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WHO WON THE 1996 NHL PLUS-MINUS AWARD?

William (Bill) H. Williams
CUNY Hunter College

David A. Williams
St Louis Blues

WHO WON THE 1996 NHL PLUS-MINUS AWARD?
(OR IS HOCKEY'S PLUS/MINUS A TEAM STATISTIC?)

Bill Williams and David Williams
Hunter College and The St. Louis Blues

1. The Plus/Minus Statistic

Point total, goals plus assists, is an NHL player's most important individual statistic; it is the best predictor of salary. However, an **individual** player's goals and assists are only indirectly important to his team because the team objective is to win games and not necessarily to watch **individual** players run up their point totals. Unfortunately, sometimes opposition teams score easy goals **against** a team's best goal scorers because these players do not always play well defensively.

As a result of this conflict, hockey uses a statistic called the "plus/minus," (P/M), which purports to measure a player's offensive versus defensive ability. When a team scores an even strength or short-handed goal, every player on the ice for that team gets a "plus" and every player on the ice for the other team gets a "minus." For each player, the net accumulated difference between his pluses and minuses is his "plus/minus rating."

A negative "plus/minus" is often used to suggest that a player may not be paying attention to his defensive responsibilities. And a large positive P/M is likely to be related to exceptional defensive play. However, even though the P/M may described as an **individual**, defensive measure, it is clearly a balance of the offense and defense of **both** the player and the team.

2.   The Plus/Minus Annoys NHL Players

The plus/minus is widely described as an **individual,** defensive statistic and is also used by team management in **individual** salary negotiations; but there are diverse **team** factors, beyond the control of the player, that affect the plus/minus significantly. The P/M statistic is more than an individual statistic.

General team ability is one influencing factor. It helps greatly to play with talented teammates. Additionally, players are used in very different ways that also affect the plus/minus. It is very difficult to interpret the plus/minus comparison of an offensive player on one team with an enforcer on another. Although comparisons of players on the same team are not affected by team differences, internal comparisons are still very much affected by this different use of players.

We shall make adjustments to the calculation of the plus/minus so that comparisons across teams can be made more reasonably. Unfortunately, until useful statistics on

player use, such as ice-time, are made publicly available, it does not yet seem possible to make adjustments to improve internal comparisons.

3. The Official 1995/96 Winners

The final NHL 1995/96 season statistics show that Vladimir Konstantinov, who played 81 games for the Detroit Red Wings, finished the regular season with a league-wide high +60 rating. Although this is not seriously close to Bobby Orr's all-time NHL record of +124 in 1969/70, it is a very respectable number indeed. Now while Konstantinov is certainly a very good defensive player, many other players also have good reputations for defensive play, leading us to consider who else did well on this statistic. The top five players are given in Table 1.

NAME	TEAM	GP	P/M
Konstantinov, Vladimir	Detroit	81	+60
Federov, Sergei	Detroit	78	+49
Fetisov, Viacheslav	Detroit	69	+37
Nedved, Petr	Pittsburgh	80	+37
Vyacheslav, Kozlov	Detroit	82	+33

Table 1: THE BEST PLUS/MINUS NHL PLAYERS, 1995/96

From Table 1, we see that Konstantinov won the plus/minus award with a reasonably comfortable lead. Two of the players, Konstantinov and Fetisov, are defensemen and the other three are forwards, but notice that four of these players are from Detroit and the other one, Petr Nedved, played for Pittsburgh; both teams are very offensively skilled, but only Detroit received defensive praise. In fact, most of the top 30 P/M players are from the highest ranking teams: Detroit had eight in the top 30; Colorado, six; Pittsburgh and Philadelphia, four. Each of these teams led their division. These highly skilled teams do have considerable talent, but do they have all of it? To address this question, the lowest ranked P/M players are listed in Table 2.

