

Take Home

Some interesting things we could look at regarding NFL player grades and statistics:

-- Change in average grades of top players in a position:

- Graph the change over time of the top 20 quarterbacks with a certain amount of snaps each year.
- Do the same with running backs and wide receivers. Can we use this to argue that the NFL is becoming more of a passing league?

-- Who is the best at coverage between defensive position groups? Which position group is the best at stopping the run? Stopping the pass?

-- Do some sort of visualization with the combined dataset with receivers that have college and nfl stats. Putting them on a scatterplot would be very cool. I'm thinking do highest grade in the league with highest amount of yards. We can also do receptions and touchdowns too.

It would also be cool to look at how certain draft classes are doing but that would require more data scraping.

```
In [234... import pandas as pd
full_receiving = pd.read_csv("data/full_recieving.csv")

# remove team name, create column for highest grade (200 snap min), remove all
full_receiving = full_receiving[full_receiving["grad_year"].notna()]

# find best grade, year with best grade
full_receiving["best_grade"] = full_receiving[["grades_pass_route_2021", "grade
full_receiving["best_year"] = full_receiving[["grades_pass_route_2021", "grades

# sed
full_receiving["best_year"] = full_receiving["best_year"].replace(to_replace =
full_receiving = full_receiving[full_receiving["best_grade"].notna()]

# find number of snaps for best year
full_receiving["snaps"] = [row[row["best_year"]] for _, row in full_receiving.i

# filter out where best year doesn't have 200 snaps
full_receiving["min_snaps"] = 200
full_receiving = full_receiving.query("snaps > min_snaps")
full_receiving = full_receiving[(full_receiving.grad_year != 2018)]

# drop all other rows
full_receiving = full_receiving[["player", "player_id", "position", "best_grade
full_receiving
```

Out [234]:

	player	player_id	position	best_grade	snap	rec	yds	td
1	Tyreek Hill	10799	WR	89.8	703.0	31.0	281.0	1.0
4	Stefon Diggs	9579	WR	90.6	794.0	62.0	792.0	5.0
8	D.J. Moore	48267	WR	80.2	607.0	80.0	1033.0	8.0
10	Mark Andrews	47436	TE	91.0	670.0	62.0	958.0	8.0
23	Chris Godwin	11839	WR	90.4	634.0	69.0	1101.0	11.0
...
838	Braxton Miller	10719	WR	54.9	268.0	25.0	340.0	3.0
859	Thomas Rawls	9993	HB	55.8	211.0	10.0	93.0	0.0
933	Malcolm Mitchell	10746	WR	64.5	408.0	58.0	865.0	5.0
964	Keith Mumphery	9608	WR	47.6	230.0	26.0	495.0	3.0
1076	Ahmad Bradshaw	3866	HB	70.3	281.0	1.0	25.0	0.0

