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### Winning Percentage and Attendance in the NHL

Daniel Peters  
*St. John Fisher College*

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## Winning Percentage and Attendance in the NHL

### Abstract

This research extends the analysis of winning on attendance, looking specifically at its prevalence in the National Hockey League. Data was collected from 2005-2006 through the 2010-2011 season for the each of the league's 30 teams. Each club's winning percentage at the midway point of each year was noted, and attendance at each of the remaining home games was analyzed. Statistical analysis revealed that the only season in which there was a significant relationship between midpoint winning percentage and second half attendance was 2010-2011. This study also explored patterns of attendance across the league over this six-year span.

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Winning Percentage and Attendance in the NHL

Daniel Peters

St. John Fisher College

### **Abstract**

This research extends the analysis of winning on attendance, looking specifically at its prevalence in the National Hockey League. Data was collected from 2005-2006 through the 2010-2011 season for the each of the league's 30 teams. Each club's winning percentage at the midway point of each year was noted, and attendance at each of the remaining home games was analyzed. Statistical analysis revealed that the only season in which there was a significant relationship between midpoint winning percentage and second half attendance was 2010-2011. This study also explored patterns of attendance across the league over this six-year span.

### **Winning Percentage and Attendance in the NHL**

The devoted sports fan is an influential part of modern society throughout the world. Individuals can consume virtually any sport, as well as follow their favorite teams through various print and electronic mediums if they choose not to attend games. According to the 1993 U.S. Census Bureau, both sporting event attendance and media coverage enjoyed steady increases over the previous ten years (as cited in Laverie & Arnett, 2000). Upon reviewing existing literature on the topic, however, most studies on success and attendance have been conducted with respect to a few world renowned sports: baseball, soccer, and American football.

Upon observing previous works by various authors in terms of attendance practices, there exists only a small amount of consideration that has been paid to professional hockey (specifically the National Hockey League), one of North America's premier sports. Anecdotal observations from those working in hockey claim that team success is a major factor on whether or not fans come out to game. According to Warren Kosel, Manager of Communications for the American Hockey League's Rochester Americans, the biggest reason that fans cite for not attending the club's games is due to lack of success on the ice (W. Kosel, personal communication, February 11, 2011). The National Hockey League's Florida Panthers also experience fan attendance deficiencies, which has been referenced to be mostly due to lack of success as well (the team has missed the playoffs for 10 straight seasons). As the organization's Event Marketing Manager Jill Waldman explained, "Our biggest problem in attracting people to attend games is not due to technology; however, it comes down to team performance. If the team is winning people will come. When the team is losing it is increasingly difficult to get people to come out" (J. Waldman, personal communication, November 16, 2010).

After hearing each of these testimonials, it appears as if winning percentage can have a substantial weight on fans' aspirations to make the trip out to the stadium/arena for the game. Raymond Williams, a socialist and novelist in the mid 1900s, (1961) pointed out that if customer wants are not met and they are not satisfied, they will probably take their money and invest it in alternative options, and possibly decide to tune into the television/radio, or simply not at all (as cited in Giulianotti, 2002). The purpose of this study is to extend previous research and look in terms of how attendance can impact a specific team over the course of a season.

### **Literature Review**

Trail, Anderson, and Lee (2006) (cited in Kwon, Trail, & Lee, 2008) said that scholars have been interested in factors such as team identification, sport fan motivations, enjoyment, and others that influence fan behaviors in spite of team success/failure. Such behaviors seem to be principal determinants of peoples' attitudes toward their respective club, including their willingness to make their association publically-known. Other factors include whether or not they will continue to support the team and attend games (a trait known as conative loyalty), which has significant relevance to sport organizations by showing the relative importance of success on the playing surface ranks in the minds of fans. In turn, this has been shown to be a rather effective predictor of attendance, as well as consumption of team-related merchandise and media (Trail et al., 2006 as cited in Kwon et al., 2008).

#### **Fan responses to team performance**

In a study which analyzed the relationship between team success and MLB attendance, Davis (2007) found that winning was significantly important to the fans. For teams above .500, each win was shown to add between 138 and 350 fans (Davis 2007). Further, Lemke, Leonard, and Tlhokwane (2007) used data collected from box score information reported by the MLB and

determined that attendance behavior only changes in September (the final stretch of the season) based on playoff chances and contention, while no difference was found in April through August. Upon the arrival of September, results showed that attendance is expected to increase by 4,353 when the home team is leading its division and by 2,512 when leading its wild card race (Lemke, Leonard, & Tlhokwane, 2007). In terms of the home team's probability of winning each game specifically, attendance was shown to be positively correlated with the chances of winning (Lemke et al., 2007). Based on such relationships, sport psychologists have extensively looked at the degree to which an individual feels a psychological connection to a particular team or athlete can be used to predict the way in which they react to their team's performance (Wann & Branscombe, 1990). Campbell, Aiken, and Kent (2004) present that external fan behavior can be linked to internal tactics of managing one's image to both themselves and others.

Basking In Reflected Glory, also known as BIRGing, is an identity-management phenomenon presenting that sport fans often highlight their connection with their respective team following a victory (Assollant, Lacassagne, & Braddock II, 2007). Throughout analysis of significant literature on BIRGing, a classic study conducted by Cialdini et al., (1976) was referenced as the basic foundation of the theory itself (as cited in Assollant et al., 2007). The investigation itself found that after victory by a university football team, students were more likely to wear affiliate attire and use the term "we" to reference themselves as part of the victorious group following a win as opposed to a loss (Cialdini et al., 2007 as cited in Assollant et al., 2007). Wann & Branscombe (1990) explored this topic more extensively, finding that fans with high levels of team identification were more likely to BIRG after a victory than fans with low levels. Additionally, the duo established that such individuals with high levels of identification would maintain their association even after a poor performance. Wann, Hamlet,

Wilson, & Hodges (1995) described BIRGing as an “ego enhancement function” and sought to further test the validity of BIRGing behaviors. The group did so in a political atmosphere, examining whether or not those aligned with a successful party were more likely to wear badges identifying group membership rather than those of the less successful party (Wann et al., 1995). Results demonstrated that persons belonging to the successful group were less likely to publically make their affiliation known, and it was also confirmed that those individuals who maintained their association with the unsuccessful group were higher in group identification (Wann et al., 1995). In turn, this supports the theory evaluated by this study of fans increasing their support, affiliation, and attendance with a winning team.

