

Fantasy NFL Score Predictor

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Daily Fantasy Sports: Skill or Luck?

DraftKings = 8 million players

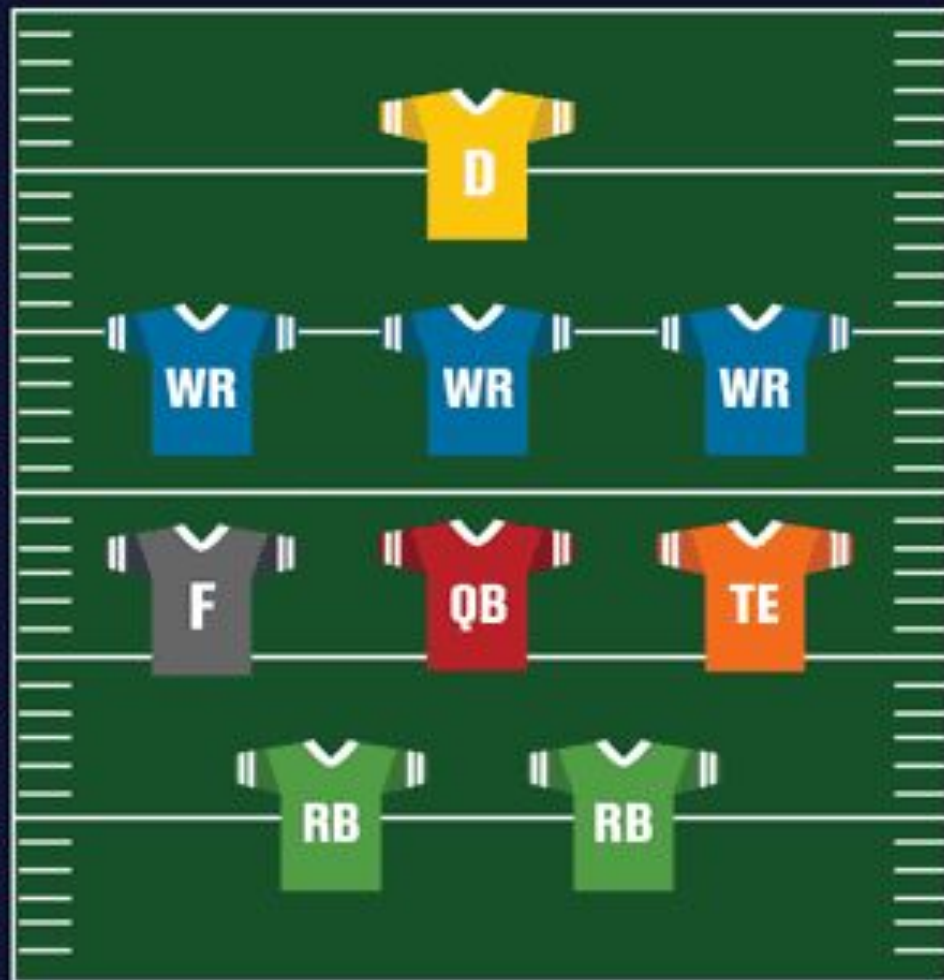
FanDuel = 6 million players

Prizes in range \$100 - \$1 million

Lots of tech already in use

Plenty of data and quantifiable variables





QB Quarterback

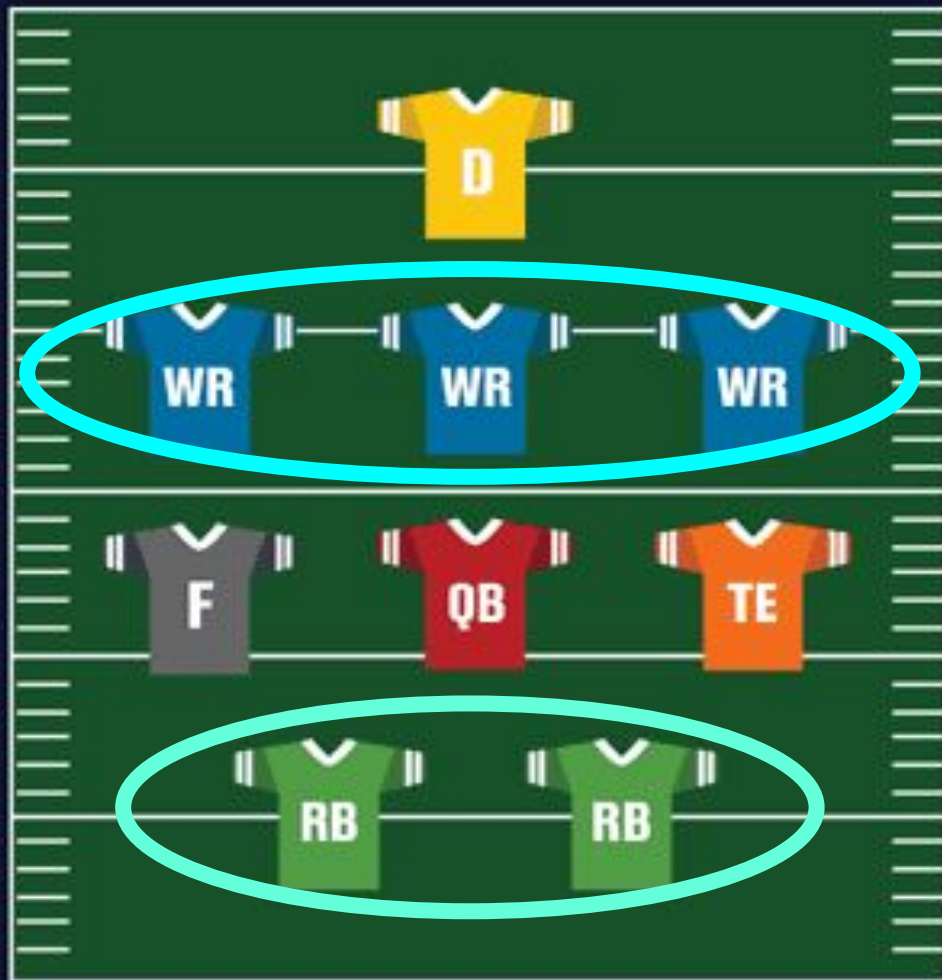
RB Running Back
RB Running Back

WR Wide Receiver
WR Wide Receiver
WR Wide Receiver

TE Tight End

FLEX RB/ WR/ TE

DST Defense/
Special Teams



QB Quarterback

RB Running Back
RB Running Back

WR Wide Receiver
WR Wide Receiver
WR Wide Receiver

TE Tight End

FLEX RB/ WR/ TE

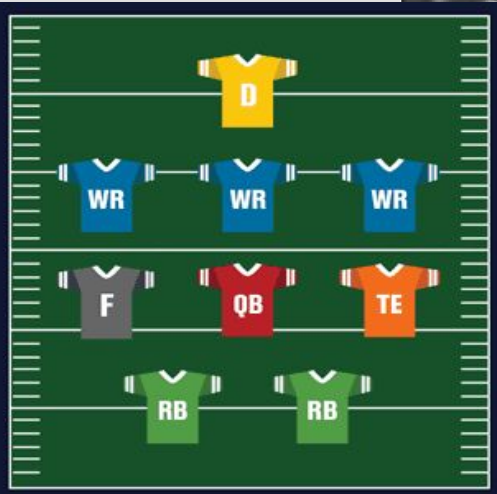
DST Defense/
Special Teams

How do I score points?

- Events = +/- Points
- Past scores available to public
- Formula varies by contest provider

Passing TD	4
Passing Yard	.04
300+ Passing Yards	0
Interception	-1
Rushing TD	6
Rushing Yard	.1
Fumble Lost	-2
Receiving TD	6
Receiving Yards	.1
Reception	0.5
100+ Yard Receiving Game	0
2 Point Conversion	2
Punt/Kickoff Return For TD	6
Sack	1
Interception	2
Fumble Recovery	2
Safety	2
Blocked Kick	2





112 WR, 84 RB → 5 positions (+1 flex) →
152,549,591,040 combinations



RESULTS -- TOP 10 PLAYERS AT EVERY OFFENSIVE POSITION BASED ON CURRENT H2H GAMEPLAY

QUARTERBACK						HALFBACK						FULLBACK						SLOT RECEIVER					
#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE
1	Tom Brady (MM)	QB	MM	99	93.41	1	Barry Sanders (MM)	HB	MM	99	93.81	1	Bruce Miller	FB	PH	99	41.22	1	Larry Fitzgerald (MM)	WR	MM	99	56.15
2	Russel Wilson	QB	PH	99	93.40	2	Barry Sanders (REW)	HB	REW	99	92.27	2	Franco Harris	HB	SB	98	40.77	2	Steve Largent	WR	MM	99	55.96
3	Andrew Luck (FE)	QB	FE	99	92.77	3	Marshawn Lynch (MM)	HB	MM	99	91.57	3	Barry Sanders (REW)	HB	REW	99	39.60	3	Rob Gronkowski (MM)	TE	MM	99	55.86
4	Steve Young (MM)	QB	MM	99	92.49	4	Adrian Peterson	HB	MM	99	91.45	4	Marcel Reece	FB	FE	94	39.46	4	Kellen Winslow Sr.	TE	MM	99	55.42
5	Aaron Rodgers	QB	HON	99	91.76	5	Bo Jackson	HB	LEG	99	91.12	5	Emmitt Smith	HB	EAS	99	39.30	5	Vincent Jackson	WR	FB	96	55.25
6	Kurt Warner	QB	FB	99	91.61	6	Emmitt Smith	HB	EAS	99	90.67	6	Barry Sanders (MM)	HB	MM	99	39.29	6	Jerry Rice	WR	LEG	99	55.11
7	Warren Moon	QB	EAS	99	91.40	7	DeMarco Murray (HON)	HB	HON	99	90.43	7	Bo Jackson	HB	LEG	99	39.23	7	Plaxico Burress	WR	MM	99	55.10
8	Otto Graham	QB	SB	99	91.19	8	Franco Harris	HB	SB	98	90.21	8	John Kuhn	FB	FE	94	38.68	8	Demaryius Thomas	WR	FE	99	54.90
9	Tom Brady (SB)	QB	SB	99	91.05	9	Melvin Gordon	HB	DFT	94	89.66	9	William Perry	FB	XMA	96	38.62	9	Dez Bryant (PH)	WR	PH	99	54.90
10	Marcus Mariota	QB	DFT	96	91.00	10	Marshawn Lynch (TOW)	HB	TOW	98	89.62	10	Alfred Morris	HB	FE	96	38.08	10	Calvin Johnson	WR	MM	99	54.80
WIDE RECEIVER #1 (SLANTS/SCREENS)						WIDE RECEIVER #2 (DEEP)						TIGHT END						CENTER					
