



CSA Basketball G5

Research Question:

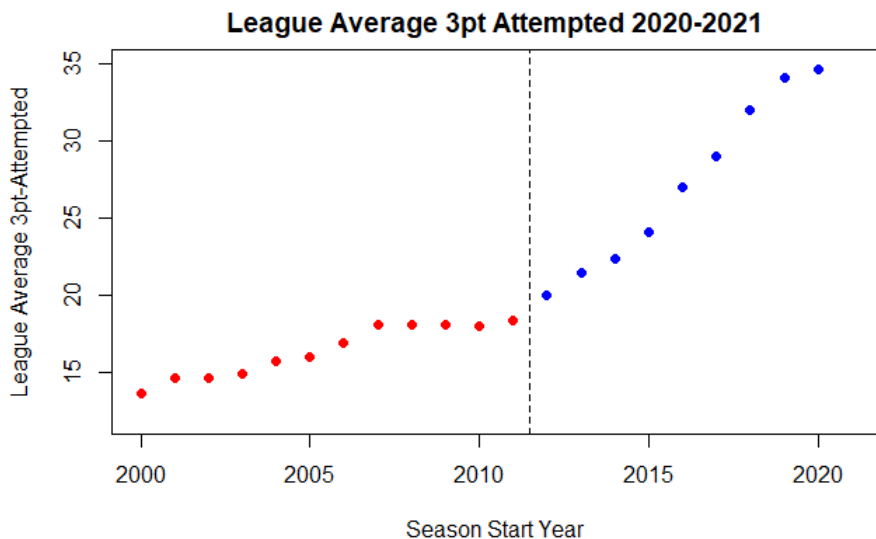
During the past two decades of seasons (2000-2021) in the NBA, how did the league's three-point shots attempted, made, and percentage change after Stephen Curry popularized the three-point shots during his record setting 2012-2013 season.

A three-point field goal in basketball games is a field goal made from beyond the three-point line (a designated arc surrounding the basket), which worth three points. The three-point line was adopted by the NBA from 1979-80 season.



League Average Three-Pointer Attempted

```
#Scatter Plot: League average 3 Pointers Attempted (season 2000-2021)
plot(League_Averages$Season.Start, League_Averages$X3PA, main = "League
Average 3pt Attempted 2020-2021", ylab = "League Average 3pt-Attempted",
xlab="Season Start Year",pch=19)
abline(v=2011.5, lty=2)
abline(lm(League_Averages$X3PA ~ League_Averages$Season.Start), col = "red")
```



Welch Two Sample t-test (Left-Tailed)

data: PreSteph\$X3PA and
Steph\$X3PA

$t = -5.6217$, $df = 9.1182$, $p\text{-value} = 0.000155$
alternative hypothesis: true difference
in means is less than 0

95 percent confidence interval:

$-\text{Inf}$ -7.242317

sample estimates:

