

A Brief Review of American Football Rules and Statistical Variables

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As someone with a background in sports coaching and a great interest in the sport of American football as played in the National Football League, I agreed to review Cohea and Payton's [article on game statistics](#). I found there were numerous omissions of information about the game of American football that, if provided, would prove useful to the reader who is untrained in the rules of the sport so as to better follow the methodology, results and conclusions as stated by the authors. I have therefore provided here a brief explanation of how the game is played at the NFL level and a description of each variable or factor used in the analysis.

BRIEF GAME TUTORIAL

The sport of American football is unique in many respects when compared with most national and international team sports. It is the only sport in which overall team performance, outside of the scoring, is literally measured by inches. In its most basic form, American football consists of two teams with eleven players each. One team is awarded possession of the ball (offense) and is given an opportunity to score by driving through the other team in a series of set plays. The opposing team (defense) is tasked with trying to prevent the offense from advancing or scoring. Play begins with the offense awarded possession of the ball until it either scores, loses the ball to the other team during play, or has to relinquish possession to the other team. When the opposing team takes possession of the ball, it then becomes the offense and is given an opportunity to score, as the two teams reverse roles. The game continues in this fashion for one hour of playing clock time, which is divided into four quarters, with the teams changing direction of play on the field after each quarter.

Offensively, the team with possession of the ball can score by taking the ball, under control (caught or carried by an offensive

player), across the plane of the end of the field (goal line – the beginning of the End Zone), resulting in a touchdown (6 points). Other scoring opportunities are provided when the ball is kicked between the goalposts in a field goal attempt (3 points), or during a Point After Touchdown (PAT) attempt (1 or 2 points, depending on PAT method, kick or run, respectively).

In order to score or get into scoring position, a team that is on the offensive must march down the field through a series of plays, called downs, until, if successful, they reach the End Zone by scoring a touchdown or a field goal. The team with possession of the ball is given four downs to cross at least ten yards of the field, after which, if successful, they are given a new set of four downs to cross another ten yards, and so on. If a team fails to cross ten yards of the field in four downs, it relinquishes the ball to the other team. If a team on offense senses, after the third down, that it will not reach the tenth yard, it may use its fourth down to “punt” the ball to the other team by kicking it as far into the opposing team’s side of the field as possible so as to give the opposing team more yards to work with when they take possession. In a fourth down situation the offensive team may also elect to try a fourth down conversion to reach the tenth yard and thus assure a new set of downs, keeping the offensive drive alive.

Defensively, the team that is not awarded possession of the ball will try to thwart the offensive team’s attempt to advance at every down. The objective for the defense is to stop the offense as soon as possible, through a turnover or through denial of the tenth yard. This is done by rushing at the offensive team at the snap of the ball and trying to either steal the ball away from the offense or grounding the ball through means of a “tackle.” Tackling usually involves bringing the offensive team’s ball-carrier to the ground so that the ball, or specific parts of the ball carrier’s body, touch the ground while the ball is still under control of the ball carrier. Once the ball

touches the ground, the referee will blow a whistle, ruling the play “dead” and a new down is created for the offensive team, assuming the offense is still within their four down allotment. When a defensive team has been successful in stopping the offense and preventing a score, the offense is forced to turn possession of the ball over to the defensive team by means of a punt or, in a failed fourth down situation, by relinquishing possession of the ball at the last spotting of the ball. A defensive team may only score if it legally steals the ball from the offensive team and can bring the ball to the End Zone of the offensive team in one play, or, when an offensive player is tackled behind his own End Zone (a “safety” worth 2 points for the team on defense). Otherwise, within any offensive play, a defensive team is not given a legal opportunity to accrue yards or score.

As with all other team sports, at the professional level, strategy and pre-established plays are extremely important to the success of a team. In American football, however, pre-established plays are critical to the game, and define the style of play of each team, with many teams being recognized for their ability to succeed with certain pre-established plays. Terms such as *West Coast offense*, *Wildcat offense*, and *Nickleback defense* have become the trademark style of play of some highly successful NFL teams. Success of a team therefore depends to a great extent on how effective they play their particular style of offense and defense. Many NFL coaches adhere to a specific type of offense/defense and will recruit players specifically tailored to make a particular style of play successful.

There are many other details concerning the rules of the game that should be studied in order to better understand what factors are critical to winning in the sport of American football. Of particular interest are the rules governing overtime play, when the game ends in a tie after regulation time expires. Usually, overtime play involves one regulation period (15 min) of sudden-death play. This means the first team to score wins. For further details, the reader can go to the [NFL rulebook](#) or a [Wikipedia article](#).