#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE
1	Larry Fitzgerald (MM)	WR	MM	99	94.32	1	Larry Fitzgerald (MM)	WR	MM	99	88.60	1	Rob Gronkowski (MM)	TE	MM	99	89.67	1	Nick Mangold (FE)	C	FE	99	94.90
2	Steve Largent	WR	MM	99	94.22	2	Steve Largent	WR	MM	99	87.84	2	Kellen Winslow Sr.	TE	MM	99	87.70	2	Mike Webster (MM)	C	MM	99	94.54
3	Dez Bryant (PH)	WR	PH	99	93.47	3	Plaxico Burress	WR	MM	99	87.31	3	Mike Ditka (MM)	TE	MM	99	87.51	3	Jason Kelce	C	PH	99	92.67
4	Jerry Rice	WR	LEG	99	92.55	4	Dez Bryant (PH)	WR	PH	99	87.27	4	Shannon Sharpe (EAS)	TE	EAS	99	86.42	4	Kory Lichtensteiger	C	MVP	94	90.25
5	Calvin Johnson	WR	MM	99	92.08	5	Vincent Jackson	WR	FB	96	86.99	5	Jimmy Graham	TE	PH	99	86.27	5	Travis Frederick	C	TOY	94	89.09
6	Devin Hester	WR	FB	94	92.04	6	Jerry Rice	WR	LEG	99	86.83	6	Martellus Bennett	TE	FE	98	85.51	6	Mike Webster (LEG)	C	LEG	93	88.98
7	Kevin White	WR	DFT	96	92.00	7	Demaryius Thomas	WR	FE	99	86.82	7	Delanie Walker	TE	MVP	94	85.26	7	Nick Mangold (CAP)	C	CAP	91	87.54
8	Amari Cooper	WR	DFT	96	91.96	8	Calvin Johnson	WR	MM	99	86.51	8	Vernon Davis	TE	COM	96	84.53	8	John Sullivan	C	FE	93	87.35
9	Percy Harvin (COM)	WR	COM	96	91.68	9	Kevin White	WR	DFT	96	86.20	9	Kared Cook	TE	COM	98	84.02	9	Max Unger (SB)	C	SB	93	87.33
10	Plaxico Burress	WR	MM	99	91.60	10	Andre Reed	WR	EAS	98	86.00	10	Antonio Gates (MM)	TE	MM	99	83.69	10	Alex Mack	C	BAS	89	86.23
LEFT TACKLE						LEFT GUARD						RIGHT GUARD						RIGHT TACKLE					
#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE	#	PLAYER	POS	SET	OVR	H2H SCORE
1	Anthony Munoz (MM)	OT	MM	99	95.94	1	Kyle Long	OG	PH	99	95.59	1	Kyle Long	OG	PH	99	95.16	1	Anthony Munoz (MM)	OT	MM	99	95.08
2	Joe Thomas	OT	PH	99	95.19	2	Larry Allen (MM)	OG	MM	99	95.03	2	Larry Allen (MM)	OG	MM	99	94.66	2	Joe Thomas	OT	PH	99	94.53
3	Dan Dierdorf	OT	MM	99	94.36	3	Gene Upshaw (MM)	OG	MM	99	94.01	3	Gene Upshaw (MM)	OG	MM	99	93.69	3	Dan Dierdorf	OT	MM	99	93.82
4	Orlando Pace (EAS)	OT	EAS	99	94.31	4	Josh Sitton	OG	PH	99	93.77	4	Josh Sitton	OG	PH	99	93.13	4	Orlando Pace (EAS)	OT	EAS	99	93.44
5	Jake Fisher	OT	DFT	94	92.57	5	Brandon Scherff	OG	DFT	94	90.80	5	Brandon Scherff	OG	DFT	94	90.24	5	Cedric Ogbuehi	OT	DFT	94	92.35
6	Cedric Ogbuehi	OT	DFT	94	92.49	6	Larry Allen (LEG)	OG	LEG	98	89.54	6	Greg Robinson	OG	COM	98	89.46	6	Jake Fisher	OT	DFT	94	92.24
7	T.J. Clemmings	OT	DFT	94	92.45	7	Greg Robinson	OG	COM	98	89.22	7	Larry Allen (LEG)	OG	LEG	98	89.07	7	Ricky Wagner	OT	PH	99	92.14
8	Cameron Erving	OT	DFT	94	92.44	8	A.J. Cann	OG	DFT	94	89.22	8	A.J. Cann	OG	DFT	94	89.07	8	T.J. Clemmings	OT	DFT	94	92.04
9	Ricky Wagner	OT	PH	99	92.29	9	Marshal Yanda	OG	TOY	96	89.02	9	Marshal Yanda	OG	TOY	96	88.75	9	Cameron Erving	OT	DFT	94	91.90
10	Ereck Flowers	OT	DFT	94	92.20	10	Clint Boling	OG	TOY	96	88.83	10	Clint Boling	OG	TOY	96	88.33	10	La'el Collins	OT	DFT	94	91.25

