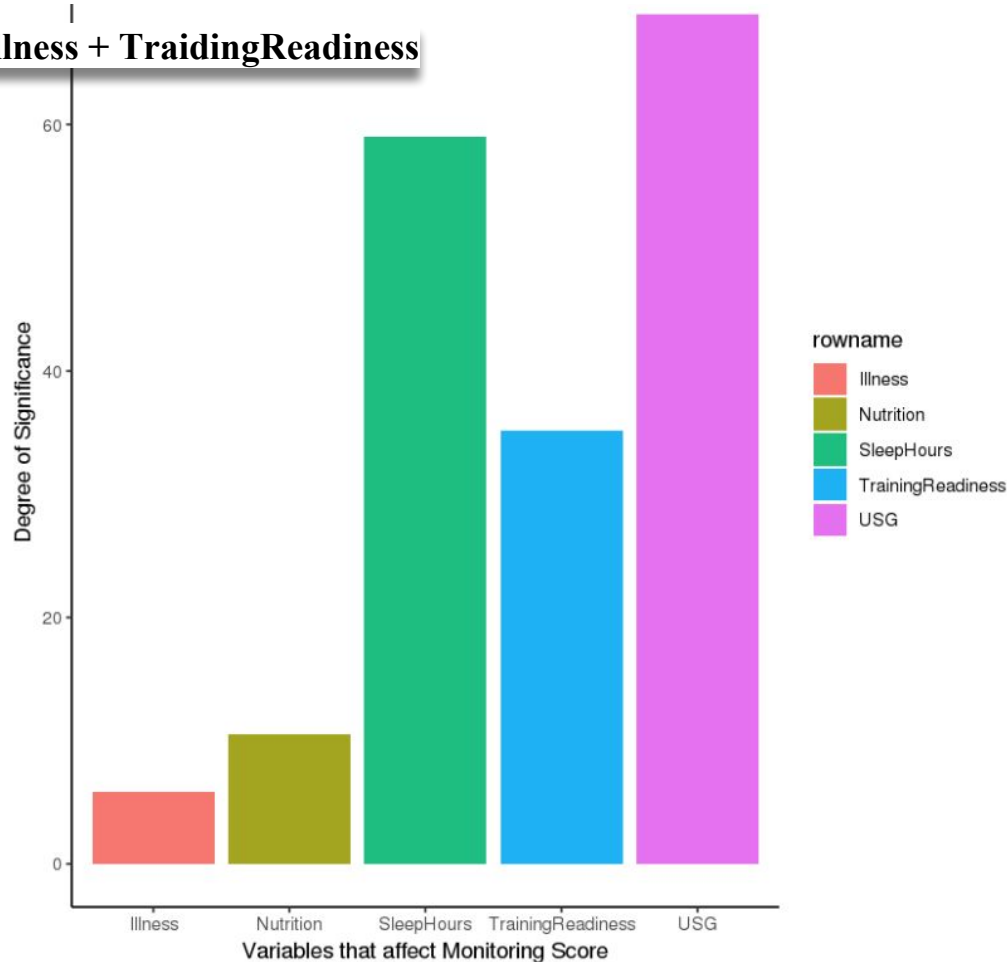
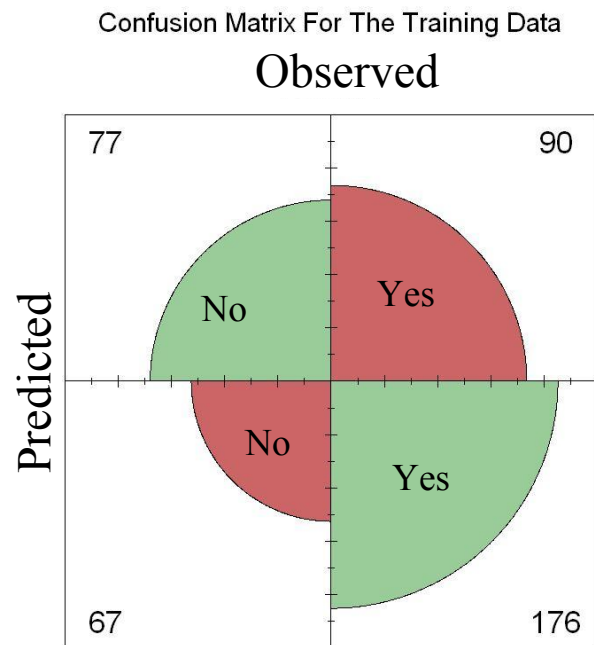


Wellness in the Canadian Women's Rugby Sevens Team

*DataFest 2019
The Snack Team*

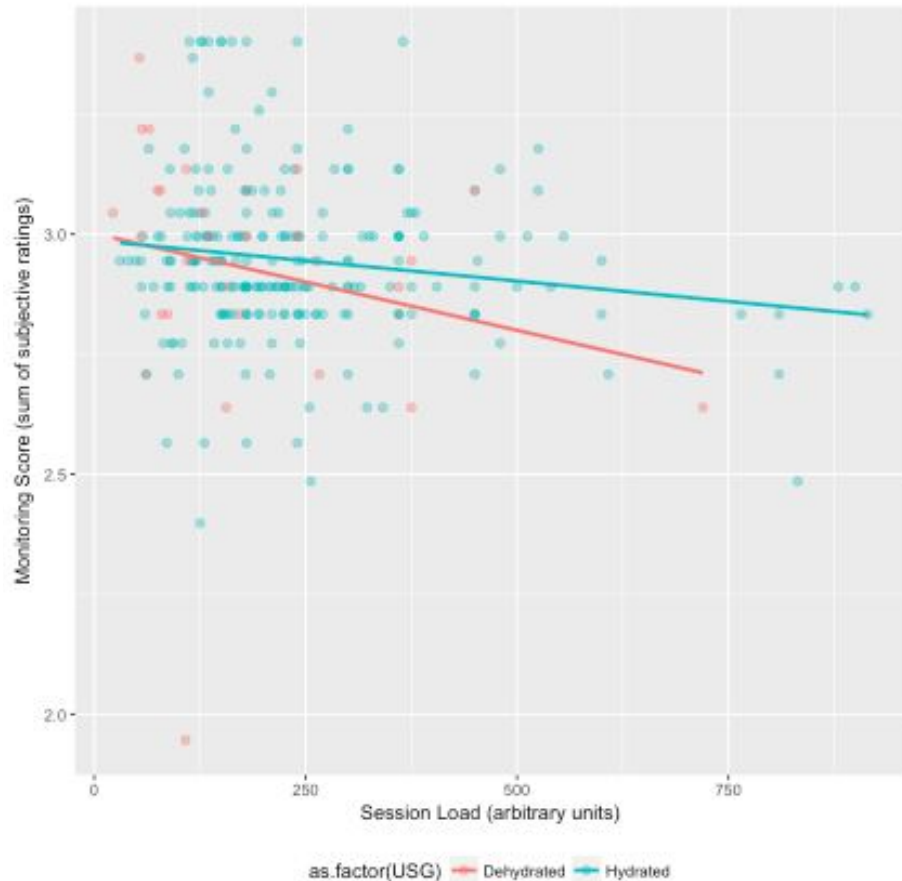
What factors affect the athletes' general feeling of wellness?

