

# Preventing Concussions during NFL Punt Plays

## Understanding the Problem

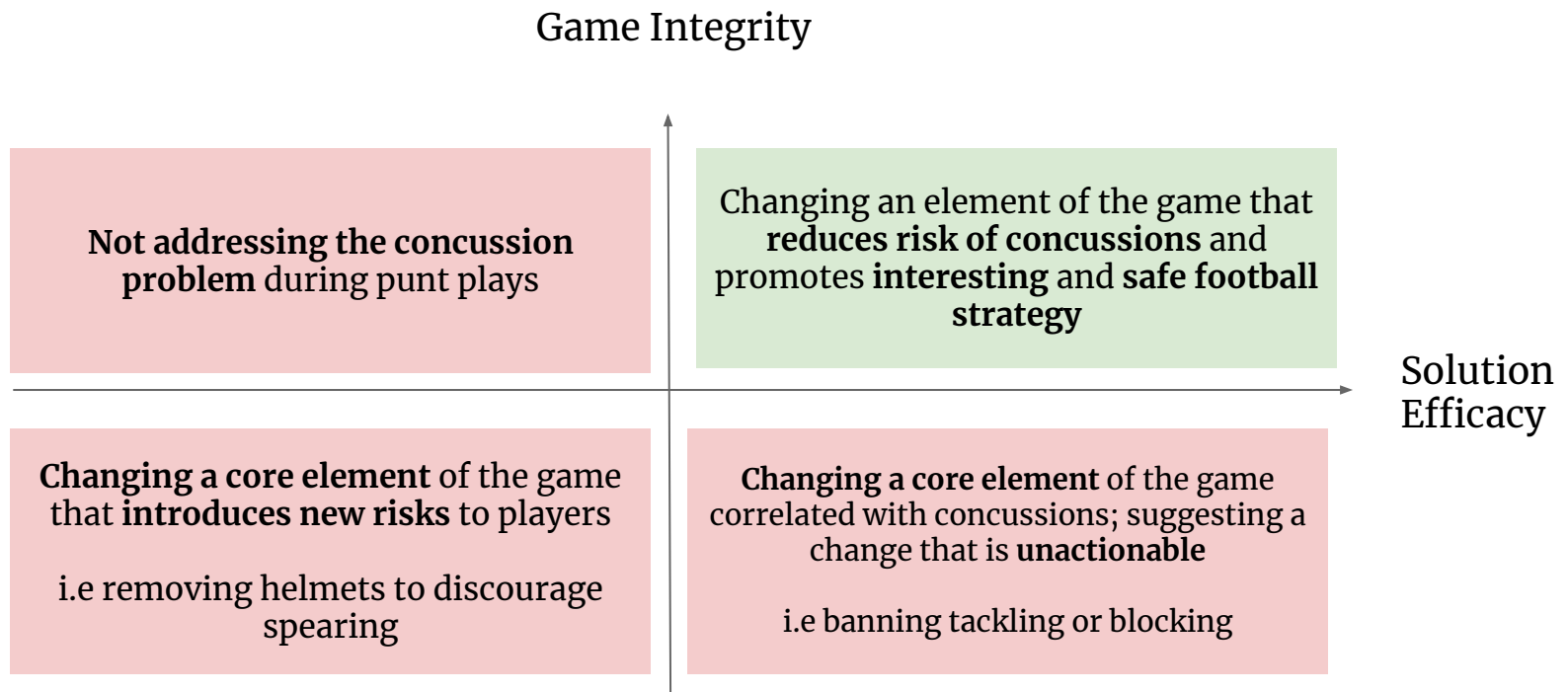
Use data to propose a rule that:

1. Reduces the number of concussions on Punt Plays (**Solution Efficacy**)
2. Does not drastically change gameplay strategy or watchability of the sport, nor add new risks to players (**Game Integrity**)

## Understanding the Problem

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# PROPOSAL:

If the returning team successfully fair catches a punt within the field of play the return team shall be awarded 10 yards from the spot of the catch

## Proposal Defense

### Solution Efficacy

By awarding the return team for successful fair catches and punishing coverage teams for catchable punts, the NFL will be **encouraging both teams to avoid common concussion prone situations**, namely easily returnable punts. Solution efficacy can even be calculated aggregate NFL data

### Game Integrity

This rule is **actionable** and can easily be added for the 2019 season. Rather than reducing the excitement of punts, this new rule will result in **more interesting 4th down strategies** and excitement for the fans. A quick discussion of potential new risks will demonstrate that the **player risk added by this new rule is negligible**

