

Skater Influence on Shot Location in the NHL

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Shot Locations

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- ▶ Isolate player impact on shot location and frequency.
- ▶ Consolidate impact into convenient units.
- ▶ Measure correlation from season to season.

Least-Squares Regression

- ▶ α a collection of observations
- ▶ X a design matrix
- ▶ β a collection of (imagined) individual isolated impacts

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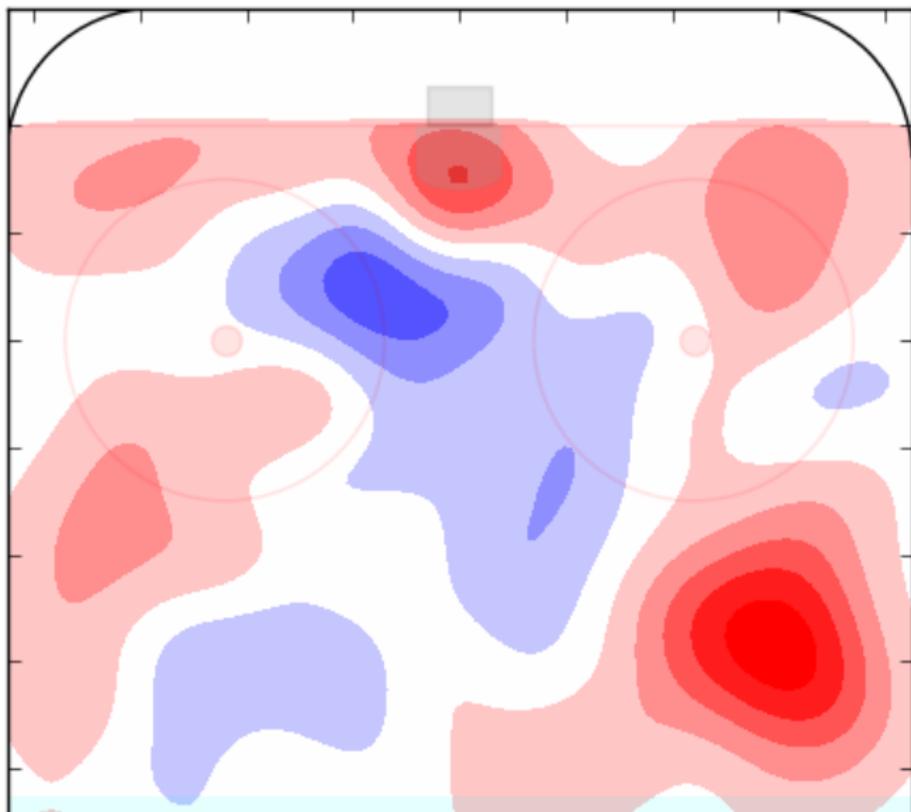
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Elements of α and β can be taken from *any inner product space* and the usual proof goes through.

