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Crime in the NFL: Does an Arrest History Lead to Better Performance?

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Abstract

Teams in the National Football League will do whatever it takes to win football games, even if that means having players with a criminal arrest history on their roster. However, does being arrested result in improved performance? Do NFL players with an arrest history perform better than those without one? I examine the effect a criminal arrest record has on player performance in the NFL from 2000-2014, using the top 30 ranked players within each position group. The position I chose to analyze were: Quarterbacks, Running Backs, Wide Receivers, Defensive Linemen, Linebackers, and Defensive Backs. My findings show that having an arrest record leads to better performance only with Defensive Linemen. Because of the various skill specialties and differences inherent in each position group, aggression and violence should be more important qualities among Defensive Linemen. Furthermore, I find evidence that players with an arrest record on average perform incrementally better than players who do not have a criminal arrest history.

I. Introduction

"Just win baby, win". This iconic phrase by late football coach, owner, and general manager of the Oakland Raiders, Al Davis, has served as a cornerstone slogan for the National Football League. NFL teams do whatever it takes to win games, whether it is scouting potential superstars, evaluating opposing teams, re-signing valuable players to their organization, or taking chances on athletes no other team would. However, a prominent issue in many professional sports, especially in the National Football League, is criminal violence and arrest history of its athletes.

In a non-athletic labor market, criminal activity has great potential to affect the makeup of the company or corporation the employee works for. Many individuals who get arrested end up losing their job and have great difficulty finding another. In contrast, there are a great number of current NFL players with a criminal arrest history. Unlike general labor markets, the NFL is a setting in which having a criminal background is not as detrimental to the team or organization and that if you are good or valuable enough to your team, you will most likely be given a second chance either with the team you are on or with another team in the league. I would argue that in many cases within the context of the National Football League, arrests aren't necessarily viewed as a bad thing. In fact, there are certain characteristics that might lead to certain types of criminal behavior that are seen as positive factors on the field.

From the years 2000-2014, there have been over 800 arrest records of NFL players. Surprisingly, "one N.F.L. player in every 40 is arrested in a given year and

2.53% of players has had a serious run-in with the law in an average year" (Irwin 2014). There is a huge perception by the general public that the NFL has a major crime problem that desperately needs to be fixed. Many NFL arrests tend to make front page news and bring negative attention to the NFL. In 2007 ex-Falcons Quarterback, Michael Vick, was indicted for animal cruelty and dog-fighting charges. Arguably the most notable and widely publicized arrest involved ex-Patriots Tight-End, Aaron Hernandez, who was charged with murder. Just recently in September of 2015, ex-49ers Linebacker, Aldon Smith, was also arrested and charged with driving under the influence, hit-and-run, property damage, and vandalism.

While these are all issues I believe need to be fixed, the goal of my analysis is to determine whether an arrest record affects NFL player performance. I base my analysis and define an arrest record/criminal history as any offense worse than a simple speeding ticket. While I do not differentiate between the types of crimes or offenses in my regression analysis, it is interesting to distinguish and identify the most common charges N.F.L. players face from the years 2000-2014. (The preceding figures include *all* player positions, not just the ones I use in my analysis and regression models. The charges from highest frequency of arrests to lowest frequencies (with number of arrests in parentheses) include: (202) Driving under the influence, (88) Assault and battery, (85) Domestic Violence, (82) Drugs, (43) Disorderly Conduct, (38) Gun-related charges, (35) Alcohol-related (excluding D.U.I.), and (21) Burglary/Theft (Figure 1). As you can see in Figure 1, the most common criminal offense is that of driving while drunk, while domestic abuse consistently remains a huge issue, even before the increased media coverage surrounding the spousal domestic abuse case of Ray Rice, an extremely successful Running Back that

was released from the Baltimore Ravens. While some of these types of arrests may have smaller effects on player game performance than others, I find it important to include them all in an aggregate amount to better understand the impact a criminal arrest record of any sort has on player performance across the league.

I believe some of these types of behaviors are extremely valuable and attributable to increased levels of game performance, most evident within the context of defensive players (Defensive Linemen, linebackers, Defensive Backs). The behaviors that are most relevant when looking at characteristics of certain NFL player positions include aggression, toughness, and intensity.

All of the above factors are seen as positive attributes for defensive players because the focus of playing defense is to inflict pain and assert dominance over the opposing offensive players, stopping them in their tracks and preventing them from moving the ball forward or scoring points. It is almost impossible to succeed in these aspects if the player is not aggressive, tough, or fails to assert his dominance over the opposing player across the line of scrimmage from them. For offensive players, I argue that criminal arrest records have less of a positive effect on game performance due to the nature of the positions I will analyze (Quarterbacks, Running Backs, and Wide Receivers). These positions require much less aggression and their game performance success is highly contingent on more cohesive offensive unit play. I believe because of the variations of defenses in the NFL, offensive players require more film study, analysis of coverages and blitzes, and are less reliant on simple aggression and violence towards opposing players, and even trying to hurt other players. The greater variety of defenses an

offensive player sees throughout the season, the more he has to adapt to the changing landscapes of NFL defensive structures and philosophy. This requires a greater amount of film study and analysis of player tendencies because of the defensive differences throughout the league.

Based on these facts and personal opinions, I predict that an arrest record is correlated to poorer performance for positions that heavily favor intelligence and a high "football IQ", including Quarterbacks, Running Backs, and Wide Receivers. I predict that an arrest record is more associated with higher performance for Defensive positions where aggression and toughness are more valuable attributes, which include Defensive Lineman, Linebackers, and Defensive Backs. Overall, I predict NFL Offensive players with a criminal arrest record perform worse than offensive players who do not have an arrest record, while NFL Defensive players with a criminal arrest record perform better than defensive players who do not have an arrest record.

II. Literature Review

Economics of Crime:

Before discussing the effect of criminal arrest records on NFL player performance, it is crucial to first look at the economics and incentives of crime on a more macro level. More specifically, I will focus my attention on non-athletic labor markets. Freeman (1999) displays the role of incentives in criminal decisions. He highlights the

"difficulty of reducing crime through incapacitation: when the elasticity of supply to crime is high, one criminal replaces another in the market; and thus the importance of deterring crime by altering behavior" (p. 3530). In the NFL however, it is clear that more attention and criticism by the media and general population is cast upon athletes who commit crimes because they are in the spotlight. Freeman derived a model in which we can see whether individuals choose between criminal activity and legal activity based on expected utility of these actions. But what is the root cause of criminal decisions? Freeman argues that it could be a result of poor legitimate labor market opportunities of potential criminals. This would mean low hourly pay and high unemployment rates are some of the main determinants of crime. This research also implies that men with below average skill and educational levels who commit crime can receive higher pay from criminal activities than from legal legitimate activities. Freeman uses an Expected Return On Crime (EROC) model to show the impact committing a crime with friends, or even similar individuals with common characteristics of the criminal, can have on the probability of criminal activity. If W_c is the gain from crime, p is the probability of being apprehended, S the extent of punishment, and W is earnings from legitimate work, then crime will be committed instead of legitimate work when:

$$(1\text{-}p)U(W_c) - pU(S) > U(W)$$

However, three implications exist:

1. Successful crime must pay a higher wage than legitimate activities

2. Attitudes towards risk will influence the decision to commit crime; risk averse individuals will respond greater to changes in apprehension risks than to changes in punishment extent
3. The major factors that affect decisions on whether or not to commit the crime (criminal vs. legitimate earnings, chances of being caught and sentencing extent) are all intrinsically related.

The above model is based on probability and the idea that there is actually an effective return on crime that is more desirable and beneficial than honest behavior and work. While this model is a hypothetical economic model of decision-making, it is interesting to note that the equation includes and highlights the major variables in which most empirical economic studies focus their attention on. Freeman further explains that "given the same expected return from crime, you may be more likely to commit crime if your peers commit crime than if they do not" (pg. 3549). This means that one's decision to commit a crime can greatly affect the decision of others to commit a similar crime. This could be seen as a parallel to similar types of professional athletes getting arrested for similar types of crimes professional athletes commit (driving under the influence, domestic abuse, drug charges, etc.). Also, very dissimilar from NFL player salaries, criminals have lower earnings prospects than those who do not commit crimes. The best way to show this disparity between labor markets is analyzing the salary of a current NFL Defensive Back with a criminal arrest record and comparing it to an NFL Defensive Back without a criminal arrest history. Adam "Pacman" Jones of the Cincinnati Bengals signed a three year, $5,350,000 contract even after being arrested for various charges, including: assault, drug possession, disorderly conduct, etc. However, current cornerback for the

New York Jets, Darrin Walls, makes $950,000 a year even though he does not have a criminal background. This shows a clear and large disparity between the effect a criminal arrest record has on earnings when looking at normal labor markets and that of the National Football League.

An earlier study by Grogger (1995) further expands on the effect arrests and criminal records have on overall employment and earnings figures of young men of similar ages to newly drafted NFL players. Grogger uses an empirical econometric model to show that (1) arrests and prosecution should affect both current and future labor market outcomes, and (2) should exploit the longitudinal structure of the data to provide controls and explanations for unobserved variables that correlate with arrests and their effect on future earnings in a labor market. The model proved to be consistent with Grogger's hypothesis that arrests and criminal activity decreases future earnings. Those that are arrested more than once in a given quarter/period experience an additional decrease in estimated earnings whereas the effect an arrest has on employment is also negative. However, Grogger concludes his study stating "the effects of arrests on employment and earnings are moderate in magnitude and are rather short-lived" and that declining wages among our nation's younger generations, in conjunction with improved criminal activity benefit prospects (especially in the illegal drug market), provides strong incentives to commit crime at the expense of working in a legitimate market (pg. 70).

Schmitt and Warner (2010) provide a more modern analysis on ex-criminals and their impact on the overall general labor market in the United States. In terms of employment rates, they found that "ex-offenders lower employment rates for men by 1.5-

1.7 percentage points" and even at relatively low productivity rates of ex-offenders, the resulting loss of GDP/output that year was likely somewhere between $57 and $65 billion (pg. 1). Schmitt and Warner also believe this negative trend will continue in coming years and that output will steadily decrease substantially over time. The results of their study show that felony convictions, or any convictions for that matter, can have a substantial negative impact on job prospects. This is in large part because of the heightened probability of "deterioration of worker 'human capital', including formal education, on-the-job experience, and even "soft skills" such as punctuality or customer relations" (pg. 8).

It is important to point out that this study argued that many ex-prisoners and ex-felons struggled in the labor market before their arrests and convictions, so it is an interesting topic that I find few similarities with when making comparisons to the National Football League. This is most likely due to the greater weight NFL teams place on talent rather than on an arrest history or character concerns. This is blatantly obvious when looking through recent media and news articles of current NFL players having multiple arrests and continuing their careers in the NFL either on the same team, or another team willing to take the risk of employing them.

Athlete Aggression and Violence In Sports:

While there is a plethora of implications for crime and arrests on the overall labor market in the United States, I focus my study and research on why athletes throughout sports engage in criminal behavior.

In professional sports such as Football, Ice Hockey, Mixed Martial Arts, etc., talent and aggressiveness are important traits an athlete must possess in order to excel in their respective sport. Most blatantly seen in Ice Hockey, there is a position designated to be extremely aggressive and fight other members of the opposing team. The "Enforcer" is known for reacting "harshly to violence", and that those "fighting skills can help a less-talented or smaller player in the league when their hockey skills alone would not" (Wikipedia).

