MoodWise: A Personal Informatics System for Tracking Mood, Weather, and Physical Activity

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ABSTRACT

MoodWise is a mobile app designed to help users affected by weather conditions and who are physically active to easily log their mood, physical activity, and daily weather conditions. The app aims to provide users with insights and visualizations to enhance their emotional well-being by identifying patterns between their habits and environmental factors. Its development process was guided by user-centered design principles and iterative evaluations, including internal discussions, usability testings, and an HCI experiment. Usability evaluations and were conducted to test the app's ease of use, which revealed key design insights and areas for improvement. These insights have been used to refine the app, making it a valuable tool for fostering habits which combat mood reductions under adverse weather conditions in today's fast-paced world.

1 INTRODUCTION

Every day, we experience changes in weather and engage in a variety of physical activities, such as running, biking, or walking. These external factors can have a powerful effect on our mood and overall sense of well-being [1][2]. However, many people struggle to pinpoint exactly how these elements interact; they may not realize, for instance, that a walk in chilly weather consistently lifts their spirits, or that an overcast day often leaves them feeling low on energy. Understanding these subtle interactions is even more crucial in countries with long, cold winters, where maintaining emotional well-being can be particularly challenging. Extended periods of low temperatures and limited sunlight can negatively impact mood, sometimes leading to seasonal affective disorders (SAD) or milder forms of seasonal mood fluctuations [3][4]. In these contexts, being able to track the relationship between mood, physical activity, and weather becomes an important tool for improving mental health. By increasing awareness of how daily habits and environmental factors influence emotional states, individuals can make more informed decisions, for example prioritizing outdoor activities on sunnier days or adjusting routines during darker months, to support and improve their well-being.

To address this need, this report presents MoodWise, a mobile application designed to help users who are impacted by weather conditions and are otherwise physically active, to easily log their mood, physical activity, and daily weather conditions. The app further aims to provide users with interactive visualizations that allows them to identify how these factors interact over time, ultimately helping them to make choices that may benefit their mental well-being.

1.1 Related Work

In the design of MoodWise, several studies examining the relationship between weather, mood, and physical activity were explored. These offered valuable insights to guide its development. For example, Mathew C. Keller et. al. [1] found that during springtime, individuals who spent more than 30 minutes outdoors experienced improved mood and enhanced cognitive function, highlighting the importance of environmental exposure in mood regulation. Building on this, Lee White and colleagues [2] showed that exercising outdoors led to significantly greater mood improvements compared to indoor exercise.

In addition, a review by Benny Peiser [3] on seasonal affective disorder (SAD) and exercise treatments highlights how seasonal changes can significantly affect mood. The review reports that approximately 2% of people in northern Europe suffer from SAD, with up to 10% experiencing milder seasonal symptoms. It also notes that regular exercise, particularly when combined with light therapy, may help alleviate these mood disturbances. Kristin H. Kroll's [5] research further supports this, showing that even in non-depressed individuals, regular exercise significantly improves mood, with average mood scores rising from 6.55 to 7.81 on a 9-point scale.

Together, these studies indicate that both weather conditions and physical activity are key factors in shaping emotional well-being. However, studies regarding interactions between all three interaction terms are very limited in the literature. For MoodWise, this underscores the value of capturing and visualizing these variables and their interactions with one another.

1.2 Analysis

While the impact of weather and physical activity on mood is acknowledged, there is still a lack of simple, accessible tools that allow individuals to systematically track and analyze these variables over time. Despite the wealth of digital self-tracking tools available, many existing solutions either focus narrowly on fitness metrics or offer overly broad tracking without emphasizing the specific relationship between mood, activity, and weather. For instance, Daylio [6] is a self-care app that tracks a wide range of factors, from mood to water intake, but its broad scope can make it difficult for users to identify clear patterns between environmental factors and emotional well-being. Conversely, fitness apps like Apple Fitness [7] or Fitbit [8] prioritize physical activity and largely overlook its correlation with mood and weather conditions. As a result, users are left without clear, actionable insights that could empower them to make informed decisions about their daily habits.

MoodWise addresses this gap, by providing a focused system which emphasizes the interactions between just mood, physical activity and weather conditions.

1.3 Prototype

The final MoodWise prototype (App. D.4) is a mobile personal-informatics app that supports the full stage-based model of self-tracking systems [9]. The app is divided in three main screens: the Home Screen, the Calendar View and the Stats Screen.

When accessing the app, users are directed to the Home Screen (Fig. 1a). Here, they can log and later inspect their daily mood, activities, and weather with minimal steps. To log their mood, users must click the button called 'Log Today's Mood', which redirects them to the Mood Log Screen (Fig. 1b). On this screen, users can log their morning and evening mood separately to later observe how their emotional state evolves throughout the day. Five mood options are available - fantastic, good, neutral, bad, and awful - displayed as an emoji face scale to make the selection intuitive and quick.

In early design sketches, we explored different input methods for mood logging, including a numeric 1-to-10 slider and a tap-to-type list. However, informal hallway testing revealed that a five-emoji scale allowed participants to recognize and record their feelings more quickly and intuitively, so the emoji option was adopted. The decision to separate morning and evening mood entries was also informed by heuristic evaluations. This approach was chosen because it enables users to observe how factors such as weather and physical activity may have influenced changes in their mood throughout the day if desired, or do the entire entry at once.

