

Is All Publicity Good Publicity? A Sentiment Analysis of Media Regarding Concussions in the NFL and its Effects on Viewership

Sebastian Barrera¹ and Daniel Olivo^{1#}

¹Bergen County Technical High School – Teterboro

#Advisor

ABSTRACT

With the increase in the rate of concussions within the National Football League (NFL), as well as an increase in studies finding the long-term effects of these concussions, there has been growing interest garnered by the media on the NFL's concussion protocol. Other studies would suggest that these portrayals by the media, if negative, would impact the league's viewership; however, with no research done on the topic, this claim was unsupported. To determine this relationship, this study conducts a sentiment analysis using MeaningCloud Software on statements made within the years 2017 through 2021 regarding NFL concussions/concussion protocol, which was then compared to the average viewership of its corresponding season. Throughout the entirety of the years analyzed, MeaningCloud analyzed that 49 of the 99 statements about NFL concussions/concussion protocol were deemed to have negative polarity (49.5%), while only 24 had positive polarity (24.24%), conveying a very large disparity in the media coverage. These results disagreed with the current ideals that negative portrayals can impact enjoyment (therefore viewership), and could speak to the strength of the NFL's business model.

Introduction

Concussions and their Effects

The discourse surrounding the term concussions has greatly changed over the last few years, and so has the weight it has begun to hold within the NFL community. A concussion is medically defined as “a traumatic brain injury that affects your brain function” by the Mayo Clinic (2023), which can impact an athlete in a multitude of ways. These symptoms were studied in depth by Laurie M. Ryan and Deborah L. Warren (2014), who found that they normally consist of a variety of physical and emotional setbacks, including headaches, issues with memory and concentration, dizziness, as well as depression and anxiety, that have been found to last from solely a week to months (or longer). In recent years, Football has been the sport that has garnered the most concussions at the high school level, with a concussion rate of 10.40 concussions per every 10,000 player visits to their athletic trainers with injury, which increases to 33.97 concussions per 10,000 player visits during competition-based visits like games and scrimmages (Kerr et al., 2019). This also rings true at the collegiate level, as a study conducted by Cristine M. Baugh found that concussions were so common throughout the sport that around 40% of high school athletes believed that they would obtain a concussion within the next coming years (Baugh et al., 2014).

These high rates of concussions seem to be consistent within the National Football League (NFL) as well. Within the years 1996-2001, there was a concussion rate of 0.42 concussions per game, slightly higher than the 6 years after it, which had a rate of 0.38 per game (Casson et al., 2010). Additionally, statistics provided by the NFL found that there were an average of ~226 concussions per season, with some reaching rates of 281 concussions a year (NFL,

2023). These high rates of concussions within the NFL can greatly affect the lives of these players, as in addition to the previously mentioned short-term effects of concussions, there have been found to be many long-term detriments to their health and well-being. This was corroborated when around 350 former NFL players were studied an average of 29 years after their playing careers ended. When these players were compared to 5,000 men who had not played football in their lives, they were found to have scored worse on tests measuring cognitive performance, with players who had been retired from the NFL for a longer period of time having scored the lowest within the group (Mass General Brigham, 2023). The most infamous long-term byproduct of concussions within the NFL, however, would be chronic traumatic encephalopathy, or CTE. CTE is known as a degenerative brain disease commonly associated with repetitive brain trauma, such as concussions and other constant blows to the head, which cause brain lesions that can lead to the death of brain cells (Pallone, 2014). This cellular death of brain cells within one case has been found to cause paranoia, chronic depression, and insomnia before the victim, a 44-year-old retired NFL player, committed suicide (Omalu et al., 2010), and similar symptoms have been found in a multitude of other cases. Additionally, the condition can only be discovered after death, so it has only recently been associated with professional athletes, and garnered attention within both the medical and sports fields (Pallone, 2014). Therefore, it is due to this high association between concussions and CTE that the NFL's high concussion rates have become a highly contentious issue within the NFL, and studies have been done to find the relationship between the two events. One such study analyzed 376 former NFL players, and found that 345 of these players were found to have CTE, or around 92% (Boston University School of Medicine, 2023).