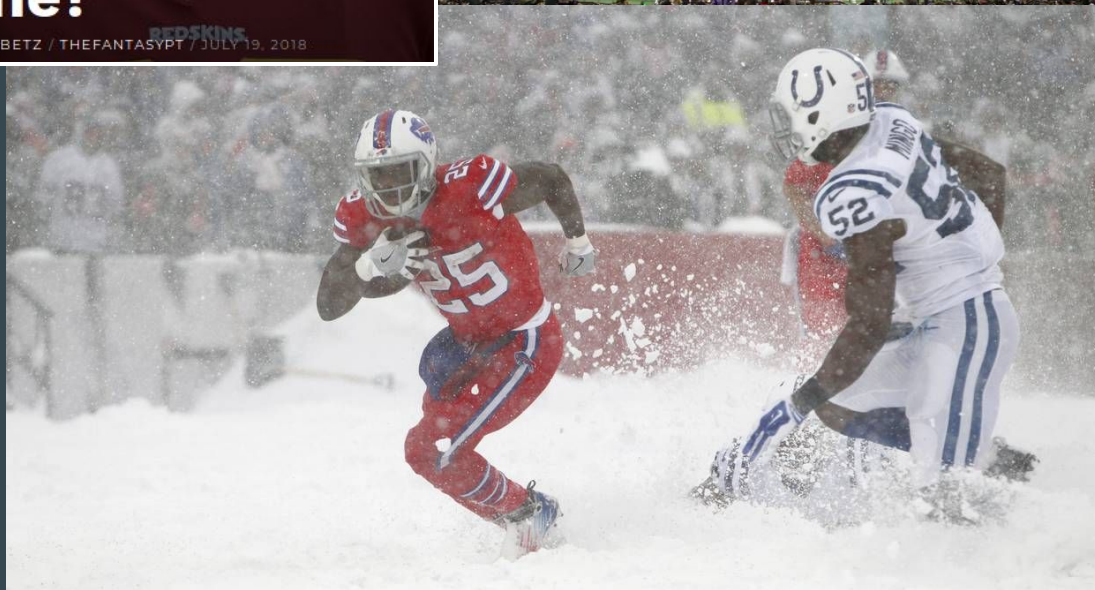
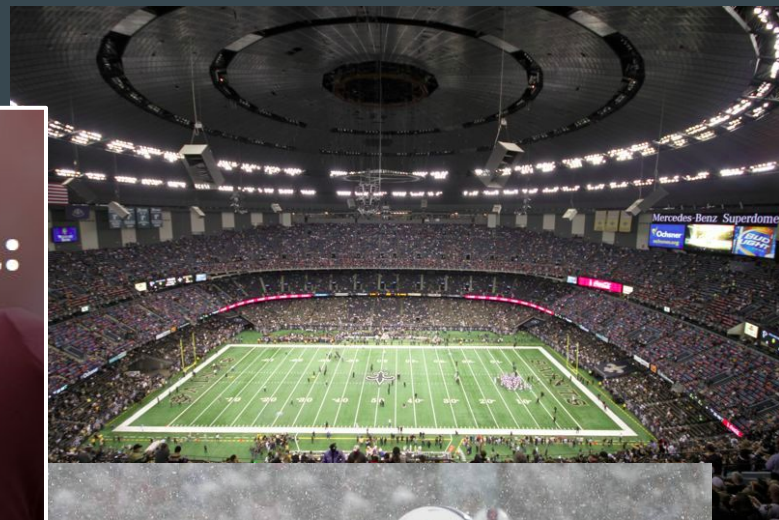
Other factors