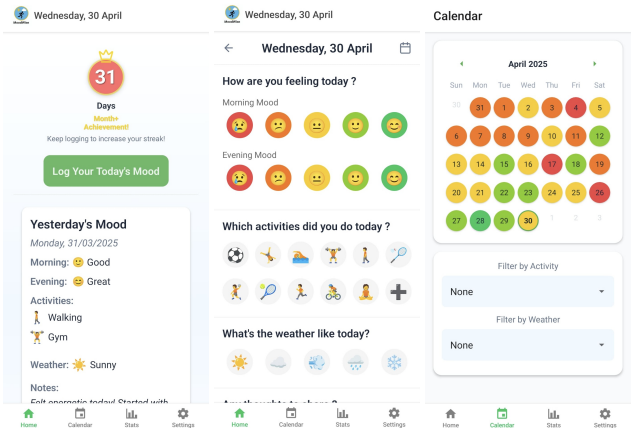
Additionally, in the mood log screen, users can add the activities they engaged in during the day. They can choose from a set of default activities or click the '+' button to add a new one (App. D.3). When adding a custom activity, users assign an emoji and a name, and the new activity is saved for future use. Furthermore, users can select the weather experienced during the day from five options: sunny, cloudy, windy, rainy, and snowy. A free-text box is also available for users to record any personal notes or reflections. Once all information is entered, users press the "Log Mood" button, leading to a summary screen where they can review and confirm their entries before saving. Then, users are redirected back to the Home Screen.

The Home screen then updates three elements: a streak counter; today's mood with an inline edit link; and a 14-day mini-calendar that colors each date by average mood (App. D.3).

Tapping any date on the 14-day mini-calendar opens the full Calendar view (Fig. 1c), which displays a full monthly calendar with mood color coding. Filters at the bottom of the screen allow users to view only days that match certain activities and weather conditions. For instance, selecting "Swimming" and "Sunny" highlights only those days, enabling users to easily observe patterns between activities, weather, and mood.

Finally, the Stats page offers detailed data visualizations, aggregating longer-term patterns. The features include:

- Mood trend line graph (Fig. 2a): Shows the average daily mood over time, with the y-axis representing mood and the x-axis representing time (last 7 days, last 30 days, or all-time, selectable with a chip-style switch). Users can tap individual points for more detailed information.
- Slope plot of daily mood changes (Fig. 2b): Displays how users' mood shifts from morning to evening in a horizontal scrollable view across the month.
- Activity or weather analysis: A bar plot shows the frequency of activities or weather conditions, with bars colored according to the average mood associated with each (see App. D.3).



(a) Home Screen **(b) Mood log** **(c) Calendar view**

Figure 1: Main screens of the MoodWise prototype D.3

- Mood distribution pie chart (Fig. 2c): Visualizes the total count of logged moods across different mood levels (0 to 4), with each segment representing a mood's frequency. Users can tap a segment to highlight it and view a summary providing insights into the frequency and context of each mood, such as the number of occurrences and associated activities or weather.
- Relationship summary cards: Displays a card-based view ranking the relationships between weather, activities, and mood, ordered by average mood score. Each card highlights a specific activity or weather condition, showing its frequency and associated average mood, helping users identify which activities or weather types correlate with their happiest moods (App. D.3).

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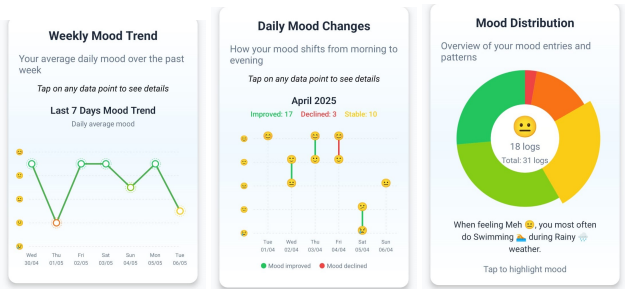
The decision on how to organize the screens and detailed data visualizations was also carefully considered. In the first iteration (Sub. 2.3), the app displayed visualizations on both the Home Screen and the Stats Screen. However, this caused confusion among users, who found it unclear where to find a summary of the visual information (as discussed in Sub. 2.3). As a result, we decided to consolidate all detailed visualizations into the Stats Screen to ensure a clearer and more focused user experience.

Further design choices, such as the types of plots displayed on the Stats Screen, the visualization of the calendar view, and the mood logging process, were informed by usability tests, a human-computer interaction (HCI) experiment (Sub. 2.5) and internal heuristic evaluations. Additional details about these methods are provided in the Methods Sec. 2.

2 METHODS

This section outlines the experiments, usability tests, and evaluation methods conducted throughout the development of MoodWise.



(a) Mood trend **(b) Slope plot** **(c) Pie chart**

Figure 2: Main screens Stats screen in MoodWise. For completed prototype look D.3

2.1 Data collection

In the initial stages of development, data collection was carried out manually, with team members recording their mood, activities, and weather observations in a shared notes app. Once a sufficient amount of data was collected, we imported it into the MoodWise app to populate the visualizations and test the functionality of the interface. This initial data was critical in testing the app's basic functionality and ensuring the system was capable of capturing meaningful patterns between these factors.

As the project progressed, we transitioned to a dynamic data system, allowing real-time data entry directly within the app. This allowed for continuous updates to the visualizations as new data was logged, improving the interactivity and the responsiveness of the system.

2.2 Internal heuristic evaluations

Throughout the development of MoodWise, the team held weekly meetings to guide the design process. During these sessions, we discussed desired features, evaluated previous iterations of the app, and identified areas for improvement. These internal heuristic evaluations, in particular for recognition, consistency and efficiency [10] , played a key role in shaping the design and functionality of the app. Some of the key features that emerged from these discussions were the system supporting adaptable mood-logging patterns, the overall contents of the stats page and the potential for a notification screen (App. C.5). Several resulting design decisions will also be discussed in detail in the Results Sec. 3.

2.3 Usability Test #1

To evaluate the first design iteration of MoodWise, an initial usability test was conducted with four participants. This test aimed to assess the intuitiveness of the app and to determine whether users could easily navigate its basic features. Using the first prototype of the app, we used the Thinking Aloud method to do this test. Observing users complete these tasks while expressing their thought process provided valuable insights into areas for improvement.