105 rows × 8 columns

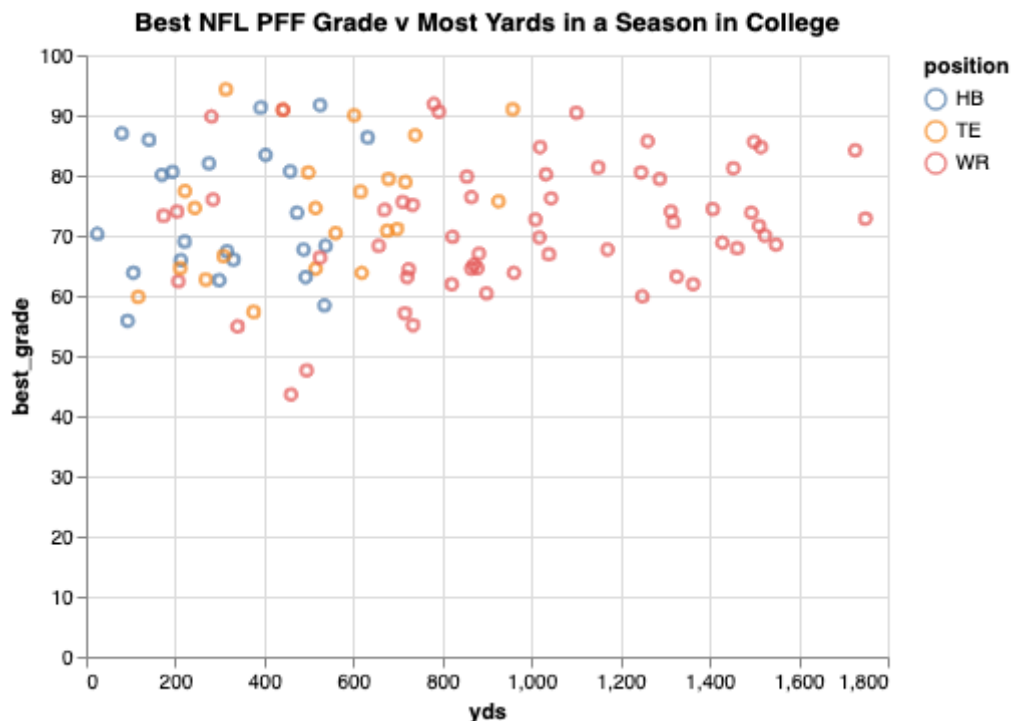
```
In [235... import seaborn as sns
import matplotlib.pyplot as plt
```

```
In [236... import altair as alt
from vega_datasets import data
from altair import datum
```

```
In [237... chart = alt.Chart(full_receiving).mark_point().encode(
    x="yds:Q",
    y="best_grade:Q",
    color="position:N",
    tooltip='player:N',
).transform_filter(
    (datum.position == "WR") | (datum.position == "HB") | (datum.position == "T")
).properties(
    title={
        "text": "Best NFL PFF Grade v Most Yards in a Season in College"
    }
)

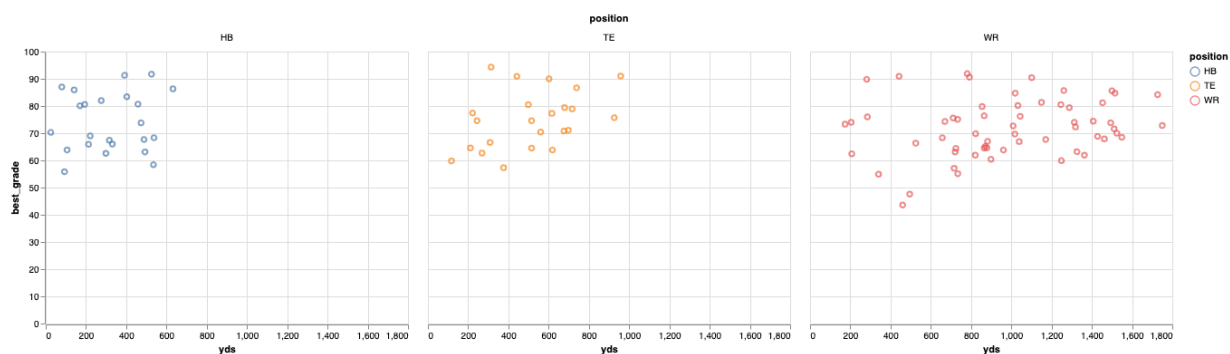
chart
```

Out [237]:



```
In [238]: multi_chart = chart.facet("position")
multi_chart
```

Out [238]:



```
In [353]: # import numpy as np

# qbs = pd.read_csv("data/quarterbacks.csv")
# rbs = pd.read_csv("data/rushing.csv")
# wrs = pd.read_csv("data/recieving.csv")

# qbs = qbs.fillna(10000)
# rbs = rbs.fillna(10000)
# wrs = wrs.fillna(10000)
# # qbs = qbs.query("passing_snaps_2017 > min_snaps")
# # qbs = qbs.replace(10000, np.nan)
# # qbs.groupby(["grades_pass_2021", "grades_pass_2020", "grades_pass_2019", "grades_pass_2018", "grades_pass_2017", "grades_pass_2016", "grades_pass_2015", "grades_pass_2014", "grades_pass_2013"])

# qbs['s2021'] = tuple(zip(qbs.grades_offense_2021, qbs.grades_pass_2021, qbs.grades_defense_2021, qbs.grades_special_2021))
# qbs['s2020'] = tuple(zip(qbs.grades_offense_2020, qbs.grades_pass_2020, qbs.grades_defense_2020, qbs.grades_special_2020))
# qbs['s2019'] = tuple(zip(qbs.grades_offense_2019, qbs.grades_pass_2019, qbs.grades_defense_2019, qbs.grades_special_2019))
# qbs['s2018'] = tuple(zip(qbs.grades_offense_2018, qbs.grades_pass_2018, qbs.grades_defense_2018, qbs.grades_special_2018))
# qbs['s2017'] = tuple(zip(qbs.grades_offense_2017, qbs.grades_pass_2017, qbs.grades_defense_2017, qbs.grades_special_2017))
# qbs['s2016'] = tuple(zip(qbs.grades_offense_2016, qbs.grades_pass_2016, qbs.grades_defense_2016, qbs.grades_special_2016))
# qbs['s2015'] = tuple(zip(qbs.grades_offense_2015, qbs.grades_pass_2015, qbs.grades_defense_2015, qbs.grades_special_2015))
# qbs['s2014'] = tuple(zip(qbs.grades_offense_2014, qbs.grades_pass_2014, qbs.grades_defense_2014, qbs.grades_special_2014))
# qbs['s2013'] = tuple(zip(qbs.grades_offense_2013, qbs.grades_pass_2013, qbs.grades_defense_2013, qbs.grades_special_2013))
```