Observations - Ottawa with Erik Karlsson



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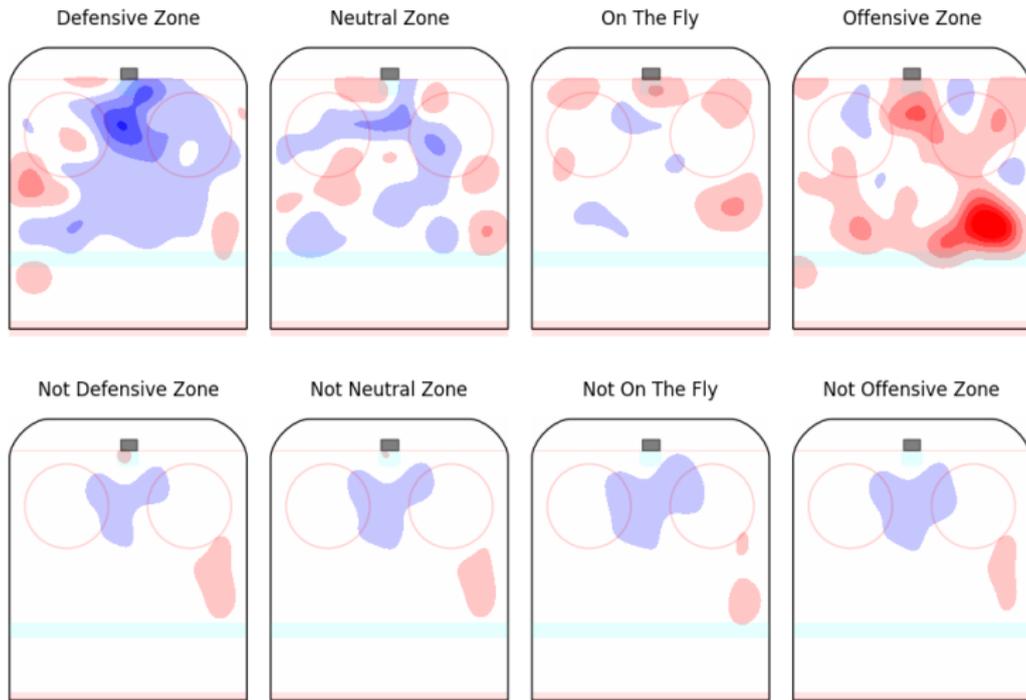
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$$\beta'_p = 0.17\beta_p(NZ) + 0.13\beta_p(OZ) + 0.11\beta_p(DZ) + 0.59\beta_p(OTF)$$

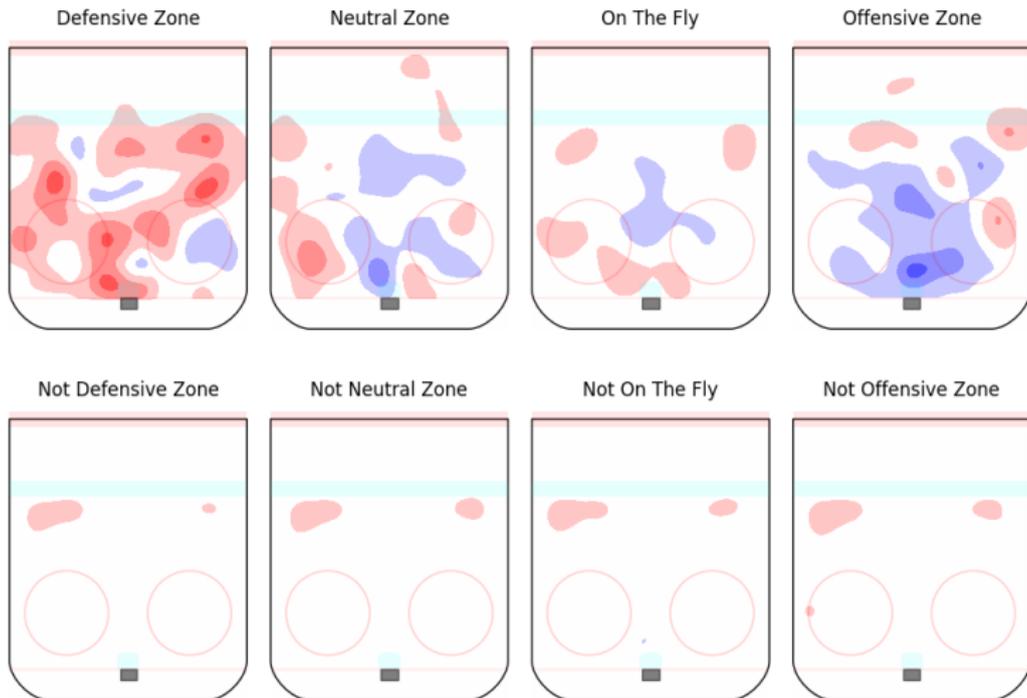
Erik Karlsson (attacking)

