

Physical & psychological factors affecting the female collegiate lacrosse athlete & performance

Paula Parker, EdD, CMPC®

Department of Exercise Science

Abby Cooley, MSPH Candidate

Campbell University School of Osteopathic Medicine, Class of 2028

Behavioral Health & Wellness Manager:
Campbell Community Care Clinic



Purpose

To discuss the influencing factors for sport performance in Division I female athletes

- Objective data
- Subjective data



Why this population?

Small portion of the literature devoted to collegiate athletes & even less devoted to female athletes.

Collegiate athletes are unique due to the academic demands of the student-athlete.

Female athletes are different from their male counterparts physiologically and psychologically.

Longitudinal assessment of 7 years and counting

THANK YOU!



- Dr. Jennifer Bunn
 - Sam Houston State University
 - Olivia Sisson
 - Brynn Hudgins
 - Kattie Alphin
 - Dalton Garner
 - Camden Johnston
 - Justin Clark
 - Megan Frick
 - Matt Hamlet
 - Jenna Carter
 - Libby Bynum
 - Charli Rosenberg
 - Andrew Thornton
 - Brianna Robinson
 - Austin Calhoun
 - Monseratt Andrade
-
- Abby Cooley
 - Sarah Grace
 - Allison Peele
 - Alyson Kidd
 - Emma Carew
 - Elaine Smith
 - Shania Roehrich
 - Jordan Riggs
 - Lio Sevelio
 - Diana Guerrero-Neito
 - Arianna Hunsucker
 - Sara Honeycutt
 - Ella Coleman
 - Levi Chamberlain
 - Taylor Gery
 - Cecilia Pasquarella
 - Carson Pina

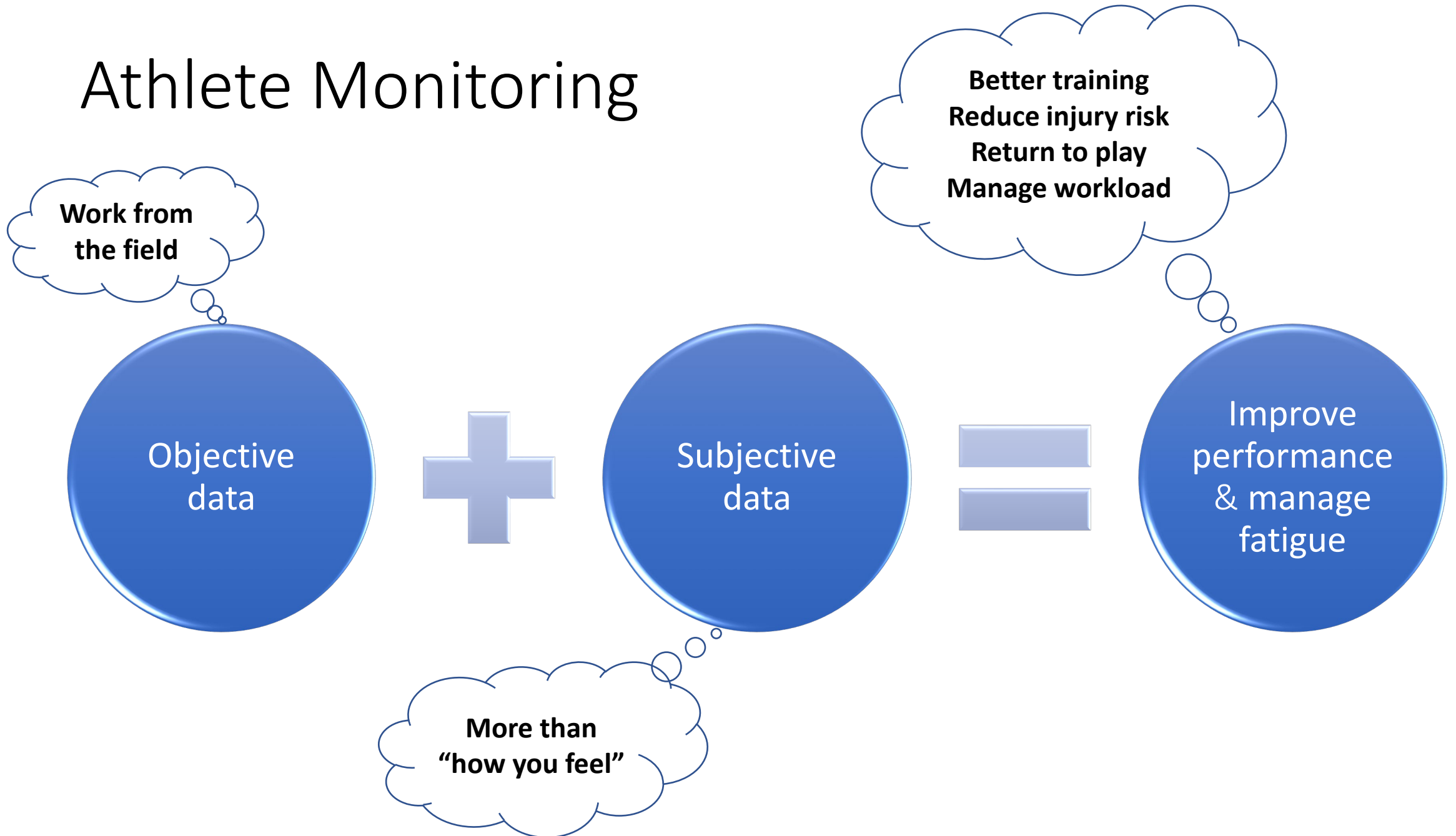
Research funding in part by:

Campbell Women's
Lacrosse

Ester H. Howard Student
Research Fellow Grant

National Association for
Kinesiology in Higher
Education (NAKHE)
Hellison Interdisciplinary
Research Grant

Athlete Monitoring



Objective Data: Microtechnology

- Sport microtechnology companies measure variables through global positioning systems (GPS), accelerometry, & heart rate
- They have created an “all-in-one” variable (A1M) to provide a composite score for external load
- VX Sport – Athlete Load (AL)



Athlete Training Load: The Big 5 Metrics

Total distance

- For a session, drill, game, etc.
- Meters or yards

High-intensity distance (HID)

- Distance run that exceeds a given speed threshold (>60% max speed)
- Meters or yards

Sprints

- # of sprint efforts above a given speed threshold
- Count

Accelerations

- # of fast starts above a given threshold
- Count

Decelerations

- # of quick stops above a given threshold
- Count

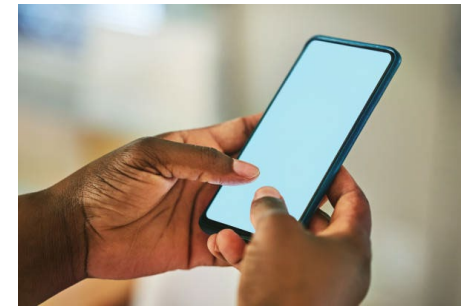


Daily Well-Being

Subjective Data:
Daily Wellness
Survey



Logging Daily Wellness



10:14

Welcome to Metrifit

Aug 15 My Body & Mind

Mood state +

Sleep quality +

Energy / Fatigue +

Muscle readiness +

Yesterdays nutrition +

Stress +

Health +

Sleep duration +

Menstruation

How ready are you to train/compete? +

General comments

10:14

Welcome to Metrifit

Aug 15 My Body & Mind

Mood state +
4 - Good mood

Sleep quality +
4.5

Energy / Fatigue +
4 - Good energy levels

Muscle readiness +
3.5

Muscle readiness - Body locations
Please select all that apply:-

- Arm
- Back
- Chest
- Foot/Ankle
- Leg
- Neck
- Groin
- Shoulder
- Aches/Tiredness
- Soreness from training/competition
- Other

10:15

Welcome to Metrifit

Yesterdays nutrition +
4.8

Stress +
4.5

Health +
4.5

Sleep duration +
8

Menstruation

How ready are you to train/compete? +
14%

Performance issues
Please select all that apply:-

- Injured
- Ill/Sick
- Pain
- Demotivated
- Physically exhausted
- Mentally exhausted
- Feeling Anxious/Stressed
- Enjoyment levels low
- No reason

10:15

Welcome to Metrifit

Performance issues
Please select all that apply:-

- Injured
- Ill/Sick
- Pain
- Demotivated
- Physically exhausted
- Mentally exhausted
- Feeling Anxious/Stressed
- Enjoyment levels low
- No reason
- Other

Performance comments

General comments

← BACK

✓ DONE

10:15

Welcome to Metrifit

August 15

Today Reports Overview

Your mobile phone number is not verified, you will not be able to receive phone alerts. Click [here](#) to verify your number.
You can choose to dismiss this message [here](#) and verify at later time through the Settings area.

