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DATA 6560 – Sports Analytics

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Checkpoint 2: Problem Definition and Justification

NBA Executives struggle to accurately value three-point shooting abilities of players as the players age. Aging players are attempting to remain valuable to franchises by developing their 3pt shooting ability as their athleticism decreases. Without metrics that can identify the value of three-point shooting ability as players age, executives struggle to determine how to pay older players vs their younger counterparts. This project will deliver the value of the three-point shot (in dollars) for each age of player in the NBA. The goal is to also provide an equation of the value of the three point shot as a function of age. Such metrics can help NBA executives optimize their contracts and capitalize on win potential that may have previously been overlooked.

I will track various three point shooting metrics as they relate to win shares and each players Value over Replacement Player (VORP). Win shares is an important metric that represents the estimated number of wins contributed by an individual player. This metric gives a quantifiable amount of wins an individual contributes. The other metric that will be considered is VORP, which tracks an individual's value of a replacement player of average value. VORP is more closely related to individual contributions towards **points**, while win shares is more closely related to the teams **wins**. I will analyze these metrics based on 3pt shooting data that comes from basketball-reference.com during the 2024-2025 season, mainly looking at player stats per game. I will use all 3pt shooting metrics, such as 3p makes, attempts, percentages, 3pt shot selection percentages, to determine the strongest correlations for the clearest results. I will omit players that took less than 30 3PA, as this may dilute correlations to win shares.

The three point shot is what players over 30 turn to to promote their longevity and maintain value as their athleticism decreases. We see players like Demar DeRozan, Blake Griffin, and Al Horford changing their entire playstyle past the age of 30 to a more sustainable way of playing. All three of these players 3-point percentages increased with age over a moving average. This phenomenon has been highlighted in other studies such as one from EdgeRed.com, titled, "Data Driven Insights into Player Longevity and Success". This study describes how as players age, more of their points come in the form of 3-point shots. Another source from medium.com titled, "What does Data tell us about Aging in the Modern NBA?" focuses on how the distribution of highest box plus minus is shifting towards older NBA populations in recent years. A study from Dartmouth examining peak

age in sports describes how most players peak at around 27 due to athleticism, however the players who peak later and longer into their 30's do so by relying on skill-based advantages rather than athleticism. With the modern NBA seeing players adapter their game to maintain their value for longer, it is essential to understand the true value of these attributes in order to accurately form contracts and maximize potential.

To begin the analysis, I will first examine and establish some relationships that are key to moving forward. These relationships include player age vs shot selection, player age vs win share, win shares of high 3pt shooters vs low 3pt shooters past the age of 30. These are more manageable relationships that I can evaluate early on to establish the basis of the investigation. These relationships can easily be displayed through scatter plots, bar graphs, etc. Once these relationships are established and refined, I will use analysis tools like regression modeling to see how much 3pt attributes contribute to win shares and VORP for players over 30 vs younger players.

While I believe that 3pt attributes do contribute to an individual's win shares more as they age, there may not be a strong correlation as I go through the analysis. If a strong correlation between 3pt attributes alone does not exist, I will look into what other attributes alongside 3pt shooting help increase win shares and VOPR amongst players as they age. This will allow me to still present a meaningful deliverable that helps NBA Executives navigate how to value aging NBA players.

For the next checkpoint, I will gather relevant data from basketball reference and examine various trends to help refine which 3pt attributes I will focus on. I will also focus on eliminating further outliers that I see in the trends to help maintain a clear, yet accurate correlation.