How Can a Wellness Technology Company Play It Smart?

Scenario:

I'm a junior data analyst on the marketing analytics team at Bellabeat, a leading manufacturer of health-focused products tailored for women. With ambitions to expand globally in the smart device market, Bellabeat sees the potential in analyzing smart device fitness data to unearth new growth opportunities. As part of this initiative, I've been tasked with delving into the usage patterns of one of Bellabeat's products, leveraging smart device data to inform our marketing strategy. My analysis findings and strategic recommendations will be presented to Bellabeat's executive team, shaping the direction of our marketing efforts moving forward.

Characters and products:

1. Characters

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

2. Products

- **Bellabeat app:** The Bellabeat app provides users with health data related to their activity, sleep, stress, menstrual cycle, and mindfulness habits. This data can help users better

understand their current habits and make healthy decisions. The Bellabeat app connects to their line of smart wellness products.
- **Leaf:** Bellabeat's classic wellness tracker can be worn as a bracelet, necklace, or clip. The Leaf tracker connects to the Bellabeat app to track activity, sleep, and stress.
- **Time:** This wellness watch combines the timeless look of a classic timepiece with smart technology to track user activity, sleep, and stress. The Time watch connects to the Bellabeat app to provide you with insights into your daily wellness.

- **Spring:** This is a water bottle that tracks daily water intake using smart technology to ensure that you are appropriately hydrated throughout the day. The Spring bottle connects to the Bellabeat app to track your hydration levels.
- **Bellabeat membership:** Bellabeat also offers a subscription-based membership program for users. Membership gives users 24/7 access to fully personalized guidance on nutrition, activity, sleep, health and beauty, and mindfulness based on their lifestyle and goals.

Goals of Study:

Three questions will guide my analysis:

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

Sršen want me to analyze the first question. I will produce a report with the following deliverables:

- A clear summary of the business task
- A description of all data sources used.
- Documentation of any cleaning or manipulation of data
- A summary of your analysis
- Supporting visualizations and key findings
- Your top high-level content recommendations based on your analysis.

Phase-1: Ask

The "Ask" phase marks the beginning of our analysis, focusing on formulating essential questions designed to delve into the smart device usage patterns of Bellabeat customers. This foundational step is crucial for uncovering actionable insights and identifying opportunities for growth that the marketing team can leverage.

Business Task

The primary goal is to pinpoint patterns in the usage of non-Bellabeat smart devices by consumers. These insights will be integrated into Bellabeat's marketing strategies to enhance its market positioning and consumer engagement.

Stakeholders

- Urška Sršen, the co-founder and Chief Creative Officer of Bellabeat, plays a pivotal role in steering the creative direction and product innovation.
- Sando Mur, co-founder and a vital member of the executive team, brings analytical and strategic insights into decision-making processes.
- The Bellabeat marketing analytics team is responsible for conducting the analysis, extracting valuable insights, and recommending strategies based on consumer behavior trends observed in non-Bellabeat smart device usage.

Phase 2: Prepare

The "Prepare" phase focuses on collecting and preparing the necessary data for analysis, ensuring it is accurate, complete, and ready for in-depth examination to inform Bellabeat's strategic decisions.

Overview of Data Sources Utilized

The data source selected for our case study originates from the FitBit Fitness Tracker Data. This dataset is hosted on Kaggle and was provided courtesy of Mobius.

Information About the Data

This dataset was generated by respondents to a distributed survey via Amazon Mechanical Turk between 03.12.2016-05.12.2016. Thirty eligible Fitbit users consented to the submission of personal tracker data, including minute-level output for physical activity, heart rate, and sleep monitoring. Individual reports can be parsed by export session ID (column A) or timestamp (column B). Variation between output represents use of different types of Fitbit trackers and individual tracking behaviors / preferences.

Structure of the Data

The dataset comprises 18 distinct CSV files, each corresponding to different quantitative metrics monitored by Fitbit. This data is organized in a long format, where each row indicates a distinct time point for a given subject, thereby assigning multiple rows to each subject. A unique ID is assigned to every user, facilitating the differentiation of data across various rows, as it is segmented by both date and time.