Shot Locations (only/not), Karlsson

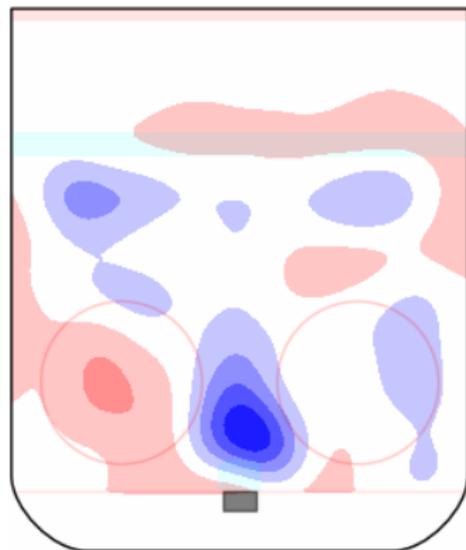
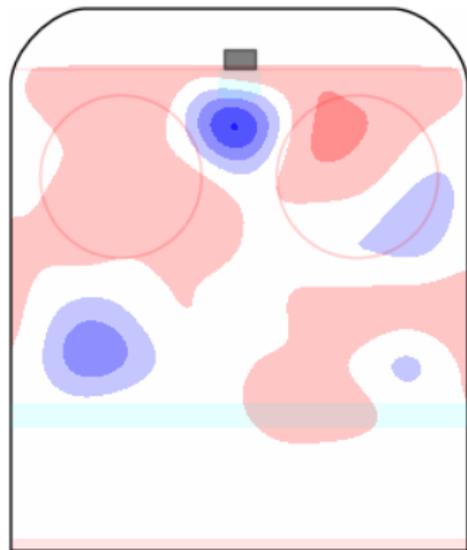


Erik Karlsson (defending)

Shot Locations (only/not), Karlsson



Erik Karlsson (isolated)



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- ▶ Threat Against: +1.3 goals per hour

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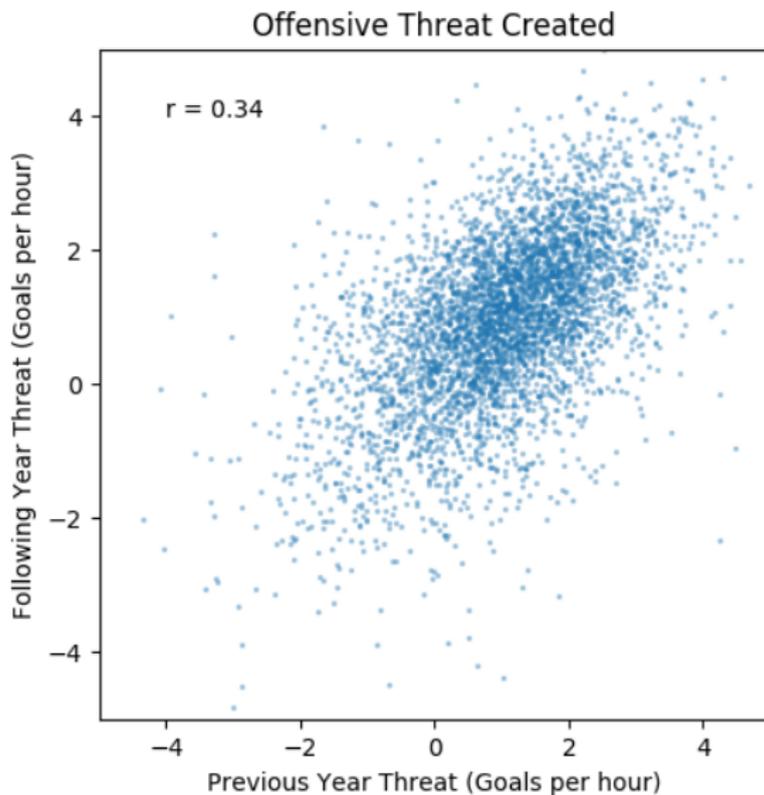
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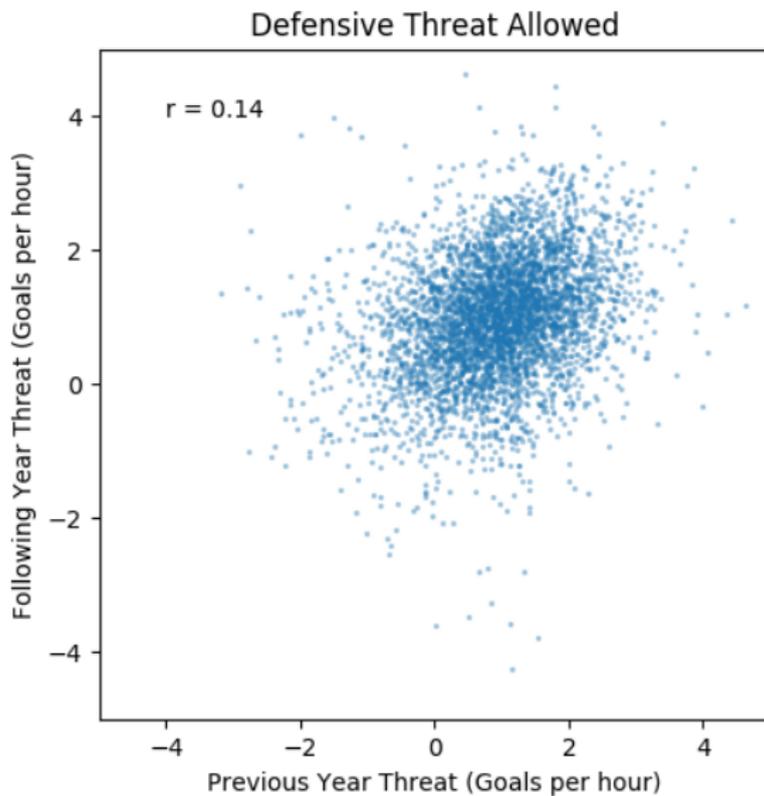
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- ▶ Threat For: +2.4 goals per hour (Actual: 2.4)
- ▶ Threat Against: +1.3 goals per hour (Actual: 2.1)

