Head Injuries & The NFL

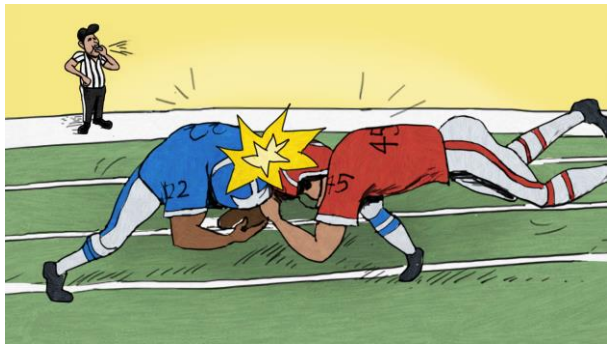
American football is a rough and dangerous game. It features high-speed collisions between human beings at least one of whom is often very large. Broken bones, torn ligaments, and even occasional paralysis can result. But it is the research on brain injuries that has caused many people to claim football is immoral and to advocate that it be banned. Such calls have gained the attention and opposition of the National Football League (NFL) given the high popularity and profitability of football as a spectator sport.

The Center for Disease Control defines a *traumatic brain injury* (TBI) as "a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head, or penetrating head injury." A *concussion* is a form of TBI where the blow causes the brain to move rapidly back and forth, bouncing around in the skull and suffering various types of structural damage. Although concussions can carry serious consequences, they are termed a "mild" form of TBI because they are not typically life threatening. *Chronic traumatic encephalopathy* (CTE), says the Mayo Clinic, is "brain degeneration likely caused by repeated head traumas." *Repetitive head impacts* (RHIs) can cumulatively lead to CTE and early death, even though no single RHI results in a concussion.

If only one thing is clear about the current science surrounding *sports-related concussions* (SRCs) and their related brain injuries, it's that very little is certain about the current science. The field is surprisingly new. A significant scientific breakthrough occurred in 2002 when an African-American neuropathologist in Pittsburgh named Bennet Omalu (played by Will Smith in the 2015 movie *Concussion*) performed an autopsy on Hall of Fame center Mike Webster. Dr. Omalu identified abnormal clumps of the protein tau in Webster's brain, which he believed to be evidence of CTE. Such proteins develop in tangles that slowly strangle neurons and, consequently, inhibit brain function.

Many studies point to how dangerous football is to players' long-term brain health. Although there is also research related to college players and younger, this case study focuses on the NFL. The studies show:

- Over two regular seasons (2012-2014), NFL players sustained 4,384 injuries, including 301 concussions. This statistic is up 61% from 2002-2007, perhaps reflecting an improvement of awareness and reporting (Lawrence et al. 2015).
- In a study of 14,000 NFL players, researchers found that even head impacts insufficient to cause concussions can mount up over the years, leading to CTE and premature death. An NFL player who plays 24 games increases the likelihood of premature death by 16% (Ehrlich et al., 2019).



- A 2019 study of the brains of 223 football players with CTE and 43 players without CTE found that for each additional 2.6 years of play, the risk of developing CTE doubled (Mex et al. 2019).

Given the results of these studies, there has been a strong outcry against football, including at the NFL level. The NFL initially pushed back against the implications of such research. Then, as evidence piled up, the NFL funded research itself about head injuries and also how to design safer equipment. And, the NFL made rule changes in an attempt to make the game safer. The NFL has also changed rules to discourage helmet-to-helmet contact, and instituted protocols for safely returning concussed players to the field.

Despite these changes, controversy continues because the science in this area is not settled. Importantly, standard medical imaging techniques do not show brain damage even when a player has had a concussion. And CTE cannot truly be diagnosed until the brain is examined after death.

Neuropsychologist Munro Cullum argues: "I worry the pendulum has swung too far. The reality is that we still don't know who is most likely to suffer a concussion, who will take longer to recover, how anatomic or genetic differences influence concussions, and who may be at risk of prolonged symptoms or developing cognitive problems later in life."

