[Orthopaedic Surgery]

“I Went to a Fight the Other Night and a Hockey Game Broke Out”: Is Professional Hockey Fighting Calculated or Impulsive?

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Background: The current study explored the relationship between fighting behavior and passage of time, across games and seasons, in an attempt to assess if violent behavior in hockey is impulsive or intentional.

Hypothesis: Before engaging in fighting behavior, players assess the utility of their actions and thus will fight less when the game is on the line (third period) and when champions are crowned (postseason).

Methods: An archival exploration utilizing open access databases from multiple Internet sources.

Results: During the 2010-2011 National Hockey League (NHL) season, players were significantly less likely to be involved in a fight as the game was coming to a close than in its early stages. In addition, data from the past 10 NHL seasons showed that players were significantly more violent in preseason games than during the regular season. They were also least likely to be involved in a fight during the postseason.

Conclusion: The converging evidence suggests that players take into account the penalties associated with fighting and are less likely to engage in violence when the stakes are high, such as at the end of a game or a season. This implies, in turn, that major acts of aggression in the league are more likely to be calculated rather than impulsive. The findings suggest that a more punitive system should diminish fighting behavior markedly.

Keywords: aggression; sport; fighting in NHL; hockey; utility analysis

Fighting is considered by many as an integral part of playing hockey in the National Hockey League (NHL) as well as one of its most honored traditions.^{4,11,15,19} The NHL is unique among the 4 major professional sports leagues in the United States (the other 3 being the National Basketball Association, the National Football League, and Major League Baseball) in its policy of not automatically ejecting players who are involved in fights. Not only does the NHL refrain from banishing those who fight, it specifically states in its rulebook that combatants should be disciplined with a meager 5-minute major penalty for fighting and additional time served if the instigator of the fight is identified. A player who participates in 3 fights in a single game is ejected automatically.

Junior and semiprofessional hockey leagues in North America, which cultivate young players for the NHL, have maintained largely similar rules¹ though in recent years have started to adopt harsher measures to reduce fighting. All the while, European junior and professional hockey leagues, as well as

Olympic hockey tournaments, are significantly harsher in how they deal with fighting, which often results in game ejection. For example, according to the international rule book (IIHF), hockey players who fight are assessed a 10-minute penalty, twice the length stipulated in the NHL. Those differences in policy manifest themselves subsequently when these 2 classes of players compete in the NHL ranks. According to 1 study, North American players fought significantly more than their European counterparts (234 vs 29 fighting penalties, respectively, during the 2003-2004 NHL regular season).¹⁶ The authors argued that fighting may be better explained as a learned response that is modeled and reinforced. More specifically, a player who early in his career observes another player fighting and is made aware of the rewards associated with doing so (eg, applause, additional playing time, financial compensation) is more likely to replicate this behavior in a similar context because he is guided by the assumption that he will also be similarly reinforced and rewarded.

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Another outcome from the NHL lax policy toward fighting is the emergence of players who serve as enforcers. This special class of hockey players aims to deter and respond aggressively to violent play perpetrated by the opposition. Enforcers are judged on their aggression, size, and checking ability but mostly fighting prowess. They are typically less skilled than their teammates, are often among the lowest scoring players on the team, and receive a smaller share of ice time.⁴ Notably, by studying the relationship between fighting and wages, it was established that an altercation was worth an additional \$10,000 to \$18,000 for an enforcer, depending on whether he was perceived as the loser or the winner of the fight, respectively.²⁰

Several studies have focused on the relationship between aggression and success in the NHL. Fighting was associated with teams advancing farther in the playoffs.²⁰ A strong positive relationship has been found between aggressive acts operationally defined as aggressive penalties (including but not limited to fighting) and the points the team accumulated per game. However, this does not hold true for the come-from-behind momentum shift theory, as teams who exercised aggression in the third and last period did not experience more wins.²⁸ Home teams incurred more aggressive penalties in games they won, while visiting teams incurred more aggressive penalties in games they lost during the 1987-1988 NHL season.¹³ Another study failed to find an association between fans' perceptions of who won the fight (as tabulated in fan-based websites) and game outcome.²³

Proponents, or defenders, of NHL fighting argue that the practice helps deter other types of more extreme and dangerous rough play, such as spearing and high-sticking. Players' interviews demonstrate, for example, that fighting was perceived as an informal mode of social regulation that in turn reduced more extreme instances of violence between players.¹¹ Others in favor of this relatively lenient approach claim that it allows teams to protect their star players and that it creates a sense of camaraderie and cohesion among teammates.⁴

