

How Important is a Kicker to an NFL Team's Success?

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Inspiration

The Steelers won against the Baltimore Ravens without scoring a touchdown, relying on six field goals from Boswell to get the 18-16 win

It was Boswell's third career game with six FGs, which makes him the first kicker in NFL history to accomplish that



Problem Statement

- How important is a kicker to an NFL team? Do you need a successful kicker to win games? How detrimental is it to the team if a kicker misses field goals and extra points?

Data Description

- All current NFL kicker career statistics by game
- 25 variables with information about game and kicker
- 2932 observations (every game a current kicker has played)

A Look at the Data

Player	Year	Date	Week	Tm	HomeAway	Opp	Result	TmScore	OppScore	Status	XPM	XPA	XP.	FGM	FGA	FG.
Boswell	2015	10/12/15	5	PIT	A	SDG	W	24	20	Played	3	3	100.0	1	1	100.0
Boswell	2015	10/18/15	6	PIT	H	ARI	W	25	13	Played	1	1	100.0	4	4	100.0
Boswell	2015	10/25/15	7	PIT	A	KAN	L	13	23	Played	1	1	100.0	2	2	100.0
Boswell	2015	11/1/15	8	PIT	H	CIN	L	10	16	Played	1	1	100.0	1	1	100.0
Boswell	2015	11/8/15	9	PIT	H	OAK	W	38	35	Played	3	3	100.0	3	4	75.0
Boswell	2015	11/15/15	10	PIT	H	CLE	W	30	9	Played	1	2	50.0	3	3	100.0
Boswell	2015	11/29/15	12	PIT	A	SEA	L	30	39	Played	1	1	100.0	3	3	100.0
Boswell	2015	12/6/15	13	PIT	H	IND	W	45	10	Played	4	4	100.0	3	4	75.0
Boswell	2015	12/13/15	14	PIT	A	CIN	W	33	20	Played	3	3	100.0	4	4	100.0
Boswell	2015	12/20/15	15	PIT	H	DEN	W	34	27	Played	4	4	100.0	2	2	100.0
Boswell	2015	12/27/15	16	PIT	A	BAL	L	17	20	Played	2	2	100.0	1	1	100.0

Important Variables

WinLoss (0, 1) – whether team won or lost game

ScoreDiff – difference between scores at end of game

TmScore – score of kicker's team at end of game

Important Variables (cont)

Player – kicker's name

HomeAway – whether or not the game was home or away

Status – whether or not kicker played that game

XP. – percentage of extra points kicker made out of total attempts

FG. – percentage of field goals kicker made out of total attempts

Pts – total kicker points

PtsMissed – total points kicker failed to gain

TmScoreKPts. – percentage of team's score that is kicker points

Statistics

Average absolute value of difference in scores across games: 11.132

Average percentage of score that is kicker points: 34.61%

Average FG percentage: 73.57%

Average XP percentage: 83.36%

Probability of winning and losing a game based on this data:

W - 0.4998

L - 0.5002

Statistics

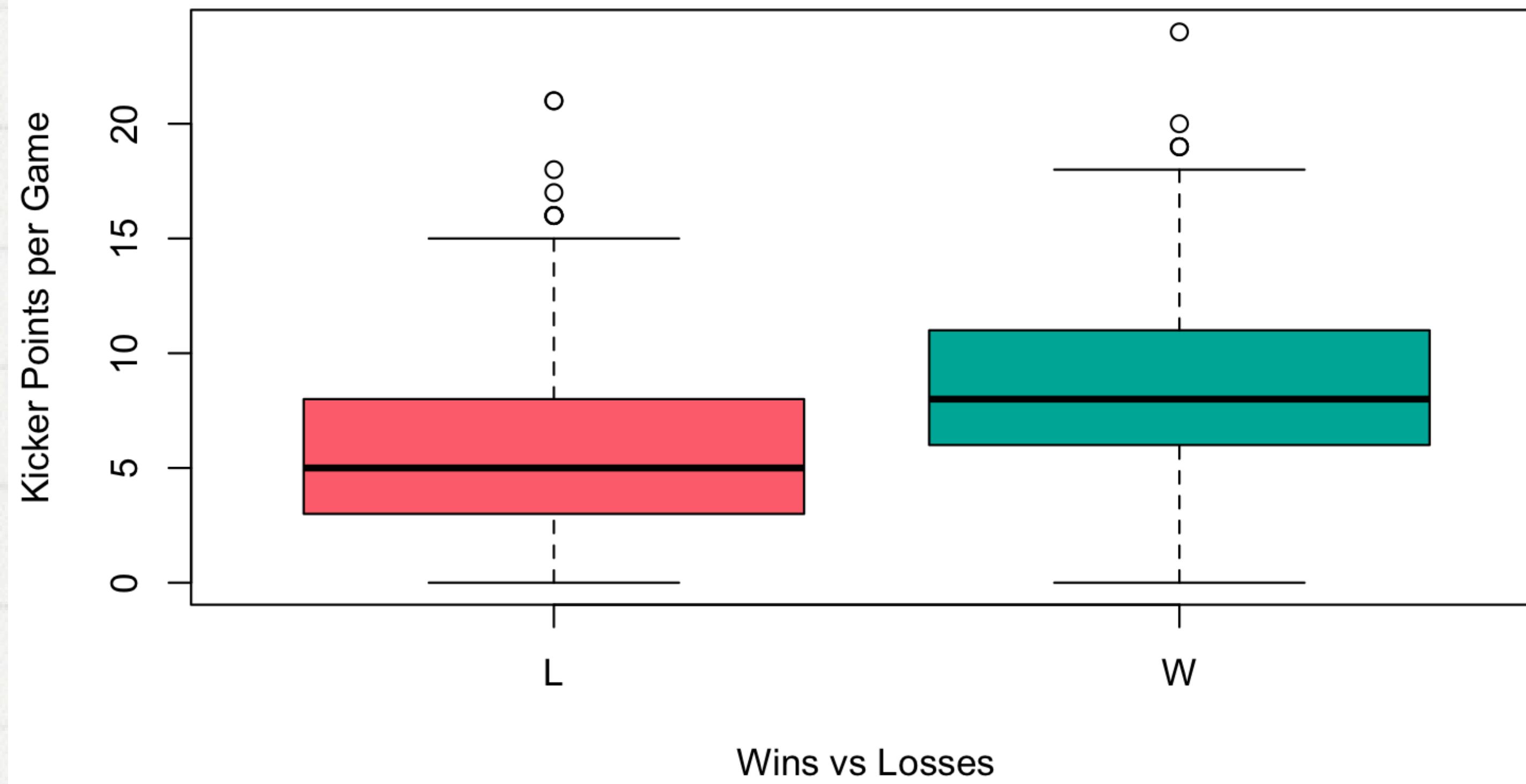
Proportion of games won with a kicker that has a FG percentage of 80% or greater for that game: 0.3444

Proportion of games won with a