Injury

- “Out” / “IR”
- “Questionable”

Weather

- Visibility
- Rain
- Snow
- Wind
- Indoor or outdoor?



Data ~ 2014-2017

Player points earned

- 17 weeks
- Top 50 RB, 50 WR

= 6800 rows

Injury Records

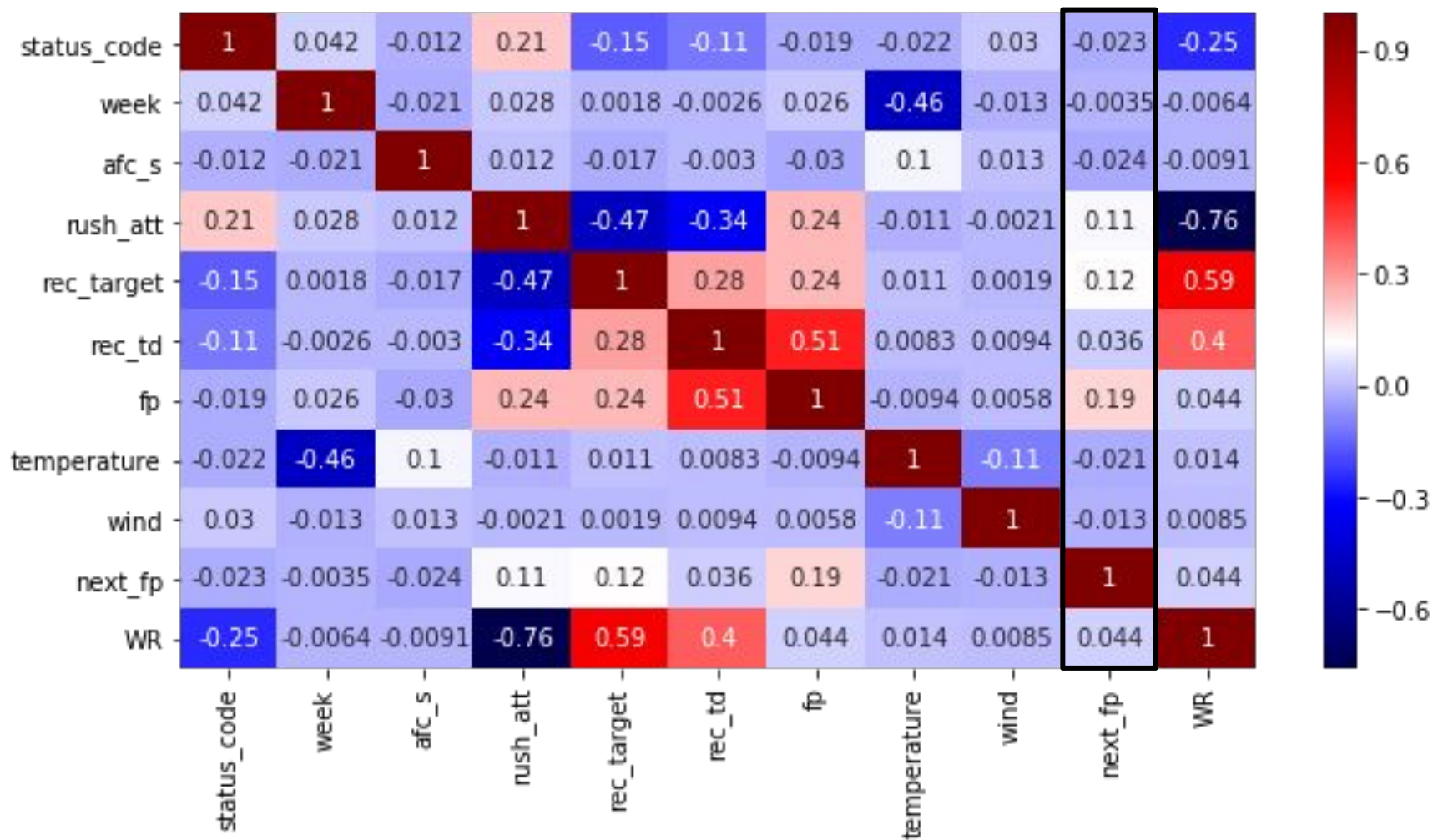
- Weekly
- Type
- Severity

Games

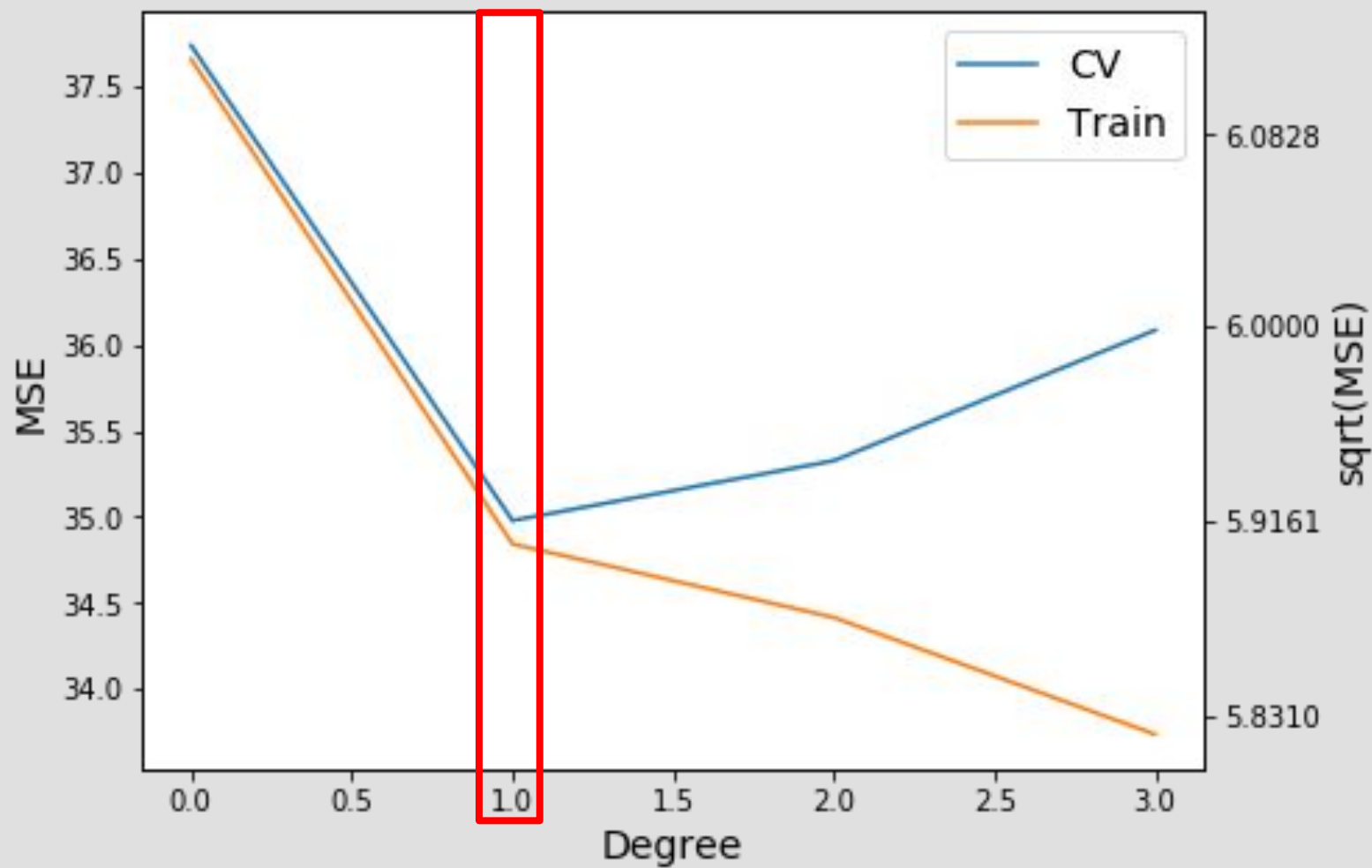
- Weather by Quarter
 - Temperature
 - Precipitation
 - Stadium
 - Wind
 - Outcome

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name	team	yr	week	NFC N	NFC W	AFC S	rush yd	rush td	receive td	injury	fantasy pts	temp	precip	wind	dome	week+1 pts
Chris Johnson	Jets	2014	1	0.0	0.0	0.0	68.0	0.0	1.0	0.0	15.1	63	0.0	1	0.0	7.6
Shane Vereen	Patriots	2014	3	0.0	0.0	0.0	20.0	0.0	0.0	0.0	3.7	72	0.0	3	0.0	4.5
Darren Sproles	Eagles	2014	9	0.0	0.0	0.0	17.0	0.0	0.0	0.0	6.3	49	0.0	0	0.0	9.3
Lamar Miller	Dolphins	2014	12	0.0	0.0	0.0	59.0	0.0	0.0	0.0	6.7	43	0.0	9	0.0	25.6
Mark Ingram	Saints	2014	12	0.0	0.0	0.0	27.0	0.0	0.0	0.0	4.2	61	0.0	1	0.0	19.6