NFL Concussion Protocol

As a way to limit the dangerous and long-lasting effects of concussions on the lives of their players, the NFL incorporated a concussion protocol in 2011, which sets a list of rules athletic trainers of each NFL team must follow to maintain player safety (NFL, 2022). It is important to note that the NFL protocol does not limit concussions, as is noted by the NFL itself; however, its main purpose is to limit the danger of these concussions, and make it 'safer.' If a player exhibits any signs of a concussion, the league's concussion protocol is immediately placed into effect, and the player must be immediately taken out of the game and evaluated by the person that has spotted them (NFL, 2022). The player will be evaluated for serious concussion symptoms, such as loss of consciousness, amnesia, or any form of impact seizure, and if these symptoms are found, they would immediately be taken out of the game (NFL). If they are still believed to have a concussion after not having these so-called 'no-go' symptoms, they would be taken to a team doctor or athletic trainer, and if they deem them to have any evidence of concussion, the player will also be placed into the concussion protocol (Sutelan, 2023). While in the concussion protocol, players are not allowed to resume play until completing all of the necessary steps to being medically cleared by the team doctor, starting with aerobic exercises to participating in non-contact football drills (Pallone, 2013).

While the NFL states that protocol was put in place for player safety, its effectiveness has been heavily disputed by researchers and popular journalism. One major dispute to the effectiveness of the protocol is it allows players to return to the field too quickly, as the median days that a player issued in the concussion protocol is not cleared is 9 days, while some studies argue that concussions on average take around 10-14 days for full recovery, causing possible re-aggravation in the injuries for the players (D'Lauro et al., 2018). Additionally, multiple sources describe instances in which the reporting of concussions has not been accurate, which could have led to the re-aggravation or worsening of concussions and their symptoms. One study found that 50.3% of the 829 former players studied admitted to having sustained a concussion and not advising their team's medical staff at least once (Kerr et al., 2017). This non-disclosure was not only done by players, however, as one paper highlights anecdotal evidence from Stewart Bradley, a former member of the Philadelphia Eagles, that, after showing signs of a concussion, was placed back into a game instead of the league's concussion protocol and reinjured himself to the point of having to ask his coaches to take him out of play (Lazarus, 2011).

Finally, the literature also discusses previous litigation held against the NFL in 2012, the year after the concussion protocol was set into place. This lawsuit contains allegations that the NFL knew about the long-term risks, like CTE, about concussions before publicly admitting them, and attempted to conceal this information, as a way to economically benefit the league (Raffi, 2022). The litigation, filed by over 4,500 former players and their families, goes on to further state that this failure to act on this information made the NFL negligent, which continued the long-term brain damage to its players (Raffi, 2022). The findings of this case, however, were never published, as it was privately settled for an estimated \$1 billion (Gasquoine, 2022).

