# MAT 243 Project Two Summary Report

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## Introduction: Problem Statement

The coach of my team has asked me to analyze patterns in data between my chosen team the Atlanta Hawks during the years 2013 – 2015 and the Chicago Bulls in 1996 – 1998. In analyzing the data between these two teams I am hoping to improve the team’s performance through the statistics and claims mentioned in this summary report. I will be performing a comparison of the data between the two to see how the Hawks perform in comparison to the Bulls during that time using hypothesis testing.

## Introduction: Your Team and the Assigned Team

I picked the team the Atlanta Hawks for the last project so I will be using their data again in this project. I will be comparing the Hawks data to my assigned team, the Chicago Bulls using data from the years 1996 to 1998 and data from my team during the years 2013 to 2015.

Table 1. Information on the Teams

|  | Name of Team | Years Picked |
| --- | --- | --- |
| 1. Yours | Atlanta Hawks | (2013 - 2015) |
| 2. Assigned | Chicago Bulls | (1996- 1998) |

## Hypothesis Test for the Population Mean (I)

Hypothesis testing is used to test claims by finding a mean using data and doing a z-test if the standard deviation is known or a t-test is it is not known. The null hypothesis is either rejected or accepted based on the data from these tests. In this case the null hypothesis is that my team the Atlanta hawks has a skill level lower than 1340 or 1340. The alternative hypothesis would be my team having a skill level equal to or higher than 1340 or . The level of significance management wants me to work with is 5% or in other words the elo level of my team must be within 5% of the mean standard deviation.

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

| Statistic | Value |
| --- | --- |
| Test Statistic | 44.56 |
| P-value | 0.0 |

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During the hypothesis test I got a p-value of 0.00 which is less than the level of significance of 0.05 meaning I would reject the null hypothesis. The null hypothesis claims the Hawks skill level is lower than 1340 if that is rejected that means that they had a mean skill level that is higher than the amount that management claims is critically low at 1340. My team would have performed better than expected during the years 2013 to 2015.

## Hypothesis Test for the Population Mean (II)

The null hypothesis presented by my teams coach is that the average number of points scored by my team is more than 106 or > during the years 2013 to 2015

Since the null hypothesis being presented is that my teams average is more than 106 points that makes my alternate hypothesis the opposite or in other words 106.

The level of significance or alpha of this problem that was tested is 1%

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

| Statistic | Value |
| --- | --- |
| Test Statistic | -7.44 |
| P-value | 0.0 |

The p-value of my hypothesis test is 0.0 which is less than 0.01 or 1% which means the null hypothesis of my team scoring more than 106 points on average would be rejected. The implications from this would be that my team scored less than 106 points on average during the years 2013 to 2015.

## Hypothesis Test for the Population Proportion

Hypothesis testing for population proportion is often used to verify a null hypothesis so it can be rejected or accepted. The null hypothesis or > 90% that is given is my team wins 90% of the time when they score over 102 points. The alternative hypothesis or is that they win less than 90% of the time when they score over 102 points. The level of significance given is 5% or 0.05.

Table 4: Hypothesis Test for the Population Proportion

| Statistic | Value |
| --- | --- |
| Test Statistic | -4.35 |
| P-value | 0.0 |

The p-value is lower than the level of significance so the null hypothesis of my team winning 90% of the games they get 102 or more points in is rejected. This means my team wins less than 90% of the games they score over 102 points in.

## Hypothesis Test for the Difference Between Two Population Means

Hypothesis testing is used to compare two population means through either t-tests if the standard deviation is not known or z-tests if it is.

The null hypothesis is that my team the Atlanta Hawks skill level is the same as the skill level of the assigned team, the Chicago Bulls or = Bulls

The alternate hypothesis would be that my team has a lower skill level than the bulls.

The level of significance given is 1% or 0.01.

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

| Statistic | Value |
| --- | --- |
| Test Statistic | 36.16 |
| P-value | 0.0 |

My p-value is 0.0 which is less than the level of significance at 0.01 so I reject the null hypothesis that my team in the years 2013 to 2015 is as good as the Chicago Bulls were in 1996-1998. The Bulls’ relative skill in the years 1996 to 1998 was 1739.8 while the Hawks elo was 1539.22 in the years 2013 to 2015. The implications for this would be that my team may need to study from the Chicago Bulls as their elo is not as high as the Bulls was by comparison.

## Conclusion

The analyses I did compared the average skill and scores between two teams. The team I chose, the Atlanta Hawks and the team I was assigned, the Chicago Bulls. The tests also showed how often my team won when they scored over 102 points and how often they scored higher than 106 points in a game.

The results of these analyses show which team did better, my chosen team or the Chicago Bulls, and showed that they performed above the level that was expected of them by management. On top of comparing the teams to each other there were also a few hypotheses such as my team winning 90% of games after scoring 102 points. My team did not win over 90% of the games they scored 102 points in unfortunately, nor did they score over 106 points on average. Of course, these are all during the years of 2013 to 2015, they may have done so outside of these years but those are not within the given parameters. In performing these hypothesis tests, I found that my team during the years 2013 to 2015 was not as good as the Chicago Bulls were from 1996 to 1998 comparatively.

## Citations

references:

FiveThirtyEight. (April 26, 2019). FiveThirtyEight NBA Elo dataset. Kaggle. Retrieved from https://www.kaggle.com/fivethirtyeight/fivethirtyeight-nba-elo-dataset/