Track & XC Comparison Analysis

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Introduction

- Track & XC do not train together
- Run the same meets and compete with either team
- Analysis with historical Force Plate Data (2021-2024)
- Race data from tffrs.org

Distance Description

Distance Categories:

- Short Distance (100M – 400M)
- Medium Distance (800M – 3000M)
- Long Distance (3000M+)
- Jumps

Track Categories

- Short Distance
- Medium Distance
- Jumps

XC Categories

- Medium Distance
- Long Distance

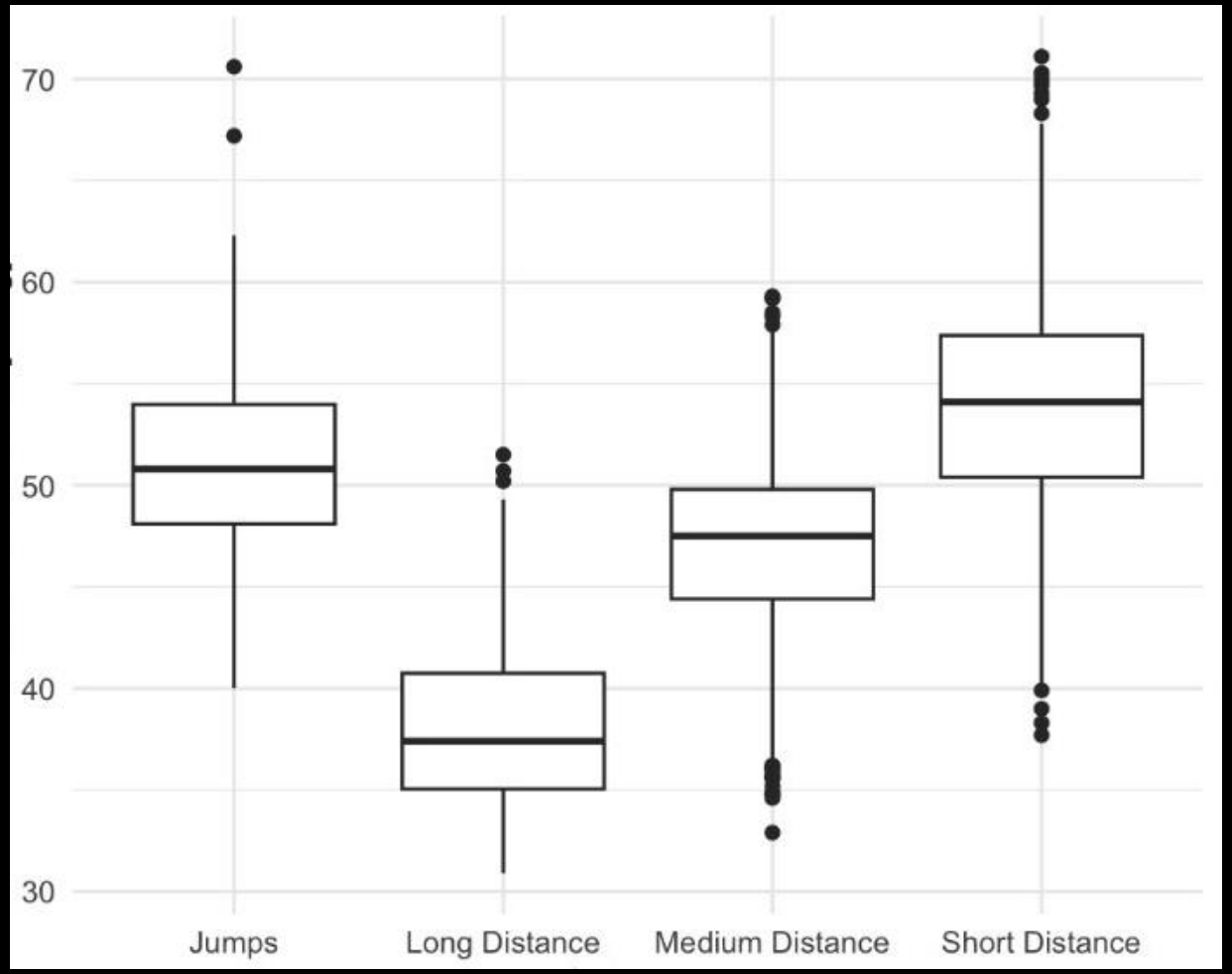
Only Overlap in Medium Distance

Main Question

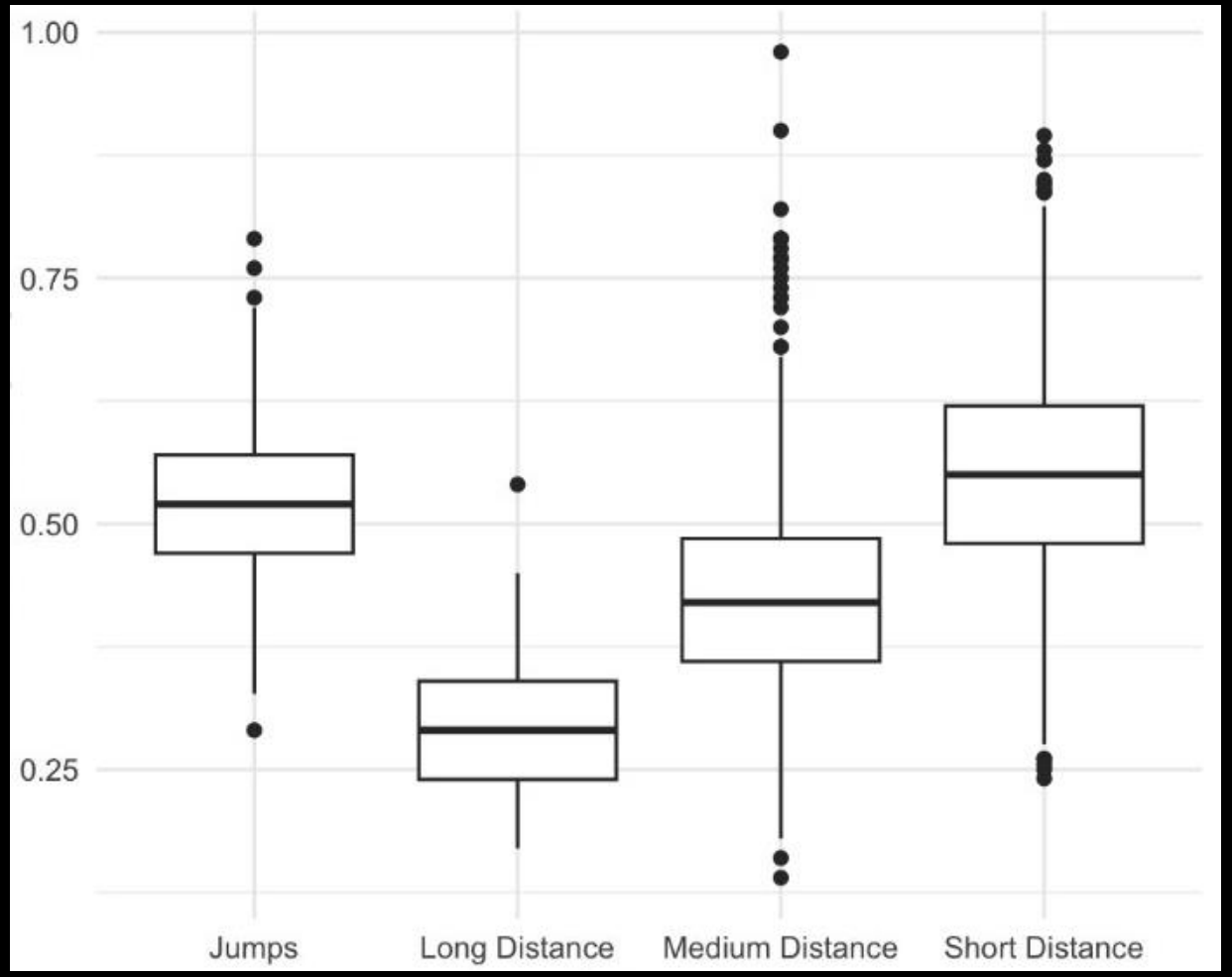
What is different between these two teams?