My Body & Mind

RTP score (%) 85

Mood state

Sleep quality

Energy / Fatigue

Health

Muscle readiness

Leg

Yesterdays nutrition

Stress

Sleep duration 8 hours

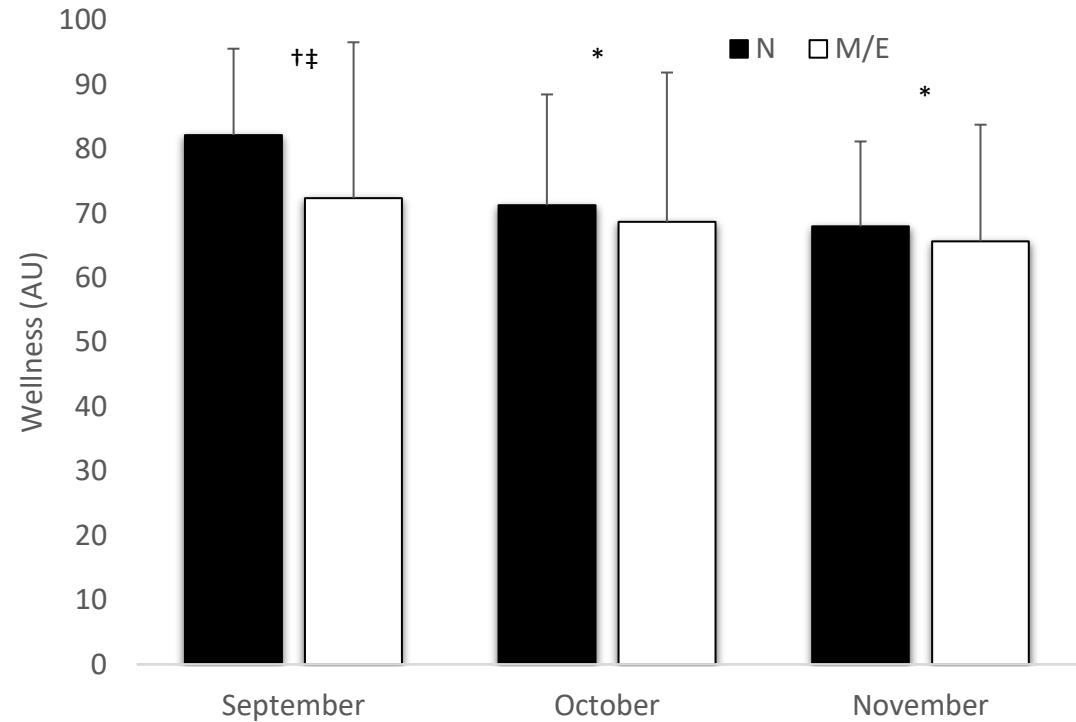
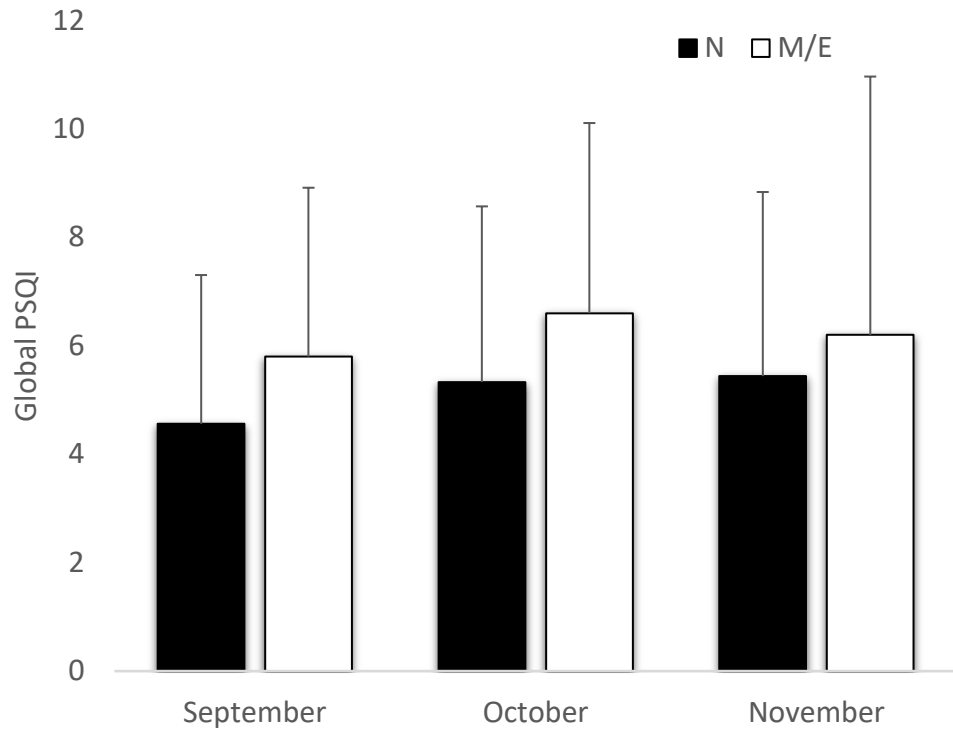
How ready are you to train... 14 %

