

# Fitness Data Analysis

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## Scenario

You are a junior data analyst working on the marketing analyst team at Bellabeat, a high-tech manufacturer of health-focused products for women. Bellabeat is a successful small company, but they have the potential to become a larger player in the

global smart device market. Urška Sršen, cofounder and Chief Creative Officer of Bellabeat, believes that analyzing smart device fitness data could help unlock new growth opportunities for the company. You have been asked to focus on one of Bellabeat's products and analyze smart device data to gain insight into how consumers are using their smart devices. The insights you discover will then help guide marketing strategy for the company. You will present your analysis to the Bellabeat executive team along with your high-level recommendations for Bellabeat's marketing strategy.

## Characters and products

### • Characters

- Urška Sršen: Bellabeat's cofounder and Chief Creative Officer
- Sando Mur: Mathematician and Bellabeat's cofounder; key member of the Bellabeat executive team
- Bellabeat marketing analytics team: A team of data analysts responsible for collecting, analyzing, and reporting data that helps guide Bellabeat's marketing strategy. You joined this team six months ago and have been busy learning about Bellabeat's mission and business goals — as well as how you, as a junior data analyst, can help Bellabeat achieve them.

### • Products

- Bellabeat app: The Bellabeat app provides users with health data related to their activity, sleep, stress, menstrual cycle, and mindfulness habits. This data can help users better understand their current habits and make healthy decisions. The Bellabeat app connects to their line of smart wellness products.
- Leaf: Bellabeat's classic wellness tracker can be worn as a bracelet, necklace, or clip. The Leaf tracker connects to the Bellabeat app to track activity, sleep, and stress.

- Time: This wellness watch combines the timeless look of a classic timepiece with smart technology to track user activity, sleep, and stress. The Time watch connects to the Bellabeat app to provide you with insights into your daily wellness.
- Spring: This is a water bottle that tracks daily water intake using smart technology to ensure that you are appropriately hydrated throughout the day. The Spring bottle connects to the Bellabeat app to track your hydration levels.
- Bellabeat membership: Bellabeat also offers a subscription-based membership program for users. Membership gives users 24/7 access to fully personalized guidance on nutrition, activity, sleep, health and beauty, and mindfulness based on their lifestyle and goals.

## About the company

Urška Sršen and Sando Mur founded Bellabeat, a high-tech company that manufactures health-focused smart products. Sršen used her background as an artist to develop beautifully designed technology that informs and inspires women around the world. Collecting data on activity, sleep, stress, and reproductive health has allowed Bellabeat to empower women with knowledge about their own health and habits. Since it was founded in 2013, Bellabeat has grown rapidly and quickly positioned itself as a tech-driven wellness company for women.

By 2016, Bellabeat had opened offices around the world and launched multiple products. Bellabeat products became available through a growing number of online retailers in addition to their own e-commerce channel on their website. The company has invested in traditional advertising media, such as radio, out-of-home billboards, print, and television, but focuses on digital marketing extensively. Bellabeat invests year-round in Google Search, maintaining active Facebook and Instagram pages, and consistently engages consumers on Twitter. Additionally, Bellabeat runs video ads on Youtube and display ads on the Google Display Network to support campaigns around key marketing dates.

Sršen knows that an analysis of Bellabeat's available consumer data would reveal more opportunities for growth. She has asked the marketing analytics team to focus on a Bellabeat product and analyze smart device usage data in order to gain insight into how people are already using their smart devices. Then, using this information, she would like high-level recommendations for how these trends can inform Bellabeat marketing strategy.

## Ask

Sršen asks you to analyze smart device usage data in order to gain insight into how consumers use non-Bellabeat smart devices. She then wants you to select one Bellabeat product to apply these insights to in your presentation. These questions will guide your analysis:

1. What are some trends in smart device usage?
2. How could these trends apply to Bellabeat customers?
3. How could these trends help influence Bellabeat marketing strategy?