Isaiah Crowell	Browns	2014	14	0.0	0.0	0.0	54.0	1.0	0.0	0.0	11.4	45	0.0	5	0.0	14.2
Chris Polk	Eagles	2014	17	0.0	0.0	0.0	38.0	1.0	0.0	0.0	9.8	75	0.0	8	0.0	21.4
Roy Helu	Redskins	2014	17	0.0	0.0	0.0	42.0	0.0	0.0	0.0	8.3	75	0.0	6	0.0	9.1
Taiwan Jones	Raiders	2015	7	0.0	0.0	0.0	35.0	0.0	0.0	0.0	5.2	68	0.0	8	0.0	14.8
Chris Ivory	Jets	2015	7	0.0	0.0	0.0	41.0	0.0	1.0	0.0	11.3	68	0.0	8	0.0	3.3
Chris Johnson	Cardinals	2015	7	0.0	1.0	0.0	122.0	1.0	0.0	0.0	18.2	63	0.0	1	0.0	19.9
Marshawn Lynch	Seahawks	2015	8	0.0	1.0	0.0	71.0	0.0	0.0	0.0	8.2	70	0.0	0	1.0	12.1
Shane Vereen	Giants	2015	12	0.0	0.0	0.0	15.0	0.0	0.0	0.0	3.6	52	0.0	5	0.0	6.7
Jeremy Langford	Bears	2015	15	1.0	0.0	0.0	46.0	0.0	0.0	0.0	5.7	83	0.0	1	0.0	9.2
Matt Forte	Jets	2016	4	0.0	0.0	0.0	27.0	0.0	0.0	0.0	4.3	57	0.0	6	0.0	13.9
Mike Gillislee	Bills	2016	9	0.0	0.0	0.0	32.0	1.0	0.0	0.0	9.6	38	0.0	6	0.0	10.3
Jalen Richard	Raiders	2016	13	0.0	0.0	0.0	53.0	0.0	0.0	0.0	5.3	23	0.0	4	0.0	19.1