2.4 Usability Test #2

A second usability test was conducted to assess the updated MoodWise prototype. This evaluation was designed to observe how users engaged with the revised Stats screen and interacted with the enhanced activity customization features.

Participants were asked to complete a series of representative tasks that reflected typical user goals, such as logging mood entries with custom activities or analyzing mood trends over different time periods (App. C.2). The study employed a thinking-aloud protocol, encouraging participants to articulate their reasoning and impressions as they navigated the app. Observational and timing data were collected alongside qualitative insights from post-session interviews to build an understanding of user experience and identify areas for further refinement.

2.5 HCI Experiment

The purpose of the experiment was to evaluate the effectiveness of four different visualization methods (a stacked bar chart, heatmap, scatter-line chart, and seperated bar charts; (App. C.4) in helping users answer questions that require deeper insight in personal data patterns. The data patterns were simulated in four different ways, yielding four unique datasets. The experiment followed a within-subjects design, in which each participant completed four rounds, interacting with all four visualization methods. Each method was paired with one of the datasets and a unique question. The visualizations were interactive in the same manner across all conditions to ensure consistency. To mitigate learning effects, the order of visualization methods and associated questions was counterbalanced using a 4×4 balanced Latin Square design [11]. The order of datasets showed was held constant due to their inherently distinct characteristics. Prior to the main task of inferring a question, participants were given the opportunity to explore a mock dataset using a visualization interface not included in the main tasks, allowing them to become familiar with the interaction style. Once the task was started, their time to complete it was recorded for each round, and after they answered the posed question, they were asked to fill in a Likert scale questionnaire, assessing their perceived workload and preference. The participants were gathered using convenience sampling from DTU, and as such the demographic ranged from ages 21 to 30, with a background of moderate to high technical proficiency, and familiarity with visualization methods. Due to the narrow participant demographic, external validity becomes quite limited, as the experimental results do not apply to a general user population. This is in addition to using simulated mock datasets, which do not fully represent the complexity and variability of real data.

3 RESULTS

In this section, the key findings and insights derived from the evaluations introduced in the methods (Sec. 2) are presented.

3.1 Internal heuristic evaluations

One of the main insights gained from the internal heuristic evaluations was the selection of visualizations for the Stats Screen. To inform this decision, we first sketched various visualizations in an Observable notebook. We developed 10 different visualizations and then evaluated which ones provided the most insightful information. This discussion, coupled with the results from the HCI

experiment (App. C.3), led to the final set of visualizations displayed on the Stats Screen.

As discussed in the Prototype Sec. 1.3, the number and timing of mood logs per day was also a topic of internal evaluation. We debated whether to allow users to log their mood as many times as they wanted or to limit the entries to just two. Ultimately, we decided to restrict users to two entries — morning and evening — because it would encourage more consistent logging while still allowing users to capture their mood changes throughout the day [12].

Additionally, we considered when users should be prompted to log their mood. Requiring multiple manual entries each day can become burdensome and decrease user engagement [13], while limiting input to only once a day (e.g., in the evening) may lead to forgetfulness or reduced motivation. To balance these factors, we adopted a flexible approach: users can log their mood at any time during the day and have the option to revise or complete their entries later. This allows for adaptability — users can return to the app to update their evening mood if they missed it earlier, add activities as they occur, or log both morning and evening moods at once.

3.2 Usability test #1

This usability test revealed several important insights that guided the next iteration of MoodWise. One of the main findings concerned the section in the Mood Logging Screen where users could add the activities they had performed during the day. A question mark icon was originally used to represent the option "another activity," but most participants did not understand its meaning. This suggested the need to use a more intuitive icon. So the question mark icon was replaced by a '+' sign. Additionally, participants commented that it would be beneficial to personalize the list of sports or activities available for selection, allowing for a more tailored user experience. So this feature was implemented in the app.

Another significant issue identified was related to the presentation of data. In the initial prototype, three different screens were dedicated to showing different statistics. This layout confused participants, who felt overwhelmed by the amount of information spread across multiple locations. As one participant put it: "If you have a lot of places where you can see information, it can become confusing." Based on this feedback, we restructured the app: the Stats Screen now centralizes all key statistics, while the Home Screen was simplified to only show the user's streak, allow mood logging/updating, and display a calendar view. After these changes, users are left with just two main sections for data visualization: the Calendar view Screen and the Stats Screen, making navigation much clearer and more intuitive.

3.3 Usability test #2

The second usability study confirmed that the core logging flow in MoodWise is functional and well received. All three participants recorded a mood, reviewed the confirmation screen, and located the updated streak counter unaided. They described the emoji scale as "quick to read," and the summary overlay as "reassuring". Several interface elements, however, still introduced friction, prompting refinements grounded in participant feedback and established design principles.

A recurring problem concerned the control for adding custom activities. Participants repeatedly tapped the small "+" icon before realizing it opened a creation form, signaling weak accordance. We therefore introduced a modal overlay behind the '+' symbol, prompting users to specify the activity name and select an emoji. This change improves recognition over recall, an approach first advocated by Nielsen and Molich [10] (App. D.2).

The slope plot visualization, which shows the change from morning to evening mood, also proved difficult to interpret. The legend repeated the words "morning" and "evening" on every point, creating clutter and obscuring the axis mapping. We simplified the display by tinting the two readings in distinct shades — lighter for morning, darker for evening — and by adding date ticks beneath each segment. These revisions follow the graphical-mark guidelines presented by Heer, Bostock, and Ogievetsky [14] and are illustrated in Fig. 2b.

When asked to inspect mood on March 25th, users turned to the calendar instead of the weekly trend line, indicating that the chart lacked sufficient temporal cues. Hover-revealed day numbers and faint weekly grid lines were added to support fine-grained inspection, echoing reflection heuristics proposed by Cuttone et al [15].