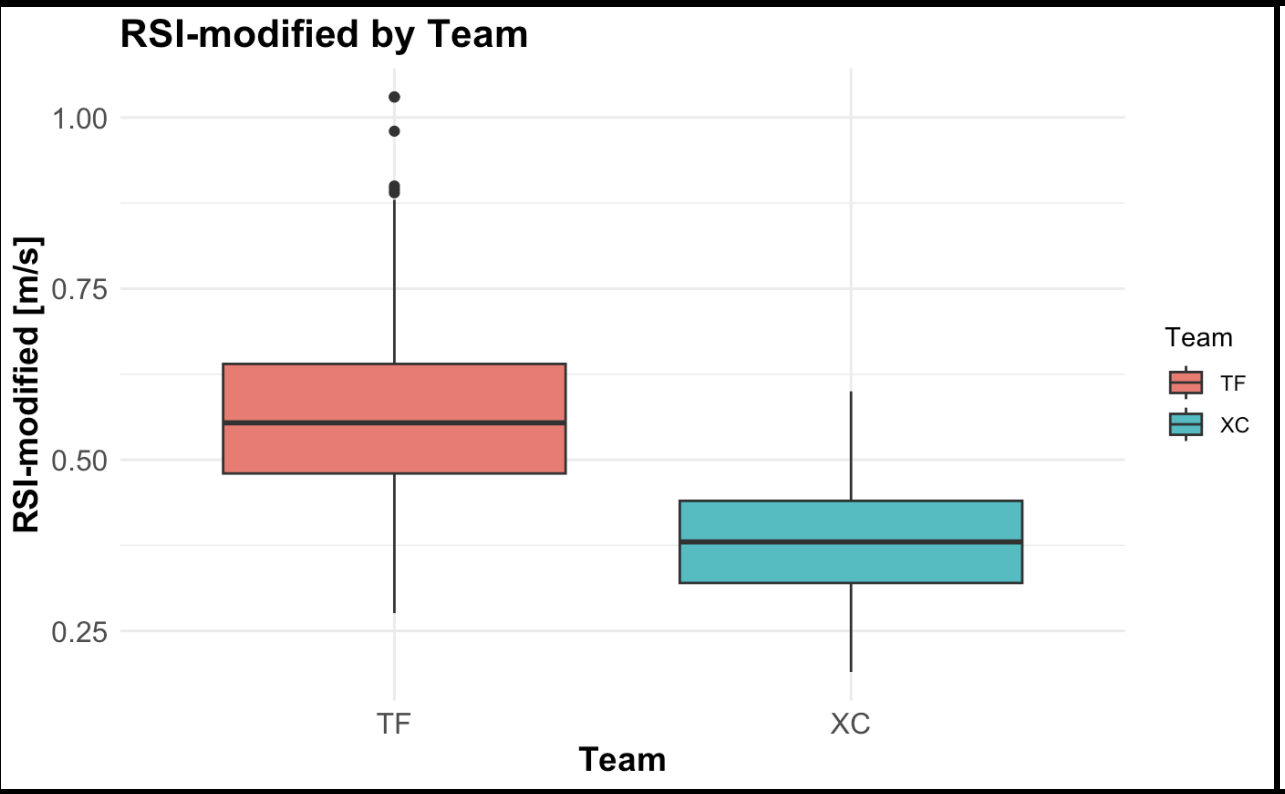
Distance Analysis

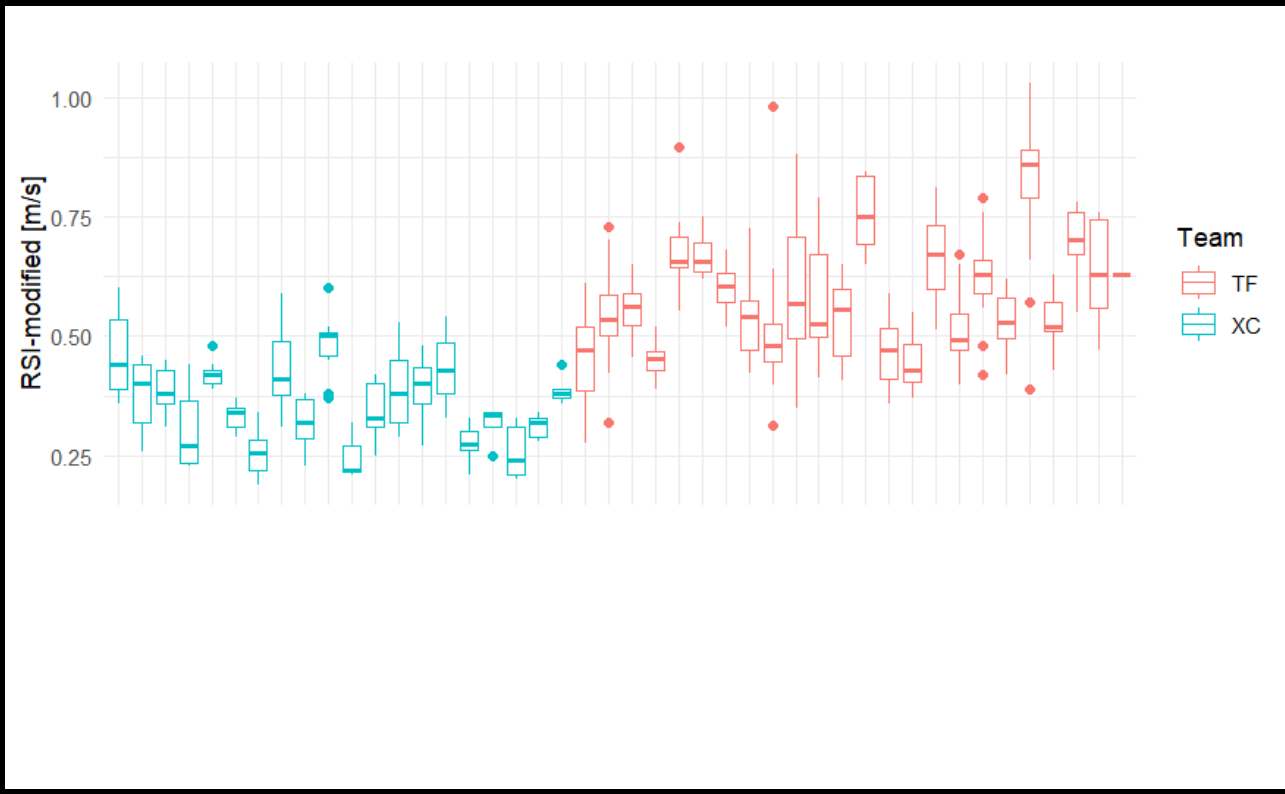
Peak Power / BM



RSI-Modified

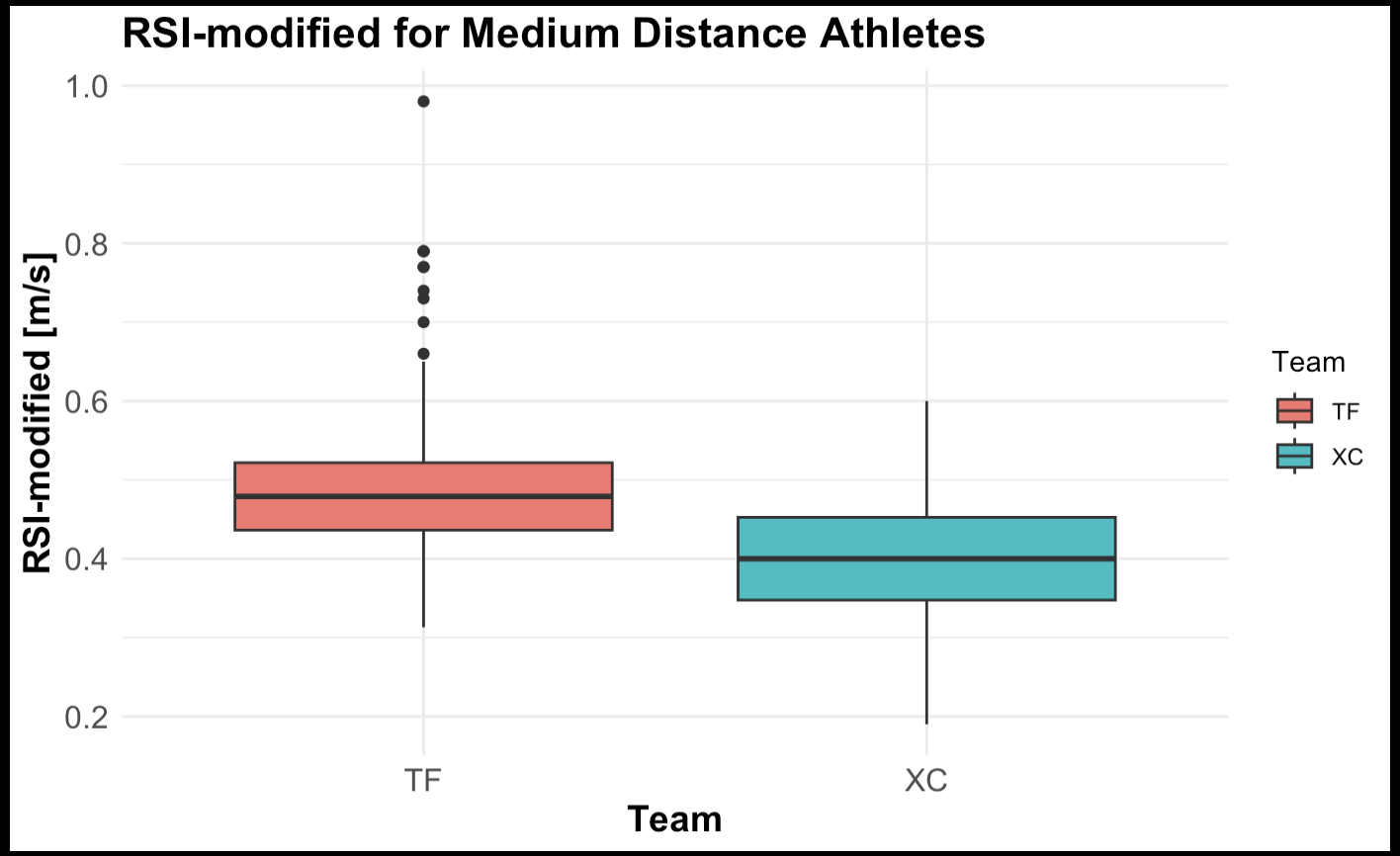






Team by Team Analysis: RSI-Modified

