

**Stat 488-Capstone**  
**Effects Of The New NFL Kickoff Rule**

## Introduction

"I don't like the rule," said Seahawks kick returner Leon Washington. "And I'm sure Brad Smith, Devin Hester, and Joshua Cribbs and the rest of those guys that do a really good job of returning the ball don't like the rule. It's part of the game that's really exciting. I think fans look forward to it because it's an instant momentum-changer." That was indeed the feeling many other players and fans expressed after the NFL owners voted to change the rules for kickoffs prior to the 2011 football season. The rule moved the start of the kickoff from the 30 to the 35 yard line. In addition to that the owners also voted to adjust the running start players on the coverage team could get before the kicker made contact with the ball. Before the change, coverage players could get a 10-15 yard start but under the new rule coverage players would only get a 5 yard running start. The owners passed the changes to the rules with a 26-6 vote in favor of the changes. Rich McKay, Atlanta Falcons president and chairman of the NFL competition committee, said of the six no votes, "The objections were, 'Hey, you're affecting my team.' Clearly, some teams have good kick returners and they said, 'What if there's 10 percent less returns?' "

The reason behind the changes in the rules was the NFL wanted to address safety concerns. At the head of those concerns was the amount of concussions in the NFL and specifically on kickoff plays where some of the most violent and injury inducing collisions occur. By reducing the amount of a running start the coverage players could get the league was hoping to reduce the amount of injuries occurring on the play. By moving the kickoff up 5 yards they were basically making it easier and more likely for the kickoff to result in a touchback. This would reduce the number of kick returns which would then also hopefully reduce the number of injuries. "The league has contended such emphasis on special teams was needed, given the higher injury rate on kickoffs when compared to other plays." Also from Rich McKay, "The field just got 15 yards shorter for the kicking team." "We are hopeful that the change will have an impact on the injury numbers." In response to the rule change many players, former and present, and coaches had opinions on the change. Many of those opinions were negative and unsupportive. "Their reasoning is a little crazy," said former Pro Bowl returner Brian Mitchell, who holds the NFL records for career kick returns (607) and kick-return yards (14,014). "They're trying to stop the collisions, but shoot; any football player that runs downfield is a collision waiting to happen. Moving it up 5 yards or changing the running start won't make a difference." Added Buccaneers coach Raheem Morris, "I don't know if that's going to be as big a factor as we think. The build-up of speed will still occur as you run through the speed zone, to the bully zone, to the confrontational point."

## Data Collection

The data collected was for all regular season NFL games over a 2 year period, 2010 being the year before the rule changes and 2011 being the first year the rule changes were implemented. To collect the data the use of game logs on espn.com were used. Each game had to be looked at individually and on a play-by-play basis. Searching through all the plays to find the kickoffs and all the numbers that needed to be recorded was a very tedious and time consuming process. It took roughly an hour to collect data for one week of NFL games. Each week there was either 14 or 16 games played depending on how many teams had a bye for that week. There were 2515 kickoffs in 2010 and 2533 in 2011 for a total of 5048 kickoffs. A sample of what the data looked like in the play-by-play format:

