Menifee, Wolfe, Leslie, McCreary, Pike, and Morgan. Note this includes several counties that are both largely rural and comparatively poor counties. Likewise, all these counties are located in the eastern end of the state and are considered Appalachian counties per the Appalachian Regional Commission.

Next, the quality-of-life measure is a standardized scale, creating a mean of approximately zero and a standard deviation near one. The highest quality of life counties included Oldham, Boone, Spencer, Lyon, Bullitt, Marshall, Kenton, Anderson, and Fayette counties. Turning to poverty, the mean rate for childhood poverty among Kentucky counties is 21.30% or roughly 1 in 5 children. Notably, the counties with the lowest rates of poverty often overlap with counties having the highest quality of life. Examples include Oldham, Boone, Bullitt, and Kenton Counties. When turning to race, the most diverse counties included Fulton, Jefferson, Christian, Fayette, Warren, Hardin, Union, Franklin, and Simpson. Some of these counties represent urban areas: Jefferson includes Louisville, Fayette includes Lexington, and Christian is part of the Clarksville TN/KY MSA. Others are very rural counties with small populations, such as Fulton, which is the furthest western county in the state and is located along the Mississippi River.

Variable	*N*	Min	Max	Mean	*SD*
Air Pollution Levels (dichotomous coding where 1 = particulates of 10.63 or higher)	120	0	1	0.51	.50
Quality of Life (standardized scale)	120	-1.03	1.08	0.00	.44
Percentage of Children in Poverty	120	5.60	41	21.30	7.08
Percentage of Residents Identifying as White	120	73.7	99.9	94.73	4.95

Table 1. *Summary of Study Variables*

Table 2 utilizes t-tests to examine hypotheses in this study. Just to restate these briefly, the researchers expect (based on previous literature and theory) to find the following: counties with higher environmental toxins (measured as air pollution) will have higher poverty, lower quality of life, and lower percentages of white residents. H1 examines poverty. There the researchers find (p =.001) that counties with higher air pollution actually had lower poverty. As such, the results of the t-test suggests there is no relationship between air pollution and quality of life. Notably, roughly one in four were defined as poor in low air pollution counties compared to 17% in high air pollution counties.

Next, the researchers examined how air pollution impacts on quality of life. Here, the researchers found that lower levels of air pollution correlated with increase issues with quality of life

(p = .001). Again, the result of this t-test suggests there is no relationship between air pollution and quality of life.

Finally, the researchers examined the impacts of air pollution on race composition in the county. Here, the results matched the hypotheses: counties with lower air pollution had higher percentages (on average) of white residents. In comparison, counties marked as higher air pollution had closer to 92% white residents, slightly below the mean for the entire state.

Discussion

The findings in this paper offer an interesting example of data which somewhat vary from existing theoretical findings on environmental racism. Parts certainly alight: Kentucky matches the trend of having higher concentrations of minorities (notably in a largely white state) in areas with higher pollution rates. The strange difference here likely starts with poverty, health care, and pollution in rural eastern Kentucky.

Eastern Kentucky's rural areas have long experienced generational poverty and unequal development (Maples, 2021; Gaventa, 1982). The state's eastern rural areas have few manufacturing sites or other air pollution-producing employers, so there is concomitantly less air pollution made from these sources. However, the other side of the coin is that there are also few job opportunities, furthering the generational poverty found in the region. Coal plants (which represent how much of the electricity in the state is made) would create pollutants and some jobs, but these are fewer in number (just twelve operational at this time) and are largely located outside the region. Taking this a step further, many of the lowest air pollution counties in this study are in largely forested parts of the state, including counties like Owsley and Powell which are partly included in the Daniel Boone National Forest. This could indicate that air pollution, while a common measure of environmental toxins, may not work perfectly for Kentucky studies. In retrospect, landfills may have been a more effective approach, particularly if the study could be redesigned to focus on case studies rather than all counties.

Similarly, Eastern Kentucky overlaps with a history of acute medical issues and addiction (Maples, 2021). For example, the region has long experienced issues with medical deserts, longer distances to medical care, low rates of health insurance, and longstanding culture-bound illnesses like diabetes (Krasnopolsky & Maples, 2021). The quality-of-life measure used in this dataset is heavily reliant on health outcomes. As such, this may have impacted the results due to the severity of health in this region and the state overall. Issues with educational attainment could also impact low birth weights as correlations have been found in previous studies between these two id

Group Zero (low air pollution)-Poverty Mean	Group One (high air pollution)-Poverty Mean	*t*	*df*	*p*
25.69	17.19	8.06	94.96	.001

Group Zero (low air pollution)-Quality of Life Mean	Group One (high air pollution)-Quality of Life Mean	*t*	*df*	*p*
0.28	-0.26	8.61	101.74	.001

Group Zero (low air pollution)-Percentage White Mean	Group One (high air pollution)-Percentage White Mean	*t*	*df*	*p*
97.16	92.46	5.87	118	.001

Table 2. *Summary of Difference of Means*

This also poses a question about Kentucky's future. Is creating more air pollution the only option for industrial development? Although deindustrialization is influencing the increase in the amount of industrial and manufacturing jobs lost in Kentucky, industries could be developed that offer different job opportunities besides those of manufacturing that produce large masses of air pollution. Tourism and place-based resources (such as rivers, agriculture, and rock formations) could be revisited to create economic development and revitalization in eastern Kentucky (Maples, Sharp Clark, Gerlaugh, & Gillespie, 2017). Sustainable tourism is centered on the principles of low environmental impact, limited disruption of the local culture, and providing employment for the local community (Maples, Sharp Clark, Gerlaugh, & Gillespie, 2017). Minimizing pollutants that are linked to production would be beneficial as well. This could improve the quality of life in industrialized areas. These changes

would be more beneficial and healthier to the environment and the residents but still provide them with opportunities for employment and income.

Additionally, finding ways to attract new jobs and industries, therefore creating a more diverse economy in Kentucky, may also be an option. College education could be made more affordable so that the primary sector jobs that do require higher education to qualify could be more easily obtained. The dual labor market has been centered around discrimination and poverty. Being able to afford the schooling needed for Primary Sector positions regardless of one's class and/or race, would provide people with the opportunity to obtain the certification, degrees, and skills needed to qualify for these primary jobs. Working within the Primary Sector would decrease a person's likelihood of working in a hazardous, unsafe environment which are mainly present in Secondary Sector jobs and would provide them with a steady income thus decreasing their chances of living within poverty. All in all, this could increase a person's quality of life.

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