Finally, one participant wished to hide the streak counter after missing a day. A visibility toggle has been placed in the Settings Screen, giving users control over motivational features and supporting the "action" stage of the personal-informatics model described by Li, Dey, and Forlizzi [**?**].

3.4 HCI Experiment

Due to time and resource constraints, the experiment was conducted with only eight participants, resulting in a limited dataset, making formal statistical analysis inapplicable, As such, the findings are based on surface-level summary statistics, collected across the four visualization methods. Among the ones tested, the Stacked Bar Charts consistently outperformed the others across nearly all evaluated metrics. They produced the fasts average response time (38.25 seconds), the highest confidence in conclusions (4.50/5), lowest mental effort (2.13/5) and were rated highest in ease of understanding (4.13/5). Participants also could imagine this to be particularly helpful for identifying strategies otherwise (4.13/5).

Heatmaps performed overall second best and were voted to be the most visually appealing of the four visualization methods, while the separated bars were overall third best, scoring closely to heatmaps, and the line-scatter plot being the worse by a large margin. Thus, the resulting final visualization can be seen in Fig. 3. This choice is not properly substantiated as a larger sample size is needed for statistical testing to be done.

4 DISCUSSION

This section contains reflections on internal design choices, their limitations and their implications. Further, we set out to address potential issues with how the usability evaluations and HCI experiment were carried out.

A key design decision concerned the timing and frequency of mood entries. The final iteration of this was a deliberate, internal

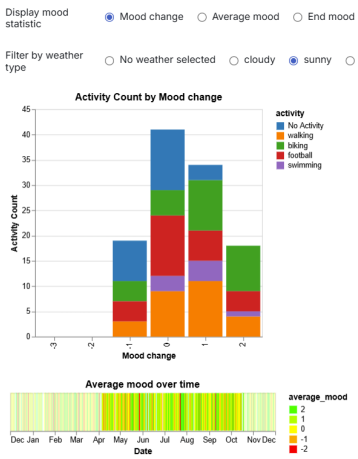


Figure 3: The best visualization inferred from the results of the HCI experiment on a mock dataset. The radio buttons on top filter the data, and the bar below delimits it.

choice, and would need to be verified through further experimentation, in which user engagement and satisfaction is measured. As the system functions with only a single data-point per day containing two mood values, activity and weather, users were initially planned to either log their mood twice per day, morning and evening or once just in the evening. However, after internal discussions and consideration we opted for a flexible system that allows continuous updating of the daily mood-log if desired through overwriting. This balance aimed to support consistent logging while avoiding user fatigue, and reflected findings from related work on tracking burden [13]. In extension to this users are also unable to edit past entries, a deliberate choice to avoid retrospective bias [16] but one that may reduce user satisfaction. Another option would be to allow users to edit their past entries within a certain time limit, or clearly visualize what entries are edited in the calendar view, and exclude these from the stats page. Both of these options are valid, but introduces bias to some degree.

The app supports no degree of automatic tracking which can introduce inaccuracy in logging. In terms of physical activity, the user must decide for themselves when a daily activity qualifies for an entry in the app. For example, if a user casually walks during the day, they may not denote it as extraordinary, and thus not take note of it in the app. This example could be partly improved through an automatic step counter, though this is followed by its own challenges. Some of which are out whether the steps are taken inside or outside, and whether this should be discerned. Further, self-selecting a single weather option which represents the entire day, also introduces a high amount of bias. Initially, we considered automatically tracking the weather, but decided against it. This was deliberate as it allows the user to pick the weather condition that they felt affected them the most during the day. For example, a poorly timed downpour could ruin an outside activity, and thus be the highlighted weather of the day. Naturally, these choices should be evaluated further and not be based solely on our internal discussions, which suffer from our own bias.

For the app functionality, usability testing played a critical role in progressing to the final design of MoodWise. Although only a few participants were involved, their feedback directly led to meaningful design improvements. Despite this, there are several limitations that affect the validity of these tests. First and foremost, the usability tests were conducted with a very narrow user demographic, which largely does not resemble our actual targeted user demographic. This restricts the generalizability of the results, and could have resulted in unsuitable changes. Moreover, because we used simulated datasets during the HCI experiment, the effectiveness of the visualizations in real-world use remains uncertain. This could have been addressed by using our real mood logs, but this was not possible due to time constraints.

Finally, motivational strategies deserve further exploration. While streaks were initially introduced to encourage engagement, feedback indicated they could be demotivating. A better approach might involve adaptive feedback, personalized insights, or gamification techniques that would otherwise support long-term engagement without penalizing missed days.

4.1 Future Work

Guided by the stage-based model of personal informatics [9], and the discussions in this report, further developments of MoodWise could focus on easing data collection by making it semi-automatic, and adopting a notification system. To promote a consistent logging habit, a configurable reminder system could let users schedule gentle prompts at times that suit their routines. Self-set notifications have been shown to reduce attrition in self-tracking apps [17]. Further, logging iteself could be made with less bias and with more information by automatically inserting real-time weather, tremperature, precipitation, and cloud cover, but while still allowing manual edits if necessary. The settings panel could be expanded with switches that let users hide the streak counter and export their records to CSV, which supports autonomy and data portability in line with reflection-oriented design heuristics [15]. To allow for deeper insights, the Stats screen could get the addition of a comparative view, such that users will be able to place two conditions such as running versus yoga or sunny versus rain, side by side in box plots. This style of visual analytics is known to prompt richer reasoning [18]. These enhancements, among many others internally discussed, are speculative in their impact but hypothesized to lower friction between user and system, and allowing for better analysis tools.