Normal Scale



Significant features

Injury status

- “Questionable”
- “Doubtful”

Rushing and Reception

- Attempts
- Pass target frequency

Weather

- Wind
- Temperature

Wide Receiver

Week

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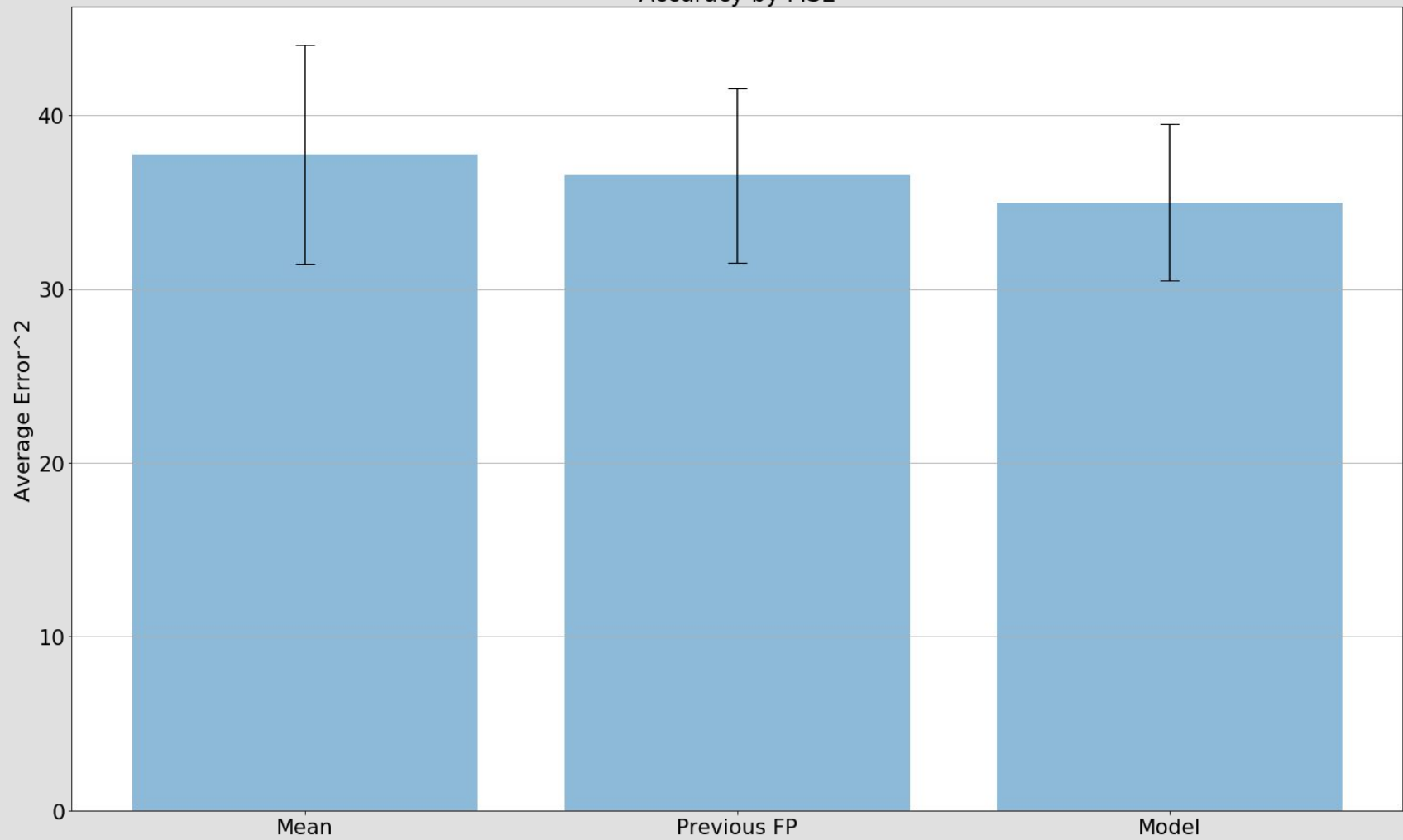
Wide Receiver