Model: Wellness ~ USG + SleepHours + Nutrition + Illness + TraidingReadiness

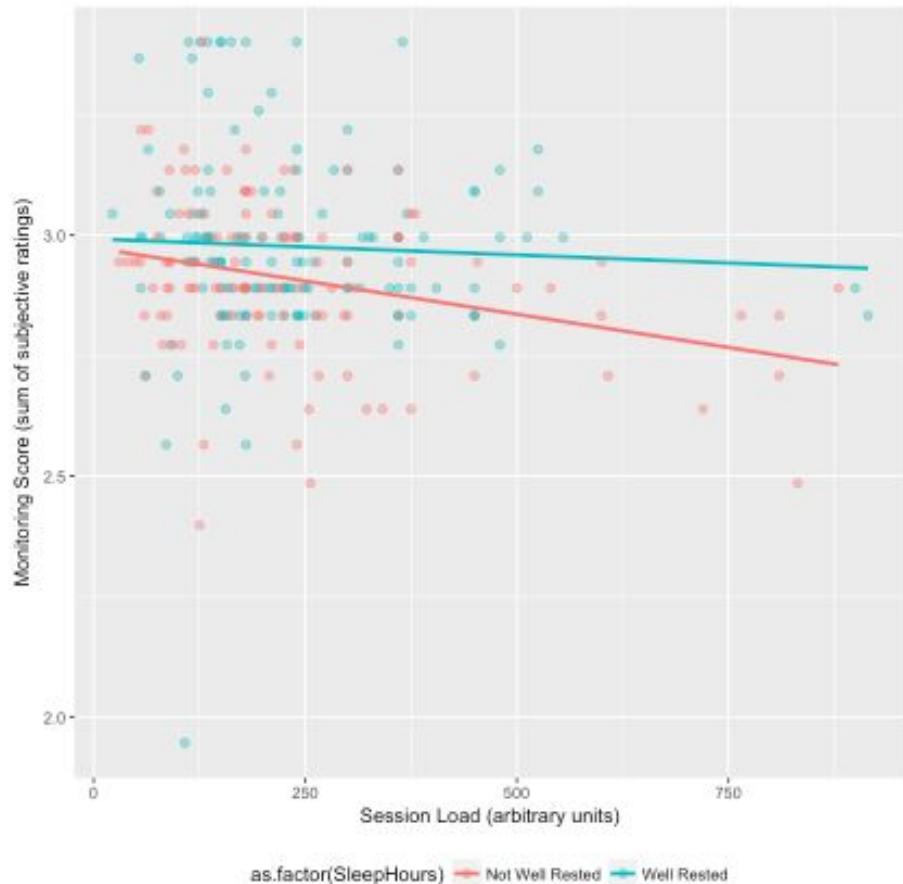


How Feelings of Wellness decrease with Training Load

If the players are dehydrated or not

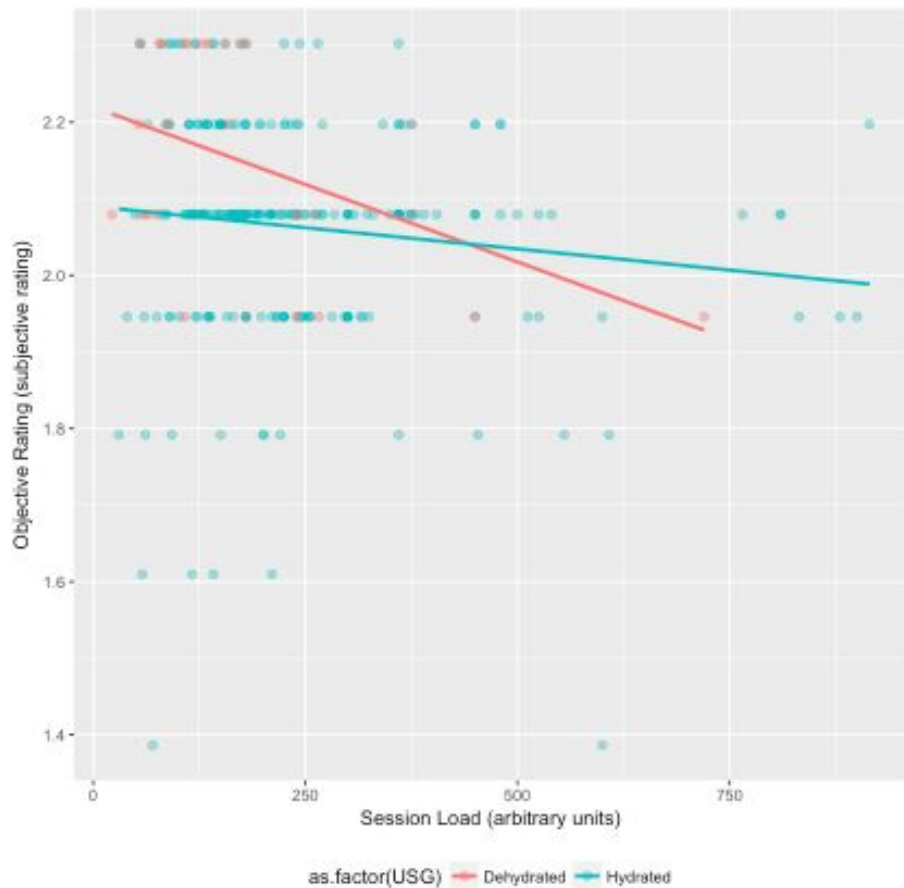


If the players have slept or not

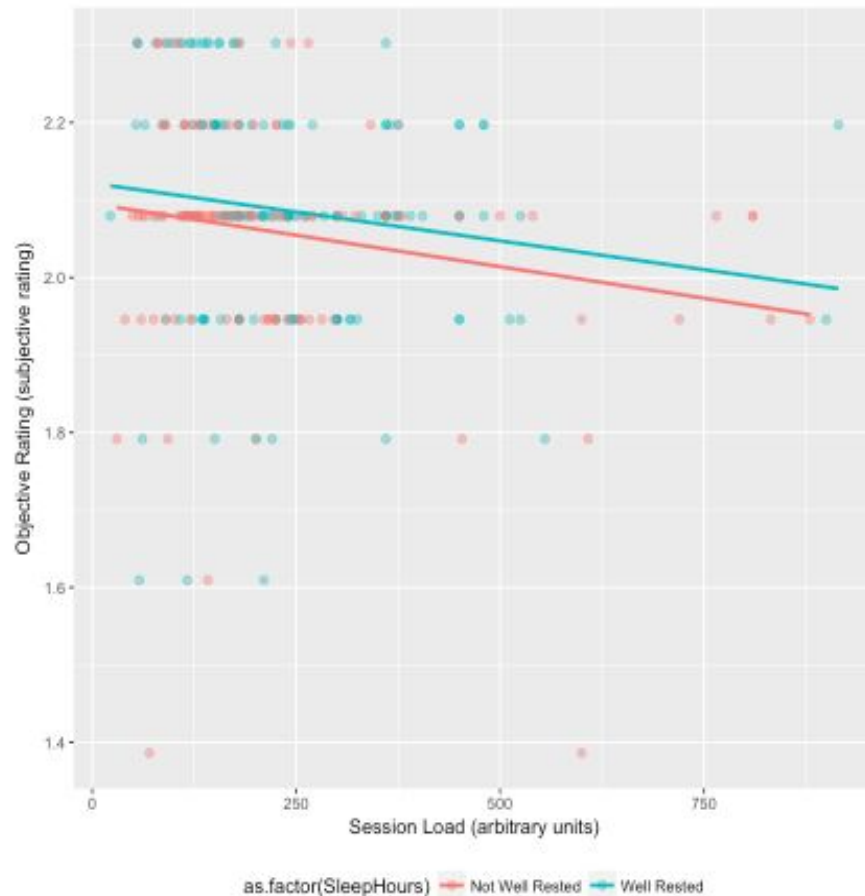


How Training Achievement decreases with Training Load

If the players are dehydrated or not



If the players have slept or not



What We Found

- Both sleep hours and dehydration affect how player feel
- Only dehydration affects how the players perform in training
- Players are more aware of their lack of sleep than their lack of hydration

Future Steps

- Further quantify amount slept and dehydration to provide a guideline on optimal drinking and sleeping habits.
- Look at game data instead of training data, so we can use a measurement of achievement that is based on more objective data.



Practice Makes Perfect

By: Team Eighteen





Standardizing Fatigue and

- To each their own (average)
- Converted each player reported value to a z-score based on their other responses
 - A players average response goes to 0
 - A players below average goes to negative

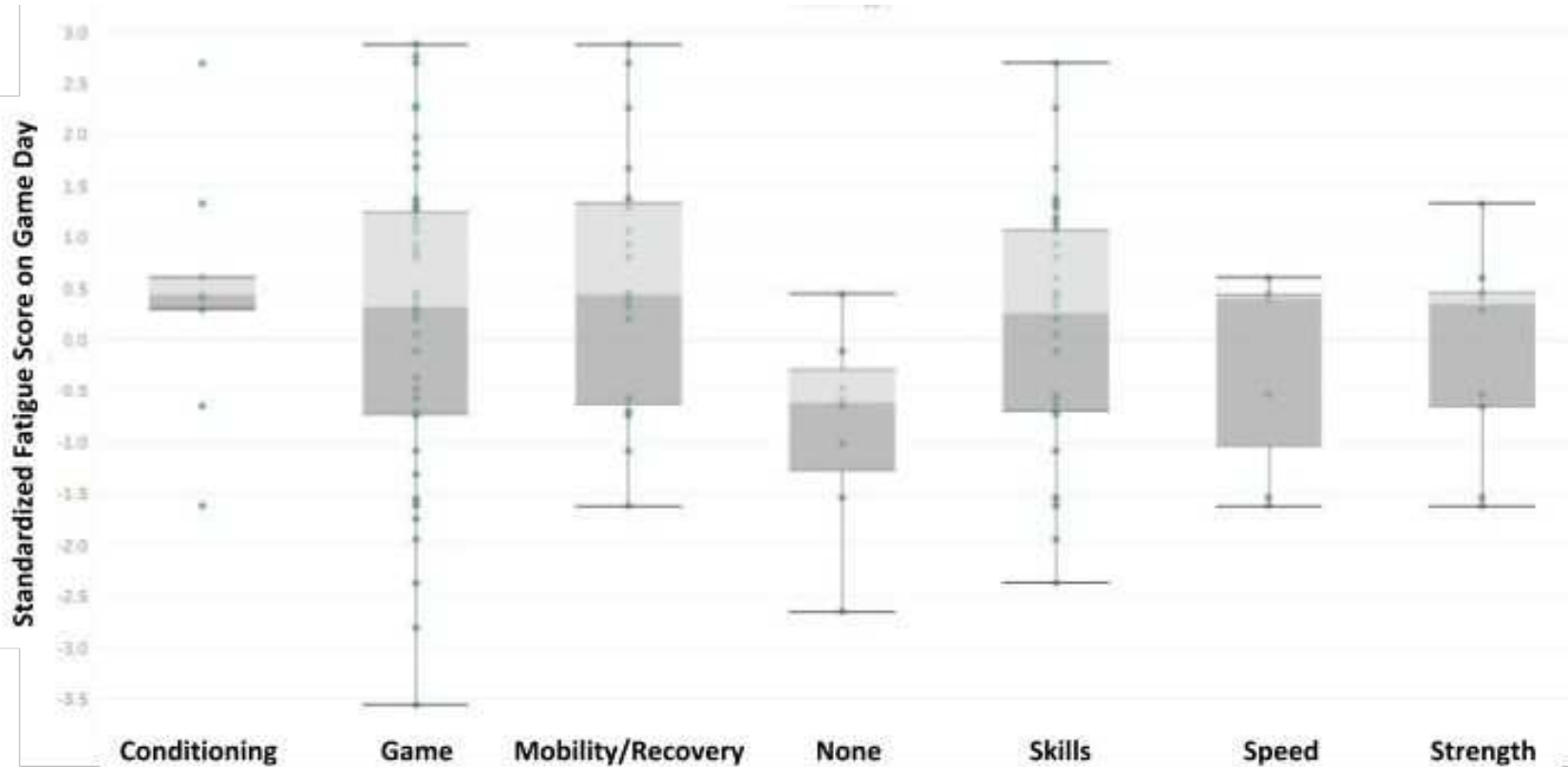


Logistic Regression

	Df	Deviance	Resid. Df	Resid. Dev	Pr(<>Chi)	
NULL			430	580.62		
Fatigue	1	10.2376	429	570.38	0.001376	**
Soreness	1	4.1739	428	566.21	0.041052	*
Desire	1	0.0000	427	566.21	0.999026	
Irritability	1	0.0262	426	566.18	0.871378	

