What Does It Mean to Draft Perfectly in the NHL?

When is Best Player Available not the Best Strategy?

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Vancouver Hockey Analytics Conference 2017

Let's define the status quo.

- There are 30 NHL teams, ~210 draft picks per year, and amateur players are eligible at age 18.
- The vast majority of drafted players need one or more years of further development before playing in the NHL.
- **Best Player Available**: Picking the best player left on the draft board with each of your team's picks.

But a player's potential career value isn't the only thing that teams care about...

Draft Case Study: Johnny Gaudreau

“Calgary beat us to the punch. There were people banging their hands on the table, like, ***‘Oh, we should have taken him a round earlier.’*** *It’s a calculated risk. The Flames got Gaudreau in a* ***really good spot****.”*

~ John Weisbrod, former Bruins scout

What's even better than picking good players?

Picking good players right before anyone else does.

When could your team have picked Johnny Gaudreau?

- Penguins: 54th
- Bruins: 81st
- Canucks: 101st

Estimating when teams will draft players is hard. But knowing everything is easy!

You are a time-traveling GM.

- You know the **value of each player** over the course of their career.
- You know **when another team will pick them** if you do not.
- What do you do?

Assumptions:

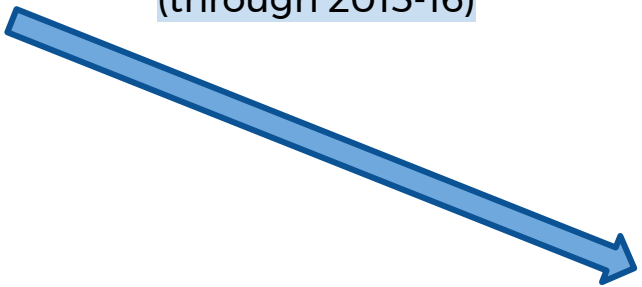
- You want to optimize the overall value of all your picks.
- If there's a logjam at some position, you can trade freely and efficiently.
- Your picks are fixed.
- No undrafted players. If you want them, sign them later!

Work backwards.
Don't pick a player before you have to.

Best Player Available

Pick	Player	PS
2	Benn	55.8
41	Subban	52.8
66	Martinez	27.7
122	Muzzin	24.6
152	Gunnarsson	23.9
161	Hagelin	21.1
182	Braun	21.1

PS: Career Point Shares from hockey-reference.com (through 2015-16)



Philadelphia Flyers 2007 Re-Draft

Backwards Best Player Available

Pick	Player	PS
182	Braun	21.1
161	Gunnarsson	23.9
152	Hagelin	21.1
122	Benn	55.8
66	Martinez	27.7
41	Subban	52.8
2	Pacioretty	46.2

Each team has a different Perfect Draft Value.

- **Perfect Draft Value**: sum of optimal picks' career values.
- Having **more picks** and **earlier ones** makes your Perfect Draft Value higher.

- **Draft Efficiency**:

$$\frac{\text{Actual Value Drafted}}{\text{Perfect Draft Value}}$$

- Allows us to compare teams on a more level playing field.

2007 NHL Draft	Rank	# of Picks	Average Pick	Total Value Drafted	Perfect Draft Value	Draft Efficiency %
Montreal Canadiens	1	9	94	153	319	47.92
San Jose Sharks	2	8	119	80	253	31.47
Los Angeles Kings	3	10	104	93	299	31.13
Dallas Stars	4	8	118	62	232	26.72
Chicago Blackhawks	5	7	76	80	307	26.21
Columbus Blue Jackets	6	7	90	46	247	18.73
Colorado Avalanche	7	9	96	53	284	18.66
St. Louis Blues	8	10	77	66	376	17.58
Philadelphia Flyers	9	7	104	41	249	16.53
Edmonton Oilers	10	6	70	39	249	15.76
Carolina Hurricanes	11	5	96	29	186	15.70
Toronto Maple Leafs	12	6	128	27	175	15.22
Pittsburgh Penguins	13	8	96	35	269	13.09
Phoenix Coyotes	14	7	69	36	273	13.08
Calgary Flames	15	5	108	20	181	11.14
New York Rangers	16	6	127	21	200	10.52
Detroit Red Wings	17	5	130	14	154	9.18
Washington Capitals	18	10	112	25	319	7.74
Tampa Bay Lightning	19	9	135	14	232	6.21
New Jersey Devils	20	6	121	10	174	5.80
Atlanta Thrashers	21	4	140	5	111	4.58
Nashville Predators	22	9	108	12	273	4.32
Florida Panthers	23	8	116	9	257	3.58
Buffalo Sabres	24	8	130	8	241	3.23
Anaheim Ducks	25	8	85	6	274	2.11
Minnesota Wild	26	5	127	3	179	1.84
Ottawa Senators	27	4	75	1	177	0.45
Boston Bruins	28	6	115	0	200	0.10
New York Islanders	29	5	121	0	154	0.00
Vancouver Canucks	30	6	122	0	175	0.00