Week

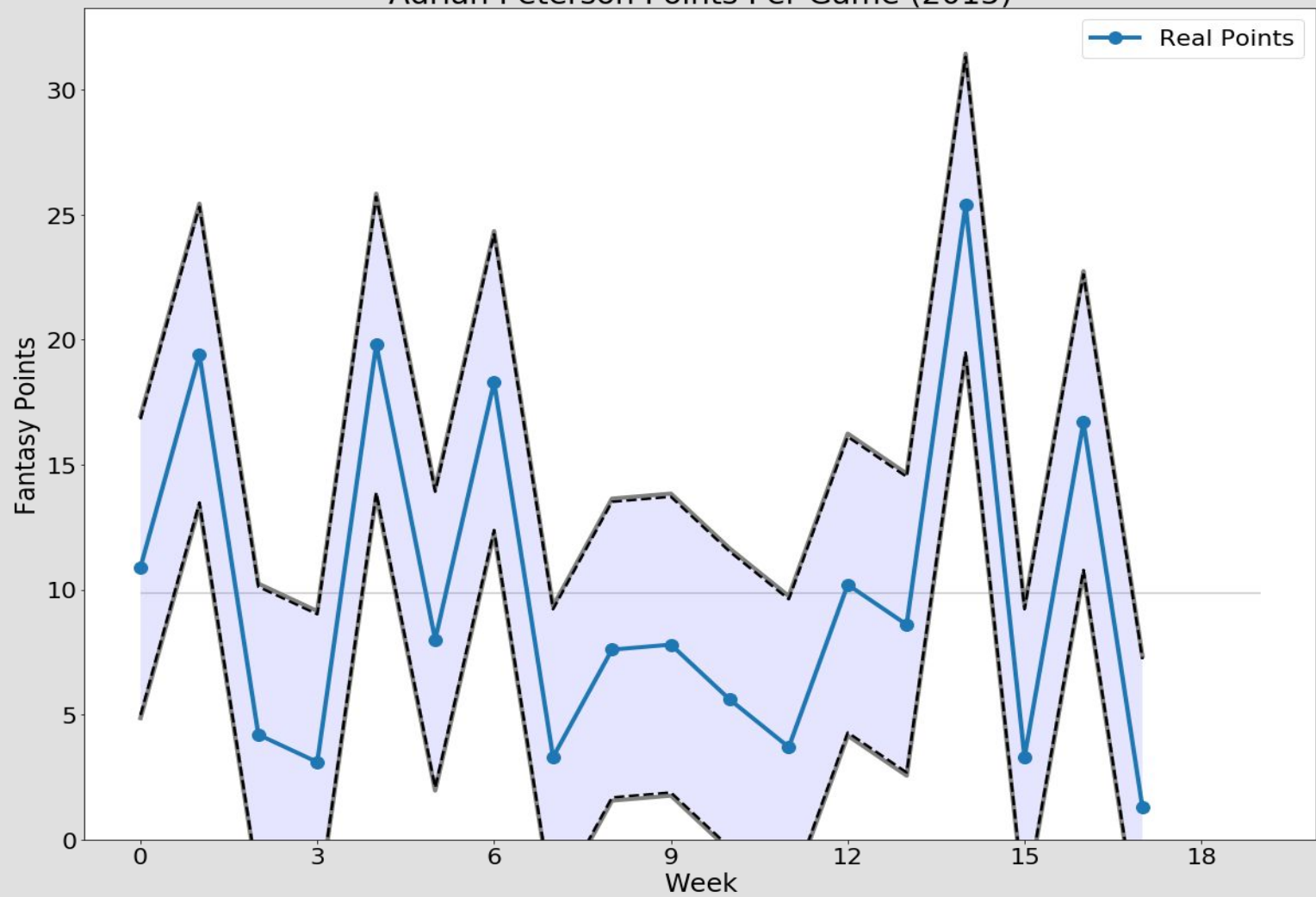
AFC S



Accuracy by MSE



Adrian Peterson Points Per Game (2015)



Improvements

- Break down precipitation
- Player consistency can be measured?
- How to quantify team chemistry
 - Ranking of the QB
- Opponents
 - Defense ranking
 - Points allowed
- Coach

Data Sources

- [FFToday](#)
- [FOX Sports](#)
- [NFLWeather.com](#)

Tools

- BeautifulSoup
- pandas
- numpy
- patsy
- sklearn
- statsmodel
- matplotlib
- seaborn

More Sources

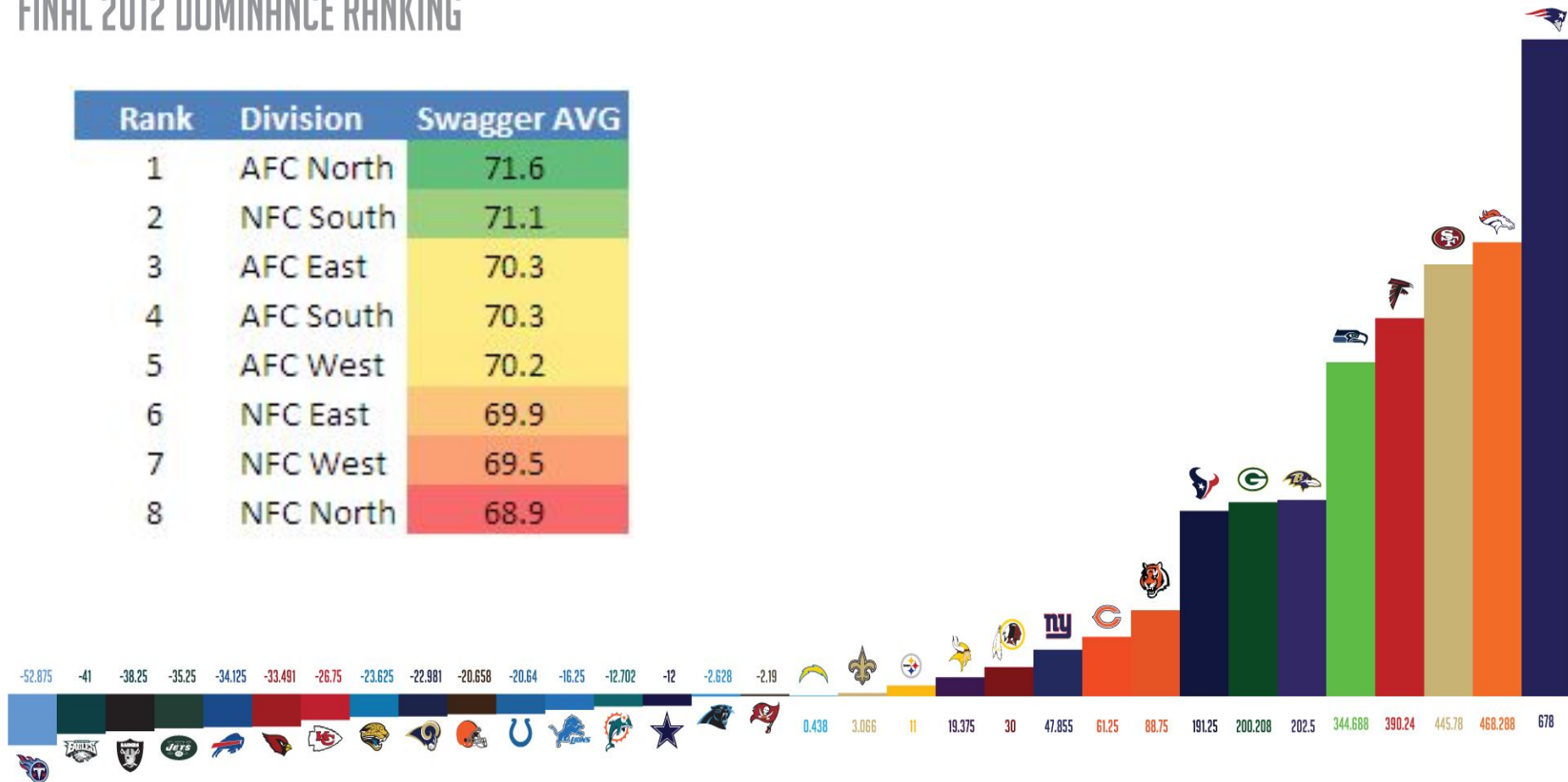
- <https://www.dailyfantasysports101.com/football/>
- <https://cowboyswire.usatoday.com/2018/06/01/dallas-cowboys-fpi-index-espn/>
- <http://www.idiom.co/nfl-power-rankings-most-dominant-nfl-teams-2012/>
- <https://www.sportingcharts.com/dictionary/nfl/rushing-attempts.aspx>