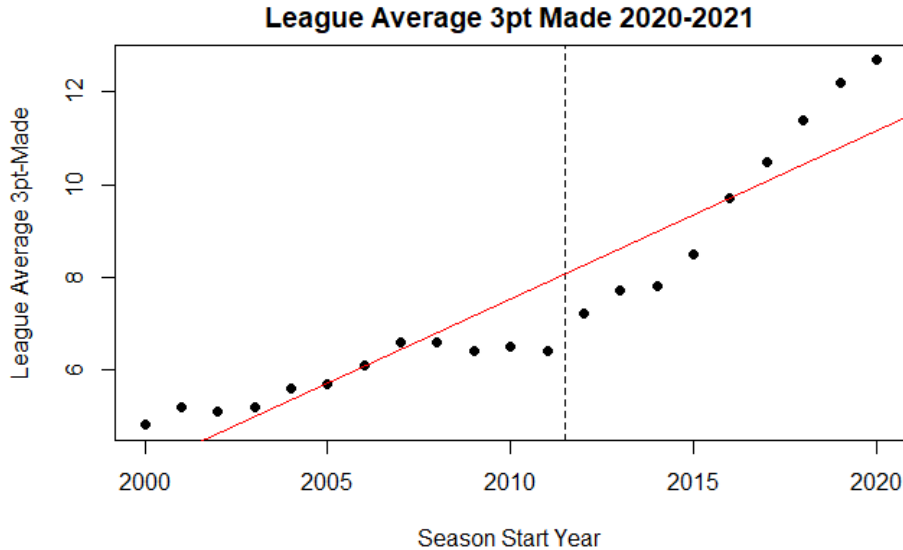
mean of x mean of y

16.45000 27.18889

Critical Value: $-1.830411 > -5.6217$

League Average Three-Pointer Made

```
#Scatter Plot: League average 3 Pointers Made (season 2000-2001 to 2020-2021)
plot(League_Averages$Season.Start, League_Averages$X3P, main = "League Average
3pt Made 2020-2021", ylab = "League Average 3pt-Made", xlab = "Season Start
Year", pch=19)
abline(v=2011.5, lty=2)
abline(lm(League_Averages$X3P ~ League_Averages$Season.Start), col = "red")
```



Welch Two Sample t-test (Left-Tailed)

data: PreSteph\$X3P and Steph\$X3P
 $t = -5.4558$, $df = 9.24$, $p\text{-value} = 0.0001837$

alternative hypothesis: true difference
in means is less than 0

95 percent confidence interval:

-Inf -2.589807

sample estimates:

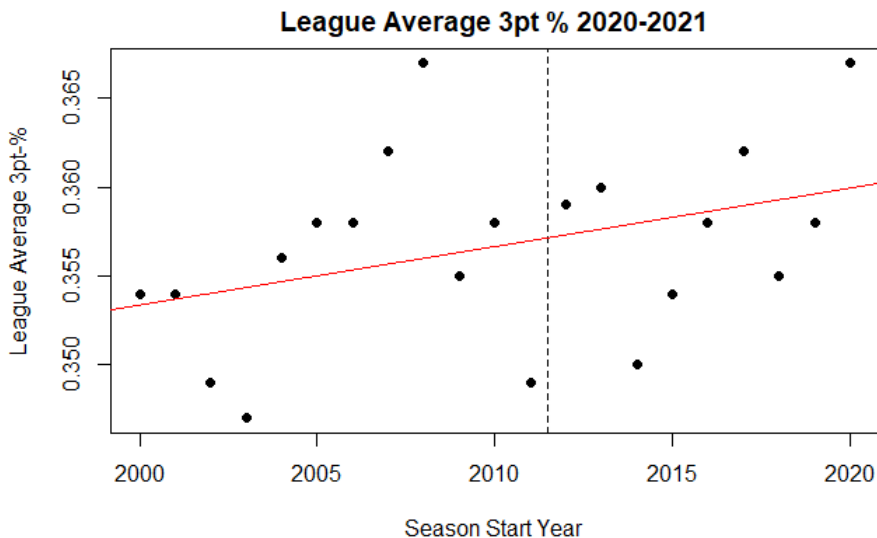
mean of x mean of y

5.850000 9.744444

Critical Value: $-1.827707 > -5.4558$

League Average Three-Pointer Percentage

```
#Scatter Plot: League average 3 Pointers Percentage (season 2000-2021)
plot(League_Averages$Season.Start, League_Averages$X3P., main = "League
Average 3pt % 2020-2021", ylab = "League Average 3pt-%", xlab = "Season Start
Year", pch=19)
abline(v=2011.5, lty=2)
abline(lm(League_Averages$X3P. ~ League_Averages$Season.Start), col = "red")
```



Welch Two Sample t-test (Left-Tailed)