Zimmerman (2013) further explains and expands on this inherently violent and aggressive behavior by including a quote by Roger Dangerfield in the beginning of his study: "I went to a fight and a hockey game broke out". More generally, the National Hockey League uses violence and aggressive play in order to maximize profits and increase fan numbers and game attendance. Many athletic spectators enjoy violence on the ice just as much as team success. Furthermore, Zimmerman uses the following regression model in his study to explain the relationship between certain attributes and their effect on a player's salary:

$$\text{Salary: } \beta_0 + \beta_1 \text{PPG} + \beta_2 \text{TOIPG} + \beta_3 \text{Enforcer}$$

This equation states that salary is a function of a constant (β_0), points per game, time on ice per game, and a dummy variable that classifies enforcers (1 for enforcer; 0 if not an enforcer). His results showed that all three variables have positive coefficients meaning it positively correlates with a player's salary. More specifically, if the team believes the enforcer-type player has adequate skills to fulfill that role, the "player's salary can increase 485,960 dollars" (pg. 55), which shows a clear incentive for increased

aggression and violence on the ice. Most importantly, the positive coefficient for the β_3Enforcer variable shows that team's see the value of being an enforcer to be positive attribute and characteristic of their team.

Jensen, Roman, Shaft, and Wrisberg (2013) further explore the impact and benefit of having an extremely aggressive and violent nature towards an opponent, as well as how it almost always correlates positively with individual success. They discovered the phenomenon of "cage reality" (pg. 6), in which being inside of a cage is completely different than being outside of the cage, and that aggression towards the opposition is normal and necessary once an individual is in the cage. This idea draws many similarities with professional football players on the football field and hockey players in the rink. They also explore the idea that violence can be a viable solution "when tasks become more important than people (winning and injuring someone versus losing and not injuring someone)" (pg. 6).

My thesis examines the effect a criminal arrest record has on in-game performance in the National Football League. Stevens (2012) looks at this idea from a different perspective by analyzing the relationship between being a male-athlete and the chances for off-field violence and criminal activity. In 2009, young-adult males between the age of 15-19 and 20-24 were arrested for violent crime at a rate of 730.3 and 667.5 respectively per 100,000 people (pg. 3). Stevens analyzed traditional masculine ideologies society imposes on males at a young age, stressing the importance of manliness, and that those with the strongest characteristics of masculinity would be rewarded greater later on in his life. Stevens also acknowledges that our community as a

whole values an athlete's willingness to successfully use violence in a sports context, making it seem as if it is a normative behavior. This emphasis can be seen not only as a major concern and current threat for our society currently, but also for the future path our society takes in the future.

Character Concern Effects on NFL Draft Stock:

I have a strong belief that professional athletic labor markets are much different than the general labor market in terms of overall employment and job retention. Daly (2014) dives deeper into this idea by looking within the scope of the NFL Draft and a player's draft stock. Daly argues that the economic labor market should follow the same guidelines as the NFL in terms of placing a higher and more weighted emphasis on the prospective athlete's potential success with the firm or company rather than placing too much emphasis on the criminal arrest history.

Weir (2012) takes this analysis a step further by looking at the effects character concerns (mainly arrest records and team suspensions) have on draft status *and* performance in the NFL, instead of just focusing on NFL players. There is not a great deal of current research concerning the effects a criminal arrest history has on a player's draft status, so it is important to take this fact into consideration when looking at the bigger picture of current NFL player performance. For example, an extremely talented player could have a very tainted arrest record and could be drafted in the sixth or seventh rounds of the draft, and be signed by a team that will fail to maximize his talent because of preconceived notions of character. Weir found that teams tend to undervalue prospective players with criminal arrest records while overvaluing those without an arrest

history. Weir argues that draft status is mainly predicted by NFL Combine results at three positions (Running Backs, Wide Receivers and Defensive Backs) (pg.4) rather than putting more weight on factors such as the type of team they played on, success in college, strength of their conference their team played in, etc. Ironically, these are the position groups in my models and data sets that have the greatest number of arrests compared to any other positions, which gives rise to possible explanations of disparities and interesting discussion. To determine the effect character issues have on NFL draft status, Weir used the following regression model:

$$OP = \beta_0 + \beta_1 Character + \beta_2 X + \varepsilon$$

where *OP* is each player's overall pick in the draft, and *Character* is a dummy variable for players who had an arrest or were suspended for at least one game during their college careers. *X* represents a vector of player and school characteristics and also serves as a variable for varying player positions. ε represents a random error figure. In order to determine whether or not these character concerns affect player performance once they get to the National Football League, Weir used the following regression model:

$$Perform = \beta_0 + \beta_1 Arrest\_No\_Charge + \beta_2\ Arrest\_Charge + \beta_1 Suspend + \beta_2 X + \varepsilon$$

where *Perform* represents a particular measure of NFL player performance. A weakness of this model however, is that it does not account for the fact that some of the players that have been arrested may not still be playing in the NFL. It also fails to account for serious injuries that could severely affect performance measurements after returning from an injury. Weir's results show that players with a history of character concerns are taken later in the draft. But when looking at these factors in terms of player performance, there

is no statistical significant correlation to game performance. Weir concludes that having a "history of conflict with coaches and teammates usually predicts future on-the-field difficulties, but off field behavior does not negatively impact game performance" (pg. 18). Weir also states that while criminal backgrounds are not as detrimental to labor market outcomes initially, there is still labor discrimination when looking within the context of the NFL Draft.

Athletes Compared to General Population:

There is a constant discussion regarding professional athletes and their criminal arrest history, most notably with professional football players in the National Football League. This is likely attributable to the vast majority and shear number of athletes on a professional football team compared to other sports, as well as the growing attention and media presence of the National Football League. Many members of our society tend to believe professional athletes have higher frequencies of arrests compared to the general population. To test this idea, Blumstein (2010) conducted a study where he compared NFL players to individuals of similar age and comparable income. He found that the rate of arrests for NFL players is below that of the general population. Even when looking at NFL players who make their living through exercising their physical abilities and strength, they still have a lower arrest compared to the general population. Piquero (2015) also came to the same conclusion when looking at data spanning over a fourteen year period. In 2013, the arrest rate for the general population was 4,889 arrests per 100,000 people, compared to 3,740 arrests per 100,000 people for NFL players (Figure 5). Piquero attributed this misconception to the media, stating that "in our instantaneous

world right now, you see a video, you see a tweet and it becomes real" and that "one image of one person does not necessarily characterize every single player" in the NFL.

Other Topics to Explore:

Special Treatment and Redemption:

Another interesting debate regarding professional athletes is the concept of special treatment when facing punishment, as well as the idea of redemption. There is a conspiracy theory believed to be attributable to many of the premier players in the NFL, stating that these athletes are not given the same punishment as the general population for their crimes and that they are treated differently by law enforcement simply because of their social status and image in the sporting world. Withers (2015) explores this idea of special treatment and lack of consequences of professional athletes as a whole when they are violent off the field. Most notably in her discussion, she addresses how Ray Rice was able to return to the Baltimore Ravens while an investigation was pending, which involved Ray Rice punching his then fiancé unconscious in an elevator followed by him dragging her body out of the elevator. Rice was given a second chance due to the penalty being seen as "arbitrary" and too severe because he had previously admitted his wrong-doing to NFL Commissioner, Roger Goodell. Withers also found that in the MLB, NFL, and NBA, that only one of the 64 reported allegations resulted in a conviction, only seven players were actually punished by their respective league, and only two players were punished by their individual team in 2014.

More specifically within the context of the NFL, current starting Quarterback of the Pittsburg Steelers, Ben Roethlisberger, made headlines when he was accused of

sexual assault against a college student. It is also important to note that he had previously been accused of sexual assault on three separate occasions before this new highly publicized incident. It was reported during the investigation that the officer conducting the interviews with Roethlisberger took photos with him and was reported saying the accuser was drunk and that the officer took Roethlisberger's side during the investigation. Shockingly, Withers found that there haven't been any convictions of professional athletes for sexual assault from the years 2010-2014. While this may be a result of a variety of different things, special treatment of athletes and their interactions with the law will always be a widely debated topic.

The concept of professional athlete redemption also gives rise to much controversy and debate. There seems to be a tendency by the NFL to give players second chances under the condition they are talented enough, can still salvage/maintain a positive NFL image, or can still generate revenue for the NFL. This is an enormous social problem with our society as a whole. From my own personal experience, male athletes from a very young age tend to get special treatment and second chances more so than non-athletes. The blame is rarely placed on the athlete and the phrase "boys will be boys" becomes more commonly and widely used. When looking at this idea in the general labor market, if an individual makes a serious mistake or commits a crime, they tend to not have a job after the incident. In the NFL however, if a player commits a crime, he is suspended, benched, traded, or cut, all of which give plenty of opportunities for the athlete to maintain their job and status in the NFL as long as they are good enough to remain in the league. Rarely ever is the athlete banned form the NFL.

An interesting parallel to this idea of redemption in sports can also be seen in Russian literature. Dostoevsky's critically acclaimed novel, *Crime and Punishment* contains elements of redemption and the concept of a second chance. In the novel, the main character Raskolnikov commits a double murder and struggles to find redemption and meaning throughout the entirety of the novel. The author suggests redemption is not easily achieved, but when it finally is achieved, an individual can feel energized and be better off physically and emotionally than they were before their immoral action or crime. Raskolnikov sees himself as above the moral rules of Russian law and humanity (similar to what society thinks of some elite NFL players) and that redemption is only achieved through suffering or punishment.

When comparing this idea to a professional athlete or NFL player, this can be seen as a player facing negative media coverage, being arrested for short periods of time, or even being cut from a team after an arrest. The athlete in most cases is given chances to "redeem" himself by performing well in games after his punishment or is given a second chance for glory with another team in the league. Unfortunately in our modern society, NFL players tend to find redemption fairly easily. It seems as if the majority of sins or crimes committed by NFL athletes tend to be forgiven as long as their game performance is up to par or as long as they remain positive and gain favorable media coverage after their incident. This can be seen in *Crime and Punishment* as Raskolnikov strives to receive redemption after the murders, similar to the trial of Ray Lewis, ex-linebacker for the Baltimore Ravens. Many people forget that in the beginning of Lewis' career he was arrested and faced multiple charges, most notably murder. When the case ended in is favor, he managed to evolve and eventually become a hall-of-fame caliber

player who is well respected and idolized by many NFL fans and spectators. Media coverage portrayed Lewis as a God and a great leader of the Baltimore Ravens defense, instead of in a negative light. These examples show how prevalent the theme of redemption is in the NFL even with the presence of a troubled past, such as a criminal arrest record.

The Goal of the NFL – Protecting its Image:

The goal of the NFL has always remained the same throughout its conception: increase revenue, increase the total number of fans, and maintain a classy organization regardless of fan pressure or changing societal landscapes. NFL player arrests greatly hinder this NFL objective, but have the potential in some cases to improve it. Gregory (2013) reported that in 2013, the off-season arrest rate for NFL players is up 75% year-over-year" but "is much lower than the national arrest rate for men ages 22 to 34: 3.5% since 2003 compared to 9.9% for all men aged 22 to 34". This statistic would be surprising to most people if they gave themselves a chance to hear it, but it is often overlooked because of the microscope the media places on players when they commit a crime or wrongdoing. So, how should the NFL solve the problem of increased off-season arrests? Many ideas have circulated NFL front offices, but one idea that was proposed included economic incentives for good conduct. This would mean that if a team as a whole stayed out of trouble, their team would be granted higher picks in the draft, increased salaries, or increases in team salary cap.

