Flying Walri

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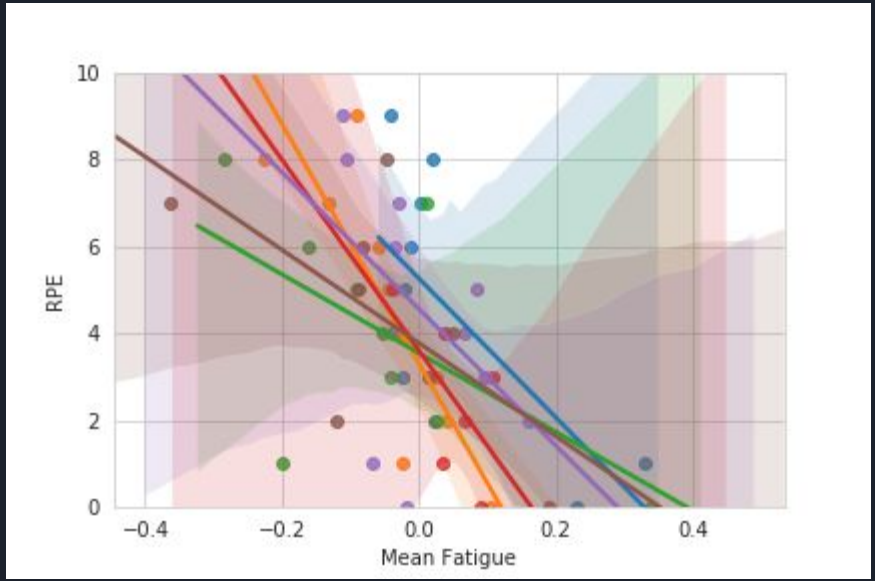
Imagine...

Project Context

- Objectives:
  - Provide insight on fatigue

- Data Source:
  - Womens rugby sevens canada team

Fatigue as a predictor for RPE

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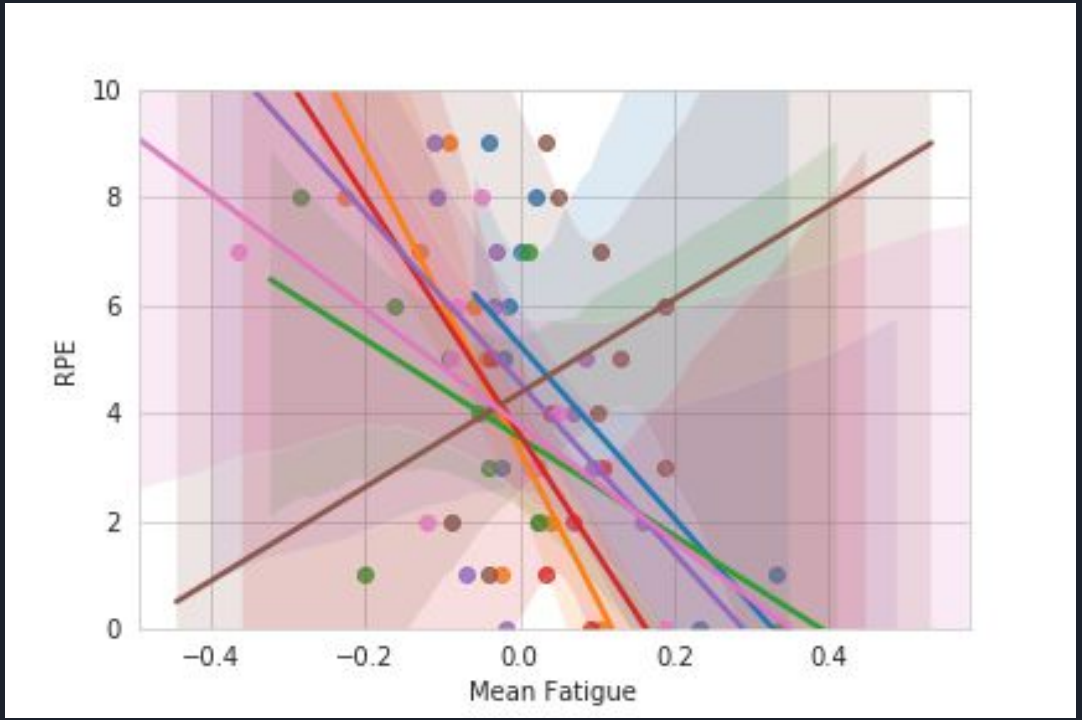
In [15]: strength_summary