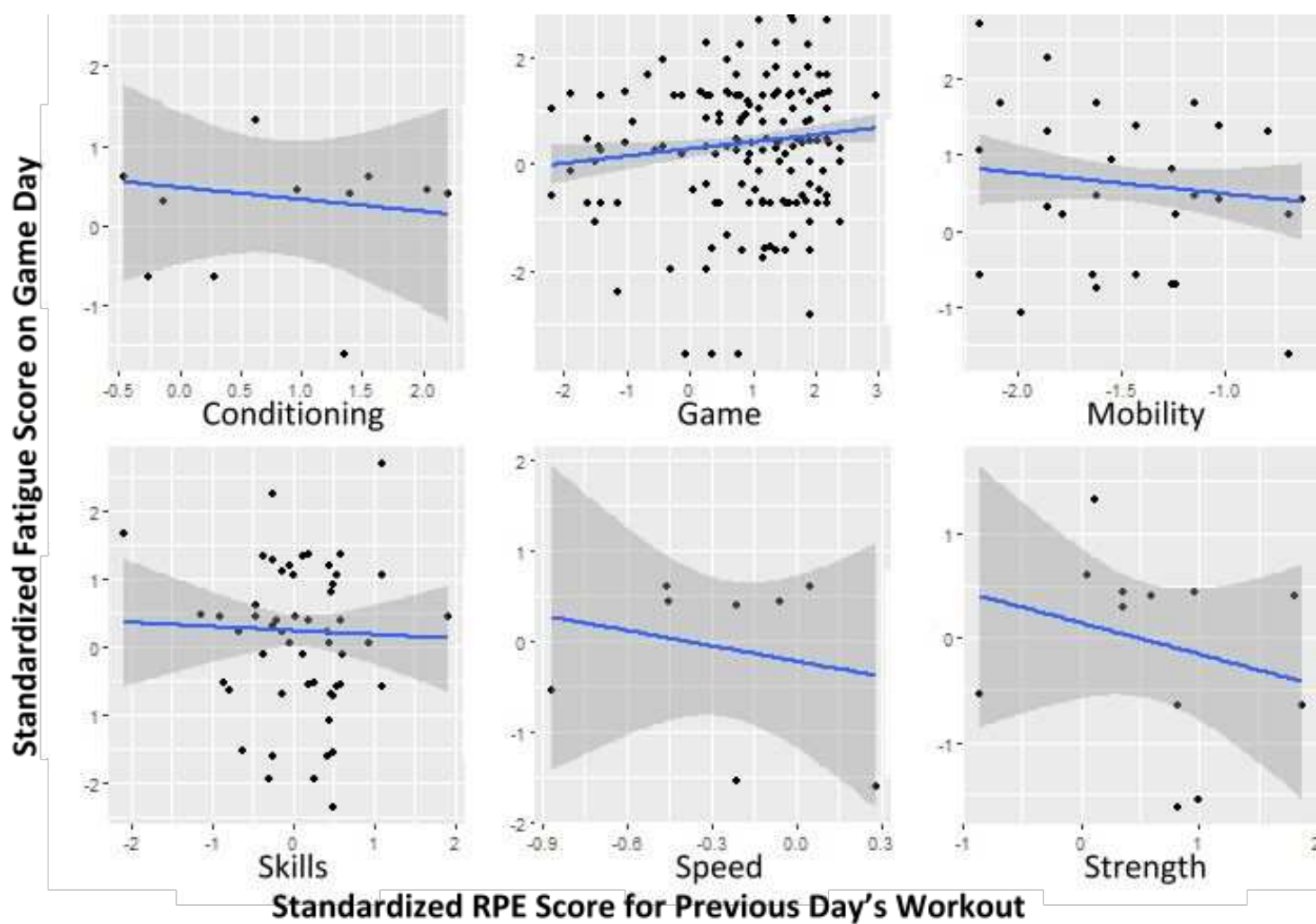
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Fatigue and the Previous Days Training





A Closer Look



Impact of Wellness & Practice on Game Speed

LeGit

Catherine Kung, Kelly Pien, Sunni Raleigh, & Victoria Zheng

Wrangling the Data

Data: Tournament game performance for the 17 players who played more than 1 tournament game

Response:

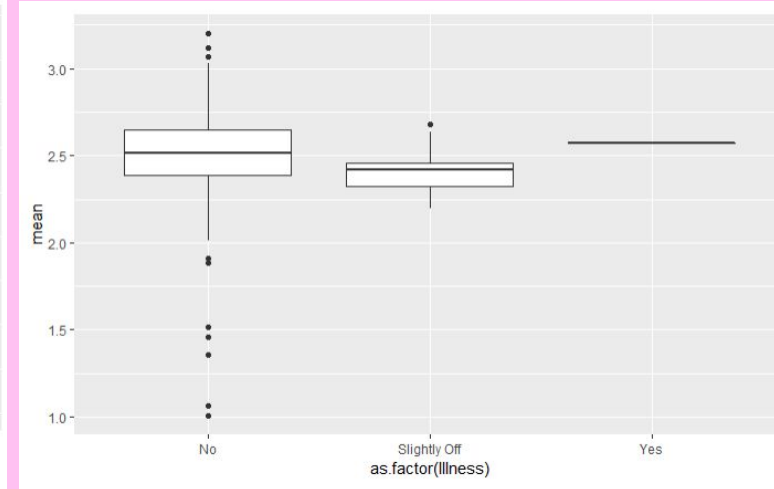
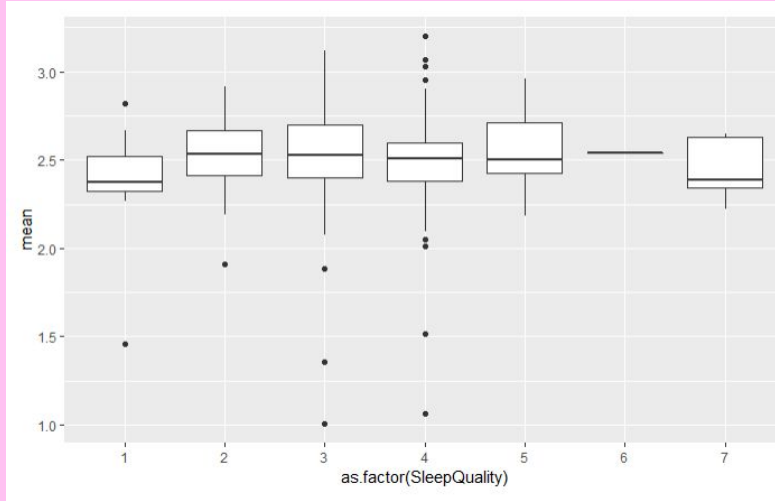
- Mean game speed

Explanatory:

- Wellness
- Practice
 - Self-reported effort rate (RPE)
 - Duration of practice in minutes

Wellness Not Related To Mean First Tournament Game Speed

- Training Readiness
- Fatigue
- Soreness
- Desire
- Irritability
- Sleep Hours
- Sleep Quality
- Pain
- Illness
- Menstruation
- Nutrition
- Nutrition Adjustment
- USG Measurements



Nutrition: Needs Further Investigation

ANOVA comparisons showed that the better the nutrition, the less effect physical discomfort has on self-evaluated fatigue.

Response: Fatigue

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
SleepHours	1	22.065	22.065	68.2421	1.401e-15 ***
SleepQuality	1	94.110	94.110	291.0560	< 2.2e-16 ***
Nutrition	1	4.316	4.316	13.3467	0.0002872 ***
Illness	2	1.142	0.571	1.7654	0.1722209
Menstruation	1	2.359	2.359	7.2967	0.0071508 **
NutritionAdjustment	2	2.877	1.439	4.4491	0.0121722 *
Desire	1	25.756	25.756	79.6548	< 2.2e-16 ***
Soreness	1	45.953	45.953	142.1179	< 2.2e-16 ***
Irritability	1	1.684	1.684	5.2068	0.0229329 *
USG	1	0.214	0.214	0.6608	0.4166650
SleepQuality:Nutrition	1	0.001	0.001	0.0029	0.9574055
Nutrition:Illness	2	0.348	0.174	0.5389	0.5837629
Nutrition:Menstruation	1	0.001	0.001	0.0031	0.9557906
Nutrition:NutritionAdjustment	2	0.222	0.111	0.3431	0.7097384
Nutrition:Desire	1	3.055	3.055	9.4485	0.0022327 **
Nutrition:Soreness	1	2.151	2.151	6.6510	0.0102050 *
Nutrition:Irritability	1	0.363	0.363	1.1228	0.2898444
Nutrition:USG	1	0.048	0.048	0.1492	0.6994310
Residuals	483	156.174	0.323		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Analysis of Variance Table