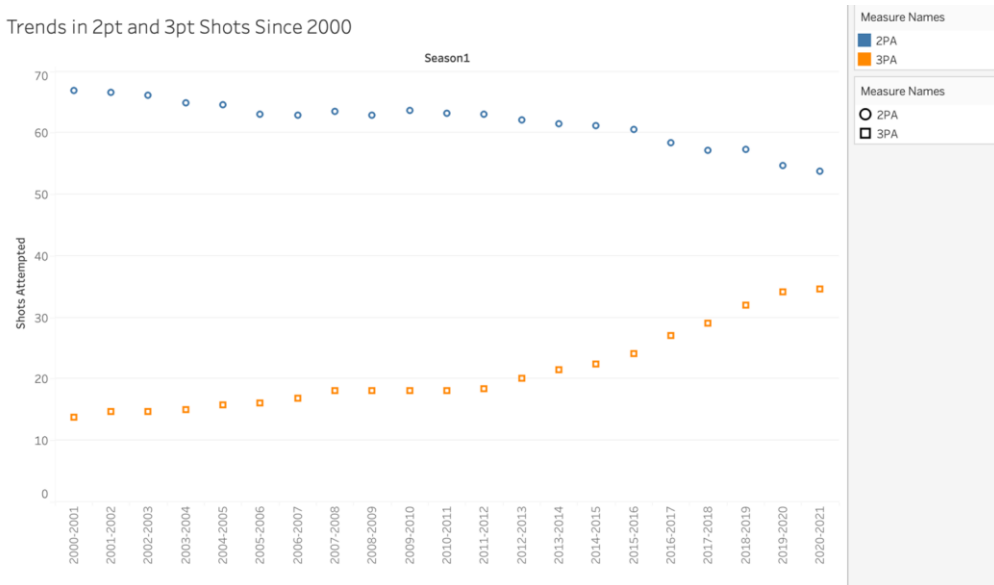
data: PreSteph\$X3P. and Steph\$X3P.
 $t = -1.0939$, $df = 18.567$, $p\text{-value} = 0.144$
alternative hypothesis: true difference
in means is less than 0

95 percent confidence interval:
-Inf 0.001472757
sample estimates:
mean of x mean of y
0.3555833 0.3581111

Critical Value: $-1.731199 < -1.0939$

League Average Three-Pointer vs. Two-Pointer Attempted

Trends in 2pt and 3pt Shots Since 2000



Welch Two Sample t-test (Right-Tailed)

data: PreSteph\$X2PA and Steph\$X2PA
 $t = 5.2032$, $df = 11.044$, $p\text{-value} = 0.0001446$
alternative hypothesis: true difference
in means is greater than 0

95 percent confidence interval:

3.755207 Inf

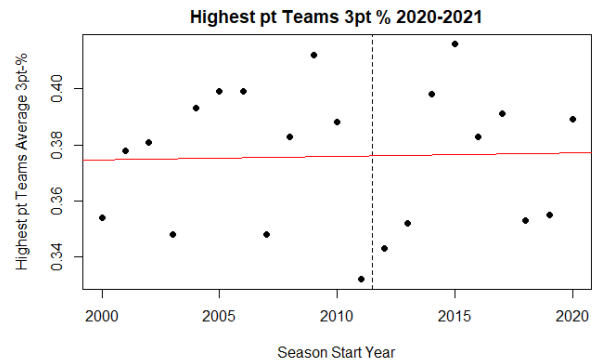
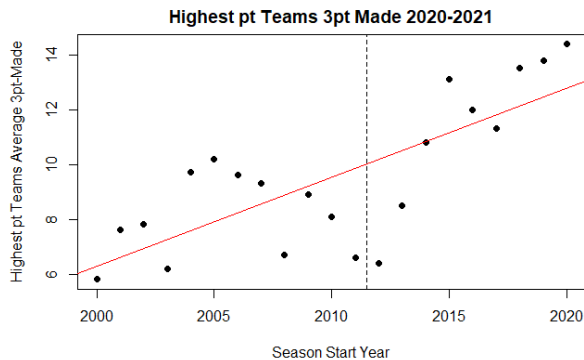
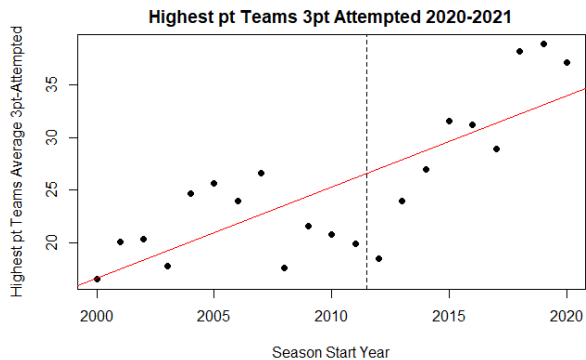
sample estimates:

mean of x mean of y

64.23333 58.50000

Critical Value: $1.79523 < 5.2032$

Highest-pt Teams Three-Pointer Analysis



```
#Find the 3pa, 3pm, and 3p% of the team that has the highest points each season
```

```
highScore_team_3pa <- c(NA, times = 21)
highScore_team_3pm <- c(NA, times = 21)
highScore_team_3pr <- c(NA, times = 21)
```

```
counter <- 1
for(temp_rank in 1:(length(Team_Averages$Rk)-3)){
  if(Team_Averages$Rk[temp_rank] == 1){
    highScore_team_3pa[counter] <- Team_Averages$X3PA[temp_rank]
    highScore_team_3pm[counter] <- Team_Averages$X3P[temp_rank]
    highScore_team_3pr[counter] <- Team_Averages$X3P.[temp_rank]
    counter <- counter + 1
  }
}
```