Out[15]: LinregressResult(slope=-15.992728704391677, intercept=5.253955436566669, rvalue=-0.6730398388015063, pvalue=0.03292917709901
         607, stderr=6.213515204554453)
```

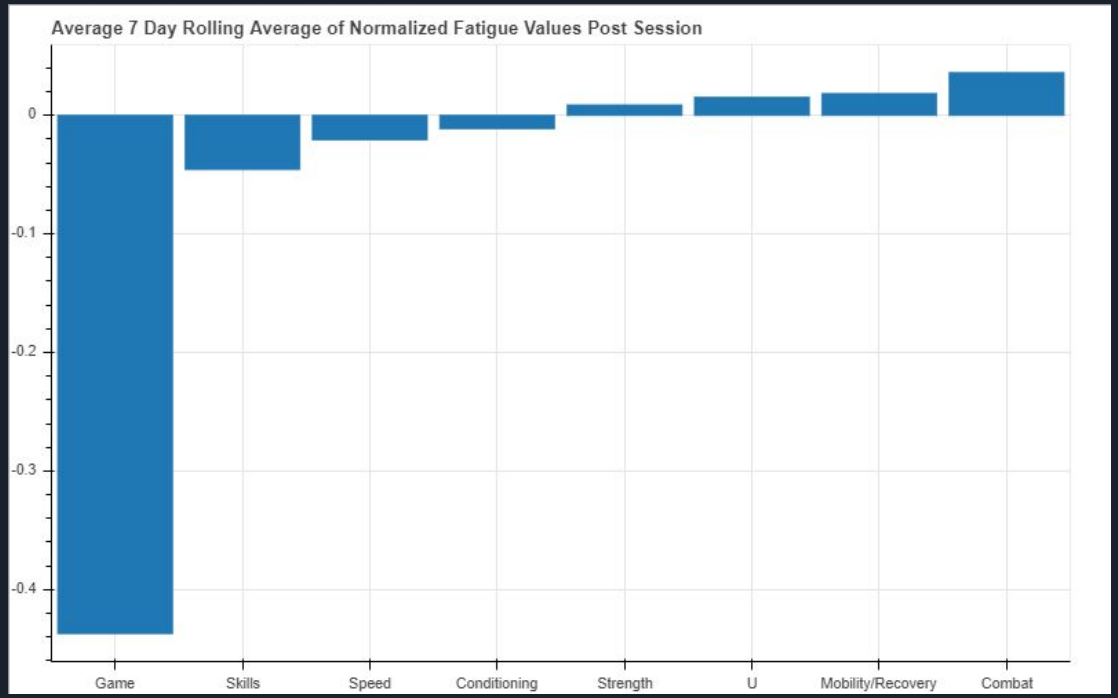
Why RPE is not viable for game performance

Game vs fatigue:
p-value = 0.428



Session impact on fatigue

- Games have highest impact on fatigue
- Mobility and recovery lessen fatigue
- U represents undefined session type



If games have highest negative effect on fatigue, why?