5 CONCLUSION

To conclude, we recognize the challenges of the project by highlighting the potential issues of our internal design choices throughout the development of MoodWise, as due to resource constraints, everything has not been verified with a suitable user demographic. Despite this, we remain confident in the app's potential for users with SAD, or are otherwise affected by weather, and its capacity for further growth. The project underscores the importance of thorough testing and adapting to user feedback. The insights gained from our usability evaluations and HCI experiment reinforced the direction of the development, making it efficient, practical, and easy to use.

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A CONTRIBUTIONS

	Asbjørn	Alba	Leo	Pablo
Design	X	X	X	X
Prototype			X	
Internal Evaluations	X	X	X	X
Usability Test 1	X	X	X	
Usability Test 2	X		X	X
HCI Experiment	X	X		X
Report	X	X	X	X

Table 1: Contributions

B USE OF AI IN THE PROJECT

We utilized generative AI tools like ChatGPT to assist with grammar corrections and to improve the overall flow and readability of our paper (example prompt: *"Please help improve the grammar and flow of this paragraph."*). AI tools also significantly aided in coding the prototype using React Native (example prompt: *"How do I create a modal overlay in React Native? Provide example code."*), as well as in searching for academic materials and references (example prompt: *"Find relevant papers on the stage-based model of personal informatics."*). Additionally, we employed AI to help structure and plan the experimental design (example prompt: *"Suggest a structure for conducting usability tests on a mobile app prototype."*). We also used Claude and ChatGPT in conjunction with Observable to streamline data visualization (example prompt: *"Provide Observable notebook code for visualizing user mood data."*). The core ideas and concepts were the result of team discussions, with AI used solely to refine and enhance these ideas through large language model (LLM) interactions.

C RESEARCH METHODS

C.1 Usability test #1

Demographical information: The participants consisted of 2 males and 2 females, all students at DTU. All participants owned and used a smartphone on a daily basis. Their ages ranged from 22 to 26 years old.

Goal: Test the first iteration of the app and gather user feedback to guide future improvements.

Tasks:

(1) Log your mood of today.
(2) Find your morning mood on the 27th of March.
(3) Determine how many days you have been swimming on sunny days.
(4) Check how many times you have recorded a “neutral” mood since you started using the app.

Evaluation method: A thinking-aloud protocol was used during the session. Participants were encouraged to verbalize their thoughts as they interacted with the app, allowing us to identify bottlenecks, misunderstandings, and areas of difficulty.

Summary of answers and observations:

- *Mood logging.* Two of the participants didn’t know what the question mark in the ’Log your activity’ section meant. One participant suggested that it would be nice to be able to add a custom activity. Finally, the ’Log your activity’ was introduced by the sentence: What have you been up to, and this confused users, not knowing if it was asking for that day or past days.
- *Find morning mood.* All participants completed this task easily. They all went to the calendar view, as expected, and easily navigated through it.
- *Count days with swimming and sun.* Two of the participants went directly to the Stats Screen. The information was in the Calendar View, so they could not find the answer. We had to help them navigate again to the Calendar Screen.
- *Neutral mood.* All participants went directly to the Stats Screen. The information was in the Home Screen, so they could not find the answer. They were a little bit overwhelmed by the information being displayed in different screens.

Common issues noticed:

- The ’?’ sign used to add a new sport was confusing for most of the participants.
- Having data in different screens was overwhelming for some participants. It was difficult for them to find the information they wanted to find.

Design suggestions:

- Participants suggested to change the ’?’ sign for ’+’ sign.
- Centralize all main visualizations in one Screen.
- Put a slicer to change month in the Calendar Screen.

C.2 Usability test #2

Demographical information: Four participants (two males and two females) aged 23–27. Three were graduate students and one was an office worker. All were frequent smartphone users and had tried at least one mood- or health-tracking app before the study.

Goal: To check whether the new MoodWise visualisations and features are easy to use and whether they help users explore and reflect on their mood data.

Tasks:

(1) Log today's mood and add a custom activity. Describe the process and what happens after saving.
(2) Find the current streak length after the new log.
(3) View mood trends for the past week, then switch to the past month and explain what the graph shows.
(4) Find how many times "swimming" was logged and the average mood for those logs.
(5) Check how mood changed from morning to evening on 25 March.
(6) Edit today's entry and change mood, activity, and weather values.

Evaluation method: Participants spoke aloud while working. The moderator noted navigation steps and time on each task, then ran a short interview. Screen recordings were later annotated.

Summary of answers and observations:

- *Logging and custom activity.* All four said the flow was clear and quick. Two expected the "add" button to be inside the activity list. One was not sure when evening mood could be entered.
- *Streak.* Everyone found the streak counter on the home screen in a few seconds.
- *Trend graphs.* Three used the filters on the Stats screen without help. One first tapped the calendar and needed a hint. Two asked for clearer labels to tell morning points from evening points.
- *Swimming counts and averages.* All used the bar chart filter quickly. One asked for a weekly vs monthly toggle.
- *Daily change on 25 March.* Two read the slope plot correctly. One first tried the calendar. One found the legend wording confusing.
- *Editing an entry.* All edited today's entry through the calendar. One asked if weather could fill automatically from an online source.

Common issues noticed:

- Morning versus evening logging not always clear.
- Legends on slope and line graphs need simpler wording.
- Users want automatic weather data.
- Some users want easier access to weekly or monthly summaries.

Design suggestions.

- Add a clear morning / evening toggle during logging.
- Simplify graph legends and consider a single "daily change" label.
- Offer a weekly or monthly view toggle on the Stats screen.
- Pull weather automatically by location to avoid manual input.

C.3 HCI Experiment #2

Demographical information: Eight participants (six males and two females) aged 21–30. All eight were individuals with graduate level education, and were all proficient with computer interfaces and familiar with common visualization techniques.

Goal: To evaluate the effectiveness of four different visualization methods in helping users answer questions they might pose themselves while using the app in regards to their gathered data.