Medium Distance



This disparity in RSI-Mod & other metrics still existed where the teams overlap in races

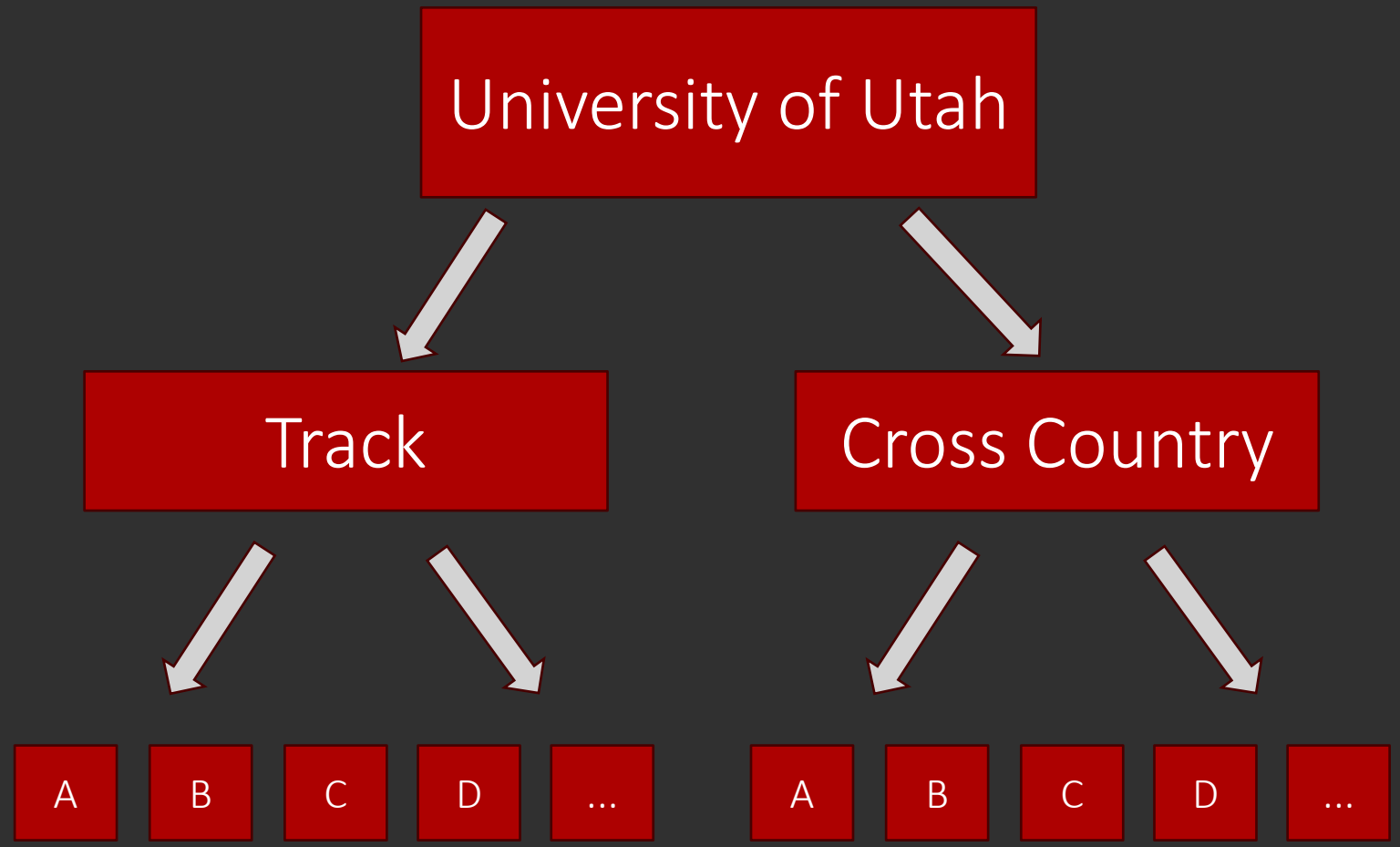
But is the difference really coming from the team/training?