Injured

External Training Load Parameter Estimate (associated 95% CI); Crouch et al. (2021) P-value									
Effect	Subjective Wellness Score Comparison**	Distance		HID		Distance Rate		Athlete Load	
		Muscle Soreness	100 v. ≤50	-40.8 (-236.0, 154.4)	-35.3 (-74.9, 4.3)	-0.3 (-3.1, 2.5)	0.7 (-2.8, 4.3)	0.6820	0.0806
75 v. ≤50	120.7 (-55.4, 296.8)		-22.0 (-57.7, 13.7)	0.0 (-2.5, 2.5)	1.1 (-2.1, 4.3)	0.1790	0.2262	0.9964	0.5094
Sleep Quality	100 v. ≤50	303.8 (50.0, 557.6)	64.2 (12.7, 115.7)	3.4 (-0.3, 7.0)	5.7 (1.1, 10.3)	0.0190	0.0147	0.0681	0.0158
	75 v. ≤50	310.5 (36.7, 584.3)	72.7 (17.2, 128.3)	2.1 (-1.8, 6.0)	6.8 (1.8, 11.8)	0.0263	0.0103	0.2961	0.0077
Fatigue	100 v. ≤50	323.6 (52.2, 594.9)	49.7 (-5.4, 104.8)	2.3 (-1.6, 6.1)	5.6 (0.6, 10.5)	0.0195	0.0773	0.2532	0.0271
	75 v. ≤50	141.5 (-137.3, 420.3)	13.8 (-42.9, 70.4)	0.0 (-4.0, 4.0)	2.7 (-2.4, 7.7)	0.3195	0.6339	0.9969	0.3014
Stress	100 v. ≤50	49.6 (-161.8, 261.0)	14.0 (-28.8, 56.9)	-3.9 (-6.9, -0.9)	1.5 (-2.3, 5.4)	0.6452	0.5206	0.0116	0.4416
	75 v. ≤50	-22.6 (-225.6, 180.4)	21.4 (-19.8, 62.6)	-1.3 (-4.2, 1.5)	2.3 (-1.3, 6.0)	0.8269	0.3081	0.3616	0.2131
Overall Wellness†	-	3.5 (1.2, 15.1)	0.8 (-0.6, 2.2)	0.001 (-0.1, 0.1)	0.2 (0.0, 0.3)	0.0213	0.2737	0.9793	0.0132

Chronotype & Sleep (Grace et al., 2023)

Lower scores = Better sleep



* indicates a difference from September ($p < .05$), † indicates a difference from October ($p < .05$), and ‡ indicates a difference from November ($p < .05$).

Psychological Hardiness (Cooley et al., 2023)

- Kobasa (1979)
 - Bartone et al. (1989)
- Dispositional Resilience Scale-15



Wellness Following Wins & Losses Based on Psychological Hardiness in Division I Women's Lacrosse (Cooley et al., 2023)