Weiler and Higgs (1997) extended the application of this theory by examining the background profile of the committed sports fan to the All American Girls Professional Baseball League (AAGPBL), which existed in the 1940’s. After taking many previous theories into perspective, the authors found that BIRGing was the most significant factor in determining fan commitment with particular teams (Weiler & Higgs, 1997). Based on a questionnaire distributed to fans of the AAGPBL, the conclusion was drawn that people sought to enhance their own image by associating themselves with winners (Weiler & Higgs, 1997). This tendency was also connected to individuals seeking achievement, stating that some identification with a certain team was in effort to be able to share in its outcomes, including taking credit for victories (Weiler & Higgs, 1997). A study by Murrell and Dietz (1992) revealed another element of BIRGing, related to college athletics. The authors discovered that when fans believe that their respective college/university is perceived by others as high in status, they formulate behaviors and attitudes that strengthen their association with its sports teams (Murrell & Dietz, 1992). This



discovery may also have implications for professional sports, because it could lead to the same behaviors if fans of a certain team recognize that their team is perceived as high in status.

Contrary to their test on fan reactions to success, Weiler and Higgs (1997) decided to look at how individuals would respond to failure of associated groups. Through their study, the two authors discovered a tendency for fans to avoid blame if failure (losing) occurred within their team, an extension to the aforementioned BIRGing . The explanation which was found in previous literature to this conduct has been termed Cutting Off Reflected Failure, or CORFing (Koenigstorfer, Groeppel-Klein, & Schmitt, 2010). CORFing behaviors lead individuals to decrease their association with an unsuccessful group (Wann et al., 1995). According to Koenigstorfer et al. (2010), this tactic serves to prevent one's self esteem or image from harm. Rather than experience the consequences of a weakened position in the social environment, fans will distance themselves through this process (Campbell et al., 2004). Consequently, Wann, Tucker, and Schrader (1996) established that a lack of team success is the most important reason for individuals ceasing to follow a once-favorite team.

The work of Kwon et al. (2008) revealed a previously unproven relationship between CORFing and people who have a high need for achievement which they choose to fulfill through external experiences. The results noted that individuals characterized by such factors will detach themselves from groups seen as unsuccessful in attempt to protect their self-esteem (Kwon et al., 2008). Vicarious achievement is another branch which has been tied into CORFing (Kwon, Trail, Lee, & Anderson, 2007). Kwon et al. (2007) stated that vicarious achievement refers to the need for achievement which an individual may choose to fulfill through association with a successful other. If this "other" becomes unsuccessful, however, this need for vicarious achievement is no longer met. As a result, some individuals may be forced to cut off the existing

reflected failure (CORF) when their identity as a fan of the team does not allow them to build or maintain self-esteem (Kwon et al., 2007). Conversely to BIRGing tendencies, a higher level of identification as a fan of the particular team decreases one's likelihood to CORF (Wann & Branscombe, 1990). A specific example of CORFing behavior is provided by Campbell et al.(2004), who cited many franchises such as the NBA's Golden State Warriors, the NFL's Detroit Lions, and the NHL's Toronto Maple Leafs, all of which have maintained a large, loyal fan base despite poor winning percentages over extended periods.

In opposition to these widely studied and prevalent responses to winning and losing, Campbell et al. (2004) presented two newly discovered concepts, CORSing and BIRFing. Cutting Off Reflected Success (CORSing) is a behavior in which fans cut off ties with successful teams (Campbell et al., 2004). Cited reasons for such actions have included fans becoming resentful towards seemingly greedy owners/managers/players, team conduct issues, as well as teams that simply buy the best players (Campbell et. al, 2004). Further, Campbell et al. (2004) stated that others may rebel toward an earlier era, previous style of play, of a previous coach/management team because of a high preference for consistency. In connection with self-image, certain people may need individuality, and to stand apart from the crowd which can come from associating with a winning team (Campbell et al., 2004). When a team begins to display success and attracts new fans, the uniqueness of following that club is replaced by the feeling of just being "part of the crowd" (Campbell et al., 2004). This may also cause individuals to resent bandwagon jumpers, fans who haven't been loyal and join the crowd as the team becomes successful (Campbell et al., 2004). To others who cut off ties with a successful team, the exhilaration of associating with the underdog may cause them to move on to following a less successful club (Campbell et al., 2004).

According to Campbell et al. (2004), Basking In Reflected Failure (BIRFing) occurs when fans remain loyal to a team in the face of failure. It is presented that sticking with their team may be seen a means of expressing uniqueness (as talked about earlier in CORSing as well) because this type of behavior would be seen as less common (Campbell et al., 2004). Perhaps the most interesting fact pointed out by Wann et al. (2006) was that BIRFing can be considered a distinct method of self-image management. Because society views loyalty as a positive trait, people treat it as a “badge of honor” worn to display their loyalties in the face of hardship (Wann et al., 2006). Some individuals may also believe that their loyalties through the tough times will pay off someday and they will be rewarded, which would also result in strengthening social ties amongst the true diehard fans (Campbell et al., 2004).

### **Self and Group Identity**

Researchers within the fields of psychology and sociology have explored the identity and affiliation aspect of sports fans, relating fandom to one’s social/psychological manner. It has been presented that sport team identification facilitates social psychological well being by increasing social connection with others.