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# qbs['s2012'] = tuple(zip(qbs.grades_offense_2012, qbs.grades_pass_2012, qbs.p
# rbs['s2021'] = tuple(zip(rbs.grades_offense_2021, rbs.grades_run_2021, rbs.at
# rbs['s2020'] = tuple(zip(rbs.grades_offense_2020, rbs.grades_run_2020, rbs.at
# rbs['s2019'] = tuple(zip(rbs.grades_offense_2019, rbs.grades_run_2019, rbs.at
# rbs['s2018'] = tuple(zip(rbs.grades_offense_2018, rbs.grades_run_2018, rbs.at
# rbs['s2017'] = tuple(zip(rbs.grades_offense_2017, rbs.grades_run_2017, rbs.at
# rbs['s2016'] = tuple(zip(rbs.grades_offense_2016, rbs.grades_run_2016, rbs.at
# rbs['s2015'] = tuple(zip(rbs.grades_offense_2015, rbs.grades_run_2015, rbs.at
# rbs['s2014'] = tuple(zip(rbs.grades_offense_2014, rbs.grades_run_2014, rbs.at
# rbs['s2013'] = tuple(zip(rbs.grades_offense_2013, rbs.grades_run_2013, rbs.at
# rbs['s2012'] = tuple(zip(rbs.grades_offense_2012, rbs.grades_run_2012, rbs.at

# wrs['s2021'] = tuple(zip(wrs.grades_offense_2021, wrs.grades_pass_route_2021,
# wrs['s2020'] = tuple(zip(wrs.grades_offense_2020, wrs.grades_pass_route_2020,
# wrs['s2019'] = tuple(zip(wrs.grades_offense_2019, wrs.grades_pass_route_2019,
# wrs['s2018'] = tuple(zip(wrs.grades_offense_2018, wrs.grades_pass_route_2018,
# wrs['s2017'] = tuple(zip(wrs.grades_offense_2017, wrs.grades_pass_route_2017,
# wrs['s2016'] = tuple(zip(wrs.grades_offense_2016, wrs.grades_pass_route_2016,
# wrs['s2015'] = tuple(zip(wrs.grades_offense_2015, wrs.grades_pass_route_2015,
# wrs['s2014'] = tuple(zip(wrs.grades_offense_2014, wrs.grades_pass_route_2014,
# wrs['s2013'] = tuple(zip(wrs.grades_offense_2013, wrs.grades_pass_route_2013,
# wrs['s2012'] = tuple(zip(wrs.grades_offense_2012, wrs.grades_pass_route_2012,

# qbs = qbs[["player", "s2021", "s2020", "s2019", "s2018", "s2017", "s2016", "s2015", "s2014", "s2013", "s2012"]]
# rbs = rbs[["player", "s2021", "s2020", "s2019", "s2018", "s2017", "s2016", "s2015", "s2014", "s2013", "s2012"]]
# wrs = wrs[["player", "s2021", "s2020", "s2019", "s2018", "s2017", "s2016", "s2015", "s2014", "s2013", "s2012"]]

# # list = [qbs['s2021'], qbs['s2020'], qbs['s2019'], qbs['s2018'], qbs['s2017'], qbs['s2016'], qbs['s2015'], qbs['s2014'], qbs['s2013'], qbs['s2012']]

