# INFORMING TACTICAL PERIODIZATION IN COLLEGIATE FOOTBALL

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# THE EXPERIENCE

- Working for nebraska football, in any capacity, has always been my lifelong dream!

- Drove an hour to lincoln mon-fri to be a part of the team.

  o Was able to take advantage of the many amenities:

    - Workout facility

    - Recovery facility

    - Food court

    - Clothes and shoes as uniform

- Met with my boss on a weekly basis to discuss current project and future projects.

# PROJECT MOTIVATION

**WHAT IS TACTICAL PERIODIZATION?**

-"REFERS TO THE PLANNED MANIPULATION OF TRAINING LOADS WITH THE AIM OF PRIORITIZING ATHLETE READINESS FOR MATCHES OF GREATEST IMPORTANCE"

**WHY IS IT IMPORTANT?**

-THOUGH PHYSICAL CONDITION IS MONITORED, EXTERNAL FACTORS ARE LESS INFORMED.

**HOW DO TEAMS BENEFIT?**

- PROPER WORKLOAD DISTRIBUTION IN PREPARATION FOR GAMES OF HIGHEST DIFFICULTY.

**WHAT DOES IT LOOK LIKE?**

- A VALUE FROM 0-10 BASED ON THE OPPONENTS WIN PROBABILITY

  o MDI: MATCH DIFFICULTY INDEX

# EXPLANATION OF VARIABLES AND DATA

DATA COLLECT FROM ALL FBS GAMES FOR 2022-2023:

- FIXED EFFECTS MODEL(PHASE 1)

  o COACHING EXPERIENCE

  o RETURNING PRODUCTION

  o TALENT COMPOSITE RATING

  o PREVIOUS PERFORMANCE

  o TRAVELING FACTORS

  o OTHER ADVANCED RANKING SYSTEMS(SP+, FPI)

  o RESULT(WIN=1,LOSS=0)

# RESULTS – MODEL(S)

**SINGLE VARIABLE MODEL:**

- CONSIDERED ALL VARIABLES INDIVIDUALLY.

- ACCURACY ON 2023: 73.3%

**DIFFERENCE MODEL:**

- CONSIDERED THE DIFFERENCE IN TEAM AND OPP. METRICS.