Response: Fatigue

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
SleepHours	1	18.871	18.871	55.8514	5.992e-13 ***
SleepQuality	1	68.974	68.974	204.1420	< 2.2e-16 ***
Illness	2	0.161	0.081	0.2384	0.7880
Menstruation	1	0.588	0.588	1.7393	0.1881
NutritionAdjustment	2	0.018	0.009	0.0273	0.9730
Desire	1	12.130	12.130	35.9013	5.038e-09 ***
Soreness	1	39.447	39.447	116.7506	< 2.2e-16 ***
Irritability	1	0.731	0.731	2.1621	0.1423
USG	1	0.468	0.468	1.3841	0.2402
Pain	1	0.195	0.195	0.5763	0.4483
Residuals	360	121.635	0.338		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> anova(pf4)

Analysis of Variance Table

Response: Fatigue

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
SleepHours	1	7.466	7.4659	26.2659	1.152e-06 ***
SleepQuality	1	22.544	22.5437	79.3108	6.844e-15 ***
Illness	2	2.252	1.1258	3.9608	0.021590 *
Menstruation	1	2.376	2.3756	8.3576	0.004560 **
NutritionAdjustment	2	2.945	1.4724	5.1799	0.006954 **
Desire	1	18.430	18.4303	64.8395	6.695e-13 ***
Soreness	1	5.145	5.1455	18.1022	4.173e-05 ***
Irritability	1	1.005	1.0052	3.5363	0.062464 .
USG	1	0.028	0.0275	0.0968	0.756283
Pain	1	0.061	0.0614	0.2159	0.642994
Residuals	120	34.109	0.2842		

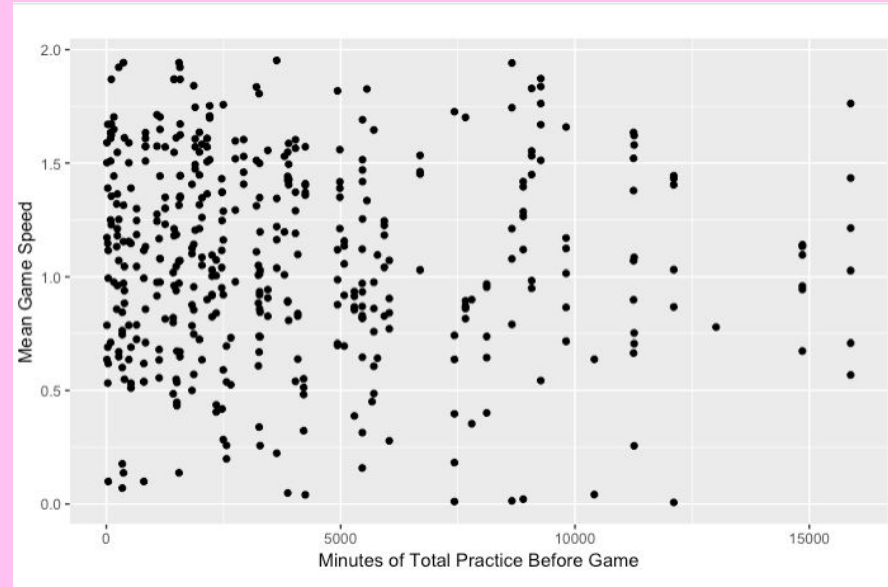
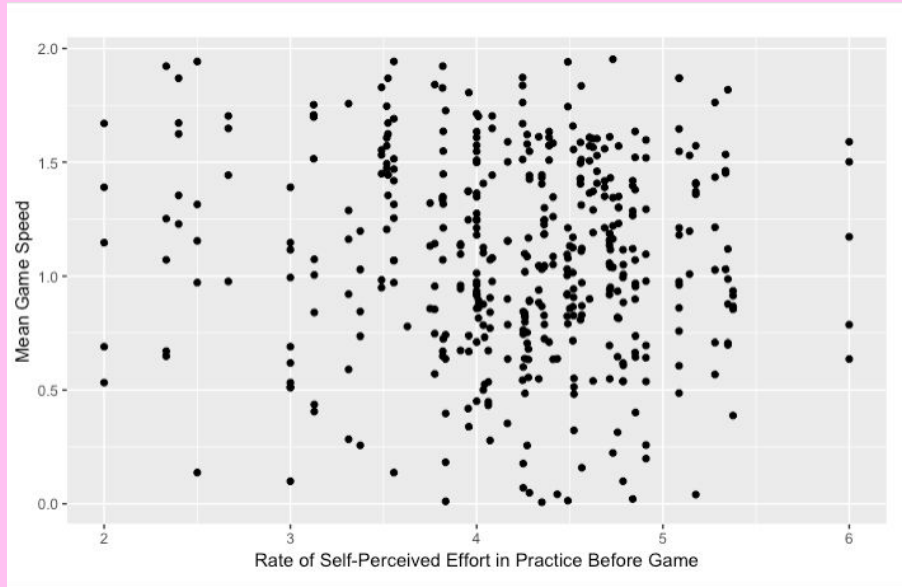
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

BUT the interaction term is not significant

Practices Can Be More Chill

No linear relationship between:

- Rate of perceived effort in practices before game and mean game speed
- Minutes of total practice before game and mean game speed





Pain vs Success

We R: Jasmine, Sarah, Syrine, Ellen, Marta

Research Question:



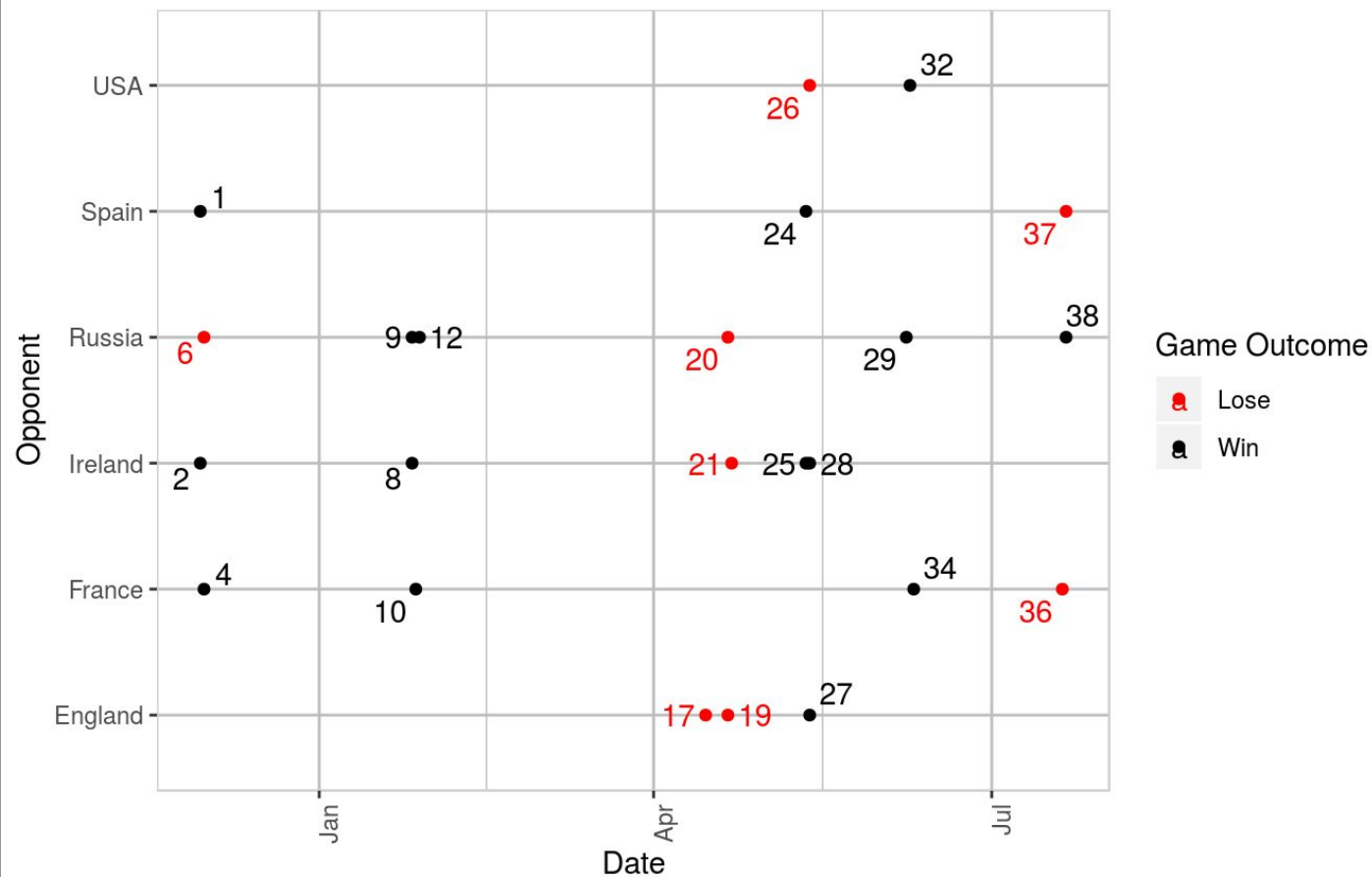
— — —
Is there a correlation between pain and success in tournaments? Specifically the accumulation of pain in a range of days before the first day of a game.