# # print(qbs)

# # names = [i for i in qbs['player']]
# f2021 = []
# f2020 = []
# f2019 = []
# f2018 = []
# f2017 = []
# f2016 = []
# f2015 = []
# f2014 = []
# f2013 = []
# f2012 = []

# r2021 = []
# r2020 = []
# r2019 = []
# r2018 = []
# r2017 = []
# r2016 = []
# r2015 = []
# r2014 = []
# r2013 = []
# r2012 = []

# w2021 = []
# w2020 = []
# w2019 = []
# w2018 = []
# w2017 = []

```

```
# w2016 = []
# w2015 = []
# w2014 = []
# w2013 = []
# w2012 = []

# for i in qbs['s2021']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2021.append(i)

# for i in qbs['s2020']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2020.append(i)

# for i in qbs['s2019']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2019.append(i)

# for i in qbs['s2018']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2018.append(i)

# for i in qbs['s2017']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2017.append(i)

# for i in qbs['s2016']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2016.append(i)

# for i in qbs['s2015']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2015.append(i)

# for i in qbs['s2014']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2014.append(i)

# for i in qbs['s2013']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2013.append(i)

# for i in qbs['s2012']:
#     if i[2] < 400 or i[2] == 10000:
#         continue
#     f2012.append(i)

#     ##

# for i in rbs['s2021']:
#     if i[2] < 150 or i[2] == 10000:
```

```
#         continue
#         r2021.append(i)

# for i in rbs['s2020']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2020.append(i)

# for i in rbs['s2019']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2019.append(i)

# for i in rbs['s2018']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2018.append(i)

# for i in rbs['s2017']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2017.append(i)

# for i in rbs['s2016']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2016.append(i)

# for i in rbs['s2015']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2015.append(i)

# for i in rbs['s2014']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2014.append(i)

# for i in rbs['s2013']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2013.append(i)

# for i in rbs['s2012']:
#     if i[2] < 150 or i[2] == 10000:
#         continue
#     r2012.append(i)

#     ##

# for i in wrs['s2021']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2021.append(i)

# for i in wrs['s2020']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2020.append(i)
```

```

# for i in wrs['s2019']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2019.append(i)

# for i in wrs['s2018']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2018.append(i)

# for i in wrs['s2017']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2017.append(i)

# for i in wrs['s2016']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2016.append(i)

# for i in wrs['s2015']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2015.append(i)

# for i in wrs['s2014']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2014.append(i)

# for i in wrs['s2013']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2013.append(i)

# for i in wrs['s2012']:
#     if i[2] < 300 or i[2] == 10000:
#         continue
#     w2012.append(i)

# data = [f2012, f2013, f2014, f2015, f2016, f2017, f2018, f2019, f2020, f2021]
# rdata = [r2012, r2013, r2014, r2015, r2016, r2017, r2018, r2019, r2020, r2021]
# wdata = [w2012, w2013, w2014, w2015, w2016, w2017, w2018, w2019, w2020, w2021]

# years = [2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021]
# # position = ["QB", "RB", "WR", "QB", "RB", "WR", "QB", "RB", "WR", "QB", "RB"]
# # qb_average = []
# average = []
# for i in data:
#     # print(i)
#     running = 0
#     count = 0
#     for j in i:
#         running += j[0]
#         count += 1
#     average.append(running/count)

# rb_average = []
# for i in rdata:
#     # print(i)

```

```

#     running = 0
#     count = 0
#     for j in i:
#         running += j[0]
#         count += 1
#     rb_average.append(running/count)

# wr_average = []
# for i in wdata:
#     # print(i)
#     running = 0
#     count = 0
#     for j in i:
#         running += j[0]
#         count += 1
#     wr_average.append(running/count)

# # print(years)
# # print(qb_average)
# # print(rb_average)
# # print(wr_average)

# # average

# # print(len(average))
# # print(len(years))
# # print(len(position))

# df = pd.DataFrame({'Year':years, 'qb':average, 'rb':rb_average, 'wr':wr_average})
# df

```

Out[353]:

	Year	qb	rb	wr
0	2012	72.037037	73.565517	72.919048
1	2013	74.088462	73.534286	71.727273
2	2014	71.834615	68.645455	70.713333
3	2015	73.570370	65.628125	70.759740
4	2016	74.100000	66.867857	70.505806
5	2017	73.835714	68.623529	68.850000
6	2018	77.362069	73.516667	70.389726
7	2019	75.214286	72.451515	69.569872
8	2020	79.750000	74.017241	70.912102
9	2021	74.576667	73.162500	69.293671

In [374... **import** numpy **as** np

