Beyond Corsi: Examining Weighted Shots

Matt Cane

@Cane_Matt

puckplusplus.com

Looking Beyond Corsi

- Corsi is dead! (At least according to Ken Campbell)
- In many ways "pure" Corsi has been dead for a while now
  - Corsi Rel adjusts for strength of teammates
  - dCorsi (Burtch) accounts for situational factors, looks at offense/defense separately
  - Score Adjusted Corsi (Tulsky, McCurdy) is more predictive than raw Corsi
- Corsi has flaws that others have pointed out
  - Treats goals, shots, misses and blocks the same (no "quality" factor)

Weighted Shots and Score Adjustments

- Team level Weighted Shots (wSH or Tango) differentiates between goals and non-goals
  - Goals = 1
  - Non-Goal Shot Attempts: 0.2
- Score Adjustments are necessary to properly weight events depending on game state and location
  - Game State: Losing teams shoot more, but score on a lower % of those shots
  - Location: Home teams take more shots
- At the team level Score Adjusted Weighted Shots (SAwSH) is as repeatable as Score Adjusted Corsi (SAC)
- SAwSH is a better predictor of future Goals For Percentage than SAC

3

Individual Score Adjusted Weighted Shots: The Basics

- Only 5v5 Data

- Adjusted for score and location

- Consider forwards and defencemen separately
  - What's indicative of success for a forward is different than for a defenceman

- Consider offence and defence separately

- Weights derived from split-half regression, i.e.:
  - Odd/Even GF60 ~ Even/Odd iGF60 + Even/Odd TMGF60 + ...
  - Even/Odd GA60 ~ Odd/Even GA60 + Odd/Even SAAS60 + ...

4

Offensive Event Weights - Forwards

Stat	Individual	Teammate
Goals For	0.346	0.100*
Shot Attempts For Saved	0.022	0.036
Shot Attempts For Missed	0.052	0.037
Shot Attempts For Blocked	0.036	0.029
1st Assists	0.337	n/a
2nd Assists	0.260	n/a

All weights are before score/venue adjustment
*Teammate goals exclude 1st and 2nd assists

$$SAwSHF60 = 0.34 * iGF60 + 0.10 * TMGF60 + 0.02 * iSAFS + \cdots$$

- Individual shot attempts are more heavily weighted than teammates' shot attempts

- 1st assists are just as valuable as goals

Stat	Individual	Teammate
Goals For	0.054*	0.114***
Shot Attempts For Saved	0.054*	0.042
Shot Attempts For Missed	0.022**	0.029
Shot Attempts For Blocked	0.022**	0.041
1st Assists	0.320	n/a
2nd Assists	0.103	n/a

All weights are before score/venue adjustment
*Modelled as one variable
**Modelled as one variable
***Teammate goals exclude 1st and 2nd assists