H0: Pain does not impact tournament success

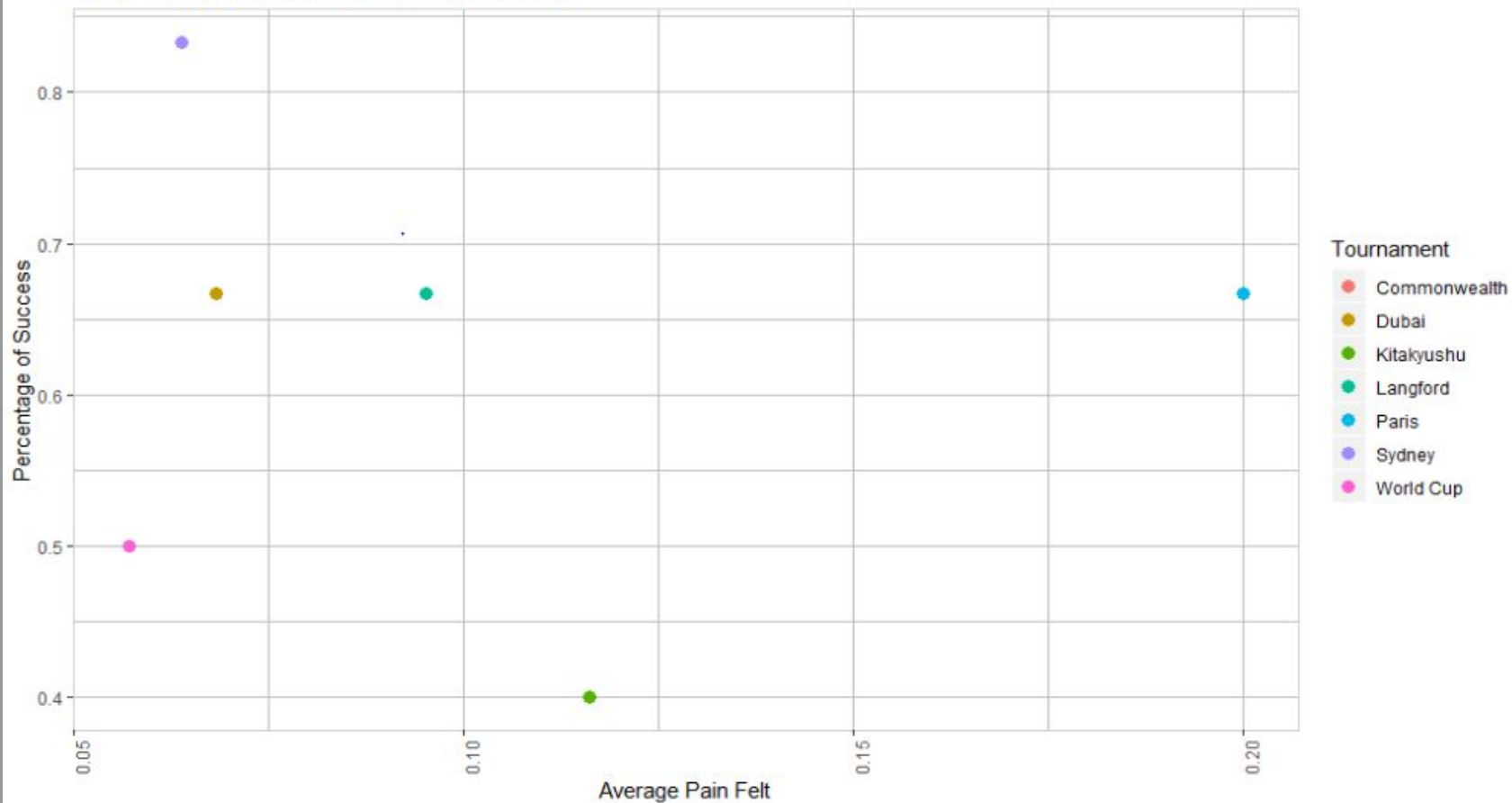
H1: Pain affects tournament success.

Wins and Losses - evenly matched games

In respect to Pain



How Pain Affects the Outcome of a Game



Results

- Discovered no correlation: $p = 0.78$
 - Different from what we had hypothesized
 - Could be linked to missing data--had a lot of NA
- Fail to reject Null Hypothesis
- For further research..let's look at the right!



Further Ideas

- Enter more specific data as to how pain is measured:
 - Ex:
 - List injuries
 - Chronic illnesses
- Determine whether medication are taken
 - Ex:
 - Athletes taking over-the-counter painkillers to relieve the pain in order to play
 - Information missing but understandable that it is invasive
 - Medication has been known to influence fatigue from a medical standpoint

— — —

Interested in
sponsorships by:

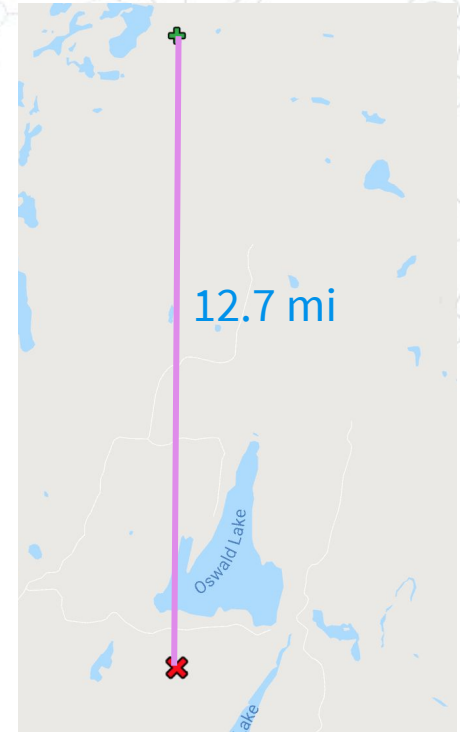
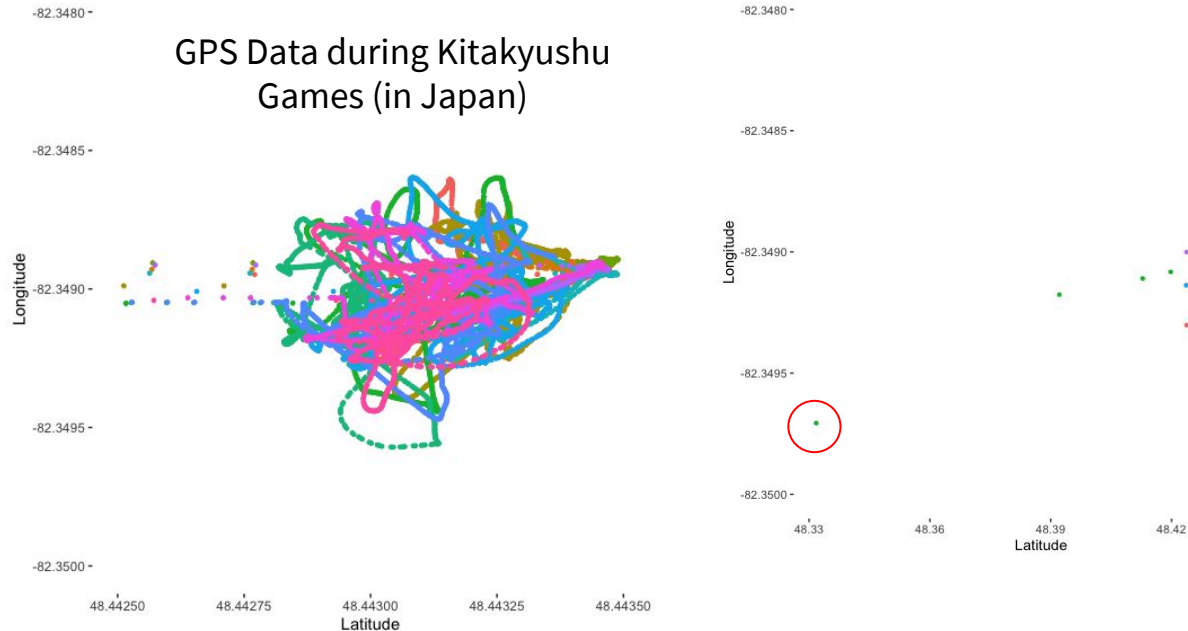


Five College DataFest 2019: Quantifying and Predicting Exhaustion

Clara Seo, Esther Song, Fengling Hu, Laboni Hoque, Lesley Zheng
TEAM LOAF

Visualizations

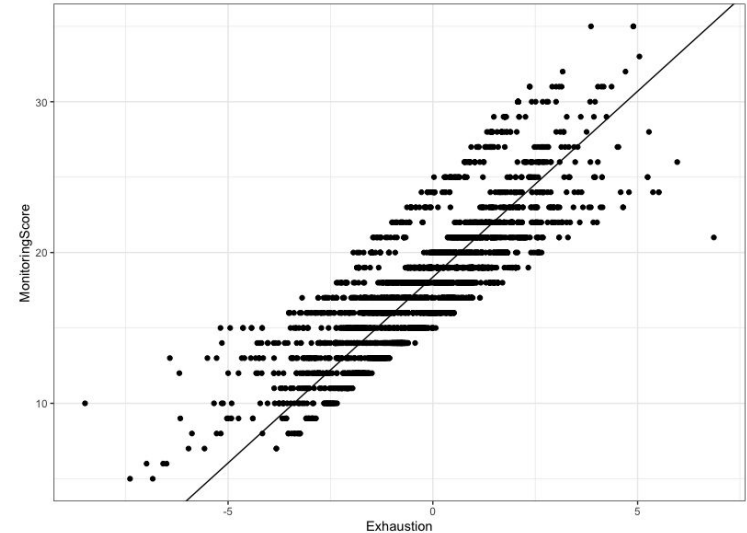
Interesting complications with GPS data



Other players go from Canada to Philadelphia and back within two minutes (~1800 miles).