Yet others argue that the benefits of the current NHL fighting practices extend beyond the strict on-ice play and pertain more to the business aspect of the sport.^{20,22,27} For example, one study found a positive relationship between hockey violence and game attendance for the US-based NHL teams. Interestingly, for the Canadian-based franchises, the situation was more complex. While there was a negative relationship between the more extreme violent home teams and attendance, spectators seemed to like more violent visiting teams.²²

In recent decades, opposition to the lenient treatment accorded to fighting by the NHL emerged, and those voices assailed the policy, utilizing diverse arguments spanning from issues related to the health of the players to the adverse influence it exerts on fans¹⁸ to the general unsportsmanlike character of the practice. For example, as far back as 1991, the Canadian Academy of Sport Medicine issued a position statement asserting that "Fighting does cause injuries, which range from fractures of the hands and face to lacerations and eye injuries. At present, it is an endemic and ritualized blot on the reputation of the North American game."⁹

One of the key questions surrounding fighting in the NHL pertains to whether it is a calculated type of behavior, which follows a rational cost-benefit analysis performed—implicitly or explicitly—by those who choose to partake in fighting prior to engaging in it. Alternatively, is fighting just a case of "hot tempers" that prevail and, thus, principally not a premeditated type of behavior?

One worthy approach to study fighting behavior is the economic theory of crime, which postulates that an increase in police resources shall lead to a decrease in crime rate. A study examining the effect of additional referees in enforcing NHL rules during the 1999-2000 hockey season when the league was evaluating (and alternating across the season) whether to have 1 or 2 referees found that the number of referees did not affect the number of penalties committed.²¹ The authors concluded that most infractions (penalties) are "accidental or retaliatory in nature" and "more analogous to a crime of passion rather than a calculated benefit-cost analysis performed by a rational criminal."²¹

However, studying aggression on ice as a function of the frequency of competition by contrasting intradivisional rivals who play each other 7 or 8 times during the season versus interdivisional teams who play each other only 3 games led others to reach an opposite conclusion.²⁹ Fighting penalties per game were significantly higher for intradivisional (mean = 2.63) in comparison to interdivisional (mean = 1.82) encounters. Yet, the relationship between frequency of competition and aggression was not linear for intradivisional games such that the aggressive penalties reached their peak in game 6 and declined markedly from thereon. The authors postulated that teams compete with their intradivisional rivals for playoff spots late in the season and thus, "teams reduce their aggression in order to minimize the likelihood of penalization and maximize their chance for victory."²⁹ In other words, the players were in control of their on-ice aggression and conducted a utility analysis before involving themselves in a fight.

The current investigation sought to address the question of whether fighting in the NHL is a calculated behavior through a more direct exploration of the frequency of fighting behavior. Fighting was first studied within games as a function of time. Following this, it was assessed longitudinally at a between-game level comparing preseason games (which do not count in the official points tally) to regular season games and postseason play over a span of 10 seasons (2000-2001 to 2010-2011). The authors hypothesized that NHL players are, for the most part, in control of their fighting behavior,²⁹ and while many motivations can propel aggression,⁷ hockey fighting is not predominantly an impulsive or affective behavior. Thus, when the incentives not to partake in fighting surpass those associated with engaging in it, fighting is less likely to occur. More specifically, we predicted that NHL players would fight less as games near their end; similarly, it was expected that NHL players would fight the least during the postseason, when every game is vital, and fight the most in the preseason, when the stakes of penalties are minimal.

METHOD

Archival data were used to study fighting in the NHL under select game situations. The NHL official website (www.nhl.com), www.hockey-reference.com, and, primarily, hockeyfights.com were the 3 online sources for data extraction. The latter is a website devoted to documenting all fights in the NHL and other leagues. It archives fighting in the league starting from the 1957-1958 season, and the fight cards are kept through box scores and recaps. A fight was counted when at least 1 player involved received a fighting major.

The study of fighting as a function of game time was conducted for the 2010-2011 season, for which the data were extracted from the hockeyfights.com website. The following information was recorded for each fight: date of the game, whether it was regular or postseason, and time of occurrence.