- Seasonal Fatigue Visualization Tool
- Meta-Game data Visualization Tool

$$E(t) = AvgSpeed(t) \times ActiveTime + (Accel(t) - MeanAccel)^2$$

Variables:

Avg Speed (5 second rolling avg)

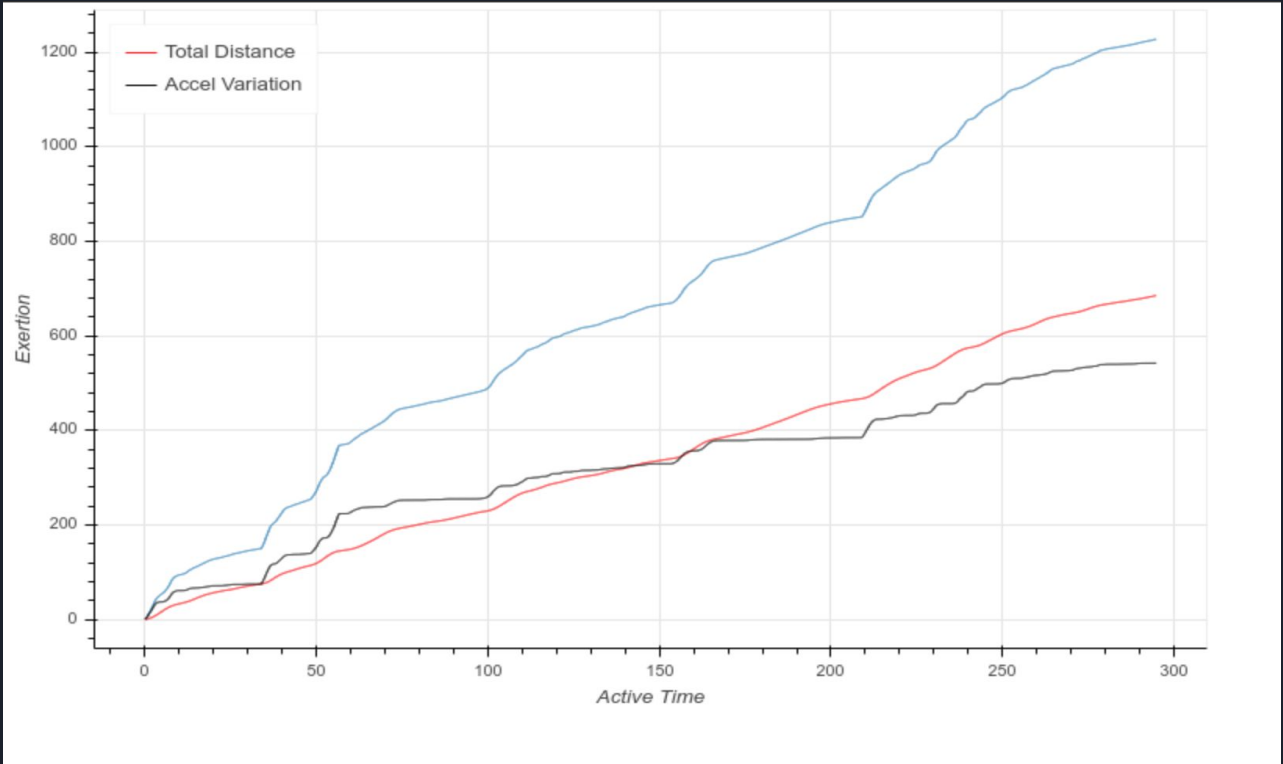
Active time = time where Avg Speed > 1 m/s

- These combine for total distance

Variance of Accel = instantaneous accel compared to mean