Summarizing Overall Fatigue

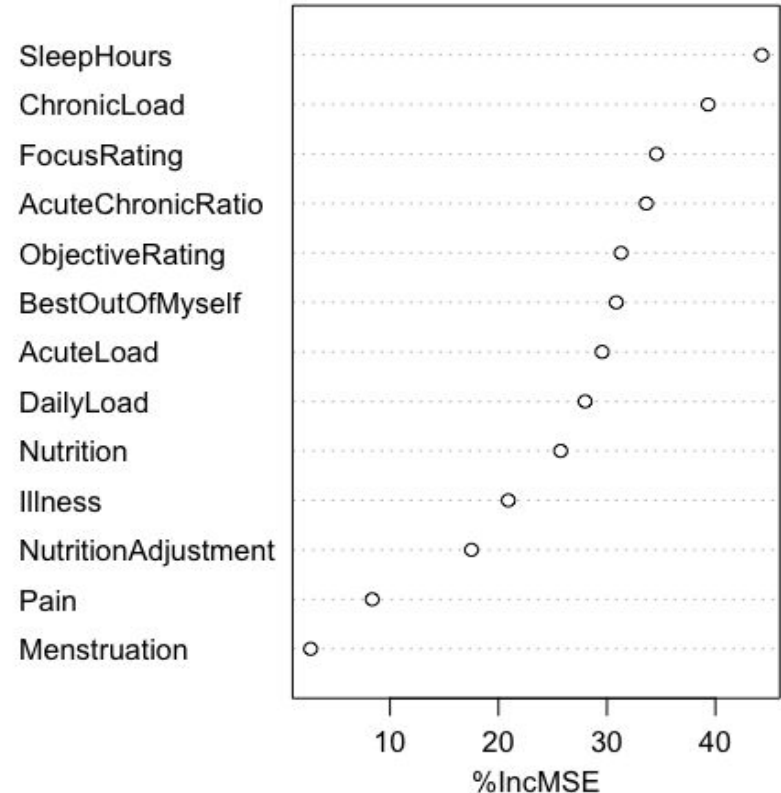
- Principal component analysis (PCA) to determine best summary of:
 - Fatigue, Soreness, Desire, Irritability, and SleepQuality*
 - Standardized within *PlayerID*
- Weighted average → ***ExhaustionMS***
 - Explained 45% of the variability
 - Theoretically better than *MonitoringScore*



Training Analysis

- Standardized *RPE* and training loads by *PlayerID*
- Find important predictors for *ExhaustionMS*
- Prediction of *ExhaustionMS* is more accurate than *Fatigue*
 - ExhaustionMS* seems more likely

Random Forest Variable Importance Plot for Predicting Exhaustion



Game Analysis

- ◎ Predicting exhaustion in games based on accelerometer readings
- ◎ Scraped and added weather conditions by game
- ◎ Ran **17** different models
 - Gradient Boosting Regressor
 - Training MSE: **0.48**
 - Test MSE: **2.72**
- ◎ Multiple Linear Regression (stepwise) includes only *WindSpeed* and *TeamPoints*
 - Higher *WindSpeed/TeamPoints* ↔ less *ExhaustionMS*

A thick black L-shaped frame is positioned on the left and bottom edges of the slide, framing the central text.