```

qbs = pd.read_csv("data/quarterbacks.csv")
rbs = pd.read_csv("data/rushing.csv")
wrs = pd.read_csv("data/recieving.csv")

qbs = qbs.fillna(10000)
rbs = rbs.fillna(10000)
wrs = wrs.fillna(10000)

```



```

# qbs = qbs.query("passing_snaps_2017 > min_snaps")
# qbs = qbs.replace(10000, np.nan)
# qbs.groupby(["grades_pass_2021", "grades_pass_2020", "grades_pass_2019", "grades_pass_2018", "grades_pass_2017", "grades_pass_2016", "grades_pass_2015", "grades_pass_2014", "grades_pass_2013", "grades_pass_2012"])

qbs['s2021'] = tuple(zip(qbs.grades_offense_2021, qbs.grades_pass_2021, qbs.passing_snaps_2021))
qbs['s2020'] = tuple(zip(qbs.grades_offense_2020, qbs.grades_pass_2020, qbs.passing_snaps_2020))
qbs['s2019'] = tuple(zip(qbs.grades_offense_2019, qbs.grades_pass_2019, qbs.passing_snaps_2019))
qbs['s2018'] = tuple(zip(qbs.grades_offense_2018, qbs.grades_pass_2018, qbs.passing_snaps_2018))
qbs['s2017'] = tuple(zip(qbs.grades_offense_2017, qbs.grades_pass_2017, qbs.passing_snaps_2017))
qbs['s2016'] = tuple(zip(qbs.grades_offense_2016, qbs.grades_pass_2016, qbs.passing_snaps_2016))
qbs['s2015'] = tuple(zip(qbs.grades_offense_2015, qbs.grades_pass_2015, qbs.passing_snaps_2015))
qbs['s2014'] = tuple(zip(qbs.grades_offense_2014, qbs.grades_pass_2014, qbs.passing_snaps_2014))
qbs['s2013'] = tuple(zip(qbs.grades_offense_2013, qbs.grades_pass_2013, qbs.passing_snaps_2013))
qbs['s2012'] = tuple(zip(qbs.grades_offense_2012, qbs.grades_pass_2012, qbs.passing_snaps_2012))

rbs['s2021'] = tuple(zip(rbs.grades_offense_2021, rbs.grades_run_2021, rbs.attending_snaps_2021))
rbs['s2020'] = tuple(zip(rbs.grades_offense_2020, rbs.grades_run_2020, rbs.attending_snaps_2020))
rbs['s2019'] = tuple(zip(rbs.grades_offense_2019, rbs.grades_run_2019, rbs.attending_snaps_2019))
rbs['s2018'] = tuple(zip(rbs.grades_offense_2018, rbs.grades_run_2018, rbs.attending_snaps_2018))
rbs['s2017'] = tuple(zip(rbs.grades_offense_2017, rbs.grades_run_2017, rbs.attending_snaps_2017))
rbs['s2016'] = tuple(zip(rbs.grades_offense_2016, rbs.grades_run_2016, rbs.attending_snaps_2016))
rbs['s2015'] = tuple(zip(rbs.grades_offense_2015, rbs.grades_run_2015, rbs.attending_snaps_2015))
rbs['s2014'] = tuple(zip(rbs.grades_offense_2014, rbs.grades_run_2014, rbs.attending_snaps_2014))
rbs['s2013'] = tuple(zip(rbs.grades_offense_2013, rbs.grades_run_2013, rbs.attending_snaps_2013))
rbs['s2012'] = tuple(zip(rbs.grades_offense_2012, rbs.grades_run_2012, rbs.attending_snaps_2012))

