Investigating Mobile Mental Health App Designs to Foster Engagement Among Adolescents

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ABSTRACT

We identify features of mood-tracking apps for managing mental health that foster engagement and sustained use by adolescents—a population that expresses a preference for digital apps over face-to-face support, yet demonstrates low levels of engagement with such apps. We developed a prototype of an adolescent-focused mood-tracking app, informed by literature about existing apps' approaches to recording patients' symptoms, the role of data representations in long-term mental health management, and the potential benefits of peer support tools. We then conducted a survey (n = 88) to assess adolescents' preferences for various aspects of this prototype. We found that participants prefer tools for self-reflection and self-awareness over those for gamification or social support, and that they value function over entertainment when choosing wellness apps, especially among participants who disclosed a history of managing mental health. Qualitative analysis of open-ended responses revealed that customization and self-reflection are important design themes. Our findings have implications for the design of mental health apps that cater to the specific needs and preferences of adolescent users.

CCS CONCEPTS

• **Human-centered computing** → **Collaborative and social computing**; **Empirical studies in HCI**; *HCI design and evaluation methods*.

KEYWORDS

Mental health informatics; mobile app design; bipolar disorder; engagement; adolescent users

1 INTRODUCTION

An estimated 50% of all adolescents have had a mental disorder at some point in their lives [9]. This can be due to peer pressure, social media, overwork tendencies, the state of their home environment, and the quality of their relationships with their peers. Although technology use is often cited as a factor contributing to this mental health crisis, well-designed technologies can also help to mitigate it [4, 5, 8].

Adolescents often prefer digital mental health support over face-to-face interactions [4, 5]. Mobile phone applications have proven successful in helping individuals manage and improve mental health by increasing self-awareness, encouraging self-reflection and goal setting, enabling longitudinal data collection about symptoms, helping to uncover trends, and allowing connection with others for support, but sustained use of such apps tends to be less than 4% [8]. Our research aims to identify features that engage adolescent users and support their particular goals.

Our high-level research question was: **How can the design of a mood tracking app encourage long-term management of mental illnesses by adolescents?**

We tested the following three hypotheses, with the measure of preference based on participants' ranking of features and anticipated frequency of feature use:

H_1: Participants will express a stronger preference for gamified features (e.g., *Streaks*).

H_2: Participants will express a stronger preference for social features (e.g., *Community*).

H_3: Participants will express a stronger preference for reflection features (e.g., *Calendar*).

2 BACKGROUND/RELATED WORK

Mental health apps have proven highly effective in documenting symptoms, but sustained engagement (defined as adoption and use of an app to experience intended benefits) tends to be less than 4% after 15 days [8]. Young people exhibit distinct behaviors, interests, goal orientation, and often less patience than adults [7], as well as specific digital preferences and developmental needs [11]. Typically, mental health apps are crafted by adults whose demographics do not align with the distinct experiences and requirements of this younger population, resulting in reduced uptake, use and—therefore—effectiveness of mental health apps [11].

Nonetheless, prior literature has highlighted specific design features that have the potential to enhance the engagement of youth with mental health apps. One such concept is gamification, which involves incorporating game elements and incentives to encourage desired behaviors, to positively influence user motivation, behavior, and adherence [10]. Gamified incentives to drive engagement with

mental health apps have received mixed reviews in evaluation [2], however some like the idea of stars or badges being awarded to motivate recurrent usage [4].

Another feature that has been found to drive engagement is peer social support [3, 7]. Technologies that incorporate features such as sharing pictures or stories or creating and editing content have been shown to help keep adolescents engaged [7]. Therefore, enabling a "live feed" for users to share, comment, and vote on various topics has been suggested as a means for fostering a robust community that promotes engagement and encourages individuals to continue their mental health journey[7]. Social connection is also a crucial protective factor for mental health challenges; peer support in interventions can build social connections and improve adolescents' mental wellbeing [3].