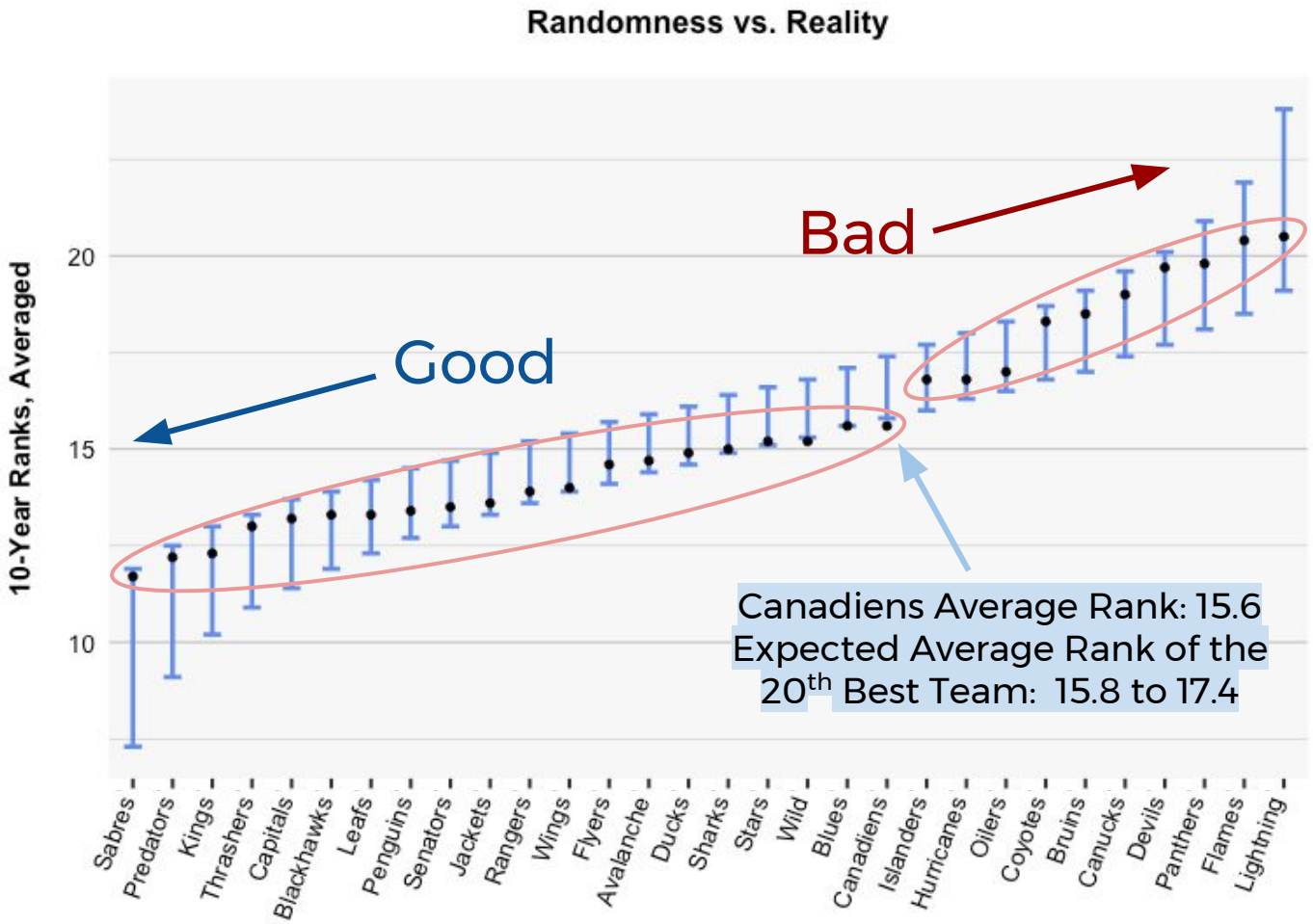
Sample Rank Output for the 2007 Draft

The team rankings look fairly random over the entire period.

Drafting is hard.

- If you focus on smaller intervals, some teams do significantly better than others.
- No team has managed to do significantly better (or worse) over the 10-year period.

Team	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average
Buffalo Sabres	21	2	6	3	7	22	12	24	10	10	11.7
Nashville Predators	11	12	20	5	6	9	26	22	5	6	12.2
Los Angeles Kings	3	9	23	19	27	4	13	3	6	16	12.3
Atlanta Thrashers	7	8	5	10	30	12	10	21	15	12	13
Washington Capitals	22	18	13	24	2	26	2	18	2	5	13.2
Chicago Blackhawks	26	10	3	1	14	23	6	5	27	18	13.3
Toronto Maple Leafs	12	16	4	26	28	3	3	12	12	17	13.3
Pittsburgh Penguins	16	24	14	6	4	1	5	13	29	22	13.4
Ottawa Senators	6	1	29	16	18	24	7	27	3	4	13.5
Columbus Blue Jackets	17	21	7	18	26	13	4	6	13	11	13.6
New York Rangers	1	7	22	28	8	15	19	16	4	19	13.9
Detroit Red Wings	10	26	1	8	11	14	21	17	17	15	14