$$SAwSHF60 = 0.05 * iGF60 + 0.11 * TMGF60 + 0.05 * iSAFS + \cdots$$

Offensive Event Weights - Defencemen

- For defencemen, goal scoring is less critical than shot generation

- After the puck leaves a defenceman's stick they have little control over it

- Assists are once again a key predictor of future success

6

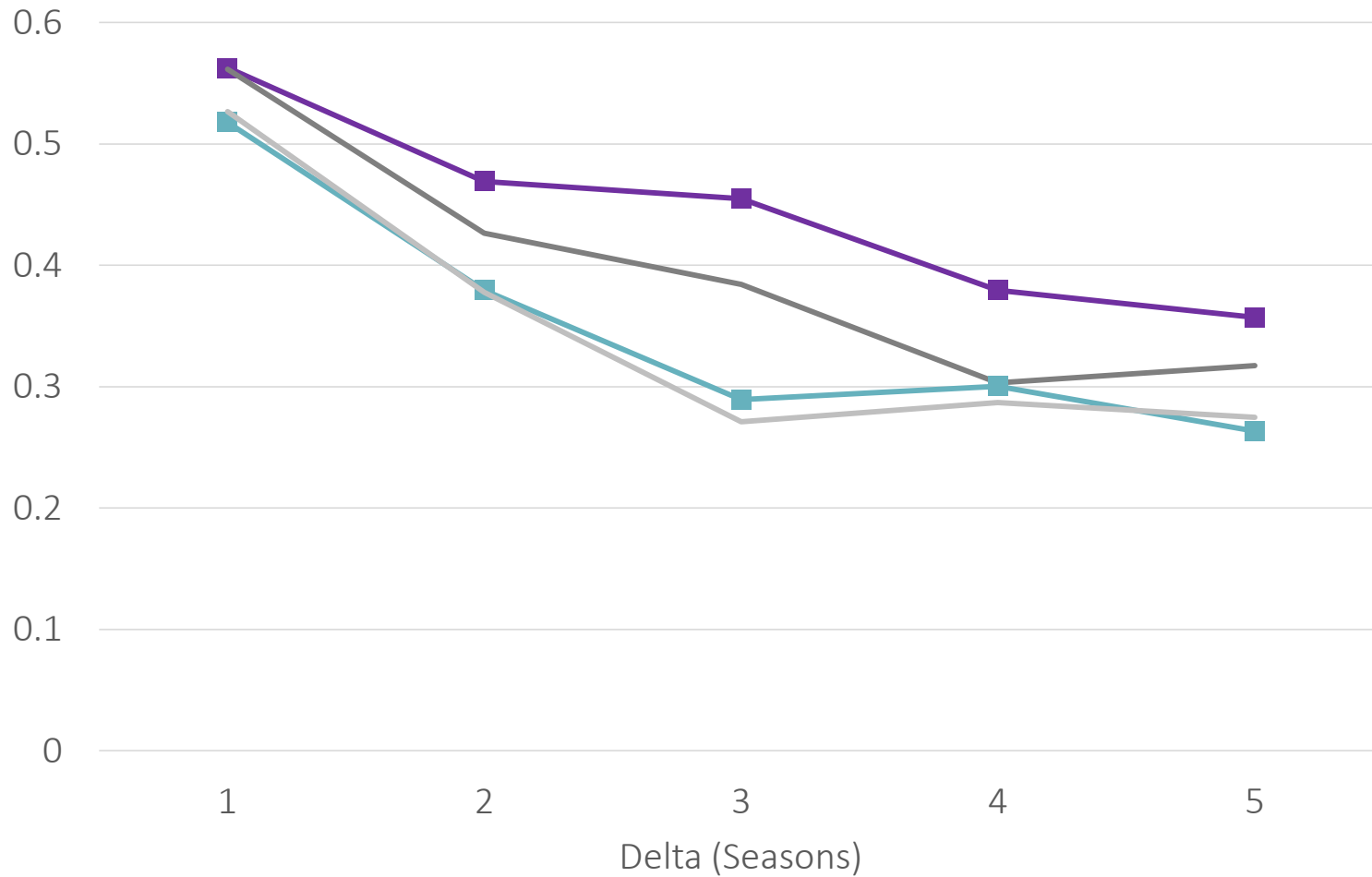| Stat	Forwards	Defencemen
Goals Against	0.128	0.085
Shot Attempts Against Saved	0.043	0.045
Shot Attempts Against Missed	0.038	0.048
Shot Attempts Against Blocked	0.036	0.025

All weights are before score/venue adjustment

$$F: SAwSHA60 = 0.13 * GA60 + 0.04 * SAAS60 + 0.04 * SAAM + \cdots$$
$$D: SAwSHA60 = 0.09 * GA60 + 0.05 * SAAS60 + 0.05 * SAAM + \cdots$$

Defensive Event Weights

- Preventing goals against appears to be more of a talent for forwards than defencemen

- For forwards there's little difference between non-goal events

- For defencemen, blocked shots are less "risky" than saves and misses

7

Repeatability

- For forwards, SAwSh% shows better repeatability over longer periods of time than SACF%

