Detox and Unwind: Assessing Screen Time, Stress, and Physical Activity via Ecological Momentary Assessment in a Mobile App

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Abstract—Excessive smartphone use has been linked to rising levels of stress, poor sleep quality, and declining self-esteem, particularly among young people. While many existing tools monitor screen time, few offer actionable insights or lack attention to other potential factors. This paper presents *Detox & Unwind*, a mobile application that tracks passive digital behavior (e.g., screen time, step count, calendar activity) and combines it with active self-reflection through mood check-ins. This paper explores how combining behavioral data with journaling can help users become more aware of patterns and make informed changes to improve well-being. Existing literature is reviewed to examine the psychological effects of screen time and evaluate interventions that promote healthier digital habits.

I. INTRODUCTION

In our current world, technology is an asset to everyday life. For younger and older generations, digital tools keep communities connected, improve human productivity, and enhance social interactions. However, the convenience of such tools comes with drawbacks. Excessive use of digital devices raises important concerns about technology's impact on social and mental well-being—especially on today's youth.

Studies have shown that excessive screen time is associated with negative psychological impacts, including lower self-esteem and heightened stress levels [1,2,3]. Doctor Jean Twenge, a psychology professor at San Diego State University, found that users with high screen time were more likely to have an "inability to finish tasks, lower curiosity, and more difficulty making friends" [1]. These findings highlight the importance of developing healthier digital habits and building self-awareness around technology use.

To explore potential solutions, researchers have conducted experiments on screen time reduction. One randomized controlled trial in Austria led by Cristoph Pieh and a group of researchers found that limiting screen use to two hours per day for three weeks produced small to moderate improvements in depression, stress, sleep quality, and overall well-being [4]. These results suggest that modest behavioral changes can positively impact mental health.

Building on this idea, *Detox & Unwind* introduces a lightweight mobile app that combines brief, daily self-reflection with passive data tracking, such as screen time, step count, and calendar density. By correlating users' reported stress with their behavioral patterns, the app aims to surface personalized insights and encourage more mindful technology use. This project explores how simple digital interventions can promote emotional balance in a fast-paced, hyperconnected world.

II. LITERATURE REVIEW

A. Search terms

Platforms like Google Scholar and PubMed were utilized to find studies conducted on digital interventions targeted towards screen time reduction. Search terms included "screen time," "mental health," "digital intervention," and "screen time reduction."

B. Associations between Screen Time and Psychological Impacts

The connection between screen time and mental health has been explored extensively in psychological and behavioral literature. Twenge found that adolescents who spent more than five hours daily on electronic devices were twice as likely to exhibit depressive symptoms compared to those with less than an hour of use [1]. Their findings also indicate that higher screen time is associated with lower psychological well-being, including reduced self-control, decreased curiosity, and difficulty forming close social relationships. Santos discovered in their comprehensive study that "replacing screen time with physical activity showed a positive effect on associations with mental health" [2].

C. Benefits of Screen Time Interventions

Recent research has focused on the effectiveness of screen time reduction as an intervention to promote better mental health outcomes. In a randomized controlled trial, Pieh demonstrated that limiting screen time to two hours daily over a period of three weeks led to improved sleep quality,

Calendar Density	● Track number of meetings, classes, hangouts etc. in order to determine how busy the user is
Physical Activity	● Track workouts and step count through Apple's Healthkit in order to track user's daily level of physical activity
Screentime	● Tracks screen time on social media apps
Daily mood checks	● Asks user their overall mood on a daily basis

Fig. 1. Enter Caption

reduced perceived stress, and greater emotional well-being [4]. This suggests that relatively modest adjustments can produce meaningful benefits.

In addition to screen time reduction, some interventions incorporate reflective or therapeutic practices. Santos found that combining screen time limits with daily journaling increased users' self-awareness and reduced symptoms of anxiety in college students [2].

Taken together, these studies form the foundation for projects like Detox and Unwind, which combine passive data collection with active mood check-ins to help users become more mindful of how technology affects their well-being.

III. PRODUCT FUNCTIONALITIES

Detox and Unwind aims to integrate the elements below in order to create a comprehensive, multi-faceted app:

A. Measures

A study conducted at the Youth Mental Health Lab in Dublin, Ireland used the WHO-5 scale (World Health Organization Well-Being Index) to assess general well-being among their participants [5], which is the same scale used in Detox and Unwind. The tool consists of a 6 point scale, ranging from "All of the time" to "At no time." This scale is then used for further analysis—converted to a percentage score. This excerpt is taken from the World Health Organization:

> "The raw score is calculated by totalling the scores on each of the five questions. The raw score ranges from zero to 25, zero representing worst possible mental well-being and 25 representing best possible mental well-being. To get a percentage score ranging from zero to 100, the raw score is multiplied by four. A percentage score of zero represents worst possible mental well-being; a score of 100 represents best possible mental well-being. A percentage score

below 50 (or a raw score below 13) has been suggested as a cut-off for poor mental well-being and as an indication for further assessment for the possible presence of a mental health condition (e.g., depressive disorder)" [6].