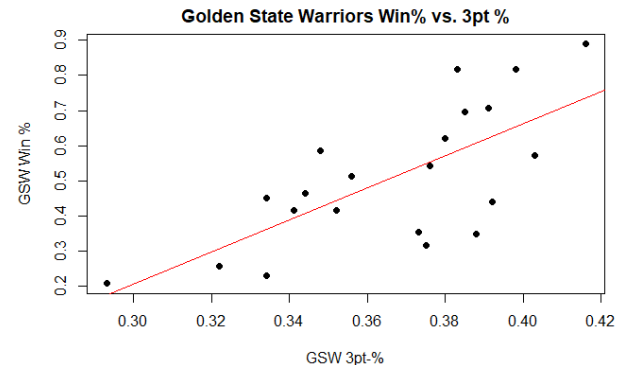
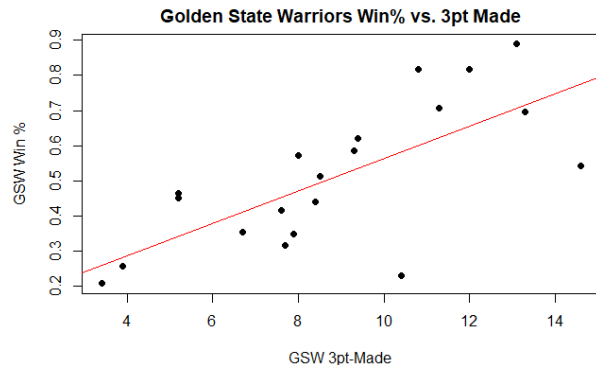
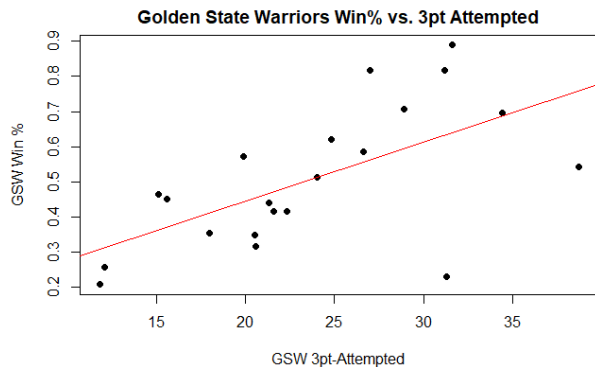
```
#Scatter Plot: highest-pt team 3-pointer analysis
```

```
plot(League_Averages$Season.Start, highScore_team_3pa, main = "Highest pt
Teams 3pt Attempted 2020-2021", ylab = "Highest pt Teams Average 3pt-
Attempted", xlab="Season Start Year", pch=19)
abline(v=2011.5, lty=2)
abline(lm(highScore_team_3pa ~ League_Averages$Season.Start), col = "red")
```

```
plot(League_Averages$Season.Start, highScore_team_3pm, main = "Highest pt
Teams 3pt Made 2020-2021", ylab = "Highest pt Teams Average 3pt-Made", xlab =
"Season Start Year", pch=19)
abline(v=2011.5, lty=2)
abline(lm(highScore_team_3pm ~ League_Averages$Season.Start), col = "red")
```