Social identity theory focuses on the connection between one’s sense of self and society (Dhurup, Dubihlela, & Surujlal, 2010), and also explains that people strive to maintain/enhance personal and group identity through multiple outlets (Murrell & Dietz, 1992). This need for association causes people to form emotional attachments to physical possessions, places, people, and groups (Dhurup et al., 2010). Wann, Keenan, & Page (2006) stated that when someone shows a high level of identification with a specific group, it comes as a result of positive emotions, high feelings of self-esteem, and high levels of satisfaction which the particular group provides. In addition, this can lead to a strong sense of attachment to a group as a result of

enhanced feelings of belongingness and connection, and are often times facilitated by identifying with sports teams (Wann et al., 2006). Through a study conducted in Pittsburgh, Pennsylvania, Kraszewski (2003) discovered that “football bars” have emerged in cities such as Pittsburgh, Green Bay and Buffalo (and virtually all NFL team cities), where fans gather on game-days to watch their respective clubs play on satellite television feeds. This can be seen as a way for individuals to experience feelings of collective unity with those other fans whom support the same team. It was also found that such alliances and groups can also apply to distance fans (those away from the geographical center of their team). This includes people who have moved from their area of origin who will meet up with others from their former region. Such factions have provided individuals with the opportunity to watch their team play and while also reconnecting with their "home". According to Kraszewski, he himself joined a club of Steelers fans from Western Pennsylvania while living in Fort Worth, Texas. He specifically indicates that when he joined the club, it had been in existence for four years and grown in membership from a few people to well over 20 (Kraszewski, 2003).

Previous research has also demonstrated that sport teams serve as a distinct source of group identity and are becoming more popular as a source for a “community” and extended social network that people can become a part of (Heere & James, 2007). These external groups can be formed on the basis of many factors, including gender, ethnicity, geography, sexuality, and social class (Heere & James, 2007). For example, sport organizations such as Historically Black Colleges and Universities (African-American) and the Boston Celtics (Irish American) appeal to fans who share a common ethnicity. Further, Heere & James (2007) found that members of a group seek to feel a degree of exclusivity with their association to the team. Therefore, they present that if a citizen of New York perceives the Yankees as having more of a

national identity (not representing the local community), identification with the Mets might be greater because of the club's affiliation with New York City itself (Heere & James, 2007).

Fans that form an identity to a team may experience strong feelings associated with their team and may feel the sense of attachment previously described (Laverie & Arnett, 2000). As a result, this increases the relative importance of their identity as a fan to their sense of self, which in turn was found to be highly correlated to attendance in Laverie and Arnett's study. These types of individuals, whom form a bond with their respective team and become "true fans", are not dissuaded from attending games based on the outcome and thus are prepared to attend every event (Hall, O'Mahony, & Vieceli, 2009). Hall et al. (2009) also follows up by stating that these fans demonstrate the highest degree of loyalty towards their clubs and display intense emotional responses to the team and its players.

On the other hand, there are those who may follow a specific team in a more casual sense. In a study which examined fans of Africa's Nippon Professional Baseball League, it was discovered that attendance increased at games between better teams and also for those which the home team was more likely to win (Leeds & Sakata, 2011). Hall et al. (2009) claimed that "casual fans" attendance behaviors are influenced by advertisements/promotions, as well as alternative events to the game. Fans as such look for entertainment and satisfaction when making a trip to the stadium or arena, and a report by Wann et al. (2008) showed that entertainment was the strongest motivational factor for fans of the thirteen major target sports which were examined. Additionally, many fans who felt satisfied upon attending felt so because the home team came out victorious in the contest (Wann et al., 2008). Zhang, Pease, Lam, Bellerive, Pham, Williamson, and Wall (2001) also analyzed fan attendance at minor league hockey games, finding that achievement seeking was a major determinant of the decision to

attend. Such individuals are people that wish to express prestige and accomplishment through identifying with sport game winners, which in turn leads to an increased likelihood of attending if their team is expected to win (Zhang et al., 2001). All of these previous findings exhibit that the success of a particular team can indeed impact whether or not fans attend, because if fans perceive a high probability of victory, their intentions to come to the game are much higher.

### **NHL fan behavior and recent trends**

Paul (2003) conducted a study related to variations in NHL game-to-game attendance, looking at the impact of scoring, violence, and regional rivalries, as well as team success. In the years preceding this research, there were many policies implemented by the league in attempt to increase scoring, reduce violence, and put more games in the schedule against regional rivals. In hopes to raise offensive output, the National Hockey League has instructed referees to enforce tighter rules in terms of players obstructing one another, while also reducing the size of goalie equipment, and increasing the size of the attacking zone/space behind the net. In terms of violence, an instigator rule has been put in which results in a penalty/ejection to any player whom blatantly starts a fight. In addition, officials have cracked down on hits to the head and suspensions for harmful conduct. Divisions have also been realigned over the years with respect to regions, and the schedule has increased the number of games between closely-proximate foes (Paul, 2003).

Evidence from this analysis of NHL attendance found that increased scoring actually decreased attendance when compared to the previous season's goal total and current season's goal per game average (Paul, 2003). Further, violence was found to be highly significant and positively related to attendance, which was tested using fighting as the representative variable (Paul, 2003). Paul (2003) also revealed that divisional rivals in the United States attracted larger

crowds, whereas fellow Canadian opponents did so for Canadian franchises. In terms of team success, it was discovered that making the playoffs but not advancing has a negative relationship to attendance the following year, however winning at least one round negates this connection (Paul, 2003). Upon reviewing previous studies to theirs, Leadley and Zigmont (2006) also argued that team performance was found to be a significant determinant of attendance in nearly all of the existing literature which they examined.