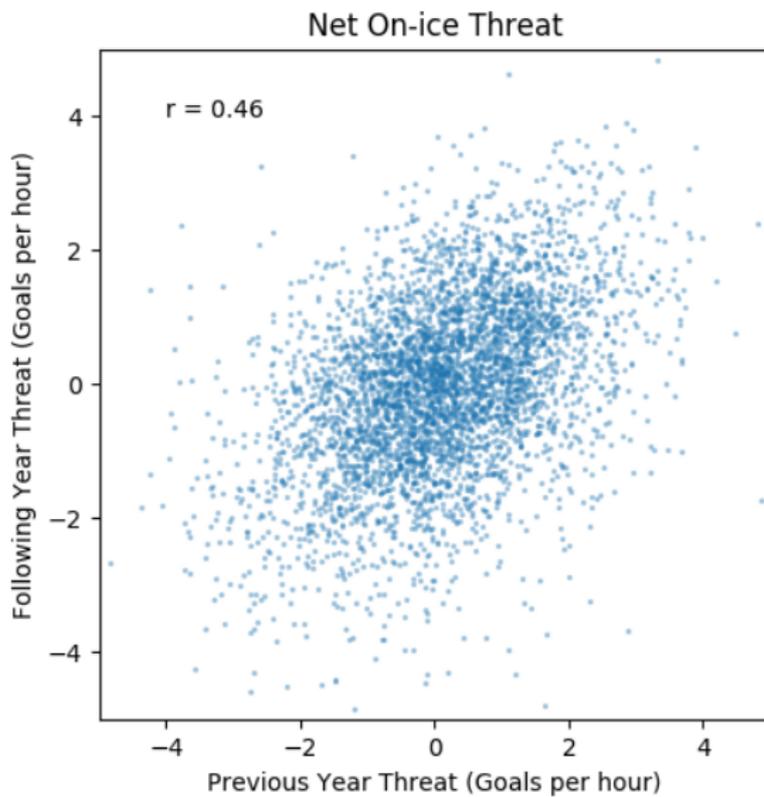
Correlations - Offensive Threat Created



Correlations - Defensive Threat Allowed



Correlations - Net Threat



Conclusions

- ▶ Players have small but noticeable individual effects on shot locations.
- ▶ Effects are strongest when *net* threat is considered.

Future Work

- ▶ Isolate interactions with goaltending metrics.
- ▶ Take into account shooter quality.
- ▶ Consider quality-of-competition and score state.
- ▶ Isolate coaching impacts.
- ▶ Consider non-linear effects.

Thanks!