Another way the NFL tries to maintain its image and pursue its goals is by further limiting the amount of criminals inducted into the Pro Football Hall of Fame. Eddie

DeBartolo Jr. is an athlete under Hall of Fame consideration. However, it is reported that he was involved with political corruption in Louisiana that is currently keeping him out of contention (Weiner 2014). However, there currently is a large amount of athletes in the NFL Hall of Fame with criminal arrest records, including all-time greats O.J. Simpson and Lawrence "L.T." Taylor. While there is not a majority of Hall of Famers with an arrest record, it is one way the NFL attempts to regulate some aspects of player behavior and maintain its image. Society as a whole worries that if someone from within their community commits a crime, it tarnishes the entire community's image and downgrades their society morally, as well as socially. Specifically in the NFL, the Cincinnati Bengals have been notorious for hiring and drafting criminals on their team, which in large part has tarnished their image more so than other teams in the NFL. I believe public opinion can also play a huge role in the NFL draft in the sense that the fans and media could greatly influence NFL front offices and coaches to decide to draft different players they normally would not have drafted or considered otherwise.

IV. Model and Methodology

In my research approach, I will use multiple models and regressions to better measure performance and see the effect an arrest record has on individual positions in the National Football League. For my statistical analysis and performance evaluations, I have pulled data from the *NFL.com* website using the top thirty ranked players in each position for the years 2000-2014. I also have compiled an arrest database listing all arrest records

for NFL players in the same time period. I will use different performance metrics when looking at offensive and defensive positions due to the nature and inherent differences of each position.

Offensive Positions:

I decided not to include Offensive Lineman, Tight Ends, or Fullbacks in my analysis because these positions have weak data and widespread results, and are highly dependent on the team they are on and the philosophy and coaching style of their team's offensive personnel. For example, many teams do not frequently use the fullback position in the National Football League anymore due to the increased prevalence of passing more frequently in regular season games and the growing popularity of the spread offense. Tight-ends in the NFL are also hard to measure performance because some teams emphasize blocking Tight Ends, while others emphasize the use of receiver type Tight Ends. Also, it is incredibly hard to accurately measure Offensive Linemen performance individuals since they tend to be ranked and evaluated as an entire group instead of individually. In addition, the sample sizes of these various offensive positions (in terms of criminal arrest records) are too small to sufficiently draw relevant and significant conclusions from.

I acknowledge that there is a wide variety of alternatives measures for evaluating player performance, but I will be placing higher emphasis on certain variables based off of my own analysis and experience playing and watching the sport of football. Also, I believe that the current metrics used to evaluate offensive player performance in the NFL has many weaknesses. Overall, players will tend to respond and place higher value on

certain metrics more than others. For example, Running Backs may tend to place a higher emphasis on overall rushing yards and touchdowns, even though most commonly used performance metrics for that position do not take into account fumbles in their models, which can be seen as a serious weakness in a player's performance arsenal. Even if the metric is irrelevant in the grand scheme of a football game, it is important to realize that players still have a tendency to respond to those metrics.

Quarterbacks:

In my analysis of Quarterback performance, I include other variables with the widely-used Quarterback Rating (QBR) measurement, in order to better estimate the characteristics of a successful quarterback in the National Football League. While the current QBR system is widely used and valued today, it has a variety of shortcomings inherent in its calculation that I believe fail to accurately account or measure performance. The current QBR method has four parts that contribute to the final rating:

- Percentage of Completions
    - Subtract 30 from completion percentage, multiply that result by 0.05
    - If < 0, award 0 points
    - If >2.375, award 2.375 points
- Average yards Gained Per Attempt
    - Divide passing yards by the number of attempts
    - Subtract three yards from yards/attempt and multiply result by 0.25.
    - If < 0, award 0 points
    - If >2.375, award 2.375 points

- Percentage of Touchdown passes
    - Divide number of touchdowns by amount of attempts
    - Multiply touchdown percentage by 0.2
    - If > 2.375, award 2.375 points
- Percentage of Interceptions
    - Divide number of interceptions by number of attempts
    - Multiply that percentage by 0.25 and subtract that number from 2.375
    - If < 0, award zero points

Now, the QBR rating adds the results of Steps 1-4, then divides the result by 6, followed by multiplying the result by 100. In the case of this current QBR formula, it can be used for a passer who completes at least one pass, which I believe is a serious flaw in the model because it fails to account for the possibility a Quarterback throws a single completion on one attempt, and happens to score. I propose a new method by adding in additional variables in my regression analysis to more accurately measure Quarterback performance including: *Games Played, Sacks Allowed,* and *Arrest Record*.

My rationale behind this adjusted QBR is due to three things. First, QBR does not account for a quarterback who got injured during the season and missed games, or has possibly faced a suspension or playing time adjustment. Second, *Sacks Allowed* is a very important statistic in football performance evaluations because a Quarterback who holds on to the ball too long and gives up a sack results in a negative play, compared to if the Quarterback had the ability to throw the ball out of bounds or intentionally throw an incomplete pass to prevent a loss of yardage. And third, similar to what was previously

stated, being arrested can drastically alter a QBR rating due to possible suspensions, missed games, or can greatly affect the performance of an NFL Quarterback trying to stay focused in a game. QBR is also based on data from statistics dating back to the 1960's and 1970's, and I believe the NFL has experienced and continues to experience a constantly changing style of play. Also, in the current QBR measurement system, by looking at completion percentage after looking at yards per attempt, you are accounting for completions twice. The adjusted QBR regression model that I use to evaluate Quarterback performance is defined as:

$$QBR_{ACADJ} = \beta_0 QBR_{NFL} + \beta_1 GP_{QB} - \beta_2 SA_{QB} - \beta_3 Arrested_{QB}$$

where QBR_{ACADJ} is QBR including my additions to the regression model. QBR_{NFL} represents the QBR the National Football League currently uses, GP_{QB} defining the number of games played by a Quarterback during the season, and SA_{QB} representing the total number of times a Quarterback was sacked during a season. Lastly, included in all of my regression models, the last variable in every regression I use, Arrested, serves as the dummy variable that determines whether or not the player has been arrested.

Unlike the regression models I will use for the other offensive positions, I have not included the player rank variable in my Quarterback regression model due to its subjectivity and the fact that it fails to take into consideration the additional variables I have added in for Quarterback performance model. For all of the independent variables, I predict that increases in Quarterback Rating and Games Played positively correlate with game performance. I also predict Sacks and Arrests negatively correlates with performance and Quarterback Rating. Being sacked as a quarterback drastically affects

performance metrics because of a Quarterback's inability to make quick decisions, throw the ball out of bounds to move on to another down, or his inability to sufficiently read defenses in the National Football League.

Running Backs:

For the Running Back position, my analysis and variables are much simpler and have much less subjectivity when evaluating performance and the effect being arrested has on player performance. The model I use to evaluate Running Back performance is defined as:

$$Rk_{RB} = \beta_0 Att/G_{RB} + \beta_1 Yds/G_{RB} + \beta_2 TD_{RB} - \beta_3 Fum_{RB} + \beta_4 GP_{RB} - \beta_5 Arrested_{RB}$$

where Rk_{RB} represents the end of year position rank of the Running Back position. Att/G_{RB} defines the number of attempts a Running Back has per game, while Yds/G_{RB} represents the number of yards per game a Running Back has. TD_{RB} describes the number of touchdowns a Running Back has in a single season while Fum_{RB} includes the total number of fumbles a Running Back gives up in a single season. Lastly, GP_{RB} identifies the number of games a Running Back has played in during a given season.

I only used end of season outcome variables for touchdowns, fumbles, and games played. This is because these metrics are better measurements of in-game performance and give less leeway for large differences and discrepancies in my Running Back performance model I will use. For example, a Running Back may have four carries and four touchdowns in a single game. This can be attributable to only having this Running Back run the ball when the offense is in the red-zone (within the opponent's 20 yard

line). There are also situations in which this same Running Back can have a negative rushing yard amount in a game. For example, when Jerome Bettis (ex-Steelers RB) played in his last Super Bowl, he at various points in the game had more than one touchdown, but also had negative net rushing yards because he was tackled multiple times behind the line of scrimmage.

I believe looking at attempts and yards per game eliminates this shortcoming and more accurately depicts Running Back performance. Also, by not looking at total yardage figures for Running Backs, it eliminates the aberrations some Running Backs have when they have an incredible rushing game one week, and perform poorly the following week. It is also important to note that the addition of games played allows for further and more concise analysis when looking at performance and measuring whether or not end of season outcomes correlate with the amount of games the athlete has actually played in (taking into account the possibility of suspensions, injury, etc.).

Among all of the independent variables, I predict that increases in Attempts per Game, Yards per Game, Touchdowns, and Games Played positively correlate with higher Running Back rankings. However, I predict that increases in Fumbles and Arrests negatively correlates with game performance due to the effect turnovers have on the game, as well as any possibility of scoring points for the offense on that drive.

Wide Receivers:

For the Wide Receiver position, similar to the Running Back position, my analysis and variables are much easier to analyze and are less likely to be subjective

when I evaluate performance and the effect being arrested has on game performance. The model I use to evaluate Wide Receiver game performance is defined as:

$$Rk_{WR} = \beta_0 Rec/G_{WR} + \beta_1 Yds/G_{WR} + \beta_2 TD_{WR} - \beta_3 Fum_{WR} + \beta_4 GP_{WR} - \beta_5 Arrested_{WR}$$

where Rk_{WR} represents the end of year position rank of the Wide Receiver position. Rec/G_{WR} defines the number of receptions a Wide Receiver has per game, while Yds/G_{WR} represents the number of yards per game a Wide Receiver has. TD_{WR} describes the total number of touchdowns a Wide Receiver has in a single season while Fum_{WR} includes the total number of fumbles a Wide Receiver gives up in a single season. Lastly, GP_{WR} identifies the number of games the Wide Receiver has played in in a given season.

For the Wide Receiver position, similar to that of Running Backs, the only end of season variables used in my regression model were touchdowns, fumbles, and games played. While it may not be as beneficial to look at these metrics alone, at the end of the day society continues using these figures as a gauge for measuring Running Back and Wide Receiver performance.

Among the independent variables for the Wide Receiver position, I predict Receptions per Game, Yards per Game, Touchdowns, and Games Played positively correlate with Wide Receiver Rankings. I also predict that Fumbles and Arrests negatively correlate with player rankings, which is similar to what was previously stated in the previous player section.

Defensive Positions:

Unlike the offensive positions, I will use different performance evaluation metrics because while there are numerous ways to independently evaluate offensive players, it is much harder to do on the defensive side of the ball. For example, it would be irrational to compare total interceptions of a Defensive Back to the total interceptions of a Defensive Lineman or Nose-Guard simply because of positional and situational differences in a defensive scheme, whether it is a 3-4 scheme, 4-3 scheme, Tampa 2 scheme, etc. So, I will use WPA, +WPA, EPA, +EPA, and EPA/G, and TF metrics to more accurately evaluate in-game performance and to better compare defensive players to each other with and without the presence of an arrest history.