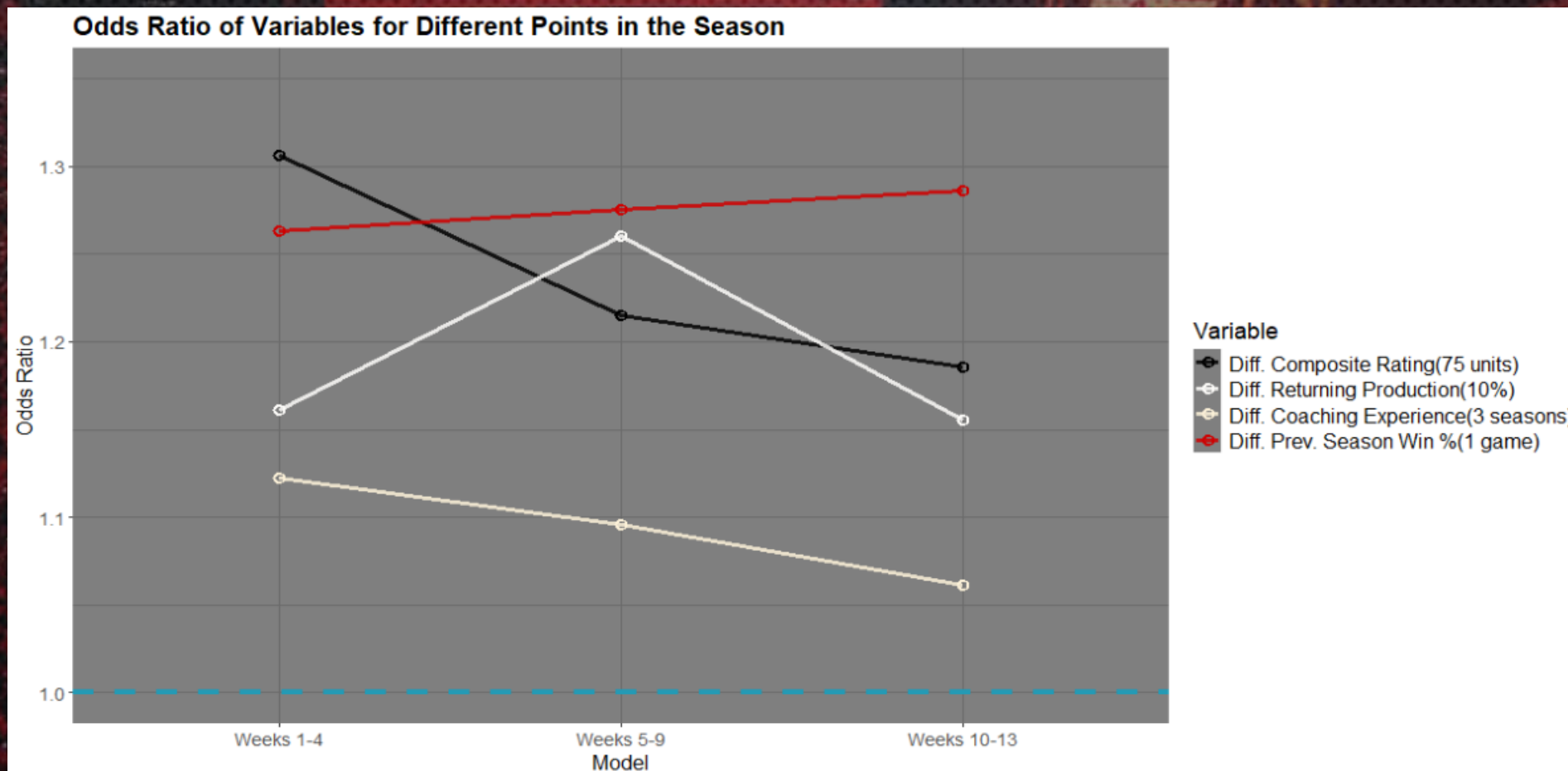- ACCURACY ON 2023: 72.7%

**INTERACTION MODEL:**

- CONSIDERED SELECT INTERACTIONS.