kicker that has a FG percentage less than 50% for that game: 0.0708

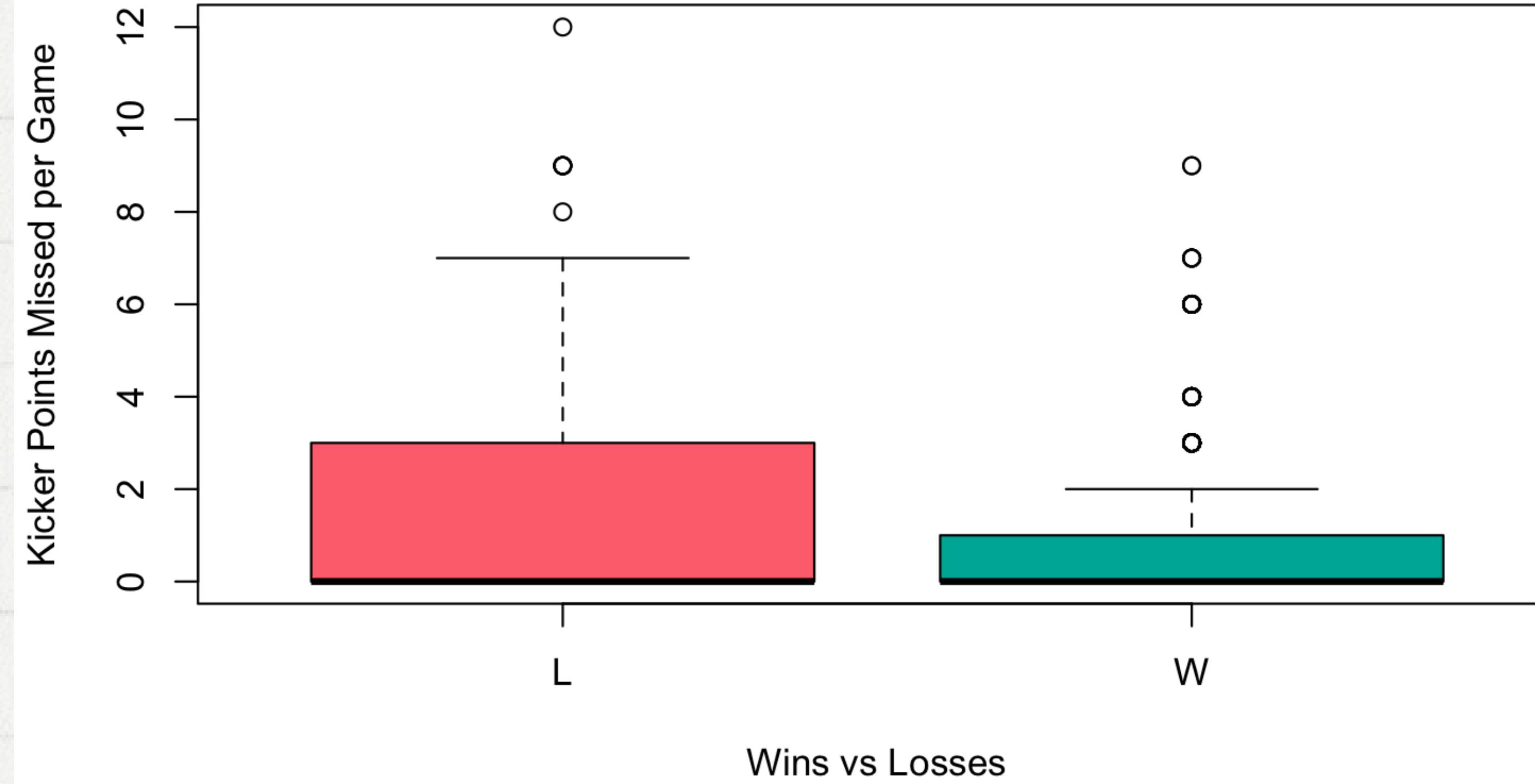
Proportion of games won with a kicker that has a XP percentage of 90% or greater for that game: 0.4162