In all of my defensive player performance evaluations, I use the Win Probability Added (WPA) and the Expected Points Added (EPA) variables. WPA represents the difference between a team's Win Probability (WP) at the beginning of a play and the WP by the end of the play. This variable measures a play's impact on the outcome of a game. A player's WPA measures the play's impact on the game's overall outcome and is the sum of the WPA of the plays in which the player was directly involved (catch, tackle, completion, etc.). Defensive players are credited for WPA for events such as making a tackle, sacking the Quarterback, causing a fumble, etc.

+WPA is limited to only the net positive values for his team. It is a measure of a defender's impact on the outcome of fames in terms of play-making ability. Only positive plays are included because solid individual plays can still result in a net loss in WPA. For example, a touchdown saving tackle twenty yards past the line of scrimmage would result

in a negative value even though the defensive player denied the offensive player six points. This metric usually correlates well with WPA. EPA represents the difference between expected points (EP) at the start of a play and the EP by the end of the play. This measurement relates to a play's impact on the final score of the game. One way to measure expected impact per play is: $EPA = EP_1 - EP_0$.

+EPA is attributed to a defensive player in which his plays are net positive values for his team. Similar to +WPA, it is a measure of a defender's impact on the game score in terms of play-making ability and that only positive plays are considered because some defensive plays can result in net losses in EPA (same as above). Overall, individual EPA usually correlates well with +EPA. Another variable in my regression model is EPA/G, which measures EPA on a per-game basis. Similar to the offensive regression model, I included Games Played and Arrested as additional independent variables. Throughout all of the defensive regression models, I predict that WPA, EPA, EPA/G, Arrested, as well as my added-in variables all positively correlate with higher player rankings.

TF, which stands for Tackle Factor, is the ratio of a player's proportion of his team's tackles to what is expected at his position. For example, "a middle linebacker in a 4-3 defensive scheme typically make 11.9% of their team's tackles, so a middle linebacker who made 12.6% of his team's tackles would have a TF of 1.06" (Glossary – Advanced Football Analytics). The TF is adjusted for a full season, not including playoffs, which would be irrational to include since a majority of players in the rankings do not end up going to playoffs.

Defensive Linemen:

For all of the following defensive positions, my regression models are much less subjective in terms of evaluating player performance in the NFL. The model I use to evaluate Defensive Linemen game performance and the effect an arrest record has on game performance is defined as:

$$Rk_{DL} = \beta_0 WPA_{DL} + \beta_1 EPA_{DL} + \beta_2 EPA/G_{DL} + \beta_3 TF_{DL+} \beta_4 GP_{DL} + \beta_5 Arrested_{DL}$$

A new additional variable I chose to include in the Defensive Linemen regression model is GP_{DL}, which represents the number of Games Played by a Defensive Lineman in a season. I predict that increases in all of the independent variables in this regression equation positively correlates with player rank and higher performance.

Linebackers:

The model I use to evaluate Linebacker game performance is defined as:

$$Rk_{LB} = \beta_0 WPA_{LB} + \beta_1 EPA_{LB} + \beta_2 EPA/G_{LB} + \beta_3 TF_{LB+} \beta_4 INT_{LB+} \beta_5 GP_{LB} + \beta_6 Arrested_{LB}$$

A new additional variable I chose to include in the Linebacker regression model is INT_{LB}, which represents the number of interceptions made by a linebacker. I predict interceptions by a linebacker positively correlate with player rank because of the increased pressure it puts on a Quarterback to make a good through, and the increased pressure it puts on the Receiver to create more space and separation from the linebackers and defensive secondary in order to make a catch in the open field after the ball is snapped.

Defensive Backs:

The model I use to evaluate Defensive Back game performance is defined as:

$$Rk_{DB} = \beta_0 WPA_{DB} + \beta_1 EPA_{DB} + \beta_2 EPA/G_{DB} + \beta_3 TF_{DB} + \beta_4 PD_{DB} + \beta_5 INT_{DB} + \beta_6 GP_{DB} + \beta_7 Arrested_{DB}$$

A new additional variable I chose to include in the Defensive Backs regression model is PD_{DB}, which represents passes deflected by a Defensive Back. I predict that PD_{DB} positively correlates with player rank because of the nature of the Defensive Back position and the added pressure pass deflections put on the Quarterback and Wide Receiver positions.

V. Data

For my individual positional data, I have compiled a data set of the top thirty ranked players for each individual position, for the years 2000-2014. I pulled offensive statistics and rankings from *NFL.com*, but extracted defensive statistics and rankings from a different rating website, *AdvancedFootballAnalytics.com*. My data sets only include regular season performance statistics because a large amount of the players in the top thirty lists statistics do not end up making playoffs, so it is more beneficial to not include playoff statistics.

My data includes statistics for Quarterbacks, Running Backs, Wide Receivers, Defensive Linemen, Linebackers, and Defensive Backs. For the Defensive Linemen position group, I consolidated all positions across the Defensive Line, which includes Defensive Ends, Nose Guards, and Defensive Tackles. I used the same method for the Defensive Backs position group, which includes Cornerbacks and Safeties. I used offensive statistics and information from the NFL's primary website because the NFL constantly updates the statistics of current players, while also providing the most reliable and complete set of historical statistical data. I used statistical information and data from the *Advanced Football Analytics website* because it provided, in my opinion, the most accurate method of measuring a player's game performance on a play-by-play basis rather than simply just using end of season performance results.

For my arrest data, I manipulated and extracted criminal records and offenses from the *NFL Arrest Database* in the *San Diego Tribune* website. I organized my results and came to the conclusion that I would include any offense or criminal record that was worse than a simple speeding ticket.

While extracting data from three different sources can be seen as a cause for concern and higher chances of disparity, I find my methods of measurement to be the most accurate and reliable when looking at game performance of players individually by position. I believe any differences or errors in my data sets are immaterial and do not deem my analysis and results illegitimate.

Definitions and explanations of the variables I use are located in Tables 1 and 2 in the appendix. Summary statistics, as well as correlation matrices, are located in Tables 3-

11. Tables 3 and 4 show summary statistics of all of the offensive and defensive variables I used in my regression models, including the number of observations, mean, standards deviation, as well as minimum and maximum values for each component of performance measurements. It is important to note that the largest standard deviation amount was 11.49, which was found in the Quarterback position category. In all, I believe all of the values within the summary statistics tables are reasonable and show little major disparities when looking at both offensive and defensive positions.

Tables 5 and 6 contain correlation matrices for the Quarterback position, and contain correlation and P-value statistics describing results and correlation significance. The number of observations is also noted on each table respectively. Tables 7 and 8 show correlation matrices for both the Running Back and Wide Receiver positions respectively, and contains correlation and P-value statistics describing results and correlation significance. Tables 9-11 show correlation matrices for all defensive positions: Defensive Linemen, Linebackers, and Defensive Backs respectively. While most of the positions had a similar total amount of observations, it is important to note that both the Defensive Linemen and Defensive Backs had the largest amount with a total of 900 observations each compared to the other positions. This could possibly lead to more accurate and statistically significant results overall with lower chances of outliers and components that could affect my analysis. I must acknowledge the fact that high correlations within all of my position groups could have a large impact on my regression results, but still give opportunities to make reasonably accurate assumptions and generalizations.

Tables 12-18 give regression statistics and results for each position individually. There were very little surprises or largely unexpected results at the offensive position, but it is critical to look at the defensive regression results knowing the rationale behind the negative values, which I have mentioned earlier in this study.

Tables 19-24 show league-wide performance metric averages for non-arrested and arrested athletes in each position individually for the period 2000-2014. Each component used in my regression model of player performance evaluation is included in these tables. The last row in each of these tables should be the main area of focus when comparing averages of arrested and non-arrested players in the NFL during the entire 15 year period.

Lastly, Figure 1 shows the most common criminal offenses players are arrested or charged with during the years 2000-2014, which leaves much room open for discussion in terms of how players in the NFL with a criminal arrest history carry their violent and aggressive behaviors off of the field.

VI. Results

Offensively, my results showed that being arrested had neither a positive nor negative impact on player performance in the NFL in the years 2000-2014. While my hypothesis was partly correct in the sense that an arrest record does not lead to better performance for offensive players, the results show that there are no statistically significant negative effects on offensive player game performance.

Defensively, my hypothesis turned out to hold true in only one position, the defensive line. While I believe there are varying amounts of aggression and violence among all defensive positions, the lack of consistency in my results could be a result of the constant violent interactions between offensive and Defensive Linemen play after play. In terms of the total number of plays a defensive player makes contact with an offensive player, Defensive Linemen tend to make violent contact more frequently than linebackers and Defensive Backs, who tend to drop into coverage more often.

The following results were probably directly affected by the small overall number of players that have been arrested when comparing it to the NFL player population as a whole. Another possible explanation and weakness in my model could be including repeat offenders in my overall data set and not adjusting the total number of individual players with an arrest history. If I were to further analyze the arrest database and recreate certain elements of my models, there would end up being a higher total percentage of athletes who have been arrested in the past. These surprising results parallel nicely with the common misconceptions society has on the NFL player population, claiming arrest rates are higher for players than for the general public, which I discussed earlier in my literature review. Lastly, these results could be a result of poorly kept arrest records or charges that have been dropped that did not result in direct punishment, including jail or prison time, fines, community service, etc. It is also important to note that every regression model and correlation matrix containing the *Rank* variable are listed as negative values, but in reality positively correlate at different significance levels. Again, this is due to a rank of 1 being better than a rank of 30, even though the sum and physical number is smaller.

Quarterbacks

Table 5 shows the correlation between various individual Quarterback performance measurements (including being arrested) and NFL QBR components calculated by the NFL. Unfortunately, while there is a small positive correlation between being arrested and QBR, it is statistically insignificant given a P-value of 0.546. While my additional variables I chose to include in my model proved to be consistent with my initial correlation predictions, the results showed they were statistically insignificant in terms of their effects on the independent QBR variable. However, I still believe each of the components I discussed in my model greatly determine how successful a Quarterback is in the National Football League on a game-by-game basis. Overall, I found that having an arrest record as a Quarterback does not have a significant positive or negative impact on game performance.

In terms of comparing arrested athletes to non-arrested athletes, there were very small differences in average QBR. In the 15 year period from 2000-2014, the average QBR for arrested Quarterbacks was 85.35 as opposed to a QBR rating of 84.60 of Quarterbacks with no criminal background during the years 2000-2014. So, there were no significant QBR disparities among arrested and non-arrested Quarterbacks in the NFL.

Running Backs:

My results shown in Table 7 contain many negative values. These are attributable to the idea that a higher ranking is actually represented by a lower number in my data set. For example, a ranking of 5 is better than a ranking of 30, even though it is counterintuitive in terms of looking at raw regression and correlation data at first glance.

I found that every variable prediction I made in measuring performance (with the exception of GP) proved my initial predictions correct when looking strictly at correlation. But, after looking at my regression results, GP surprisingly did not have a statistically significant impact on player rank, which could be a result of a Running Back having a few spectacular games that leads to higher statistical numbers that hide disparities in performance statistics. I also found that being arrested had a small positive correlation with player rank, yet still remained statistically insignificant. There was also a weak positive correlation between being arrested and fumbles/Attempts per game. This makes intuitive sense because the more fumbles you lose, the less carries your coach will likely give you, especially after poor ball security. Another expected result was the higher value of GP, the more attempts a Running Back will get per game, which in turn likely lead to a higher chance of higher fumble totals. However, having an arrest record has no significant impact on player rank or game performance for Running Backs.