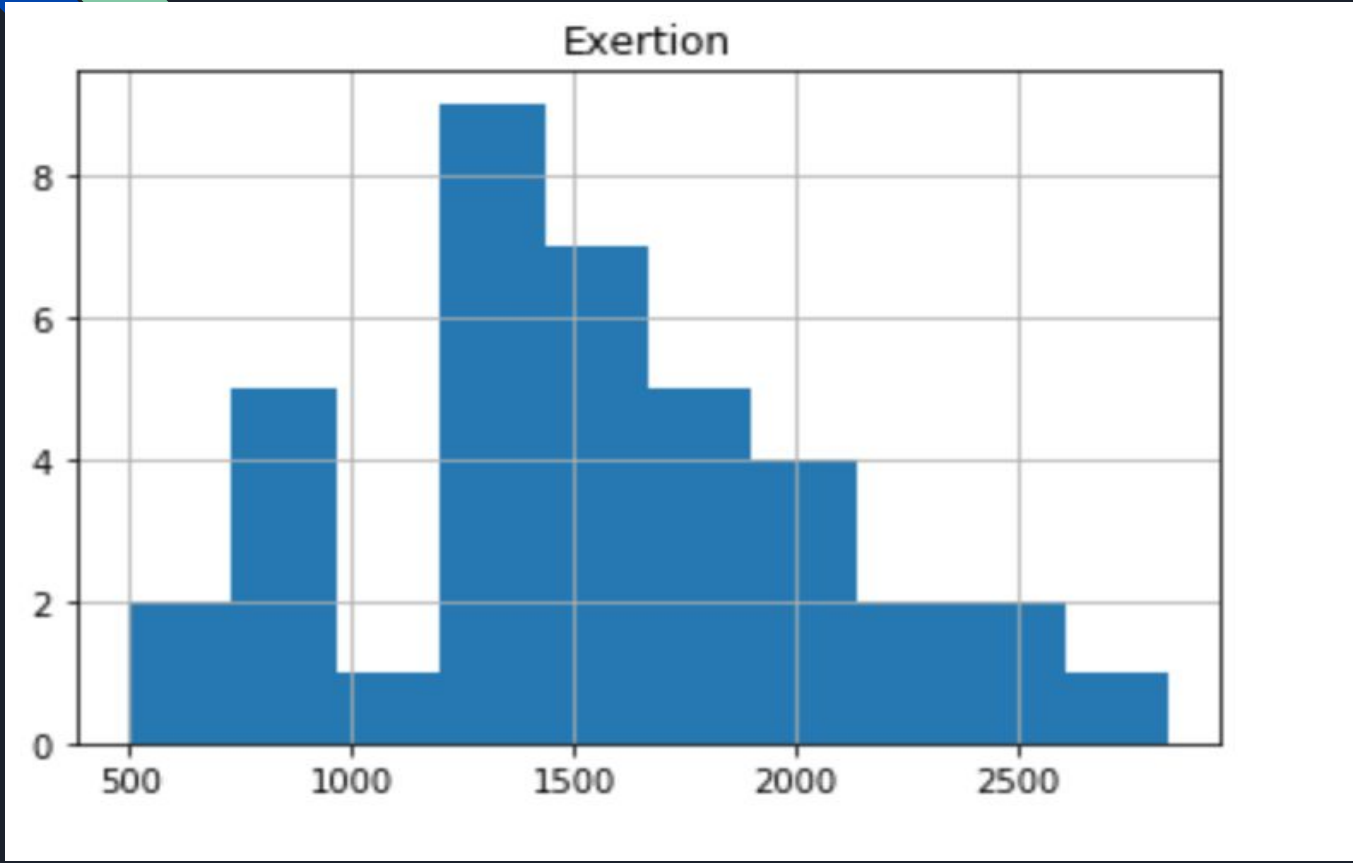
Accel and total distance over time given a player's exertion

Exertion vs. Time (for a single game)



- Two-part Metric
- Acceleration portion decreases over time
- Total distance portion surpasses acceleration

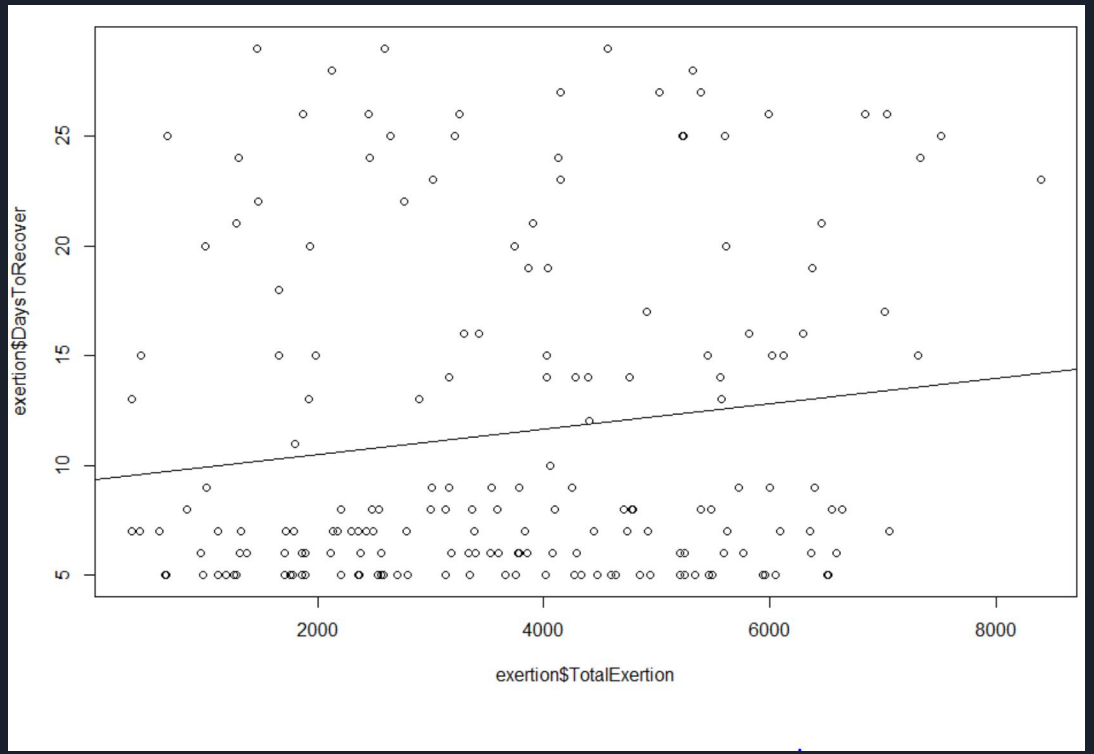
Player 13’s exertion metric over all games