2nd and 11 at NO 11	(Shotgun) A.Rodgers pass short right to D.Driver to NO 3 for 8 yards (J.Greer).		
	Timeout #1 by GB at 06:29.		
3rd and 3 at NO 3	(Shotgun) A.Rodgers pass short right to J.Nelson for 3 yards, TOUCHDOWN.	0	13
	M.Crosby extra point is GOOD, Center-B.Goode, Holder-T.Masthay.	0	14
	M.Crosby kicks 72 yards from GB 35 to NO -7. D.Sproles, Touchback.		
<b>DRIVE TOTALS: NO 0, GB 14, 6 plays, 41 yards, 3:05 elapsed</b>			
<b> New Orleans Saints at 6:24</b>			
		<b>NOR</b>	<b>GNB</b>
1st and 10 at NO 20	(Shotgun) D.Brees pass incomplete short right to R.Meachem.		
2nd and 10 at NO 20	M.Ingram left end to NO 24 for 4 yards (M.Burnett, S.Shields).		
3rd and 6 at NO 24	(Shotgun) D.Brees pass short middle to D.Sproles to GB 40 for 36 yards (M.Burnett; A.Hawk) [C.Matthews].		
1st and 10 at GB 40	D.Brees pass short right to P.Thomas to GB 32 for 8 yards (D.Bishop).		
2nd and 2 at GB 32	C.Brown reported in as eligible. P.Thomas up the middle to GB 31 for 1 yard (R.Pickett).		
3rd and 1 at GB 31	D.Brees pass deep middle to R.Meachem for 31 yards, TOUCHDOWN.	6	14
	J.Kasay extra point is GOOD, Center-J.Drescher, Holder-C.Daniel.	7	14
	T.Morstead kicks 73 yards from NO 35 to GB -8. R.Cobb, Touchback. PENALTY on NO-J.Dunbar, Offside on Free Kick, 5 yards, enforced at NO 35 - No Play.		
	T.Morstead kicks 79 yards from NO 30 to GB -9. R.Cobb, Touchback.		
<b>DRIVE TOTALS: NO 7, GB 14, 6 plays, 80 yards, 2:53 elapsed</b>			
<b> Green Bay Packers at 3:31</b>			
		<b>NOR</b>	<b>GNB</b>
1st and 10 at GB 20	A.Rodgers right end to GB 22 for 2 yards (J.Greer).		
2nd and 8 at GB 22	A.Rodgers pass deep right to J.Finley to GB 42 for 20 yards (R.Harper).		
1st and 15 at GB 37	A.Rodgers pass short left to R.Cobb to GB 40 for 3 yards (R.Harper).		
2nd and 12 at GB 40	(No Huddle, Shotgun) A.Rodgers pass short middle to G.Jennings to 50 for 10 yards (P.Robinson).		
3rd and 2 at 50	(No Huddle, Shotgun) A.Rodgers pass short middle to J.Finley to NO 32 for 18 yards (R.Harper, M.Jenkins).		
1st and 10 at NO 32	(Shotgun) A.Rodgers pass short middle to R.Cobb for 32 yards, TOUCHDOWN.	7	20
	M.Crosby extra point is GOOD, Center-B.Goode, Holder-T.Masthay.	7	21
	M.Crosby kicks 67 yards from GB 35 to NO -2. D.Sproles to NO 17 for 19 yards (D.Smith).		

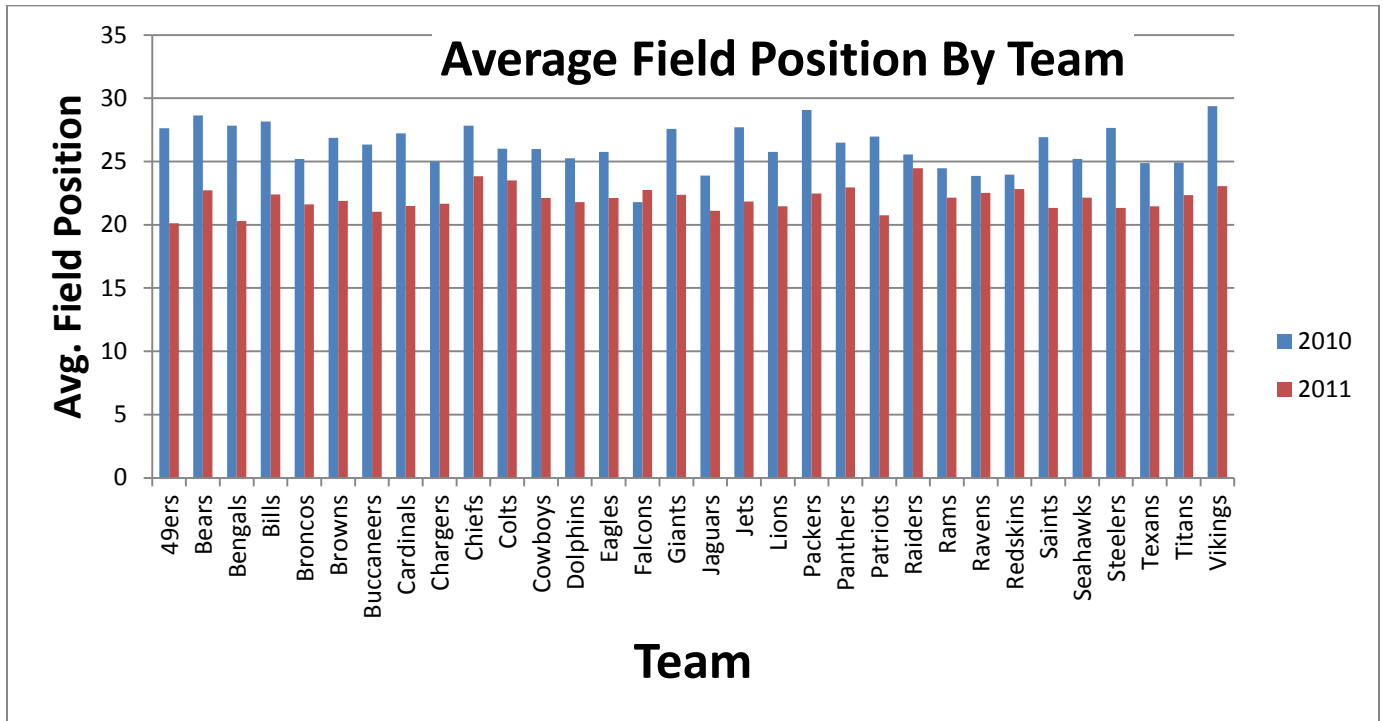
For each kickoff there were 16 variables that were recorded into an excel sheet as follows:

1	kick #	kicker	returner	distance	touchback	start	returnyds	fieldposition	touchdown	location	time	quarter	HorA	week	score	team	year
2	1	R.Longwell	C.Roby	72	no	-2	25	23	no	indoor	night	1	away	1	0	Vikings	2010
3	2	G.Hartley	P.Harvin	70	yes	0	0	20	no	indoor	night	1	home	1	7	Saints	2010
4	3	R.Longwell	C.Roby	63	no	7	32	25	no	indoor	night	2	away	1	-4	Vikings	2010
5	4	R.Longwell	C.Roby	64	no	6	26	20	no	indoor	night	2	away	1	2	Vikings	2010
6	5	G.Hartley	P.Harvin	73	no	-3	22	19	no	indoor	night	3	home	1	-2	Saints	2010

- Kicker- name of the kicker
- Returner- name of the returner
- Distance-distance of the kick
- Touchback- was the kick a touchback?
- Start- where the returner started
- Returnyds- how far the kick was returned
- Fieldposition- where the play ended
- Touchdown- was the kick ran back for a touchdown?
- Location- was the game played indoor or outdoor?
- Time- was it a day, afternoon, or night game
- Quarter- what quarter did the kickoff happen
- HorA- was the kicking team home or away
- Week- what week the game was played
- Score- how much the kicking team was ahead or losing by
- Team- the kicking team
- Year- 2010 or 2011

## Analysis

Let's begin the analysis by looking at some simple comparisons of average starting field position and return yards based on the year and teams.