Annual National Hockey League marketing statistics were summarized by Miller and Washington following the 2007, 2008, and 2010 seasons. The documents highlighted various points of data including franchise valuations, annual revenues, fan loyalty, and attendance, amongst other things. According to Miller and Washington (2011), average league wide attendance has increased across the league since the lockout (2004-2005) from 16,954 to 17,070 (2009-2010). The Montreal Canadiens have finished in the top two in terms of attendance over the three years, averaging 21,273 per game, while the Detroit Red Wings and Philadelphia Flyers have been amongst the league leaders as well (19,494 and 19,458, respectively). The Red Wings have also led the NHL in fan loyalty from 2008-2010, with the Flyers, New Jersey Devils, and Boston Bruins have all been within the top five (Miller and Washington, 2008, 2009, 2011).

The purpose of this study is to extend previous research and look in terms of how attendance can impact a specific team over the course of a season. This will be conducted using all 30 National Hockey League teams upon the conclusion of each examined season, looking at each particular club's winning percentage at the midway point and the impact of such factors on second-half attendance. Various long-developed theories of psychology and sociology are integrated to help interpret the study's results, in addition to the exploration of various factors

that have been found to impact attendance frequency. The following are the research questions that are addressed in this project:

1. What are the trends of attendance for each particular team and the league as a whole over the span of examined years, as well as within each individual season?
2. Does attendance increase over the second half of the season for a team whose record is over .500 at the midway point?
3. Does attendance decrease over the second half of the season for a team whose record is under .500 at the midway point?

## **Method**

### **Sample Section**

The subjects of this particular study were all 30 NHL teams in each of the six examined seasons (n=30), with the research itself being exploratory in nature. Using content analysis, the investigation first looked at each team's winning percentage through the first 41 games of the following seasons: 2005-2006, 2006-2007, 2007-2008, 2008-2009, 2009-2010, and 2010-2011, while also noting first and second half attendance as well as final winning percentage.

### **Data Collection and Measurement**

To access the necessary information, the NHL's official game sheet/box score (via [NHL.com/team](http://NHL.com/team) websites) for each game was consulted. Consequently, the result of each contest (win/loss/overtime loss/shootout loss) was noted, as well as the attendance at each home game. After gathering the required game statistics for the first half, each individual attendance figure was averaged to come up with each particular team's average through the first 41 games. Upon completion, these steps described above were repeated for the second half of each examined teams' season. Furthermore, instead of analyzing each individual game over the last 41 games,



official league standings at the end each season were utilized to determine final winning percentage. Subsequent attendance figures provided the ability to calculate average attendance for the second half and compare this to their first half average. In terms of operations of measurement, winning percentage will be calculated at two points, all games after each team's 41<sup>st</sup> contest and also upon the conclusion of each season. Winning percentage is calculated as a team's number of wins divided by the total number of games played.

Along the way, it was discovered that determining the capacity of each NHL team's arena would also be useful in looking at the results from a different perspective. Through this, the ability arose to identify the capacity percentage of each club in addition to simply the raw attendance numbers.

### **Data Examination**

This research looks at six NHL seasons, ranging from 2005-2006 to 2010-2011. After the entire 2004-2005 season was cancelled due to a lockout of the players and owners, many changes were implemented into the rulebook across the league. Perhaps the most drastic adjustment was the insertion of a league-wide salary cap for the first time in its history. Additionally, the league tightened the rules with respect to obstruction, increased the number of games with divisional rivals, eliminated the two-line pass rule, and increased the size of the offensive zone (Paul, 2003). All of the on-ice adjustments were geared towards increasing scoring and creating more excitement, thus attracting more fans (Paul, 2003). These implementations changed the face of the game both on and off the ice, and as a result serve as a sufficient benchmark year to begin assessment. By examining data over six separate years, this ensures an adequate sample size to be sure that the results are accurate and not just a coincidence (Gratton & Jones, 2010).

By analyzing the relationship between first half success and subsequent attendance, this study follows an experimental design (Gratton & Jones, 2010). The two specific questions presented include whether or not an unsuccessful first half has an impact on subsequent attendance for teams in last place, and whether or not having a successful first half influences subsequent attendance for the first place team. The dependant variable in this case is represented by attendance, while winning percentage/position in the standings is the independent variable. Trends of attendance for each individual team since the lockout will also be disclosed over the six-year span, as well as within each specific season.

Data was compiled into an excel spreadsheet (one for each individual season) upon being gathered. The categories created included: season examined (year), team, first half winning percentage, first half average attendance, second half attendance, final winning percentage. These figures were in turn inserted into IBM SPSS Statistics 19 for analytic analysis. The two statistical analysis tools utilized in this study were regression and descriptive statistics. Correlation is used to determine how much of a relationship exists between two variables and the impact of a predictor variable on a dependent variable (Gratton & Jones, 2010). In this case, winning percentage will serve as the predictor variable, with attendance (over the second half) representing the outcome variable.

## **Results**

### **Statistics and Data Analysis**

#### **NHL overall from 2005-2006 season through 2010-2011 season**

##### ***Attendance***

As demonstrated in Table 1 the league average attendance capacity from 2005-2011 was 92%. There have been a handful of teams who have averaged perfect attendance figures (100%)

over this span, and this unique group includes the following: Calgary Flames, Edmonton Oilers, Minnesota Wild, Montreal Canadiens, New York Rangers, Philadelphia Flyers, Toronto Maple Leafs, and Vancouver Canucks. On the other hand, those with the worst attendance capacity numbers since the lockout are the New Jersey Devils and New York Islanders, both of whom average 79%.

Descriptive statistics of the league's attendance from 2005-2011 showed that the range between the highest and lowest raw attendance numbers across the league actually fell over the second half with respect to the range in the first half in all examined seasons but one (2005-2006), with that range being 1,068. It should be pointed out, however, that this range from 2005-2006 through 2008-2009 was just 365 people but jumped to 2,123 over the final two seasons. In addition, the highest attendance average for the entire league came in the 2008-2009 second half (17,678), while the lowest was in the first half of 2009-2010 (16,748). Over this span, the highest average belonged to the Chicago Blackhawks in the second half of 2008-2009 (21,953) and the lowest to the New York Islanders during the first half of the 2010-2011 season (9,962).

