Brainstorm:

Layout:

- The board will be a 35”x23” and made out of cork. This like formal shit is kinda boring. Basically the top left area will be aligned with the six sports illustrated covers. Then I will add picture cut outs and text/stats about things I like.

Topics:

- 2016 finals
- The double<
- Demar Derozan
- Kevin Mchale, Larry Bird, and the ‘85 Celtics
- 2004 and 2016 Red Sox World Series

What I love about sports:

- I love the competitive nature
- I love how it is a microcosm of intensity, physicality, and intelligence
- I love how smart you really need to be to play sports at a professional level.
- I love that the great players are the ones who can break down the game
- And I love that sometime you don’t need that, you can be a pure athlete

Stats:

- Rate at which Kobe scored during the 2008-2009 season
- Efficiency of Paul Pierce's pull up midrange shots
    - Thought I could find it but nba.com/stats sucks
    - Note-can prob find this on nba savant

Features:

- These are just kinda gonna be things I think are cool or like things that would look sick. I think I’m gonna start with an Allen Iverson fading away to his left shot then do some stats about The one and only Answer.
- Then I think that I am going to add some formulas or something about advanced metrics, or like some example. Maybe like a Paul George efficiency in Indiana metic, w/ a free throw pic? Bottom left?
- Maybe like a Calvin Johnson 329 yard breakdown with a picture of him leaping over those two defenders

## New Statistic: Meta shooting impact (The Nick Index) **{Notes/Brainstorm}**

- This stat will be a combination stat that tries to assess how much a player causes an opponent to make adjustments to when they are defending them. The thought behind this is that we can measure if a player can create more opportunities for himself and his teammates. For instance, if a player shows that he can consistently hit midrange shots it won’t allow opponents to play drop coverage in the pick and roll which could allow the roll man to be more open.
- But also it can be like how unstoppable someone can be. Because if they score well at every level in every situation it takes a mental and strategic toll on opponents.
- Really it could also be summarized as how versatile their offensive game is

    - Honestly just let me put a bunch of stats I like together and see what happens
- Components of the stat may include:
    - What % of shots the player takes for specific distances, maybe (0.200-% of FG) because a perfectly even shot distribution would be 20% at all distances.
        - It is more valuable for a player to shoot better at longer distances; modification of the true shooting stat
    - What % of touches does the player pass for and assist vs shoot vs don't have an impact
        - https://www.nba.com/stats/player/201142/passes-dash/?Season=2013-14&SeasonType=Regular%20Season
    - What percent of shots were assisted and how many were self created
    - Can also include traditional stats like points and assists, putbacks, offensive rebounds, more those second two things because they're big plays
        - Play-by-play section on bball reference
    - How many double/triple teams they draw
- To be able to actually calculate this state I am going to need to figure out a way to standardize all the components into one format
- I want this stat to reflect more of how effective a player is in this regard as opposed to just how efficient he is.
- I will do the example calculation using either Kevin Durant or Dirk
- This doesn't have to be some be all end all stat, I just want to describe some things I like in a player
- I should also think about making adjustments for position like BPM
- Shits kinda annoying because tracking data isn't available past 2013-14
    - Clutch I decided to use Kevin Durant 13-14 for example calculation
    - Maybe i can find a relationship between EFG and contest maybe and construct a regression line so thaf I can model older plahyers off of that line, of course I would need to adjust for era tho

Calculation Brainstorm

- Now I need to decide how to make the calculation, the components of the stat are:
    - How frequently they shoot from each distance
    - How well they shot at each distance
    - How many shots were assisted/how many they created at each distance
    - How many of their shots were contested and how much
    - How well they shot at each contest level
        - https://www.basketball-reference.com/players/d/duranke01/shooting/2014
        - https://www.nba.com/stats/player/201142/shots-dash/?Season=2013-14&SeasonType=Regular%20Season&sort=G&dir=1
        - Or should I use the data from NBAsavant
    - Now it just comes down to standardizing it. I need to know how to even do that, am I going to do it based on just manipulating numbers that I have. Or am I going to use a system that converts the stats into points or something based on some arbitrary/self-made criteria

    - Maybe shot distribution should be measured against league average at the player position since it will adjust for position
- I FUCKING KNOW HOW IM GOING TO DO IT. I JUST NEED TO FIND THE RATIO OF ALL THE STATS OF THE PLAYER VS THE REST OF THE LEAGUE AT THEIR POSITION AND THEN MULTIPLY HOW MUCH THEY SHOOT BY HOW EFFICIENTLY THEY SHOOT [AT EACH DISTANCE] AND THEN ADD IT ALL UP TO GET PRIMARY SCORE.
    - That way it actually also kinda works if you think about it now matter what. Like this expresses the logic of what I'm trying to represent with the distance thing.
- Contest calculation: %ofFGs * 1/(1-EFG%)
    - Use a multiplier for the different levels: 1 for wide open, 2 for 4-6, 3 for 2-4 and so on
-

| CALCULATION: Sum[(Dist. Freq. Ratio)*(Dist. FG% Ratio)] \|Average for the leage is always 5, subract from score so that stat mean is 0 |
|---|
| \| [0.849*1.278]+[1.159*1.134]+[2.566*1.259]+[0.892*1.300]+[0.785*1.266] = 1.085+1.314+3.232+1.160+0.993 = 7.784-5=***2.784*** |

| Kevin Durant: 2013-14 | Stats | Standardization |
|---|---|---|
| Distance | % of FG / EFG% / ast'd% | *used Fg% instead |
| 0-3: | .223 / .785 / .504 | (%Fg/league)*(FG%/league) |
| 3-10: | .150 / .428 / .309 | (%Fg/league)*(FG%/league) |
| 10-16: | .191 / .426 / .472 | (%Fg/league)*(FG%/league) |
| 16-3p: | .145 / .461 / .500 | (%Fg/league)*(FG%/league) |
| 3p: | .291 / .572 / .609 | (%Fg/league)*(FG%/league) |
| | | |
| Contest | | |
| 0-2 Feet - Very Tight: | 20.4% of FGs, 57.2 EFG% | (%Fg/league)*(FG%/league) |
| 2-4 Feet - Tight: | 44.3% of FGs, 52.5 EFG% | (%Fg/league)*(FG%/league) |
| 4-6 Feet - Open | 27.5% of FGs, 61.3 EFG% | (%Fg/league)*(FG%/league) |
| 6+ Feet - Wide Open | 7.9% of FGs, 71.9 EFG% | (%Fg/league)*(FG%/league) |

- Fuck what I wrote before, this is going to show how good a offensive player is based off of how well they create shots, how well they vary their shot selection, and how well they hit contested shots
- For once the contest portion is all figured out I can use https://www.nbasavant.com/player.php?ddlYear=2013&ddlShotMade=&ddlTeamDefense=&player_id=201142 to make a good visual because it has all information.

*FINAL CALCULATION*:

- The final components for the stat are the Frequency that a player shoots at the following ranges: (0-3 ft., 3-10 ft., 10-16 ft., 16ft.-3p, 3p) and the players field goal % (FG%) at each of those ranges as well.
- To calculate the stat you need obtain the league averages for each of the statistics that were noted above using the database of all other players. This portion is position adjusted, so the league average at the position of the given player is used when calculating.
- The math for the stat is done as follows:
    - Divide all the players percentages by the corresponding league average to give the ratio of how much more frequently a player shoots from each of the distances d=0-3, 3-10, 10-16, 16-3p, 3p. As well as the ratio for how well the player shoots compared to the league at each of the distances as well.
    - These ratios are used to find a player's score at each distance; we multiply the Freq% ratio by the FG% ratio for all distances. This is done for all distances d, to give individual representations of how well the player shot compared to the league at these distances, as well as how well the mix up their offensive game compared to the league at their position.
    - The Final Score is found by adding up the grades at each of the distances. League average would obviously be 5 so to find the player's Index Rating you subtract 5 from the final score. Accordingly the league average for index rating 0, so you can easily see how well a player did compared to the league.
    - The Formula for index score: $I = \sum_{d_0}^{3p} Freq\%_d * FG\%_d - 5$
        1. *Freq% ratio *FG% ratio *d={0-3, 3-10, 10-16, 16-3p, 3p}
    - The calculations done in the spreadsheet with Kevin Durant 2013-2014 as an example is shown below

| CALCULATION: Sum[(Dist. Freq. Ratio)*(Dist. FG% Ratio)] \| Average for the league is always 5, subtract from score so that stat mean is 0 |
|---|
| \| [0.849*1.278]+[1.159*1.134]+[2.566*1.259]+[0.892*1.300]+[0.785*1.266] = 1.085+1.314+3.232+1.160+0.993 = 7.784-5=***2.784*** |

1. The full spreadsheet is linked to here: Basketball Stats [INDEX: 13-14]

Possible Oversights

- ➢ I used data totals for all players. Using only players in a certain percentile of shots/minutes so that players w small impact will not affect calculation
    - Observed because low minutes correlate to high score in the data

Direct Calculation Process (1st draft):

Setup:

- The page that was used for the sample calculation is https://www.basketball-reference.com/leagues/NBA_2014_shooting.html
- The columns that are on the table are:

| | | | | | | | | % of FGA by Distance | | | | | | FG% by Distance | | | | | | % of FG Ast'd | | Dunks | | Corner 3s | | Heaves |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rk | Player | Pos | Age | Tm | G | MP | FG% | Dist. | 2P | 0-3 | 3-10 | 10-16 | 16-3P | 3P | 2P | 0-3 | 3-10 | 10-16 | 16-3P | 3P | 2P | 3P | %FGA | # | %3PA | 3P% | Att. | # |

- The columns used were:

| | | | | | % of FGA by Distance | | | | | | FG% by Distance | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rk | Player | Pos | G | MP | 2P | 0-3 | 3-10 | 10-16 | 16-3P | 3P | 2P | 0-3 | 3-10 | 10-16 | 16-3P | 3P |

- After the 20th, 40th, 60th etc… row the stat headers are repeated, these rows were deleted. Also the top row of headers is deleted for clarity.
- Then the table is divided into 5 sub tables by filtering based on the players position.The Positional Sub-Tables are:
  - PGs, (includes PG)
  - SGs, (includes SG, SG-PG, SG-SF) For second draft will include SG-PG in PGs category
  - SFs, (includes SF, SF-PF, PF-SF) For second draft will include PF-SF in PFs category
  - PFs, (includes PF)
  - Cs, (includes C)
- The Columns that correspond to each of the terms in the table are:
  - (\\Columns A,B,C,D,E,F,G: rankings \\H,I,J,K,L: Frequency% \\,M,N,O,Q,P: FG%.)

| Rk =A | Player= B | Pos =C | Tea m=D | Age =E | G =F | MP =G | 0-3 =H | 3-10 =I | 10-16 =J | 16-3P =K | 3P =L | 0-3 =M | 3-10 =N | 10-16= O | 16-3 P=P | 3P= Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Calculation:

- In each of the 5 positional sub-tables the league averages for each column are calculated using the $\text{subtotal}(1, \text{range})$ function in google sheets.
- The first round of computations is to give us the ratio between the players stats and the league average for distance Frequency% [$Freq\%_d$], and distance FG% [$FG\%_d$]. The table below refers to the row numbers for the league and the player averages, as well as which column is used

| d | 0-3 | 3-10 | 10-16 | 16-3P | 3P |
|---|---|---|---|---|---|
| $Freq\%_d$= | $\frac{\text{Player F}}{\text{League F}}$ | $\frac{\text{Player G}}{\text{League G}}$ | $\frac{\text{Player H}}{\text{League H}}$ | $\frac{\text{Player I}}{\text{League I}}$ | $\frac{\text{Player J}}{\text{League J}}$ |

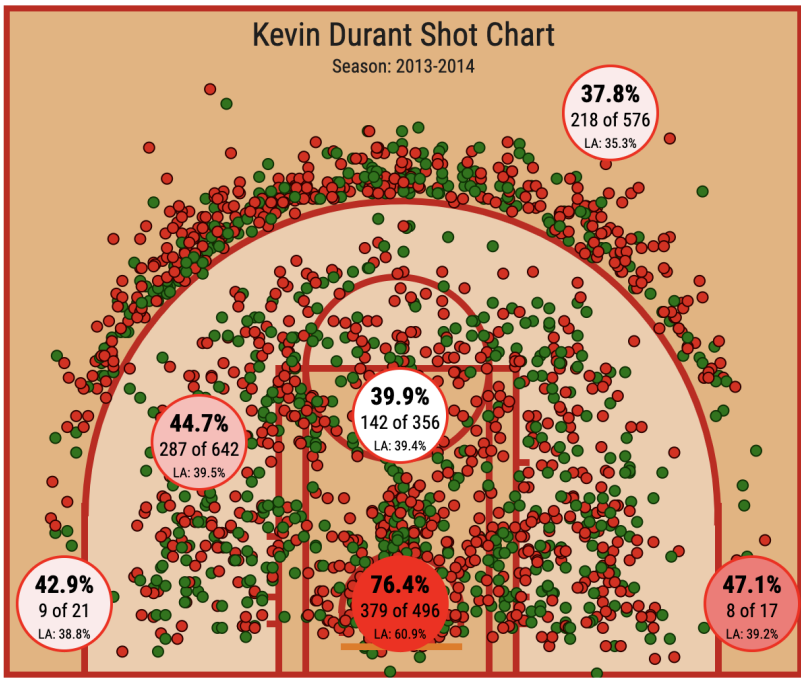
| d | 0-3 | 3-10 | 10-16 | 16-3P | 3P |
|---|---|---|---|---|---|
| $FG\%_d$= | $\frac{\text{Player K}}{\text{League K}}$ | $\frac{\text{Player L}}{\text{League L}}$ | $\frac{\text{Player M}}{\text{League M}}$ | $\frac{\text{Player N}}{\text{League N}}$ | $\frac{\text{Player O}}{\text{League O}}$ |

- The second calculation uses the ratios to find the index score for the player.

- The Formula for index score:

$$I = \sum_{d=0-3}^{3p} Freq\%_d * FG\%_d - 5$$

  - *Freq% ratio *FG% ratio *d={0-3, 3-10, 10-16, 16-3p, 3p}




- NEXT STEP: Look at how the defense reacts after a mid-range shot
  - Closest defender before/after data (hand track, almost impossible to find)
    - Would be possible to construct a multinomial distribution to model this, but visual confirmation of the effect would be necessary.

THE BIG CHANGE THAT FIXED EVERYTHING:

$$I = (\sum_{d_0}^{3p} Freq\%_d * FG\%_d)/5$$