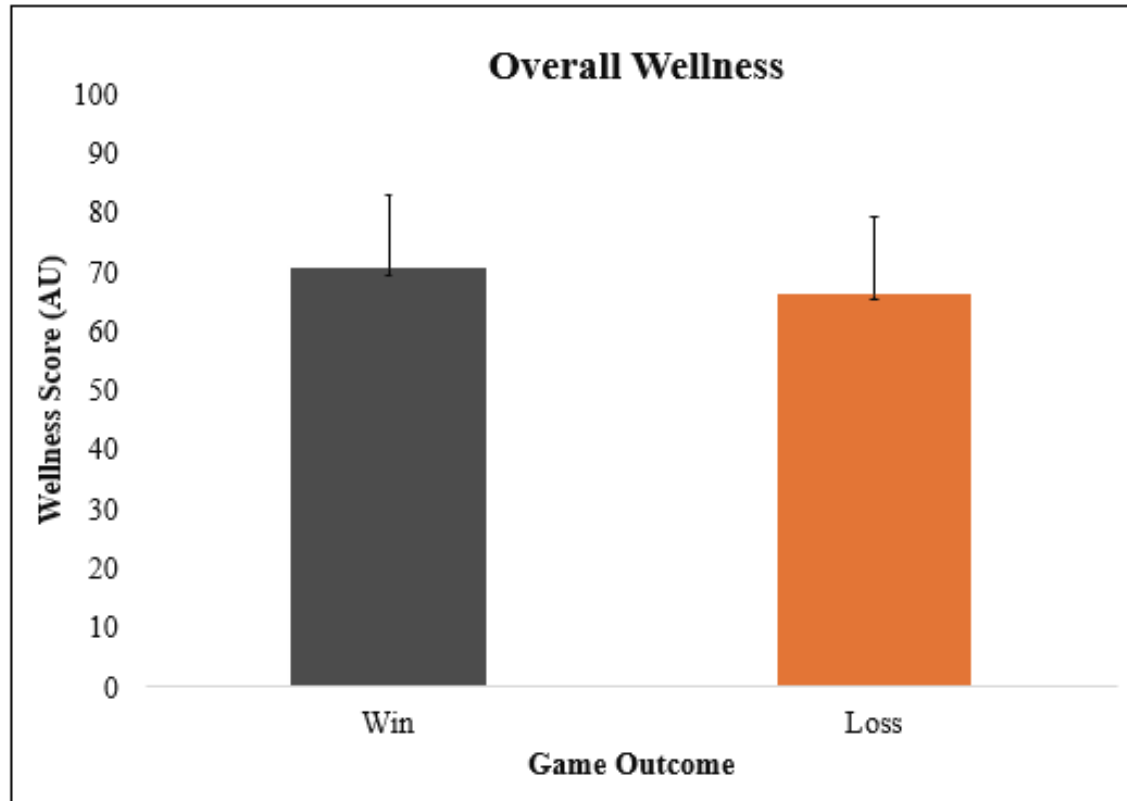


Figure 1: Total mean scores for overall wellness following win & loss based on wellness survey ($p = 0.015$)