EXPLORING INFLUENTIAL FACTOR OF FATIGUE

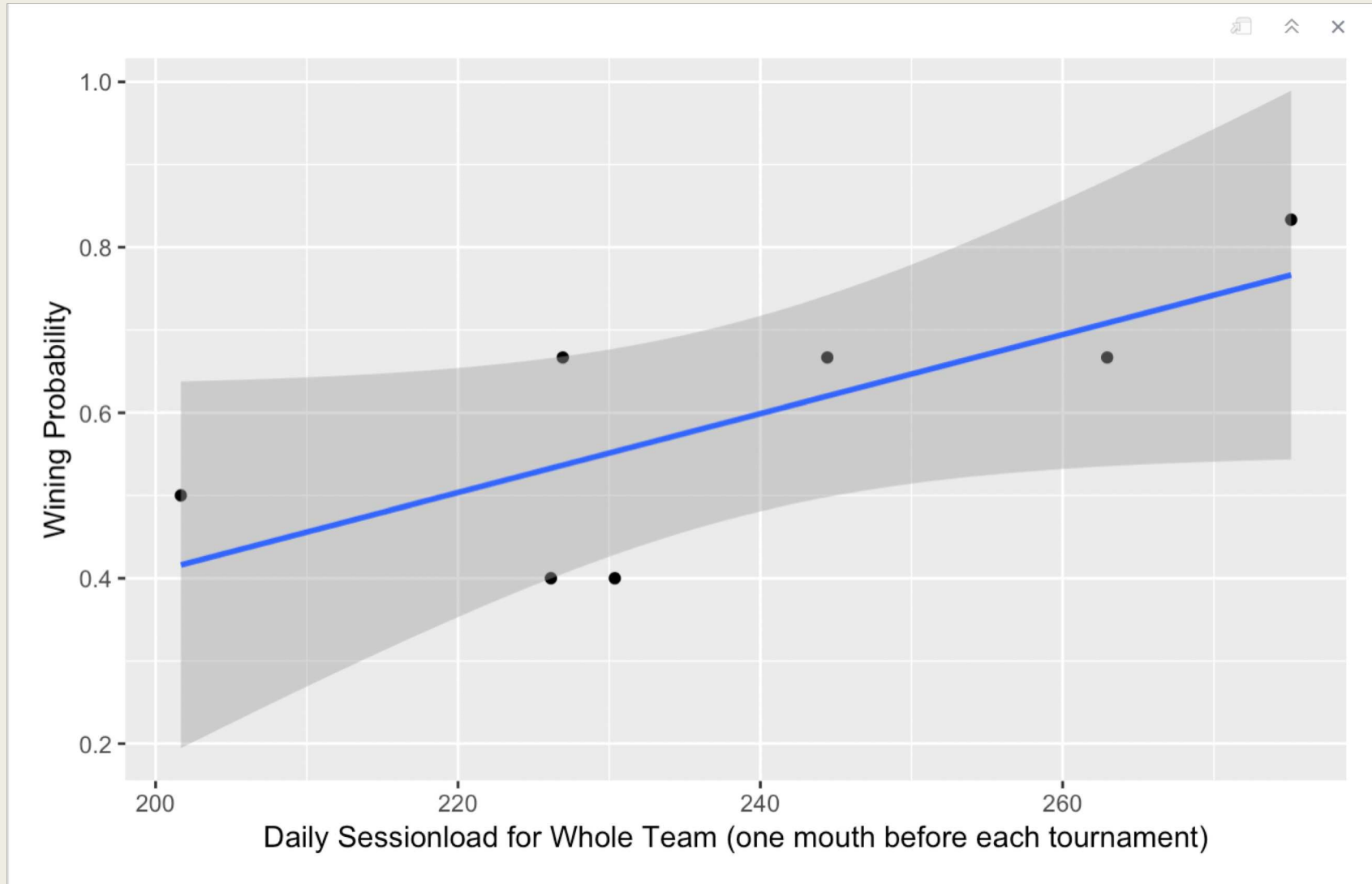
With Concentration on Session Load

--Group 20 from UMass Amherst

Correlation Display

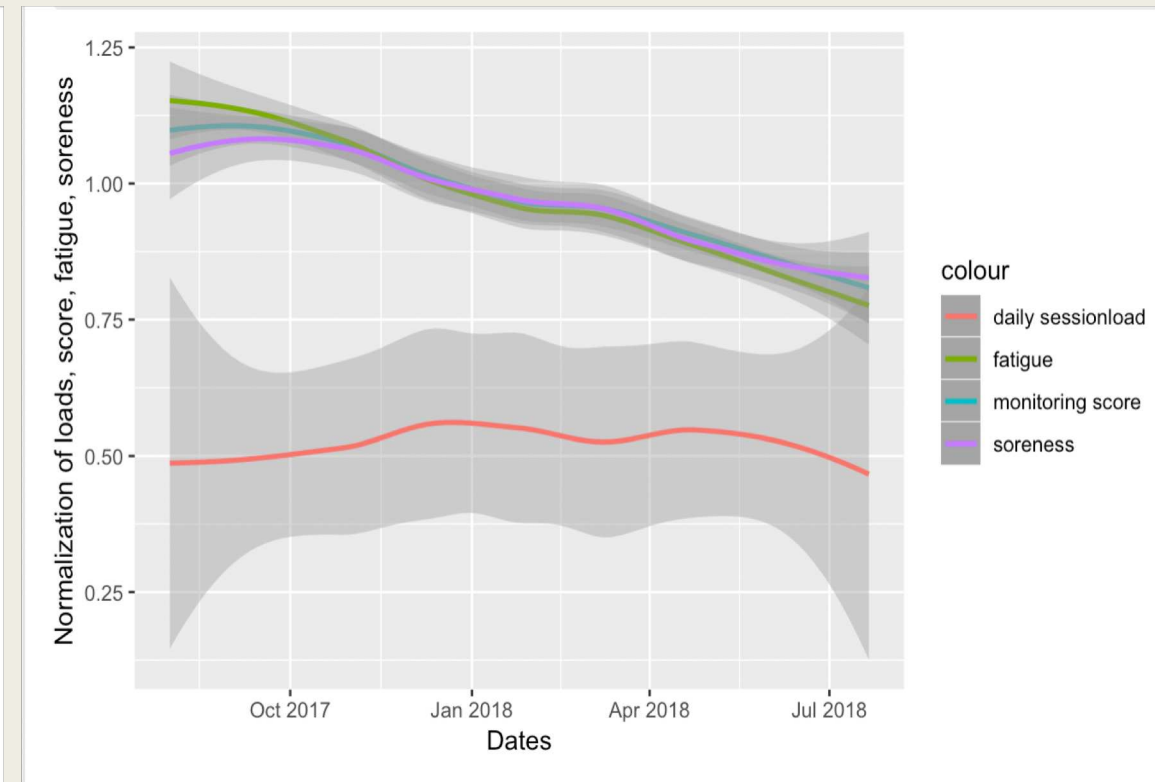
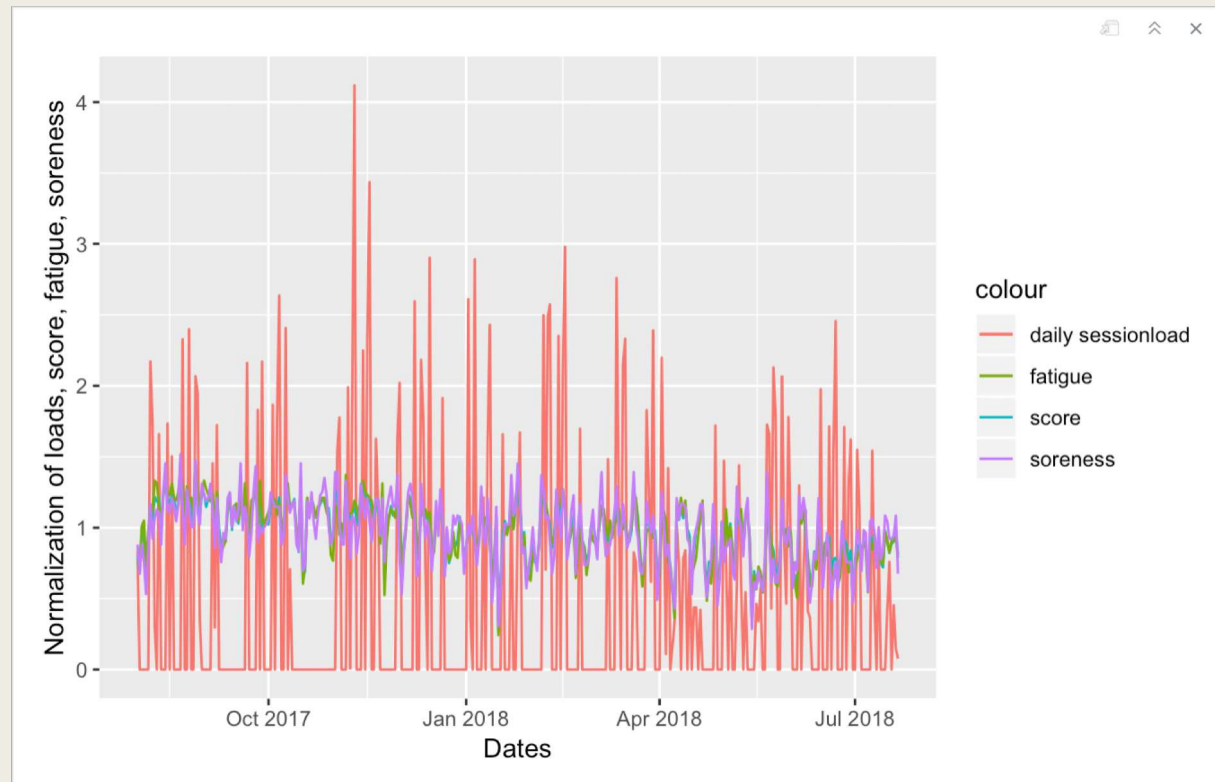
	Fatigue	Soreness	Desire	Irritability	SleepQuality
Fatigue	1.0000000	0.5199037	0.5801947	0.4814748	0.5253614
Soreness	0.5199037	1.0000000	0.4258580	0.3292331	0.2817755
Desire	0.5801947	0.4258580	1.0000000	0.4511123	0.3117694
Irritability	0.4814748	0.3292331	0.4511123	1.0000000	0.4028425
SleepQuality	0.5253614	0.2817755	0.3117694	0.4028425	1.0000000

Winning Probability and Session Load

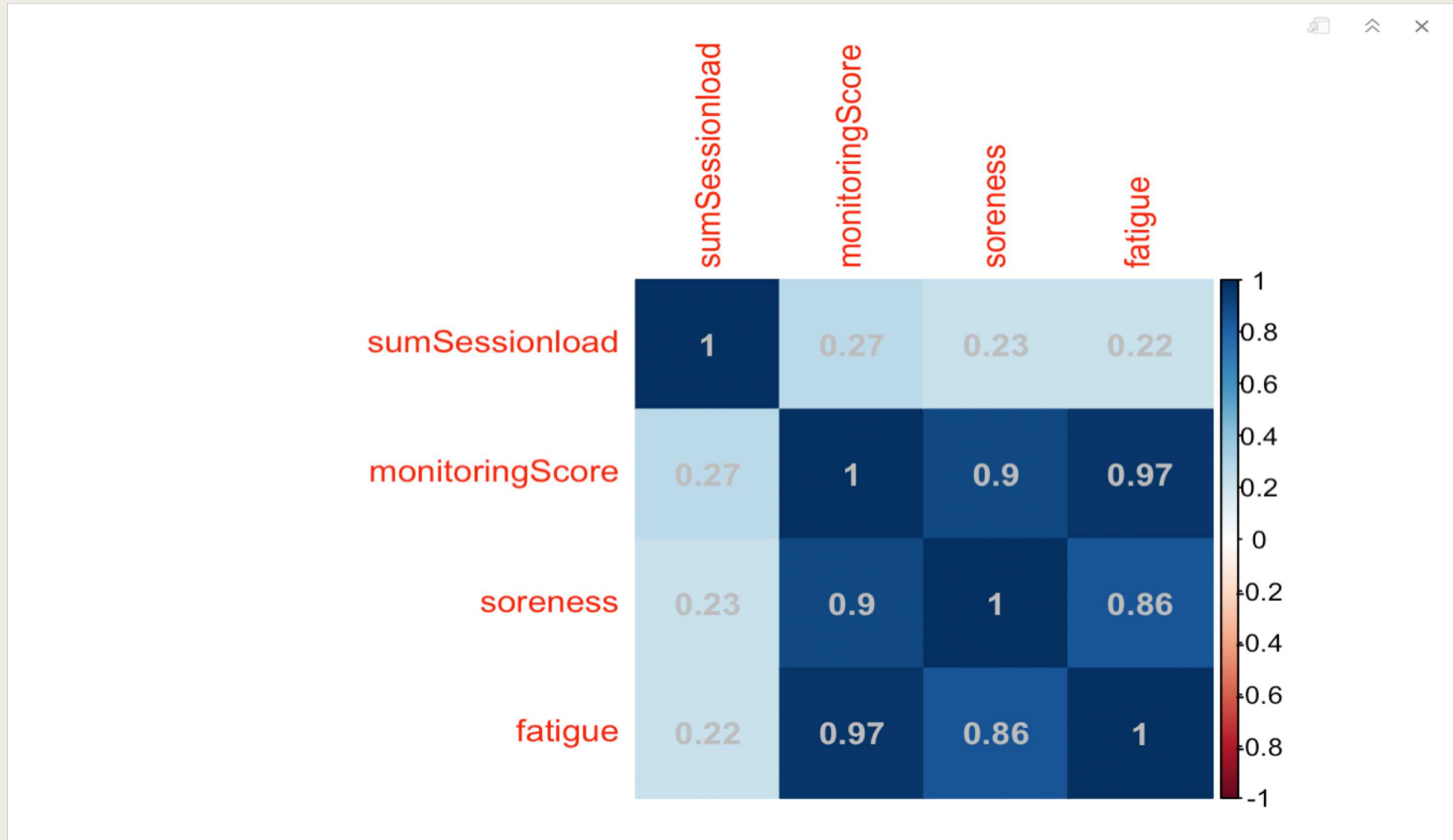


SessionLoad → fatigue & Soreness & High Monitoring Score??

NOT REALLY !!