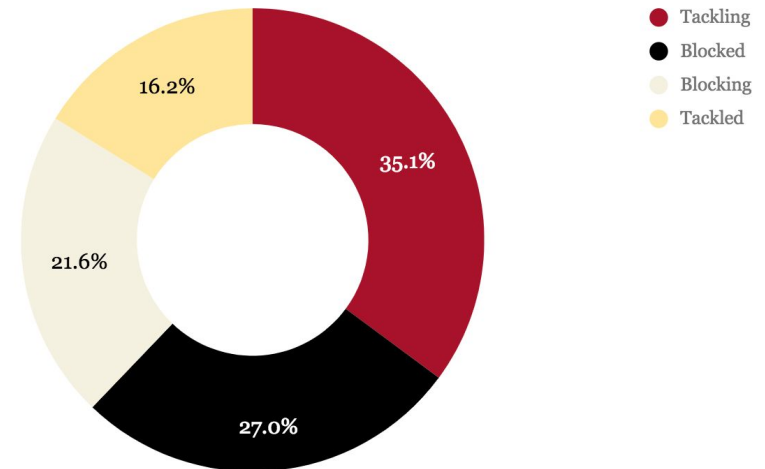
# Data Orientation

## How often and what kinds of concussions occur on punt plays?

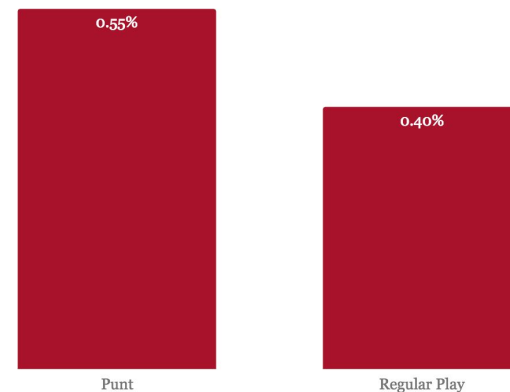
Tackling and being tackled account for only half (**51.3%**) of all concussions; nearly just as many occur because of blocking. This is surprising because most fans are aware of concussion plays when they happen on hits to the ball-carrier, but **nearly as many occur off-ball.**

A chance of a concussion on a punt in 2016-2017 was **0.55%**, much larger than a typical football play<sup>[2]</sup>

