

MAT 243 Project Two Summary Report

Dante Trisciuzzi
Dante.Trisciuzzi@snhu.edu
Southern New Hampshire University

1. Introduction: Problem Statement

In this analysis we're looking to assess the relative skill levels of the team I chose and the team assigned to me. We'll be reviewing the mean skill over the relative time periods as compared to the entire league to gain context about the skill of each team relative to the environment that team played in. We will employ T-Tests and Z-Tests in this analysis.

2. Introduction: Your Team and the Assigned Team

Table 1. Information on the Teams

	Name of Team	Years Picked
1. Yours	Warriors	2013 - 2015
2. Assigned	Bulls	1996- 1998

3. Hypothesis Test for the Population Mean (I)

Suppose a relative skill level of 1340 represents a critically low skill level in the league. The management of your team has hypothesized that the average relative skill level of your team is greater than 1340. You tested this claim using a 5% level of significance. For this test, you assumed that the population standard deviation for relative skill level is unknown. Explain the steps you took to test this problem and interpret your results.

Hypothesis testing is used to determine whether a given hypothesis can be confirmed or rejected by finding evidence in support of the hypothesis (or lack thereof). For this instance, we will use a T-Test to determine the population mean of our data set.

The null hypothesis is that the chosen team's average relative skill is greater than the league average of 1340. The alternative hypothesis is that the chosen team's skill is equal to or less than the average.

$$H_0: u > 1340$$

$$H_a: u \leq 1340$$

The level of significance for this test is 5% or 0.05.

Table 2: Hypothesis Test for the Population Mean (I)

Statistic	Value
Test Statistic	46.95
P-value	0.0

The mean relative score of my team over the period of years (2013-2015) is 1607.22.
Given the p-value is less than the level of significance, I can accept the null hypothesis.

4. Hypothesis Test for the Population Mean (II)

Your team's coach has hypothesized that average number of points scored by your team in the team's years is less than 106 points. For this test, you assumed that the population standard deviation for points scored is unknown. You tested the claim using a 1% level of significance. Explain the steps you took to test this problem and interpret your results.

The null hypothesis is that the chosen team's average points scored is less than the league average of 106. The alternative hypothesis is that the chosen team's points are equal to or greater than this average.

$$H_0: u < 106$$

$$H_a: u \geq 106$$

The level of significance for this test is 1% or 0.01.

Table 3: Hypothesis Test for the Population Mean (II)

Statistic	Value
Test Statistic	-1.18
P-value	0.24

Since the p-value is greater than the level of significance, I do not have enough evidence to support the null hypothesis and must reject it.

Even though my team's average score over this period was calculated to be 105 points per game, the test we performed (T-Test @ 0.01a) does not have enough significance to imply that the findings are representative of the entire set.

5. Hypothesis Test for the Population Proportion

Suppose the management claims that the proportion of games that your team wins when scoring 102 or more points is 0.90. You tested this claim using a 5% level of significance. Explain the steps you took to test this problem and interpret your results.

The null hypothesis is that the chosen team's wins when scoring 102 or more points is 0.90. The alternative hypothesis is that the chosen team's wins when scoring 102 or more is not 0.90.

$$H_0: p = 0.90$$

$$H_a: p \neq 0.90$$

The level of significance for this test is 5%, or 0.05.

Table 4: Hypothesis Test for the Population Proportion

Statistic	Value
Test Statistic	-2.22
P-value	0.0265

The p-value is less than the level of significance, so our test is significant.

Since our average wins for games where we scored 102 or more is 0.8298, we can reject the null hypothesis. Our test is significant. This indicates that the management's claims are false, we actually won less games with the given score than stated.

6. Hypothesis Test for the Difference Between Two Population Means

You were asked to compare your team's skill level (from its years) with the assigned team's skill level (from the assigned time frame). You tested the claim that the skill level of your team is the same as the skill level of the assigned team, using a 1% level of significance.

The null hypothesis is that the chosen team's relative skill level is the same as the assigned team, within their respective years. The alternative hypothesis is the skill levels are not the same.

$$H_0: u_1 = u_2$$

$$H_a: u_1 \neq u_2$$

The level of significance for this test is 1%, or 0.01.

Table 5: Hypothesis Test for the Difference Between Two Population Means

Statistic	Value
Test Statistic	20.18
P-value	0.0

Our p-value is 0, and is less than our level of significance.

Given the results we can conclude that our test was significant, and our test indicates that the team's relative skill levels were not the same. We can reject the null hypothesis.

7. Conclusion

Over the variety of analyses we performed give us different information about the team we chose. Our first two tests gave us insight into our team's performance compared to only the league they played in; whereas our second two tests gave us information relative to an older team (and thus their league).

We can say with confidence that our team did well in their league over the time period. Compared to the NBA as a whole, we can look at our past results from project one as well and determine that, if these teams are a fair representation (not outliers) of their relative leagues, that the NBA's relative skill has increased over the years.