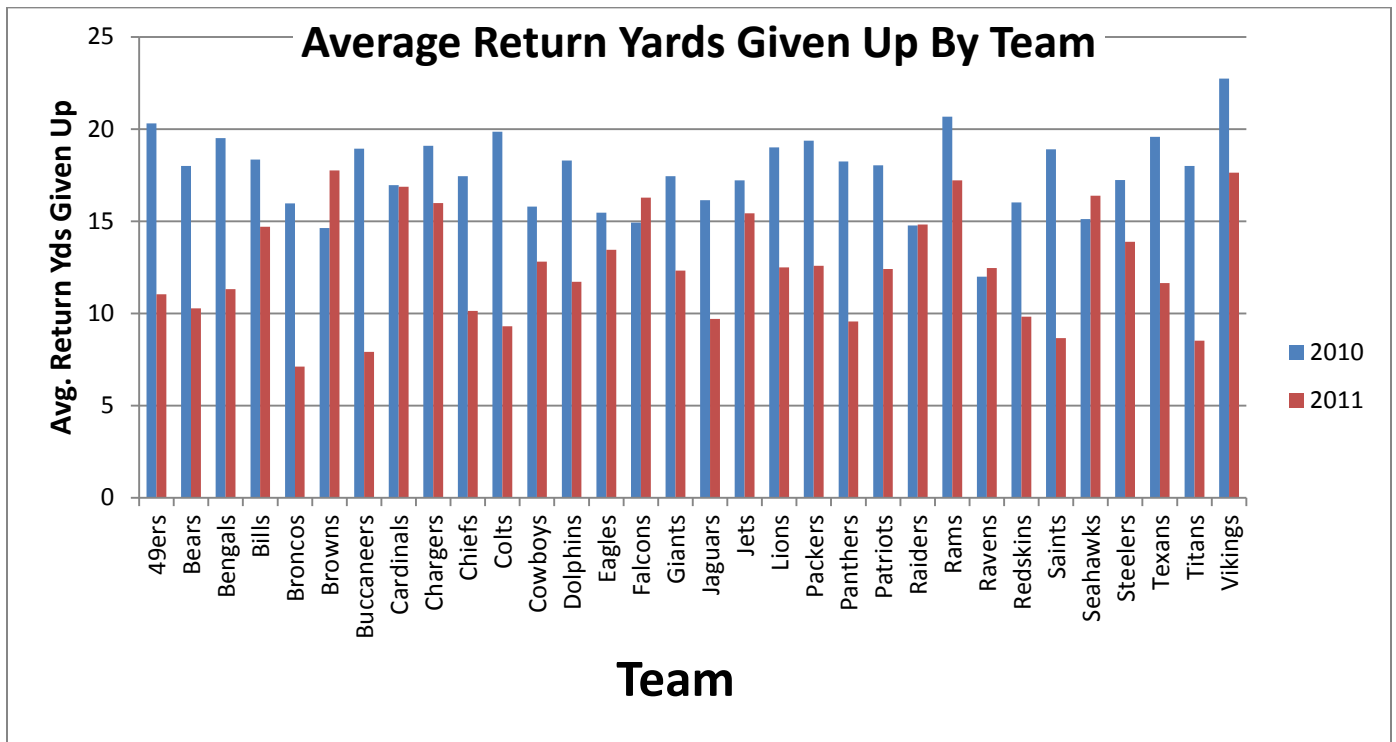
This graph is showing the average field position that the team's opponent had for the 2010 versus 2011 seasons. From this graph we can easily see that the average field position given up by each team went down from the 2010 to 2011 season.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
year	1	22056.95	22057.0	231.9964	<.0001*
Error	5046	479746.24	95.1		
C. Total	5047	501803.19			

Means for Oneway Anova					
Level	Number	Mean	Std Error	Lower 95%	Upper 95%
2010	2515	26.2020	0.19443	25.821	26.583
2011	2533	22.0213	0.19374	21.642	22.401

Conducting a one-way ANOVA we can see that there is a difference in the average starting field position from 2010 to 2011. (p-value=<.0001) The average starting position for 2010 was 26.2 compared to 22.02 for 2011 which gives us 4.18 yards less for 2011. Keeping in mind that the rule moved the kickoff up 5 yards in 2011 the 4.18 difference seems very reasonable.



The average return yards that a team gave up also looks to have gone down from the 2010 to 2011 season. Similar to the previous graph we can see that almost all the 2011 averages per team are lower than the 2010 averages.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
year	1	32202.7	32202.7	147.2183	<.0001*
Error	5046	1103768.4	218.7		
C. Total	5047	1135971.1			

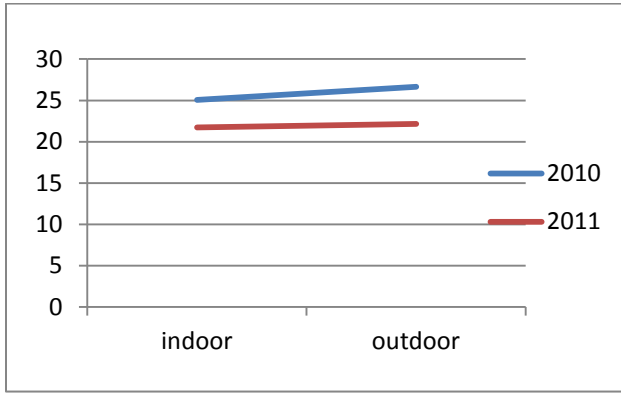
  

Means for Oneway Anova					
Level	Number	Mean	Std Error	Lower 95%	Upper 95%
2010	2515	17.5789	0.29491	17.001	18.157
2011	2533	12.5274	0.29386	11.951	13.104