Procedure: The participant is instructed of how to use the interface and gets to practice before the start of the main task. The participant is asked a question and the instructor makes sure the question is understood before the visualization is viewed. Upon the start of task, a laptop with the paired visualization is turned towards the participant and a stopwatch is started. Once the participant has arrived at a conclusion, the stopwatch is stopped, and their time and answer is written down. After the main task, the participant is asked to fill in a Likert scale questionnaire, assessing their perceived workload and preference. This is repeated four times with a different visualization and question for each round.

Main task questions: The following questions were posed to the participants:

Q1: Which activity or activities improves my mood the most when it is sunny?
Q2: How does my mood typically change on rainy days with no activity?
Q3: Do my physical activity levels improve my mood more on cloudy or sunny days?
Q4: Which weather condition is overall most associated with low mood?

Dataset "personalities": To ensure uniqueness and to attempt at improving the validity of the experiment, the datasets simulated were done so under different stochastic rule-sets simulating events, which impacts the mood score for each day. Each dataset was simulated for 365 days, with a 5% of the data missing. The datasets can be viewed on the following ObservableHQ notebooks:

P1 A personality which is overall happy except for rainy and snowy days, with a heightened dislike for biking in the snow

https://observablehq.com/d/f30be6076a6f8c17

P2 A personality which is overall happy but does an exceptional amount of unique activities, which occupies a lot of space in visualizations.
https://observablehq.com/d/e02b7e1d81360f12

P3 A personality which has a mood improvement when being inside and very rarely has mood improvements when doing outdoor activities.
https://observablehq.com/d/7292c1b9cb08838e

P4 A personality who does a lot of two activities being swimming and walking, and generally gets mood improvements from these.
https://observablehq.com/d/38eec217dfe86a9f

C.4 HCI Experiment Visualizations

Following are the four visualizations created with one of the simulated datasets. These are how they were depicted under the experiment.

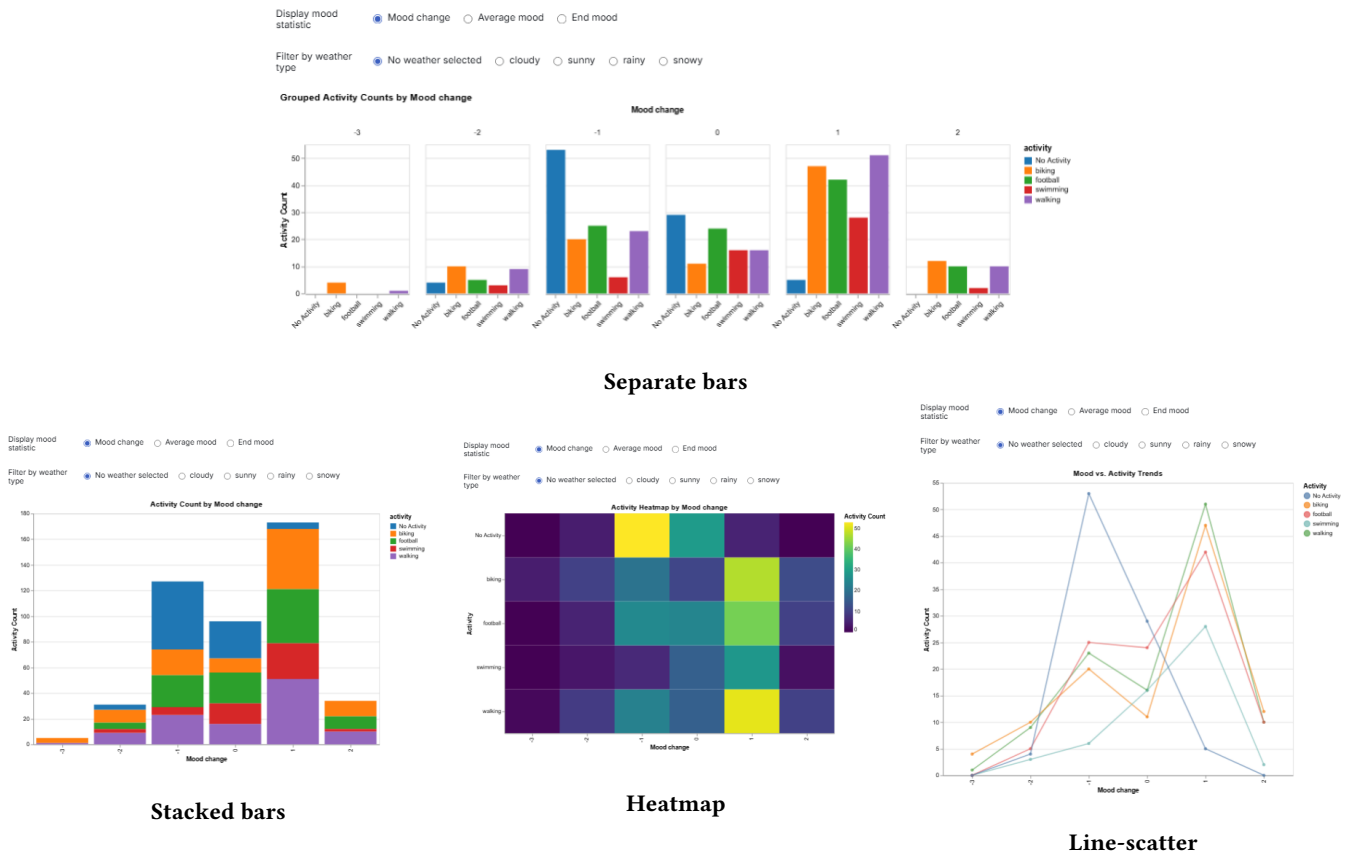


Figure 4: The four different visualizations made on P1

C.5 Notification Screen

The MoodWise app includes a notification screen that helps users stay on track with their mood and activity logging. If a user forgets to log their mood for the day, the app sends a timely alert as a reminder, encouraging them to enter their data and stay engaged with their well-being tracking. This feature helps ensure that users maintain consistency in tracking their mood, activity, and weather conditions, which is crucial for identifying patterns and making informed decisions about their daily habits. The notifications are designed to be non-intrusive yet effective in prompting users to engage with the app without overwhelming them. Fig. 5 illustrates the lock screen notification.