Less surprisingly however, is that on average arrested Running Backs have higher league averages than non-arrested Running Backs in 3 important categories: yards per game, total yards, and touchdowns (Tables 14-15). However, these results are small and do not constitute themselves as material or statistically significant differences.

Wide Receivers:

Shown in Table 8, there were positive correlations between Touchdowns, yards per game, receptions per game, and player rank. These align correctly with my previous regression model predictions, but show minor statistical significance. Being arrested and player rank have a weak positive correlation, but is statistically insignificant as well.

Unlike the other offensive positions in my analysis, total number of games played and receptions per game are strongly correlated with player rank and are statistically significant with a P-value of 0.00 for both, and t-scores of -17.85 and -33.29 respectively. Especially since the number of run plays is usually less than the total amount of pass plays, Wide Receivers that can maintain high reception averages are extremely valuable to a team. In addition, there are weak positive correlations between fumbles and games played variables on overall player rank, but yield no statistical significance. Similar to my previous offensive positional results, having an arrest record has no significant impact on player rank or game performance with the Wide Receiver position group.

When looking at league-wide averages, results show that non-arrested athletes and arrested athletes do not have significant performance disparities (Table 14). The largest difference between non-arrested athletes and arrested athletes comes from the average yards per season component. Wide Receivers that have been arrested outperformed non-arrested Wide Receivers by 5% by an average of roughly 45 yards. However, this difference is extremely small when looking at its impact on performance throughout an entire season since that is nearly a difference of 4 yards per game throughout a 16 game regular season.

Defensive Linemen

Shown in table 9, WPA/EPA/EPAG all have strong positive correlations with player rank. Also, every independent variable within my regression model had statistically significant effects on player rank. In alignment with my initial prediction in my hypothesis, being arrested had a positive correlation with game performance (Table

9). Most importantly, my regression data showed statistical significance between a Defensive Lineman being arrested and its positive effect on game performance, given a p-value of 0.049 and a t-score of -1.97. My results showed that being arrested as a Defensive Linemen leads to higher player position rankings at the 95% confidence level. More specifically, being arrested as a Defensive Lineman can lead to a higher player rank by up to .87 points.

One important element of my regression data to point out is the low R-squared value of 0.62 in comparison to my other positional regression models. This R-squared value means that only 0.62% of the variations in my model can be accounted for when looking at their effects on my dependent variables at a 95% confidence level. I believe that while it is in fact lower than the other regression R-Squared values by an average of roughly .15 points, it still partially validates my original prediction on player performance. This low R-squared could be a result of my decision to use models and calculations created by *Advanced Football Analytics* rather than using end of season statistics and averages like I did for my selected offensive positions. Many times, Defensive Linemen are judged more harshly on their end of year statistics, rather than on their true impact on a game on a play-by-play basis, which is why I put less emphasis on those factors. For example, many premier Defensive Linemen in the NFL are double or even sometimes triple teamed by offensive players, which can drastically affect and limit the performance metrics used by *Advanced Football Analytics* when looking at game performance only on plays a player was directly involved in. Also, a large talent gap exists between the 30th best Defensive Linemen and the highest ranked Defensive

Linemen in terms of the independent variables I used in my regression model, which could explain why my results were not as significant and blatant as I predicted.

In terms of league-wide averages, arrested Defensive Linemen have better performance averages than non-arrested Defensive Linemen in every performance category used in my regression model. These categories include WPA, EPA, EPA/G, and TF. While there are differences, the disparities are very small and do not represent material differences among Defensive Linemen throughout the National Football League.

Linebackers:

Table 10 shows positive correlations with every dependent variable and player rank. There were strong positive correlations between WPA, EPA, EPA/G on Rank, while there were weaker positive correlations between TF, INT, GP and Arrested on Rank. My regression results showed no statistical significance in terms of being arrested and its impact on player rank given a 95% confidence level. My results show that being arrested does not have a significant effect on player performance or rank for the Linebacker position.

When looking at league-wide averages for Linebackers, arrested players have better averages in a majority of the categories across the league than non-arrested players, including WPA, EPA, EPA/G, and INT. The biggest difference in average can be seen in the EPA category, where arrested Linebackers' EPA is roughly 7.4% higher than Linebackers who have not been arrested. However these differences are minor and do not represent significant disparities among NFL Linebacker performance.

Defensive Backs:

Table 11 also shows the positive correlations between every independent variable and overall player rank used in my performance evaluation metrics. After running the regression, I found that only two of the variables (WPA and TF) had statistically significant impacts on overall player rank, given P-values of 0.00 and 0.02 respectively. This proves to be consistent with my initial predictions in that Win Probability Added and Tackle Factor take various elements into account when determining player rank. While these same variables did not help the results for Defensive Linemen, I believe using them with the other defensive positions provides more accurate results and logical explanations for its values.

My regression results proved elements of my hypothesis statement to be incorrect when looking at the effect being arrested had on NFL Defensive Back performance. My results show that being arrested has little to no statistically significant effect on player rank, which parallels society's stereotype and perception of NFL athletes as well.

VII. Conclusion

Society's widespread perception and stereotyping of NFL players as thugs and criminals is not as accurate as one may think. This study showed that while there is an increased necessity in the NFL to be aggressive and violent within the confines of the football field, it does not necessarily carry over to off the field arrests stemming from an

individual player's aggression and violence. While my study may be limited and tempered due to a lack of desired results and certain personal judgments, the results failed to show statistical significance or validity to my initial predictions supporting the idea that the NFL player population primarily consists of criminals.

When comparing the NFL arrest population to the general population in the United States, it is clear that the NFL arrest rate is lower than the arrest rate of the general population by roughly 30%. I am a firm believer that media outlets greatly contribute to ignorant and false stereotyping of NFL players, which is something I too have been guilty of in the past. The figures discussed in my study are far lower than what society tends to believe at first glance, especially with the attention the media puts on high-profile and high-caliber players such as Ben Roethlisberger, Ray Rice, Michael Vick, and Aaron Hernandez.

More specifically, on the offensive side of the ball, Table 3 shows that within the pool of athletes I chose to analyze in the years 2000-2014, only 11% of Quarterbacks, 28% of Running Backs, and 26% of Wide Receivers in the NFL have a criminal arrest history. Defensively, my results show that within my specific data set regarding defensive athletes playing in the NFL between the years 2000-2014, 21% of Defensive Linemen, 20% of Linebackers, and 16% of Defensive Backs has a criminal arrest history (Table 4).

In conclusion, I found that having an arrest record as an offensive player has no positive or negative effect on game performance or rank. Additionally, my results proved my hypothesis and initial predictions to be incorrect. Defensively, having an arrest record only provides statistical significance at the Defensive Linemen position at a 95% level.

More specifically, being arrested as a Defensive Lineman has a positive effect on player rank, while having no effect on either the Linebacker or Defensive Back positions.

While the NFL is constantly trying to improve its tainted image and misconceptions by the general public, hopefully this study will shed some light and provide some solid evidence clarifying these stereotypes and misconceptions. I acknowledge that I may have overlooked certain types of statistics and data, such as differentiating types of crime or only including certain positions in my models, but I believe this paper is a good starting point for further research and analysis if this issue continues to be a big problem for the NFL, or even the professional sporting world as a whole.

Appendix

Table 1

Definitions of Offensive Variables

Variable	Definition
Rate	Quarterback Rating
GamesPlayed	Number of games an NFL player has played in during a single season
Sck	Number of times a Quarterback was sacked in a single season
TDINT	Ratio of Touchdowns Thrown to Interceptions Thrown in a single season
PCT	Quarterback Completion Percentage, equals total number of passing completions divided by total number of passing attempts in a single season
YPA	Yards per Pass Attempt, equals a Quarterback's total passing yards divided by total passing attempts in a single season
TDPerct	Touchdown Percentage, equals number of a Quarterback's total touchdowns divided by total passing attempts in a single season
INTPerct	Interception Percentage, equals number of interceptions thrown by a Quarterback divided by passing attempts in a single season
Arrested	A dummy variable equal to 0 if a player has not been arrested and equal to 1 if the player has been arrested
Rank	Player Rank on a scale of 1-30, 1 being the best, 30 being the worst
AttG	Number of Rushing Attempts per Game by a Running Back
YdsG	Number of Total Yards per Game by either a Running Back or Wide Receiver
TD	Number of total touchdowns in a season by any offensive position
FUM	Number of fumbles lost in a season by a Running Back or Wide Receiver
Rec/G	Number of receptions per game by a Wide Receiver

Table 2

Definitions of Defensive Variables

Variable	Definition
Rank	Player Rank on a scale of 1-30, 1 being the best, 30 being the worst
WPA	Win Probability Added of a defensive player in the NFL
EPA	Expected Points Added of a defensive player in the NFL
EPAG	Expected Points Added per Game of a defensive player in the NFL
TF	Tackle Factor of a defensive player in the NFL
GamesPlayed	Number of games an NFL player has played in during a single season
Arrested	A dummy variable equal to 0 if a player has not been arrested and equal to 1 if the player has been arrested
PD	Number of pass deflections in a single season
INT	Number of interceptions in a single season

Table 3

Summary Statistics of Independent Variables – Offensive Positions

*This data is compiled from the 2000-2014 NFL seasons for all of the offensive positions I chose to analyze. Quarterbacks, Running Backs, and Wide Receivers are all represented in this table

Variable	Observations	Mean	Std. Dev.	Min	Max
Quarterbacks:					
Rate	450	84.68	11.49	56.20	122.50
GamesPlayed	450	14.24	2.34	7.00	16.00
Sck	450	29.25	10.54	6.00	76.00
TDINT	450	1.80	1.37	.44	13.50
PCT	450	60.90	4.10	50.00	71.20
YPA	450	7.08	.75	5.08	9.88
TDPerct	450	.04	.01	.02	.01
Arrested	450	.11	.31	0	1
Running Backs:					
Rank	480	15.50	8.66	1	30
AttG	480	17.29	3.27	9.20	26.00
YdsG	480	74.52	16.00	44.90	131.10
TD	480	6.96	4.35	0.00	28
FUM	480	2.56	1.87	0.00	11
GamesPlayed	480	13.55	3.43	1	16.00
Arrested	480	.28	.45	0	1
Wide Receivers:					
Rank	450	15.20	8.59	1	30
Rec/G	450	5.18	.94	3.56	8.94
YdsG	450	70.46	14.59	37.50	122.80
TD	450	7.08	3.31	0	23
FUM	450	.94	.93	0	5
GamesPlayed	450	15.54	.91	10	16.02
Arrested	450	.26	.44	0	1

Table 4

Summary Statistics of Independent Variables – Defensive Positions

*This data is compiled from the 2000-2014 NFL seasons for all of the defensive positions I chose to analyze. Defensive Linemen, Linebackers, and Defensive Backs are all represented in this table

