

The Truth May Not Be Enough To Set You Free

Brandon Morgan

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Abstract

The death penalty has been around since the beginning of our country and continues to be the most severe form of punishment that a criminal can receive; however, even in this highly scrutinized process, biased opinions may still exist. In this paper we will use statistical analysis to show how the race of a person can affect their convictions involving the death penalty and hopefully give some possible reasons for these discrepancies.

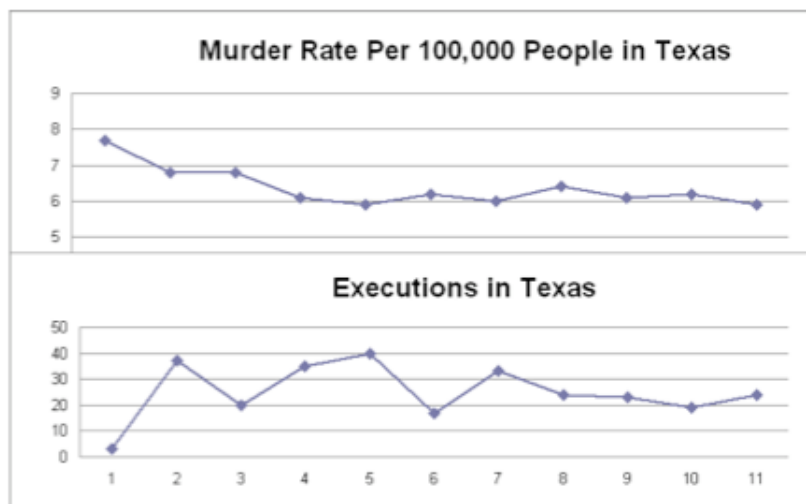
1 Introduction

We are first going to conjecture that the percent of population of any race in Texas (P) should be proportional to its percent of people who are on Death Row (P_0) and who have been executed. This paper will have two main goals. First, we will disprove the initial conjecture by finding different proportions between the percent of population in Texas and the Death Row percentage of a race. This will be done with a 2-tailed hypothesis test. The second goal is to pose questions to the criminal justice community about why the death row and execution proportions between Texas and its counties are not equal. These questions will be posed in order to keep our criminal justice system from being biased.

Figure 1: Executions vs. Murder Rate per 100,000 in Texas

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Executions	3	37	20	35	40	17	33	24	23	19	24
Murder Rate	7.7	6.8	6.8	6.1	5.9	6.2	6.0	6.4	6.1	6.2	5.9

Figure 2:



We are studying the death penalty because in recent years, the murder rate has shown opposite reactions to the number of executions per year. Figures 1 and 2 show the relationship between the number of executions and the murder rate per 100,000 people; however, the reason for this relationship is unknown. This study will mainly focus on Texas because it has been the leading state in executions for years, and it will focus on men because women represent a very small percent of the Death Row population. We will first start off with the history of the death penalty. This will include some information on the methods of executions and the moratorium. After that we will look at the current Death Row statistics, and then we will use our hypothesis tests on the counties of Texas to determine if our initial conjecture is true or false.

2 History

The death penalty was first used in the U.S. on April 30, 1776. Since then America's support for it has been up and down. In 1890, the first execution by electrocution occurred, and in 1924 lethal gas was introduced. In 1972, *Furman vs. Georgia* was brought before the Supreme Court. The Supreme Court determined that the current death penalty statute in Georgia, along with many other states, was too arbitrary, and so they suspended the death

Figure 3: Offenders on Death Row in Texas

Race	Female	Male	Total	Percentage of Men
White	5	105	110	28.4
Black	4	147	151	39.8
Hispanic	0	103	103	27.9
Other	0	5	5	1.3
Total	9	360	369	97.5

Figure 4: Texas Population vs. Death Row Population for Men

Race	Texas Population	Death Row Inmates
White	23.8%	28.4%
Black	5.7%	39.8%
Hispanic	18.5%	27.9%

penalty in all states until 1976 when the states rewrote their laws concerning the death penalty. The executions resumed in 1977 and have continued until this day. Currently there are five methods of execution in the U.S. permitted by law: lethal injection, electrocution, lethal gas, hanging, and firing squad. Lethal injection and electrocution are the only two still in use. The other three have never been removed from the laws and can only be used in extreme cases where the other two methods are declared unconstitutional. Today, Texas uses only lethal injection.

3 Current Death Row Statistics

Here we see from Figure 4 that black men make up the largest percentage of people on Death Row with 39.4%. You can also see that women represent only 2% of the Death Row population which does not give us enough information to use in our tests.

When we look at this next figure, we see a major problem: black men are 39.4% of the Death Row population but make up only 5% of Texas' total population. Compare this to the white men of Texas who are 23.8% of the overall population and 28.4% of the Death Row population. To further show just how far from the norm these percentages are, we will use conditional

Figure 5:

Race	Death Row Probability	Conditional Probability
White	0.0000044666	0.00187641%
Black	0.0000062532	0.01101859%
Hispanic	0.0000043815	0.00236479%
Other	0.0000002127	0.00106889%

probability to find out the chances for men of a certain race to end up on Death Row in Texas.