Correlation Plot



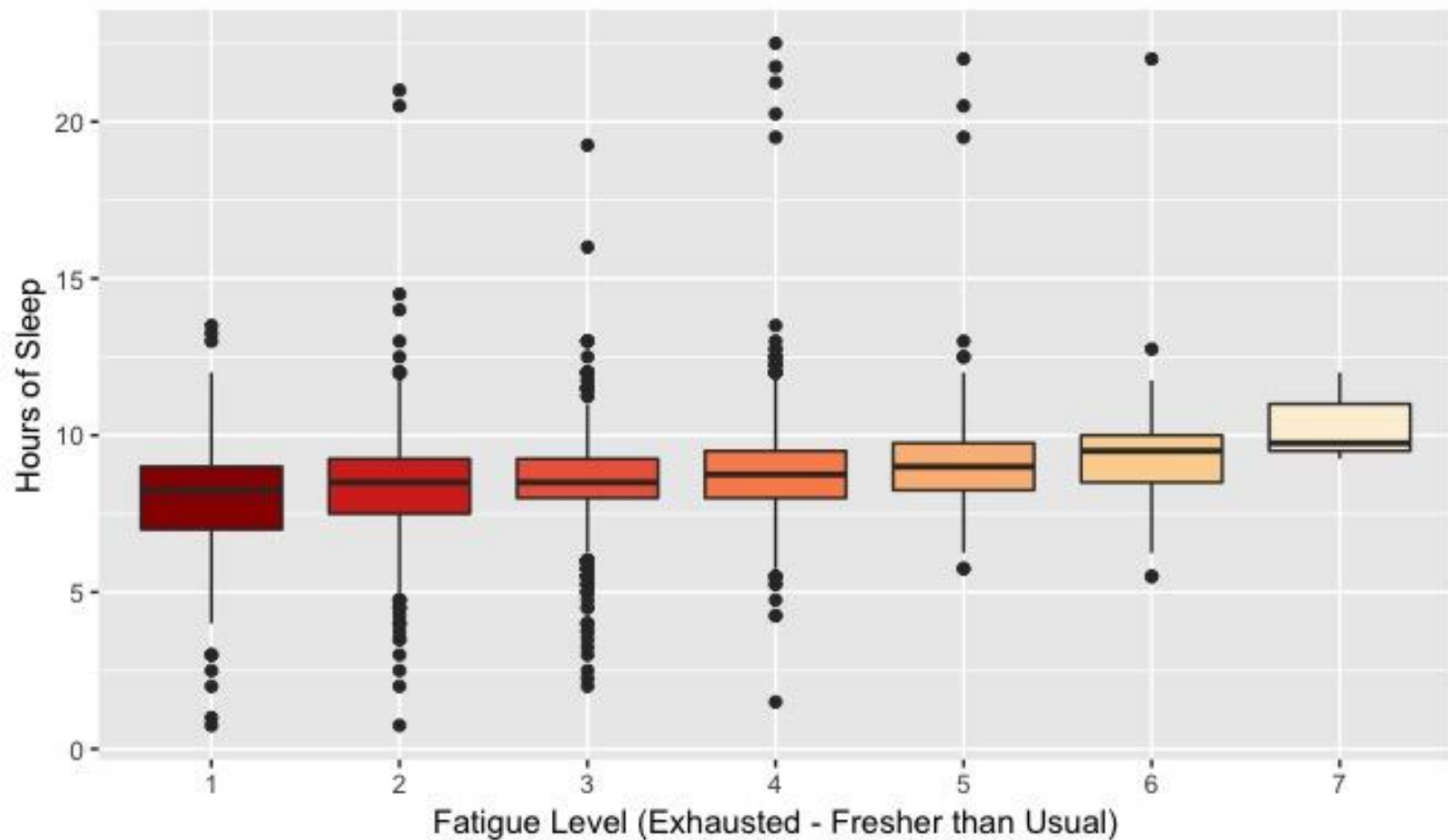


<https://www.artstation.com/artwork/o4E3W>

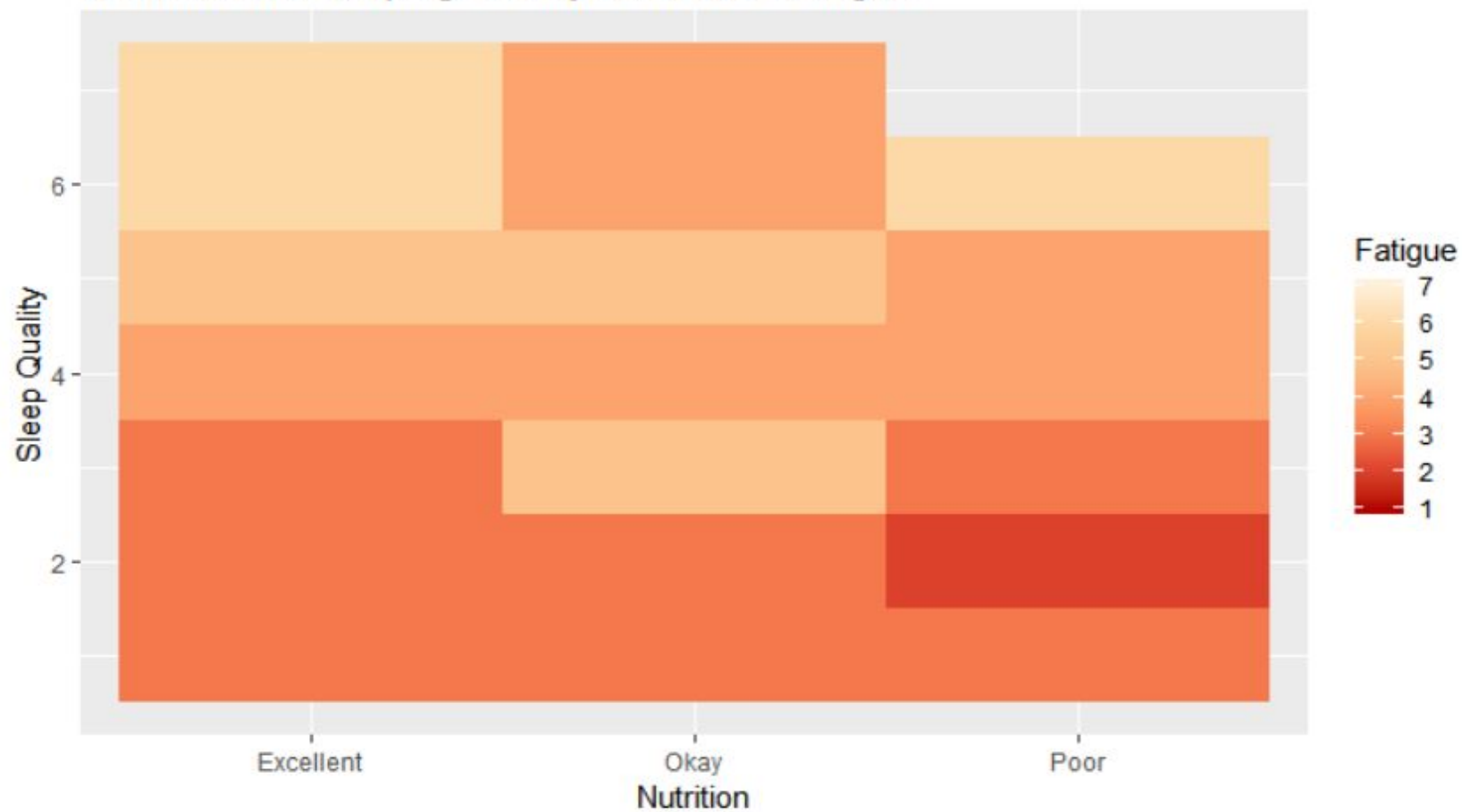
Wellness vs. Fatigue in Rugby 7s

Free Samples: Jane Bang, Emma Scott, and Sarah Weden

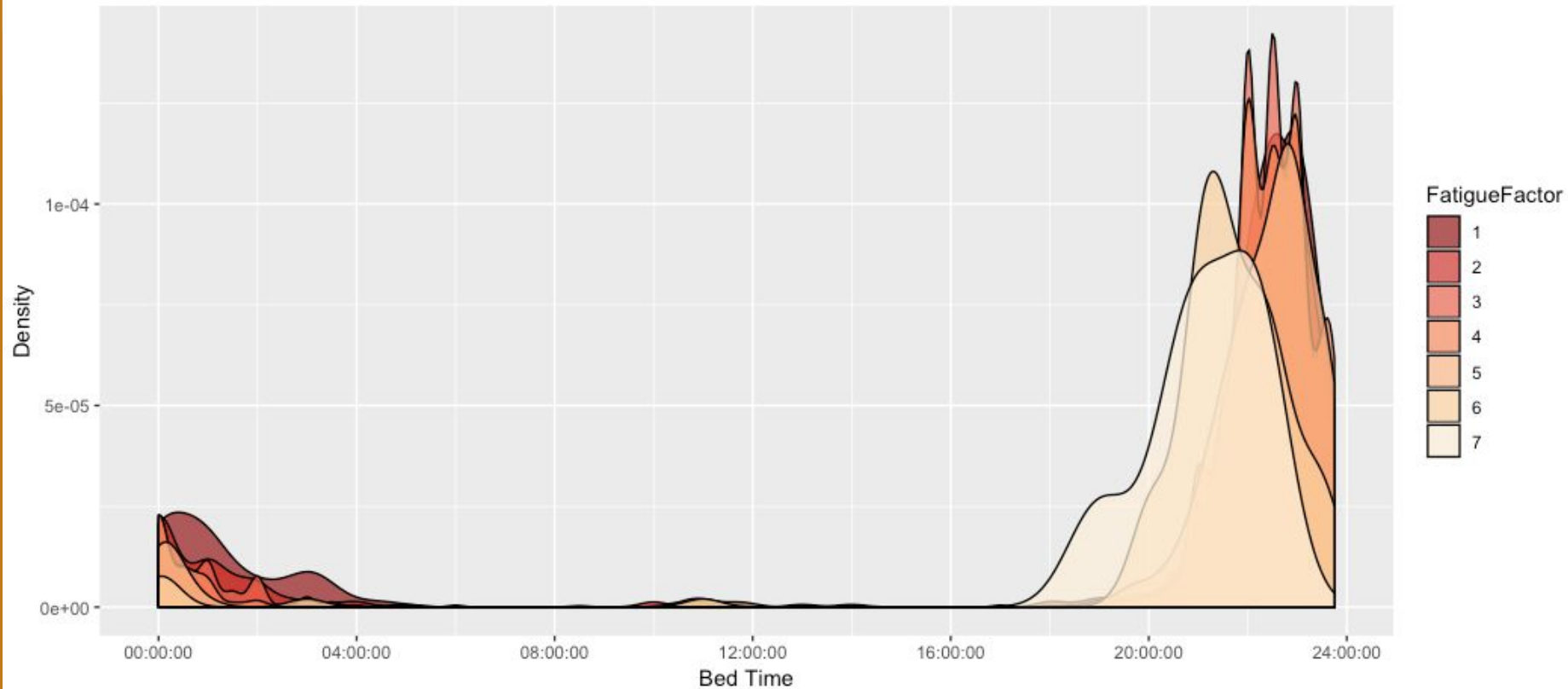
Impact of Sleep Hours on Fatigue Level



Nutrition and Sleeping Quality's Effect on Fatigue



Impact of Bed Time on Level of Fatigue



Influence of Fatigue on Game Results