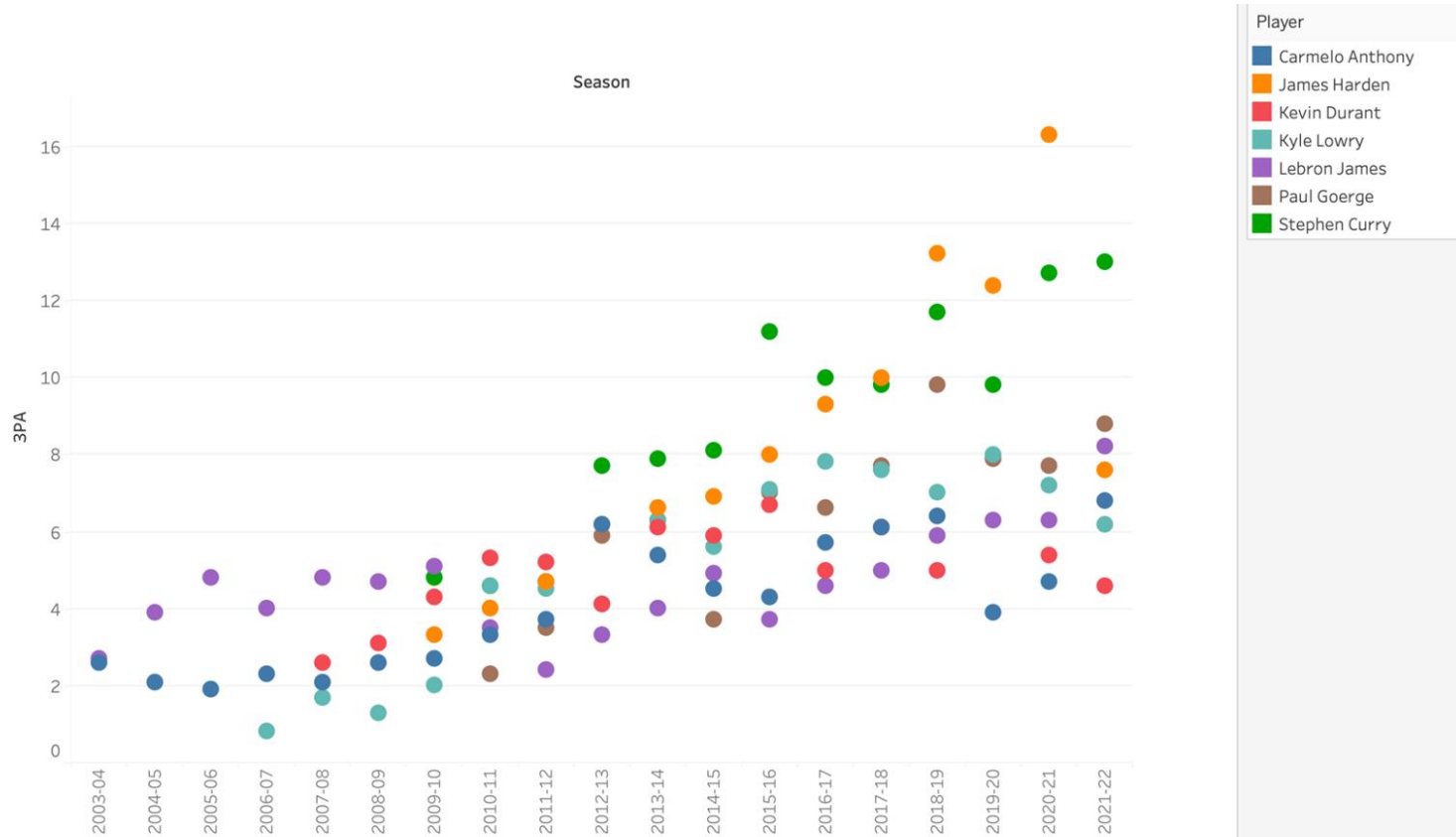
```
plot(League_Averages$Season.Start, highScore_team_3pr, main = "Highest pt
Teams 3pt % 2020-2021", ylab = "Highest pt Teams Average 3pt-%", xlab =
"Season Start Year", pch=19)
abline(v=2011.5, lty=2)
abline(lm(highScore_team_3pr ~ League_Averages$Season.Start), col = "red")
```