  o COACHING EXPERIENCE : RETURNING PRODUCTION – CULTURE RATING

  o RETURNING PRODUCTION : COMP. RATING - RETURNING "GOOD" PRODUCTION

  o RETURNING PRODUCTION : PREV. PERFORMANCE - RETURNING "SUCCESSFUL" PRODUCTION

  o COMP. RATING : PREV. PERFORMANCE – TALENT CONSIDERING PREVIOUS SUCCESS
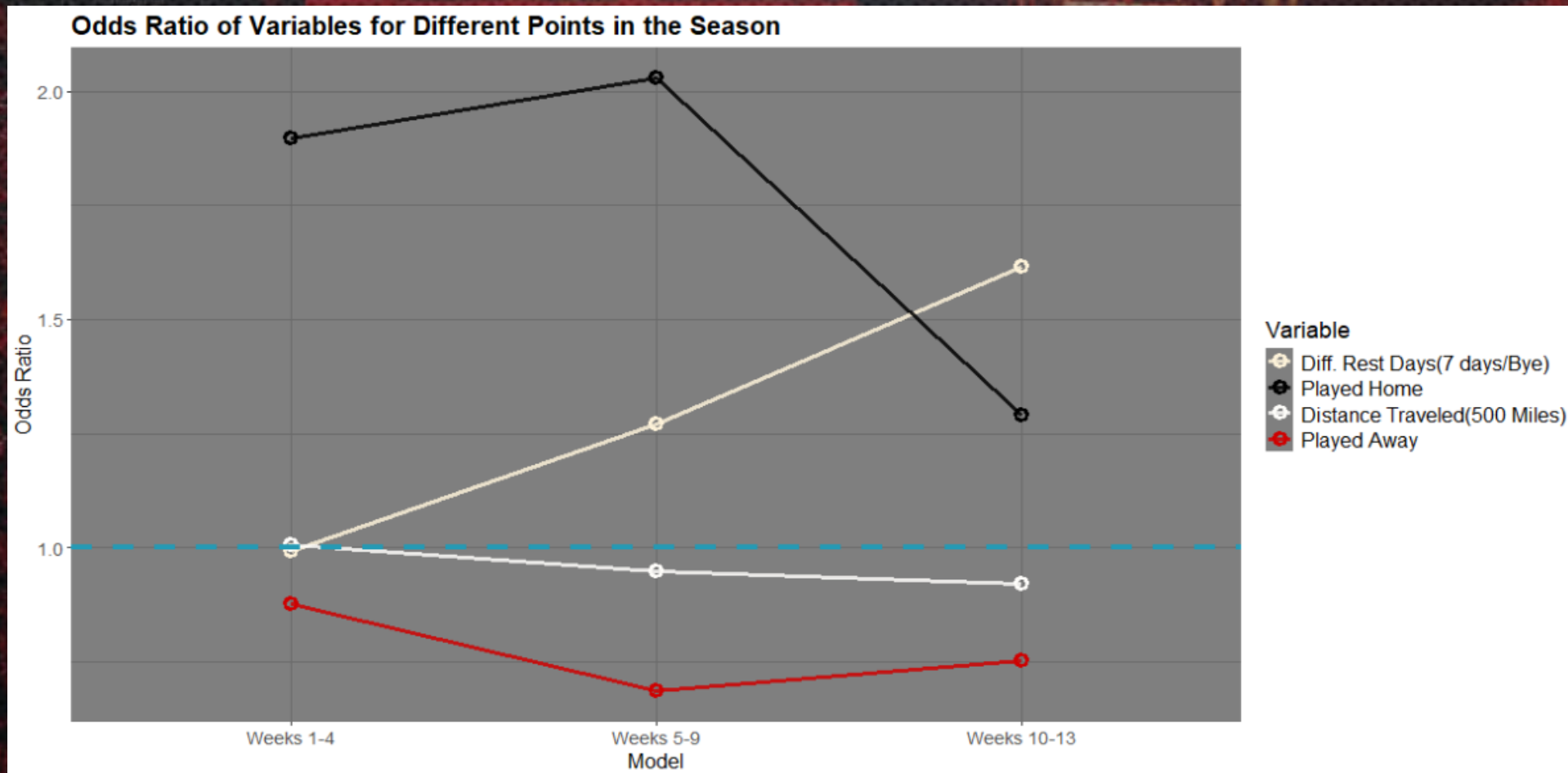
- ACCURACY ON 2023: 74.4%

**SP+ MODEL:**

- CONSIDERED THE ADVANCED RANKING SYSTEM SP+

- ACCURACY ON 2023: 74.6%

# RESULTS - VARIABLE IMPORTANCE THROUGH THE SEASON



Odds Ratio of Variables for Different Points in the Season

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Odds Ratio of Variables for Different Points in the Season