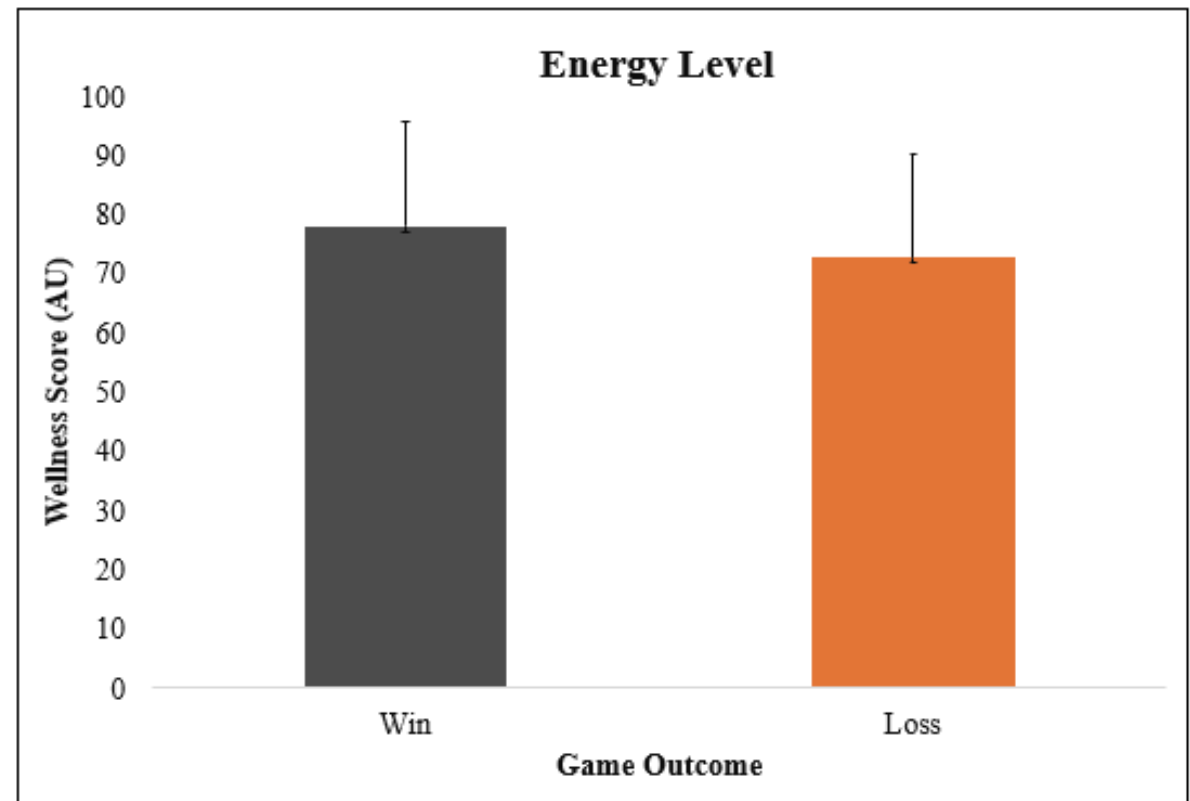


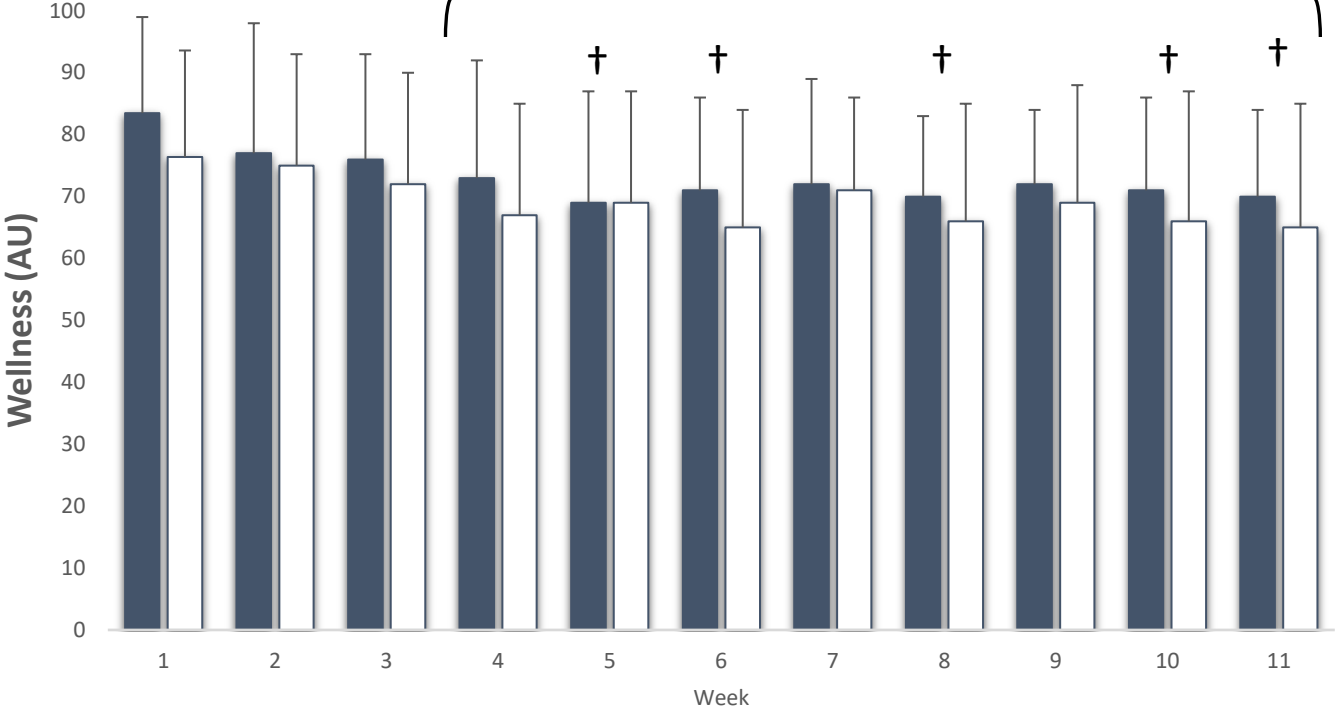
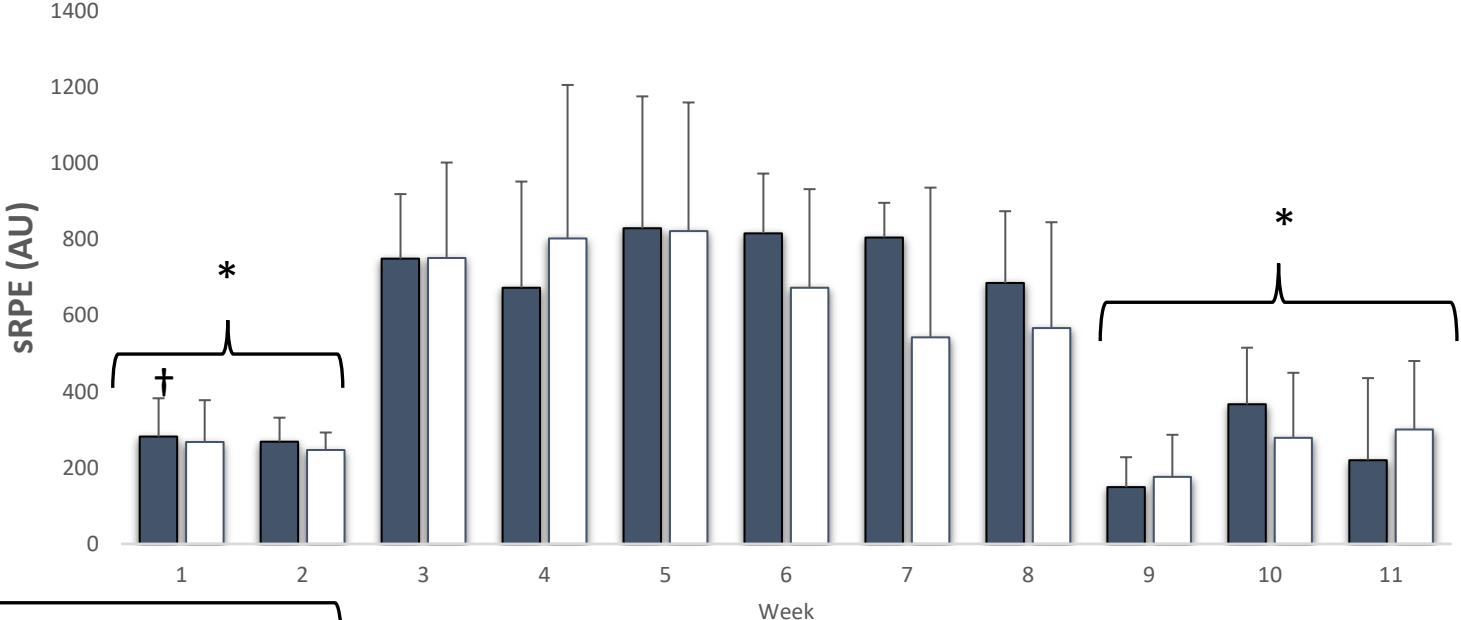
Figure 2: Total mean scores of total energy level following win & loss based on wellness survey ($p = 0.024$).

