An AI-Powered Positive Psychology App for Student Well-Being: A Pilot Study

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Submitted to: JMIR Formative Research
on: September 17, 2025

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Abstract

Background: Higher education institutions in the U.S. are facing an unprecedented mental health crisis, yet the development and validation of effective mental health promotion and prevention resources have been limited so far.

Objective: This two-week pilot study evaluated the effectiveness of a mobile app ("Flourish") that integrates interactive, evidence-based positive psychology activities with an AI-powered chatbot, designed to promote everyday well-being practices and provide in-the-moment emotional support at scale.

Methods: Students from eight classrooms at a two-year community college in Northern California were randomly assigned at the classroom level to either a treatment condition (n = 40), where they completed at least two well-being activities from the Flourish app weekly, or a control condition (n = 19), where they did not receive the mobile app. We assessed positive and negative affect, emotional challenges, and perceptions of school support, both at baseline and two weeks later.

Results: A 2 (Condition: Treatment vs. Control) × 2 (Time: Before vs. After) repeated-measures ANOVA revealed a significant Condition x Time interaction effect for positive affect, F(1, 39) = 4.56, p = .039, ?2 = 0.10, ?2 = 0.08; specifically, those in the treatment condition exhibited a marginally significant increase in positive affect after using the app for two weeks (p = .080, 95% CI [-0.39, 0.02], d = 0.18), whereas those in the control condition showed no changes (p = .182). Similarly, there was a significant Condition x Time interaction for emotional challenges, F(1, 39) = 4.50, p = .040, ?2 = 0.10, ?2 = 0.08; specifically, those in the treatment condition reported a decrease in emotional challenges after using the app for two weeks (p = .062, 95% CI [-0.01, 0.49], d = 0.19), whereas those in the control condition showed no changes (p = .217). Finally, across both timepoints, those in the treatment condition reported marginally higher perceptions of school support compared to those in the control condition, F(1, 39) = 3.68, p = .063, ?2 = 0.09, ?2 = 0.06.

Conclusions: This pilot study suggests that a mobile app integrating evidence-based well-being activities and an AI-powered chatbot can improve positive affect, reduce emotional challenges, and enhance perceptions of school support among college students. These findings highlight the potential of scalable, evidence-based interventions to address student mental health challenges and provide a foundation for further research on long-term impacts and broader applications.

(JMIR Preprints 17/09/2025:84308)
DOI: https://doi.org/10.2196/preprints.84308

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An AI-Powered Positive Psychology App for Student Well-Being: A Pilot Study

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Keywords: psychology, positive; artificial intelligence; mobile applications; students; resilience, psychological; emotions; mental health; AI chatbot; well-being; digital mental health intervention

Abstract

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Conclusion: This pilot study suggests that a mobile app integrating evidence-based well-being activities and an AI-powered chatbot can improve positive affect, reduce emotional challenges, and enhance perceptions of school support among college students. These findings highlight the potential of scalable, evidence-based interventions to address student mental health challenges and provide a foundation for further research on long-term impacts and broader applications.

Introduction

Higher education institutions (HEIs) in the U.S. are facing an unprecedented mental health crisis, with clinically significant symptoms doubling in the past decade and over 60% of students meeting criteria for at least one psychological disorder in 2022 [1,2]. Unfortunately, traditional counseling services often struggle to meet students' needs due to limited resources and staffing constraints [3,4]. To address this gap, HEIs are increasingly adopting a public health approach: By developing evidence-based strategies for mental health promotion and upstream prevention, these institutions can meet students' mental health needs proactively, at scale, and at lower levels of severity [5].

Notably, proactive approaches that foster resilience and equip students with evidence-based strategies to manage stress before it escalates have been shown to have a positive impact on well-being [6]. Different from a reactive, deficit-based approach, which tends to focus on addressing problems after they have reached a crisis level, a proactive, strength-based approach looks for opportunities to help students create more positive experiences for their thriving and prevent everyday mental health challenges from escalating. This approach is deeply rooted in positive psychology, which emphasizes building resilience, gratitude, and optimism as strategies to promote mental, emotional, and social well-being [7]. By fostering positive emotions, these approaches help individuals expand their range of coping strategies and develop sustainable psychological resources for both current and future challenges [8-11].