For the in-game analysis, each game was broken down into 5-minute segments for a total of 12 sections. These segments were chosen because the league instituted harsher punishment for fights occurring in the last 5 minutes such that a “player who is deemed to be the instigator of an altercation in the final five (5) minutes of regulation time or at any time in overtime shall be suspended for one game, pending a review of the incident. When the 1-game suspension is imposed, the coach shall be fined \$10,000—a fine that will double for each subsequent incident.”²⁵ The overall general number of fights occurring in each segment was correlated with its serial position for the preseason and the regular season (the postseason had too few fights [12] to conduct a similar analysis). Next, a bootstrapping procedure was used to assign measures of accuracy to sample estimates.¹⁴

For the longitudinal analysis, data from 10 seasons (2000-2001 to 2010-2011) were extracted from the hockeyfights.com website (earlier seasons were not part of the online database), excluding the 2004-2005 season, which was canceled due to a lockout. Each season was broken down into the pre-, regular, and postseason. There is a variable number of games played in the preseason (mean = 112.2 during the 10 seasons covered by this study), a fixed number of games during the regular season ($n = 1230$), and a variable number of games during the postseason (mean = 86.9 during the 10 seasons covered by the study). As an outcome variable, a percentage score of the number of fights divided by number of games for each period during the season, for the 10 NHL seasons covered, was computed. In addition, a percentage of games with fights was also computed.

RESULTS

Within-Game Analysis

During the 2010-2011 NHL regular season, 646 fights were recorded. The relationship between fighting and game time (12 segments of 5 minutes each) was investigated using the Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumption of normality, linearity, and homoscedasticity. Figure 1 demonstrates that there was a strong negative correlation between the 2 variables ($r = -0.697$, $P = 0.01$),

Figure 1. Number of fights as a function of game time across the entire season.

with a high number of fights occurring early in the game and thereafter declining markedly (no fights occurred during overtime). The effect size is of the medium-large magnitude.¹⁰ The coefficient of determination (r^2) was 0.49; in other words, 49% of the variability in fighting can be explained by the passage of time. A bootstrapped correlation analysis, which is a method for assigning measures of accuracy to sample estimates using 10,000 samples, computed a 95% confidence interval ranging from -0.35 to -0.92 (standard error = 0.14), indicating that this effect was robust and not driven by outlying values.

Further analysis of the same season for fights occurring in the preseason revealed the same pattern but failed to reach significance ($r = -0.49$, $P = 0.11$), most probably because of the reduced number of fights overall ($n = 116$). During the postseason, merely 12 fights occurred.

Longitudinal Analysis

A one-way repeated measures analysis of variance (ANOVA) was conducted to compare the percentage of fights occurring over the number of games played in the preseason (mean = 1.14; standard deviation = 0.18), regular season (mean = 0.54; standard deviation = 0.09), and postseason (mean = 0.13; standard deviation = 0.05) (Figure 2). There was a significant effect of time, $F(2, 18) = 222.88$, $P < 0.00$, partial eta squared = 0.96, indicating a large effect size. Within-comparison of the main effect showed that each level was significantly different than the rest.

A one-way repeated measures ANOVA was also conducted to compare the percentage of games with fights during the preseason (mean = 61.63; standard deviation = 4.15), regular season (mean = 37.62; standard deviation = 4.34), and postseason (mean = 10.14; standard deviation = 4.1). Once again, there was a significant effect of time, $F(2, 18) = 493.92$, $P < 0.00$, partial eta squared = .98, also indicating a large effect size. Within-comparison of the main effect showed that each level was significantly different than the rest.

Figure 2. Percentage of fights per game as a function of time over the entire season.

DISCUSSION

The findings provide strong convergent evidence that NHL players certainly take time into consideration when deciding to engage in fighting. They are significantly more likely to fight early in the game and in the preseason rather than at times when the score is most meaningful, namely, when the game is close to the end of regulation or during the postseason. In fact, NHL players are least likely to fight during the eventual Stanley Cup Finals championship series. In the 10 years covered, a fight erupted on average only in 1 of every 8 games (percentage of fights occurring over the number of games played = 0.125).

These findings run against previous findings demonstrating that hostility was intensified with a prolonged competition duration.^{2,12} The magnitude of the present effects suggests that fighting in the NHL is largely premeditated and deliberate behavior rather than underlined by “hot” out-of-control bursts of violence. These findings stand in stark contrast to past research, which argued that “many sports infractions take place during the heat of competition and may be accidental or retaliatory in nature rather than planned in advance.”²¹

The results of longitudinal or cross-game analyses also suggest that the players in the league do not treat each game as a new and distinct experience but keep a detailed account of past encounters with rivals and tend to settle the “fighting” score early in the next game. This trend is also in line with what is commonly known in the NHL as the “free pass.”²⁴ This norm makes it permissible for enforcers, who often play injured due to previous fighting instances, to decline a challenge to fight. However, the courtesy is usually extended only until the next game, when the fighting score is usually settled early on.