The average percentage change in attendance from the midway point to the end of the season for all teams from 2005-2011 was + 3.60%. Further, an impressive statistic worth noting is that the NHL's league-wide average capacity percentage has experienced a positive change over the second half in comparison to the first.

Table 2 displays the average capacity percentage for teams above and below the .500 mark over each season from 2005-2006 through 2010-2011. As it portrays, those teams with a record above .500 overall for the entire season had a mean capacity of 95%, while those below .500's was fairly lower at 89%.

The following teams experienced changes in attendance patterns over the years examined since the lockout that appeared to be change in relation to success: Boston Bruins, Buffalo Sabres, Carolina Hurricanes, Chicago Blackhawks, Colorado Avalanche, Dallas Stars, Los Angeles Kings, St. Louis Blues, Tampa Bay Lightning, Pittsburgh Penguins, Washington Capitals, and Ottawa Senators. These patterns were then compared to changes in the each club's record with respect to .500. The attendance figures of each of the teams being looked at with respect to their record are shown in Table 1, while the winning percentages of each of those teams over that span are portrayed in Table 3.

As Tables 3-8 portray, twelve teams over the course of the examined period had at least 100% attendance capacity for at least one year. Conversely, ten teams recorded average attendances of less than 85% of capacity at least once over the six seasons.

#### **Attendance Change for Teams based on Winning Percentage relative to .500**

A linear regression test was conducted to examine the relationship between winning percentage at the midway point and subsequent second half attendance (see Table 9). It was discovered that no significant relationship existed in the first five seasons analyzed; however there was indeed one for the 2010-2011 season. The relationship was indeed significant in this particular year ( $r=0.366$ ,  $p<0.05$ ).

#### **Discussion**

The purpose of this study is to extend previous research and look in terms of how attendance can impact a specific team over the course of a season. This was conducted using all 30 National Hockey League teams upon the conclusion of each examined season, looking at each particular club's winning percentage at the midway point and the impact of such factors on

second-half attendance. Further, the attendance figures for the league as a whole, as well as each individual club were analyzed.

The study revealed that the only season in which the relationship between a team's record at the midway point and subsequent attendance over the second half is significant was 2010-2011. With this, it can be determined that there is a 36.6% correlation between winning percentage and attendance across the league, as well as 13.4% of that correlation being due to actual winning percentage. The fact that the  $p = .047$  ( $p < .05$ ) we are able to state that with 95% certainty, the change in attendance for that season was due to winning percentage being above or below .500. Because the data shows that it was only significant in one of the seasons, that particular season still did not have a strong correlation between the two.

With this in mind, however, the unique trends of attendance that were pointed out for individual teams over the six years is worth noting. Despite no true relationship between attendance and winning percentage (or performance), a handful of teams seemed to have patterns that could possibly provide an argument for success influencing attendance patterns. These teams have been broken down into three groups: those who have increased their success over the span, those who have decreased over the span, and those who have experienced both ups-and-downs throughout the span.

#### **1. Teams that have consistently increased:**

- **Boston Bruins:** The Bruins' record has improved overall since 2005-2006 (all the way to being the Stanley Cup Champions in 2010-2011) and their attendance has also increased with each passing year since 2006-2007.
- **Buffalo Sabres:** Prior to the lockout, the Sabres had had five straight seasons of missing the playoffs. Since the lockout, the organization has had the potential to be a legitimate

playoff contender during the first half of 2005-2006 (eventually ended up coming within one game of the Stanley Cup Finals) and their attendance has thus skyrocketed since then as compared to what it was before the lockout. It presently remains near the top of the league, averaging out at almost 100% since the second half of 2005-2006.

- **Chicago Blackhawks:** Perhaps the most unique case of all, the Blackhawks have had by far the largest attendance change over these six years. They were near the bottom of the league standings from 2005-2007, but have gotten immensely better since and made the Western Conference Finals in 2009 and eventually won the Stanley Cup in 2010. After averaging less than 70% capacity over the first three years examined, they have since averaged 97% capacity.
- **Los Angeles Kings:** The Kings qualified for the playoffs in 2009-2010 and 2010-2011 for the first time in six seasons, with their attendance figures also rising over those two seasons. Over the first four examined years, they averaged just over 93% and that has since jumped to 96% and 100% over the final two, respectively.
- **Washington Capitals:** The Capitals have seen a consistent increase in attendance since 2006-2007. After missing the playoffs in the first two seasons after the lockout (as well as two of the three years leading up to the lockout) and being near the bottom of the standings, the Caps have been one of the league's better teams since 2007-2008, and their attendance has gone from 79% over the first three analyzed seasons to basically 100% in the last three.
- **Pittsburgh Penguins:** The Penguins came out of the lockout having missed the playoffs for two consecutive seasons and also failed to qualify in 2005-2006 (in which they averaged 92% attendance capacity). The following season, the club began a string of

making the postseason for the remainder of the seasons analyzed (and continues today).

With this, the Pens made it to the Stanley Cup Finals in 2008 and 2009, winning the championship in the latter year. Over this five year span, the franchise saw their attendance numbers rise above that of 2005-2006, and averaged 100% capacity in two of those seasons.