IV. APP WALKTHROUGH

Detox and Unwind's interface includes a home screen with a check in page and a dashboard.
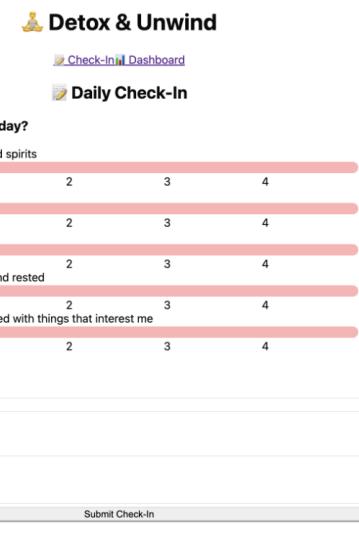
Fig. 2. Check in screen (no values filled in)
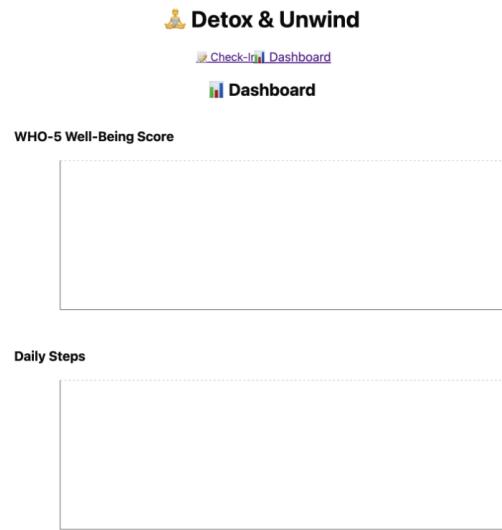
Fig. 3. Dashboard (blank)

V. METHODOLOGY

To evaluate the effectiveness of Detox & Unwind, a mixed-methods study design is proposed. Participants will include 40 university students aged 18–25, recruited through campus advertisements and social media. This demographic was chosen
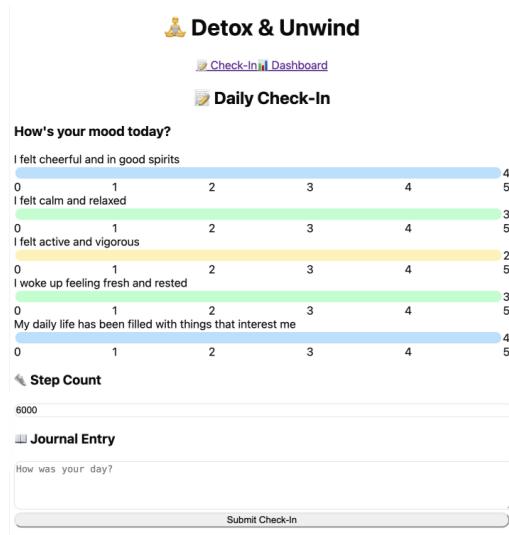
Fig. 4. Check in screen with values
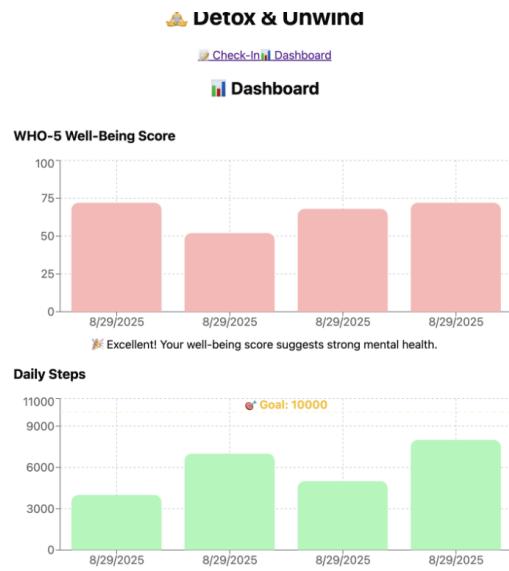
Fig. 5. Dashboard with simulated values over time

due to their high levels of smartphone use and vulnerability to stress-related issues.

Participants will be divided into two groups:

Experimental group (n = 20): Uses Detox & Unwind daily for four weeks.

Control group (n = 20): Monitors screen time with default phone settings, but does not use the app.

A. Data Collection

Quantitative data: WHO-5 scores, daily screen time logs, step counts, and calendar density measures will be collected weekly.

Qualitative data: Short surveys and optional journal entries will be collected to capture subjective experiences.

B. Analysis

Paired-sample t-tests will measure within-group changes in well-being, while independent-sample t-tests will compare differences between the experimental and control groups. Correlation analysis will be conducted between self-reported stress levels and behavioral data (screen time, activity, calendar load).

VI. EXPECTED RESULTS

Based on existing literature, it is anticipated that participants using Detox & Unwind will show:

- Improved WHO-5 scores compared to baseline.
- Reduced daily screen time, particularly on social media applications.
- Increased awareness of personal behavioral patterns, leading to more meaningful self-reflection.
- Stronger correlations between reported mood and behavioral measures, suggesting that the app helps users manage mental health in relation to daily habits.
- The control group may demonstrate minimal or no improvement, indicating that passive screen monitoring alone is insufficient for meaningful behavioral change.

VII. DISCUSSION

Detox & Unwind contributes to the growing body of digital health interventions by integrating behavioral tracking with active self-reflection. Unlike tools that solely restrict screen use, this app encourages users to understand the reasons behind their habits. The combination of step counts, screen time, and calendar density offers a more holistic picture of digital well-being.

A key strength of this approach is its accessibility: brief daily check-ins and passive tracking require minimal effort from users, reducing the likelihood of inconsistency. However, potential limitations include reliance on self-reported mood (which may be biased), small sample size, and short study duration. Additionally, results may not generalize to older populations or those with more severe mental health conditions.

Future revisions of the app could integrate partnerships with existing wellness platforms, which could potentially expand reach and effectiveness.

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