Golden State Warriors Win % and Three-Pointers

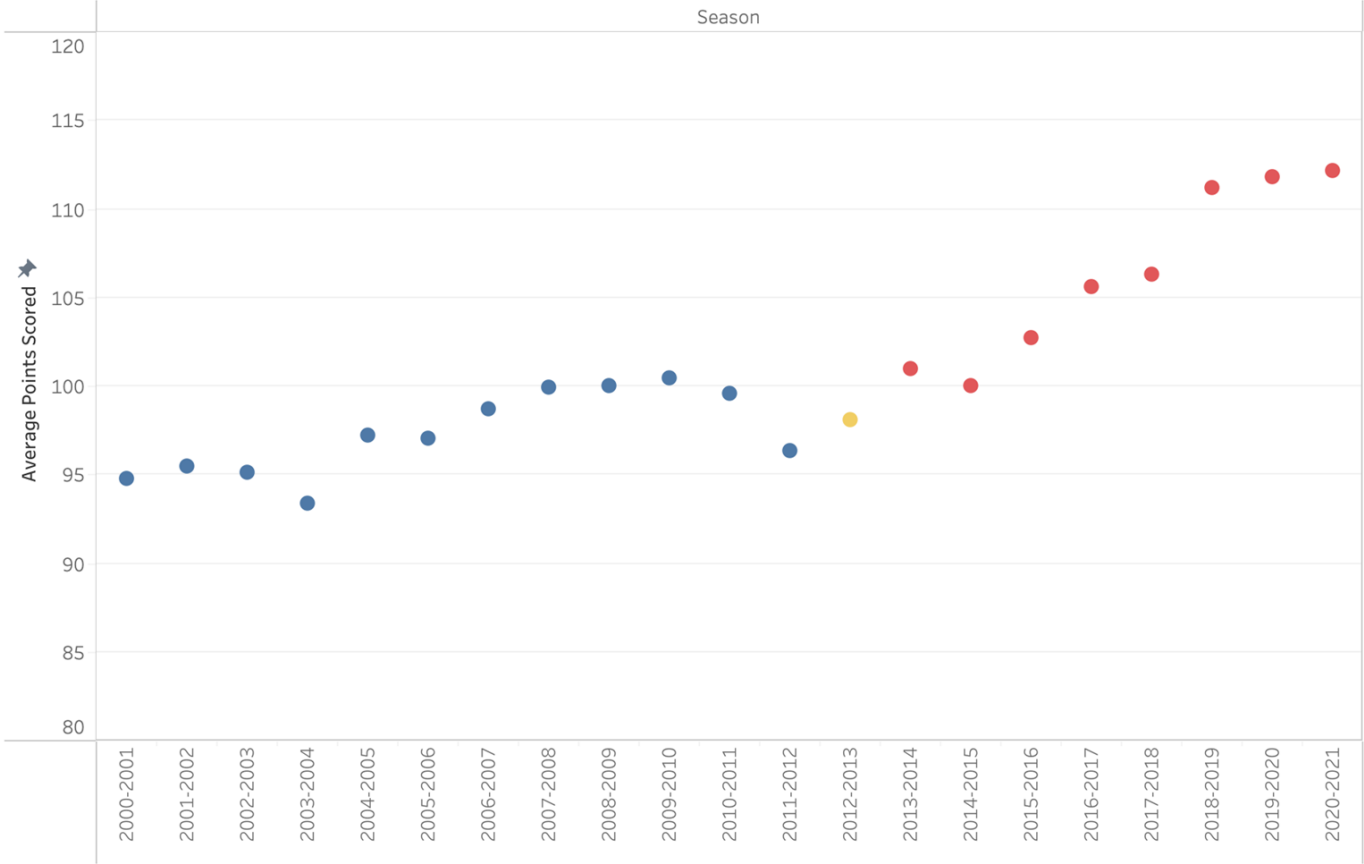


Golden States Warriors 2014-2015 NBA Championship

Trends in Individual Player three-pointers attempted



Trends in league average scores



References

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- ESPN Internet Ventures. (n.d.). *NBARank: Players 5-1 get animated with gifs!* ESPN. Retrieved December 6, 2021, from http://www.espn.com/espn/feature/story/_/id/11777975/nbarank-animated-gifs-5-1.
- Jphayer. (2020, March 21). *24 reasons why we'll never forget the Warriors' 24-0 start to the season*. Golden State Warriors. Retrieved December 6, 2021, from <https://www.nba.com/warriors/news/top24moments-20151218>.
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- This date in NBA history (June 16): Golden State Warriors defeat Cleveland Cavaliers in 2015 finals & more*. Sporting News - NFL. (n.d.). Retrieved December 6, 2021, from <https://www.sportingnews.com/au/nba/news/this-date-in-nba-history-june-16-golden-state-warriors-defeat-cleveland-cavaliers-in-2015-finals-first-title-in-40-years/16s1r7p06se5k1378zjn8ehe57>.