## 2. Teams that have consistently decreased:

- **Carolina Hurricanes:** The Hurricanes won the Stanley Cup in 2005-2006 and saw their attendance increase the following season. With this, however, they ended up missing the playoffs that year and have not done anything since to reach such expectations and attendance has gone back down. After being above 90% from the second half of 2005-2006 through the end of 2006-2007, it has fallen below that threshold each year since.
- **Colorado Avalanche:** After being one of the more elite franchises in the league from the mid-1990s through the early 2000s, Colorado has not done much in terms of winning since the lockout. With this, their attendance figures have fallen from almost 98% over the first three seasons to just 85% over the last three.
- **Dallas Stars:** Like the Avalanche, the Stars were one of the league's better teams throughout the late 1990s and early 2000s, however have not made the playoffs since 2007-2008. During this span, their attendance has consistently fallen from 97%-95%-93%-81%.
- **Ottawa Senators:** The Senators were considered to be one of the league's strongest teams for the first three post-lockout seasons (made it to the Stanley Cup Finals in 2006-2007), however have regressed over the past three. After averaging over 95% capacity from 2005-2008, the Sens have seen it drop to just 90% from 2008-2011.

### 3. Teams that have experienced ups-and-downs:

- **St. Louis Blues:** The Blues have been over .500 just twice out of the six years analyzed (2008-2009 and 2009-2010), and their attendance was also highest during those years and continues to increase.
- **Tampa Bay Lightning:** The Lightning came out of the lockout as the defending Stanley Cup Champions and made the playoffs in 2005-2006 and 2006-2007. The next three seasons following, however, they did not qualify for postseason play and attendance fell substantially (100% over first two years to 97%-86%-81, respectively). The club rebounded in 2010-2011 to make it to within one game of the Stanley Cup Finals and saw capacity rise to 90%.

This data, as well as the tables cited show that all Canadian teams except one, the Ottawa Senators, had 100% attendance capacity every single year. Statistics also show, however, that teams with records above .500 in each season overall had approximately 6% greater attendance than those below .500. Other relationships that may potentially exist despite the results of regression analysis are observed in the unique attendance trends that certain teams experienced from 2005-2011. Teams like the Boston Bruins, Buffalo Sabres, Los Angeles Kings, and most of all Chicago Blackhawks and Washington Capitals have all have seen substantial attendance increases as the team improved, while others like the Ottawa Senators, Dallas Stars, Carolina Hurricanes, and particularly the Tampa Bay Lightning and Colorado Avalanche have suffered decreases with lower performance.

Based on the information in Table 1 with the annual attendance figures of each specific team, it appears as if Canadian markets and larger markets in the U.S. have less attendance fluctuations relative to team performance. These larger markets include areas like: Philadelphia,



Minnesota, Pittsburgh, and San Jose, while the smaller markets are places such as: St. Louis, Nashville, Atlanta, Columbus, and Florida.

### **Threats of data, Implications, & future directions**

Upon evaluating this study, certain threats to the validity of the data must be taken into account. First, every specific club is located in a unique market, some of which may have more loyal fans or even a larger fan base in general. Qualities as such can more or less impact the amount of capacity an arena fills when they are winning or losing. Second, certain streaks always may arise, for instance a “bottom feeder” may make a push in the second half towards the playoff race, while a team near the top of the standings may struggle and significantly drop in the standings throughout their final 41 outings. This can lead to large-scale variations in the attendance over the first or second half. Further, some teams might make a “blockbuster” trade at any point during the season that brings in a new face that has a huge impact on attracting fans. Such an instance occurred in the 2009-2010 season, as the New Jersey Devils acquired Ilya Kovalchuk from the Atlanta Thrashers at the trade deadline, which despite not having a real influence on attendance figures, brought a world-class dynamic player to New Jersey. It may also occur that a team who finishes near the bottom of the standings drafts a player thought to be a “generational talent”, and thus garners additional fan interest (i.e. the Pittsburgh Penguins and Sidney Crosby). Lastly, management or coaching changes may also play a role in drawing more people to come to games if they had resentful feelings toward the staff being replaced.

One aspect of the population that should be noted is that the Atlanta franchise being observed has relocated to Winnipeg since the conclusion of last season. Although this does not have any impact on research because it only examines through 2010-2011, readers should be made aware of the change.

In the future, additional research can build off this study by using the data collected and predicting future attendance for each organization. For a different perspective on winning percentage's overall impact, it could also be examined as to how much additional revenue each win adds for every team, which in turn could present an "optimal" number of wins for a profit-maximizing owner.

This investigation determined that no significant relationship between winning percentage and attendance can be determined from the past six NHL seasons with the exception of 2010-2011. Additionally, even the relationship during this particular year was not particularly strong. There are, however, trends among individual teams over this time period that contradict the results of the study. The statistics put forth can also still be useful to ownership/management of individual NHL franchises as well as the league as a whole because of the fact that it presents in-depth details of overall attendance since the lockout. This would allow them to possibly discover the areas in need of change and be of assistance in all aspects of business operations.