## Analysis

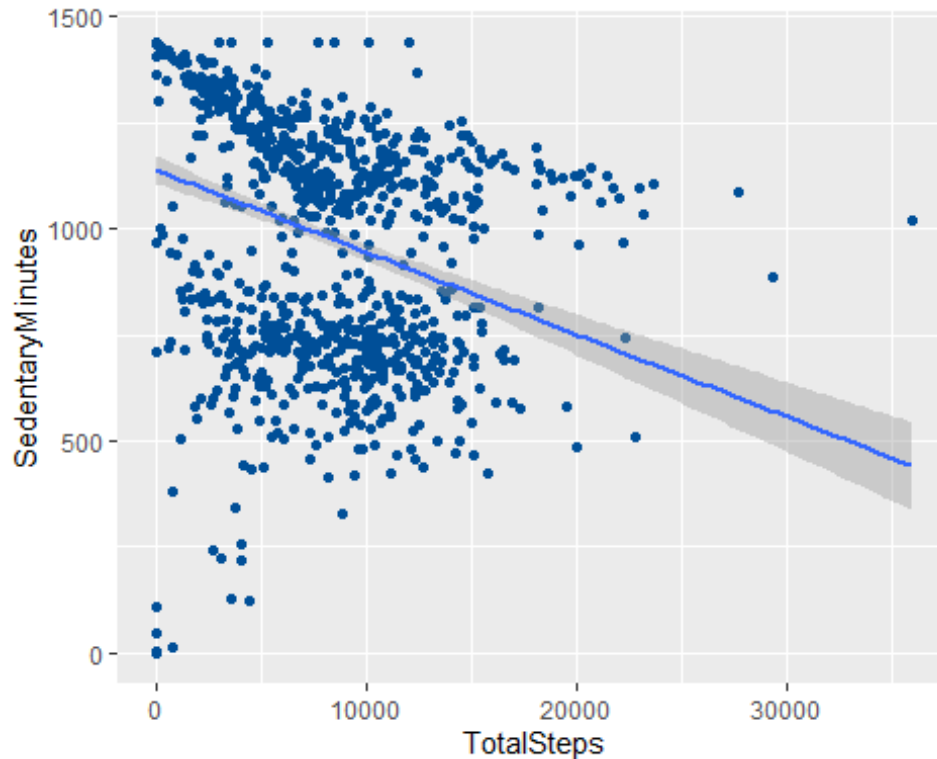
First, we will install and load some important packages.

Reading all the necessary csv files into program

```
daily_activity <- read_csv('Data/dailyActivity_merged.csv')  
weight_log <- read_csv('Data/weightLogInfo_merged.csv')  
sleep_day <- read_csv('Data/sleepDay_merged.csv')
```

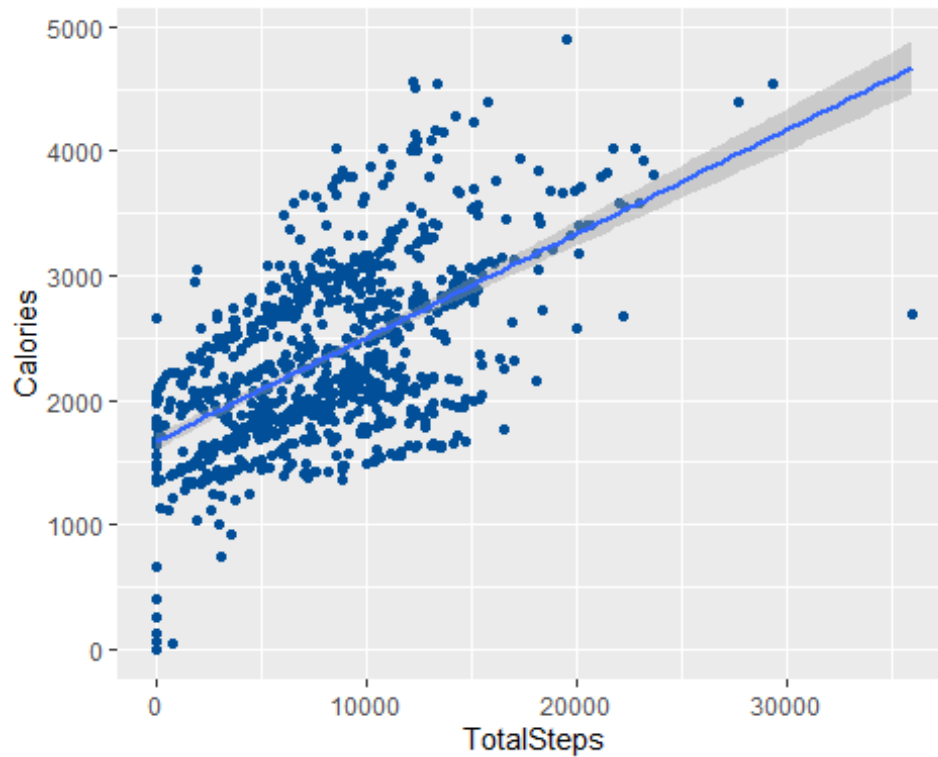
### Correlation between exercise and sedentary

Data shows a clear trend between Total steps and sedentary minutes. It suggests that people who exercise more spend less time in sedentary as opposed to people who exercise less.



### Correlation between exercise and calories burned

Data also proves that more exercise leads to more calories burned.