Psych hardiness

Weekly changes in sRPE for both groups.

* indicates a difference from weeks 3-8 ($p < .05$)

† indicates a difference from week 2 ($p < .05$)

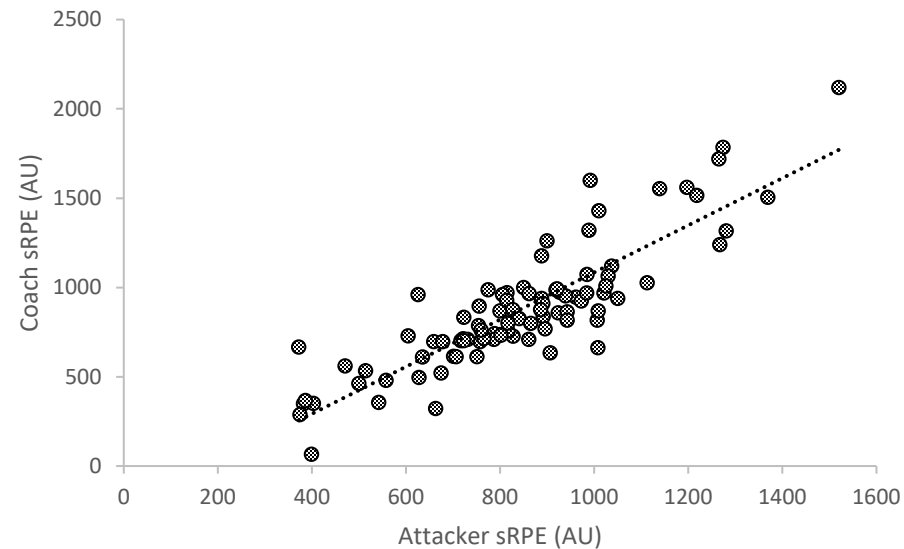
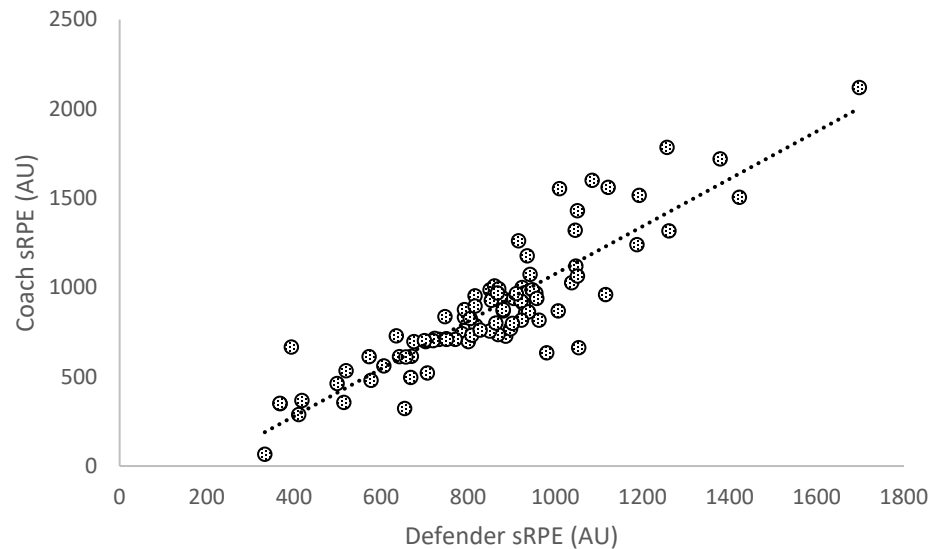
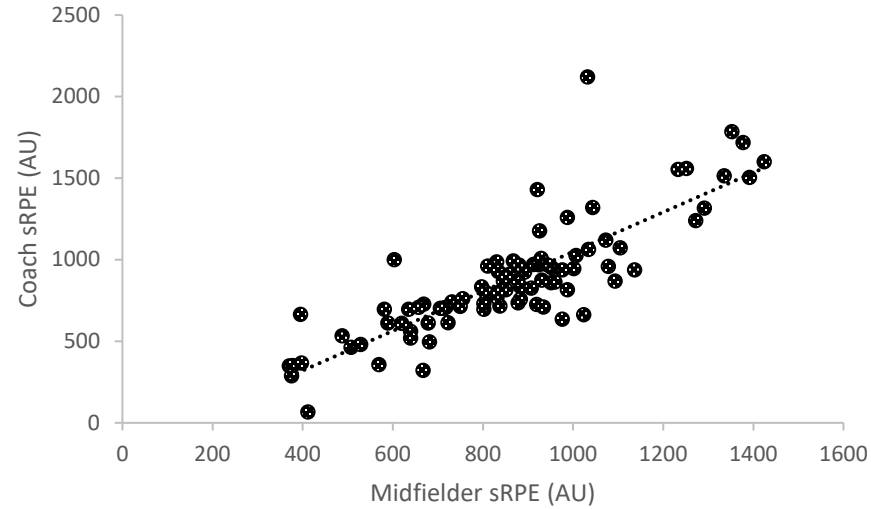
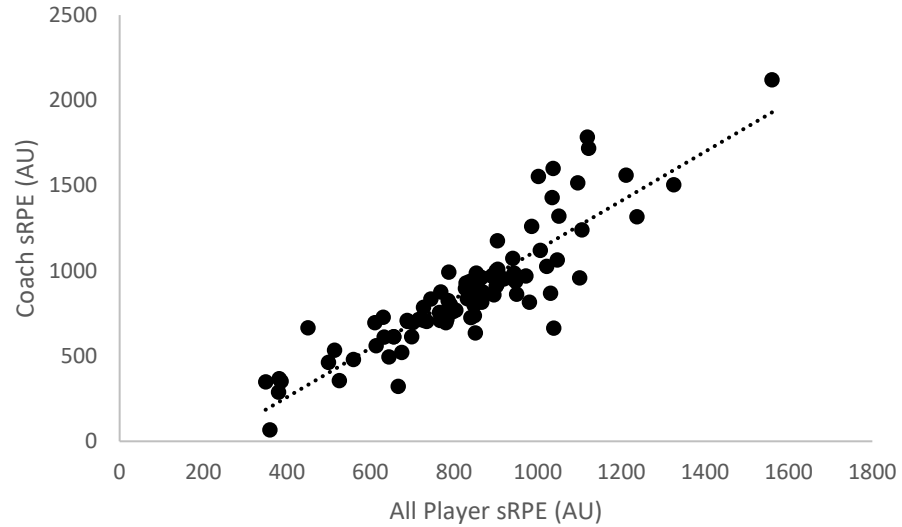


Changes over time in mean wellness for both groups.

* indicates a difference from week 1 ($p < .05$)

† a difference from week 2 ($p < .05$)

Comparisons of sRPE between coaches & players



Coaches overestimated sRPE for training (876 ± 349 AU) compared to:

- Players as a whole (829 ± 214 AU)
- Attackers (842 ± 229 AU)
- Midfielders (857 ± 240 AU)
- Defenders (849 ± 233 AU)

The correlations ranged $r = .834-.888$.



Help Coaches Plan Effective Practices & Manage Training Loads

- Assess psychosocial variables (e.g., psychological hardiness, burnout, wellness) & teach athletic coping skills
- Help athletes increase self-awareness
- Consider academic load when planning training sessions for all seasons
- Teach athletes both physical & mental recovery are essential to continued performance improvements
- Incorporate goal setting sessions focused on both mental & physical health throughout the training season