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Table 1

*Team-by-team attendance figures from 2005-06 through 2010-11*

<b>Team</b>	<b>2005-06</b>	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>	<b>Team Average</b>
<b>Anaheim</b>	88%	95%	100%	99%	88%	86%	93%
<b>Atlanta</b>	84%	88%	85%	79%	73%	73%	80%
<b>Boston</b>	92%	84%	88%	97%	99%	100%	93%
<b>Buffalo</b>	90%	100%	100%	99%	99%	99%	98%
<b>Calgary</b>	100%	100%	100%	100%	100%	100%	100%
<b>Carolina</b>	83%	93%	89%	89%	82%	88%	87%
<b>Chicago</b>	65%	62%	82%	100%	95%	96%	83%
<b>Colorado</b>	100%	98%	94%	86%	77%	82%	89%
<b>Columbus</b>	93%	90%	82%	86%	85%	75%	85%
<b>Dallas</b>	96%	96%	97%	95%	93%	81%	93%
<b>Detroit</b>	100%	100%	94%	99%	97%	98%	98%
<b>Edmonton</b>	100%	100%	100%	100%	97%	100%	100%
<b>Florida</b>	94%	90%	91%	92%	89%	92%	91%
<b>Los Angeles</b>	98%	93%	92%	91%	96%	100%	95%
<b>Minnesota</b>	100%	100%	100%	100%	100%	100%	100%
<b>Montreal</b>	100%	100%	100%	100%	100%	100%	100%
<b>Nashville</b>	84%	89%	87%	88%	88%	94%	88%
<b>New Jersey</b>	75%	74%	82%	83%	82%	78%	79%
<b>NY Islanders</b>	78%	79%	84%	85%	78%	68%	79%
<b>NY Rangers</b>	100%	100%	100%	100%	99%	99%	100%
<b>Ottawa</b>	95%	94%	97%	92%	89%	90%	93%
<b>Philadelphia</b>	100%	100%	100%	100%	100%	100%	100%
<b>Phoenix</b>	91%	88%	87%	87%	70%	71%	82%
<b>Pittsburgh</b>	92%	96%	100%	99%	100%	99%	98%
<b>San Jose</b>	96%	100%	100%	100%	100%	100%	99%
<b>St. Louis</b>	74%	65%	92%	97%	99%	100%	88%
<b>Tampa Bay</b>	100%	100%	97%	86%	81%	90%	92%
<b>Toronto</b>	100%	100%	100%	100%	100%	100%	100%
<b>Vancouver</b>	100%	100%	100%	100%	100%	100%	100%
<b>Washington</b>	76%	76%	85%	99%	100%	100%	89%
<b>League Average:</b>	<b>91%</b>	<b>92%</b>	<b>93%</b>	<b>94%</b>	<b>92%</b>	<b>92%</b>	<b>92%</b>

*Note.* The percentages in the table represent the average percentage of each arena's capacity that was filled during that particular season

Table 2

*Season-by-Season Attendance for teams above .500 and teams below .500*

<b>Year</b>	<b>Below .500</b>	<b>Above .500</b>
<b>2005-2006</b>	86%	95%
<b>2006-2007</b>	86%	96%
<b>2007-2008</b>	91%	95%
<b>2008-2009</b>	91%	97%
<b>2009-2010</b>	92%	92%
<b>2010-2011</b>	87%	95%
<b>Overall Average:</b>	<b>89%</b>	<b>95%</b>

*Note.* The percentages in the table represent the average collective percentage of the arenas capacity for teams above vs. below .500 that was filled during that particular season

Table 3

*Season-by-season winning percentages of teams with notable attendance changes based on record*

<b>Team</b>	<b>2005-06</b>	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>
<b>Boston</b>	.354	.427	.500	.646	.476	.561
<b>Buffalo</b>	.634	.646	.476	.500	.549	.524
<b>Carolina</b>	.634	.488	.524	.549	.427	.488
<b>Chicago</b>	.317	.378	.488	.561	.634	.537
<b>Colorado</b>	.524	.537	.537	.390	.524	.366
<b>Dallas</b>	.646	.610	.549	.439	.451	.512
<b>Los Angeles</b>	.512	.329	.390	.415	.561	.561
<b>St. Louis</b>	.256	.415	.402	.500	.488	.463
<b>Tampa Bay</b>	.524	.415	.402	.500	.488	.561
<b>Washington</b>	.354	.341	.524	.610	.659	.585
<b>Ottawa</b>	.634	.585	.524	.439	.536	.390
<b>Pittsburgh</b>	.268	.573	.573	.549	.573	.598

*Note.* The values in the table represent each team's winning percentage over the entire season represented by that heading.



Table 4

*2005-2006 League Wide Comparison of Success and Attendance*

Team	Attendance Capacity	Midpoint Winning Percentage	End of Season Winning Percentage	Percent Attendance Change from Mid to End of Season
Anaheim		.439	.524 <sup>a</sup>	20.45% <sup>b</sup>
Atlanta	84%			
Boston				
Buffalo		.659	.634 <sup>a</sup>	17.34% <sup>b</sup>
Calgary	100%			
Carolina	83%	.659	.634 <sup>a</sup>	12.47% <sup>b</sup>
Chicago	65%	.317	.317	-18.47% <sup>c</sup>
Colorado	100%			
Columbus				
Dallas				
Detroit	100%			
Edmonton	100%			
Florida				
Los Angeles				
Minnesota	100%			
Montreal	100%			
Nashville	84%			
New Jersey	75%			
NY Islanders	78%			
NY Rangers	100%			
Ottawa				
Philadelphia	100%			
Phoenix				
Pittsburgh				
San Jose				
St. Louis	74%			
Tampa Bay	100%			
Toronto	100%			
Vancouver	100%			
Washington	76%	.317	.354	14.43% <sup>b</sup>

Note. <sup>a</sup> indicates team making the playoffs. <sup>b</sup> indicates an increase in attendance change of 10% or greater. <sup>c</sup> indicates a decrease in attendance of 10% or greater.

Table 5

*2006-2007 League Wide Comparison of Success and Attendance*

Team	Attendance Capacity	Midpoint Winning Percentage	End of Season Winning Percentage	Percent Attendance Change from Mid to End of Season
Anaheim		.683	.585 <sup>a</sup>	13.95% <sup>b</sup>
Atlanta				
Boston	84%	.488	.427	11.51% <sup>b</sup>
Buffalo	100%			
Calgary	100%			
Carolina				
Chicago				
Colorado				
Columbus				
Dallas				
Detroit	100%			
Edmonton	100%			
Florida				
Los Angeles				
Minnesota	100%			
Montreal	100%			
Nashville				
New Jersey	74%	.585	.598 <sup>a</sup>	14.13% <sup>b</sup>
NY Islanders	79%	.463	.488 <sup>a</sup>	16.36% <sup>b</sup>
NY Rangers	100%			
Ottawa				
Philadelphia	100%			
Phoenix		.463	.378	13.74% <sup>b</sup>
Pittsburgh	100%			
San Jose	100%			
St. Louis	65%	.317	.415	20.84% <sup>b</sup>
Tampa Bay				
Toronto	100%			
Vancouver	100%			
Washington	76%	.415	.341	11.90% <sup>b</sup>

Note. <sup>a</sup> indicates team making the playoffs. <sup>b</sup> indicates an increase in attendance change of 10% or greater. <sup>c</sup> indicates a decrease in attendance of 10% or greater.