NAME	TEAM	GP	P/M
Janney, Craig	Winnipeg	84	-33
Nolan, Owen	SJ Sharks	81	-33
More, Jay	SJ Sharks	74	-32
Cunneyworth, Randy	Ottawa	81	-31
Daigle, Andre	Ottawa	50	-30

Table 2: THE LOWEST PLUS/MINUS NHL PLAYERS, 1995/96

Craig Janney and Owen Nolan ranked the lowest, at minus 33. Although -33 is not particularly close to Bill Mikkelson's 's all-time NHL low of -82 in 1974/75 with the Washington Capitals, it is a distinction no NHL player wants. Since Janney played 71 of his 84 games for San Jose, he really achieved his bottom ranking while playing for the Sharks. So, as with the top-ranked players, the five players at the bottom also came from just two teams, the San Jose Sharks and the Ottawa Senators. Both teams were weak.

Are these five players are just weak and fell naturally to the bottom of the P/M rankings? At least four of the five players listed in Table 2 have received accolades for their ability during their NHL careers. Additionally, the NHL general managers must feel they are reasonably good because the total salary of the lowest five players is $6,775,500 compared to $8,362,033 for the top five, a mere million and a half or so less. And of the top salaries, Sergei Federov alone was paid $4,162,023: so that the lowest paid four players in Table 2 were paid almost the same as the lowest paid four in Table 1. A reasonable conclusion is that the NHL G.M.'s think that the players in Table 2 are good players.

The P/M statistic looks suspiciously like a team measure as well as an individual measure.

4. The Plus/Minus Statistic Reviewed

A thorough interpretation of "plus/minus" comparisons is not simple. There are a number of reasons.

The amount and types of player's ice time affects his P/M. In the extreme, a player who sits on the bench all season cannot get pluses nor minuses and his P/M statistic will be zero. On the other hand, if a player was on the ice all the time, he would be credited with every plus and every minus and his P/M would be completely determined by his team's overall performance. (Goalies are on the ice all the time, but goalies are saddled with a different set of statistics.) Further, a player who is used only on power plays cannot get a positive P/M because pluses are not given out for power play goals; only minuses are possible these players. Conversely, a player who is only used short-handed can, at worst, get a zero P/M. If use of players by their teams were consistent, as in the forgoing examples, interpretation and adjustment of the P/M might be possible, but this is not usually the case: players are used in a mix of situations and without knowing this mix a reasonable interpretation of the P/M is difficult indeed. Generally, special team play tends to make a player's P/M look relatively good **if** his team plays a negative offense and less so if the team plays a positive offense.

Some players, who are very good defensively, are consistently used by coaches against the most offensively skilled players. The team hopes that these strong defensive players will reduce the number of goals scored by the opposing teams best players. Nevertheless, the usual result for these defensive players is that they score few points, collect minuses and do

not look good when hockey's only purported measure of defensive skill, the P/M, is used against them.

The most serious difficulty in judging the P/M is that a player's team mates heavily influence it. A study of the 92/93 New York Rangers shows that the forwards had considerably more difficulty scoring goals (and as a result, winning games) when Brian Leetch was injured and out of the line up. The team was left with little play making ability. Sergi Zubov had not yet blossomed and only Mark Messier was left as a serious play maker. The Ranger goal scoring fell off and the players' P/Ms suffered without the presence of Leetch.

Occasionally fans think some players attempt on-ice manipulation of the P/M. A defenseman might appear to be slow leaving the ice when an offensive rush looks promising. The plan would be to back on the bench before the play turns around and a goal can be scored against his team. However, the players know that very often this just does not work; the play turns around so rapidly that you cannot get off the ice at all. We do not know any player who thinks this is a serious strategy for improving his P/M rating.

More information would very useful. Ice-time statistics have been jealously guarded by the NHL teams and would be very helpful. In the past, even an individual player might not manage to see his personal ice-time statistics. The good news is the NHL may release ice-time next season.

Next, since pluses measure offense and minuses measure defense, it would be useful to know the plus and minus figures separately. A **net** zero P/M made up of plus 75 and minus 75 is very different from one made up of plus 5 and minus 5. Unfortunately, these separate numbers are not available.

Finally, teams regularly play with no goalie at the end of a game. However, this team gamble mostly fails and even-strength, empty net goals are common. A result is that the players used in that situation collect many more minuses than pluses. During his career Tom Kurvers was always assigned by teams to work the power play and score points, but he had many empty net goals scored against him and his teams regularly used the P/M against him.

Perhaps, the Kurvers example demonstrates best, from a player's perspective, the unpleasant aspect of the P/M. It is very much of a team measure, but is sometimes used against him, individually, in salary negotiations. Statistically, a league-wide analysis of variance of the player P/M's shows that, to no player's surprise, the between-team component is highly significant.

5. The Team Plus/Minus

Since a player's P/M rating is clearly influenced by his team's performance, what is the **team** plus/minus?

For a team, goals for, GF, are scored in three ways: at even strength; EGF; on power plays, PPGF; and short handed SHGF,

$$GF = EGF + PPGF + SHGF.$$

Since pluses are given out for scoring at even strength and short handed, the team plus is equal to

$$EGF + SHGF = GF - PPGF = Te+.$$

All of these statistics are published, but GF and PPGF are more readily available than EGF and SHGF and so we can calculate Te+ as GF - PPGF. Similarly, goals against, GA, are also scored in three ways: at even strength, EGA; on power plays, PPGA; and short-handed, SHGA,

$$GA = EGA + PPGA + SHGA.$$

This permits calculation of the team minus as

$$EGA + SHGA = GA - PPGA = Te-.$$

Table 3 displays the plus/minus, TeP/M = (Te+)-(Te-), for each of the NHL teams.

Team	Te+	Te-	TeP/M	GF-GA
ANA	174	166	8	-13
BOS	214	202	12	13
BUF	171	188	-17	-15
CAL	170	160	10	1
CHI	210	155	55	53
COL	240	169	71	86
DAL	160	198	-38	-53
DET	228	137	91	144
EDM	168	224	-56	-64
FLA	173	171	2	20
HAR	170	176	-6	-22
LAK	184	230	-46	-46
MON	188	180	8	17
NJD	160	153	7	13
NYI	159	225	-66	-86
NYR	187	148	39	35
OTT	138	208	-70	-100
PHI	200	146	54	74
PIT	253	206	47	78
SJS	190	264	-74	-105
STL	145	166	-21	-29
TBL	155	180	-25	-10
TOR	164	182	-18	-5
VAN	209	200	9	0
WAS	171	137	34	30
WIN	193	203	-10	-16

Table 3: 1995/96 NHL TEAM PLUS/MINUS RANKINGS

There are a number of interesting features in Table 3. Detroit's Te+ of 228 was the highest in the league and they tied for the lowest Te- (137), giving Detroit a team plus/minus of 91. Strong team performance like that had to help any Red Wing player obtain a respectable, individual P/M rating. As an aside, notice that the Red Wings' GF-GA was 144, considerably more than the TeP/M of 91. This difference is due to the performance of special teams, so the Wings were also very effective in that area too. Even strength or special teams, the Wings dominated last year, at least into the playoffs.

Without additional information, such as ice time, it is difficult to imagine adjustments of the P/M statistic that would make the within team comparisons less ambiguous. League-wide comparisons are different however: even with the statistics that are currently available, we can make adjustments that enable better comparisons among the players.

6. The Expected Plus/Minus for Players

Since an individual player's P/M is so heavily team-dependent, it would be useful to construct an expected P/M for each player on a team. Then comparison of the expected P/M with the official P/M, will show how the player did relative to the team-dependent expectation. On his team, did the player do better or worse than expected? Furthermore, this adjustment also permits player comparisons across teams by consideration of how well each did relative to his team.

To create the expected P/M, notice that every time a team gets an even strength (or shorted handed) goal, five (four) players on the team get pluses. Consequently, if we multiply the number of even strength goals by five and the short handed goals by four, we get the number of pluses given out by the team for the season. [Since we do not know how many even strength goals are actually four on four, this is an approximation.] Similarly, for minuses. The difference is net number of team plus/minuses that get allocated to the players on the team for the season. Further, if we divide this difference by the number of games, 82, and then by 18, the number of skaters dressed for each game, we have the mean P/M per player per game for that team. Then, **assuming each player gets equal ice time**, we can multiply the number of games played by each individual player by the P/M factor to get an expected P/M for each player. Next, subtraction of the expected P/M from the official P/M tells how much a player exceeded, (or otherwise) his "expectation."

Since the expected P/M is team dependent, players traded during the year must have their expected P/M's calculated separately for each team.

7. The 1995/96 NHL Adjusted Plus/Minus Winners

While there are clearly improvements in the AdjP/M that can be made with better data, it is important to note that a league-wide analysis of the players' adjusted P/M's show that there are no longer significant, inter-team differences. This new statistic has, at least partially, removed some of the player complaints against the P/M.

The players with the best adjusted P/M's in the NHL in 1995/96 appear in Table 4.

NAME	TEAM	GP	P/M	AdjP/M
Konstantinov, Vladimir	Detroit	81	+60	+35
Bourque, Ray	Boston	82	+31	+28
Federov, Sergei	Detroit	78	+49	+25
Nedved, Petr	Pittsburgh	80	+37	+23
Courtnall, Russ	Vancouver	81	+25	+23

Table 4: THE TOP ADJUSTED P/M NHL PLAYERS, 1995/96

In spite of our best efforts to remove the advantage of playing for the powerful Detroit Red Wings with their league best team P/M, Vladimir Konstantinov is still the leader. Apparently, he really did have a great season.

Is anyone surprised that Ray Bourque suddenly appears in second place? Bourque is perennially effective. His official P/M of +31 was nowhere near Konstantinov's +60, but he had been clearly hurt by the Bruins modest team plus/minus of +12.

Russ Courtnall seems to arrive on the list from out of nowhere. Certainly, on the east coast of the United States, or even in the various hockey publications, we do not recall his season getting much praise. But even casual consideration of the Vancouver Canucks' player statistics quickly suggests that Courtnall was overlooked. He clearly had a great season.

Petr Nedved remains on the list, which is less surprising, at least to us, than Russ Courtnall because reports coming out of Pittsburgh all year long said he was having a great year. Both Viacheslav Fetisov and Vyacheslav Kozlov are gone from our top-five list, so that now only two of the top five players are from Detroit.

Based on the adjusted P/M's, which players rank last? First, **none** of the players in Table 2 are among the lowest five. Andre Daigle's adjusted plus/minus is -18 that ranks him 18th from the bottom. Randy Cunneyworth's AdjP/M is -12 and ranks him 63rd from the bottom, a much better position.

Who does appear on the bottom-five list? Tough guys, is the generic answer, no goals, no assists, no pluses and many minuses! Who specifically? The winner of this dubious award is 6' 5," 225 pounds, very mean and we don't plan to upset him by announcing it publicly!

Finally, since we are in Chicago, how did the Black Hawk players do? Fans here know that Keith Carney led the team with an official +31 followed by Chris Chelios at +25. Carney was eighth in the league and Chelios 27th. However, Chicago had a strong even-strength team, third in the league behind only Detroit and Colorado, (unfortunately, the Hawks special teams were -2 over the season) and as a result the adjusted P/M expects the Hawks players to have relatively high P/M's. Carney's AdjP/M is +16 and Chelios' is +10, excellent numbers, but still dropping them to 31st and 72nd in the league.

This project has been very interesting in that it has permitted us to focus on the excellent performances by players on the less powerful teams. However, we look forward to refining this analysis next year when the NHL makes player ice time available.

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