Media Coverage in the NFL

These disputes, especially the litigation and its settlement, led to a large amount of both negative and positive media coverage for the NFL. In fact, after the notable death of Mike Webster, the first player who post-mortem was diagnosed with CTE, while the term concussion itself did not see an increase in usage throughout the media, ‘head injury’ saw an increase of almost 100% (Moe, 2014). In addition to these statistics, it was also conveyed that the nature of the NFL has brought about an increase in injury awareness as a whole, when not being reported in a way to promote masculinity (Best, 2017). All of these reports, both from scholarly reports and the media, have undoubtedly brought attention to the scope of concussions within the league, but what is their direct impact on the NFL? Sources have previously studied the impact that the NFL’s crisis management messages have on consumers when this concussion portrayal is negative. One such study found that when the NFL did have a response strategy to mitigate the effects of the media, the perceptions from the viewers were much more positive than when they did not have a response strategy, as they were met with anger from the fans (LaGree et al.). The conclusions of this study are supported by another source within the literature, which states that the establishment of brand value through promotion is very important to the ideals of the consumers (Xiadi et al., 2019). In the case of the Lagree et al. works, if the promotion of the media is negative, without promotion by the NFL, then the Xiadi et al. study states that the ideals of the consumers would also be negative, which is agreed upon within both sources. A 2016 study done by Christian J. Bunce, however, disagrees with these views. Bunce’s study agrees that the ideals held within the media surrounding the NFL may be negative, even though his study was focused on domestic violence scandals instead, but instead found that the media had little to no impact on the ideals of the NFL consumers (Bunce, 2016). Through each of these studies, it is clear that there is contention about what impact the portrayals of the NFL have on their viewers. Additionally, there has been a lack of research done on what this impact means for the NFL. One study conducted found that negative social judgments are easier for the brain to process, and therefore are more apparent in our ideals (Nohlen et al., 2019). This study, coupled with the data provided by Kremer et al. (2019), which found that negative emotions can lead to a decrease in participation within a topic, can lead to the hypothesis that negative media would be easier for the consumers of the NFL to notice, and these negative views would decrease their participation in the NFL, which in this case would mean their viewership; however, with no research done on the topic, this is unsupported. This then presents the goal of this study: to determine whether or not there is a relationship between the media portrayals of the NFL’s concussions/concussion protocol and the average viewership of the NFL.

Methods

To determine this relationship, a sentiment analysis will be conducted on statements made within the years 2017 through 2021 regarding NFL concussions/concussion protocol and will be compared to the average viewership of its corresponding season.

Data Collection

The statements being analyzed will be comprised of articles written about players that were listed as injured due to concussion on the NFL's injury report during the mentioned 2017 to 2021 timeframe. Each player on this injury list provided by the NFL (NFL, 2022) that is injured due to a concussion will be placed onto a Google Sheet in chronological order based on the time in which their concussion occurred, and, as to keep the selection of the players without bias, will be randomly selected using a number generator that will give each player in the list an equal chance of being selected. These players will then be ordered by the year in which they were injured, and the article selection process will begin. The total number of players selected will be capped at 15, to comply with the time constraints of the research project.

For each player selected, the dates of their concussions will be recorded, and all articles written about them during the time period they are on the concussion protocol will be analyzed. This was specifically done so that any information that is provided after the statement regarding the concussion is not placed through the sentiment analysis, as this could lead to information not relevant to the topic being analyzed and skewing results. Each of the articles mentioned will be selected from the top five media sites that generate the most views regarding NFL content, which are espn.com, nfl.com, cbssports.com, yahoo.net, and nbcports.com (SemRush, 2022). On this list, mlb.com and stubhub.com were not included, even though they were viewed at a higher rate than yahoo.net, as they do not produce content relating to football that could be examined in this study. These articles will be found by searching through each of the websites' databases, and selecting every article that is written about these players during the time period of their concussion.

From each of the articles, key statements regarding concussion, concussion protocol, or any other phrasing regarding the player's injury will be selected and placed into a Google Sheet. Here, using MeaningCloud, a sentiment analysis will occur for each of these statements.

Sentiment Analysis

MeaningCloud is, at its core, a compilation of application programming interfaces, or APIs, that allow for text analytics functions. In simpler terms, the software has a variety of web pages that, when given information, analyze text (MeaningCloud, 2023). Using these text analytics, MeaningCloud can allow users to analyze a number of different forms of texts, by analyzing the common themes, the topics, or in the case of this study, the sentiment of the text. To use MeaningCloud, an account must be created, and the user must be given access to a licensing key, as without this key, the APIs cannot be utilized (MeaningCloud, 2023).