Philadelphia Flyers	4	6	11	7	29	19	11	9	23	27	14.6
Colorado Avalanche	14	17	8	23	21	11	17	7	28	1	14.7
Anaheim Ducks	5	15	15	2	25	10	24	25	20	8	14.9
San Jose Sharks	28	3	27	4	20	5	20	2	11	30	15
Dallas Stars	13	4	18	20	23	7	25	4	25	13	15.2
Minnesota Wild	2	13	12	13	22	21	22	26	19	2	15.2
St. Louis Blues	24	22	26	14	12	8	8	8	9	25	15.6
Montreal Canadiens	18	11	21	11	5	2	28	1	30	29	15.6
New York Islanders	9	30	9	27	16	28	9	29	8	3	16.8
Carolina Hurricanes	20	28	2	15	9	17	16	11	26	24	16.8
Edmonton Oilers	19	14	16	25	15	20	18	10	7	26	17
Phoenix Coyotes	25	25	25	30	10	6	23	14	16	9	18.3
Boston Bruins	23	19	24	12	3	25	1	28	22	28	18.5
Vancouver Canucks	29	5	28	21	1	16	15	30	24	21	19
New Jersey Devils	8	29	30	9	13	18	29	20	21	20	19.7
Florida Panthers	30	20	10	22	17	30	14	23	18	14	19.8
Calgary Flames	15	23	19	17	24	27	27	15	14	23	20.4
Tampa Bay Lightning	27	27	17	29	19	29	30	19	1	7	20.5



We see minor separation between the top 20 and bottom 10 teams.

Are both of these teams good at drafting?