Hierarchical Model

Tier 1: Overarching

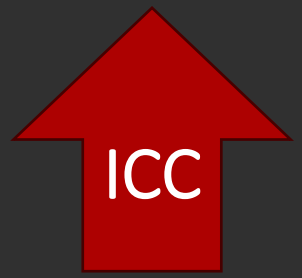
Tier 2: Teams

Tier 3: Athletes



Hierarchical Model

ICC: Intraclass Correlation Coefficient



Variation comes from the differences between the teams

Variation comes from the differences between the athletes

Hierarchical Model

- 13 / 19 metrics with above 15% ICC are either:
  - **RSI**
  - **Jump Height (Flight Time)**
  - **Power & Force**
    - Concentric & Eccentric

This shows these metrics differ on a team level

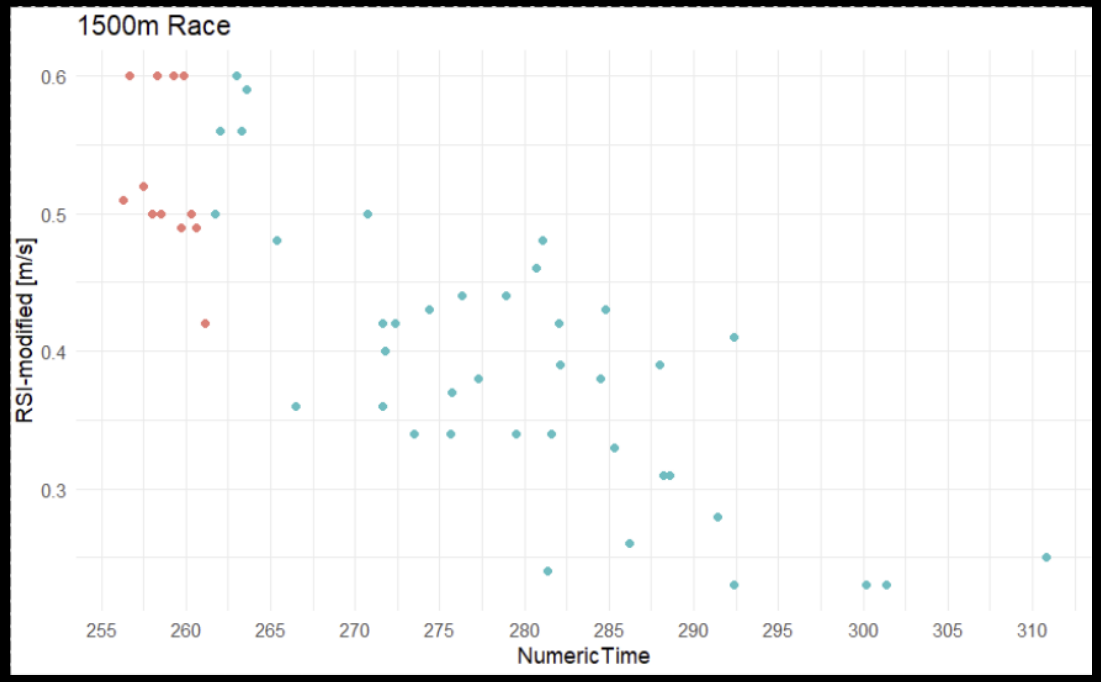
Does this matter?

Race Time Analysis

- Scraped our athlete's race times
- Paired their times with most recent jump test
- Analyzed the how athlete's most recent jump test correlated with their performance

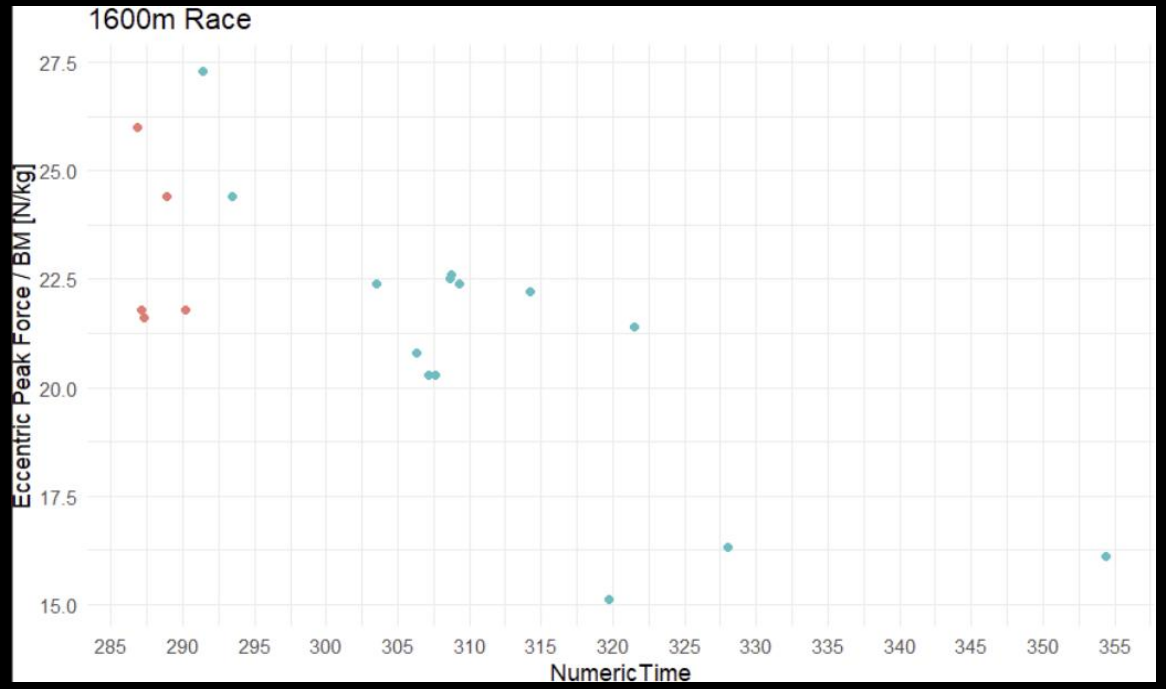
Force Plate data is associated with faster race times.

1500M Race & RSI-Mod



Correlation: -0.82

Mile Race & Eccentric Peak Force / BM

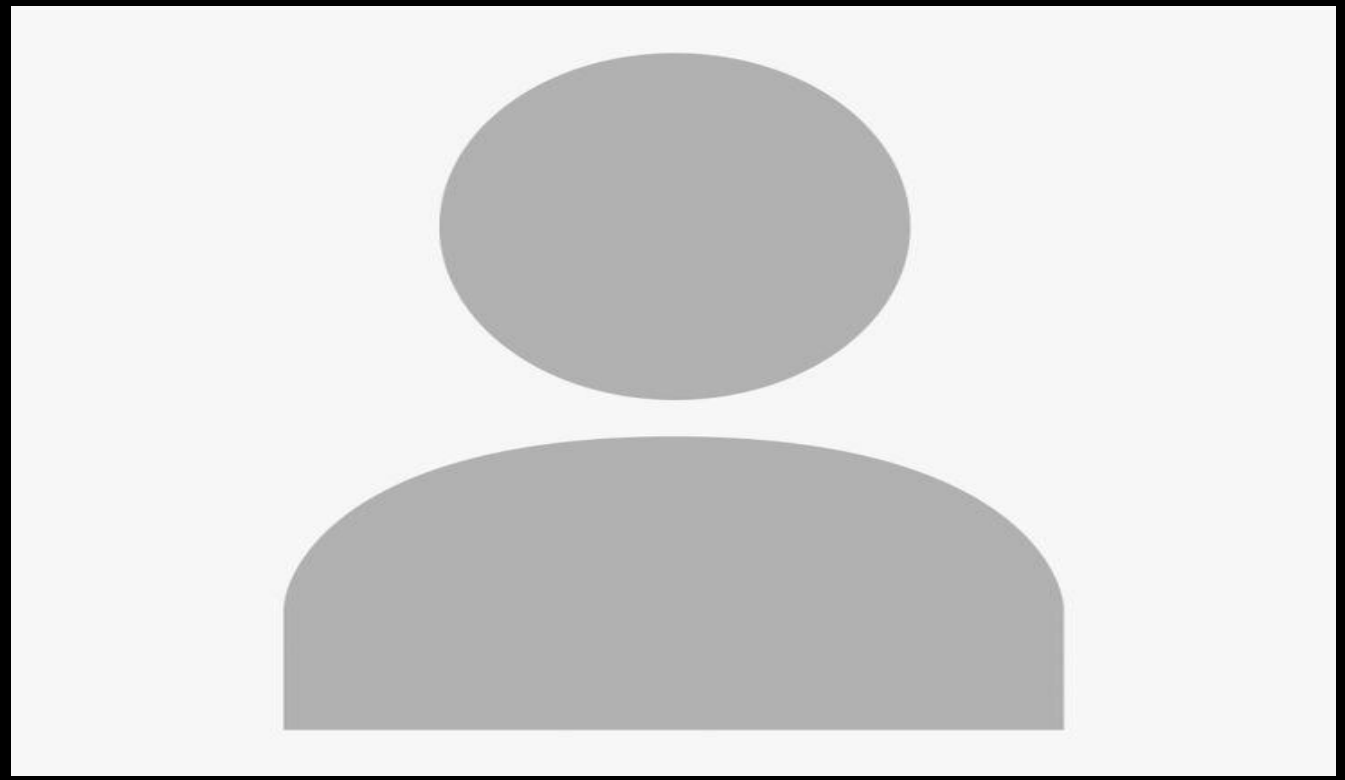


Correlation: -0.74

Red dots represent the top 25% times, blue represent the rest.