wrs['s2021'] = tuple(zip(wrs.grades_offense_2021, wrs.grades_pass_route_2021, wrs.attending_snaps_2021))
wrs['s2020'] = tuple(zip(wrs.grades_offense_2020, wrs.grades_pass_route_2020, wrs.attending_snaps_2020))
wrs['s2019'] = tuple(zip(wrs.grades_offense_2019, wrs.grades_pass_route_2019, wrs.attending_snaps_2019))
wrs['s2018'] = tuple(zip(wrs.grades_offense_2018, wrs.grades_pass_route_2018, wrs.attending_snaps_2018))
wrs['s2017'] = tuple(zip(wrs.grades_offense_2017, wrs.grades_pass_route_2017, wrs.attending_snaps_2017))
wrs['s2016'] = tuple(zip(wrs.grades_offense_2016, wrs.grades_pass_route_2016, wrs.attending_snaps_2016))
wrs['s2015'] = tuple(zip(wrs.grades_offense_2015, wrs.grades_pass_route_2015, wrs.attending_snaps_2015))
wrs['s2014'] = tuple(zip(wrs.grades_offense_2014, wrs.grades_pass_route_2014, wrs.attending_snaps_2014))
wrs['s2013'] = tuple(zip(wrs.grades_offense_2013, wrs.grades_pass_route_2013, wrs.attending_snaps_2013))
wrs['s2012'] = tuple(zip(wrs.grades_offense_2012, wrs.grades_pass_route_2012, wrs.attending_snaps_2012))

qbs = qbs[["player", "s2021", "s2020", "s2019", "s2018", "s2017", "s2016", "s2015", "s2014", "s2013", "s2012"]]
rbs = rbs[["player", "s2021", "s2020", "s2019", "s2018", "s2017", "s2016", "s2015", "s2014", "s2013", "s2012"]]
wrs = wrs[["player", "s2021", "s2020", "s2019", "s2018", "s2017", "s2016", "s2015", "s2014", "s2013", "s2012"]]

# list = [qbs['s2021'], qbs['s2020'], qbs['s2019'], qbs['s2018'], qbs['s2017'], qbs['s2016'], qbs['s2015'], qbs['s2014'], qbs['s2013'], qbs['s2012']]

# print(qbs)

# names = [i for i in qbs['player']]

f2021 = []
f2020 = []
f2019 = []
f2018 = []
f2017 = []
f2016 = []
f2015 = []
f2014 = []
f2013 = []
f2012 = []

r2021 = []
r2020 = []
r2019 = []

```

```
r2018 = []
r2017 = []
r2016 = []
r2015 = []
r2014 = []
r2013 = []
r2012 = []

w2021 = []
w2020 = []
w2019 = []
w2018 = []
w2017 = []
w2016 = []
w2015 = []
w2014 = []
w2013 = []
w2012 = []

for i in qbs['s2021']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2021.append(i)

for i in qbs['s2020']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2020.append(i)

for i in qbs['s2019']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2019.append(i)

for i in qbs['s2018']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2018.append(i)

for i in qbs['s2017']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2017.append(i)

for i in qbs['s2016']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2016.append(i)

for i in qbs['s2015']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2015.append(i)

for i in qbs['s2014']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2014.append(i)

for i in qbs['s2013']:
```

```
    if i[2] < 400 or i[2] == 10000:
        continue
    f2013.append(i)

for i in qbs['s2012']:
    if i[2] < 400 or i[2] == 10000:
        continue
    f2012.append(i)

##

for i in rbs['s2021']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2021.append(i)

for i in rbs['s2020']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2020.append(i)

for i in rbs['s2019']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2019.append(i)

for i in rbs['s2018']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2018.append(i)

for i in rbs['s2017']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2017.append(i)

for i in rbs['s2016']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2016.append(i)

for i in rbs['s2015']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2015.append(i)

for i in rbs['s2014']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2014.append(i)

for i in rbs['s2013']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2013.append(i)

for i in rbs['s2012']:
    if i[2] < 150 or i[2] == 10000:
        continue
    r2012.append(i)
```

```

##

for i in wrs['s2021']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2021.append(i)

for i in wrs['s2020']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2020.append(i)

for i in wrs['s2019']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2019.append(i)

for i in wrs['s2018']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2018.append(i)

for i in wrs['s2017']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2017.append(i)

for i in wrs['s2016']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2016.append(i)

for i in wrs['s2015']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2015.append(i)

for i in wrs['s2014']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2014.append(i)

for i in wrs['s2013']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2013.append(i)

for i in wrs['s2012']:
    if i[2] < 450 or i[2] == 10000:
        continue
    w2012.append(i)

data = [f2012, r2012, w2012, f2013, r2013, w2013, f2014, r2014, w2014, f2015, r
# rdata = [r2012, r2013, r2014, r2015, r2016, r2017, r2018, r2019, r2020, r2021]
# wdata = [w2012, w2013, w2014, w2015, w2016, w2017, w2018, w2019, w2020, w2021]

years = [2012, 2012, 2012, 2013, 2013, 2013, 2014, 2014, 2014, 2015, 2015, 2015]
position = ["QB", "RB", "WR", "QB", "RB", "WR", "QB", "RB", "WR", "QB", "RB", "WR"]
# qb_average = []

```