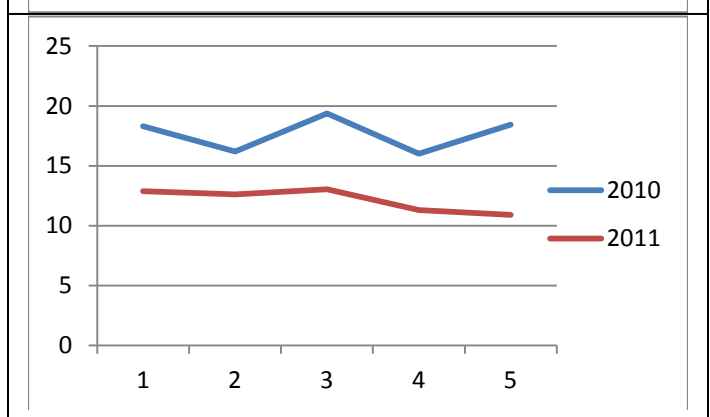
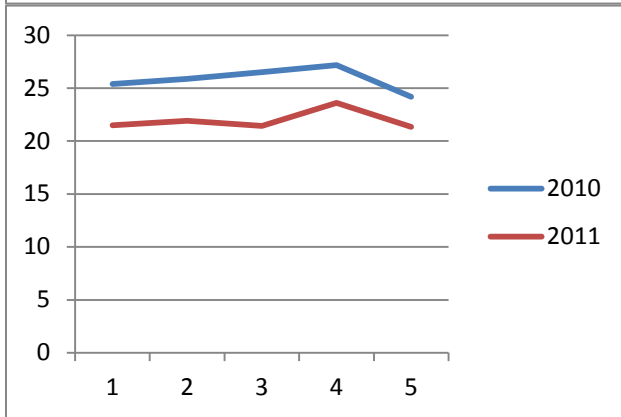
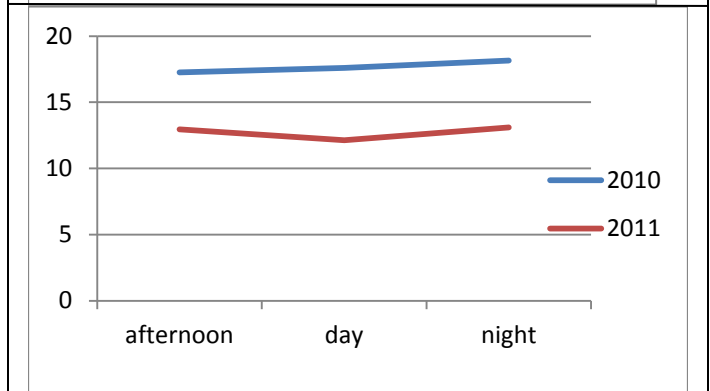
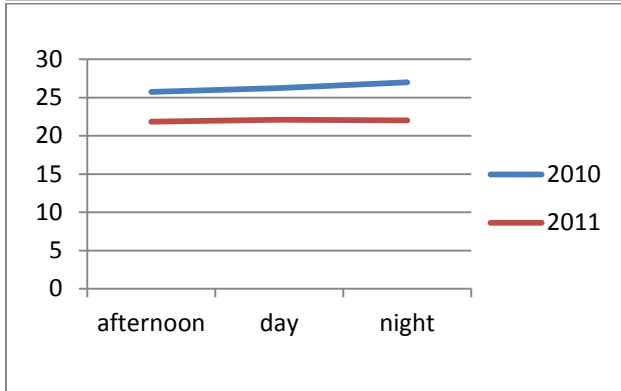
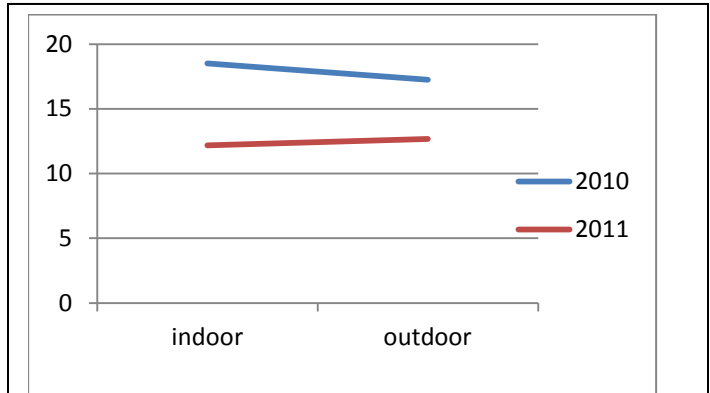
The analysis of the average return yards given up per team is again very similar to the average field position analysis. We again see that there is a difference between the two years. (p-value<.0001) The average return yards in 2010 was 17.57 compared to 12.52 in 2011 for a difference of 5.05 yards.