Currently, 2 enforcement systems are in place in the NHL to regulate fighting behavior. The first is in the official league rulebook and the second is the unofficial “code,” which

promotes the use of specialized enforcers who protect their teammates through deterrence. The findings in the current investigation demonstrate that NHL players fight less when their actions may cause their team to lose an important match. This rational-utilitarian approach suggests that the code, with its intimidation and retaliation basis, can be made expandable by instituting harsher penalties for fighting that will tilt the cost-benefit analysis toward the former. For example, under the current rule, players are automatically ejected if they are involved in 3 fights in 1 game. During the 2010-2011 season, 31 players were involved in 2 fights in 1 game but only 1 player was involved in the additional third fight that automatically disqualified him.

It has been already demonstrated that harsher sanctions could bring about changes in the frequency of aggressive penalties. During 141 regular games studied, players in the Canadian Interuniversity Athletic Union (CIAU) committed only 64 major aggressive penalties while NHL players committed 377 in a similar number of games. Fighting in a CIAU game resulted in a 5-minute suspension (like in the NHL) but also game expulsion and league suspension.¹ While the level of skill and competitiveness of the 2 leagues differ substantially, it does appear that all players respond to the negative consequences of their actions and tend to curb their aggressive behavior when the price to pay for it becomes prohibitive.

Another claim made by advocates of the current off-the-books enforcement of “the code” system is that fighting serves as a social regulation mechanism, which in turn reduces more dangerous occurrences of violence (eg, high-sticking, spearing, hitting from behind).¹¹ League officials believe that allowing players to release their pent-up emotions on the spot followed by a trip to the penalty box to blow off steam is ultimately safer than letting those aggressions fester.¹ While the current investigation did not explore this claim directly, this argument falls within the purview of the catharsis theory, which posits that following an act of aggression, one is cleansed or purged of hostility.⁶ The research literature is extensive in debunking the catharsis myth^{6,8,17} and provides strong empirical support instead for the cognitive neoassociation theory,³ which predicts the exact opposite, as it postulates that aversive events such as fighting have a negative effect and make cognitions more salient and therefore make it more likely that additional and intensified aggressive acts will soon follow. For example, in the context of the cultural spillover theory, it was found that hockey players were significantly more likely to report acting in a violent manner targeting family members than nonhockey players, presumably because of the very aggressive nature of the game.⁵

Another argument made by the proponents of the current enforcement system is that fans watch NHL games to experience enforcers as gladiators fight.²² However, when surveyed, Canadian spectators reported that “watching fights” came only third after “skillful hockey” and “support team” as the reasons behind their presence at the game.²⁴ This economic explanation is partially undermined by high TV

viewership ratings during the NHL postseason games as well as the hockey tournaments during the Winter Olympics, when fighting is at a minimum.²⁶

The archival-correlational approach undertaken by the current study is obviously limited in respect to the ability to determine the cause-and-effect relationship. Rather than conducting a utilitarian analysis of pros and cons when contemplating whether to fight, it is possible that the negative linear relationship demonstrated between time and fighting frequency is driven mostly by fatigue. In other words, as NHL enforcers get tired both during the game and as the season progresses, given the extreme physical toll that fighting bouts assert on the participants (the players need to maintain balance on ice while pummeling their rival for a duration of approximately half a minute), they become physically exhausted and thus less motivated to engage. As a case in point, it is considered unfair according to "the code" to initiate a fight with a rival who is at the end of his on-ice shift, as if acknowledging that the player is tremendously tired and not in prime shape to scuffle.⁴ To rule out this alternative explanation, a time duration comparison was completed between the first and the last 25 one-on-one fights of the regular season, assuming that if fatigue had a substantial influence, fighting bouts should be of significantly shorter duration by the end of the season. However, there was no significant difference in length between the beginning (mean = 26.52 seconds) and the end (mean = 29.08 seconds) of the regular season.

Generally, while fighting frequency has been on the decline since the late 1980s, a fight is still a relatively very frequent occurrence in the NHL, at a little less than 1 fight in every 2 games during the 2011-2012 season.¹⁹ A recent medical study established that fighting caused only 8% of all diagnosed concussions in the league.¹⁹ However, many concussions go unreported as players do not want to risk losing pay for being ruled temporarily incapacitated.

The current investigation focused on the function of time (both intra- and intergame) in the cost-benefit analysis carried out by NHL players when deciding to engage in a fight. The results firmly establish that hockey players in the league are highly sensitive to the time factor when throwing their fists. Future research can explore utility by studying other associated variables, such as game score. For example, following the present study findings, players in teams that are either in a comfortable lead or well behind should feel more at ease to engage in fighting as the collective adverse ramifications are minimized.

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