3 *MOOD:SYNC* AND OUR ADOLESCENT ENGAGEMENT-FOCUSED DESIGN PROPOSALS

Previously, members of our research group designed and developed a cross-platform progressive web-app, *mood:sync*, a tool for conducting *in situ* evaluations of self-tracking and social tracking interactions for managing bipolar disorder (BD) [6]. However, *mood:sync*'s current design emphasizes its novel social tracking functionality for BD and does not incorporate specific features to engage adolescents (Figure 1).
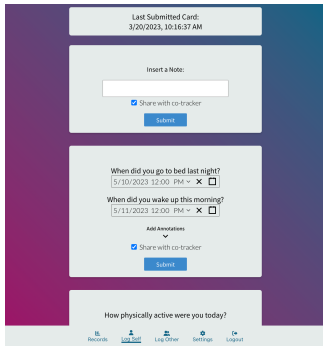

Figure 1: Current *mood:sync* PWA interface design.

Our prototype for this study incorporates a variety of features intended to engage adolescent users more directly. The app is designed to prompt users with a *Daily Check-In* upon launch, satisfying adolescents' less patient and more goal-oriented nature. This feature directs users to capture their experiences before accessing any other part of the app, reinforcing the core self-tracking nature of the tool and reducing the potential stigma of self-tracking in social environments (Figure 2).

The app leverages gamification by tracking the number of consecutive days that a user completes the *Daily Check-In*, referred to as the user's *Streak* (Figure 3, left). On this tab, the user can view their current *Streak* and *Streak History*.

To reflect the known benefits of social support for adolescent mental health [3], a *Community* tab allows users to anonymously view posts from other users and engage in chats about shared

Figure 2: Proposed new *Daily Check-In* feature that serves as the landing page for the revised app.

experiences. Users can create a post to share with the community by selecting who can see their journal entry post of the day—as flagging it as "private" to keep it to themselves or as "public" to share it anonymously with other users (Figure 3, center left).

Existing literature has indicated the efficacy of increased self-reflection in boosting adolescent user engagement [1]. To evaluate the value of self-reflection in this context, our prototype incorporates *Journal* (Figure 3, center right) and *Calendar* (Figure 3, right) features. Users can capture free-text narratives of their experiences with the *Journal*, including the ability to add a picture or video, as desired. To review previous entries, the user can access the *Calendar*, which will take them to a gallery of their prior entries, enabling them to reflect on their past experiences.
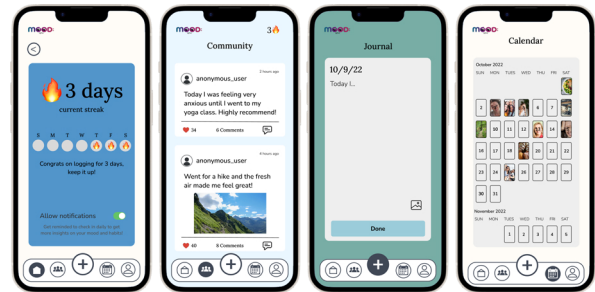

Figure 3: Figma mockups of the proposed new *Streaks, Community, Journaling,* and *Calendar* features.

4 INTERFACE EVALUATION STUDY: METHOD

We conducted an evaluation of this adolescent-focused interface using a survey, which was divided into two parts. First, participants were asked about their current *mental health status* (i.e., the self-reported extent to which each respondent has struggled with mental health issues in the past) and the strategies that they currently use to manage their mental wellness. Next, they were presented with the app feature mockups, which were created in Figma[1], and asked to rate each feature on the following parameters: *perceived helpfulness, ease of use, aesthetic appeal,* and *effectiveness*. The survey asked respondents to predict their anticipated frequency of use for each

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[1]https://www.figma.com

feature and to provide open-ended suggestions for improving each feature.

The research design was approved by the research ethics review board of the first author's public school district, where the study was carried out. Participants were recruited from the first author's high school as well as an educational nonprofit encouraging girls to pursue STEM interests.

We recruited a diverse group of adolescent research participants, regardless of their mental health, aiming to identify features engaging to adolescents, both more generally and who had some prior experience managing mental health. Prospective participants were informed about the study's purpose and asked to provide verbal consent to participate. Participants' ages ranged from 13 to 19, but other demographic information was not collected to encourage honest reporting of potentially sensitive mental health status information and to minimize risk of participant re-identification.