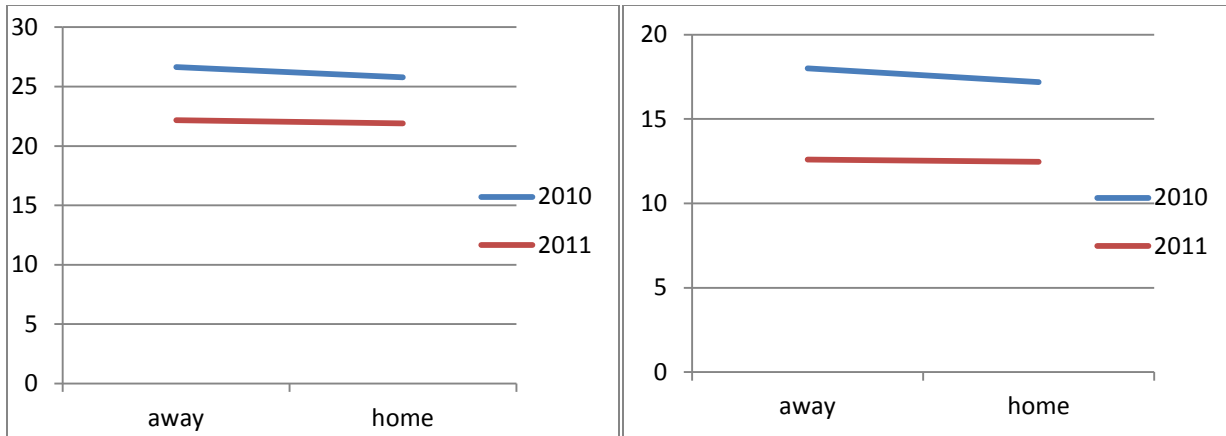
Next we'll look at some other effects on the field position and return yards.

**Average Field Position**



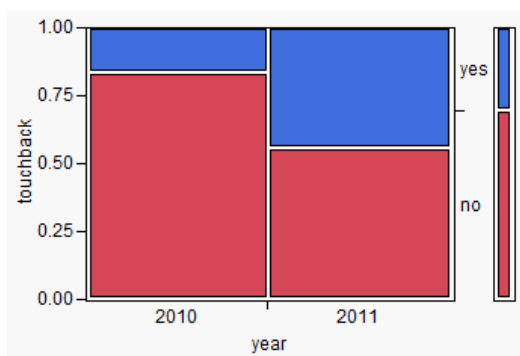
**Average Return yards**





**Summaries:**

From all the graphs with the exception of the ones comparing across quarter we see that the lines for the 2010 and 2011 season are all pretty flat suggesting that none of the other factors: location, time, and home or away are having an effect on the average field position and return yards. Comparing across the different quarters that the kickoff occurred in we see that the lines aren't very flat suggesting maybe quarter had an effect on the outcomes. We will investigate further into the effects of these factors but first a few more interesting summaries/comparisons.



**Contingency Table**

		touchback		
		no	yes	
year	2010	2100	415	2515
		83.50	16.50	
2011	1411	1122	2533	
		55.70	44.30	
	3511	1537	5048	

**Tests**

	N	DF	-LogLike	RSquare (U)
	5048	1	236.90189	0.0764

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	473.804	<.0001*
Pearson	460.362	<.0001*

Looking at the percent of kickoffs that were touchbacks in 2010 compared to 2011 we can see from the chi-square test that there is a significant difference between the 2 years. We can also get a confidence interval for how different these will be. From the relative risk ratio we see that kickoffs in 2011 were 2.68 times as likely to be a touchback as a kickoff in 2010.

