NBA Player Performance

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2025-04-28

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1 Introduction

We're exploring the relationship between physical characteristics (height, weight) and draft outcomes in the NBA.

Research questions:
- What's the distribution of height and weight among drafted players? - How do physical attributes relate to draft pick or round? - Any general patterns in the dataset?

2 Data Source

Data come from Wyatt O'Walsh's Kaggle repo (https://www.kaggle.com/datasets/wyattowalsh/basketball/data originally collected by the NBA. Cases = individual players; variables = physical stats and draft history.

3 Setup & Data Cleaning

```
library(dplyr)
library(janitor)
library(ggplot2)
library(tidyr)
library(readr)
library(scales)
library(patchwork)
library(stringr)

# Read Data
player_info <- read_csv("https://raw.githubusercontent.com/jiangyeee0/STAT-184-/main/common_
draft_history <- read_csv("https://raw.githubusercontent.com/jiangyeee0/STAT-184-/main/draft_

# Clean Player Info
player_clean <- player_info %>%
  mutate(
    feet = as.numeric(str_extract(height, "^[0-9]+")),
    inches = as.numeric(str_extract(height, "(?<=-)[0-9]+")),
    height_in = feet * 12 + replace_na(inches, 0),
    weight = as.numeric(str_extract(weight, "[0-9]+")),
    across(c(height_in, weight), ~replace_na(., median(., na.rm = TRUE))))


# Clean Draft History
draft_clean <- draft_history %>%
  mutate(across(c(overall_pick, round_number, round_pick), as.numeric))
```

```r
# Merge two databases
nba_data <- inner_join(player_clean, draft_clean, by = "person_id")
```

4 Exploratory Data Analysis

4.1 Glimpse of Data

```r
glimpse(nba_data)
```

```
Rows: 2,985
Columns: 49
$ person_id                          <dbl> 76001, 76003, 1505, 949, 76005, 76006~
$ first_name                         <chr> "Alaa", "Kareem", "Tariq", "Shareef",~
$ last_name                          <chr> "Abdelnaby", "Abdul-Jabbar", "Abdul-W~
$ display_first_last                 <chr> "Alaa Abdelnaby", "Kareem Abdul-Jabba~
$ display_last_comma_first           <chr> "Abdelnaby, Alaa", "Abdul-Jabbar, Kar~
$ display_fi_last                    <chr> "A. Abdelnaby", "K. Abdul-Jabbar", "T~
$ player_slug                        <chr> "alaa-abdelnaby", "kareem-abdul-jabba~
$ birthdate                          <dttm> 1968-06-24, 1947-04-16, 1974-11-03, ~
$ school                             <chr> "Duke", "UCLA", "San Jose State", "Ca~
$ country                            <chr> "USA", "USA", "France", "USA", "USA",~
$ last_affiliation                   <chr> "Duke/USA", "UCLA/USA", "San Jose Sta~
$ height                             <chr> "6-10", "7-2", "6-6", "6-9", "6-7", "~
$ weight                             <dbl> 240, 225, 235, 245, 220, 180, 200, 22~
$ season_exp                         <dbl> 5, 20, 7, 13, 5, 1, 3, 3, 3, 1, 6, 7,~
$ jersey                             <chr> "30", "33", "9", "3", "5", "6", NA, "~
$ position                           <chr> "Forward", "Center", "Forward-Guard",~
$ rosterstatus                       <chr> "Inactive", "Inactive", "Inactive", "~
$ games_played_current_season_flag   <chr> "N", "N", "N", "N", "N", "N", "N", "N~
$ team_id.x                          <dbl> 1610612757, 1610612747, 1610612758, 1~
$ team_name.x                        <chr> "Trail Blazers", "Lakers", "Kings", "~
$ team_abbreviation.x                <chr> "POR", "LAL", "SAC", "VAN", "GOS", "P~
$ team_code                          <chr> "blazers", "lakers", "kings", "grizzl~
$ team_city.x                        <chr> "Portland", "Los Angeles", "Sacrament~
$ playercode                         <chr> "HISTADD_alaa_abdelnaby", "HISTADD_ka~
$ from_year                          <dbl> 1990, 1969, 1997, 1996, 1976, 1956, 2~
$ to_year                            <dbl> 1994, 1988, 2003, 2007, 1980, 1956, 2~
$ dleague_flag                       <chr> "N", "N", "N", "N", "N", "N", "N", "N~
$ nba_flag                           <chr> "Y", "Y", "Y", "Y", "Y", "Y", "Y", "Y~
```

```
$ games_played_flag                <chr> "Y", "Y", "Y", "Y", "Y", "Y", "Y", "Y~
$ draft_year                       <chr> "1990", "1969", "1997", "1996", "1976~
$ draft_round                      <chr> "1", "1", "1", "1", "3", NA, "2", "1"~
$ draft_number                     <chr> "25", "1", "11", "3", "43", NA, "32",~
$ greatest_75_flag                 <chr> "N", "Y", "N", "N", "N", "N", "N", "N~
$ feet                             <dbl> 6, 7, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6~
$ inches                           <dbl> 10, 2, 6, 9, 7, 3, 6, 8, 5, 0, 11, 7,~
$ height_in                        <dbl> 82, 86, 78, 81, 79, 75, 78, 80, 77, 7~
$ player_name                      <chr> "Alaa Abdelnaby", "Kareem Abdul-Jabba~
$ season                           <dbl> 1990, 1969, 1997, 1996, 1976, 1956, 2~
$ round_number                     <dbl> 1, 1, 1, 1, 3, 0, 2, 1, 2, 2, 2, 2, 1~
$ round_pick                       <dbl> 25, 1, 11, 3, 9, 0, 2, 20, 30, 0, 16,~
$ overall_pick                     <dbl> 25, 1, 11, 3, 43, 0, 32, 20, 60, 0, 4~
$ draft_type                       <chr> "Draft", "Draft", "Draft", "Draft", "~
$ team_id.y                        <dbl> 1610612757, 1610612749, 1610612758, 1~
$ team_city.y                      <chr> "Portland", "Milwaukee", "Sacramento"~
$ team_name.y                      <chr> "Trail Blazers", "Bucks", "Kings", "G~
$ team_abbreviation.y              <chr> "POR", "MIL", "SAC", "VAN", "LAL", "S~
$ organization                     <chr> "Duke", "California-Los Angeles", "Sa~
$ organization_type                <chr> "College/University", "College/Univer~
$ player_profile_flag              <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1~
```