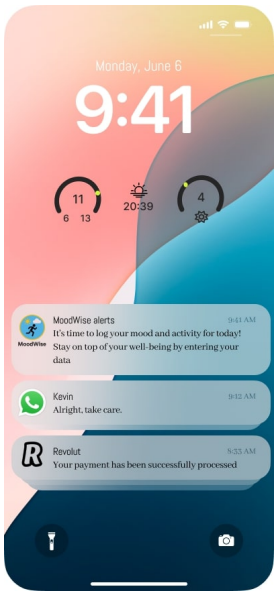
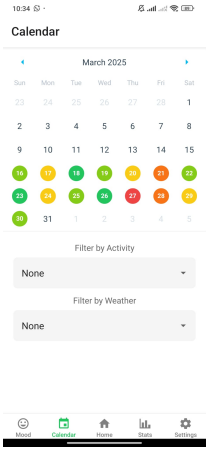
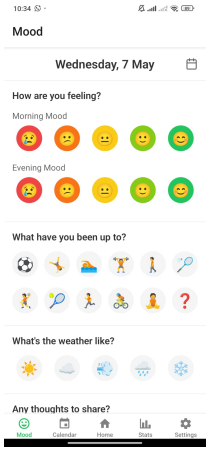


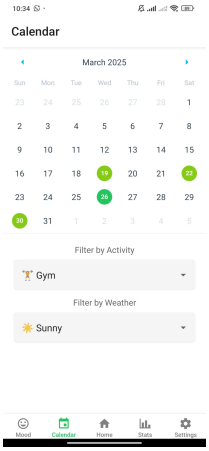
Figure 5: Lock Screen

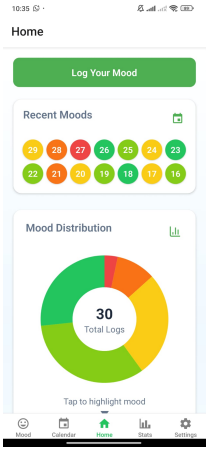
D ITERATIONS

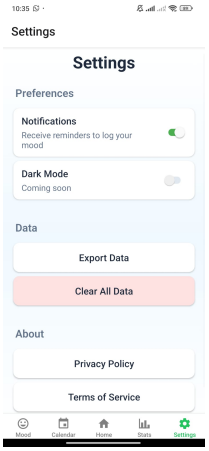
D.1 Iteration # 1

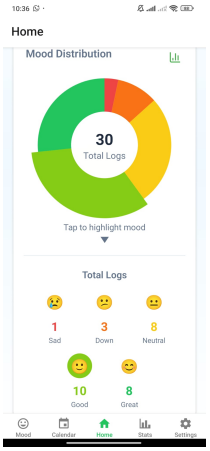


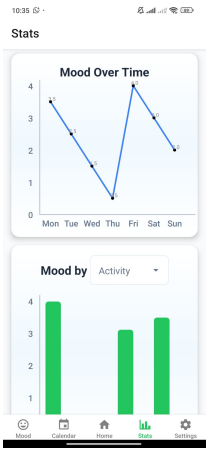




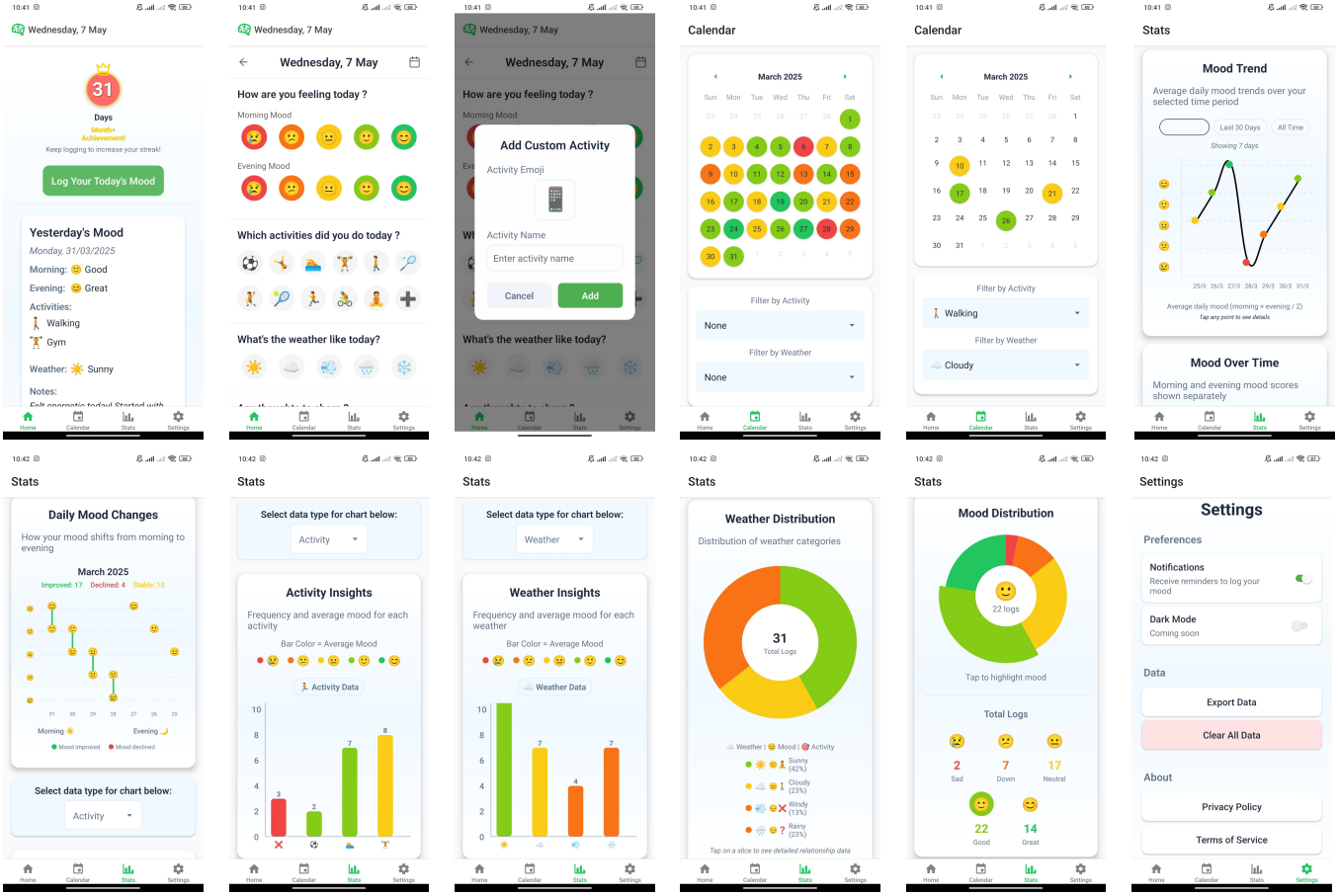