800M Race

Most overlap between XC (54 Observations) & TF (46 Observations) athletes

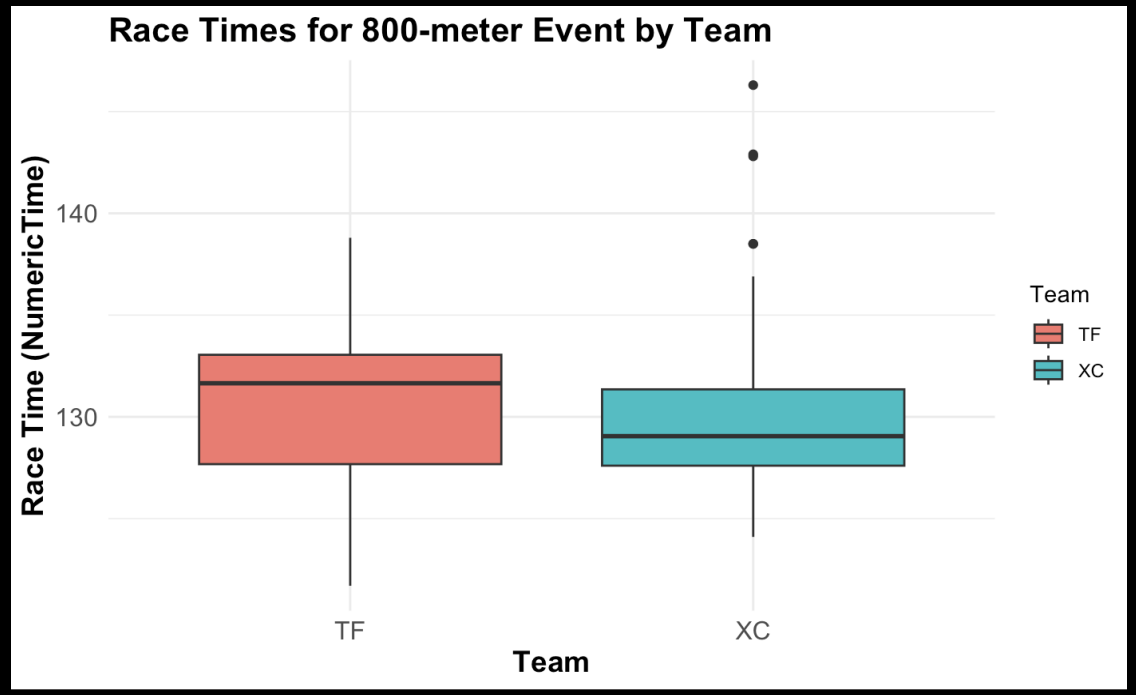


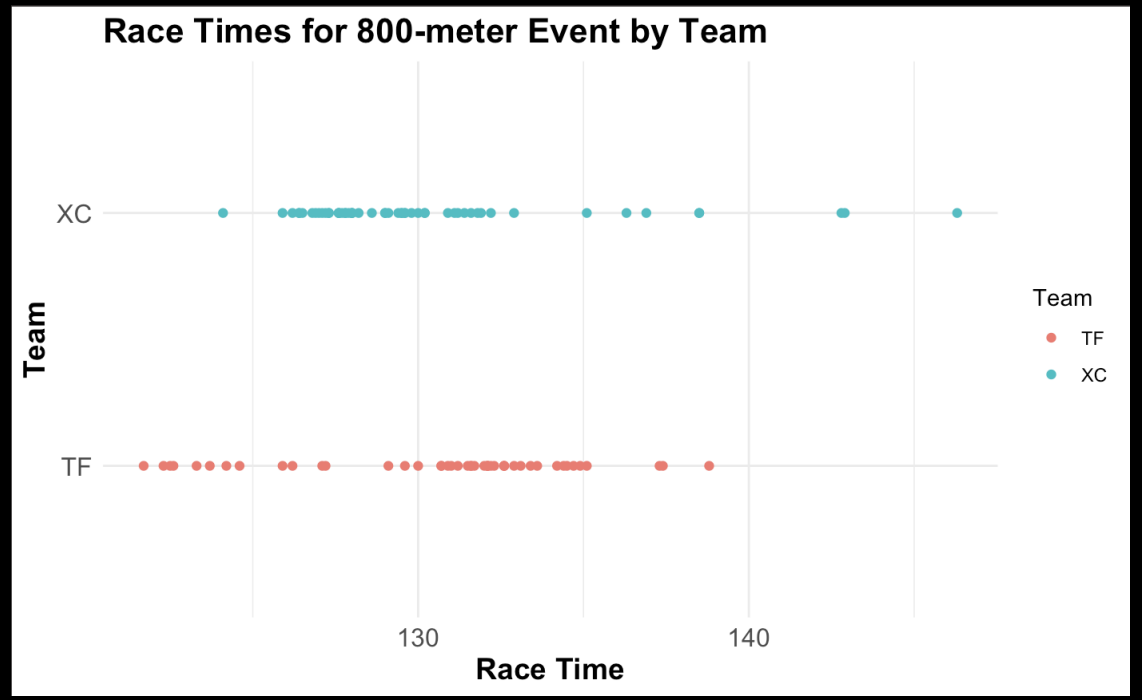
Avg Days Before Race: **38.6**

# of Tests within 10 days: **41**

Top Athletes (Top 25% of times):

- **XC: 13 Observations**
- **TF: 11 Observations**





Team differences

XC athletes have a lower median race time, *however* the TF athlete's times appear to make up most of the top race times