4.2 Summary of Numeric Variables

```r
num_summary <- nba_data %>%
  select(height_in, weight, season_exp, round_number,
         round_pick, draft_type, player_profile_flag, overall_pick) %>%
  select(where(is.numeric)) %>%
  pivot_longer(everything(), names_to = "variable", values_to = "value") %>%
  group_by(variable) %>%
  summarise(
    mean = mean(value, na.rm = TRUE),
    median = median(value, na.rm = TRUE),
    sd = sd(value, na.rm = TRUE),
    min = min(value, na.rm = TRUE),
    max = max(value, na.rm = TRUE),
    n_missing = sum(is.na(value)),
    .groups = 'drop'
  )

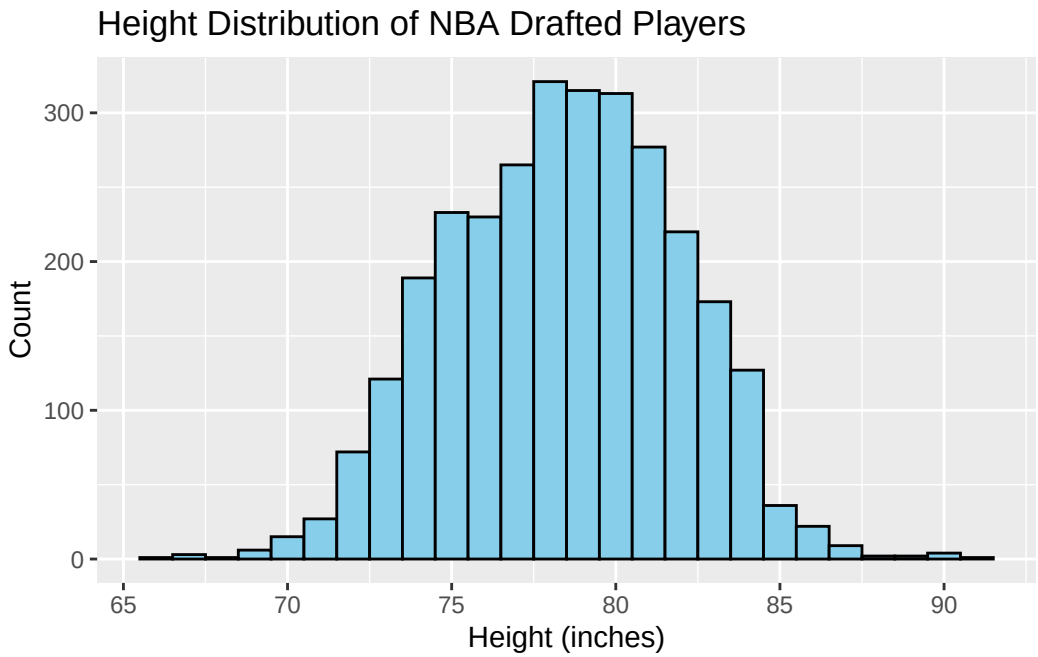
print(num_summary)
```

```
# A tibble: 7 x 7
  variable              mean median      sd   min   max n_missing
  <chr>                <dbl>  <dbl>   <dbl> <dbl> <dbl>     <int>
1 height_in            78.4      79  3.49      66    91         0
2 overall_pick         30.6      24 29.8        0   221         0
3 player_profile_flag   1.00      1  0.0183     0     1         0
4 round_number          2.06      2  1.92       0    20         0
5 round_pick           11.0       9  8.09       0    30         0
6 season_exp            5.98      4  4.70       0    22         0
7 weight              212.      210 26.4      133   325         0
```