Some studies seem to indicate that concussions may be more benign than feared. For example:

- A 2016 study found no elevated risk of suicide in a population of players with at least five years in the league (Lehman et al., 2016).
- Another study of 35 former NFL players over age 50 who had sustained multiple concussions during their careers found no significant association between the length of careers, the number of concussions, and their level of cognitive function later in life (Mez et al., 2019).
- A 2007 study found that retired NFL players experienced levels of depressive symptoms no worse than those of the general population (Schwenk, 2007).

So, at the end of the day, the jury still seems to be out on the question of whether or not we can go to a football game or watch one on television and still feel good about ourselves for supporting a sport that arguably causes irreversible traumatic brain injuries.

Discussion Questions:

1. One of the most influential studies of CTE in NFL players found that of 111 NFL players' brains that were donated for study, scientists diagnosed 110 with CTE (Mez et al, 2017). But this was not a random sample – the gold standard for research – of retired NFL players' brains. These brains had been donated by family members because the players had been exhibiting adverse symptoms before their death. Is your assessment of these results affected by the fact that family members donated these brains? If so, why? Explain.

2. Another recent study performed by the University of Buffalo found no dementia among 21 retired professional football and hockey players who had played for the Buffalo Bills and the Buffalo Sabres (Willer et al., 2018). But this is a very small sample size, which is not the gold standard for research. Is this study more persuasive to you than the previous one?

    a. Would your mind change if you learned that the study was funded by a foundation set up by the founder and long-time owner of the Buffalo Bills? If so, why?

    b. What implications does the self-serving bias have for your assessment?

    c. Would you change your mind (again) if the scientists who performed the study indicated that the foundation played no role in selecting subjects, designing the study, analyzing the data, or preparing the report? If so, why?

    d. Even without such involvement by the foundation, might the scientists have a subconscious desire to produce results that would please the foundation in order to pave the way for future funding? Explain.

3. The most influential standards for sports-related concussions come from the Concussion in Sport Group (CISG), which has published a new set of standards approximately every five years since 2001. An article by Casper and colleagues in 2021 criticized the CISG standards for adhering "to a libertarian framing of causality, risk, and intervention, rather than a precautionary, public health, and patient-centered point of view" (Casper et al.). They point out that the CISG has been "dominated by individuals with close relationships to professional and amateur sports organizations." For example, many of the CISG's members have received research support from the NFL, and other sports organizations like FIFA, the International Olympic Committee, and the International Ice Hockey Federation. In light of the self-serving bias, how does this make you feel about the CISG consensus statements? Explain your reasoning.

    a. Would your opinion be affected by the fact that the lead author of the Casper article has been hired as an expert witness by firms representing plaintiffs in litigation against sports organizations worldwide? Why or why not?

4. It has been suggested by Hanson in the *Journal of the Philosophy of Sport* that NFL team physicians and trainers are faced with conflicting loyalties. They have a duty to preserve the players' health, but can simultaneously feel pressure to get players back out on the field so the team can win. What is your opinion about how the self-serving bias might affect the judgments of team trainers and team physicians?

    b. Do you see a conflict of interest? Explain your reasoning.

5. The tobacco industry and pharmaceutical industry have long track records of funding and attempting to influence the results of research regarding their products. In their research, Bachynski and Goldberg accuse the NFL of doing the same. They give examples of the NFL pulling funding when researchers refused to remove a colleague who had been critical of the league from a research project. When the stakes are so high, is such conduct inevitable? Discuss.

    c. How can researchers guard against being unduly influenced or pressured in this way?

6. The NFL has accused the media of overhyping the dangers of concussions and CTE in order to sell newspapers and subscriptions. Is this a plausible conflict-of-interest that could impact the media? Why or why not?

7. What other behavioral ethics biases might be at play here? How might role morality, overconfidence bias, framing, and loss aversion factor in this situation?

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