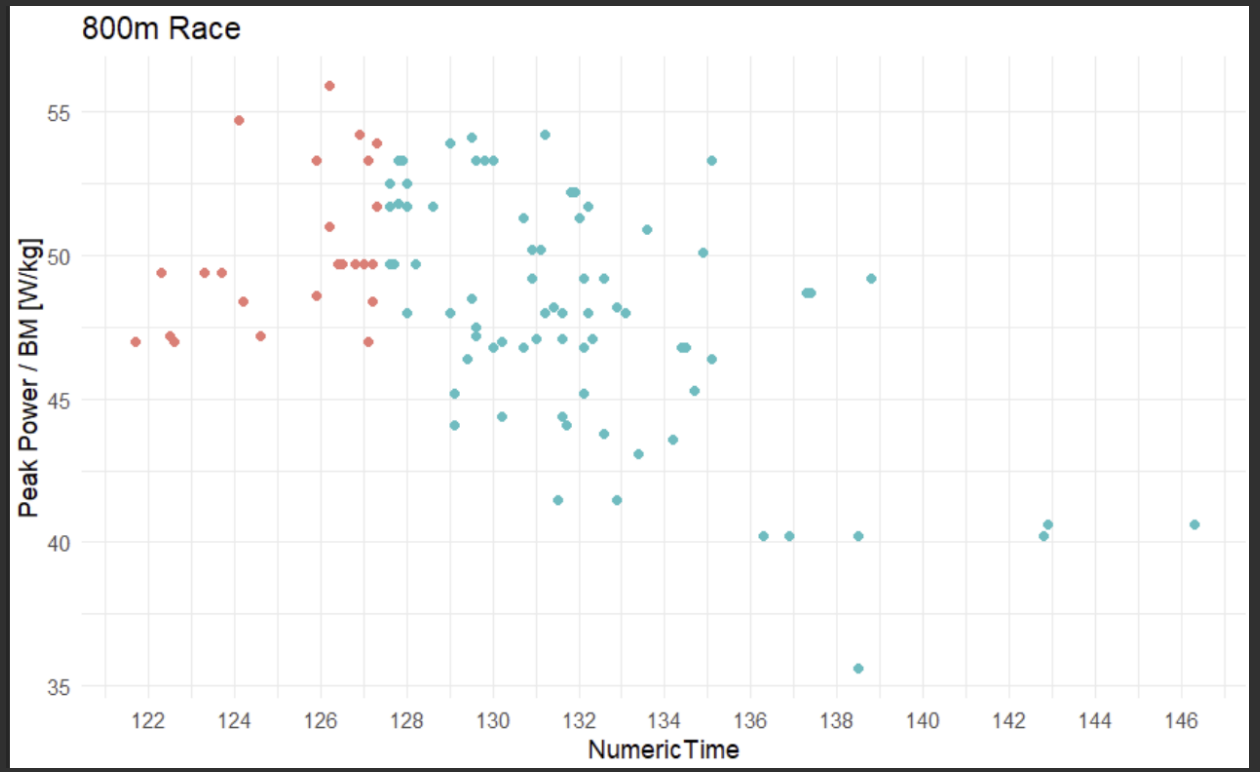
800M Force Plate Correlations

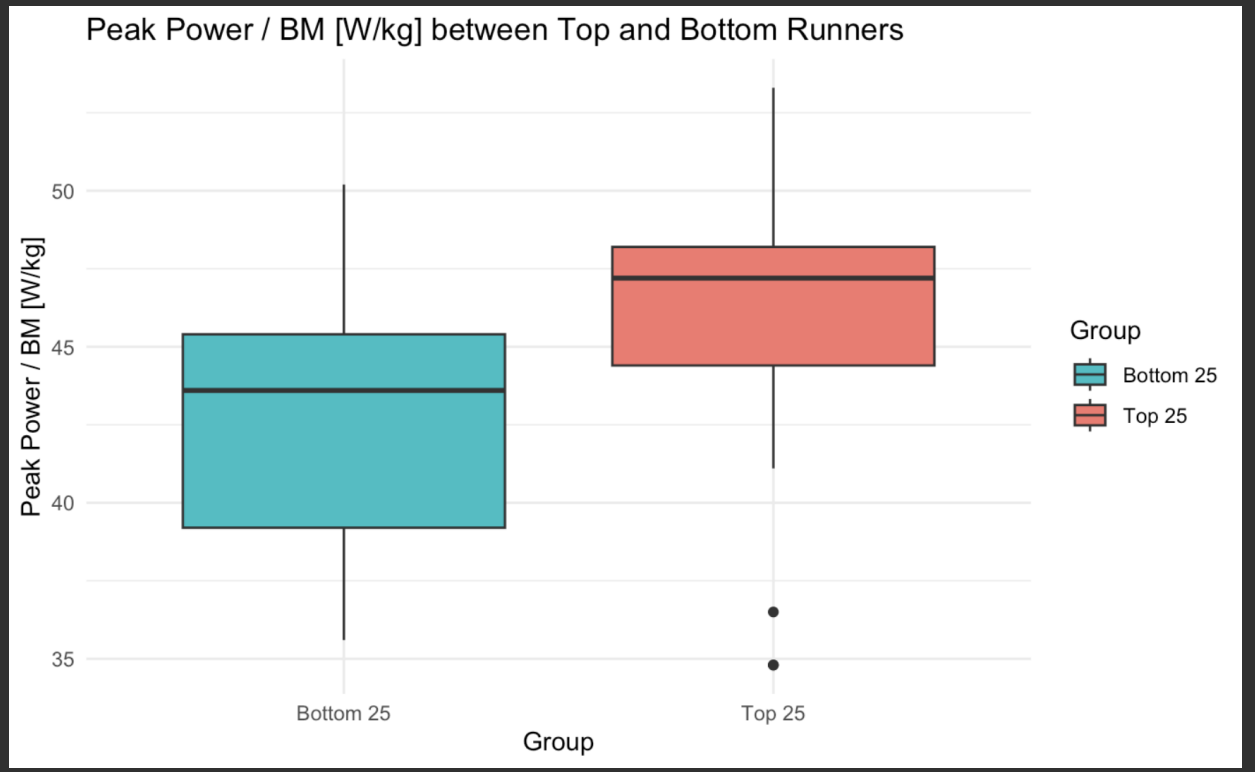
Top Metrics (By correlation with Race Times):

Peak Power [W]	-0.69
Jump Height (Flight Time) [cm]	-0.61
Peak Power / BM [W/kg]	-0.53
RSI-modified [m/s]	-0.38

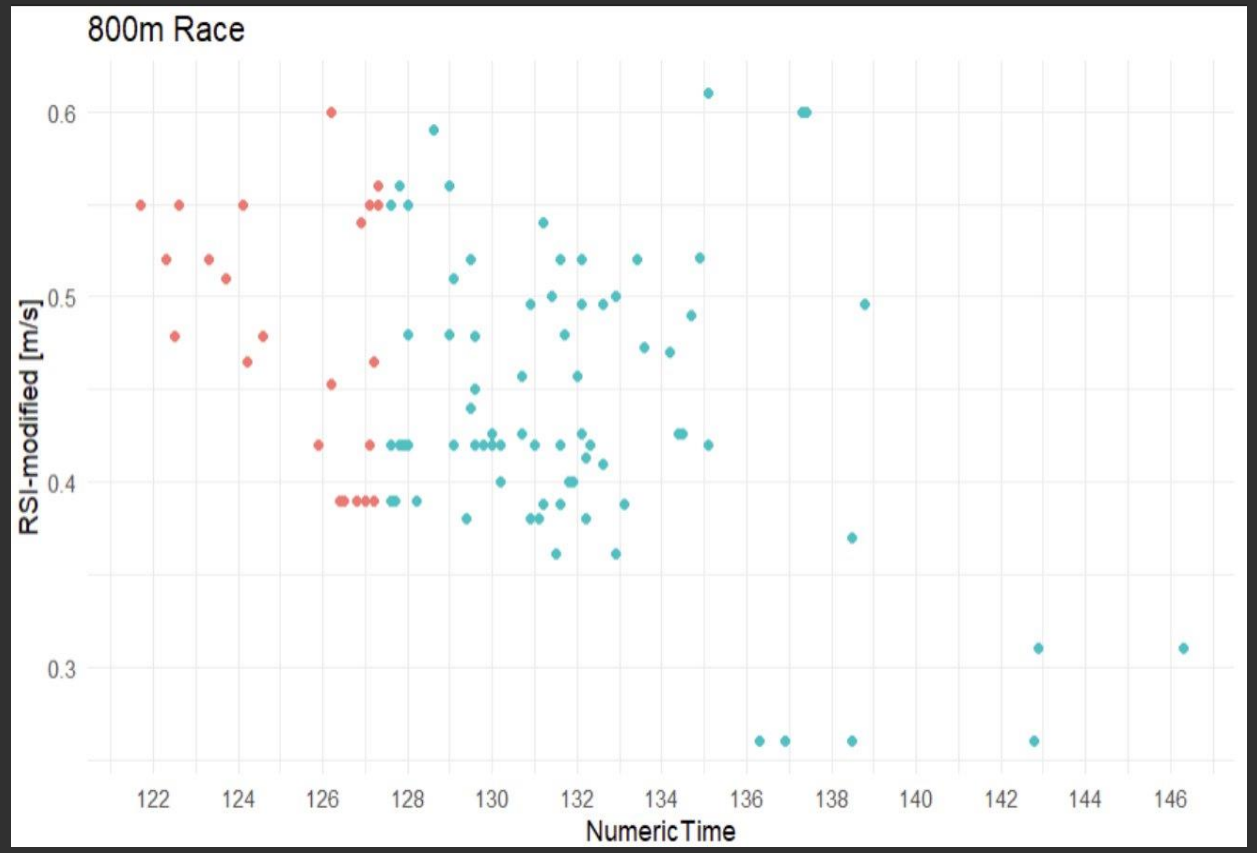
These are the *same* metrics we modeled to differentiate XC & TF athletes