5 Graphs

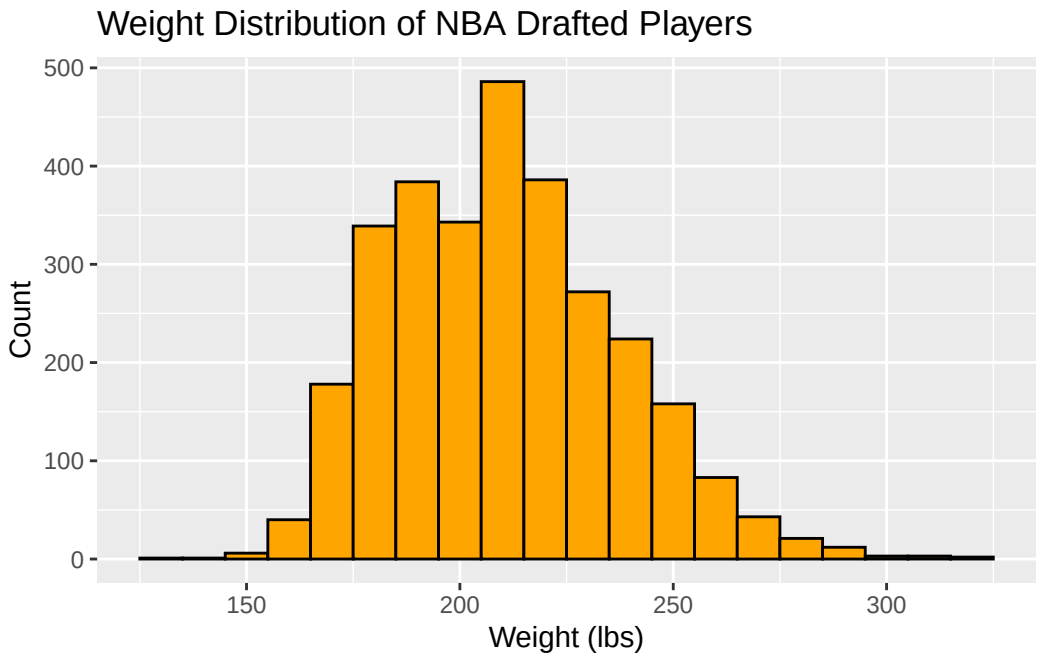
5.1 Height Distribution

```
ggplot(nba_data, aes(x = height_in)) +
  geom_histogram(binwidth = 1, fill = "skyblue", color = "black") +
  labs(
    title = "Height Distribution of NBA Drafted Players",
    x = "Height (inches)",
    y = "Count"
  )
```