### Correlation between exercise and weight

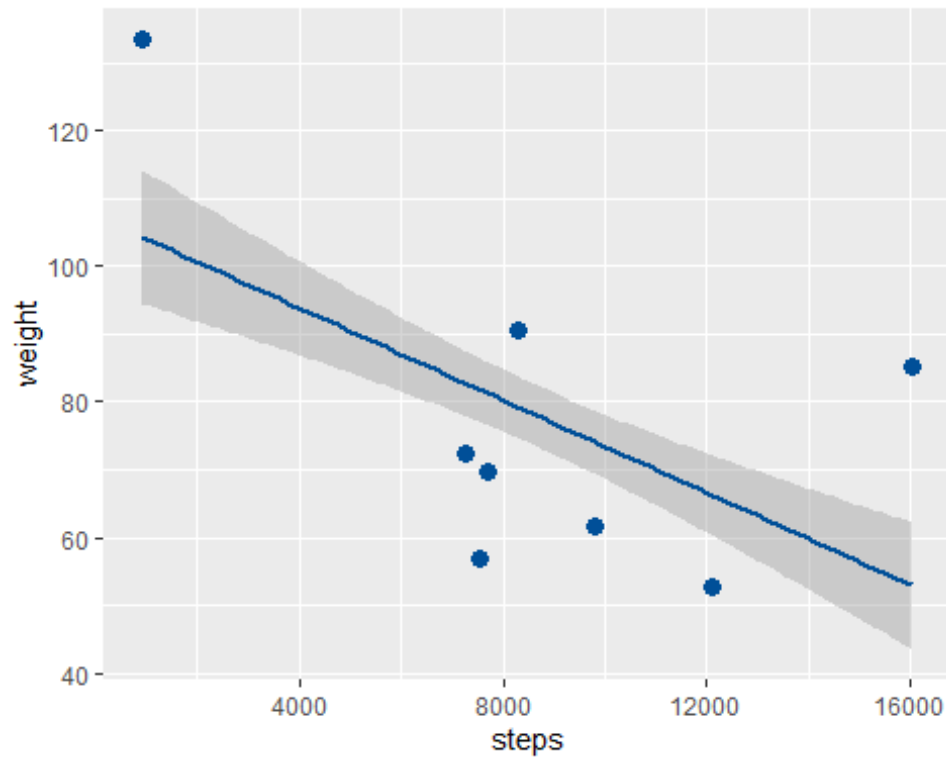
Grouping and summarizing the data.

```
steps_vs_weight <- merge(daily_activity, weight_log) %>%
  group_by(Id) %>%
  summarize(steps = mean(TotalSteps), weight = mean(WeightKg))
```

```
steps_vs_weight
```

```
## # A tibble: 8 × 3
##       Id  steps weight
##   <dbl> <dbl> <dbl>
## 1 1503960366 12117.   52.6
## 2 1927972279   916.   134.
## 3 2873212765  7556.    57
## 4 4319703577  7269.   72.4
## 5 4558609924  7685.   69.6
## 6 5577150313  8304.   90.7
## 7 6962181067  9795.   61.6
## 8 8877689391 16040.   85.1
```

There is a clear downwards trend between weight and steps. This suggests that people who exercise more tend to have less weight.



### Correlation between very active people and sleep (No Relation found)

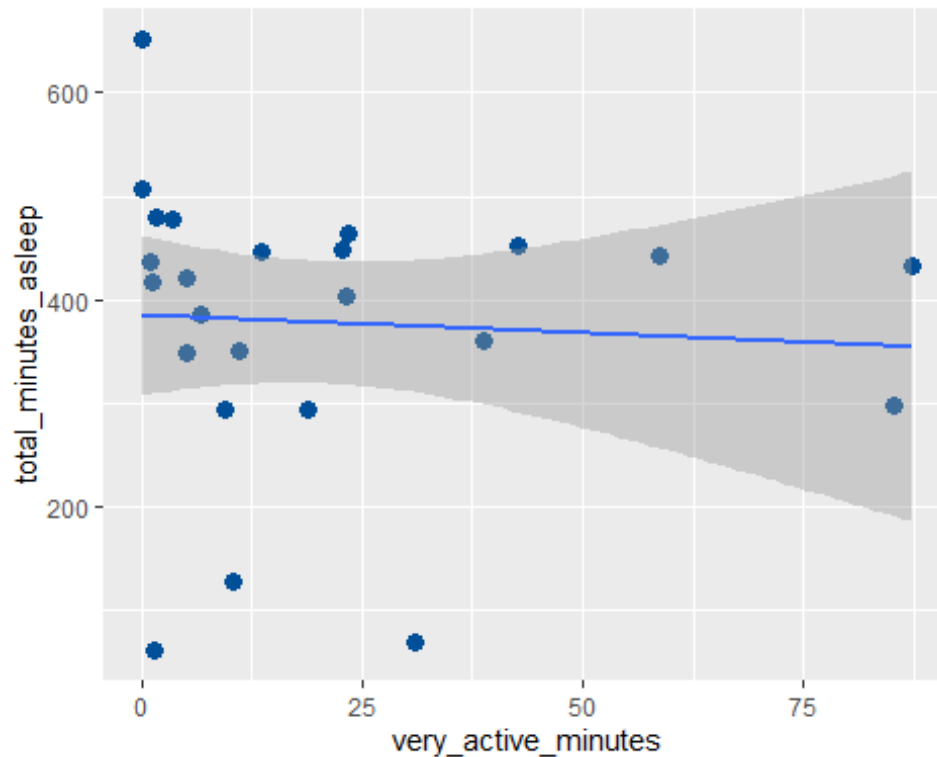
Grouping and summarizing the data

```
activity_vs_sleep <- merge(daily_activity, sleep_day) %>%
  select(Id, VeryActiveMinutes, TotalMinutesAsleep) %>%
  group_by(Id) %>%
  summarize(very_active_minutes = mean(VeryActiveMinutes),
total_minutes_asleep = mean(TotalMinutesAsleep))
```

activity\_vs\_sleep

```
## # A tibble: 24 × 3
##       Id very_active_minutes total_minutes_asleep
##   <dbl>         <dbl>             <dbl>
## 1 1503960366         38.7               360.
## 2 1644430081          9.57              294
## 3 1844505072          0.129             652
## 4 1927972279          1.32              417
## 5 2026352035          0.0968             506.
## 6 2320127002          1.35               61
## 7 2347167796         13.5              447.
## 8 3977333714         18.9              294.
## 9 4020332650          5.19              349.
## 10 4319703577         3.58              477.
## # ... with 14 more rows
```

The plot suggests that sleep is not effected by being active in the day.

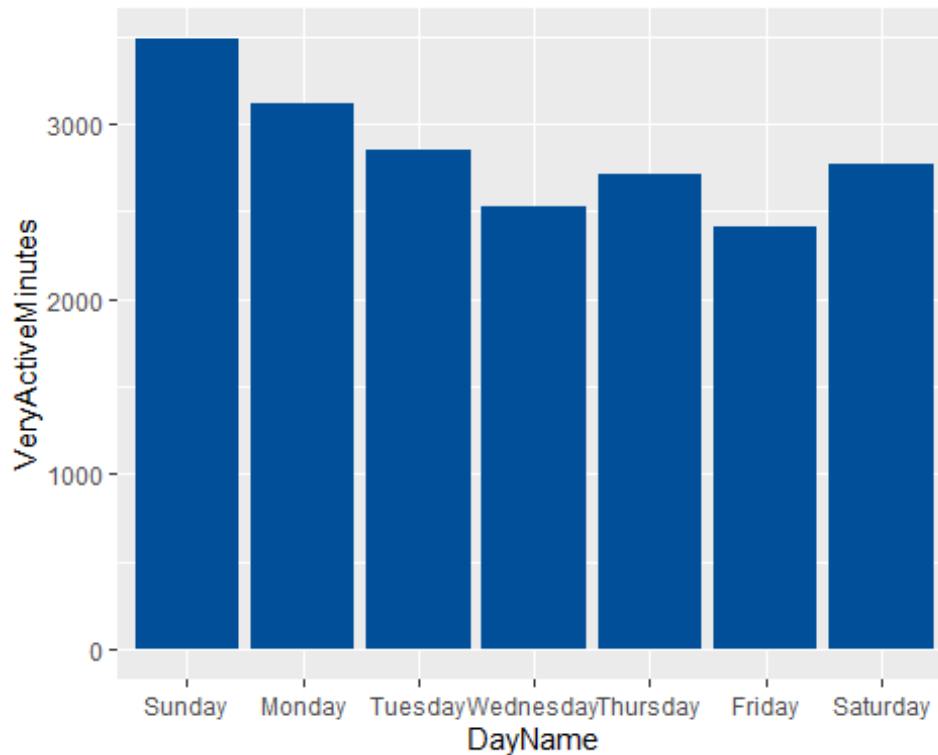


### Correlation between VeryActiveMinutes vs day of the week

Making a dayname column in daily\_activity dataframe. Since ActivityDate is char datatype, first i will convert it into date.

```
daily_activity$ActivityDate <-  
as.Date(daily_activity$ActivityDate, "%m/%d/%y")  
daily_activity$dayname <- weekdays(daily_activity$ActivityDate)
```

There is a clear downwards trend between being very active and day of the week. This may be due to high motivation levels at the start of the week which gradually go down as the week progresses.



### How many people are overweight? (using BMI)

Creating a new dataframe for 8 people who submitted their weight information

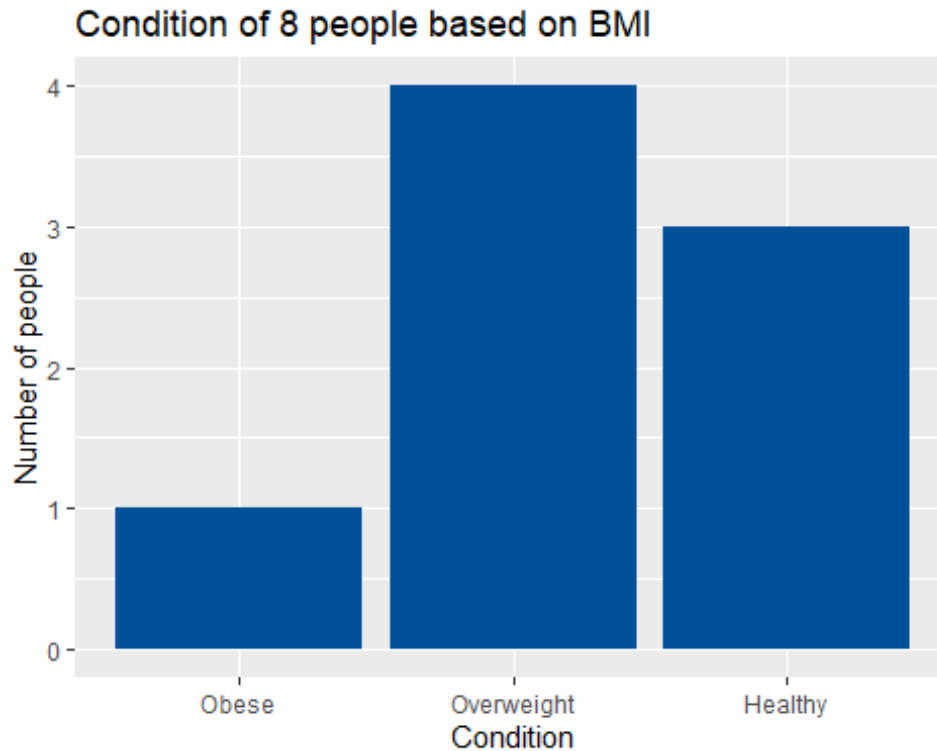
```
BMI <- weight_log %>%
  group_by(Id) %>%
  summarise(mean_BMI = mean(BMI, na.rm = TRUE))
```

Creating a column for their health condition based on BMI (Body Mass Index).

**Note: BMI less than 25 is healthy. BMI between 25-25.9 is overweight and greater than 30 is obese**

```
BMI <- BMI %>% mutate(case_when(
  mean_BMI < 25 ~ "Healthy",
  mean_BMI >= 25 & mean_BMI < 30 ~ "Overweight",
  mean_BMI > 30 ~ "Obese"
))
colnames(BMI)[3] <- "health_condition"
```

Out of the 8 people only 3 are Healthy, 4 are overweight and only 1 is obese.



### Answering the business question

1. What are some trends in smart device usage?
2. How could these trends apply to Bellabeat customers?(I believe that displaying the trends would already indicate how Bellabeat customers would follow suit.)

Based on insights generated by my analysis, i came to following hypothesis:

1. People spend more time engaged in physical activity on Sundays, which proceeds to decrease throughout the week and rise again on weekends. This may be due to motivation levels being higher on the weekend and then as the week progresses, motivation levels decrease as work load increases.

Now the Final Question.

3. How could these trends help influence Bellabeat marketing strategy?

1. Bellabeat could host events limited to Bellabeat's members which reward users who engage in a healthy lifestyle(I.E 8 hours of sleep,8k steps a day, less than 7 hours sedentary etc.) with credits. With enough credits, users could then use credits to purchase Bellabeat's products that help supplement a healthy lifestyle.
2. Bellabeat could partner with brands (IE wellness, sports, health) to reward users who consistently engage in a healthy lifestyle with coupons/store discounts.



3. With the 2 previous points combined, Bellabeat could select previously unhealthy individuals (who are now healthy), interview them and publish motivational videos as to how Bellabeat encouraged them to have a change in lifestyle.

**Thank You!**