We calculated descriptive statistics and regressions to identify potential relationships among the data. Mental health status and feature popularity were cross tabulated to identify possible relationships between the respondents' mental health status and the features that they perceived as being most/least helpful. We also conducted a thematic analysis of the open-ended survey responses to determine why participants rated/assessed features in the way(s) that they did.

5 SURVEY STUDY: FINDINGS

We recruited $n = 88$ adolescents to participate in our survey. 43% of these respondents agreed or strongly agreed that they face mental health challenges in their day-to-day lives. These results are consistent with previous studies showing that about 50% of teens have experienced mental health problems.

Only 8% of participants reported that they currently use technology to manage their mental health. Other non–technology-based interventions were cited as having much greater frequency of use, including self-care practices ($n = 80$), social connections ($n = 58$), and journaling ($n = 24$). Prior studies have shown that adolescents prefer mental health apps over in-person therapy [8]. However, in agreement with our findings, current mental health apps are not engaging to adolescents, leading to low levels of use and poor adherence.

Respondents disfavored *Streaks*, *Notifications* (a general feature designed to remind participants to use the app), and *Community*. *Daily Check-In* and *Journaling* were over 44% more popular than the next most highly rated features (Figure 4). When weighting the data to emphasize the responses of those participants who reported a history of managing their mental health, *Journaling* gained in popularity, while *Notifications* were shown to be significantly less popular (Figure 5).

48% of our respondents ($n = 42/88$) provided substantive (i.e., not "yes", "no", or "N/A") answers to one or more open-ended survey prompts. Through a thematic analysis of these qualitative data—both critiques of the proposed features and participant requests for new features—we identified two major themes for features considered to be essential for meaningful engagement in a mental wellness app: *customization* and *self-reflection.*
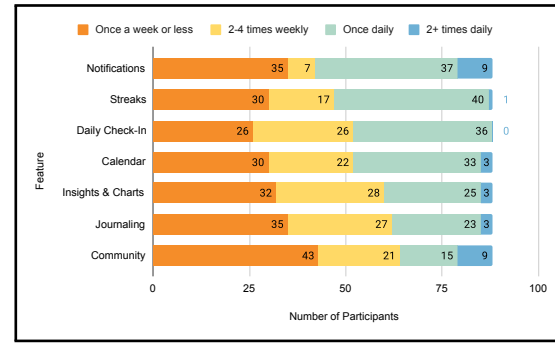

Figure 4: Anticipated use of each feature, as reported by all adolescent participants.
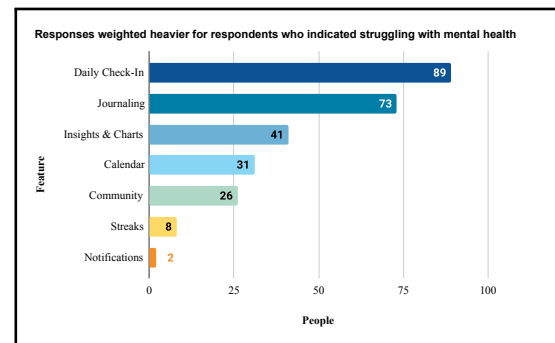

Figure 5: Positive ratings of feature helpfulness, with increased weighting of responses from participants who also reported a history of managing mental health challenges.

5.1 Customization

Respondents expressed a desire for the ability to track a greater variety of emotions, activities, and locations, allowing for more personalized tracking, tailored to specific needs and specific to the circumstances that potentially impact their mental health:

> [S]et up multiple personalized data points to track –P83

> [Provide an] opportunity to track emotions that aren't necessarily pre-loaded into the app –P72

> [M]ore options for the "what have you been up to" section – P24

Respondents also noted the potential usefulness of features that would enable goal-setting and custom reminders. These features would allow users to set their own goals and adjust their notifications based on those chosen goals:

> I think it could be helpful to have an area to place goals or be able to create personalized reminders that could be sent through push notifications or pop-ups –P42

These responses suggest the importance of catering to adolescents' goal orientation with more sophisticated flexibility.

Overall, these responses suggest that features that allow for customization of the app will be well-received by adolescent users and may increase engagement. By enabling users to curate their

experience, these teenagers may be more likely to monitor and manage their mental health effectively.

5.2 Self-Reflection

Respondents also emphasized the need for mental health apps to facilitate self-reflection. Many participants suggested that augmenting the *Journal* feature with topical prompts would make the practice of journaling more effective and appealing:

> [A]dd prompts so people can get help if they're stuck –P30

> Possibly prompts for someone who feels like they [want] to journal but don't exactly know where to start –P84

These comments suggest that participants perceive open-ended journaling to be a challenging task. Topical or structured prompts may be an effective strategy to enhance self-reflection.

Many respondents expressed reservations about the *Community* feature of the app, noting that they value self-led reflection over interaction with[in] peer support networks:

> [T]his feature would make the app too similar to social media which often time worsens my mental health...we often get sucked into comparison. –P42

> I don't think a community social media would be well-regulated enough/have enough high quality user-content to be effective –P65

These responses highlight the value of incorporating self-reflection tools into mental health apps and suggest that adolescent users may be more receptive to self-reflection features than to social support tools.

6 DISCUSSION

Although the study revealed important individual differences, there was broad agreement among participants. Our results showed that the *Streaks* feature was the second most likely to be used among all the features. Our first hypothesis consisted of two parts. The data support the first part—that *Streaks* stand to increase user engagement—but it also indicates that participants did not perceive it to be particularly effective in helping them to improve their mental health. In line with the existing literature, *Streaks* that incentivize daily usage can increase engagement; however, our respondents' responses indicated that this kind of gamification would reduce the intentionality of mental health tracking, thereby rendering this feature less effective and disproving part of our hypothesis.

Our results showed that the *Community* feature is anticipated to be the least frequently used and is perceived as the least helpful and least effective feature for improving mental health, even when controlling for participants' mental health status. This finding disproves our second hypothesis that participants would exhibit a stronger preference for social features. This could be due to the adverse effects of social media on mental health and the fear that incorporating social features will alter the intended purpose of the app, hindering its effectiveness.

The *Calendar* feature placed third in terms of anticipated usefulness, fourth in terms of likelihood of usage, and second for perceived helpfulness. This supports our third hypothesis, which stated that participants would exhibit a stronger preference for reflection-oriented features. Including a feature that enables users to review

past experiences emphasizes the benefit of recording both positive and negative experiences for later reference.

7 CONCLUSION

Adolescents prioritize mental health informatics that facilitate self-reflection and development of self-awareness over those that incorporate gamification or social support elements. Our results confirm prior findings that adolescents are goal-oriented and value function over entertainment when selecting these apps.

In designing a mental health app for adolescents, a curated library of mental health resources should take priority over gamification and community features. Also, the app design could better support reflection by providing open-ended *Daily Check-In* inputs (Figure 6, left and middle) and incorporating self-tracking prompts in a guided *Journaling* activity (Figure 6, right).
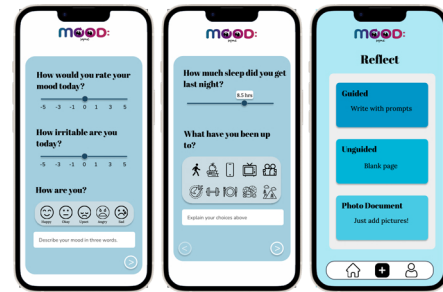

Figure 6: Revised *Daily Check-In* and *Journal* feature designs.

A limitation our findings is that our sample was relatively heterogeneous—most participants shared a similar educational and geographic background. Also, only some participants had prior experience with managing mental health. To address this, we weighted participants' responses based on their reported mental health status.