Data Integrity and Credibility:

The dataset, constrained by its small scale and lack of demographic details, may be prone to sampling bias, casting doubt on its representativeness of the general population. The additional challenges of the dataset not being up-to-date, and the survey's brief timeframe of 2 months also detract from its comprehensiveness and current applicability. Within the confines of this research, we will proceed utilizing the dataset in its present form. However, in practical applications, it would be advisable to enhance the dataset with newer, more relevant data and, where feasible, to include demographic details.

Phase 3: Process

In the "Process" phase, the task is to diligently clean and modify the selected dataset, ensuring it is well-organized and uniform for productive analysis. This phase is essential for establishing a strong base that will facilitate the derivation of valuable insights.

We will opt for R in this analysis based on its broad accessibility, suitability for handling the expected data volume, and the facility to create compelling data visualizations that will aid in presenting outcomes and suggestions to stakeholders.

Preparing the Environment by Loading Essential Packages

To this analysis, the following R packages will be loaded due to their relevance and utility in addressing the analytical requirements:

- tidyverse: Offers a suite of tools for data manipulation, visualization, and exploration, integral for data science in R.
- here: Facilitates the use of project-oriented workflows by managing file paths in a more intuitive manner.
- skimr: Enables quick and detailed summaries of datasets, which is critical for preliminary data assessments.
- janitor: Provides functions that simplify the cleaning of data and column names, enhancing data quality and readability.
- lubridate: Makes it easier to work with dates and times in R, crucial for analyses involving temporal data.
- knitr: Allows dynamic reporting in R by enabling integration of R code into LaTeX, LyX, HTML, Markdown, AsciiDoc, and reStructuredText documents.
- kableExtra: Designed to extend the basic functionality of tables produced using knitr::kable()

Next steps of phase mentioned in R file.

Key Insights

Noteworthy observations from the analysis are as follows:

1. Activity Range: The data reveals a wide range of user activity levels, with total daily steps spanning from 0 to 36,019. On average, users take approximately 7,638 steps per day. To put this in context, the Center for Disease Control and Prevention (CDC) recommends a minimum of 10,000 steps per day for general health.

2. Distance and Calories: The dataset exhibits significant variability in total distance covered (ranging from 0 to 28.03 units) and calories burned (ranging from 0 to 4,900), indicating diverse levels of physical activity and metabolic rates among users.

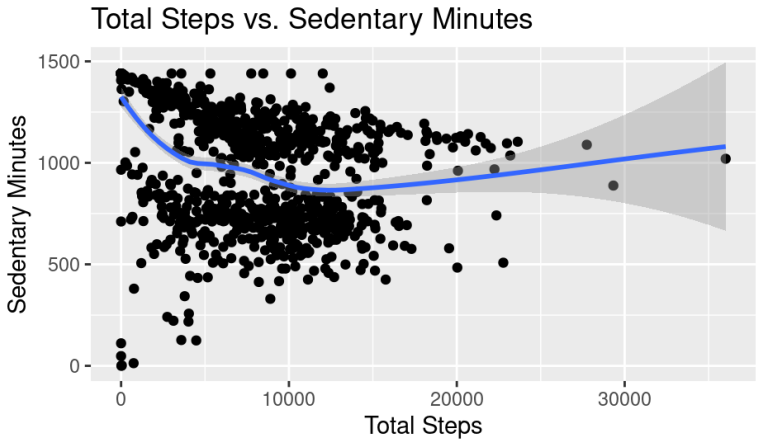
3. Active vs. Sedentary Minutes: Users spend an average of 991 sedentary minutes per day, equivalent to approximately 17 hours. This highlights a substantial portion of the day being spent inactive, which may have implications for overall health and well-being.