**Relative Risk**

Description	Relative		
	Risk	Lower 95%	Upper 95%
P(yes 2011)/P(yes 2010)	2.684402	2.433409	2.961283

One of the arguments fans and players had against the new rule was that it was going to take one of the most exciting plays in the game away. Many argued that the game would be less fun to watch because of the amount of kickoffs that would be touchbacks. They also argued that this would lead to lower scoring games. From the table and graph above we can see that the percent of touchbacks increased by almost 28% from 2010 to 2011 meaning critics who thought there would be a lot more touchbacks were correct. Scoring however actually increased in 2011. In 2010 teams averaged 22 points per game and that went up to 22.2 in 2011. The average points per game in 2011 was actually the highest per team average since 1965. (www.pro-football-reference.com)

	touchdowns		
year	no	yes	Total
2010	2493	22	2515
2011	2524	9	2533
<b>Grand Total</b>	<b>5017</b>	<b>31</b>	<b>5048</b>

Looking at the number of touchdowns that were scored on kickoffs we can see from the above table that the number went down drastically in 2011. There were 22 touchdowns on kickoffs in 2010 compared to just 9 in 2011. Again critics of the rule were supported in their theory that there would be less returns for touchdowns.

### Effects on starting field position:

Source	Nparm	DF	DFDen	F Ratio	Prob > F
location	1	1	237.2	8.7172	0.0035*
time	2	2	233.9	0.1890	0.8279
location*time	2	2	235.1	2.0156	0.1355
year	1	1	256.2	65.8341	<.0001*
location*year	1	1	232.5	0.9062	0.3421
time*year	2	2	232.8	0.3905	0.6772
location*time*year	2	2	234.4	0.0774	0.9256

Running a full factorial model with factors location, time, and year and blocking by kicker we see that the only factors that are impacting the average starting position are year and location (both p-values < .05).

Least Sq Mean		Least Sq Mean	
Level		Level	
outdoor	A 26.549033	2010	A 27.993616
indoor	B 25.023045	2011	B 23.578462

Levels not connected by same letter are significantly different. Levels not connected by same letter are significantly different.

Looking at the LS means differences for outdoor versus indoor we see there is a difference of 1.53 yards. The difference between 2010 and 2011 is about 4.42 yards.



## Effects on average return yards:

Source	Nparm	DF	DFDen	F Ratio	Prob > F
location	1	1	295.5	3.0686	0.0809
time	2	2	284.5	0.5863	0.5571
location*time	2	2	283	1.5844	0.2069
year	1	1	314.1	34.6384	<.0001*
location*year	1	1	283.5	5.7243	0.0174*
time*year	2	2	281.6	0.8938	0.4102
location*time*year	2	2	283.1	0.2267	0.7973

Again running a full factorial with location, time, and year in the model and blocking by kicker we see that the interaction between location and year is significant (p-value=.0174).

Level	Least Sq Mean
indoor,2010 A	18.334473
outdoor,2010 A	17.789995
outdoor,2011 B	14.553302
indoor,2011 C	10.895428

Levels not connected by same letter are significantly different.

From the LS Means we can see where the differences occur. From the lettering we see that in 2010 there was no difference between indoor and outdoor but outdoor for 2011 was different from those as was indoor for 2011.

## Conclusion

When the NFL owners voted to change the rules on kickoffs they knew it would have some effects on the game but what those effects would be they weren't sure. Using data from the first year of the rule changes may not be the most ideal because NFL teams will see what happened in the first year and make adjustments that they hope will help their team. In those comparisons though, we were able to see that both the average field position and return yards on kickoffs went down with the new rule changes. We also found that the number of touchbacks skyrocketed in 2011 and the number of returns for touchdowns went down as many expected. Did the rule change really change the game of football that much though? Teams actually scored more points per game than they had in any of the previous 47 years and it was still a fun season to watch. While the number of touchbacks might have been even higher than some expected the rule was changed to reduce the number of injuries in the NFL and specifically on kickoffs. After the season was complete the NFL did its own analysis of the play and Rich McKay, chairman of the competition committee said "That

was a rule change that was made for one reason only, and that was player safety. "And I think, in looking at the results of it -- and we studied it pretty carefully -- it achieved its objective." According to the NFL and McKay the new rule helped reduce concussions by 40% on kickoffs. McKay also said "The average start line went down, and we were really concerned with how that would affect offense. But player safety overrode that concern. We think that, in the end, it served its purpose." As we saw before scoring actually went up this year and therefore the NFL achieved its objective without changing the game all that much as some people and players had predicted before the start of the season.