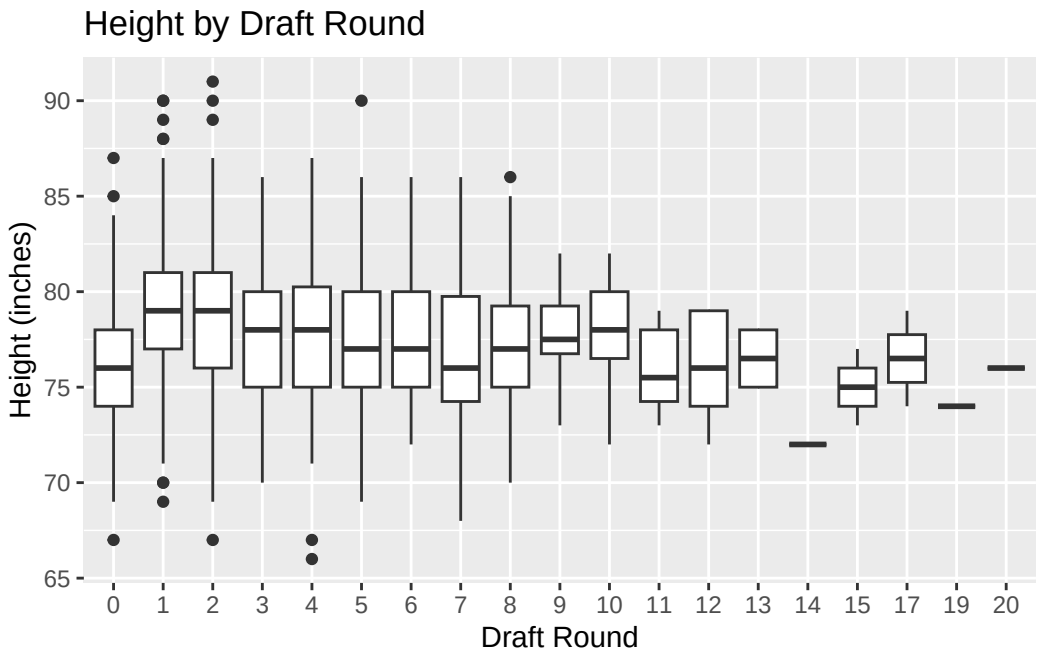
5.2 Weight Distribution

```
ggplot(nba_data, aes(x = weight)) +
  geom_histogram(binwidth = 10, fill = "orange", color = "black") +
  labs(
    title = "Weight Distribution of NBA Drafted Players",
    x = "Weight (lbs)",
    y = "Count"
  )
```



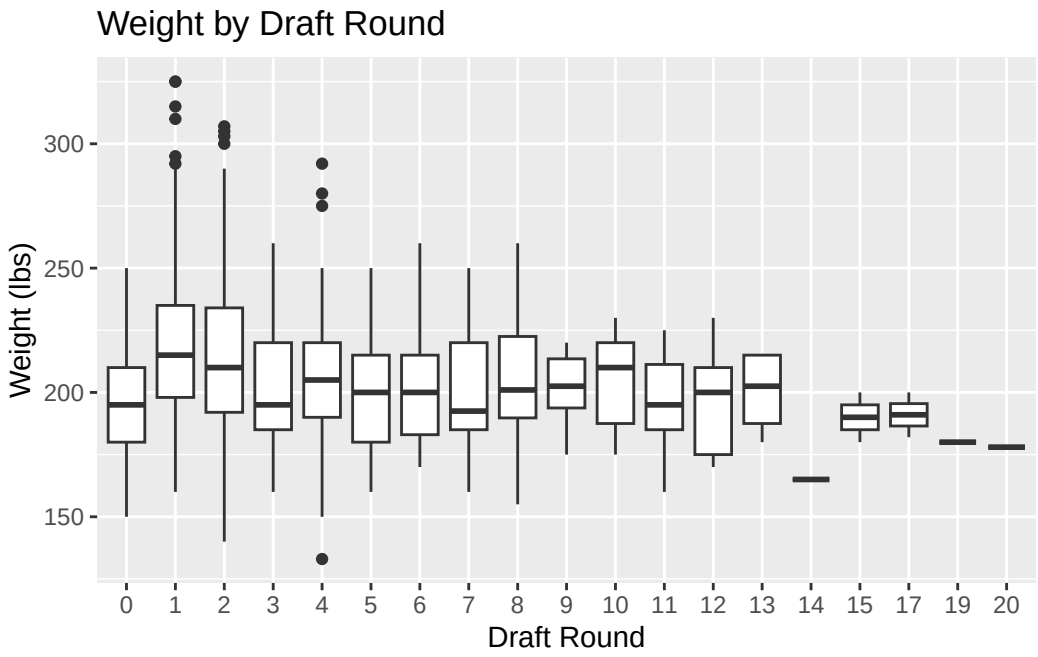
5.3 Draft Round vs Height

```
nba_data %>%
  ggplot(aes(x = factor(round_number), y = height_in)) +
  geom_boxplot() +
  labs(
    title = "Height by Draft Round",
    x = "Draft Round",
    y = "Height (inches)"
  )
```