Chicago Blackhawks

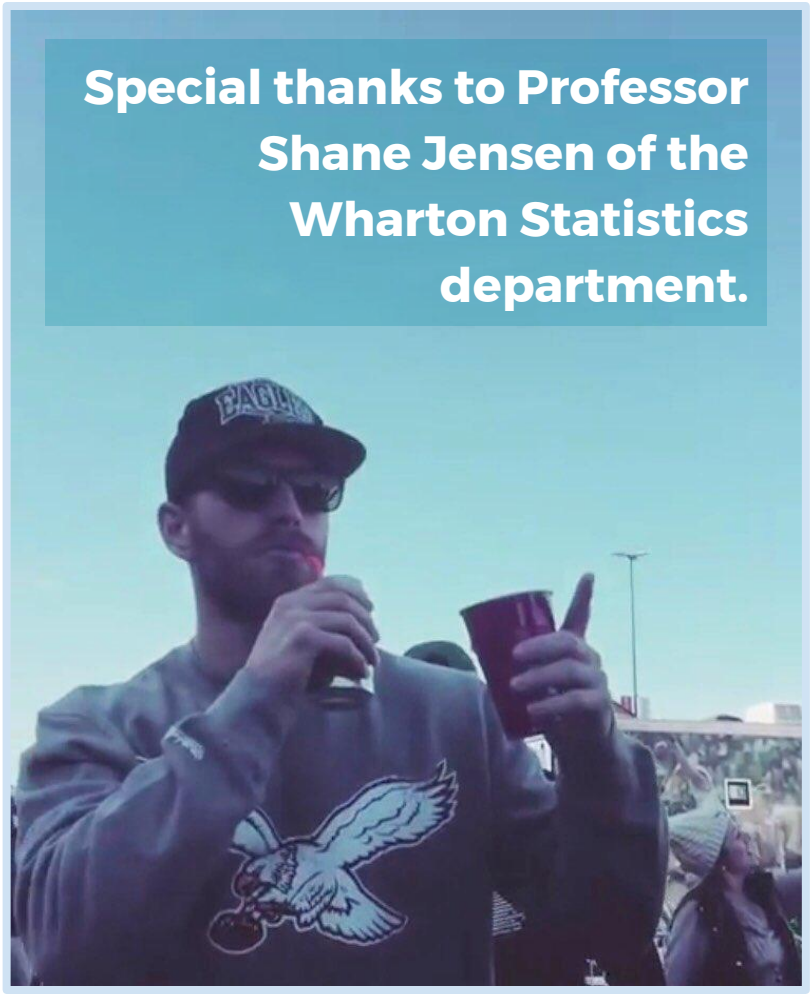
Evaluation Metric	NHL Rank
Total Value Drafted	2
Total Draft Efficiency	6
2+ Round Value Drafted	11
2+ Round Draft Efficiency	15

San Jose Sharks

Evaluation Metric	NHL Rank
Total Value Drafted	20
Total Draft Efficiency	16
2+ Round Value Drafted	6
2+ Round Draft Efficiency	4

Summary

- When teams draft, they care about what other teams do.
- In the long run, it’s hard to draft more efficiently than others.
- Moving forward, we can construct a relevant draft strategy if we have precise estimates of
  1) how valuable a player will be and
  2) when they will be drafted.
- Which is **a lot harder**.



Thank you!

Any Questions?

Check **@nnstats** on Twitter for slides/writeup/code/data.

Additional Notes

Note: Players can seem suboptimally ordered even when using Best Player Available.

- A player's outcomes are **variable**. Here are the draft year stats of an NHL star and a guy who's never played an NHL game:

Year	Junior Team	League	GP	G	A	P
2005-06	Baie-Comeau Drakkar	QMJHL	69	33	69	**102**
2005-06	Gatineau Olympiques	QMJHL	69	39	64	**103**

- Who's who? More importantly, will we ever be able to predict these outcomes beforehand?

A quick example:

- **Player A**: a big, surefire middle 6 guy.

100% Chance	Value = 50

- **Player B**: a tiny, skilled winger.

50% Chance	Value = 80	E(Value) = 40
50% Chance	Value = 0	

- If you take A before B, and B turns out to be a star, did you make a bad draft order decision? **Nope**. This is rational according to expected value.

Note: Valuation metric matters, but not as much as you think.

- If you use **NHL Games Played**, you pick someone over Sidney Crosby in the 2005 draft.
  (I mean, as a lifelong Flyers fan…)
- Use something like (rescaled) **GVT** or **Point Shares**, and then differences of opinion won't change the results that much.

Year	Team	Pick #	Optimal Player	Optimal Career Point Shares	Actual Player	Actual Career Point Shares	% Value Extracted
2007	Canadiens	12	Shattenkirk	44.7	McDonagh	41.6	93.1%