- Normally distributed
- Viable metric to use for data analysis

Linear Regression - Predicting Recovery Time

Days to Recovery



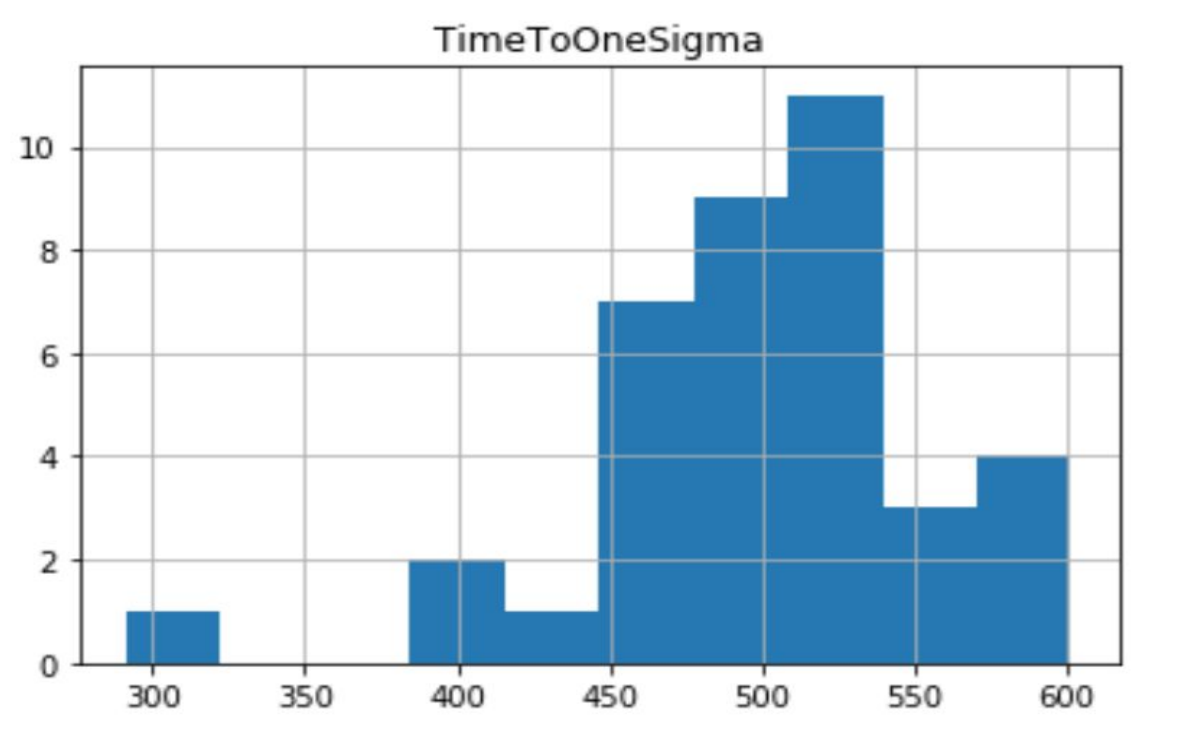
Total Exertion “Effort”

- Daily Total Exertion will cause the recovery period to increase.
- P-value = .05

How do we identify when a player is “exhausted”?