Proportion of games won with a kicker that has a XP percentage less than 60% for that game: 0.0437

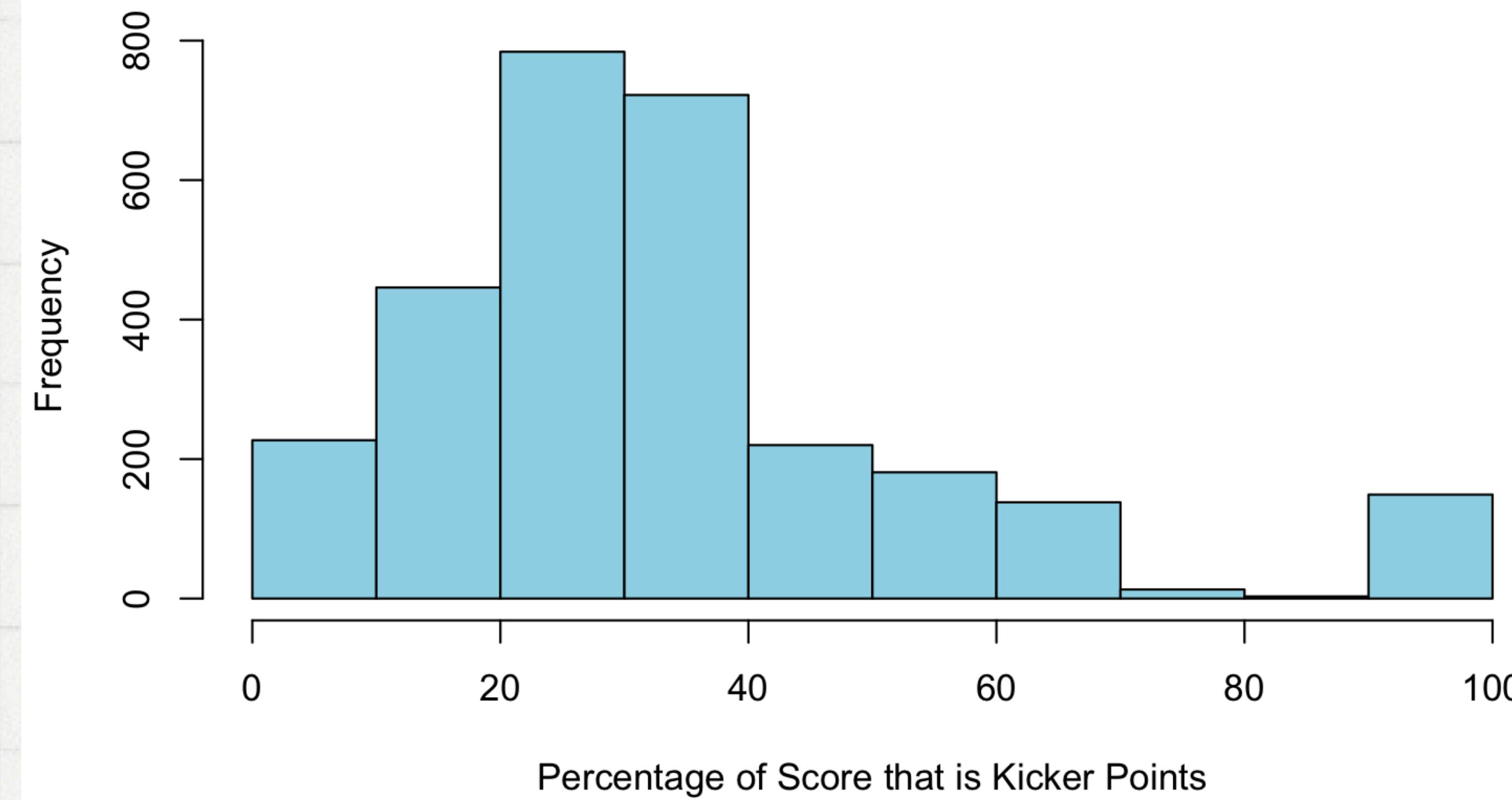
Kicker Points per Game vs Wins/Losses



Kicker Points Missed per Game vs Wins/Losses



Histogram of Percentages of Team Score that is Kicker Points



Welch Two Sample t-test

```
data: kickers$Pts[kickers$WinLoss == 1] and kickers$Pts[kickers$WinLoss == 0]
t = 22.235, df = 2860.9, p-value < 2.2e-16
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 2.664299 3.179652
sample estimates:
mean of x mean of y
 8.488550 5.566574
```

- **p-value is low, true difference in mean kicker points between wins and losses is not equal to 0**
- **kicker points are higher in games that are won**

Welch Two Sample t-test

```
data: kickers$PtsMissed[kickers$WinLoss == 1] and kickers$PtsMissed[kickers$WinLoss == 0]
t = -3.2605, df = 2819.5, p-value = 0.001125
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
-0.31667387 -0.07882894
sample estimates:
mean of x mean of y
0.8424705 1.0402219
```

- **p-value is low, true difference in mean kicker points missed between wins and losses is not equal to 0**
- **less kicker points are missed in games that are won**

Pearson's Chi-squared test

```
data: winloss_fgp  
X-squared = 19.313, df = 3, p-value = 0.0002356
```

- put FG% into categories
 - less than 50 = Low
 - between 50 and 70 = Medium
 - between 70 and 90 = High
 - greater than 90 = Very High
- p-value is low, there is an association between field goal percentage and winning or losing a game

Pearson's Chi-squared test

```
data: winloss_xpp  
X-squared = 42.231, df = 3, p-value = 3.585e-09
```

- put XP% into categories
 - less than 50 = Low
 - between 50 and 70 = Medium
 - between 70 and 90 = High
 - greater than 90 = Very High
- p-value is low, there is a relationship between extra point percentage and winning or losing a game

Linear Regression Model

(after checking
multicollinearity)

Call:

```
lm(formula = TmScore ~ XP. + FG. + Pts + PtsMissed, data = kickers)
```

Residuals:

Min	1Q	Median	3Q	Max
-16.147	-6.170	-1.495	5.365	34.571

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	13.083624	0.491375	26.627	<2e-16 ***
XP.	0.068021	0.004440	15.319	<2e-16 ***
FG.	-0.085769	0.005439	-15.771	<2e-16 ***
Pts	1.554298	0.053048	29.300	<2e-16 ***
PtsMissed	-0.898110	0.100466	-8.939	<2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 8.023 on 2878 degrees of freedom

Multiple R-squared: 0.3376, Adjusted R-squared: 0.3367

F-statistic: 366.7 on 4 and 2878 DF, p-value: < 2.2e-16

Logistic Regression Model

```
Call:  
glm(formula = WinLoss ~ Pts + PtsMissed, family = "binomial",  
    data = kickers)
```

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.58532	0.09773	-16.221	<2e-16 ***
Pts	0.23288	0.01223	19.041	<2e-16 ***
PtsMissed	-0.04287	0.02481	-1.728	0.0839 .

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 3996.7 on 2882 degrees of freedom
Residual deviance: 3537.9 on 2880 degrees of freedom
AIC: 3543.9

Number of Fisher Scoring iterations: 4

Odds

Pts	PtsMissed
1.262	0.958

exponentiate
logistic regression model
coefficients

- for each additional kicker point, the odds of winning the game increase by about 26.2%
- for each additional kicker point missed, the odds of winning the game decrease by about 4.2%

Improvement

- Include past kicker game data for more accurate results
- Looking at statistics for individual players
- Other possible kicker statistics that could be influencing games:
 - Distance each kick is from
 - Career length of kicker

Conclusion

- Based on this data, about 33.7% of the variation in a team's ending score can be explained kicker statistics alone
- A majority of kicker performance variables are significant in predicting wins/losses and game outcomes
- There is a significant difference between kicker points per game and whether the game was won or lost

Thank you!