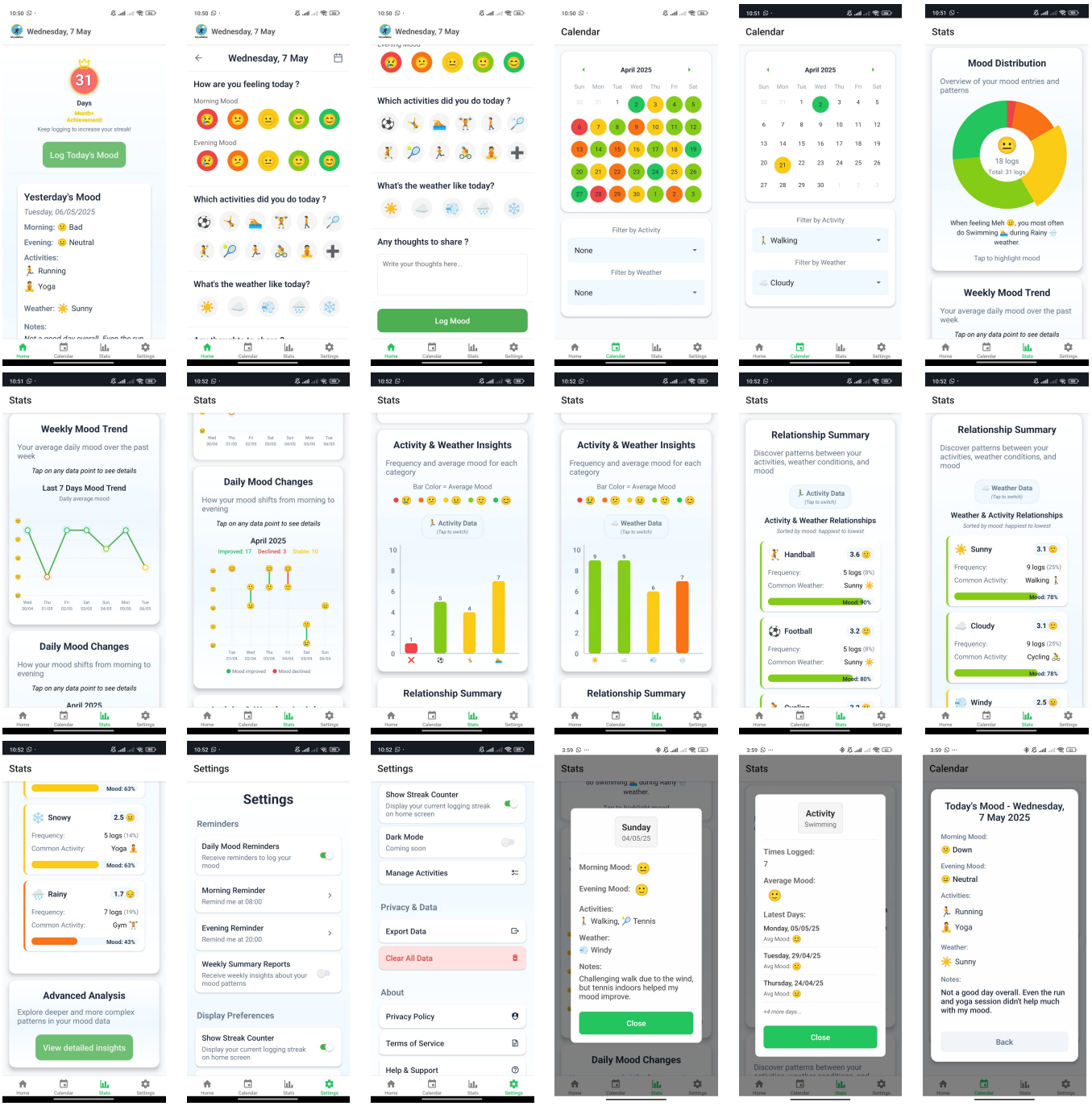




D.2 Iteration # 2



D.3 Final Iteration



D.4 Prototype access

The MoodWise prototype developed for this research is publicly accessible via the following resources:

- GitHub repository
- Demonstration video
- Interactive ObservableHQ visualization

The demonstration video highlights the main features of the MoodWise prototype, including data logging, visualization, and interaction capabilities.