4. Sleep Patterns: Analysis of sleep data reveals a wide spectrum of sleep durations, ranging from 58 to 796 minutes. The median sleep duration of 432.5 minutes suggests an average of approximately 7 hours of sleep per user, aligning with commonly recommended sleep guidelines.

5. Hourly Calories: There is notable variability in hourly calories burned, ranging from 42 to 948 units. The median value (83) is considerably lower than the maximum, indicating fluctuating levels of physical activity throughout the day, ranging from low to high intensity.

Phase 5: Share

The "Share" stage in data analysis is pivotal for conveying the outcomes and insights gleaned from the analytical process to stakeholders. This phase is fundamental for converting insights based on data into practical business strategies. It generally entails the development of visualizations, reports, dashboards, or presentations that encapsulate the principal findings, trends, and suggestions in a manner that is both engaging and easy to understand.

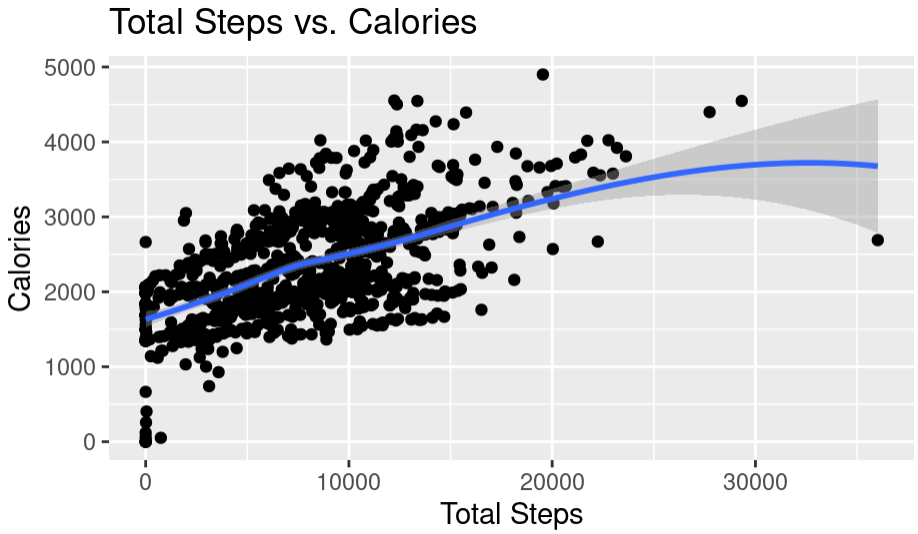


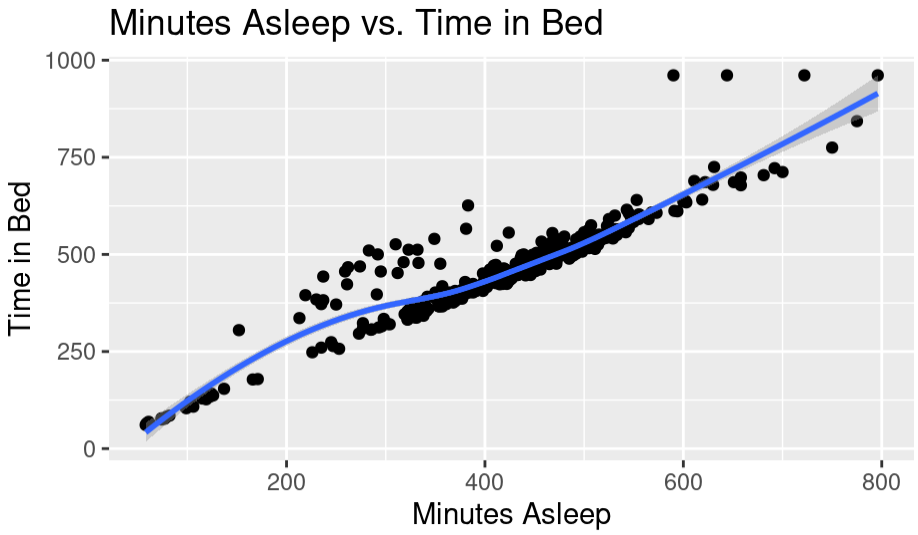
From the "Total Steps vs. Sedentary Minutes" visualization, several insights emerge:

- There appears to be a consistent pattern where an increase in total steps correlates with a reduction in sedentary minutes, underscoring the notion that individuals who engage in more physical activity generally spend less time in inactivity.
- A significant concentration of data points can be observed at the lower step count and higher sedentary minutes end, indicating that a considerable segment of the population adopts a sedentary lifestyle.
- The data exhibits a broad range of sedentary minutes for comparable amounts of steps, suggesting that the number of steps taken is not a definitive indicator of sedentary habits.
- The relationship between steps and sedentary minutes is not linear, as evidenced by the curve in the data. This implies that the reduction in sedentary time does not proceed at a uniform rate with an increase in step count.

The "Total Steps vs. Calories Burned" visualization yields several key insights:

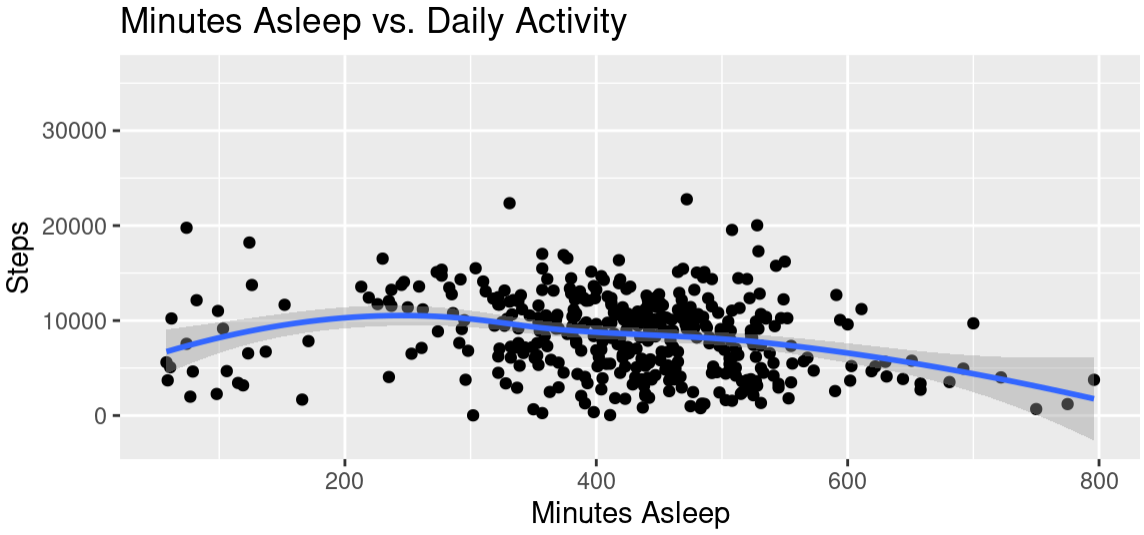
- A distinct positive correlation is evident, demonstrating that an increase in steps taken is associated with higher calories burned.
- The trend's uniformity across the dataset indicates that, for most individuals, a rise in physical activity (measured in steps) leads to an increase in caloric expenditure.
- The proximity of data points to the trend line, especially at lower step counts, reveals a strong correlation within common levels of activity.
- The presence of outliers at elevated step counts suggests that there may be personal differences in metabolic rates or variations in the intensity of physical activities.





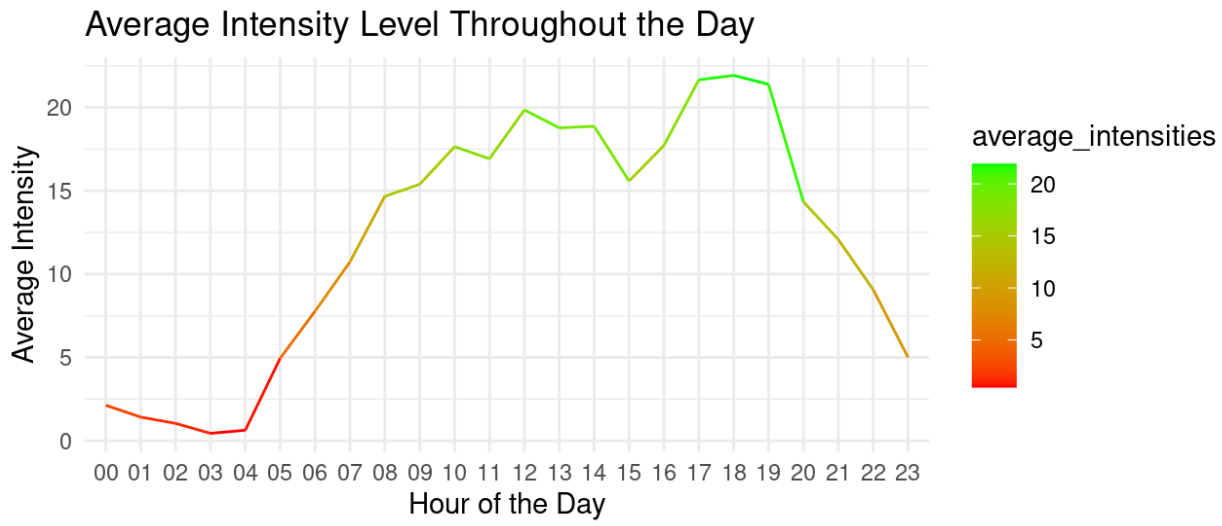
The visualization comparing "Minutes Asleep vs. Time in Bed" leads to several conclusions:

- A significant positive relationship is observed between the duration spent in bed and the minutes asleep. This suggests that, generally, an extended period in bed correlates with increased sleep duration.
- The tight clustering of most data points near the trend line indicates that, for the majority, the time spent in bed is effectively utilized for sleeping.
- Certain data points where the time in bed greatly surpasses the time spent asleep point to possible inefficiencies. These instances could reflect periods of restlessness or challenges in achieving continuous sleep.



The "Total Steps vs. Minutes Asleep" chart offers several observations:

- The relationship between total steps and minutes asleep is not linear. Initially, as the number of steps increases, the minutes spent asleep tend to rise, followed by a slight decrease.
- The data indicates that the greatest amounts of sleep are not consistently associated with the highest step counts. This suggests that optimal sleep may be more closely aligned with moderate levels of activity.
- The spread of the data points to individual differences in sleep requirements or habits that are not solely dependent on activity levels.

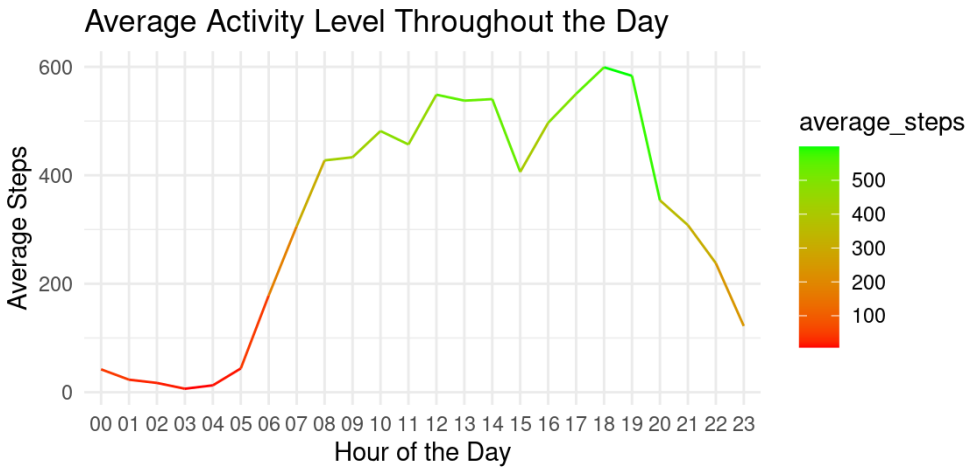


The "Average Intensity Level Throughout the Day" visualization indicates:

- **Gradual Morning Increase**: Activity intensity starts at its minimum during the early morning and experiences a sharp rise as the morning advances.
- **Peaks of Activity Intensity**: The chart shows peaks in activity intensity, indicative of periods within the day characterized by increased physical activity, possibly coinciding with exercise sessions or daily routines.
- **Evening Decrease**: In the late evening, a noticeable drop in activity intensity is observed, consistent with common rest or pre-sleep practices.

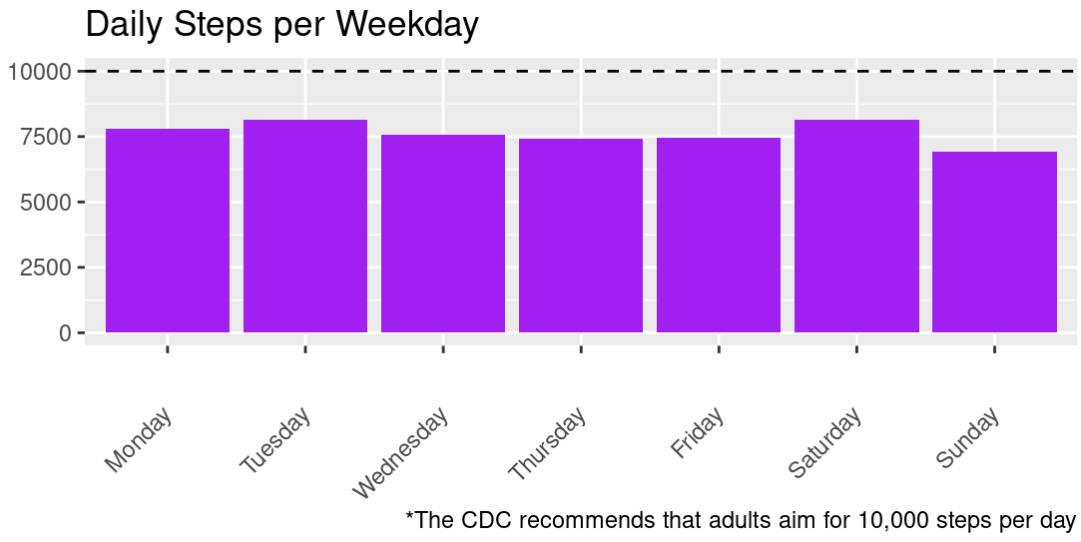
The "Average Activity Level Throughout the Day" graph reveals:

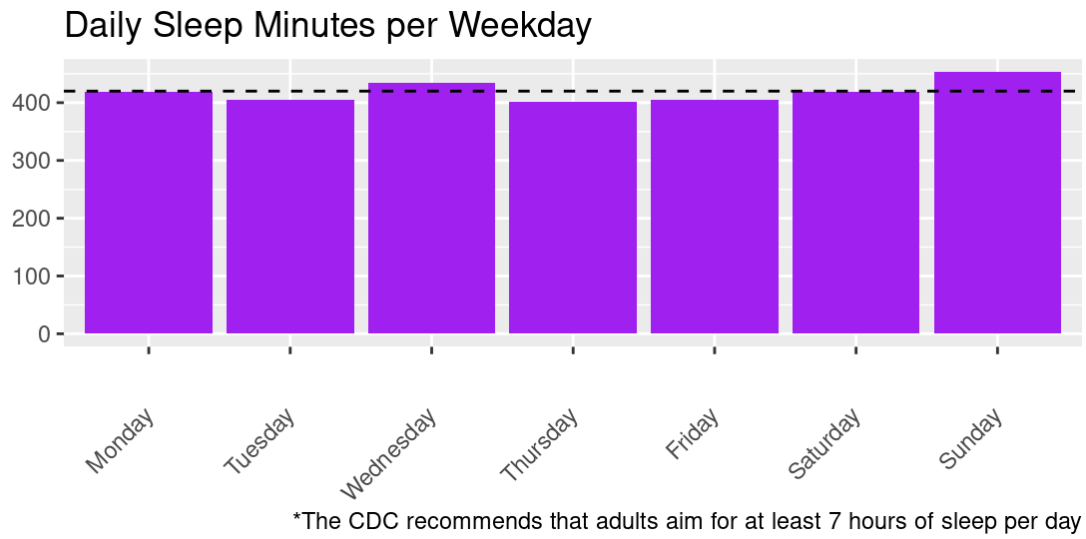
- **Morning Surge**: Activity levels are initially low, then surge sharply in the early morning, reaching a peak around midday.
- **Afternoon Decline**: Following the peak, there is a pronounced decrease in activity, which is then followed by a modest increase in the evening.
- **Evening Drop**: As the day concludes, activity levels significantly decrease, illustrating common patterns of daytime activity and nighttime rest associated with a typical workday.



The "Daily Steps per Weekday" chart provides insights such as:

- None of the weekdays achieve the recommended daily step count of 10,000, highlighting generally lower activity levels than advised.
- The activity levels across weekdays are relatively steady, with no particular day exhibiting a notable surge or drop in step counts.
- The slight differences in daily steps indicate uniform daily routines throughout the week, including weekends, which do not significantly diverge from weekdays.





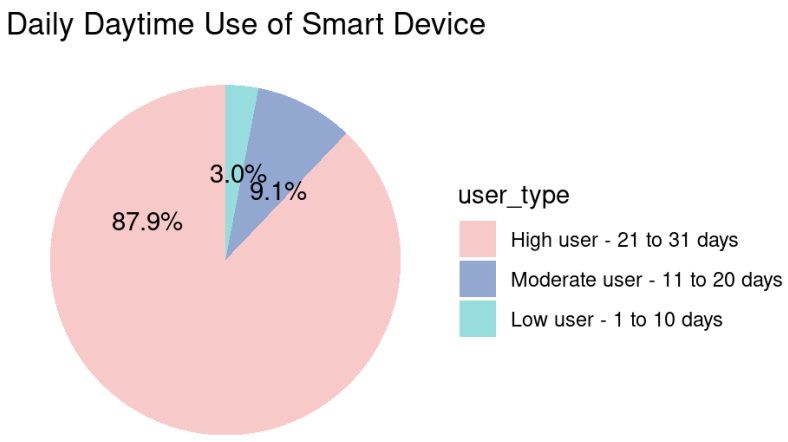
The "Daily Sleep Minutes per Weekday" chart indicates:

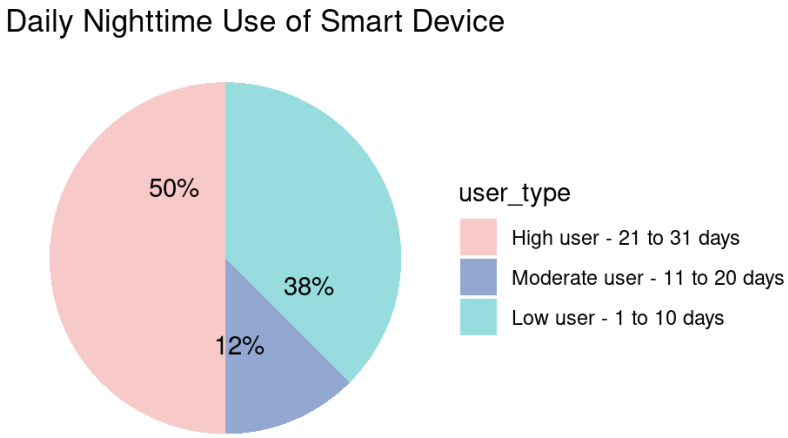
- The duration of sleep remains uniform throughout the week, without significant variance among weekdays.
- Most days either meet or exceed the CDC's recommended 7 hours of sleep, especially as the week progresses toward the weekend.
- The data suggests a regular sleep pattern among participants, with a tendency for slightly extended sleep durations on Sundays.

In the following step, we plan to assess the daily usage of smart devices among our users, categorizing them into three segments based on usage over the 31-day survey period:

- **High User**: These are users who engage with their device for 21-31 days.
- **Moderate User**: This category includes users who use their device for 10-20 days.
- **Low User**: Users falling into this segment use their device for 1-10 days.

We will further differentiate between "daytime usage" and "nighttime usage" by analyzing the daily_activity and daily_sleep records. This approach will enable us to understand patterns of smart device usage during the day compared to the night, providing insights into user behavior and device interaction across different times of the day.





The analyses of "Daily Daytime Use of Smart Device" and "Daily Nighttime Use of Smart Device" indicate:

- **Daytime Usage**: The majority of daytime users are classified as "high users," accounting for 87.9% of the segment. This suggests a significant level of engagement with the devices during daytime hours.
- **Nighttime Usage**: The distribution of user types during nighttime is more balanced, with "high users" still comprising a notable half of the segment. This indicates a considerable but less pronounced use of devices at night.
- **Comparative Engagement**: The pronounced difference in daytime versus nighttime engagement suggests that users tend to interact more actively with their devices during the day. This might be driven by the devices' features that are more applicable to daytime activities, such as activity tracking.
- **Implications for Design and Marketing**: These findings underscore a potential area of focus for the company to enhance and promote features that support daytime activities. Additionally, exploring how comfortable and practical it is for users to wear or use smart devices while sleeping could offer insights for improving nighttime usage experiences.

Phase 6: Act - Strategic Recommendations for Bellabeat's Marketing Strategy

In the "Act" phase, drawing from the extensive analysis of the fitbit user data, we formulate several strategic recommendations to refine the company's marketing approach:

1. **Promote Daytime Activity Engagement**: With 87.9% of users identified as 'high users' during daytime, emphasizing features that support and encourage daytime activity becomes paramount. Enhancing and marketing functionalities such as activity reminders or goal-setting features could significantly boost daytime user engagement.
2. **Enhance Sleep Functionality**: Acknowledging that a considerable segment of users achieves or surpasses the CDC's recommended 7 hours of sleep, especially during the weekend, Bellabeat can capitalize on this by advancing sleep analysis features. These enhancements could offer deeper insights into sleep patterns and personalized suggestions for improving sleep quality.
3. **Combat Sedentary Behaviors**: The link between step counts and sedentary minutes uncovers an opportunity for Bellabeat to motivate users towards more active lifestyles. Campaigns or features that nudge users towards movement after prolonged inactivity could address sedentary habits effectively.
4. **Leverage User Segmentation in Marketing**: By categorizing users into 'low', 'moderate', and 'high' engagement segments, Bellabeat can craft more personalized marketing messages. This could involve encouraging 'low users' to engage more with their device, while offering 'high users' information on advanced features or community engagement opportunities.
5. **Highlight Nighttime Device Comfort and Utility**: Investigating user perceptions of nighttime wearability can inform improvements in device design for enhanced comfort. Marketing efforts could then emphasize the sleep tracking and comfort features of Bellabeat products to encourage nighttime usage.
6. **Offer Customized Activity Insights**: Considering the wide variability in user activity levels and metabolic responses, providing personalized activity insights and recommendations could improve user satisfaction. Tailoring this content to fit individual user profiles would make the Bellabeat app more relevant and engaging.

By implementing these focused strategies, Bellabeat can effectively cater to individual user needs and preferences, thereby enhancing engagement and fostering brand loyalty.

In conclusion, it is important to emphasize the significance of incorporating additional datasets and demographic information for a thorough analysis. This approach ensures data relevance and facilitates the accurate correlation of behavioral patterns with specific demographic segments. Ultimately, this enhances predictive accuracy and enables more precise customization of the marketing strategy.

THANK YOU