```
average = []
for i in data:
    # print(i)
    running = 0
    count = 0
    for j in i:
        running += j[0]
        count += 1
    average.append(running/count)

# rb_average = []
# for i in rdata:
#     # print(i)
#     running = 0
#     count = 0
#     for j in i:
#         running += j[0]
#         count += 1
#     rb_average.append(running/count)

# wr_average = []
# for i in wdata:
#     # print(i)
#     running = 0
#     count = 0
#     for j in i:
#         running += j[0]
#         count += 1
#     wr_average.append(running/count)

# print(years)
# print(qb_average)
# print(rb_average)
# print(wr_average)

# average

# print(len(average))
# print(len(years))
# print(len(position))

df = pd.DataFrame({'Year':years, 'Position':position, 'Average_Rating':average})
df
```

Out [374]:

	Year	Position	Average_Rating
0	2012	QB	72.037037
1	2012	RB	73.565517
2	2012	WR	75.419540
3	2013	QB	74.088462
4	2013	RB	73.534286
5	2013	WR	73.473626
6	2014	QB	71.834615
7	2014	RB	68.645455
8	2014	WR	72.515217
9	2015	QB	73.570370
10	2015	RB	65.628125
11	2015	WR	73.943750
12	2016	QB	74.100000
13	2016	RB	66.867857
14	2016	WR	72.510638
15	2017	QB	73.835714
16	2017	RB	68.623529
17	2017	WR	71.168675
18	2018	QB	77.362069
19	2018	RB	73.516667
20	2018	WR	73.526923
21	2019	QB	75.214286
22	2019	RB	72.451515
23	2019	WR	73.420000
24	2020	QB	79.750000
25	2020	RB	74.017241
26	2020	WR	72.328916
27	2021	QB	74.576667
28	2021	RB	73.162500
29	2021	WR	72.410345

In [375]...

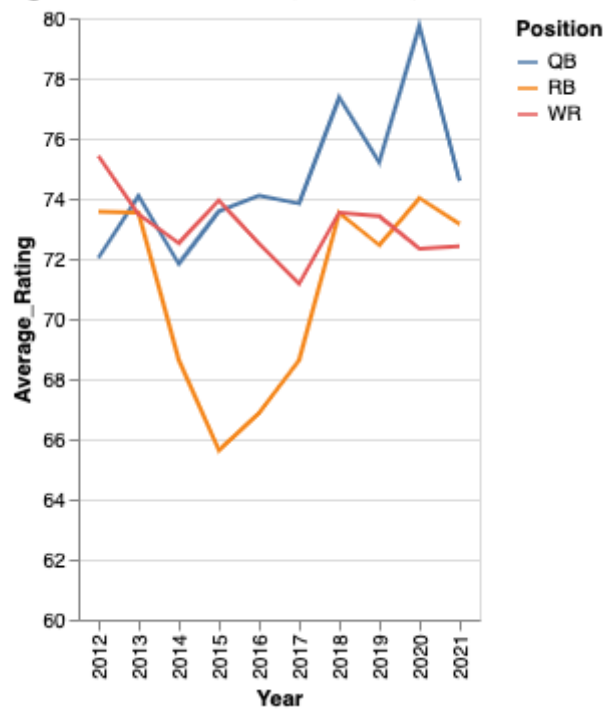
```

chart2 = alt.Chart(df).mark_line().encode(
    x="Year:N",
    y=alt.Y("Average_Rating:Q", scale=alt.Scale(domain=[60,80])),
    color="Position:N",
).transform_filter(
    (datum.Position == "WR") | (datum.Position == "QB") | (datum.Position == "F
).properties(

```

```
title={  
    "text": "Average Grades of Passers, Rushers, and Recievers"  
}  
)  
  
chart2
```

Out[375]: **Average Grades of Passers, Rushers, and Recievers**



In []:

In []: