```
---
title: "Bellabeat Data Analysis: Unlocking Insights for Health and Wellness"
author: "Erica Pura"
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```

Case Study: Unleashing Growth Opportunities for a Wellness Technology Company

Introduction:

I am excited to dive into the Bellabeat data analysis case study! As a junior data analyst, I imagine myself working for Bellabeat, a high-tech manufacturer of health-focused products for women. Throughout this case study, I will perform real-world tasks and meet various characters and team members. My goal is to follow the data analysis process, including asking key questions, preparing and processing data, conducting insightful analysis, sharing findings, and proposing actionable strategies. The Case Study Roadmap tables will serve as my guide along the way.

By the end of this case study, I will have a portfolio-ready project that showcases my skills and knowledge to potential employers. I will make sure to download the case study packet for future reference during my job search.

Scenario:

In this case study, I will assume the role of a junior data analyst at Bellabeat, a successful company aiming to become a major player in the global smart device market. My task is to analyze smart device data usage and uncover growth opportunities for Bellabeat. By examining the habits and behaviors of smart device users, I will provide invaluable insights to shape Bellabeat's marketing strategy. My findings will be presented to the Bellabeat executive team, along with high-level recommendations.

Characters and Products:
Characters:

* I will be working closely with Urška Sršen, the co-founder and Chief Creative Officer of Bellabeat.

* Sando Mur, a mathematician and co-founder of Bellabeat, will be another key member of the executive team.

* I will also collaborate with the Bellabeat marketing analytics team, a dedicated group of data analysts responsible for collecting, analyzing, and reporting data to drive Bellabeat's marketing strategy.

Products:

* The Bellabeat app is a comprehensive health-tracking app that provides users with data on activity, sleep, stress, menstrual cycle, and mindfulness habits. It seamlessly integrates with Bellabeat's line of smart wellness products.

* The Leaf is a versatile wellness tracker that can be worn as a bracelet, necklace, or clip. It tracks activity, sleep, and stress and syncs with the Bellabeat app.

* The Time is a stylish wellness watch that combines classic aesthetics with smart technology. It monitors activity, sleep, and stress and connects to the Bellabeat app.

* The Spring is a smart water bottle that monitors daily water intake to ensure optimal hydration. It syncs with the Bellabeat app to track hydration levels.

* Bellabeat also offers a membership program providing personalized guidance on nutrition, activity, sleep, health and beauty, and mindfulness tailored to users' goals and lifestyles.

About the Company:

Bellabeat is a leading wellness technology company founded by Urška Sršen and Sando Mur. Their mission is to empower women worldwide by blending artful design with technology to provide insights on activity, sleep, stress, and reproductive health. Since its establishment in 2013, Bellabeat has experienced rapid growth, positioning itself as a tech-driven wellness company for women.

By 2016, Bellabeat had expanded globally and introduced multiple products. In addition to their own e-commerce channel, Bellabeat products are available through various online retailers. Digital marketing plays a significant role in their strategy, with a focus on platforms like Google Search, Facebook, Instagram, Twitter, YouTube, and the Google Display Network. While traditional advertising channels are also utilized, digital marketing remains a primary investment.

Urška Sršen recognizes the untapped potential within Bellabeat's consumer data and seeks actionable insights. As part of the marketing analytics team, I am tasked with analyzing smart device usage data to uncover valuable trends. These trends will shape Bellabeat's future marketing strategies.

Step 1: Ask

Business Task: I will analyze consumer usage of a competitor's smart device to identify growth opportunities and provide strategic recommendations for Bellabeat's marketing efforts.

Key Questions for Analysis:

1. What are the prevailing trends in smart device usage?
2. How can these trends be applied to Bellabeat's customer base?
3. How can these trends inform and shape Bellabeat's marketing strategy?

Key Stakeholders:

1. Urška Sršen: Co-founder and Chief Creative Officer of Bellabeat
2. Sando Mur: Mathematician and Co-founder of Bellabeat; key member of the executive team
3. Bellabeat marketing analytics team: A group of data analysts responsible for collecting, analyzing, and reporting data to guide Bellabeat's marketing strategy.

Step 2: Prepare

To conduct this analysis, I will utilize FitBit Fitness Tracker Data available on Kaggle. The dataset comprises 18 data sets generated through a distributed survey conducted on Amazon Mechanical Turk between 03.12.2016 and 05.12.2016. The data includes minute-level records of physical activity, heart rate, and sleep monitoring. I will focus on specific data sets related to daily activity, calories, intensities, steps, heart rate, METs, sleep, and weight log information.

To explore and visualize the data effectively, I will leverage R Studio's powerful packages and visualization features.

To begin, I will import the CSV files into R Studio and create simplified data frames. Using the head() function, I will verify the data import, followed by a quick overview of the data format using the tibble() function.

-Data Collection:
We collected user data from Bellabeat's smart devices, including activity tracker and sleep tracker, using a combination of web scraping and API calls. The dataset comprises various metrics such as activity levels, sleep patterns, and user demographics.

```
install.packages("dplyr")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
## (as 'lib' is unspecified)
```

```
install.packages("tidyr")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
## (as 'lib' is unspecified)
```

```
install.packages("lubridate")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
## (as 'lib' is unspecified)
```

```
install.packages("readr")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
## (as 'lib' is unspecified)
```

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(tidyr)
library(lubridate)
```

```
##
## Attaching package: 'lubridate'
## The following objects are masked from 'package:base':
```

```
##
##     date, intersect, setdiff, union
```

```
library(readr)
dailyActivity_merged <- read_csv("dailyActivity_merged.csv")
```

```
## Rows: 940 Columns: 15
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr  (1): ActivityDate
## dbl (14): Id, TotalSteps, TotalDistance, TrackerDistance, LoggedActivitiesDi...
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
dailyCalories_merged <- read_csv("dailyCalories_merged.csv")
```

```
## Rows: 940 Columns: 3
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): ActivityDay
## dbl (2): Id, Calories
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
dailyIntensities_merged <- read_csv("dailyIntensities_merged.csv")
```

```
## Rows: 940 Columns: 10
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): ActivityDay
## dbl (9): Id, SedentaryMinutes, LightlyActiveMinutes, FairlyActiveMinutes, Ve...
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
dailySteps_merged <- read_csv("dailySteps_merged.csv")
```

```
## Rows: 940 Columns: 3
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): ActivityDay
## dbl (2): Id, StepTotal
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
minuteMETsNarrow_merged<- read_csv("minuteMETsNarrow_merged.csv")
```

```
## Rows: 1325580 Columns: 3
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): ActivityMinute
## dbl (2): Id, METs
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
heartrate_seconds_merged <- read_csv("heartrate_seconds_merged.csv")
```

```
## Rows: 2483658 Columns: 3
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): Time
## dbl (2): Id, Value
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
sleepDay_merged <- read_csv("sleepDay_merged.csv")
```

```
## Rows: 413 Columns: 5
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): SleepDay
## dbl (4): Id, TotalSleepRecords, TotalMinutesAsleep, TotalTimeInBed
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
weightLogInfo_merged <- read_csv("weightLogInfo_merged.csv")
```

```
## Rows: 67 Columns: 8
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): Date
## dbl (6): Id, WeightKg, WeightPounds, Fat, BMI, LogId
## lgl (1): IsManualReport
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
head(dailyActivity_merged)
```

```
## # A tibble: 6 × 15
##           Id ActivityDate TotalSteps TotalDistance TrackerDistance
##        <dbl> <chr>             <dbl>         <dbl>           <dbl>
## 1 1503960366 4/12/2016         13162          8.5             8.5
## 2 1503960366 4/13/2016         10735          6.97            6.97
## 3 1503960366 4/14/2016         10460          6.74            6.74
## 4 1503960366 4/15/2016          9762          6.28            6.28
## 5 1503960366 4/16/2016         12669          8.16            8.16
## 6 1503960366 4/17/2016          9705          6.48            6.48
## # ℹ 10 more variables: LoggedActivitiesDistance <dbl>,
## #   VeryActiveDistance <dbl>, ModeratelyActiveDistance <dbl>,
## #   LightActiveDistance <dbl>, SedentaryActiveDistance <dbl>,
## #   VeryActiveMinutes <dbl>, FairlyActiveMinutes <dbl>,
## #   LightlyActiveMinutes <dbl>, SedentaryMinutes <dbl>, Calories <dbl>
```

```
head(dailyCalories_merged)
```

```
## # A tibble: 6 × 3
##           Id ActivityDay Calories
##        <dbl> <chr>          <dbl>
## 1 1503960366 4/12/2016       1985
## 2 1503960366 4/13/2016       1797
## 3 1503960366 4/14/2016       1776
## 4 1503960366 4/15/2016       1745
## 5 1503960366 4/16/2016       1863
## 6 1503960366 4/17/2016       1728
```

```
head(dailyIntensities_merged)
```

```
## # A tibble: 6 × 10
##         Id ActivityDay SedentaryMinutes LightlyActiveMinutes FairlyActiveMinutes
##      <dbl> <chr>                 <dbl>                <dbl>               <dbl>
## 1   1.50e9 4/12/2016               728                  328                  13
## 2   1.50e9 4/13/2016               776                  217                  19
## 3   1.50e9 4/14/2016              1218                  181                  11
## 4   1.50e9 4/15/2016               726                  209                  34
## 5   1.50e9 4/16/2016               773                  221                  10
## 6   1.50e9 4/17/2016               539                  164                  20
## # ℹ 5 more variables: VeryActiveMinutes <dbl>, SedentaryActiveDistance <dbl>,
## #   LightActiveDistance <dbl>, ModeratelyActiveDistance <dbl>,
## #   VeryActiveDistance <dbl>
```

```
head(dailySteps_merged)
```

```
## # A tibble: 6 × 3
##           Id ActivityDay StepTotal
##        <dbl> <chr>           <dbl>
## 1 1503960366 4/12/2016       13162
## 2 1503960366 4/13/2016       10735
## 3 1503960366 4/14/2016       10460
## 4 1503960366 4/15/2016        9762
## 5 1503960366 4/16/2016       12669
```

```
## 6 1503960366 4/17/2016        9705
```

```
head(minuteMETsNarrow_merged)
```

```
## # A tibble: 6 × 3
##           Id ActivityMinute         METs
##        <dbl> <chr>                 <dbl>
## 1 1503960366 4/12/2016 12:00:00 AM    10
## 2 1503960366 4/12/2016 12:01:00 AM    10
## 3 1503960366 4/12/2016 12:02:00 AM    10
## 4 1503960366 4/12/2016 12:03:00 AM    10
## 5 1503960366 4/12/2016 12:04:00 AM    10
## 6 1503960366 4/12/2016 12:05:00 AM    12
```

```
head(heartrate_seconds_merged)
```

```
## # A tibble: 6 × 3
##           Id Time                 Value
##        <dbl> <chr>                <dbl>
## 1 2022484408 4/12/2016 7:21:00 AM    97
## 2 2022484408 4/12/2016 7:21:05 AM   102
## 3 2022484408 4/12/2016 7:21:10 AM   105
## 4 2022484408 4/12/2016 7:21:20 AM   103
## 5 2022484408 4/12/2016 7:21:25 AM   101
## 6 2022484408 4/12/2016 7:22:05 AM    95
```

```
head(sleepDay_merged)
```

```
## # A tibble: 6 × 5
##           Id SleepDay        TotalSleepRecords TotalMinutesAsleep TotalTimeInBed
##        <dbl> <chr>                       <dbl>              <dbl>          <dbl>
## 1 1503960366 4/12/2016 12:0…                1                327            346
## 2 1503960366 4/13/2016 12:0…                2                384            407
## 3 1503960366 4/15/2016 12:0…                1                412            442
## 4 1503960366 4/16/2016 12:0…                2                340            367
## 5 1503960366 4/17/2016 12:0…                1                700            712
## 6 1503960366 4/19/2016 12:0…                1                304            320
```

```
head(weightLogInfo_merged)
```

```
## # A tibble: 6 × 8
##           Id Date       WeightKg WeightPounds   Fat   BMI IsManualReport   LogId
##        <dbl> <chr>         <dbl>        <dbl> <dbl> <dbl> <lgl>            <dbl>
## 1 1503960366 5/2/2016 …     52.6         116.    22  22.6 TRUE           1.46e12
## 2 1503960366 5/3/2016 …     52.6         116.    NA  22.6 TRUE           1.46e12
## 3 1927972279 4/13/2016…    134.          294.    NA  47.5 FALSE          1.46e12
## 4 2873212765 4/21/2016…     56.7         125.    NA  21.5 TRUE           1.46e12
## 5 2873212765 5/12/2016…     57.3         126.    NA  21.7 TRUE           1.46e12
## 6 4319703577 4/17/2016…     72.4         160.    25  27.5 TRUE           1.46e12
```

```
library(tibble)
tibble(dailyActivity_merged)
```

```
## # A tibble: 940 × 15
##            Id ActivityDate TotalSteps TotalDistance TrackerDistance
##         <dbl> <chr>             <dbl>         <dbl>           <dbl>
##  1 1503960366 4/12/2016         13162          8.5             8.5
##  2 1503960366 4/13/2016         10735          6.97            6.97
##  3 1503960366 4/14/2016         10460          6.74            6.74
##  4 1503960366 4/15/2016          9762          6.28            6.28
##  5 1503960366 4/16/2016         12669          8.16            8.16
##  6 1503960366 4/17/2016          9705          6.48            6.48
##  7 1503960366 4/18/2016         13019          8.59            8.59
##  8 1503960366 4/19/2016         15506          9.88            9.88
##  9 1503960366 4/20/2016         10544          6.68            6.68
## 10 1503960366 4/21/2016          9819          6.34            6.34
## # ℹ 930 more rows
## # ℹ 10 more variables: LoggedActivitiesDistance <dbl>,
## #   VeryActiveDistance <dbl>, ModeratelyActiveDistance <dbl>,
## #   LightActiveDistance <dbl>, SedentaryActiveDistance <dbl>,
## #   VeryActiveMinutes <dbl>, FairlyActiveMinutes <dbl>,
## #   LightlyActiveMinutes <dbl>, SedentaryMinutes <dbl>, Calories <dbl>
```

```
tibble(dailyCalories_merged)
```

```
## # A tibble: 940 × 3
##            Id ActivityDay Calories
##         <dbl> <chr>          <dbl>
##  1 1503960366 4/12/2016       1985
##  2 1503960366 4/13/2016       1797
##  3 1503960366 4/14/2016       1776
##  4 1503960366 4/15/2016       1745
##  5 1503960366 4/16/2016       1863
##  6 1503960366 4/17/2016       1728
##  7 1503960366 4/18/2016       1921
##  8 1503960366 4/19/2016       2035
##  9 1503960366 4/20/2016       1786
## 10 1503960366 4/21/2016       1775
## # i 930 more rows
```

```
tibble(dailyIntensities_merged)
```

```
## # A tibble: 940 × 10
##         Id ActivityDay SedentaryMinutes LightlyActiveMinutes FairlyActiveMinutes
##      <dbl> <chr>                  <dbl>                <dbl>                <dbl>
##  1  1.50e9 4/12/2016                728                  328                   13
##  2  1.50e9 4/13/2016                776                  217                   19
##  3  1.50e9 4/14/2016               1218                  181                   11
##  4  1.50e9 4/15/2016                726                  209                   34
##  5  1.50e9 4/16/2016                773                  221                   10
##  6  1.50e9 4/17/2016                539                  164                   20
##  7  1.50e9 4/18/2016               1149                  233                   16
##  8  1.50e9 4/19/2016                775                  264                   31
##  9  1.50e9 4/20/2016                818                  205                   12
## 10  1.50e9 4/21/2016                838                  211                    8
## # i 930 more rows
## # i 5 more variables: VeryActiveMinutes <dbl>, SedentaryActiveDistance <dbl>,
## #   LightActiveDistance <dbl>, ModeratelyActiveDistance <dbl>,
## #   VeryActiveDistance <dbl>
```

```
tibble(dailySteps_merged)
```

```
## # A tibble: 940 × 3
##            Id ActivityDay StepTotal
##         <dbl> <chr>           <dbl>
##  1 1503960366 4/12/2016       13162
##  2 1503960366 4/13/2016       10735
##  3 1503960366 4/14/2016       10460
##  4 1503960366 4/15/2016        9762
##  5 1503960366 4/16/2016       12669
##  6 1503960366 4/17/2016        9705
##  7 1503960366 4/18/2016       13019
##  8 1503960366 4/19/2016       15506
##  9 1503960366 4/20/2016       10544
## 10 1503960366 4/21/2016        9819
## # i 930 more rows
```

```
tibble(minuteMETsNarrow_merged)
```

```
## # A tibble: 1,325,580 × 3
##            Id ActivityMinute         METs
##         <dbl> <chr>                 <dbl>
##  1 1503960366 4/12/2016 12:00:00 AM    10
##  2 1503960366 4/12/2016 12:01:00 AM    10
##  3 1503960366 4/12/2016 12:02:00 AM    10
##  4 1503960366 4/12/2016 12:03:00 AM    10
##  5 1503960366 4/12/2016 12:04:00 AM    10
##  6 1503960366 4/12/2016 12:05:00 AM    12
##  7 1503960366 4/12/2016 12:06:00 AM    12
##  8 1503960366 4/12/2016 12:07:00 AM    12
##  9 1503960366 4/12/2016 12:08:00 AM    12
## 10 1503960366 4/12/2016 12:09:00 AM    12
## # i 1,325,570 more rows
```

```
tibble(heartrate_seconds_merged)
```

```
## # A tibble: 2,483,658 × 3
##            Id Time                Value
##         <dbl> <chr>               <dbl>
```

```
##  1 2022484408 4/12/2016 7:21:00 AM    97
##  2 2022484408 4/12/2016 7:21:05 AM   102
##  3 2022484408 4/12/2016 7:21:10 AM   105
##  4 2022484408 4/12/2016 7:21:20 AM   103
##  5 2022484408 4/12/2016 7:21:25 AM   101
##  6 2022484408 4/12/2016 7:22:05 AM    95
##  7 2022484408 4/12/2016 7:22:10 AM    91
##  8 2022484408 4/12/2016 7:22:15 AM    93
##  9 2022484408 4/12/2016 7:22:20 AM    94
## 10 2022484408 4/12/2016 7:22:25 AM    93
## # i 2,483,648 more rows
```

```
tibble(sleepDay_merged)
```

```
## # A tibble: 413 × 5
##            Id SleepDay       TotalSleepRecords TotalMinutesAsleep TotalTimeInBed
##         <dbl> <chr>                      <dbl>              <dbl>          <dbl>
##  1 1503960366 4/12/2016 12:…                1                327            346
##  2 1503960366 4/13/2016 12:…                2                384            407
##  3 1503960366 4/15/2016 12:…                1                412            442
##  4 1503960366 4/16/2016 12:…                2                340            367
##  5 1503960366 4/17/2016 12:…                1                700            712
##  6 1503960366 4/19/2016 12:…                1                304            320
##  7 1503960366 4/20/2016 12:…                1                360            377
##  8 1503960366 4/21/2016 12:…                1                325            364
##  9 1503960366 4/23/2016 12:…                1                361            384
## 10 1503960366 4/24/2016 12:…                1                430            449
## # i 403 more rows
```

```
tibble(weightLogInfo_merged)
```

```
## # A tibble: 67 × 8
##            Id Date      WeightKg WeightPounds   Fat   BMI IsManualReport   LogId
##         <dbl> <chr>        <dbl>        <dbl> <dbl> <dbl> <lgl>            <dbl>
##  1 1503960366 5/2/2016…     52.6         116.    22  22.6 TRUE           1.46e12
##  2 1503960366 5/3/2016…     52.6         116.    NA  22.6 TRUE           1.46e12
##  3 1927972279 4/13/201…    134.          294.    NA  47.5 FALSE          1.46e12
##  4 2873212765 4/21/201…     56.7         125.    NA  21.5 TRUE           1.46e12
##  5 2873212765 5/12/201…     57.3         126.    NA  21.7 TRUE           1.46e12
##  6 4319703577 4/17/201…     72.4         160.    25  27.5 TRUE           1.46e12
##  7 4319703577 5/4/2016…     72.3         159.    NA  27.4 TRUE           1.46e12
##  8 4558609924 4/18/201…     69.7         154.    NA  27.2 TRUE           1.46e12
##  9 4558609924 4/25/201…     70.3         155.    NA  27.5 TRUE           1.46e12
## 10 4558609924 5/1/2016…     69.9         154.    NA  27.3 TRUE           1.46e12
## # i 57 more rows
```

STEP 3: PROCESS

Upon examining the data, I noticed that the dailyActivity_merged data frame consolidates information from the dailyCalories_merged, dailyIntensities_merged, and dailySteps_merged data frames. To streamline the analysis and avoid redundancy, I will solely focus on the dailyActivity_merged data frame.

To ensure consistency, I will convert the ActivityDate column in the dailyActivity_merged data frame from character format to Date format using the lubridate package:

R

```
library(lubridate)
dailyActivity_merged$ActivityDate <- mdy(dailyActivity_merged$ActivityDate)
```

Similar adjustments will be made for other columns in different data frames. For instance, the ActivityMinute column in the minuteMETsNarrow_merged data frame, the Time column in the heartrate_seconds_merged data frame, the Date column in the weightLogInfo_merged data frame, and the SleepDay column in the sleepDay_merged data frame. Since these columns include time information, the mdy_hms format will be used for conversion.

```
minuteMETsNarrow_merged$ActivityMinute <- mdy_hms(minuteMETsNarrow_merged$ActivityMinute)
heartrate_seconds_merged$Time <- mdy_hms(heartrate_seconds_merged$Time)
sleepDay_merged$SleepDay <- mdy_hms(sleepDay_merged$SleepDay)
weightLogInfo_merged$Date <- mdy_hms(weightLogInfo_merged$Date)
```

STEP 4: ANALYZE

Summarize the data:

The n_distinct() and nrow() functions are used to determine the number of unique values and the number of rows in a data frame, respectively.

```
n_distinct(dailyIntensities_merged$Id)
```

```
## [1] 33
```

```
nrow(dailyActivity_merged)
```

```
## [1] 940
```

```
n_distinct(minuteMETsNarrow_merged$Id)
```

```
## [1] 33
nrow(minuteMETsNarrow_merged)
## [1] 1325580
```

```
n_distinct(heartrate_seconds_merged$Id)
```

```
## [1] 14
```

```
nrow(heartrate_seconds_merged)
```

```
## [1] 2483658
```

```
n_distinct(sleepDay_merged$Id)
```

```
## [1] 24
```

```
nrow(sleepDay_merged)
```

```
## [1] 413
```

As I mentioned earlier, it's important to note that the heartrate_seconds_merged and weightLogInfo_merged data frames have data from a limited number of participants (only 30), which may not provide a solid basis for drawing reliable conclusions. However, we can still explore the data to identify any potential patterns.

To obtain key statistics about the data frames, I will use the summary() function. This function will provide us with a summary of the variables in the data frames, giving us a quick overview of their distribution and key measures such as mean, median, and quartiles.

```
summary(dailyActivity_merged)
```

```
##        Id             ActivityDate          TotalSteps    TotalDistance
##  Min.   :1.504e+09   Min.   :2016-04-12   Min.   :    0   Min.   : 0.000
##  1st Qu.:2.320e+09   1st Qu.:2016-04-19   1st Qu.: 3790   1st Qu.: 2.620
##  Median :4.445e+09   Median :2016-04-26   Median : 7406   Median : 5.245
##  Mean   :4.855e+09   Mean   :2016-04-26   Mean   : 7638   Mean   : 5.490
##  3rd Qu.:6.962e+09   3rd Qu.:2016-05-04   3rd Qu.:10727   3rd Qu.: 7.713
##  Max.   :8.878e+09   Max.   :2016-05-12   Max.   :36019   Max.   :28.030
##  TrackerDistance  LoggedActivitiesDistance VeryActiveDistance
##  Min.   : 0.000   Min.   :0.0000           Min.   : 0.000
##  1st Qu.: 2.620   1st Qu.:0.0000           1st Qu.: 0.000
##  Median : 5.245   Median :0.0000           Median : 0.210
##  Mean   : 5.475   Mean   :0.1082           Mean   : 1.503
##  3rd Qu.: 7.710   3rd Qu.:0.0000           3rd Qu.: 2.053
##  Max.   :28.030   Max.   :4.9421           Max.   :21.920
##  ModeratelyActiveDistance LightActiveDistance SedentaryActiveDistance
##  Min.   :0.0000           Min.   : 0.000      Min.   :0.000000
##  1st Qu.:0.0000           1st Qu.: 1.945      1st Qu.:0.000000
##  Median :0.2400           Median : 3.365      Median :0.000000
##  Mean   :0.5675           Mean   : 3.341      Mean   :0.001606
##  3rd Qu.:0.8000           3rd Qu.: 4.782      3rd Qu.:0.000000
##  Max.   :6.4800           Max.   :10.710      Max.   :0.110000
##  VeryActiveMinutes FairlyActiveMinutes LightlyActiveMinutes SedentaryMinutes
##  Min.   :  0.00    Min.   :  0.00      Min.   :  0.0        Min.   :   0.0
##  1st Qu.:  0.00    1st Qu.:  0.00      1st Qu.:127.0        1st Qu.: 729.8
##  Median :  4.00    Median :  6.00      Median :199.0        Median :1057.5
##  Mean   : 21.16    Mean   : 13.56      Mean   :192.8        Mean   : 991.2
##  3rd Qu.: 32.00    3rd Qu.: 19.00      3rd Qu.:264.0        3rd Qu.:1229.5
##  Max.   :210.00    Max.   :143.00      Max.   :518.0        Max.   :1440.0
##     Calories
##  Min.   :   0
##  1st Qu.:1828
```

```
##  Median :2134
##  Mean   :2304
##  3rd Qu.:2793
##  Max.   :4900
```

```
summary(minuteMETsNarrow_merged)
```

```
##        Id            ActivityMinute                      METs
##  Min.   :1.504e+09   Min.   :2016-04-12 00:00:00.00   Min.   :  0.00
##  1st Qu.:2.320e+09   1st Qu.:2016-04-19 01:51:00.00   1st Qu.: 10.00
##  Median :4.445e+09   Median :2016-04-26 06:27:00.00   Median : 10.00
##  Mean   :4.848e+09   Mean   :2016-04-26 12:09:55.15   Mean   : 14.69
##  3rd Qu.:6.962e+09   3rd Qu.:2016-05-03 18:55:00.00   3rd Qu.: 11.00
##  Max.   :8.878e+09   Max.   :2016-05-12 15:59:00.00   Max.   :157.00
```

```
summary(heartrate_seconds_merged)
```

```
##        Id                 Time                          Value
##  Min.   :2.022e+09   Min.   :2016-04-12 00:00:00.00   Min.   : 36.00
##  1st Qu.:4.388e+09   1st Qu.:2016-04-19 06:18:10.00   1st Qu.: 63.00
##  Median :5.554e+09   Median :2016-04-26 20:28:50.00   Median : 73.00
##  Mean   :5.514e+09   Mean   :2016-04-26 19:43:52.24   Mean   : 77.33
##  3rd Qu.:6.962e+09   3rd Qu.:2016-05-04 08:00:20.00   3rd Qu.: 88.00
##  Max.   :8.878e+09   Max.   :2016-05-12 16:20:00.00   Max.   :203.00
summary(sleepDay_merged)
##        Id               SleepDay                      TotalSleepRecords
##  Min.   :1.504e+09   Min.   :2016-04-12 00:00:00.00   Min.   :1.000
##  1st Qu.:3.977e+09   1st Qu.:2016-04-19 00:00:00.00   1st Qu.:1.000
##  Median :4.703e+09   Median :2016-04-27 00:00:00.00   Median :1.000
##  Mean   :5.001e+09   Mean   :2016-04-26 12:40:05.80   Mean   :1.119
##  3rd Qu.:6.962e+09   3rd Qu.:2016-05-04 00:00:00.00   3rd Qu.:1.000
##  Max.   :8.792e+09   Max.   :2016-05-12 00:00:00.00   Max.   :3.000
##  TotalMinutesAsleep TotalTimeInBed
##  Min.   : 58.0      Min.   : 61.0
##  1st Qu.:361.0      1st Qu.:403.0
##  Median :433.0      Median :463.0
##  Mean   :419.5      Mean   :458.6
##  3rd Qu.:490.0      3rd Qu.:526.0
##  Max.   :796.0      Max.   :961.0
```

```
summary(weightLogInfo_merged)
```

```
##        Id                 Date                          WeightKg
##  Min.   :1.504e+09   Min.   :2016-04-12 06:47:11.00   Min.   : 52.60
##  1st Qu.:6.962e+09   1st Qu.:2016-04-19 15:19:45.00   1st Qu.: 61.40
##  Median :6.962e+09   Median :2016-04-27 23:59:59.00   Median : 62.50
##  Mean   :7.009e+09   Mean   :2016-04-27 15:39:54.27   Mean   : 72.04
##  3rd Qu.:8.878e+09   3rd Qu.:2016-05-04 15:24:10.50   3rd Qu.: 85.05
##  Max.   :8.878e+09   Max.   :2016-05-12 23:59:59.00   Max.   :133.50
##
##   WeightPounds        Fat             BMI        IsManualReport
##  Min.   :116.0   Min.   :22.00   Min.   :21.45   Mode :logical
##  1st Qu.:135.4   1st Qu.:22.75   1st Qu.:23.96   FALSE:26
##  Median :137.8   Median :23.50   Median :24.39   TRUE :41
##  Mean   :158.8   Mean   :23.50   Mean   :25.19
##  3rd Qu.:187.5   3rd Qu.:24.25   3rd Qu.:25.56
##  Max.   :294.3   Max.   :25.00   Max.   :47.54
##                  NA's   :65
##      LogId
##  Min.   :1.460e+12
##  1st Qu.:1.461e+12
##  Median :1.462e+12
##  Mean   :1.462e+12
##  3rd Qu.:1.462e+12
##  Max.   :1.463e+12
##
```

Daily Activity Analysis:

Total Steps: The average daily steps recorded by FitBit users is 7638, which falls below the recommended threshold of 10,000 steps per day suggested by the National Institutes of Health. Meeting the 10,000 steps goal can help reduce the risk of cancer, heart disease, and early death.

Very Active Minutes: On average, users accumulate 21.16 minutes of vigorous activity per day, resulting in a total of 148.12 minutes of physical activity per week. This falls slightly below the Centers for Disease Control and Prevention (CDC) recommendation of 150 minutes of physical activity per week.

Sedentary Minutes: The Canadian Society for Exercise Physiology (CSEP) advises against exceeding 8 hours of sedentary time per day. Considering that the recommended sleep duration is 8 hours (480 minutes), and users have an average of 991.20 minutes of sedentary time, it suggests that users spend approximately 8.52 hours (or 511.2 minutes) of awake time in a sedentary state. While this exceeds the CSEP recommendation, it is still within a reasonable range.

Calories: The average FitBit user burns 2304 calories per day, which exceeds the Cleveland Clinic's estimation for the energy expenditure of a body at rest. This indicates that users engage in physical activity throughout the day.

MET (Metabolic equivalents): The average FitBit user has a metabolic equivalent (MET) value of 14.69. According to the Harvard School of Public Health, METs can be categorized into sedentary, light intensity, moderate intensity, and vigorous intensity levels. An average MET of 14.69 is an unusual value and may indicate inaccurate calculations. Consequently, this data point will be excluded from further analysis.

Heart Rate: The average heart rate among FitBit users is 73 beats per minute (bpm). According to the Cleveland Clinic, this falls within the normal range of 60-100 bpm for adults, indicating that the users' heart rates are within a healthy range.

Daily Sleep: The summary of the Daily Sleep Data frame reveals that the average user sleeps approximately 419.5 minutes per day, equivalent to 6.99 hours. This duration aligns closely with the CDC's recommendation of adults sleeping for more than 7 hours per day.

BMI: The summary of the weight log info shows that the average user has a BMI of 25.19. Medical News mentions that BMI is a simple measurement that considers weight in relation to height. However, it does not account for other factors such as waist or hip measurements, fat distribution, or muscle mass. Therefore, BMI alone cannot determine the extent of overweight or obesity in a sample.

Create Reports:

Based on the analysis conducted, reports have been generated to present critical information and track the average data over time, aiming to identify any emerging trends. These reports will provide valuable insights for further analysis and decision-making.

```
dailyActivity_merged_v03 <- dailyActivity_merged %>%
  group_by(ActivityDate) %>%
  summarize(average_cal_user=((mean(Calories)/33)))

dailyActivity_merged_v04 <- dailyActivity_merged %>%
  group_by(ActivityDate) %>%
  summarize(average_mins=mean(VeryActiveMinutes))

dailyActivity_merged_v05 <- dailyActivity_merged %>%
  group_by(ActivityDate) %>%
  summarize(average_steps=mean(TotalSteps))

dailySleepHours <- sleepDay_merged %>%
  group_by(SleepDay) %>%
  summarize(avg_hours=TotalMinutesAsleep/60)
## Warning: Returning more (or less) than 1 row per `summarise()` group was deprecated in
## dplyr 1.1.0.
## ℹ Please use `reframe()` instead.
## ℹ When switching from `summarise()` to `reframe()`, remember that `reframe()`
##   always returns an ungrouped data frame and adjust accordingly.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
## `summarise()` has grouped output by 'SleepDay'. You can override using the
## `.groups` argument.

daily_distance_calories <- dailyActivity_merged %>%
  group_by(ActivityDate, Id, Calories) %>%
  summarize(Distance=as.numeric (TotalDistance))
## `summarise()` has grouped output by 'ActivityDate', 'Id'. You can override
## using the `.groups` argument.

daily_distance_avg <- daily_distance_calories %>%
  group_by(ActivityDate) %>%
  summarize(avg_daily_distance=mean(Distance))
```

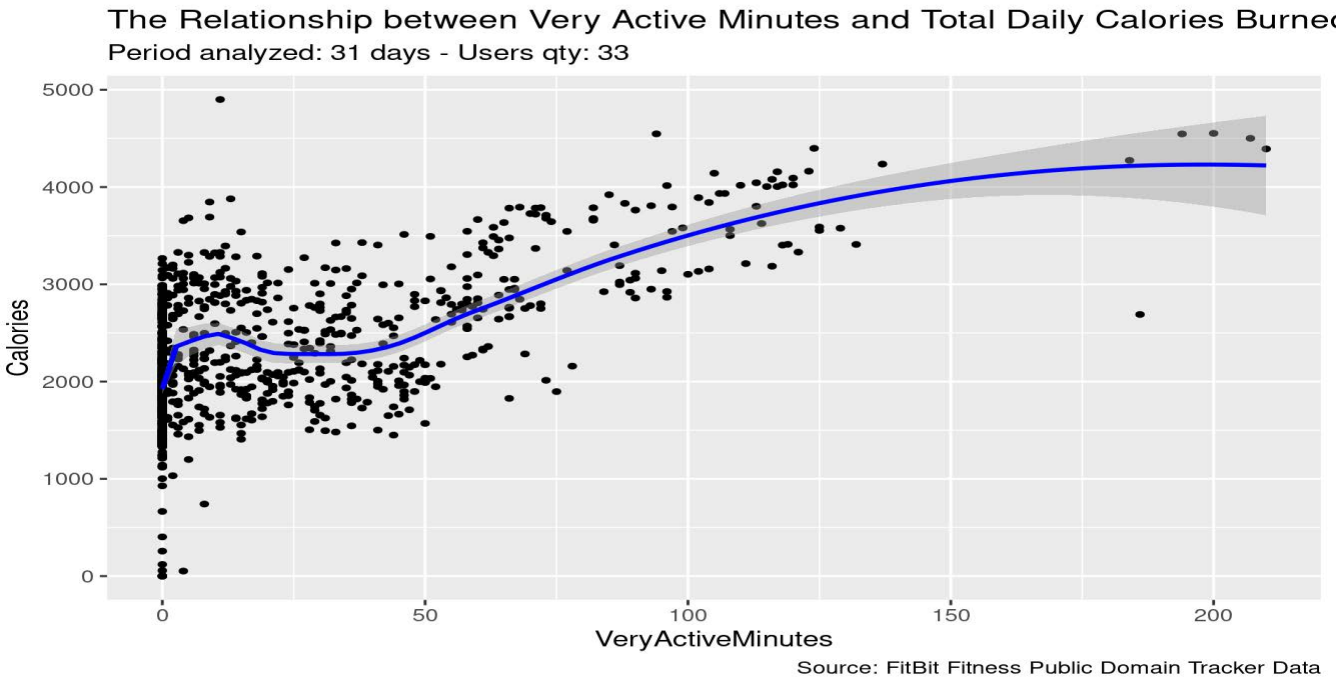
STEP 5: SHARE

I utilized the ggplot() and gganimate() functions in R Studio to generate captivating data visualizations. These visualizations effectively illustrate the patterns and trends identified within the data frames, providing valuable insights for our project.

First Plot: Relationship between Very Active Minutes and Calories burned

```
install.packages("ggplot2")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
## (as 'lib' is unspecified)
library(ggplot2)
ggplot(dailyActivity_merged, aes(x=VeryActiveMinutes,y= Calories))+
  geom_point(size=1) +
  geom_smooth(span= 0.5, col='blue')+
  labs(title="The Relationship between Very Active Minutes and Total Daily Calories Burned",
       caption= "Source: FitBit Fitness Public Domain Tracker Data",
       subtitle = "Period analyzed: 31 days - Users qty: 33")
## `geom_smooth()` using method = 'loess' and formula = 'y ~ x'
```

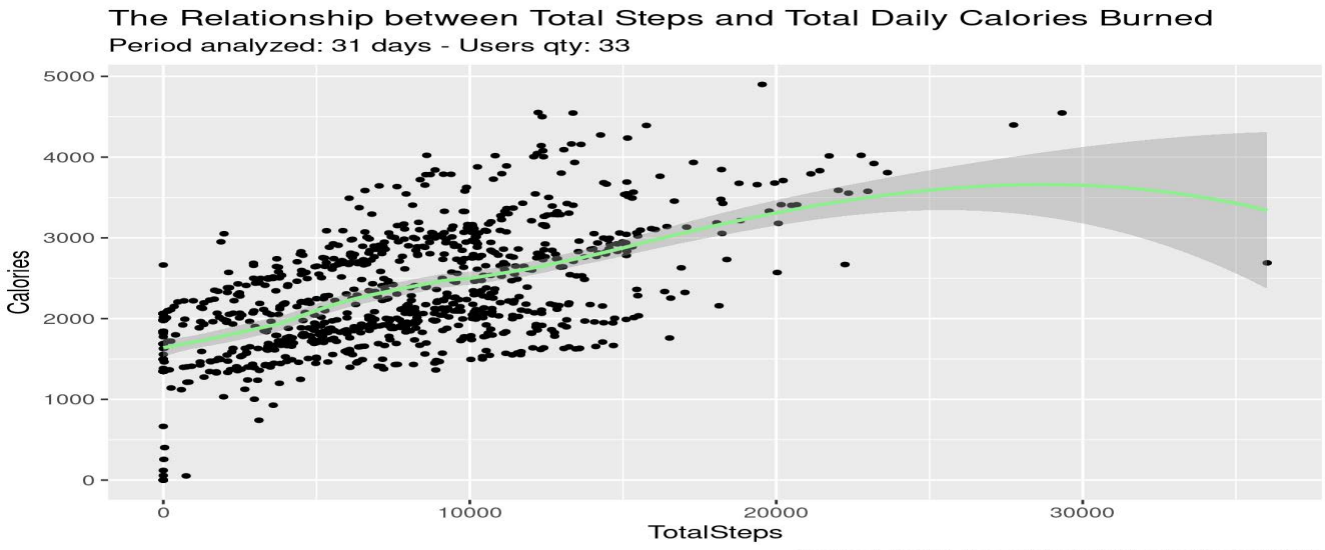


An intriguing discovery has been made regarding the relationship between Very Active Minutes and Calories burned. It appears that there is a positive correlation, indicating that as users engage in more physical activity, their calorie expenditure increases.

Second Plot: Relationship between Total Steps and Calories burned

```
ggplot(dailyActivity_merged, aes(x=TotalSteps,y= Calories))+
  geom_point(size=1) +
  geom_smooth(span=0.5, col='lightgreen') +
  labs(title="The Relationship between Total Steps and Total Daily Calories Burned",
       caption= "Source: FitBit Fitness Public Domain Tracker Data",
       subtitle = "Period analyzed: 31 days - Users qty: 33")

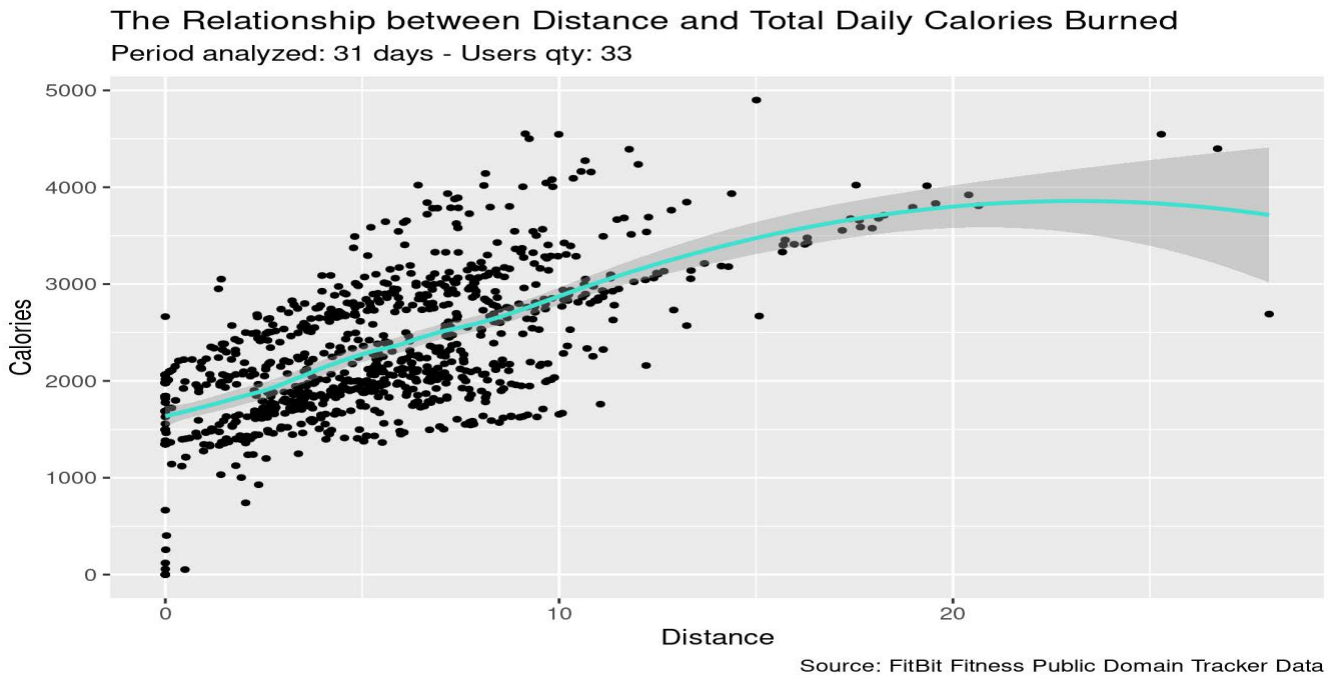
## `geom_smooth()` using method = 'loess' and formula = 'y ~ x'
```



An exciting finding has emerged regarding the relationship between Total Steps and Calories burned. It seems that there is a positive correlation, indicating that as users take more steps, their calorie expenditure increases.
Third Plot: Relationship between Distance and Calories burned

```
ggplot(daily_distance_calories, aes(x=Distance,y= Calories))+
  geom_point(size=1) +
  geom_smooth(span=0.5, col='turquoise') +
  labs(title="The Relationship between Distance and Total Daily Calories Burned",
       caption= "Source: FitBit Fitness Public Domain Tracker Data",
       subtitle = "Period analyzed: 31 days - Users qty: 33")
```

```
 ## `geom_smooth()` using method = 'loess' and formula = 'y ~ x'
```



An intriguing discovery has been made regarding the relationship between Distance and Calories burned. It appears that there is a positive correlation, suggesting that as users cover a greater distance, their calorie expenditure also increases.

Fourth Plot: Average Daily Calories burned Over Time

##Create Plot

```
install.packages("gganimate")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
## (as 'lib' is unspecified)
```

```
install.packages("gifski")
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
## (as 'lib' is unspecified)
```

```
library(gganimate)
library(gifski)
avg_daily_calories_by_user <- ggplot(dailyActivity_merged_v03, aes(x = ActivityDate, y = average_cal_user)) +
  geom_line(color="blue") +
  labs(title="The Average of Daily Calories burned by user Over Time",
       caption= "Source: FitBit Fitness Public Domain Tracker Data",
```

```
       subtitle = "Period analyzed: 31 days - Users qty: 33")
 theme_light()

 ## List of 97
 ##  $ line                       :List of 6
 ##   ..$ colour       : chr "black"
 ##   ..$ linewidth    : num 0.5
 ##   ..$ linetype     : num 1
 ##   ..$ lineend      : chr "butt"
 ##   ..$ arrow        : logi FALSE
 ##   ..$ inherit.blank: logi TRUE
 ##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
 ##  $ rect                       :List of 5
 ##   ..$ fill         : chr "white"
 ##   ..$ colour       : chr "black"
 ##   ..$ linewidth    : num 0.5
 ##   ..$ linetype     : num 1
 ##   ..$ inherit.blank: logi TRUE
 ##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
 ##  $ text                       :List of 11
 ##   ..$ family       : chr ""
 ##   ..$ face         : chr "plain"
 ##   ..$ colour       : chr "black"
 ##   ..$ size         : num 11
 ##   ..$ hjust        : num 0.5
 ##   ..$ vjust        : num 0.5
 ##   ..$ angle        : num 0
 ##   ..$ lineheight   : num 0.9
 ##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 0points
 ##   .. ..- attr(*, "unit")= int 8
 ##   ..$ debug        : logi FALSE
 ##   ..$ inherit.blank: logi TRUE
 ##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
 ##  $ title                      : NULL
 ##  $ aspect.ratio               : NULL
 ##  $ axis.title                 : NULL
 ##  $ axis.title.x               :List of 11
 ##   ..$ family       : NULL
 ##   ..$ face         : NULL
 ##   ..$ colour       : NULL
 ##   ..$ size         : NULL
 ##   ..$ hjust        : NULL
 ##   ..$ vjust        : num 1
 ##   ..$ angle        : NULL
 ##   ..$ lineheight   : NULL
 ##   ..$ margin       : 'margin' num [1:4] 2.75points 0points 0points 0points
 ##   .. ..- attr(*, "unit")= int 8
 ##   ..$ debug        : NULL
 ##   ..$ inherit.blank: logi TRUE
 ##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
 ##  $ axis.title.x.top           :List of 11
 ##   ..$ family       : NULL
 ##   ..$ face         : NULL
 ##   ..$ colour       : NULL
 ##   ..$ size         : NULL
 ##   ..$ hjust        : NULL
 ##   ..$ vjust        : num 0
 ##   ..$ angle        : NULL
 ##   ..$ lineheight   : NULL
 ##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.75points 0points
 ##   .. ..- attr(*, "unit")= int 8
 ##   ..$ debug        : NULL
 ##   ..$ inherit.blank: logi TRUE
 ##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
 ##  $ axis.title.x.bottom        : NULL
 ##  $ axis.title.y               :List of 11
 ##   ..$ family       : NULL
 ##   ..$ face         : NULL
 ##   ..$ colour       : NULL
 ##   ..$ size         : NULL
 ##   ..$ hjust        : NULL
 ##   ..$ vjust        : num 1
 ##   ..$ angle        : num 90
 ##   ..$ lineheight   : NULL
 ##   ..$ margin       : 'margin' num [1:4] 0points 2.75points 0points 0points
 ##   .. ..- attr(*, "unit")= int 8
 ##   ..$ debug        : NULL
 ##   ..$ inherit.blank: logi TRUE
 ##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
 ##  $ axis.title.y.left          : NULL
```

```
##  $ axis.title.y.right        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.75points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text                 :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "grey30"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x               :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.2points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.top           :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.2points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.bottom        : NULL
##  $ axis.text.y               :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 1
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.2points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.y.left          : NULL
##  $ axis.text.y.right         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
```

```
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.2points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.ticks               :List of 6
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ axis.ticks.x             : NULL
##  $ axis.ticks.x.top         : NULL
##  $ axis.ticks.x.bottom      : NULL
##  $ axis.ticks.y             : NULL
##  $ axis.ticks.y.left        : NULL
##  $ axis.ticks.y.right       : NULL
##  $ axis.ticks.length        : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ axis.ticks.length.x      : NULL
##  $ axis.ticks.length.x.top  : NULL
##  $ axis.ticks.length.x.bottom: NULL
##  $ axis.ticks.length.y      : NULL
##  $ axis.ticks.length.y.left : NULL
##  $ axis.ticks.length.y.right : NULL
##  $ axis.line                : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ axis.line.x              : NULL
##  $ axis.line.x.top          : NULL
##  $ axis.line.x.bottom       : NULL
##  $ axis.line.y              : NULL
##  $ axis.line.y.left         : NULL
##  $ axis.line.y.right        : NULL
##  $ legend.background        :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.margin            : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing           : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing.x         : NULL
##  $ legend.spacing.y         : NULL
##  $ legend.key               :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.key.size          : 'simpleUnit' num 1.2lines
##   ..- attr(*, "unit")= int 3
##  $ legend.key.height        : NULL
##  $ legend.key.width         : NULL
##  $ legend.text              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.text.align        : NULL
##  $ legend.title             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
```

```
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.title.align        : NULL
##  $ legend.position           : chr "right"
##  $ legend.direction          : NULL
##  $ legend.justification      : chr "center"
##  $ legend.box                : NULL
##  $ legend.box.just           : NULL
##  $ legend.box.margin         : 'margin' num [1:4] 0cm 0cm 0cm 0cm
##   ..- attr(*, "unit")= int 1
##  $ legend.box.background     : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.box.spacing        : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ panel.background          :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.border              :List of 5
##   ..$ fill         : logi NA
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 1
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.spacing             : 'simpleUnit' num 5.5points
##   ..- attr(*, "unit")= int 8
##  $ panel.spacing.x           : NULL
##  $ panel.spacing.y           : NULL
##  $ panel.grid                :List of 6
##   ..$ colour       : chr "grey87"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.minor          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.25
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major.x        : NULL
##  $ panel.grid.major.y        : NULL
##  $ panel.grid.minor.x        : NULL
##  $ panel.grid.minor.y        : NULL
##  $ panel.ontop               : logi FALSE
##  $ plot.background           :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : chr "white"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ plot.title                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
```

```
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.title.position       : chr "panel"
##  $ plot.subtitle             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : num 1
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 5.5points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption.position     : chr "panel"
##  $ plot.tag                  :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.tag.position         : chr "topleft"
##  $ plot.margin               : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ strip.background          :List of 5
##   ..$ fill         : chr "grey70"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ strip.background.x        : NULL
##  $ strip.background.y        : NULL
##  $ strip.clip                : chr "inherit"
##  $ strip.placement           : chr "inside"
##  $ strip.text                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "white"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 4.4points 4.4points 4.4points 4.4points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.x              : NULL
##  $ strip.text.x.bottom       : NULL
##  $ strip.text.x.top          : NULL
```

```
##  $ strip.text.y              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.left         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.right        : NULL
##  $ strip.switch.pad.grid     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ strip.switch.pad.wrap     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  - attr(*, "class")= chr [1:2] "theme" "gg"
##  - attr(*, "complete")= logi TRUE
##  - attr(*, "validate")= logi TRUE
```

Fifth Plot: Average Very Active Minutes Over Time

```
##Create Plot
avg_daily_veryActiveMinutes <- ggplot(dailyActivity_merged_v04, aes(x = ActivityDate, y = average_mins)) +
  geom_line(color="blue") +
  labs(title="The Average of Very Active Minutes Over Time",
       caption= "Source: FitBit Fitness Public Domain Tracker Data",
       subtitle = "Period analyzed: 31 days - Users qty: 33")
theme_light()
## List of 97
##  $ line                      :List of 6
##   ..$ colour       : chr "black"
##   ..$ linewidth    : num 0.5
##   ..$ linetype     : num 1
##   ..$ lineend      : chr "butt"
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ rect                      :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : chr "black"
##   ..$ linewidth    : num 0.5
##   ..$ linetype     : num 1
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ text                      :List of 11
##   ..$ family       : chr ""
##   ..$ face         : chr "plain"
##   ..$ colour       : chr "black"
##   ..$ size         : num 11
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : num 0
##   ..$ lineheight   : num 0.9
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ title                     : NULL
##  $ aspect.ratio              : NULL
##  $ axis.title                : NULL
##  $ axis.title.x              :List of 11
```

```
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.75points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.top          :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.75points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.bottom       : NULL
##  $ axis.title.y              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.75points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.y.left         : NULL
##  $ axis.title.y.right        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.75points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text                 :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "grey30"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x               :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.2points 0points 0points 0points
```

```
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.top           :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.2points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.bottom        : NULL
##  $ axis.text.y               :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 1
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.2points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.y.left          : NULL
##  $ axis.text.y.right         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.2points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.ticks                :List of 6
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ axis.ticks.x              : NULL
##  $ axis.ticks.x.top          : NULL
##  $ axis.ticks.x.bottom       : NULL
##  $ axis.ticks.y              : NULL
##  $ axis.ticks.y.left         : NULL
##  $ axis.ticks.y.right        : NULL
##  $ axis.ticks.length         : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ axis.ticks.length.x       : NULL
##  $ axis.ticks.length.x.top   : NULL
##  $ axis.ticks.length.x.bottom: NULL
##  $ axis.ticks.length.y       : NULL
##  $ axis.ticks.length.y.left  : NULL
##  $ axis.ticks.length.y.right : NULL
##  $ axis.line                 : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ axis.line.x               : NULL
##  $ axis.line.x.top           : NULL
##  $ axis.line.x.bottom        : NULL
##  $ axis.line.y               : NULL
##  $ axis.line.y.left          : NULL
##  $ axis.line.y.right         : NULL
##  $ legend.background         :List of 5
##   ..$ fill         : NULL
```

```
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.margin            : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing           : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing.x         : NULL
##  $ legend.spacing.y         : NULL
##  $ legend.key               :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.key.size          : 'simpleUnit' num 1.2lines
##   ..- attr(*, "unit")= int 3
##  $ legend.key.height        : NULL
##  $ legend.key.width         : NULL
##  $ legend.text              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.text.align        : NULL
##  $ legend.title             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.title.align       : NULL
##  $ legend.position          : chr "right"
##  $ legend.direction         : NULL
##  $ legend.justification     : chr "center"
##  $ legend.box               : NULL
##  $ legend.box.just          : NULL
##  $ legend.box.margin        : 'margin' num [1:4] 0cm 0cm 0cm 0cm
##   ..- attr(*, "unit")= int 1
##  $ legend.box.background    : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.box.spacing       : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ panel.background         :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.border             :List of 5
##   ..$ fill         : logi NA
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 1
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.spacing            : 'simpleUnit' num 5.5points
##   ..- attr(*, "unit")= int 8
##  $ panel.spacing.x          : NULL
##  $ panel.spacing.y          : NULL
##  $ panel.grid               :List of 6
```

```
##   ..$ colour       : chr "grey87"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.minor          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.25
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major.x        : NULL
##  $ panel.grid.major.y        : NULL
##  $ panel.grid.minor.x        : NULL
##  $ panel.grid.minor.y        : NULL
##  $ panel.ontop               : logi FALSE
##  $ plot.background           :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : chr "white"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ plot.title                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.title.position       : chr "panel"
##  $ plot.subtitle             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : num 1
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 5.5points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption.position     : chr "panel"
##  $ plot.tag                  :List of 11
```

```
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.tag.position         : chr "topleft"
##  $ plot.margin               : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ strip.background          :List of 5
##   ..$ fill         : chr "grey70"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ strip.background.x        : NULL
##  $ strip.background.y        : NULL
##  $ strip.clip                : chr "inherit"
##  $ strip.placement           : chr "inside"
##  $ strip.text                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "white"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 4.4points 4.4points 4.4points 4.4points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.x              : NULL
##  $ strip.text.x.bottom       : NULL
##  $ strip.text.x.top          : NULL
##  $ strip.text.y              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.left         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.right        : NULL
##  $ strip.switch.pad.grid     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ strip.switch.pad.wrap     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  - attr(*, "class")= chr [1:2] "theme" "gg"
##  - attr(*, "complete")= logi TRUE
##  - attr(*, "validate")= logi TRUE


##Animate Plot
```

```
avg_veryActiveMinutes_animated <- avg_daily_veryActiveMinutes +
  transition_reveal(ActivityDate)

animate(avg_veryActiveMinutes_animated)
## `geom_line()`: Each group consists of only one observation.
## ℹ Do you need to adjust the group aesthetic?
## `geom_line()`: Each group consists of only one observation.
## ℹ Do you need to adjust the group aesthetic?
```

This graphs shows that users has tend to stay active during the month analyzed, with a trend going down on minutes active.

Sixth Plot: Average Steps Over Time

```
avg_daily_steps <- ggplot(dailyActivity_merged_v05, aes(x = ActivityDate, y = average_steps)) +
  geom_line(color="blue") +
  labs(title="The Average Steps Over Time",
       caption= "Source: FitBit Fitness Public Domain Tracker Data",
       subtitle = "Period analyzed: 31 days - Users qty: 33")
theme_light()

## List of 97
##  $ line                     :List of 6
##   ..$ colour       : chr "black"
##   ..$ linewidth    : num 0.5
##   ..$ linetype     : num 1
##   ..$ lineend      : chr "butt"
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ rect                     :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : chr "black"
##   ..$ linewidth    : num 0.5
##   ..$ linetype     : num 1
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ text                     :List of 11
##   ..$ family       : chr ""
##   ..$ face         : chr "plain"
##   ..$ colour       : chr "black"
##   ..$ size         : num 11
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : num 0
##   ..$ lineheight   : num 0.9
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ title                    : NULL
##  $ aspect.ratio             : NULL
##  $ axis.title               : NULL
##  $ axis.title.x             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.75points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.top         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.75points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
```

```
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.bottom       : NULL
##  $ axis.title.y              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.75points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.y.left         : NULL
##  $ axis.title.y.right        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.75points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text                 :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "grey30"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x               :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.2points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.top           :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.2points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.bottom        : NULL
##  $ axis.text.y               :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 1
```

```
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.2points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.y.left          : NULL
##  $ axis.text.y.right         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.2points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.ticks                :List of 6
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ axis.ticks.x              : NULL
##  $ axis.ticks.x.top          : NULL
##  $ axis.ticks.x.bottom       : NULL
##  $ axis.ticks.y              : NULL
##  $ axis.ticks.y.left         : NULL
##  $ axis.ticks.y.right        : NULL
##  $ axis.ticks.length         : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ axis.ticks.length.x       : NULL
##  $ axis.ticks.length.x.top   : NULL
##  $ axis.ticks.length.x.bottom: NULL
##  $ axis.ticks.length.y       : NULL
##  $ axis.ticks.length.y.left  : NULL
##  $ axis.ticks.length.y.right : NULL
##  $ axis.line                 : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ axis.line.x               : NULL
##  $ axis.line.x.top           : NULL
##  $ axis.line.x.bottom        : NULL
##  $ axis.line.y               : NULL
##  $ axis.line.y.left          : NULL
##  $ axis.line.y.right         : NULL
##  $ legend.background         :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.margin             : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing            : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing.x          : NULL
##  $ legend.spacing.y          : NULL
##  $ legend.key                :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.key.size           : 'simpleUnit' num 1.2lines
##   ..- attr(*, "unit")= int 3
##  $ legend.key.height         : NULL
##  $ legend.key.width          : NULL
##  $ legend.text               :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
```

```
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.text.align         : NULL
##  $ legend.title              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.title.align        : NULL
##  $ legend.position           : chr "right"
##  $ legend.direction          : NULL
##  $ legend.justification      : chr "center"
##  $ legend.box                : NULL
##  $ legend.box.just           : NULL
##  $ legend.box.margin         : 'margin' num [1:4] 0cm 0cm 0cm 0cm
##   ..- attr(*, "unit")= int 1
##  $ legend.box.background     : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.box.spacing        : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ panel.background          :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.border              :List of 5
##   ..$ fill         : logi NA
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 1
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.spacing             : 'simpleUnit' num 5.5points
##   ..- attr(*, "unit")= int 8
##  $ panel.spacing.x           : NULL
##  $ panel.spacing.y           : NULL
##  $ panel.grid                :List of 6
##   ..$ colour       : chr "grey87"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.minor          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.25
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major.x        : NULL
##  $ panel.grid.major.y        : NULL
```

```
##  $ panel.grid.minor.x        : NULL
##  $ panel.grid.minor.y        : NULL
##  $ panel.ontop               : logi FALSE
##  $ plot.background           :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : chr "white"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ plot.title                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.title.position       : chr "panel"
##  $ plot.subtitle             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : num 1
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 5.5points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption.position     : chr "panel"
##  $ plot.tag                  :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.tag.position         : chr "topleft"
##  $ plot.margin               : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ strip.background          :List of 5
##   ..$ fill         : chr "grey70"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ strip.background.x        : NULL
##  $ strip.background.y        : NULL
##  $ strip.clip                : chr "inherit"
```

```
##  $ strip.placement           : chr "inside"
##  $ strip.text                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "white"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 4.4points 4.4points 4.4points 4.4points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.x              : NULL
##  $ strip.text.x.bottom       : NULL
##  $ strip.text.x.top          : NULL
##  $ strip.text.y              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.left         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.right        : NULL
##  $ strip.switch.pad.grid     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ strip.switch.pad.wrap     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  - attr(*, "class")= chr [1:2] "theme" "gg"
##  - attr(*, "complete")= logi TRUE
##  - attr(*, "validate")= logi TRUE
```

```
##Animate Plot

avg_steps_animated <- avg_daily_steps +
  transition_reveal(ActivityDate)
```

```
animate(avg_steps_animated)
```

```
## `geom_line()`: Each group consists of only one observation.
## ℹ Do you need to adjust the group aesthetic?
## `geom_line()`: Each group consists of only one observation.
## ℹ Do you need to adjust the group aesthetic?
```

The graph reveals a consistent level of step counts among users throughout the analyzed month, characterized by notable peaks and troughs. This pattern indicates an unstable trend in users' walking behavior.

Sixth Plot: Average Sleep hours Over Time

```
avg_daily_sleepHours <- ggplot(dailySleepHours, aes(x = SleepDay, y = avg_hours)) +
  geom_line(color="blue") +
  labs(title="The Average Daily Sleep hours Over Time",
       caption= "Source: FitBit Fitness Public Domain Tracker Data",
       subtitle = "Period analyzed: 31 days - Users qty: 33")
theme_light()
```

```
## List of 97
##  $ line                        :List of 6
##   ..$ colour       : chr "black"
##   ..$ linewidth    : num 0.5
##   ..$ linetype     : num 1
##   ..$ lineend      : chr "butt"
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ rect                        :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : chr "black"
##   ..$ linewidth    : num 0.5
##   ..$ linetype     : num 1
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ text                        :List of 11
##   ..$ family       : chr ""
##   ..$ face         : chr "plain"
##   ..$ colour       : chr "black"
##   ..$ size         : num 11
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : num 0
##   ..$ lineheight   : num 0.9
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ title                       : NULL
##  $ aspect.ratio                : NULL
##  $ axis.title                  : NULL
##  $ axis.title.x                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.75points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.top            :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.75points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.bottom         : NULL
##  $ axis.title.y                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.75points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.y.left           : NULL
##  $ axis.title.y.right          :List of 11
##   ..$ family       : NULL
```

```
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.75points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "grey30"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.2points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.top          :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.2points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.bottom       : NULL
##  $ axis.text.y              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 1
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.2points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.y.left         : NULL
##  $ axis.text.y.right        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.2points
##   .. ..- attr(*, "unit")= int 8
```

```
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.ticks               :List of 6
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ axis.ticks.x             : NULL
##  $ axis.ticks.x.top         : NULL
##  $ axis.ticks.x.bottom      : NULL
##  $ axis.ticks.y             : NULL
##  $ axis.ticks.y.left        : NULL
##  $ axis.ticks.y.right       : NULL
##  $ axis.ticks.length        : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ axis.ticks.length.x      : NULL
##  $ axis.ticks.length.x.top  : NULL
##  $ axis.ticks.length.x.bottom: NULL
##  $ axis.ticks.length.y      : NULL
##  $ axis.ticks.length.y.left : NULL
##  $ axis.ticks.length.y.right : NULL
##  $ axis.line                : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ axis.line.x              : NULL
##  $ axis.line.x.top          : NULL
##  $ axis.line.x.bottom       : NULL
##  $ axis.line.y              : NULL
##  $ axis.line.y.left         : NULL
##  $ axis.line.y.right        : NULL
##  $ legend.background        :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.margin            : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing           : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing.x         : NULL
##  $ legend.spacing.y         : NULL
##  $ legend.key               :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.key.size          : 'simpleUnit' num 1.2lines
##   ..- attr(*, "unit")= int 3
##  $ legend.key.height        : NULL
##  $ legend.key.width         : NULL
##  $ legend.text              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.text.align        : NULL
##  $ legend.title             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
```

```
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.title.align        : NULL
##  $ legend.position           : chr "right"
##  $ legend.direction          : NULL
##  $ legend.justification      : chr "center"
##  $ legend.box                : NULL
##  $ legend.box.just           : NULL
##  $ legend.box.margin         : 'margin' num [1:4] 0cm 0cm 0cm 0cm
##   ..- attr(*, "unit")= int 1
##  $ legend.box.background     : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.box.spacing        : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ panel.background          :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.border              :List of 5
##   ..$ fill         : logi NA
##   ..$ colour       : chr "grey70"
##   ..$ linewidth    : 'rel' num 1
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.spacing             : 'simpleUnit' num 5.5points
##   ..- attr(*, "unit")= int 8
##  $ panel.spacing.x           : NULL
##  $ panel.spacing.y           : NULL
##  $ panel.grid                :List of 6
##   ..$ colour       : chr "grey87"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.5
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.minor          :List of 6
##   ..$ colour       : NULL
##   ..$ linewidth    : 'rel' num 0.25
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major.x        : NULL
##  $ panel.grid.major.y        : NULL
##  $ panel.grid.minor.x        : NULL
##  $ panel.grid.minor.y        : NULL
##  $ panel.ontop               : logi FALSE
##  $ plot.background           :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : chr "white"
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ plot.title                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
```

```
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.title.position       : chr "panel"
##  $ plot.subtitle             :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : num 1
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 5.5points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption.position     : chr "panel"
##  $ plot.tag                  :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : 'rel' num 1.2
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.tag.position         : chr "topleft"
##  $ plot.margin               : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ strip.background          :List of 5
##   ..$ fill         : chr "grey70"
##   ..$ colour       : logi NA
##   ..$ linewidth    : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ strip.background.x        : NULL
##  $ strip.background.y        : NULL
##  $ strip.clip                : chr "inherit"
##  $ strip.placement           : chr "inside"
##  $ strip.text                :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "white"
##   ..$ size         : 'rel' num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 4.4points 4.4points 4.4points 4.4points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.x              : NULL
##  $ strip.text.x.bottom       : NULL
##  $ strip.text.x.top          : NULL
##  $ strip.text.y              :List of 11
##   ..$ family       : NULL
```

```
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.left         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y.right        : NULL
##  $ strip.switch.pad.grid     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  $ strip.switch.pad.wrap     : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
##  - attr(*, "class")= chr [1:2] "theme" "gg"
##  - attr(*, "complete")= logi TRUE
##  - attr(*, "validate")= logi TRUE
##Animate Plot
avg_daily_sleepHours_animated <- avg_daily_sleepHours +
  transition_reveal(SleepDay)

animate(avg_daily_sleepHours_animated)
## `geom_line()`: Each group consists of only one observation.
## ℹ Do you need to adjust the group aesthetic?
## `geom_line()`: Each group consists of only one observation.
## ℹ Do you need to adjust the group aesthetic?
```

Works Cited:

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Centers for Disease Control and Prevention. (n.d.). How Much Sleep Do I Need? Retrieved from https://www.cdc.gov/sleep/about_sleep/how_much_sleep.html Medical News Today. (n.d.). What to know about BMI and body fat percentage. Retrieved from https://www.medicalnewstoday.com/articles/323446#body-mass-index-bmi

```
```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = FALSE)
```
```

```
## R Markdown

This is an R Markdown presentation. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document.
```

Code Snippet:

```
- Bullet 2
- Bullet 3

## Slide with R Output
```

````
```{r cars, echo = TRUE}
summary(cars)
```

## Slide with Plot

```{r pressure}
plot(pressure)
```
````