Variable	Observations	Mean	Std. Dev.	Min	Max
Defensive Linemen:					
Rank	900	15.50	8.66	1	30
WPA	900	1.08	.36	.33	3.32
EPA	900	35.24	11.89	11.50	122
EPAG	900	2.398	.76	.88	7.63
TF	900	.85	.19	.34	1.50
GamesPlayed	900	14.76	1.51	8	30
Arrested	900	.21	.41	0	1
Linebackers:					
Rank	450	15.50	8.67	1	30
WPA	450	1.66	.32	1.10	2.77
EPA	450	52.54	10.87	26	91
EPAG	450	3.40	.67	1.63	5.83
TF	450	1.11	.28	.36	1.73
INT	450	1.40	1.34	0	6
GamesPlayed	450	15.48	1.38	9	29
Arrested	450	.20	.40	0	1
Defensive Backs:					
Rank	900	15.50	8.66	1	30
WPA	900	1.19	.29	.74	2.68
EPA	900	37.54	10.12	7.50	91.4
EPAG	900	2.49	.66	.75	5.71
TF	900	.88	.21	.35	1.51
PD	900	11.08	5.12	1	31
INT	900	3.14	1.96	0	10
GamesPlayed	900	15.10	1.39	7	18
Arrested	900	.16	.37	0	1

Table 5

Quarterbacks Correlation Matrix

	Rate	GamesPlayed	Sck	Arrested	TDINT	Pct	YPA	TDPerct	INTPerct
Rate	1.00								
GamesPlayed	0.22	1.00							
	0.00								
Sck	-0.07	0.33	1.00						
	0.13	0.00							
Arrested	0.02	-0.07	-0.10	1.00					
	0.67	0.14	0.04						
TDINT	0.73	0.07	-0.09	-0.02	1.00				
	0.00	0.15	0.06	0.39					
Pct	0.81	0.17	-0.06	0.02	0.41	1.00			
	0.00	0.00	0.24	0.61	0.00				
YPA	0.84	0.09	-0.08	0.05	0.51	0.66	1.00		
	0.00	0.07	0.11	0.31	0.00	0.00			
TDPerct	0.84	0.18	-0.13	0.00	0.63	0.57	0.72	1.00	
	0.00	0.00	0.00	0.93	0.00	0.00	0.00		
INTPerct	-0.65	-0.21	-0.21	0.00	-0.67	-0.36	-0.31	-0.31	1.00
	0.00	0.00	0.35	0.93	0.00	0.00	0.00	0.00	

*This data shows the correlations between all of my dependent variables used in my regression model and the independent variable, Rate, during the years 2000-2014 for the Quarterback Position. (Offensive Definitions can be found in Table 1)

*P-Value Significance is listed directly below the correlation value

*This table includes all components of NFL calculated QBR, as well as additional components I decided to include

*Number of Observations = 450

Table 6

QBR Individual Component Correlation Matrix

	Rate	Arrested	Pct	YPA	TDPerct	INTPerct
Rate	1.00					
Arrested	0.02	1.00				
	0.67					
Pct	0.81	0.23	1.00			
	0.00	0.61				
YPA	0.84	0.05	0.66	1.00		
	0.00	0.30	0.00			
TDPerct	0.84	0.00	0.57	0.72	1.00	
	0.00	0.93	0.00	0.00		
INTPct	-0.65	0.00	-0.36	-0.31	-0.31	1.00
	0.00	-0.93	0.00	0.00	0.00	0.00

*This data shows the correlations between all of my dependent variables used in my regression model and the independent variable, Rate, during the years 2000-2014 for the Quarterback Position. (Offensive Definitions can be found in Table 1)

*P-Value Significance is listed directly below the correlation value

*This table includes only the components QBR used by the NFL

*Number of Observations = 450

Table 7

Running Backs Correlation Matrix

	Rank	AttG	YdsG	TD	FUM	GamesPlayed	Arrested
Rank	1.00						
AttG	-0.73	1.00					
	0.00						
YdsG	-0.92	0.80	1.00				
	0.00	0.00					
TD	-0.47	0.43	0.53	1.00			
	0.00	0.00	0.00				
FUM	-0.24	0.36	0.29	0.23	1.00		
	0.00	0.00	0.00	0.00			
GamesPlayed	-0.21	0.21	0.22	0.52	0.41	1.00	
	0.00	0.00	0.00	0.00	0.00		
Arrested	-0.04	0.10	0.06	0.07	0.51	0.00	1.00
	0.42	0.02	0.19	0.13	0.00	0.97	

*This data shows the correlations between all of my dependent variables used in my regression model and the independent variable, Rank, during the years 2000-2014 for the Running Back Position. (Offensive Definitions can be found in Table 1)

*P-Value Significance is listed directly below the correlation value

*Number of Observations = 480

Table 8

Wide Receivers Correlation Matrix

	Rank	RecG	YdsG	TD	FUM	GamesPlayed	Arrested
Rank	1.00						
RecG	-0.87	1.00					
	0.00						
YdsG	-0.68	0.73	1.00				
	0.00	0.00					
TD	-0.36	0.32	0.54	1.00			
	0.00	0.00	0.00				
FUM	-0.15	0.16	0.16	0.06	1.00		
	0.00	0.00	0.00	0.19			
GamesPlayed	-0.20	-0.15	-0.03	0.10	-0.03	1.00	
	0.00	0.00	0.56	0.03	0.56		
Arrested	-0.03	0.00	0.07	0.85	0.05	0.04	1.00
	0.54	1.00	0.12	0.07	0.32	0.39	

*This data shows the correlations between all of my dependent variables used in my regression model and the independent variable, Rank, during the years for the Wide Receiver Position. (Offensive Definitions can be found in Table 1)

*P-Value Significance is listed directly below the correlation value

*Number of Observations = 450

Table 9

Defensive Linemen Correlation Matrix

	Rank	WPA	EPA	EPAG	TF	GamesPlayed	Arrested
Rank	1.00						
WPA	-0.76	1.00					
	0.00						
EPA	-0.59	0.83	1.00				
	0.00	0.00					
EPAG	-0.57	0.80	0.95	1.00			
	0.00	0.00	0.00				
TF	-0.32	0.24	0.27	0.27	1.00		
	0.00	0.00	0.00	0.00			
GamesPlayed	-0.17	0.20	0.29	-0.01	0.04	1.00	
	0.00	0.00	0.00	0.75	0.28		
Arrested	-0.05	0.00	0.00	0.02	0.02	-0.04	1.00
	0.16	0.82	0.85	0.07	0.61	0.28	

*This data shows the correlations between all of my dependent variables used in my regression model and the independent variable, Rank, during the years 2000-2014 for the Defensive Lineman Position. (Defensive Definitions can be found in Table 2)

*P-Value Significance is listed directly below the correlation value

*Number of Observations = 900

Table 10

Linebacker Correlation Matrix

	Rank	WPA	EPA	EPAG	TF	Int	GamesPlayed	Arrested
Rank	1.00							
WPA	-0.88	1.00						
	0.00							
EPA	-0.54	0.64	1.00					
	0.00	0.00						
EPAG	-0.50	0.59	0.89	1.00				
	0.00	0.00	0.00					
TF	-0.22	0.22	0.25	0.25	1.00			
	0.00	0.00	0.00	0.00				
Int	-0.22	0.27	0.39	0.39	0.18	1.00		
	0.00	0.00	0.00	0.00	0.00			
GamesPlayed	-0.15	0.18	0.33	-0.12	0.01	0.03	1.00	
	0.00	0.00	0.00	0.01	0.82	0.48	0.00	
Arrested	-0.05	0.05	0.14	0.13	-0.10	-0.01	0.04	1.00
	0.29	0.28	0.00	0.00	0.04	0.89	0.44	

*This data shows the correlations between all of my dependent variables used in my regression model and the independent variable, Rank, during the years 2000-2014 NFL for the Linebacker Position. (Defensive Definitions can be found in Table 2)

*P-Value Significance is listed directly below the correlation value

*Number of Observations = 450

Table 11

Defensive Back Correlation Matrix

	Rank	WPA	EPA	EPAG	TF	PD	Int	GamesPlayed	Arrested
Rank	1.00								
WPA	-0.86	1.00							
	0.00								
EPA	-0.61	0.68	1.00						
	0.00	0.00							
EPAG	-0.54	0.62	0.92	1.00					
	0.00	0.00	0.00						
TF	-0.15	0.10	0.19	0.17	1.00				
	0.00	0.00	0.00	0.00					
PD	-0.26	0.33	0.45	0.39	-0.30	1.00			
	0.00	0.00	0.00	0.00	0.00				
Int	-0.32	0.37	0.54	0.53	-0.21	0.52	1.00		
	0.00	0.00	0.00	0.00	0.00	0.00			
GamesPlayed	-0.18	0.16	0.25	-0.13	0.09	0.17	0.05	1.00	
	0.00	0.28	0.00	0.00	0.01	0.00	0.12		
Arrested	0.07	-0.06	0.00	0.02	-0.04	0.05	0.02	-0.04	1.00
	0.03	0.10	0.97	0.64	0.27	0.14	0.59	0.24	

*This data shows the correlations between all of my dependent variables used in my regression model and the independent variable, Rank, during the years 2000-2014 for the Defensive Backs position. (Defensive Definitions can be found in Table 2)

*P-Value Significance is listed directly below the correlation value

*Number of Observations = 900

Table 12

Quarterback Regression Data – All Components

$R^2 = 1.000$

Adjusted $R^2 = 1.000$

Variable	Coefficient	T-Score	P-Value
GamesPlayed	0.00063	0.71	0.478
Sck	-0.00006	-0.32	0.749
Arrested	0.00362	0.60	0.546
TDINT	-0.00114	-0.49	0.626
Pct	0.83371	1347.84	0.000
YPA	4.16428	1057.96	0.000
TDPerct	333.35070	1312.05	0.000
INTPerct	-416.70570	-1493.60	0.000
Constant	2.07318	56.92	0.000

**This data contains results from my regression model for the Quarterback Position during the years 2000-2014, the independent variable being Rate. (Offensive Definitions can be found in Table 1)*

**Number of Observations = 450*

**Dependent Variable Regression effects on Rate (independent variable) at a 95% confidence level*

**R^2 values of 1.000 at first glance may seem unusual, but can be attributed to variable selection. Components of QBR should lead to an R^2 value of 1.000 since they are what make up the calculation of QBR. The other variables, which include GamesPlayed, Sck, Arrested, and TDINT will have no regression effect on Rate since the NFL does not account for these factors when calculating its QBR value.*

Table 13

Quarterback Regression Data – Individual QBR Components

$R^2 = 1.000$

Adjusted $R^2 = 1.000$

Variable	Coefficient	T-Score	P-Value
Arrested	0.00362	0.61	0.541
Pct	0.83378	1362.66	0.000
YPA	4.16376	1071.47	0.000
TDPerct	333.32550	1550.95	0.000
INTPerct	-416.63620	-2035.95	0.000
Constant	2.07643	61.93	0.000

**This data contains results from my regression model for the Quarterback Position during the years 2000-2014, the independent variable being Rate. (Offensive Definitions can be found in Table 1)*

**Only includes QBR components used by the NFL*

**Number of Observations = 450*

**Dependent Variable Effects on Rate (independent variable) at a 95% confidence level*

**R^2 values of 1.000 at first glance may seem unusual, but can be attributed to variable selection. Components of QBR should lead to an R^2 value of 1.000 since they are what make up the calculation of QBR. The other variables, which include GamesPlayed, Sck, Arrested, and TDINT will have no regression effect on Rate since the NFL does not account for these factors when calculating its QBR value.*

Table 14

Running Backs Regression Data

$R^2 = 0.8573$

Adjusted $R^2 = 0.8554$

Variable	Coefficient	T-Score	P-Value
AttG	-0.02083	-0.27	0.790
YdsG	-0.51424	-30.80	0.000
TD	0.10177	2.17	0.031
FUM	0.19257	2.07	0.039
GamesPlayed	-0.08968	-1.64	0.103
Arrested	0.18935	0.55	0.580
Constant	54.13264	51.27	0.000