Texas Population = 23,507,783 people, and conditional probability is defined to be

$$P(A|B) = \frac{P(A \text{ and } B)}{P(A)}$$

where in our situation

$P(A)$ = Probability of a man on Death Row

$$A = \frac{371}{23507783} = 0.00001578$$

and $P(A \text{ and } B)$ = Probability of a certain race on Death Row

As seen in Figure 5, we find that black men are ten times more likely than white men and five times more likely than Hispanic men to end up on Death Row.

4 Hypothesis Test

Now we will examine the counties of Texas and use a two-tailed hypothesis test to find the proportions of people on Death Row versus the total population. $H_0 : P = P_c$ will be our null hypothesis. This hypothesis states that the proportion for Texas is equal to the proportion for each county. Our alternative hypothesis, $H_a : P \neq P_c$, says that the proportion for Texas is not equal to the proportion for each county.

$$H_0 : P = P_c$$

Figure 6:

Name	People on Death Row	People Executed	Total Population
Smith	7	9	194,635
Brazos	3	10	159,006
Potter	5	9	121,328
Bowie	7	4	91,455
Hunt	3	1	83,388
Anderson	2	3	57,064
Navarro	1	5	49,440

$$H_a : P \neq P_c$$

Before we begin the tests, we must first list our mitigating factors. This data does not take into account population density or minors who have been put on Death Row. It also does not account for people who have committed more than one murder. We hope to include these in our future research to make our information more accurate. First we will look at the counties with the highest numbers of people on Death Row.

Next we will use the Wilson Estimate on the counties. We will be give ourselves a 95% confidence level.

$$P = \frac{X + 2}{n + 4} = \frac{373}{23407787} = 0.000015867$$

$$SE = \sqrt{\frac{P(1 - P)}{n + 4}} = \sqrt{\frac{0.000015867(1 - 0.000015867)}{23507787}} = 0.0000008216$$

$$M = z(SE) = 1.96(0.0000008216) = 0.0000016103$$

$$z = 95\% \text{ confidence level}$$

Figure 7:

County	Harris	Dallas	Smith	Brazos	Potter	Randall	Bowie
Death Row Proportion(%)	0.00316	0.00191	0.00359	0.00188	0.00412	0.00179	0.00765

$$(P - M, P + M) = (0.00142\%, 0.00174\%)$$

From the population of Texas, we find that our confidence interval is (0.00142%, 0.00174%). Now we will divide the number of Death Row inmates in each county by their population totals and compare these proportions to our confidence interval.

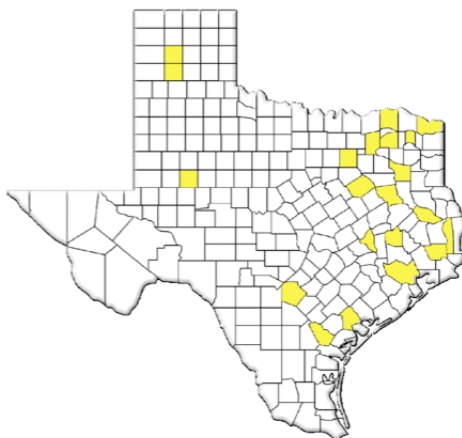
As you can see, Harris, Dallas, Smith, Brazos, Potter, Randall, and Bowie are all outside our confidence interval which means that there proportion of death row inmates to total population is higher than that of Texas. These counties disprove our null hypothesis and give us locations to begin looking for mistakes or biased views in the criminal justice system. In this next picture we can see the counties with the highest proportions. One thing to note from Figure 8 is that most of the counties are in the eastern part of Texas. The reason for this is unknown, but it does give us an area to begin investigating. In the future we would like to focus more time on the eastern part of Texas. One explanation for some of the central Texas counties such as Dallas and Harris would be the population density. The criminal justice community has proven that as cities grow and people become more crowded, the crime rate rises due to the increased opportunity to commit crimes.

Now that we have gone through the data, we must begin to ask the criminal justice community why these discrepancies exist. The first question that we will ask is why black men represent 40% of the Death Row population and only 5% of the population of Texas. Also, why do counties such as Smith and Bowie have such high numbers of Death Row inmates when their population totals are relatively small.

5 Conclusion

The death penalty in our society has become both a punishment and a deterrent, but how can it deter if our criminal justice system is not fair. In this paper, we compared the proportions of race for the state of Texas to the proportions of race on death row and found a huge difference in the numbers.

Figure 8:



We also found a difference between the proportions of people on death row for the counties of Texas versus the proportion for the total number of death row inmates in Texas. There could be many different reasons for these discrepancies, but we must understand that perfecting our criminal justice system is an ongoing process that will require constant scrutiny.

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