Future research could focus on improving the presentation of a user's journal history to encourage more self-reflection and improving the perceived helpfulness features that drive engagement (i.e., enhancing the execution of *Streaks*). Our findings challenge previous research that suggests that using a live feed, allowing users to share, comment, and vote on various topics, would foster a strong sense of community and encourage participants' sustained efforts to improve their mental health. Therefore, further studies are needed to determine how to design *Community* features of mental health apps to achieve desired mental health outcomes while avoiding replicating the detrimental characteristics of social media platforms.

REFERENCES

[1] Felwah Alqahtani, Andrea Winn, and Rita Orji. 2021. Co-designing a mobile app to improve mental health and well-being: Focus group study. *JMIR Formative Research* 5, 2, Article e18172 (Feb. 2021), 23 pages. https://doi.org/10.2196/18172

[2] Jakob E. Bardram, Mads Frost, Károly Szántó, Maria Faurholt-Jepsen, Maj Vinberg, and Lars Vedel Kessing. 2013. Designing mobile health technology for bipolar disorder: A field trial of the MONARCA system. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13)*. ACM Press, New York, NY, USA, 2627–2636. https://doi.org/10.1145/2470654.2481364

[3] Louise Birrell, Ainsley Furneaux-Bate, Cath Chapman, and Nicola C. Newton. 2021. A mobile peer intervention for preventing mental health and substance use problems in adolescents: Protocol for a randomized controlled trial (The Mind Your Mate study). *JMIR Research Protocols* 10, 7, Article e26796 (July 2021), 13 pages. https://doi.org/10.2196/26796

[4] Sandra Garrido, Daniel Cheers, Katherine Boydell, Quang Vinh Nguyen, Emery Schubert, Laura Dunne, and Tanya Meade. 2019. Young people's response to six smartphone apps for anxiety and depression: Focus group study. *JMIR Mental Health* 6, 10, Article e14385 (Oct. 2019), 14 pages. https://doi.org/10.2196/14385

[5] Sandra Garrido, Eliza Oliver, Anthony Chmiel, Barbara Doran, and Katherine Boydell. 2022. Encouraging help-seeking and engagement in a mental health app: What young people want. *Frontiers in Digital Health* 4, Article 1045765 (Dec. 2022), 9 pages. https://doi.org/10.3389/fdgth.2022.1045765

[6] Michael J. D. Hoefer, Lucy Van Kleunen, Cassandra Goodby, Lanea B. Blackburn, Priyanka Panati, and Stephen Voida. 2021. The multiplicative patient and the clinical workflow: Clinician perspectives on social interfaces for self-tracking and managing bipolar disorder. In *Proceedings of the ACM Conference on Designing Interactive Systems (DIS '21)*. ACM Press, New York, NY, USA, 907–925. https://doi.org/10.1145/3461778.3461995

[7] Alita Joyce and Jakob Nielsen. 2019. Teenager's UX: Designing for teens. Nielsen Norman Group. Retrieved from https://www.nngroup.com/articles/usability-of-websites-for-teenagers/.

[8] Benjamin T. Kaveladze, Akash R. Wasil, John B. Bunyi, Veronica Ramirez, and Stephen M. Schueller. 2022. User experience, engagement, and popularity in mental health apps: Secondary analysis of app analytics and expert app reviews. *JMIR Human Factors* 9, 1, Article e30766 (Jan. 2022), 11 pages. https://doi.org/10.2196/30766

[9] U.S. Department of Health Office of Population Affairs and Human Services. [n. d.]. Mental health for adolescents. Retrieved from: https://opa.hhs.gov/adolescent-health/mental-healthadolescents.

[10] Stephanie G. Six, Kaileigh A. Byrne, Thomas P. Tibbett, and Irene Pericot-Valverde. 2021. Examining the effectiveness of gamification in mental health apps for depression: Systematic review and meta-analysis. *JMIR Mental Health* 8, 11, Article e32199 (Nov. 2021), 19 pages. https://doi.org/10.2196/32199

[11] Colleen Stiles-Shields, Giovanni Ramos, Adrian Ortega, , and Alexandra M. Psihogios. 2023. Increasing digital mental health reach and uptake via youth partnerships. *npj Mental Health Research* 2, Article 9 (June 2023), 4 pages. https://doi.org/10.1038/s44184-023-00030-1