# 2023 EXAMPLE OUTPUT

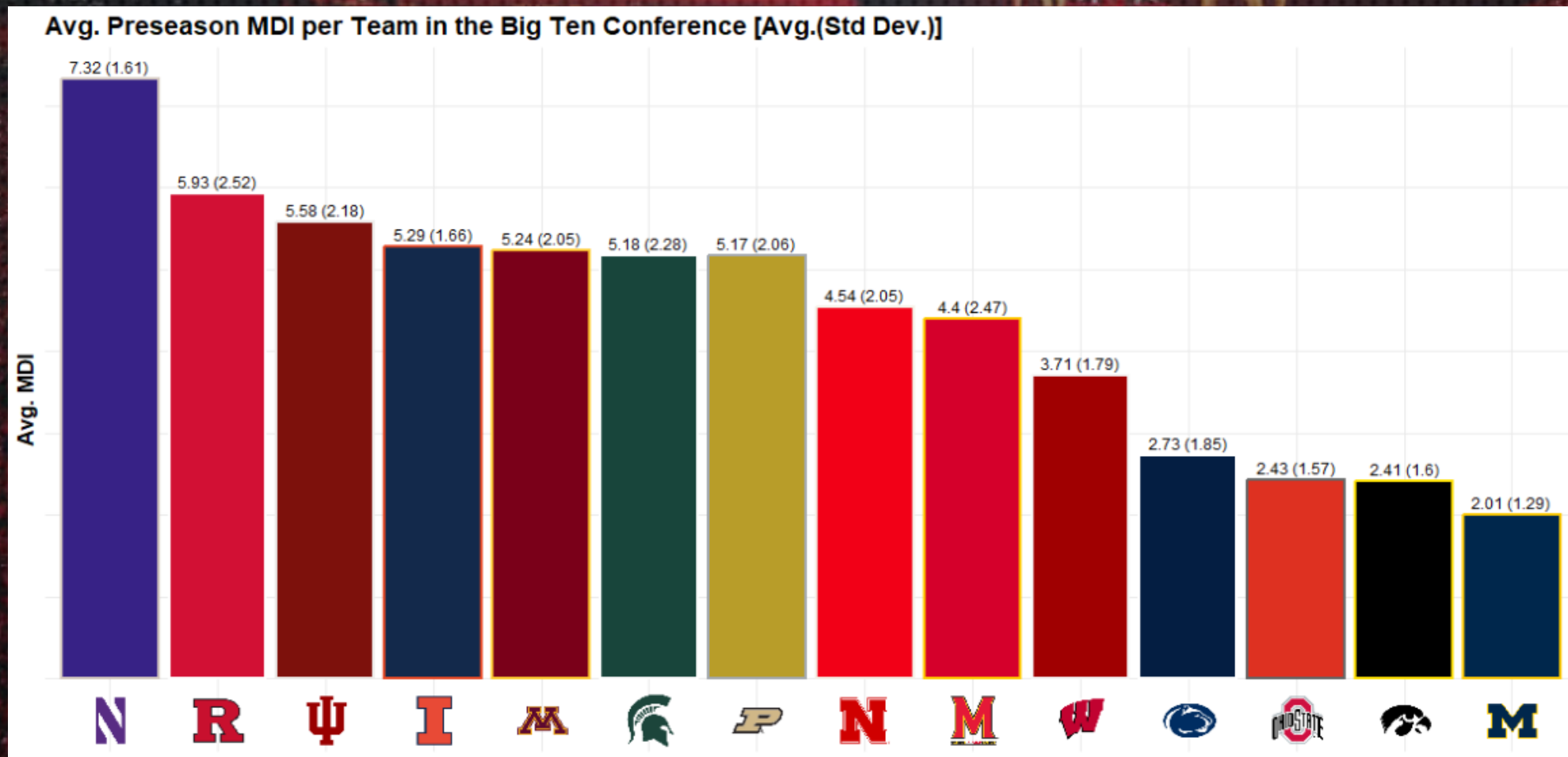## Nebraska Preseason Information

| Season | Team | Term | Value(Rank) |
|---|---|---|---|
| 2023 | | Conference | Big Ten |
| | | Coach(# of seasons) | Matt Rhule (0) |
| | | Prev. Season Record | 4-8 |
| | | Prev. Season Conference Record | 3-6 |
| | | Returning Production | 69%(39) |
| | | Composite Rating(247 Sports) | 765.2(21) |
| | | Projected Distance Traveled(Miles) | 2289 |
| | | Avg. MDI | 4.54 |