For the purposes of this study, MeaningCloud will be used to analyze the statements of the texts. Using the software's extension on Google Sheets, the statements selected from the previously mentioned texts will be analyzed based on the sentiment of the text, and will describe the statement's polarity. This does this by using the APIs within the software, and will provide one of 6 sentiments: P+ (very positive), P (positive), NEU (neutral), N (negative), N+ (very negative), or NONE (no sentiment analyzed). If the polarity of the statement is viewed as negative, then this means that the media's portrayal of the NFL in regard to concussions/concussion protocol is negative in regards to that one statement. If the polarity of the statement is viewed as positive, then this means that the media's portrayal of the NFL in regard to concussions/concussion protocol is positive in regards to that one statement. This sentiment analysis, when compared to the viewership rates within the NFL of that same year, will be used to fill the gap in the literature. For this reason, only statements specifically regarding concussion/concussion protocol will be used, so as to not have MeaningCloud analyze statements not related to the topic. Additionally, the sentiment analysis will provide the subjectivity of the statement, being either objective or subjective. Objective statements would determine that the reporting for that concussion would be more fact-based, while subjective statements would mean that the reporting for that concussion was more opinionated. Within the scope of this work, while not assisting to answer the gap in the literature, this data could be beneficial to take note of, especially if there is a large disparity between the two points.

Finally, the MeaningCloud Software will provide a confidence percentage for the sentiment analysis, and this percentage will be compiled to make sure that the sentiment analysis data being collected is accurate.

Exemplification Theory

The methods of this study will be grounded within the Exemplification Theory, which has guided the works of similar studies conducted within the literature review. The Exemplification Theory, simply stated in the works of Brosius and Peter, “investigates why and under which conditions people integrate single-case information provided by the news into their personal judgments” (Brosius and Peter, 2017, p. 2). The source further goes on to state that even when compared to valid information, consumers of media are more likely to allow certain ‘exemplars’ to assist them in forming their own judgment (Brosius and Peter, 2017). In the scope of this study, this means that people will view the media as a representation of the entirety of the NFL, and the ideas portrayed in the articles being analyzed about the concussion protocol will strongly form their personal beliefs, especially since the sports websites that are being analyzed are known to use these ‘exemplars’ (Hahn and Cummins, 2017). This process is corroborated by the previously mentioned study conducted by Bunce (2016), who, when conducting a study on the effects of media on the NFL’s consumer’s ideals, based the methods on the Exemplification Theory, and used ‘exemplars’ as examples for the media portrayals.

Results

Data Collection Results

It was gathered that between the years 2017-2021, players were listed on the NFL’s injury report due to a concussion 778 times. This data set includes players that had repeated concussions, and were counted on the list on numerous occasions, as well as players that had been listed with two injuries (i.e. concussion, shoulder). This was done so that the randomization process would not be impacted in any way that would otherwise variate from the NFL’s concussion list, and make the randomization process similar to picking players off of the NFL’s injury list if it was compiled only of players listed with concussions, as they would also be placed multiple times. The players selected for each year are listed as follows: in 2017, Evan Smith, Nathan Peterman, Senorise Perry, and Sheldon Price were randomly selected; in 2018, Adam Shaheen, and Seth Roberts were randomly selected; in 2019, Vernon Davis, Kemal Ishmael, and Rhett Ellison were randomly selected; in 2020, Adam Humphries, Troy Dye, and Joey Bosa were randomly selected; and in 2021, Kamal Martin and Michael Carter II were randomly selected.

2017

As is shown in **Figure 1**, showing the results of the sentiment analysis from 2017, MeaningCloud analyzed that 15 out of the 26 statements had a negative polarity when discussing the NFL concussions/concussion protocol, while 3 out of 26 of the statements had a positive polarity when discussing the NFL concussions/concussion protocol. Additionally, MeaningCloud determined that 19 of the 26 statements were written objectively on the topic, as opposed to subjectively, and had a 96.16% confidence in the accuracy of the sentiment analysis. In terms of viewership, 2017 had an average viewership of 15 million viewers, a decrease from the previous year’s viewership of 16.5 million viewers, resulting in a -9.09% change (Forbes, 2023).