- Look at individual player’s exhaustion elasticity relative to recovery cycle
  - Different players will recover at different rates
- Relative to overall recovery cycle
- Factoring when they need to be “ready to go”
  - Taking into consideration next game

Key model for application



- Distribution of time it takes for player 13 to reach the mean + 1 sigma (exhaustion threshold)
- Sigma up to coach discretion
- Gives the probability of risk that keeping the player in game will negatively impact recovery time

The Full Application

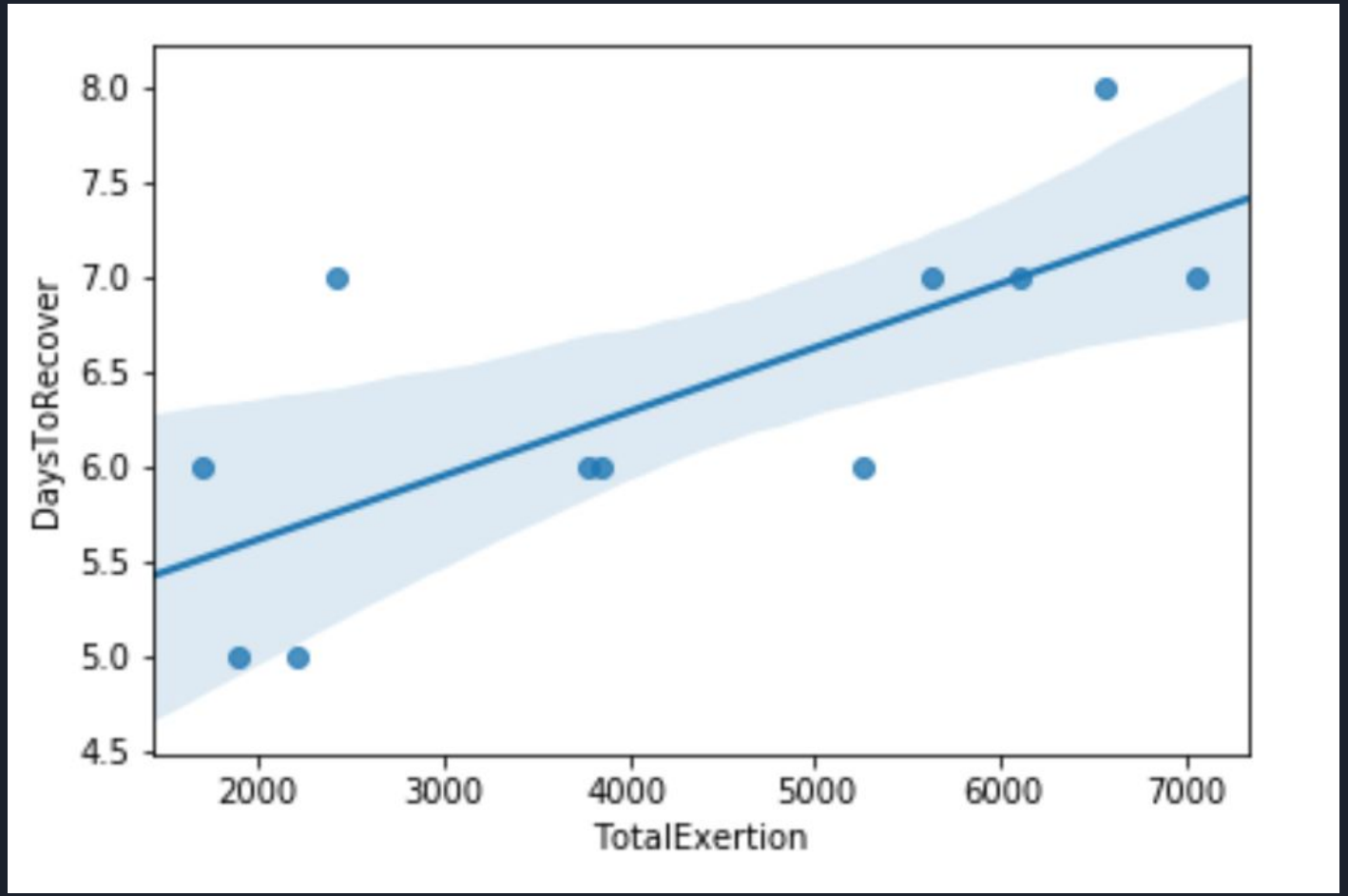
- Coach can use these risks of longer recovery time when substituting

- May risk it more if the game is the last in a tournament, etc.

Next Steps...

- More Data!
- Data can be used to build model on player and target recovery window
- Coaches will be able see the required recovery window based on their play time in a single game

Thank you! Questions?


DaysToRecover
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
2000
3000
4000
5000
6000
7000
TotalExertion