Concussed Players Activity



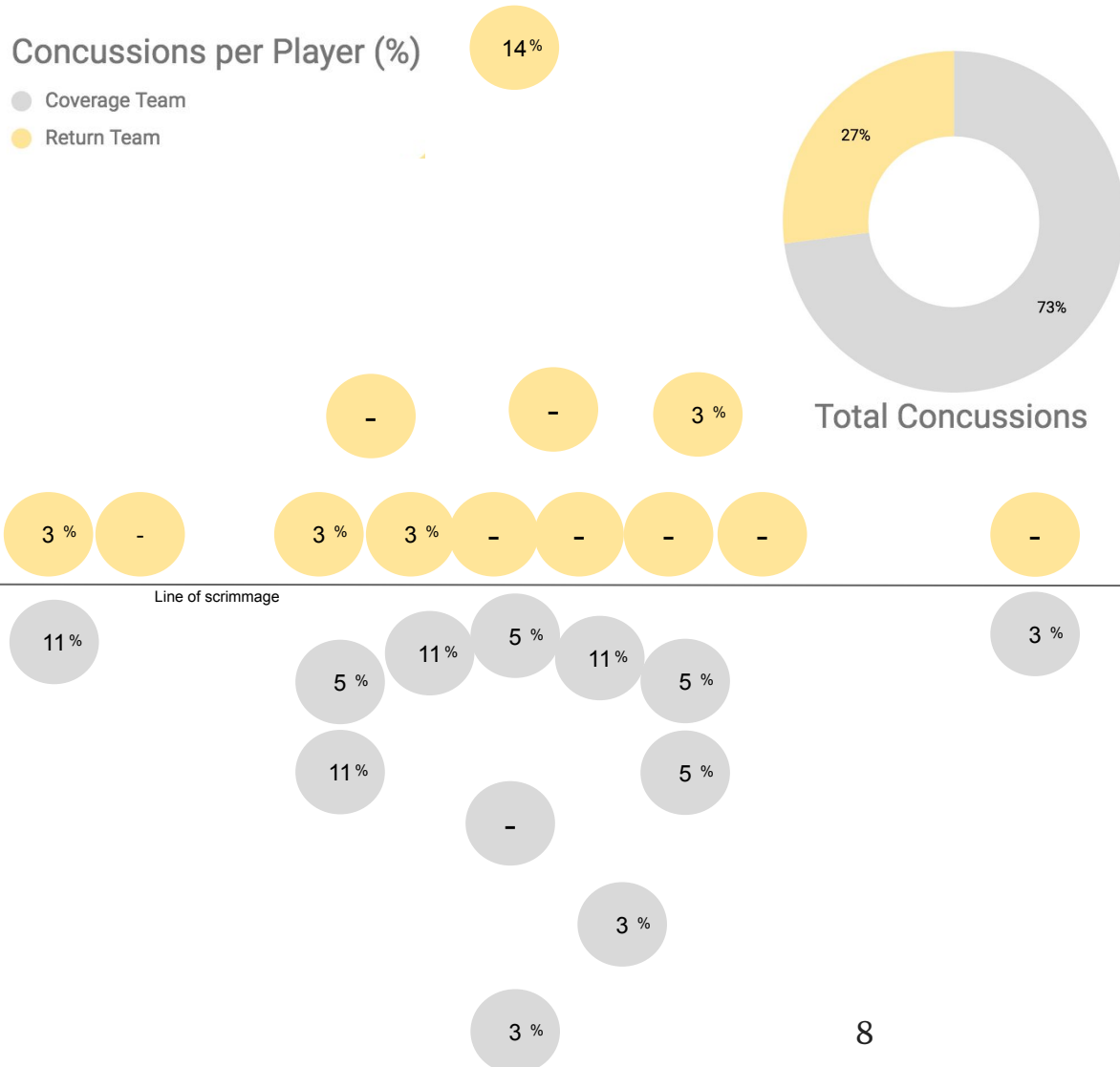
Chance of Concussion



# Which positions get concussions during punts?

## Concussions per Player (%)

● Coverage Team  
● Return Team



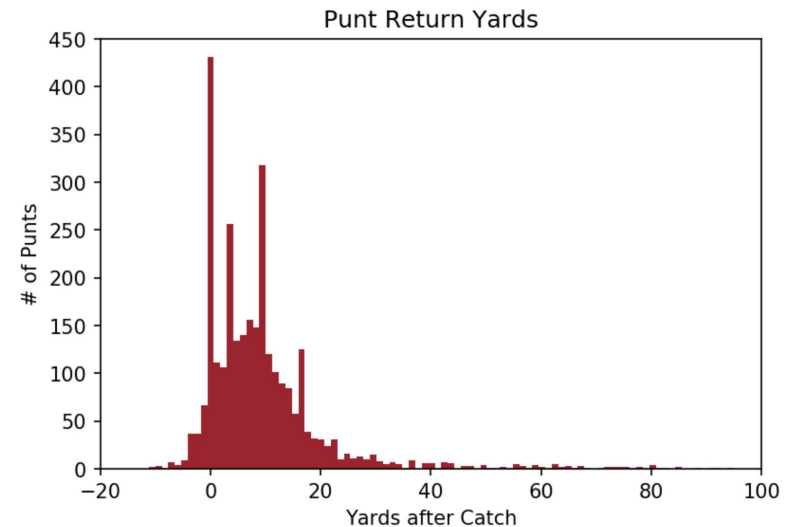
The vast majority (73%) of concussions are on the coverage team.

Another surprising find from concussion data is that **punt returners only account for 14% of concussions** on punts-- Guards on the line of scrimmage have nearly as many concussions

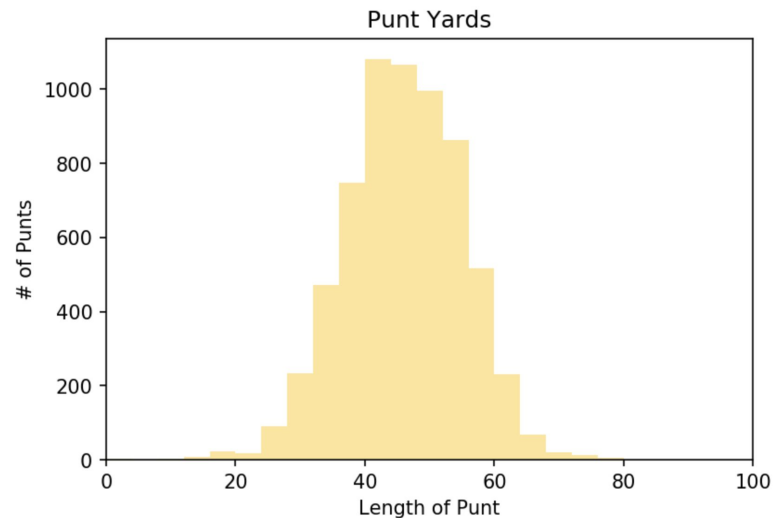


## How long are punts and punt returns?

**Punt returns are on average less than 10 yards**, with a mean of 9.71 yards and a median of 7 yards



**Punts are on average around 45 yards**, with a mean of 45.52 yards and a median 46 yards



## What punt events lead to concussions?

- Concussions are more likely to occur on punts that are kicked behind your own 40 yard line ( $p < 0.05$ )-- in fact, they are 2.5 times more likely
- The length of punt has no correlation on the chance of a concussion
- Players are nearly 7 times more likely to get concussed during a returned punt than a non-returned punt

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Concussions occur in 1.06% of returned punts, which in comparison to 0.16% of non-returned punts. **Punt returns are clearly a huge risk to player safety.** This statistic will be the focal point of the argument and rule proposal

# Solution Efficacy

## Proposal & Proof

If the returning team successfully fair catches a punt within the field of play, the return team shall be awarded 10 yards from the spot of the catch

### Dangerous Returns

As stated previously, **returned punts are much more dangerous than non-returned punts**, and so the NFL should discourage them.

### Fair Catch

Non-returnable punt actions include punting out of bounds, touchbacks, blocks, and fair catches. Of all of these options, fair catches are the only one that can turn a returnable punt into a non-returnable punt. **Encouraging fair catches encourages non-returnable punts**

### Return Incentive

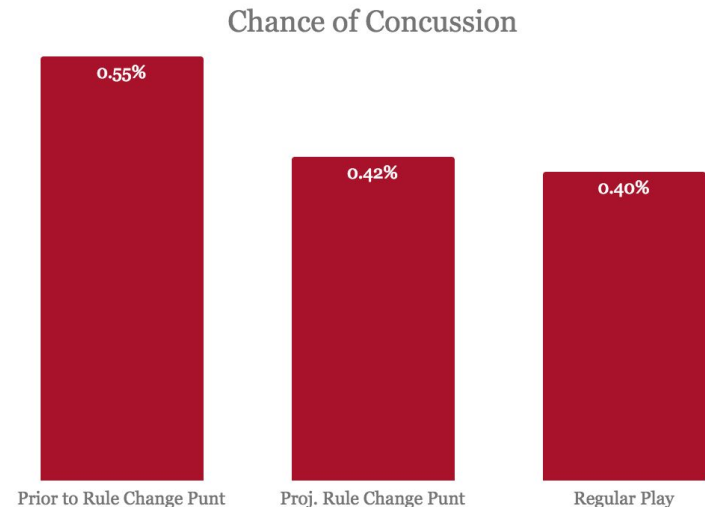
Since the average punt return is less than 10 yards, **offering a 10 yard bonus to fair catches should incentivize returners** to take the free yards in the same way a touchback on kickoffs incentivizes returners to stay in the endzone

### Coverage Incentive

Offering a large reward on fair catches **incentivizes punters to kick unreturnable punts** (out of bounds, hard to catch, hits the ground and rolls, etc.) and coverage teams to rely on skilled punts rather than tackling

## Rule Change Impact Projection

- We can look at the efficacy of the the Fair Catch Rule Change by using 2017 Season Kickoff Stats. NFL Kickoffs are a good yardstick because they have a touchback (25 yards) bonus that is more yards than the average kickoff return length (21.5 yards) <sup>[5]</sup>
- Using 2017 aggregate kickoff data, we can calculate that kickoff returners elect to take a touchback when the option is available 66% of the time\*. We also know that 50% of all punt returns would benefit from a 10 yard "touchback," so let's assume 50% of returnable punts have a real option of taking a fair catch instead.
- If 50% of returnable punts have the option of a fair catch, and 66% exercise this option, the number of returns would reduce by 33%. With 33% less returns, returned punts drops from 44% to 29.5%, with no returns rising to 70.5% of punts. Assuming no change in concussion percentages, **this will reduce concussion occurrence by 23.4%**, from 0.55% of plays to 0.42%-- nearly the percentage of a normal football play



\*[1,4,5,6]. calculation expanded upon in kernel

## Counterpoints Addressed

- **Q:** Will reducing returns actually reduce punt concussions? What if concussions happen on return plays, but not related to the return itself?
  - **A:** Based on video review data, 94% of concussions that occur on return plays are directly related to action (block or tackle) initiated because of a punt returner's attempt to run after catching the ball and making a football move
- **Q:** With the increase of fair-catches, there will be an increase in muffed returns, so will there be an increase in concussions?
  - **A:** Muffed punts are a small edge case (6.25% of all returned punts) but should still be addressed. All returns involve catching the ball, so the incentive to fair catch shouldn't change the number of muffs greatly. While muffs are a dangerous part of punts (1.09% of muffs result in a concussion) this concussion likelihood is not too far off from the overall return rate concussion percentage of 1.05%, and so additional risk from increased muffs is comparable to having more punt returns per game, which will be greatly offset by the reducing in returns. It should also be noted that based on punt data the chance of a concussion on a fumble is 1.47%, a distressingly high likelihood, and perhaps the solution to muff safety requires making fumbles safer overall.

# Game Integrity



## Proposal Game Integrity

**Game Integrity:** The rule is **(1)** actionable, **(2)** does not drastically change gameplay strategy or watchability of the sport, **(3)** nor add new risks to players



### 1. ACTIONABLE

Implementing this new rule change requires minor modifications to the rules, regulations, or gameplay. Simple appending the proposal to the end of Rule 10, Section 2, Article 4<sup>[7]</sup> and address the rule after a fair catch is made.



### 2. WATCHABLE

The rule change does not negatively impact the watchability of football games in any significant way-- if anything, it promotes compelling new strategy. This is addressed in the next slide



### 3. LOW RISK

The rule change introduces negligible new risk to players; following new game strategies addressed on this slide are not any more dangerous than the current standard of play-- and oftentimes safer

## New Game Strategy



### SKILLED PUNTING

Currently, the core skill of punting is the ability to kick the ball as far as possible, with less emphasis on location or catchability outside pinning the opposing team within their own redzone<sup>[8]</sup>.

With the addition of the new rule change, the NFL will be discouraging the typical punt and **encouraging more gadget and creative punt strategies**. Perhaps pooch punts and rugby style punts will have a comeback, or punters will aiming their kicks to land *just* out of bounds more often.

This injection of creativity into punting will introduce a new, exciting relationship to fans: punter vs. punt returner. While in the past punt returners have owned the spotlight for their potential to score, punter will now have the opportunity to outsmart the PR-- **the ideal punt is not longer the longest/highest, but the best placed punt where the returner has no chance to move the ball forward.**



### BOLDER OFFENSE

With the increased incentive to fair catch, there will be fewer returns, and returns are certainly an exciting part of the football. Luckily, this new rule promotes a high-voltage alternative.

With the addition of the new rule change, **teams will be more encouraged than ever to go for it on 4th down**. Whether by punt fake or QB sneak, the reduction in punt efficacy to give opponents poor field position will result in fewer punts on 4th and short. Fourth down plays are easily the most exciting and entertaining part of a football game, and bolder offensive play calls on 4th down will greatly offset any loss in entertainment from less punt returns..

Rather than removing exciting plays from the game, this new rule simply replaces them with an even more enjoyable alternative. The new rule will increase the watchability of football while simultaneously making it safer.

## Counterpoints Addressed

- **CP:** I watch punts because of the potential excitement of a PR returning a punt for a touchdown. By increasing fair catches, you decrease the chance of this and the watchability of the play
  - **A:** As stated previously, this rule recuperates this loss in watchability by shifting the spectacle from the punt returner to the punter and by increasing the incentive for teams to go for it on 4th down. Beyond this, punt return touchdowns are a rarity to begin with (0.61%) and return penalties negating runs of any length are such a common occurrence (19.24%) that these changes to punts seem to offer safer and more watchable alternatives.
- **CP:** If you want to decrease returns, why not simply ban punts or ban punting on a certain portion of the field and give the ball to the opposing team?
  - An earlier draft of this proposal was based on this: disallow punting from within your own 40 yard line. While this addresses the safety concerns, it does not adequately address game integrity, as football would lose part of its special teams strategy. Simply giving the ball to the other team is a form of forfeit, and forfeiting is certainly not a part of football culture. Even in surrendering the ball during a punt requires the opposing team to earn it, and banning punts runs counter to this ideal.