NFL concussion	Polarity	Agreement	Subjectivity	Confidence	Irony
As of Thursday,	N	DISAGREEMEN	SUBJECTIVE	94	NONIRONIC
Buffalo Bills qua	P	DISAGREEMEN	OBJECTIVE	94	NONIRONIC
The Bills have a	N	DISAGREEMEN	SUBJECTIVE	94	NONIRONIC
Perry (concussio	P	DISAGREEMEN	SUBJECTIVE	94	NONIRONIC
Return man Sen	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Miami is extreme	NEU	DISAGREEMEN	OBJECTIVE	92	NONIRONIC
With Williams su	N	DISAGREEMEN	OBJECTIVE	92	NONIRONIC
It was exactly th	N+	AGREEMENT	OBJECTIVE	100	NONIRONIC
Damien Williams	NEU	DISAGREEMEN	OBJECTIVE	92	NONIRONIC
RB Senorise Per	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
And, on the seco	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
The only players	N	AGREEMENT	SUBJECTIVE	92	NONIRONIC
Cornerback She	neu	AGREEMENT	OBJECTIVE	100	NONIRONIC
The Ravens rule	N	DISAGREEMEN	SUBJECTIVE	86	NONIRONIC
CB Jaylen Hill (t	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Baltimore will be	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Cornerback Jayl	P	AGREEMENT	OBJECTIVE	100	NONIRONIC
Cornerback She	neu	AGREEMENT	OBJECTIVE	100	NONIRONIC
Price missed the	N	DISAGREEMEN	OBJECTIVE	94	NONIRONIC
Buccaneers: QB	N	DISAGREEMEN	SUBJECTIVE	86	NONIRONIC
Buccaneers: RG	neu	AGREEMENT	OBJECTIVE	100	NONIRONIC
The Buccaneers	neu	AGREEMENT	OBJECTIVE	100	NONIRONIC
Winston will be j	N	DISAGREEMEN	OBJECTIVE	94	NONIRONIC
CB Robert McCl	neu	AGREEMENT	OBJECTIVE	100	NONIRONIC
Tampa Bay also	N	AGREEMENT	SUBJECTIVE	100	NONIRONIC

Figure 1. Results provided by MeaningCloud for the statements made in 2017

2018

NFL concussion	Polarity	Agreement	Subjectivity	Confidence	Irony
Tight end Adam	P	AGREEMENT	OBJECTIVE	92	NONIRONIC
The Bears also	NEU	DISAGREEMEN	SUBJECTIVE	86	NONIRONIC
The concussion,	N	DISAGREEMEN	SUBJECTIVE	94	NONIRONIC
Tight end Adam	P	DISAGREEMEN	SUBJECTIVE	89	NONIRONIC
Meanwhile, the	N	AGREEMENT	SUBJECTIVE	100	NONIRONIC
Roberts was up	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
WR Seth Robert	NEU	DISAGREEMEN	OBJECTIVE	94	NONIRONIC
Later in the gam	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Losing quarterba	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Wide receiver S	P	DISAGREEMEN	SUBJECTIVE	94	NONIRONIC
WR Seth Robert	P	AGREEMENT	SUBJECTIVE	92	NONIRONIC

Figure 2. Results provided by MeaningCloud for the statements made in 2018

As is shown in **Figure 2**, showing the results of the sentiment analysis from 2018, MeaningCloud analyzed that 3 out of the 11 statements had a negative polarity when discussing the NFL concussions/concussion protocol, while 4 out of 11 of the statements had a positive polarity when discussing the NFL concussions/concussion protocol. Additionally, MeaningCloud determined that 5 of the 11 statements were written objectively on the topic, as opposed to subjectively, and had a 94.63% confidence in the accuracy of the sentiment analysis. In terms of viewership, 2018 had an

average viewership of 15.8 million viewers, an increase from the previous year’s viewership of 15 million viewers, resulting in a 5.33% change (Forbes, 2023).