## Nebraska Schedule Preview

| Opponent | Conference | Location | Travel Distance(Miles) | Diff. in Time Zone | Diff. in Rest Days | Coach(# of seasons) | Prev. Record | Prev. Conf. Record | Returning Production | Composite Rating | MDI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | Big Ten | Away | 337 | 0 | 0 | P.J. Fleck (6) | 9-4 | 5-4 | 58%(87) | 640.46(57) | 6.13 |
| CU | Pac-12 | Away | 454 | 1 | 1 | Deion Sanders (0) | 1-11 | 1-8 | 57%(93) | 711.87(35) | 3.93 |
| NIU | Mid-American | Home | 0 | 0 | 0 | Thomas Hammock (4) | 3-9 | 2-6 | 77%(12) | 352.36(120) | 1.99 |
| LA TECH | Conference USA | Home | 0 | 0 | 0 | Sonny Cumbie (1) | 3-9 | 2-6 | 72%(26) | 433.72(105) | 2.15 |
| M | Big Ten | Home | 0 | 0 | 0 | Jim Harbaugh (8) | 13-1 | 10-0 | 81%(5) | 850.43(14) | 7.69 |
| I | Big Ten | Away | 448 | 0 | 0 | Bret Bielema (2) | 8-5 | 5-4 | 63%(71) | 630.95(63) | 5.73 |
| N | Big Ten | Home | 0 | 0 | 0 | Pat Fitzgerald (0) | 1-11 | 1-8 | 56%(96) | 657.88(52) | 2.46 |
| P | Big Ten | Home | 0 | 0 | -7 | Ryan Walters (0) | 8-6 | 6-4 | 65%(57) | 671.1(48) | 5.20 |
| | Big Ten | Away | 643 | 1 | 0 | Harlon Barnett (0) | 5-7 | 3-6 | 68%(45) | 747.34(27) | 5.96 |
| M | Big Ten | Home | 0 | 0 | 0 | Mike Locksley (4) | 8-5 | 4-5 | 64%(65) | 685.75(43) | 4.77 |
| W | Big Ten | Away | 406 | 0 | 0 | Luke Fickell (0) | 7-6 | 4-5 | 72%(27) | 741.63(30) | 6.35 |
| | Big Ten | Home | 0 | 0 | -1 | Kirk Ferentz (24) | 8-5 | 5-4 | 57%(94) | 692.62(41) | 5.95 |

# 2023 EXAMPLE OUTPUT



Avg. Preseason MDI per Team in the Big Ten Conference [Avg.(Std Dev.)]

# IMPROVEMENTS AND FUTURE WORK

## IMPROVEMENTS:

- CHANGE DATA PERSPECTIVE SO THAT ONLY ONE LINE PER GAME(I.E HOME VS. AWAY)

## FUTURE:

- DYNAMIC EFFECTS/WEEKLY MODELS:
  o CONSIDER ADJUSTED METRICS AND IN-SEASON PERFORMANCE.

- INTERACTIVE SHINY APP THAT PUTS IT ALL TOGETHER.

# CITATIONS

Robertson, Sam, and David Joyce. "Evaluating strategic periodisation in Team Sport." *Journal of Sports Sciences*, vol. 36, no. 3, 7 Mar. 2017, pp. 279–285, HTTPS://DOI.ORG/10.1080/02640414.2017.1300315.

Robertson, Samuel J., and David G. Joyce. "Informing in-season tactical periodisation in Team Sport: Development of a match difficulty index for Super Rugby." *Journal of Sports Sciences*, vol. 33, no. 1, 30 June 2014, pp. 99–107, HTTPS://DOI.ORG/10.1080/02640414.2014.925572.

@misc{gilani_et_al_2021_cfbfastr,

  author = {Saiem Gilani and Akshay Easwaran and Jared Lee and Eric Hess},

  title = {cfbfastR: The SportsDataverse's R Package for College Football Data.},

  url = {https://cfbfastR.sportsdataverse.org/},

  year = {2021}

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