Table 6

*2007-2008 League Wide Comparison of Success and Attendance*

Team	Attendance Capacity	Midpoint Winning Percentage	End of Season Winning Percentage	Percent Attendance Change from Mid to End of Season
Anaheim	100%			
Atlanta	85%			
Boston				
Buffalo				
Calgary	100%			
Carolina				
Chicago	82%	.463	.488	40.72% <sup>b</sup>
Colorado				
Columbus	82%	.463	.415	15.50% <sup>b</sup>
Dallas				
Detroit				
Edmonton	100%			
Florida		.463	.463	10.58% <sup>b</sup>
Los Angeles				
Minnesota	100%			
Montreal	100%			
Nashville				
New Jersey	82%			
NY Islanders	84%			
NY Rangers	100%			
Ottawa				
Philadelphia	100%			
Phoenix		.537	.463	11.74% <sup>b</sup>
Pittsburgh	100%			
San Jose	100%			
St. Louis				
Tampa Bay				
Toronto	100%			
Vancouver	100%			
Washington	85%	.390	.524 <sup>a</sup>	11.90% <sup>b</sup>

Note. <sup>a</sup> indicates team making the playoffs. <sup>b</sup> indicates an increase in attendance change of 10% or greater. <sup>c</sup> indicates a decrease in attendance of 10% or greater.

Table 7

*2008-2009 League Wide Comparison of Success and Attendance*

Team	Attendance Capacity	Midpoint Winning Percentage	End of Season Winning Percentage	Percent Attendance Change from Mid to End of Season
Anaheim				
Atlanta	79%			
Boston				
Buffalo				
Calgary	100%			
Carolina		.512	.549 <sup>a</sup>	18.55% <sup>b</sup>
Chicago	100%			
Colorado				
Columbus		.463	.500 <sup>a</sup>	15.50% <sup>b</sup>
Dallas				
Detroit				
Edmonton	100%			
Florida				
Los Angeles		.415	.415	16.14% <sup>b</sup>
Minnesota	100%			
Montreal	100%			
Nashville				
New Jersey	83%			
NY Islanders	85%			
NY Rangers	100%			
Ottawa				
Philadelphia	100%			
Phoenix				
Pittsburgh				
San Jose	100%			
St. Louis				
Tampa Bay				
Toronto	100%			
Vancouver	100%			
Washington				

Note. <sup>a</sup> indicates team making the playoffs. <sup>b</sup> indicates an increase in attendance change of 10% or greater. <sup>c</sup> indicates a decrease in attendance of 10% or greater.

Table 8

## 2009-2010 League Wide Comparison of Success and Attendance

Team	Attendance Capacity	Midpoint Winning Percentage	End of Season Winning Percentage	Percent Attendance Change from Mid to End of Season
Anaheim				
Atlanta	83%			
Boston				
Buffalo				
Calgary	100%			
Carolina	82%			
Chicago	100%			
Colorado	77%			
Columbus	85%			
Dallas				
Detroit				
Edmonton	100%			
Florida				
Los Angeles				
Minnesota	100%			
Montreal	100%			
Nashville		.634	.573 <sup>a</sup>	15.14% <sup>b</sup>
New Jersey	82%			
NY Islanders	78%			
NY Rangers	100%			
Ottawa				
Philadelphia	100%			
Phoenix	70%	.610	.610 <sup>a</sup>	35.90% <sup>b</sup>
Pittsburgh	100%			
San Jose	100%			
St. Louis				
Tampa Bay	81%			
Toronto	100%			
Vancouver	100%			
Washington	100%			

Note. <sup>a</sup> indicates team making the playoffs. <sup>b</sup> indicates an increase in attendance change of 10% or greater. <sup>c</sup> indicates a decrease in attendance of 10% or greater.

Table 9

*2010-2011 League Wide Comparison of Success and Attendance*

Team	Attendance Capacity	Midpoint Winning Percentage	End of Season Winning Percentage	Percent Attendance Change from Mid to End of Season
Anaheim				
Atlanta	73%	.488	.415	21.09% <sup>b</sup>
Boston	100%			
Buffalo				
Calgary	100%			
Carolina		.488	.488	12.73% <sup>b</sup>
Chicago				
Colorado	82%			
Columbus	75%			
Dallas	81%			
Detroit				
Edmonton	100%			
Florida				
Los Angeles	100%			
Minnesota	100%			
Montreal	100%			
Nashville				
New Jersey	78%			
NY Islanders	68%			
NY Rangers	100%			
Ottawa				
Philadelphia	100%			
Phoenix	71%	.463	.524 <sup>a</sup>	22.47% <sup>b</sup>
Pittsburgh				
San Jose	100%			
St. Louis	100%			
Tampa Bay				
Toronto	100%			
Vancouver	100%			
Washington	100%			

Note. <sup>a</sup> indicates team making the playoffs. <sup>b</sup> indicates an increase in attendance change of 10% or greater. <sup>c</sup> indicates a decrease in attendance of 10% or greater.

Table 10

*Correlation Analysis of League-Wide Midpoint Winning percentage and Attendance over the Second Half of Season*

<b>Year</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>P-Value</b>
2005-2006	0.225	0.051	0.232
2006-2007	0.018	0	0.926
2007-2008	0.206	0.042	0.275
2008-2009	0.054	0.003	0.776
2009-2010	0.162	0.026	0.391
2010-2011	0.366	0.134	0.047*

*Note\** $p < .05$