2019

NFL concussio	Polarity	Agreement	Subjectivity	Confidence	Irony
Ishmael (concus	N	DISAGREEMEN	OBJECTIVE	94	NONIRONIC
The Falcons will	N	DISAGREEMEN	SUBJECTIVE	94	NONIRONIC
Safety Kemal Ist	P	DISAGREEMEN	SUBJECTIVE	86	NONIRONIC
S Kemal Ishmae	P	DISAGREEMEN	SUBJECTIVE	86	NONIRONIC
Ellison (concuss	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Ellison (concuss	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
New York Giants	N	AGREEMENT	SUBJECTIVE	100	NONIRONIC
The Giants place	N	AGREEMENT	SUBJECTIVE	100	NONIRONIC
Tight ends Evan	P	DISAGREEMEN	SUBJECTIVE	86	NONIRONIC
New York Giants	NEU	DISAGREEMEN	OBJECTIVE	86	NONIRONIC
The tight end's r	P	DISAGREEMEN	OBJECTIVE	86	NONIRONIC
Also out for the g	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Davis (concussic	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Played without ir	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Played without ir	P	DISAGREEMEN	OBJECTIVE	86	NONIRONIC
Davis is importar	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Davis announce	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Davis remains in	P	DISAGREEMEN	OBJECTIVE	94	NONIRONIC
Jordan Reed (cc	P	DISAGREEMEN	OBJECTIVE	94	NONIRONIC
It gives Davis a t	P	DISAGREEMEN	OBJECTIVE	86	NONIRONIC
Davis was limite	NEU	DISAGREEMEN	SUBJECTIVE	83	NONIRONIC
The Redskins cu	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
TE Vernon Davis	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Played without ir	NEU	DISAGREEMEN	SUBJECTIVE	86	NONIRONIC

Figure 3. Results provided by MeaningCloud for the statements made in 2019

As is shown in **Figure 3**, showing the results of the sentiment analysis from 2019, MeaningCloud analyzed that 7 out of the 24 statements had a negative polarity when discussing NFL concussions/concussion protocol, while 8 out of 24 of the statements had a positive polarity when discussing NFL concussions/concussion protocol. Additionally, MeaningCloud determined that 16 of the 24 statements were written objectively on the topic of the concussion protocol as opposed to subjectively, and had a 93.625% confidence in the accuracy of the sentiment analysis. In terms of viewership, 2019 had an average viewership of 16.5 million viewers, an increase from the previous year’s viewership of 15.8 million viewers, resulting in a 4.43% change (Forbes, 2023).

2020

As is shown in **Figure 4**, showing the results of the sentiment analysis from 2020, MeaningCloud analyzed that 13 out of the 27 statements had a negative polarity when discussing NFL concussions/concussion protocol, while 7 out of 27 of the statements had a positive polarity when discussing NFL concussions/concussion protocol. Additionally, MeaningCloud determined that 13 of the 27 statements were written objectively on the topic of the concussion protocol as opposed to subjectively, and had a 95.037% confidence in the accuracy of the sentiment analysis. In terms of viewership, 2020 had an average viewership of 15.64 million viewers, a decrease from the previous year’s viewership of 16.5 million viewers, resulting in a -5.21% change (Forbes, 2023).