**This data contains results from my regression model for the Running Back Position during the years 2000-2014, the independent variable being Rank. (Offensive Definitions can be found in Table 1)*

**Number of Observations = 480*

**Dependent Variable Regression effects on Rank (independent variable) at a 95% confidence level*

Table 15

Wide Receivers Regression Data

$R^2 = 0.8623$

Adjusted $R^2 = 0.8605$

Variable	Coefficient	T-Score	P-Value
RecG	-8.11102	-33.29	0.000
YdsG	-0.01486	-0.85	0.394
TD	-0.07682	-1.39	0.165
FUM	-0.13480	-0.81	0.417
GamesPlayed	-3.02713	-17.85	0.000
Arrested	-0.20958	-0.61	0.544
Constant	106.05050	36.85	0.000

**This data contains results from my regression model for the Wide Receiver Position during the years 2000-2014, the independent variable being Rank. (Offensive Definitions can be found in Table 1)*

**Number of Observations = 450*

**Dependent Variable Regression effects on Rank (independent variable) at a 95% confidence level*

Table 16

Defensive Linemen Regression Data

$R^2 = 0.6179$

Adjusted $R^{2 =} 0.6153$

Variable	Coefficient	T-Score	P-Value
WPA	-21.06294	-23.54	0.000
EPA	0.46414	3.17	0.002
EPAG	-4.78076	-2.20	0.028
TF	-7.41966	-7.63	0.000
GamesPlayed	-0.99882	-2.76	0.006
Arrested	-0.87030	-1.97	0.049
Constant	54.61403	9.93	0.000

**This data contains results from my regression model for the Defensive Linemen Position during the years 2000-2014, the independent variable being Rank. (Defensive Definitions can be found in Table 2)*

**Number of Observations = 900*

**Dependent Variable Regression effects on Rank (independent variable) at a 95% confidence level*

Table 17

Linebackers Regression Data

$R^2 = 0.7701$

Adjusted $R^2 = 0.7665$

Variable	Coefficient	T-Score	P-Value
WPA	-24.30530	-29.86	0.000
EPA	0.28249	1.62	0.105
EPAG	-4.07542	-1.53	0.128
TF	-1.04528	-1.42	0.155
Int	0.15565	0.96	0.339
GamesPlayed	-0.92270	-1.49	0.136
Arrested	-0.26645	-0.53	0.595
Constant	70.21381	7.33	0.000

**This data contains results from my regression model for the Linebackers Position during the years 2000-2014, the independent variable being Rank. (Defensive Definitions can be found in Table 2)*

**Number of Observations = 450*

**Dependent Variable Regression effects on Rank (independent variable) at a 95% confidence level*

Table 18

Defensive Backs Regression Data

$R^2 = 0.7475$

Adjusted $R^2 = 0.7452$

Variable	Coefficient	T-Score	P-Value
WPA	-24.70767	-36.21	0.000
EPA	0.72297	0.62	0.538
EPAG	-1.40615	-0.82	0.414
TF	-1.88893	-2.32	0.021
PD	0.04895	1.32	0.186
Int	-0.11255	-1.13	0.257
GamesPlayed	-0.52290	-1.56	0.119
Arrested	0.53693	1.35	0.177
Constant	55.07853	10.91	0.000

**This data contains results from my regression model for the Defensive Backs Position during the years 2000-2014, the independent variable being Rank. (Defensive Definitions can be found in Table 2)*

**Number of Observations = 900*

**Dependent Variable Regression effects on Rank (independent variable) at a 95% confidence level*

Table 19

Quarterback League-Wide Averages

Arrested?	No
Year	**QBR Avg**
2000	**80.01**
2001	**78.53**
2002	**84.07**
2003	**77.69**
2004	**86.01**
2005	**83.58**
2006	**83.37**
2007	**85.76**
2008	**84.95**
2009	**84.64**
2010	**86.20**
2011	**85.31**
2012	**87.38**
2013	**89.58**
2014	**89.77**
Period avg	**84.60**

Arrested?	Yes
Year	**QBR Avg**
2000	**89.54**
2001	**85.28**
2002	**79.63**
2003	**92.03**
2004	**89.54**
2005	**81.78**
2006	**73.43**
2007	**82.13**
2008	**91.45**
2009	**90.70**
2010	**96.10**
2011	**90.85**
2012	**84.40**
2013	**73.00**
Period avg	**85.35**

Table 20

Running Back League-Wide Averages

Arrested?	No			
Year	**Avg of Att/G**	**Avg of Yds/G**	**Avg of FUM**	**Avg of TD**
2000	**17.96**	**76.03**	**2.66**	**6.39**
2001	**18.11**	**76.88**	**2.33**	**5.24**
2002	**16.98**	**72.32**	**2.43**	**8.29**
2003	**17.10**	**73.36**	**2.30**	**7.35**
2004	**19.41**	**82.20**	**3.27**	**8.68**
2005	**18.92**	**80.99**	**2.23**	**8.41**
2006	**18.02**	**77.40**	**2.78**	**7.52**
2007	**16.92**	**73.81**	**2.10**	**6.40**
2008	**16.92**	**73.81**	**2.10**	**6.40**
2009	**15.72**	**68.32**	**2.05**	**7.25**
2010	**15.63**	**70.48**	**2.52**	**6.71**
2011	**15.96**	**75.09**	**1.90**	**5.45**
2012	**16.89**	**73.19**	**2.68**	**6.21**
2013	**15.65**	**67.71**	**2.00**	**5.58**
2014	**15.08**	**66.00**	**1.76**	**5.96**
Period avg	**17.07**	**73.92**	**2.36**	**6.77**

Arrested?	Yes			
Year	**Avg of Att/G**	**Avg Yds/G**	**Avg of FUM**	**Avg of TD**
2000	**18.16**	**73.93**	**3.94**	**7.44**
2001	**17.30**	**67.34**	**4.22**	**6.44**
2002	**19.69**	**84.01**	**4.78**	**9.22**
2003	**22.40**	**100.53**	**6.00**	**9.00**
2004	**17.96**	**80.15**	**3.75**	**7.38**
2005	**17.45**	**71.10**	**2.63**	**6.63**
2006	**19.16**	**81.30**	**2.71**	**8.29**
2007	**17.49**	**75.70**	**2.30**	**6.10**
2008	**17.49**	**75.70**	**2.30**	**6.10**
2009	**17.09**	**77.97**	**2.60**	**8.80**
2010	**17.54**	**74.99**	**2.89**	**7.33**
2011	**16.70**	**70.43**	**2.20**	**8.40**
2012	**16.41**	**71.69**	**2.45**	**7.09**
2013	**17.28**	**71.57**	**1.67**	**8.00**
2014	**15.78**	**69.44**	**0.20**	**5.00**
Period avg	**17.82**	**76.04**	**3.07**	**7.44**

Table 21

Wide Receiver League-Wide Averages

Arrested?	No						
Year	**Avg of Yds/G**	**Avg of FUM**	**Avg of TD**	**Avg of Rec**	**Avg of Yds**	**Avg of Avg**	**Avg of Rec/G**
2000	**69.94**	**1.13**	**6.78**	**78.48**	**1104.87**	**14.02**	**4.90**
2001	**69.58**	**0.96**	**7.13**	**80.75**	**1104.46**	**13.78**	**5.05**
2002	**71.88**	**0.81**	**6.38**	**85.67**	**1118.62**	**13.12**	**5.35**
2000	**65.93**	**0.76**	**6.52**	**75.71**	**1020.86**	**13.41**	**4.73**
2004	**71.33**	**1.23**	**8.18**	**79.41**	**1116.41**	**14.08**	**4.96**
2005	**69.46**	**0.94**	**6.24**	**81.47**	**1052.88**	**12.83**	**5.09**
2006	**67.86**	**0.63**	**6.46**	**79.25**	**1054.88**	**13.33**	**4.95**
2007	**68.20**	**1.33**	**6.29**	**82.52**	**1041.14**	**12.67**	**5.16**
2008	**67.50**	**0.95**	**6.48**	**80.14**	**1057.52**	**13.32**	**5.01**
2009	**68.81**	**1.25**	**6.55**	**76.55**	**1056.30**	**13.95**	**4.78**
2010	**66.04**	**0.73**	**7.77**	**76.91**	**1006.68**	**13.17**	**4.81**
2011	**70.61**	**0.48**	**7.00**	**75.67**	**1092.19**	**14.41**	**4.73**
2012	**70.12**	**1.00**	**7.13**	**82.00**	**1099.50**	**13.35**	**5.13**
2013	**73.22**	**0.72**	**6.80**	**83.36**	**1135.60**	**13.60**	**5.21**
2014	**75.31**	**0.92**	**7.60**	**84.88**	**1147.80**	**13.46**	**5.31**
Period avg	**69.82**	**0.92**	**6.91**	**80.27**	**1082.72**	**13.51**	**5.01**

Arrested?	Yes						
Year	**Avg of Yds/G**	**Avg of FUM**	**Avg of TD**	**Avg of Rec**	**Avg of Yds**	**Avg of Avg**	**Avg of Rec/G**
2000	**76.53**	**0.86**	**8.29**	**84.14**	**1213.00**	**14.53**	**5.26**
2001	**79.67**	**0.83**	**7.83**	**94.17**	**1259.67**	**13.58**	**5.89**
2002	**71.61**	**0.89**	**6.33**	**81.78**	**1132.44**	**14.08**	**5.11**
2003	**69.08**	**0.89**	**8.11**	**79.67**	**1078.22**	**13.52**	**4.98**
2004	**70.04**	**1.00**	**7.75**	**76.25**	**1093.75**	**14.39**	**4.77**
2005	**71.04**	**0.77**	**7.62**	**76.77**	**1127.62**	**14.70**	**4.80**
2006	**73.38**	**0.83**	**7.33**	**73.17**	**1100.33**	**15.10**	**4.57**
2007	**74.58**	**1.33**	**10.11**	**83.78**	**1167.00**	**13.88**	**5.24**
2008	**73.71**	**1.44**	**6.44**	**79.89**	**1119.22**	**14.04**	**4.99**
2009	**70.90**	**1.00**	**7.90**	**83.10**	**1112.60**	**13.62**	**5.19**
2010	**63.86**	**1.00**	**6.50**	**76.75**	**975.75**	**12.84**	**4.80**
2011	**66.11**	**1.11**	**5.44**	**73.56**	**1043.67**	**14.13**	**4.60**
2012	**79.83**	**1.00**	**7.83**	**85.17**	**1277.33**	**15.22**	**5.32**
2013	**83.62**	**0.80**	**9.40**	**92.60**	**1290.80**	**14.20**	**5.79**
2014	**69.38**	**1.60**	**7.00**	**81.80**	**1056.00**	**12.98**	**5.11**
Period avg	**72.25**	**1.02**	**7.55**	**80.82**	**1128.19**	**14.06**	**5.09**