KEY FACTORS AND VARIABLES

The following list represents the most important factors and variables that affect the

ability of a team in the NFL to win games, from an offensive team and defensive team perspective, as determined by this reviewer, based on years of experience following NFL team performance. This list is not intended to be official or complete. I have grouped the variables and factors under four headings: general, offensive, defensive, and special teams. The latter are units of play utilized for kick-offs and kick returns, punts and punt returns, field goals and PAT kicks. Each factor is following by a parenthetical *positive* or *negative* to indicate its relationship to performance.

General Factors

Total Yards (positive)

Scoring performance in an NFL game is measured in how many yards a team can generate on offense. Under almost all conditions of play, in the NFL, the team with the greatest number of total yards at the end of a game, will usually also win the game. Total offense is normally measured in total offensive yards, which includes rushing yards, passing yards, and the differential from yards gained or lost due to penalties or turnovers.

Time of Possession (positive)

Time of possession is normally associated with the team that is on offense. A team that possesses the ball longer also displays an ability to control the defense. Within a 60-minute NFL game, winning teams typically average times-of-possession in excess of 30 minutes, while losing teams average times of possession less than 30 minutes.

Team Effectiveness: Offensive Efficiency vs Defensive Efficiency (positive)

In a typical NFL game, a team will field two separate and distinct set of players for playing offense and defense. The players on offense constitute the offensive unit and the players on defense constitute the defensive unit. Executing a balanced game is a key characteristic of winning teams, as measured by offensive and defensive efficiency. Note that this particular factor or variable does not exist as a statistical variable in the NFL. However, it has been the experience of this reviewer that this variable is an effective way to determine a team’s ability to win games.

Home Field Advantage (positive for home team)

Often overlooked by those who seek performance-based factors that determine outcomes in

NFL games, the home field advantage is considered to be a very powerful factor in winning NFL games.

Overtime First Possession (positive)

A highly decisive factor in winning when the game ends in a tie during regular play time, the first team to get possession of the ball during the overtime play will usually win the game.

Offensive Factors

Third-Down Conversions (positive)

A very important factor in winning games is the ability to gain the ten yards within four downs. Typically, because of the high level of play and the importance of winning in the NFL, a team that is short of reaching the ten yards on fourth down will elect to punt the ball away to the defense. Therefore, a critical factor in teams winning games is third-down conversions. That is, the ability to gain the tenth yard by the third play of each series.

Fourth-Down Conversions (positive)

Because 4th down conversions are typically tried only under special strategic circumstances, the ability of a team to convert the tenth yard on fourth down can have a significant effect on the outcome of a game, especially since it creates additional psychological factors for each team depending on whether or not the tenth yard is reached. Typically, 4th down conversion attempts are made only when short of the tenth yard by inches or when winning seems out of reach and a desperate attempt is made to continue the march down field.

First- and Second-Down Conversions (positive)

Teams that are able to move against a defense well enough to secure a ten-yard objective, or more, on their first or second down, demonstrate greater mastery over the defense and an almost unstoppable ability to score.

Yards per Play (positive)

Teams that are able to march or gain ten yards within one or two plays are seldom faced with a third down conversion. Instead, such teams will tend to “move the chains” (a term indicating that a new set of downs is beginning and the ten yard markers on the sidelines are being moved to a new spot) regularly and have no trouble marching down for a score. Typically, teams that average

more than five yards per play tend to be more successful in winning games.

Passing Efficiency (positive)

Inherent in successful passing plays is an effective offensive “front line” that protects the quarterback from the rushing defense, which is trying to upset the quarterback’s ability to throw the pass. There are several variables affecting passing efficiency, including *total passing yards*, *passing yards per play*, *percent pass completions*, and *interceptions*. Interceptions are also included in the defensive “Turnovers” factor.

Rushing Efficiency (positive)

Rushing plays usually involve a running back (with support of the offensive line) who gets the ball (usually from the quarterback) and attempts to pick up as many yards as possible. Several variables affect rushing efficiency, including *total rushing yards*, *rushing yards per play*, and *fumbles*. Fumbles are also included in the defensive “turnovers” factor.

Red Zone Conversions (positive)

The areas on the playing field extending from the 20 yard line to the goal line are referred to as the Red Zone. In this area, the dynamics of play between the offense and defense become more restricted, and the execution of the plays more significant. Within this area, an offensive unit is normally within field goal distance and can elect to score 3 points by kicking the ball, or may attempt to score a touchdown (6 points) by driving further towards the goal line. Winning teams tend to score every time they reach the Red Zone.