NFL concussion	Polarity	Agreement	Subjectivity	Confidence	Irony
The Titans release	P	AGREEMENT	SUBJECTIVE	100	NONIRONIC
Humphries (concussion)	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Tennessee Titan	P	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
The Tennessee	NEU	DISAGREEMENT	OBJECTIVE	86	NONIRONIC
Adam Humphries	NEU	DISAGREEMENT	SUBJECTIVE	86	NONIRONIC
Titans receiver A	NEU	DISAGREEMENT	OBJECTIVE	94	NONIRONIC
WR Adam Humphries	N	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
WR Adam Humphries	N	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
The Tennessee	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
The Tennessee	N	AGREEMENT	SUBJECTIVE	100	NONIRONIC
Dye exited this practice	P	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
Dye (concussion)	N	DISAGREEMENT	SUBJECTIVE	86	NONIRONIC
Dye (concussion)	N	DISAGREEMENT	SUBJECTIVE	86	NONIRONIC
LB Troy Dye departs	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
The Vikings also	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Troy Dye due to	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
In Week 13, with	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Bosa (concussion)	N	AGREEMENT	SUBJECTIVE	100	NONIRONIC
Rest assured, though	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Bosa is the hearing	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Chargers defense	N	DISAGREEMENT	SUBJECTIVE	86	NONIRONIC
Joey Bosa enters	P	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
Joey Bosa's limp	P	AGREEMENT	OBJECTIVE	92	NONIRONIC
Following Thursday	P	AGREEMENT	OBJECTIVE	92	NONIRONIC
Los Angeles Chargers	N	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
Staley is well aware	P	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
Ending an eight-	N	AGREEMENT	OBJECTIVE	100	NONIRONIC

Figure 4. Results provided by MeaningCloud for the statements made in 2020

2021

NFL concussion	Polarity	Agreement	Subjectivity	Confidence	Irony
Martin (concussion)	N	DISAGREEMENT	SUBJECTIVE	86	NONIRONIC
Also not practicing	N	DISAGREEMENT	SUBJECTIVE	94	NONIRONIC
The Panthers also	N	AGREEMENT	SUBJECTIVE	92	NONIRONIC
Carter exited Sunday	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
Carter suffered a	N	AGREEMENT	SUBJECTIVE	100	NONIRONIC
Carter (concussion)	P	AGREEMENT	OBJECTIVE	92	NONIRONIC
Carter (concussion)	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
WR Corey Davis	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
Other injured Jets	N	AGREEMENT	OBJECTIVE	100	NONIRONIC
New York did get	P	AGREEMENT	OBJECTIVE	100	NONIRONIC
Saleh said the Jets	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC
also hurt was Earl	NONE	AGREEMENT	OBJECTIVE	100	NONIRONIC

Figure 5. Results provided by MeaningCloud for the statements made in 2021

Finally, as is shown in Figure 5, showing the results of the sentiment analysis from 2021, MeaningCloud analyzed that 7 out of the 12 statements had a negative polarity when discussing NFL concussions/concussion protocol, while only 2 out of 12 of the statements had a positive polarity when discussing the NFL Protocol. Additionally, MeaningCloud determined that 8 of the 12 statements were written objectively on the topic of the concussion protocol as

opposed to subjectively, and had a 94.63% confidence in the accuracy of the sentiment analysis. In terms of viewership, 2021 had an average viewership of 17.1 million viewers, an increase from the previous year's viewership of 15.64 million viewers, resulting in a 9.34% change (Forbes, 2023).

Complete Sample Set

Throughout the entirety of the years analyzed, MeaningCloud analyzed that 49 of the 99 statements about NFL concussions/concussion protocol were deemed to have negative polarity (49.5%), while only 24 had positive polarity (24.24%), conveying a very large disparity in the media coverage. Additionally, the software analyzed that 61, or 61.6%, of the articles were written objectively on the topic, and it had an average of 95.17% confidence in the results of the sentiment analysis. In terms of viewership, the average percent change per year from 2017-2021 was 0.96%, and viewership increased from 15 million views in 2017 to 17.1 million views in 2021.