Table 22

Defensive Linemen League-Wide Averages

Arrested?	No			
Year	**Avg of WPA**	**Avg of EPA**	**Avg of EPA/G**	**Avg of TF**
2000	**1.13**	**34.55**	**2.33**	**0.91**
2001	**1.05**	**33.40**	**2.34**	**0.90**
2002	**1.12**	**36.75**	**2.49**	**0.88**
2003	**1.00**	**33.26**	**2.26**	**0.88**
2004	**1.11**	**33.75**	**2.34**	**0.88**
2005	**1.09**	**35.22**	**2.41**	**0.88**
2006	**1.18**	**38.60**	**2.57**	**0.84**
2007	**1.18**	**37.99**	**2.48**	**0.85**
2008	**1.07**	**35.43**	**2.38**	**0.82**
2009	**1.00**	**32.77**	**2.25**	**0.76**
2010	**0.97**	**33.38**	**2.28**	**0.81**
2011	**1.06**	**35.05**	**2.36**	**0.84**
2012	**1.07**	**36.05**	**2.41**	**0.81**
2013	**1.14**	**36.13**	**2.40**	**0.84**
2014	**1.08**	**36.22**	**2.47**	**0.79**
Period avg	**1.08**	**35.20**	**2.38**	**0.85**

Arrested?	Yes			
Year	**Avg of WPA**	**Avg of EPA**	**Avg of EPA/G**	**Avg of TF**
2000	**1.02**	**32.88**	**2.24**	**0.95**
2001	**1.02**	**31.34**	**2.15**	**0.87**
2002	**1.01**	**33.56**	**2.28**	**0.83**
2003	**1.04**	**35.96**	**2.56**	**0.87**
2004	**1.23**	**38.42**	**2.82**	**0.93**
2005	**1.12**	**36.05**	**2.38**	**0.87**
2006	**1.23**	**41.51**	**2.69**	**0.85**
2007	**1.06**	**34.89**	**2.49**	**0.83**
2008	**1.09**	**34.44**	**2.25**	**0.88**
2009	**1.12**	**36.73**	**2.52**	**0.84**
2010	**1.08**	**34.38**	**2.31**	**0.84**
2011	**0.94**	**33.34**	**2.21**	**0.80**
2012	**1.04**	**33.56**	**2.41**	**0.87**
2013	**1.29**	**39.98**	**2.68**	**0.89**
2014	**1.03**	**32.65**	**2.21**	**0.73**
Period Avg	**1.09**	**35.39**	**2.42**	**0.86**

Table 23

Linebacker League-Wide Averages

Arrested?	No				
Year	**Avg of WPA**	**Avg of EPA**	**Avg of EPA/G**	**Avg of TF**	**Avg of Int**
2000	**1.68**	**50.73**	**3.34**	**1.13**	**1.62**
2001	**1.71**	**52.68**	**3.46**	**1.16**	**1.46**
2002	**1.75**	**53.61**	**3.39**	**1.14**	**1.41**
2003	**1.66**	**52.03**	**3.39**	**1.14**	**1.33**
2004	**1.64**	**51.08**	**3.37**	**1.09**	**1.58**
2005	**1.54**	**49.95**	**3.24**	**1.17**	**1.24**
2006	**1.70**	**53.15**	**3.45**	**1.09**	**1.32**
2007	**1.77**	**54.08**	**3.48**	**1.11**	**1.85**
2008	**1.49**	**47.07**	**3.03**	**1.05**	**0.85**
2009	**1.68**	**51.20**	**3.35**	**1.07**	**1.20**
2010	**1.74**	**53.63**	**3.41**	**1.09**	**1.00**
2011	**1.62**	**50.41**	**3.19**	**1.14**	**1.53**
2012	**1.61**	**49.27**	**3.17**	**1.16**	**1.55**
2013	**1.82**	**59.56**	**3.87**	**1.19**	**2.26**
2014	**1.40**	**46.50**	**3.14**	**1.11**	**0.78**
Period Avg	**1.65**	**51.76**	**3.36**	**1.12**	**1.40**

Arrested?	Yes				
Year	**Avg of WPA**	**Avg of EPA**	**Avg of EPA/G**	**Avg of TF**	**Avg of Int**
2000	**1.56**	**53.05**	**3.41**	**1.05**	**1.00**
2001	**1.68**	**60.33**	**3.93**	**1.03**	**1.25**
2002	**1.38**	**64.20**	**4.01**	**0.93**	**4.00**
2003	**1.75**	**56.63**	**3.82**	**1.11**	**2.67**
2004	**1.60**	**52.57**	**3.36**	**1.04**	**1.50**
2005	**1.76**	**63.28**	**4.09**	**1.24**	**2.20**
2006	**1.74**	**57.29**	**3.71**	**1.15**	**1.75**
2007	**1.65**	**56.42**	**3.66**	**1.11**	**1.20**
2008	**1.70**	**56.94**	**3.59**	**1.07**	**1.80**
2009	**1.72**	**56.16**	**3.32**	**0.99**	**0.90**
2010	**1.93**	**60.03**	**3.57**	**1.01**	**1.17**
2011	**1.78**	**52.70**	**3.46**	**1.01**	**0.91**
2012	**1.72**	**53.83**	**3.54**	**0.97**	**1.25**
2013	**1.65**	**50.30**	**3.73**	**1.23**	**1.67**
2014	**1.17**	**39.70**	**3.00**	**0.86**	**0.33**
Period Avg	**1.69**	**55.58**	**3.57**	**1.05**	**1.38**

Table 24

Defensive Back League-Wide Averages

Arrested?	No					
Year	**Avg of WPA**	**Avg of EPA**	**Avg of EPA/G**	**Avg of TF**	**Avg of PD**	**Avg of Int**
2000	**1.25**	**40.43**	**2.64**	**0.90**	**10.92**	**3.63**
2001	**1.19**	**36.76**	**2.40**	**0.84**	**11.65**	**3.67**
2002	**1.21**	**35.63**	**2.40**	**0.88**	**10.75**	**2.93**
2003	**1.25**	**38.79**	**2.53**	**0.90**	**11.13**	**3.09**
2004	**1.33**	**40.58**	**2.66**	**0.89**	**11.52**	**3.66**
2005	**1.26**	**38.22**	**2.55**	**0.89**	**11.71**	**3.29**
2006	**1.29**	**41.15**	**2.73**	**0.85**	**12.28**	**3.63**
2007	**1.15**	**37.05**	**2.45**	**0.87**	**10.54**	**3.20**
2008	**1.20**	**38.62**	**2.54**	**0.87**	**10.75**	**2.94**
2009	**1.16**	**37.02**	**2.48**	**0.87**	**10.70**	**3.20**
2010	**1.25**	**38.66**	**2.62**	**0.92**	**10.52**	**2.85**
2011	**1.11**	**34.40**	**2.27**	**0.87**	**11.13**	**2.71**
2012	**1.16**	**36.51**	**2.43**	**0.92**	**10.83**	**3.00**
2013	**1.19**	**36.12**	**2.39**	**0.83**	**10.84**	**2.71**
2014	**1.04**	**34.15**	**2.31**	**0.88**	**9.42**	**2.54**
Period Avg	**1.20**	**37.54**	**2.49**	**0.88**	**10.97**	**3.12**

Arrested?	Yes					
Year	**Average of WPA**	**Average of EPA**	**Average of EPA/G**	**Average of TF**	**Average of PD**	**Average of Int**
2000	**1.24**	**41.26**	**2.66**	**0.80**	**13.73**	**4.45**
2001	**1.07**	**33.70**	**2.23**	**0.83**	**10.64**	**2.55**
2002	**1.04**	**34.60**	**2.29**	**0.80**	**12.40**	**3.00**
2003	**1.27**	**42.61**	**2.87**	**0.88**	**13.23**	**4.15**
2004	**1.08**	**34.54**	**2.32**	**0.91**	**10.50**	**2.69**
2005	**1.16**	**37.64**	**2.48**	**0.81**	**12.56**	**3.11**
2006	**1.21**	**35.84**	**2.29**	**0.85**	**10.43**	**2.71**
2007	**1.12**	**33.87**	**2.29**	**0.89**	**10.57**	**2.71**
2008	**1.19**	**38.77**	**2.73**	**0.86**	**13.00**	**3.44**
2009	**1.17**	**46.12**	**3.01**	**0.81**	**16.17**	**5.67**
2010	**1.33**	**42.20**	**2.82**	**0.93**	**9.50**	**3.33**
2011	**0.99**	**37.63**	**2.60**	**0.82**	**12.25**	**3.00**
2012	**1.17**	**39.90**	**2.96**	**0.94**	**10.57**	**3.29**
2013	**1.46**	**39.72**	**2.58**	**0.87**	**9.40**	**2.80**
2014	**1.02**	**34.09**	**2.29**	**0.84**	**11.17**	**2.58**
Period Avg	**1.16**	**37.57**	**2.52**	**0.86**	**11.65**	**3.22**

Figure 1

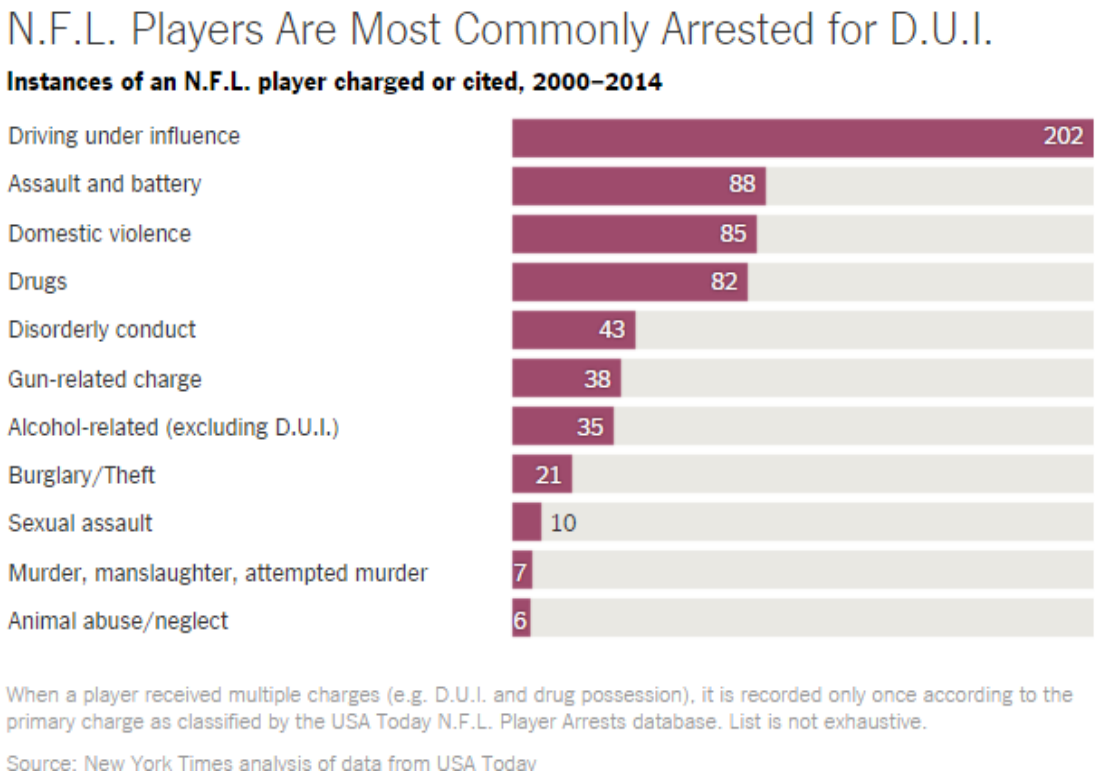

*****Diagram created by Neil Irwin of the *New York Times*

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