5.4 Draft Round vs Weight

```
nba_data %>%
  ggplot(aes(x = factor(round_number), y = weight)) +
  geom_boxplot() +
  labs(
    title = "Weight by Draft Round",
    x = "Draft Round",
    y = "Weight (lbs)"
  )
```



6 Narrative Summary

Most NBA draft picks fall within the standard height and weight range. Generally, earlier rounds feature slightly taller and lighter players. Most players have heights around the mid-to-high 70 inches and weights between 180-240 lbs.

7 Conclusion

Draft outcomes show slight tendencies towards specific physical profiles, though clear gaps remain between players selected in different rounds.

8 Code Appendix

```
library(dplyr)
library(janitor)
library(ggplot2)
library(tidyr)
library(readr)
```

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library(stringr)

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player_clean <- player_info %>%
  mutate(
    feet = as.numeric(str_extract(height, "^[0-9]+")),
    inches = as.numeric(str_extract(height, "(?<=-)[0-9]+")),
    height_in = feet * 12 + replace_na(inches, 0),
    weight = as.numeric(str_extract(weight, "[0-9]+")),
    across(c(height_in, weight), ~replace_na(., median(., na.rm = TRUE))))


# Clean Draft History
draft_clean <- draft_history %>%
  mutate(across(c(overall_pick, round_number, round_pick), as.numeric))

# Merge two databases
nba_data <- inner_join(player_clean, draft_clean, by = "person_id")
glimpse(nba_data)
num_summary <- nba_data %>%
  select(height_in, weight, season_exp, round_number,
         round_pick, draft_type, player_profile_flag, overall_pick) %>%
  select(where(is.numeric)) %>%
  pivot_longer(everything(), names_to = "variable", values_to = "value") %>%
  group_by(variable) %>%
  summarise(
    mean = mean(value, na.rm = TRUE),
    median = median(value, na.rm = TRUE),
    sd = sd(value, na.rm = TRUE),
    min = min(value, na.rm = TRUE),
    max = max(value, na.rm = TRUE),
    n_missing = sum(is.na(value)),
    .groups = 'drop'
  )

print(num_summary)
```

```r
ggplot(nba_data, aes(x = height_in)) +
  geom_histogram(binwidth = 1, fill = "skyblue", color = "black") +
  labs(
    title = "Height Distribution of NBA Drafted Players",
    x = "Height (inches)",
    y = "Count"
  )
ggplot(nba_data, aes(x = weight)) +
  geom_histogram(binwidth = 10, fill = "orange", color = "black") +
  labs(
    title = "Weight Distribution of NBA Drafted Players",
    x = "Weight (lbs)",
    y = "Count"
  )
nba_data %>%
  ggplot(aes(x = factor(round_number), y = height_in)) +
  geom_boxplot() +
  labs(
    title = "Height by Draft Round",
    x = "Draft Round",
    y = "Height (inches)"
  )
nba_data %>%
  ggplot(aes(x = factor(round_number), y = weight)) +
  geom_boxplot() +
  labs(
    title = "Weight by Draft Round",
    x = "Draft Round",
    y = "Weight (lbs)"
  )
```

9 References

- O'Walsh, W. (2025). *Basketball Data* [Data set]. Kaggle.
- NBA. (n.d.). *Official Player Stats*. NBA.com.