Conclusions

Discussion

Through the results garnered from the study, it is clear that there is a disparity in the polarity of the statements, with the majority of the statements analyzed containing negative polarity as opposed to positive or neutral polarity. With the works of Nohlen et al. (2019), Kremer et al. (2019), and the hypothesis built on their works, the results from the data should therefore show an overall decrease in viewership for the years 2017-2021; however, this was not found to be the case, as viewership had an average increase of 0.96% per year, as well as increasing by a total of 2.1 million views throughout the time span analyzed. These results, therefore, refute the hypothesis, as viewership did not decrease due to the negative media being portrayed through the results.

These results also disagree with the studies done by Xiadi et al. (2019) who, as was previously stated, found that brand value through promotion is very important to the ideals of consumers. Promotion, in the case of this study, was the portrayals created of the NFL through the media, and the methods found these portrayals to be negative. Therefore, coupled with the ideals of Nohlen et al. and Kremer et al., if their ideals of the NFL were negative due to the polarity of the media, the argument of this source would also agree that viewership would decrease, but this was not the case. Additionally, the findings of Lagree et al. (2019) are in disagreement with the results of this study, as they state that fans that were exposed to the media surrounding the NFL had an increase in negative emotions. This is disputed through the works of Kremer et al. (2019), which found that negative emotions led to a decrease in the participation in a topic, and in the case of this research, this would mean a decrease in viewership.

These results do, however, agree with the results of Bunce (2016), who found that negative media portrayals do not have an effect on the ideals of consumers. This study focused on the effects of media on the ideals of consumers of the NFL, and unlike the previous two sources, found that it had little to no effect on the ideals of consumers who had analyzed negative media in comparison to those that had not. The study explains that this lack of effect could be due to the NFL's awareness of negative media ideals, and how their own use of the media through nfl.com may negate the effects of other exemplars (Bunce, 2016).

Implications

With these ideals in mind, the business models of many other sporting organizations can be impacted by these findings. As was found by another study, professional sports within the United States have seen consistent growth in revenue, regardless of the climate inside and outside their leagues (Pittz et al., 2020). If the factors outside their league worsen, similar to what was found in both this and Bunce et al.'s studies, then the business models within American sports

could potentially be at less of a disadvantage to the media. Even if this is not the case, the business model of the NFL that has allowed it to become minorly impacted by the media could be replicated by these other organizations, as many sporting organizations have been found to follow similar revenue streams (Gonzalez-Eiras et al., 2017). Additionally, other companies that heavily rely on advertising, such as Google, could potentially follow this business model, if they are not already (Davis, 2006).

Limitations

The main limitation of this study was the sample size of the articles collected. As was previously mentioned were that only 15 players were selected from the NFL's concussion protocol, and the time frame for players selected was only 5 years. These decisions, while not ideal, were made due to the length of time needed to collect all of the necessary articles from the players, which took upwards of 40 hours. If more players were added to the study, or if the time span was increased, there was the possibility that the methods could not have been completed, or that other portions of the research would have been heavily impacted due to the lack of time. These decisions to limit the sample size in order to complete the study could have impacted the overall sentiment analysis of the data, as it is reasonable to assume that more data could have led to different conclusions, as either sources on different players than those that were analyzed, or those from different years than which were provided, could have had different trends in polarity. This idea is based on the work of Faber et al. (2014), who states that small sample sizes can greatly impact the representation of a set of variables. Additionally, with each of the players being randomly selected, there was a larger distribution of players in some years in comparison to others, and therefore there were fewer articles analyzed for these years. Using the previously mentioned ideals of Faber et al., this could have impacted the representation for the years with fewer players analyzed, and therefore misrepresented their polarity.

Future Directions

With these limitations in mind, perhaps it would be beneficial for future studies with fewer time constraints to use similar methods used in this paper, but widen the sample size, as to see if different results are gathered. Furthermore, it would also be beneficial to further examine the topic mentioned in the implications section, and examine whether or not other sporting organizations that follow similar revenue streams are also not impacted by the media, or if they would be able to implement business strategies similar to those of the NFL.

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