- For defencemen, SAwSh% shows roughly equal repeatability

8
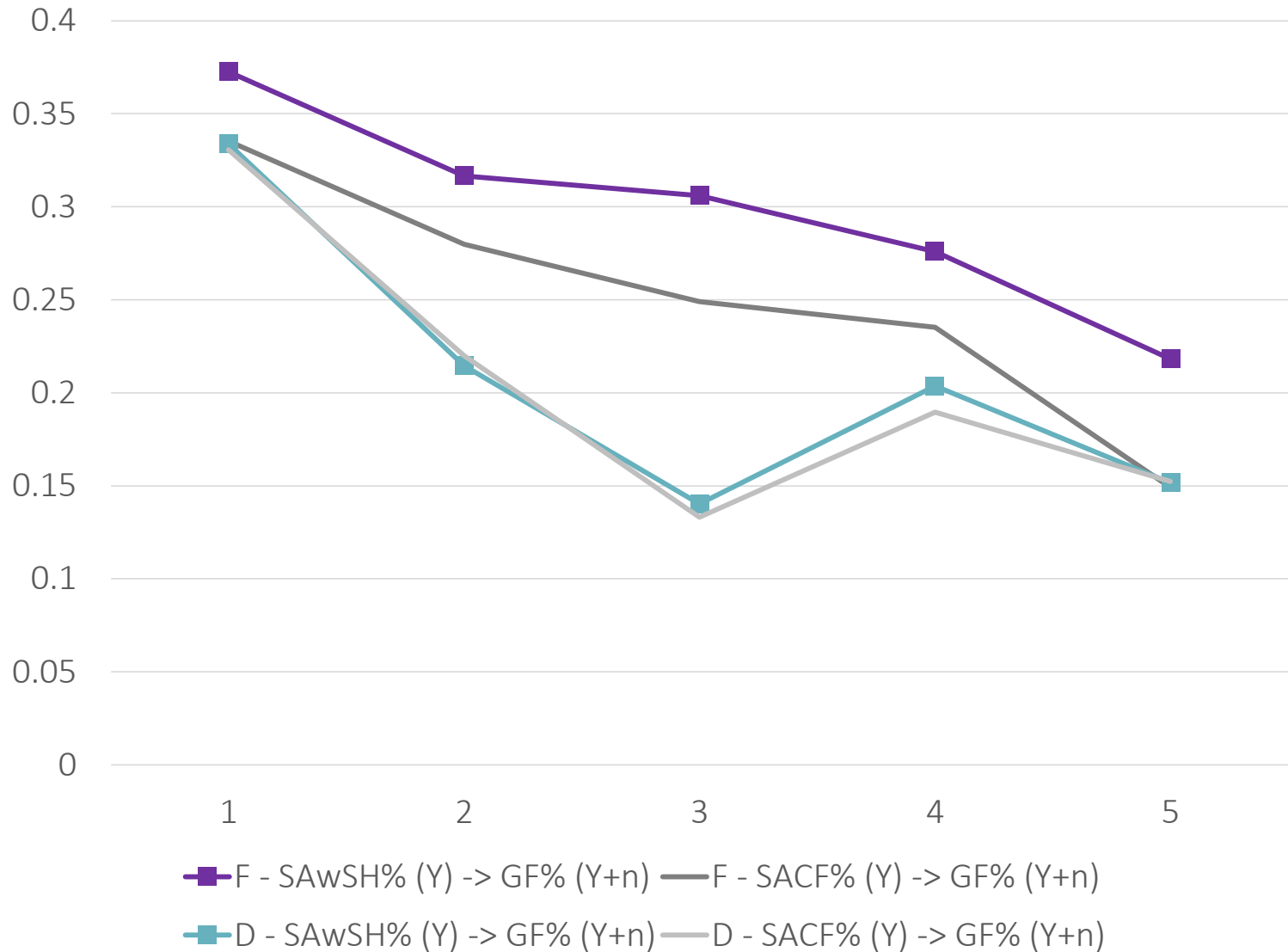
Predictability

- For forwards, SAwSh% is a consistently better predictor of future GF%

- For defencemen, SAwSh% is an equally good predictor of future GF%

9

Next Steps

- Similar to Corsi we can look at Quality of Competition and Teammates, and Rel stats
    - In particular, relative stats may be more valuable in future predictions of defence

- We can also look at the breakdown between individual and teammate components
    - Individual components show higher repeatability
    - Does splitting by individual/teammate lead to better predictions in future years?

- We can look at adding more granularity to our shot data (rebounds, rush shots, etc.)