Penalties and Penalty Yards (negative)

Penalties result in lost yardage. Because penalties are exacted by taking away yards gained, *number of penalties*, *yards per penalty*, and *total penalty yards* will greatly influence the outcome of a game. The yards taken away from an offense due to penalties are included in the total offense yards.

Turnovers and Turnover Differential (negative)

A turnover is any play that unintentionally returns possession of the ball to the defensive team, thus making the defensive team into the offense. Recovered “fumbles” are the typical type of turnover. A *fumble* occurs when a player, who is deemed to have possession of the ball, loses control of the ball and allows the ball to touch the ground. Fumbles can be *forced* (by the defense) and *unforced* (lack of offensive ball control). When a fumble is recovered by the defensive

team, it becomes a turnover and the defensive team takes possession of the ball and becomes the offense, getting the opportunity to score. Oftentimes, fumbles can result in direct scoring by the recovering defensive team.

Another type of turnover is the *interception*. An interception occurs when an offensive player (usually the quarterback) throws a pass and a defensive player catches the ball before the ball can land on the intended receiver or hits the ground.

Another related variable of interest is the *turnover differential* – the number of turnovers caused by one team minus the number of turnovers caused by the other team (from the perspective of the team of interest). A positive differential is good, with high numbers indicating a high probability of winning the game.

Defensive Factors

Sacks (positive)

When the ball is snapped to initiate a play, the defense rushes towards the quarterback, or anyone who gets the ball, to tackle them or to turn the ball over. During this rushing by the defense, if they are able to tackle the quarterback behind the line of scrimmage before the quarterback is able to hand the ball to another offensive player, the defensive unit is credited with a “sack.”

Tackling Efficiency: Tackles (positive) and Missed Tackles (negative)

The most important weapon for the defensive unit is the “tackle.” A *tackle* is performed when a defensive player brings down an offensive player who possesses the ball and causes the ball, or certain parts of the player who is in possession of the ball, to touch the ground. A *missed tackle* occurs when a defensive player manages to wrap his arms around a player in possession of the ball, but does not bring that player down, allowing the offensive player to gain additional yards.

Red Zone Stops (positive)

Red Zone stops occur when a defensive unit successfully prevents the offense from scoring after that offense reaches the Red Zone.

Red Zone Forced Field Goals (positive)

Once an offensive team has reached the Red Zone, the ability of an NFL kicker to

kick the ball through the uprights is practically assured. As such, an offense that has reached the Red Zone is assumed to be able to score at least 3 points. A defense that can limit the damage caused by an offense that has reached the Red Zone to 3 points is effective in diminishing the offensive team’s ability to score.

Penalties and Penalty Yards (negative)

For a defensive unit, penalties result in yards being awarded to the offensive unit. Because of this, a defensive unit’s *number of penalties*, *yards per penalty*, and *total penalty yards* will greatly influence the outcome of a game.

Forced Turnovers: Forced Fumbles, Recovered Fumbles and Interceptions (positive)

Defensive units that create turnovers in possession by forcing the offense to fumble the ball, or by intercepting passes, create changes in the momentum of the game that favors the defensive unit’s team and increases the team’s ability to win. This includes *forced fumbles*, *recovered fumbles* and *interceptions*.

Forced Safety (positive)

When a defensive unit drives the offense backwards, past the offense’s own goal line, that defensive unit will score two (2) points as a “safety.” This is the only legal way for a defensive team to score points as a defensive team and occurs very infrequently during an entire season of play.

Special Teams Factors

Punt and Kick-Return Yards (positive)

During a kick-off, when a team first kicks off to the offense, or when the offense kicks a punt to the defense to relinquish possession of the ball, the “new” offense will catch the ball and try “returning” it as far as they can on the field by having a player run back with the ball. The number of yards that the kick return team is able to return the ball during these Special Teams plays are included in the *total yards* calculations.

Field Goal Attempts and Conversions (positive)

The decision to attempt a field goal (3 points) is a tactical decision made by a team’s coaching staff. Usually, the decision to attempt to score a field goal depends greatly on the distance remaining to the goal posts and the ability of a team’s kicker.

Point After Touchdown (PAT) Attempts and Conversions (positive)

A PAT is an attempt to kick the ball through the uprights from the 3 yard line, immediately

following a touchdown. A successful PAT is worth one point and, normally, is converted almost 100% of the times attempted.

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