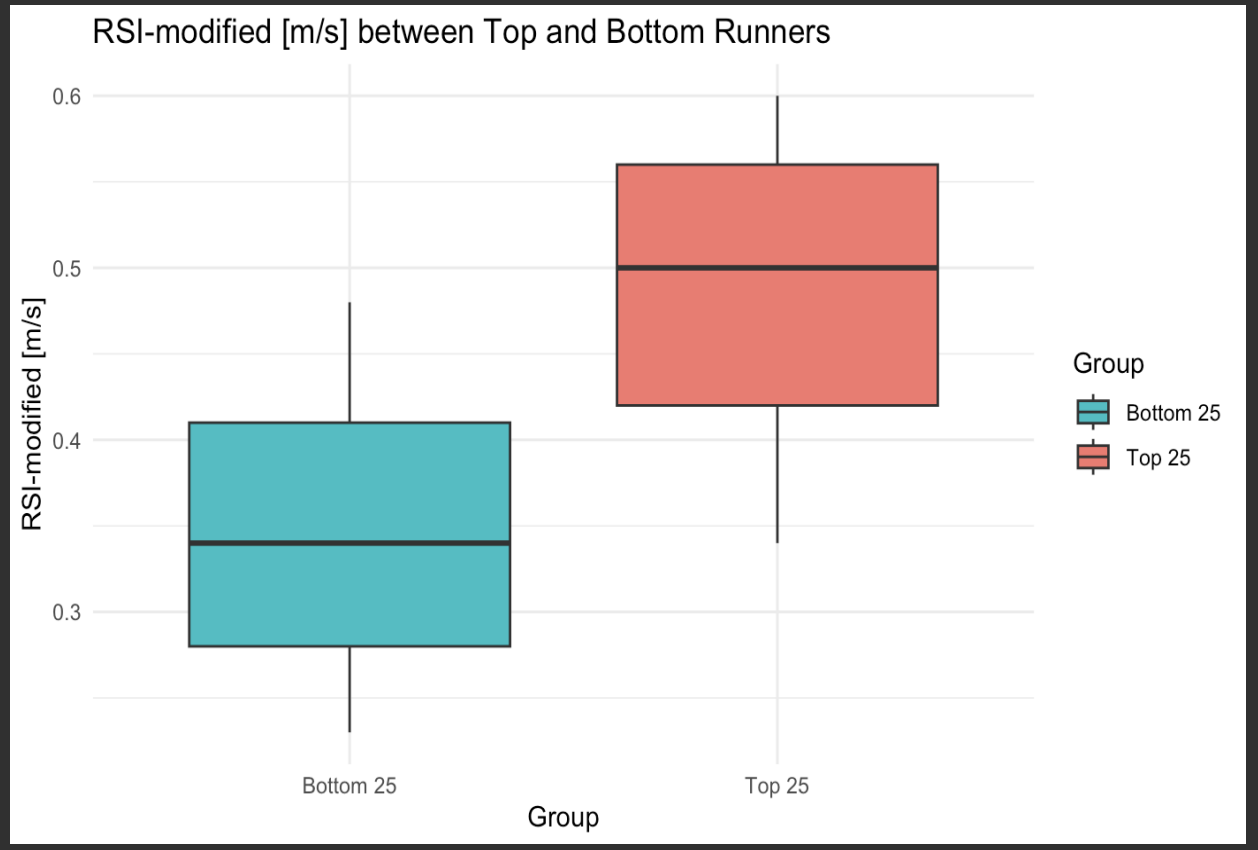
Peak Power / BM





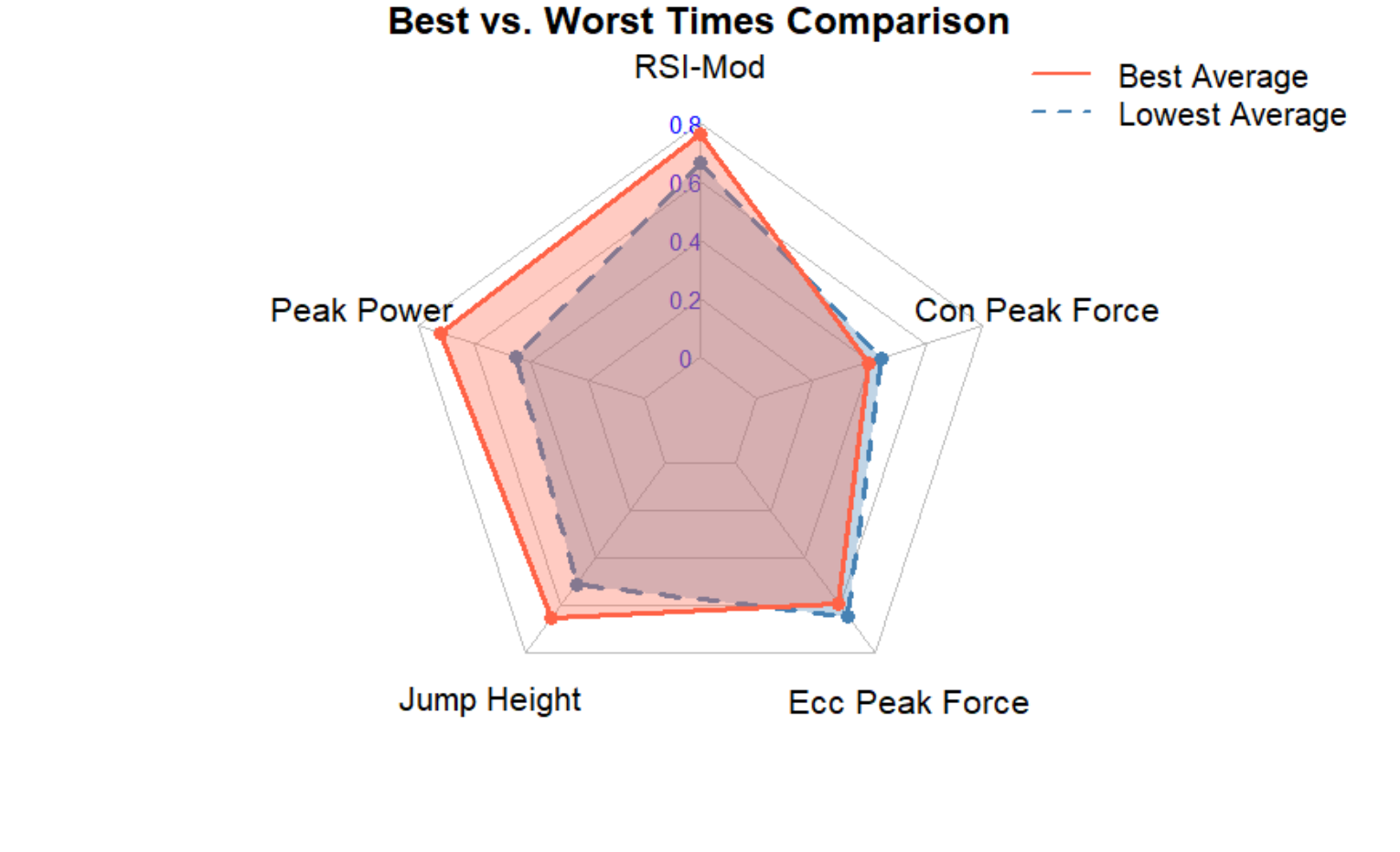
RSI-Modified





Radar Chart Profiling

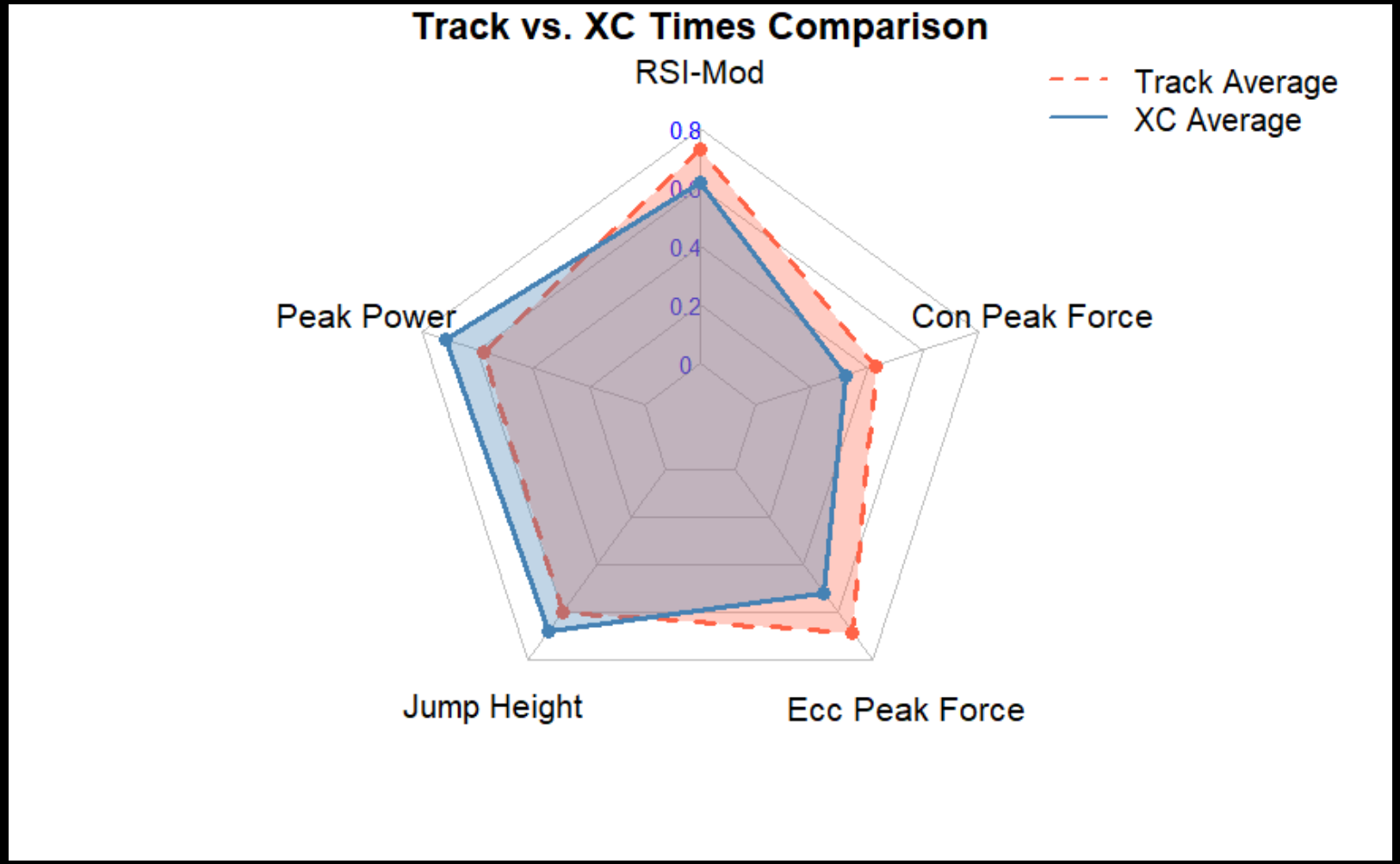
Best vs. Worst Times

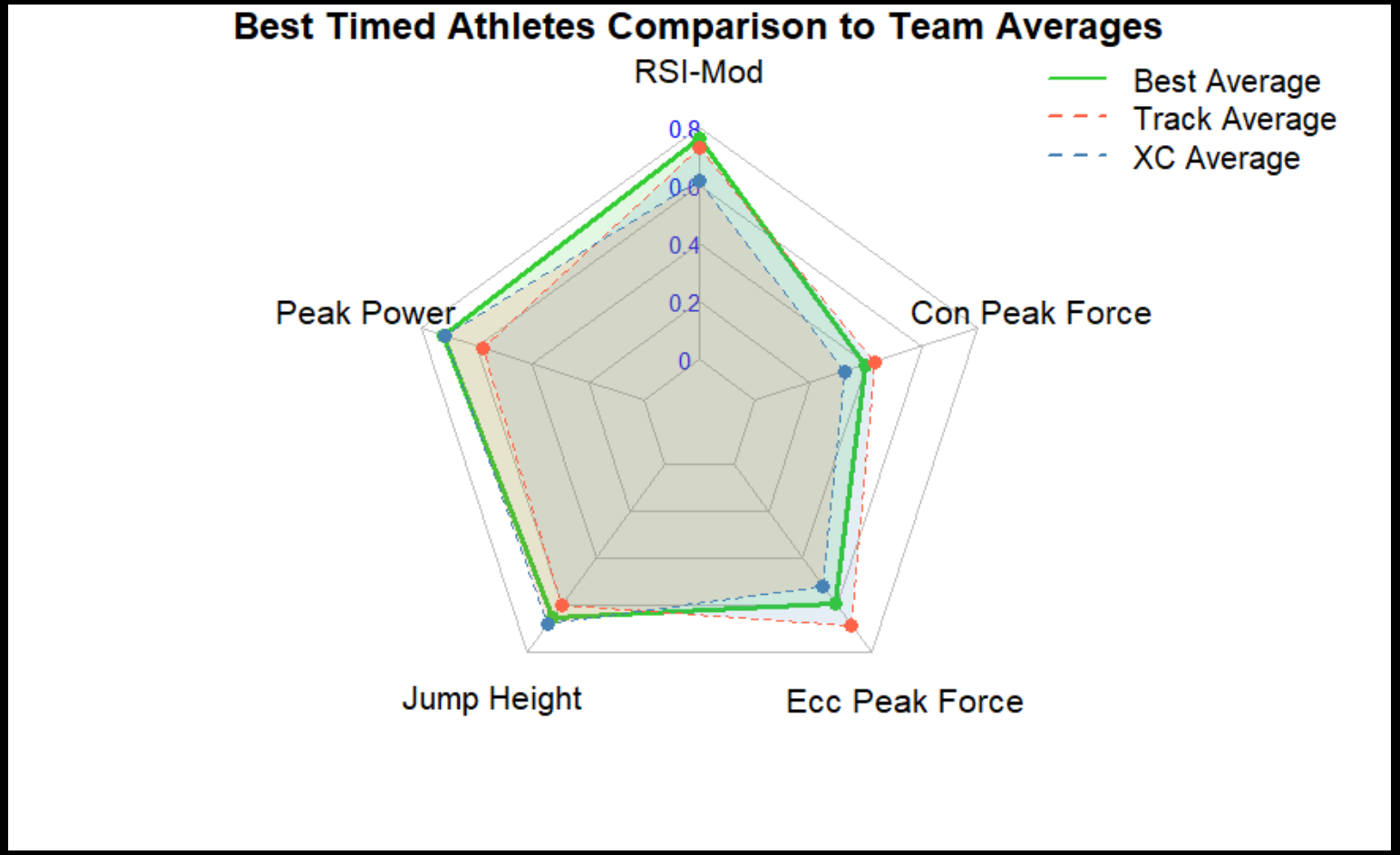


- Concentric and Eccentric Force do not impact times
- Three top metrics are extremely relevant
- Power = Most important

Track vs. XC

- Track better in RSI
- XC better in Power and Jump Height





Teams vs. Best

- XC needs to improve in RSI to reach the best
- Track needs to improve in Power and Jump Height to reach the best

Conclusion & Summary

Key Success Metrics:

- RSI-Modified
- Peak Power / BM
- Jump Height

- XC better in Power and Jump Height
- Track is better in RSI
- Concentric & Eccentric Force are not as important

Recommendations

- Work with the strength & conditioning team to implement a program to build these deficiencies
  - RSI for XC
  - Power and Jump Height for Track

- Athletes with lower times need work on all three areas

Improving these metrics directly correlates with faster times

Questions?