## Veteran NFL Punter Conversation

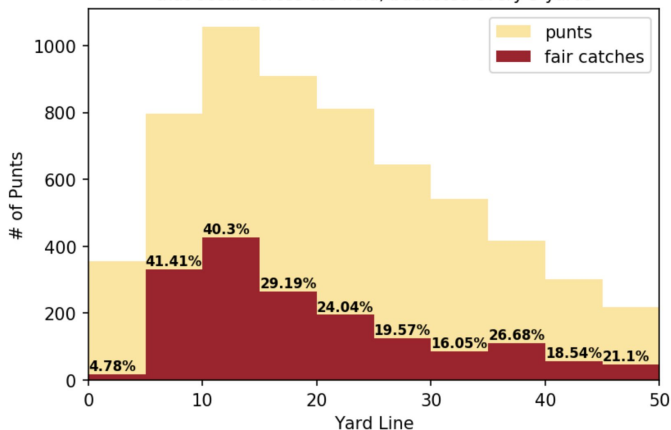
- These are quotations from a conversation had with a NFL Punter on the proposed rule change:
- **Punt Difficulty:** "As punters, we would continue to specialize even more on hitting the ball as far as possible and to the sidelines if this were a rule... **Trying to drive it out of bounds at 50 yards is an extremely difficult punt**"
  - This rule change would force punters to attempt more difficult punts that are towards the sidelines, as they would be even more incentivized to avoid easy to catch balls. If a punter cannot hit the ideal "50 yards and out of bounds" ball, they will have to resort to alternative strategies to push the opponent back like gadget punts. **This validates the claim of promoting more difficult, and by extension more exciting, punter play.** We love to watch athletes perform physically impressive feats, and encouraging punters to push themselves and their skillset will make punting a more appreciated and entertaining aspect of the game.

## Veteran NFL Punter Conversation

- **Changing Punter Strategy:** “The rule would completely change how we punt the ball inside the 20. The usual goal is a fair catch between the 8-11 yard line... **I like the rule adjustment for inside the 20 fair catches [where the bonus would not be enforced within 20 yards of the endzone]**
  - This is an interesting idea, and certainly a pro-punter augmentation, as pinning a team within their 20 is a key punter stat.<sup>[9]</sup> But here is an argument against this: It is true that most fair catches occur within the redzone (62.57%); the below graph shows that punts are fair caught above 40% between the 5 and 15-- just as the punter mentioned-- with a steep drop off beyond the 15. While waiving the bonus within the 15 would benefit punters, the rule change would lose a large portion of its solution efficacy. 32.72% of all returned punts are caught

### Punt Outcome per Yard Line

The number of punts and the number of fair catches that occur across the field; bucketed every 5 yards



within the 15 yard line, and if the bonus is not enforced in this area of the field, these returns would no longer be taken into account during concussion reduction-- essentially removing them from the projected impact. This would negatively impact the solution efficacy of the rule change. And punters can still pin teams within the redzone: kicked within the 10 yard line, even if fair caught, would result in a position within the 20 yard line. The rule would simply shift punter's target yardline from 8 - 11 to around 4 - 9; which would once again accentuate a punter's skill. **A minor modification to punter strategy seems an acceptable trade off to a 30% reduction in concussions.**

For your Consideration:

# PROPOSAL

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## Works Cited

- [1] <https://www.teamrankings.com/nfl/stat/touchbacks-per-game?date=2018-02-05>
- [2] [https://www.youtube.com/watch?time\\_continue=449&v=t\\_SslKgwvz4](https://www.youtube.com/watch?time_continue=449&v=t_SslKgwvz4)
- [3] [http://www.espn.com/nfl/statistics/team/\\_/stat/returning/position/defense](http://www.espn.com/nfl/statistics/team/_/stat/returning/position/defense)
- [4] <https://profootballtalk.nbcsports.com/2017/10/17/kickoff-returners-keep-taking-the-ball-out-of-the-end-zone-costing-their-teams-yards/>
- [5] <https://www.teamrankings.com/nfl/stat/kickoffs-per-game?date=2018-02-05>
- [6] <https://www.teamrankings.com/nfl/stat/kickoff-touchback-pct?date=2018-02-05>
- [7] <https://operations.nfl.com/media/2646/2017-playing-rules.pdf>
- [8] <https://www.inc.com/jeff-haden/game-changing-innovation-how-baltimore-raven-punter-sam-koch-reinvented-the-art.html>
- [9] [http://www.espn.com/nfl/statistics/team/\\_/stat/punting](http://www.espn.com/nfl/statistics/team/_/stat/punting)