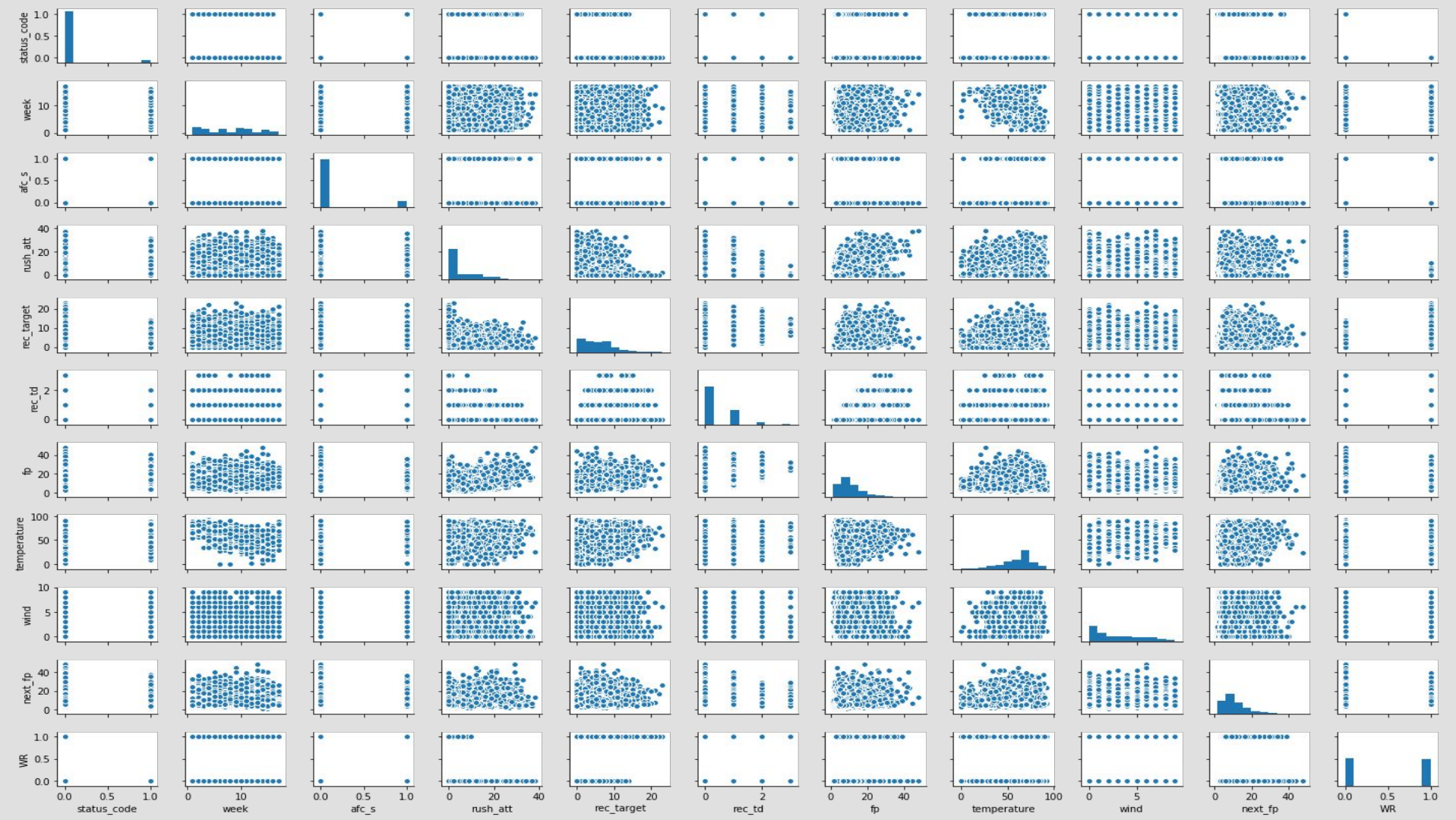
Questions?

Appendix

FINAL 2012 DOMINANCE RANKING

Rank	Division	Swagger AVG
1	AFC North	71.6
2	NFC South	71.1
3	AFC East	70.3
4	AFC South	70.3
5	AFC West	70.2
6	NFC East	69.9
7	NFC West	69.5
8	NFC North	68.9





11		MINNESOTA VIKINGS	+1	22		DENVER BRONCOS	.
12		JACKSONVILLE JAGUARS	+2	23		ARIZONA CARDINALS	+2
13		GREEN BAY PACKERS	+4	24		TAMPA BAY BUCCANEERS	+4
14		TENNESSEE TITANS	+1	25		NEW YORK JETS	-1
15		BUFFALO BILLS	-4	26		CHICAGO BEARS	-5
16		WASHINGTON REDSKINS	-3	27		INDIANAPOLIS COLTS	-1
17		DETROIT LIONS	-1	28		HOUSTON TEXANS	-1
18		LOS ANGELES CHARGERS	+2	29		MIAMI DOLPHINS	.
19		OAKLAND RAIDERS	.	30		SAN FRANCISCO 49ERS	+2
20		CINCINNATI BENGALS	-2	31		NEW YORK GIANTS	-1
21		BALTIMORE RAVENS	+2	32		CLEVELAND BROWNS	-1