The broaden-and-build theory of positive emotions [12] provides a compelling framework for understanding how resilience is cultivated. Positive emotions, such as calm, excitement, and gratitude, broaden individuals' thought-action repertoires, enabling them to explore new coping strategies and build psychological resources over time. Longitudinal studies demonstrate that these emotions not only enhance resilience but also contribute to greater life satisfaction, while negative emotions have weak or null effects on resilience [13].

Institutional support also plays a key role in promoting student mental health. For instance, a sense of belonging at school has emerged as a key predictor of student well-being [14] and is related to more frequent positive feelings, fewer emotional problems, and greater subjective well-being [15,16]. Students’ perceptions of school support are also linked to greater resilience [17]. These findings highlight the value of interventions that support both individual resilience and a sense of institutional support within educational settings.

One promising avenue for implementing such proactive strategies is the use of digital mental health tools, which can provide accessible, scalable support outside traditional clinical settings [18,19]. However, recent evidence suggests that many programs adopted by colleges and universities lack rigorous evaluation of their effectiveness [20]. In addition, most programs do not yet provide personalized, real-time interactions, whereas recent developments in technology, such as Large Language Models (LLMs), have the potential to provide 24/7, scalable, tailored well-being coaching. Indeed, systematic reviews reveal that AI-based chatbots can significantly reduce symptoms of depression and distress [21] and promote health behavior changes [22]. Thus, a strength-based, resilience-building approach, augmented by AI-powered tools, may help students develop sustainable coping strategies to navigate challenges more effectively.

Given these insights, we developed a mobile app rooted in positive psychology, social psychology, and affective science to provide students with brief, evidence-based, interactive activities that promote emotional awareness, positive affect, and emotional resilience [23,24]. While

prior efforts have introduced mobile apps (e.g., *Happify*, *How We Feel*) and web-based toolkits (e.g., Mental Health America, Greater Good Science Center) that tap into a similar knowledge base, much of the prior work is presented to users in a one-way, instructional style through articles, short videos, or audio recordings. However, this approach often falls short in providing the motivation, accountability, and personalization needed for people to take action, practice the skill, and build positive habits to achieve lasting impact. Our app addresses this gap by offering interactive, evidence-based activities designed to foster emotional growth, build resilience, and support sustainable behavior change.

Research Questions

In this study, we examined the impact of the evidence-based, AI-powered Flourish app on students' emotional well-being and perceptions of institutional support. Specifically, we sought to test the extent to which engaging with the Flourish app (the treatment condition) would lead to increases in students' positive affect, reductions in emotional challenges, and increases in students' perceptions of school support compared to the status quo (the control condition).

Methods

Participants

Faculty members at Foothill College, a two-year community college in the San Francisco Bay Area, invited students from their classes to participate in a study titled “Well-Being Study.” This study required students to complete three surveys between late February and mid-March 2024 (Weeks 8–10 of the academic quarter), a time when students often experience increasing stress as finals approach. To encourage participation, all students were offered extra credit (1% of their final class grade) for successfully completing all three surveys.

A total of 59 students enrolled in the study. Classrooms were randomly assigned to either a treatment condition (n = 40) or a control condition (n = 19). Among them, 41 completed surveys at both Time 0 and Time 2 (28 in the treatment condition, and 13 in the control condition), with retention rates comparable between conditions (70% in the treatment group vs. 68% in the control group), p = .902. Gender distribution showed a marginal difference between the treatment condition (82% female, 11% male, 7% genderqueer/non-binary) and the control condition (62% female, 38% male), $\chi^2(2) = 4.93$, p = .085, but age distribution was comparable between groups (Ms = 21.82 and 23.31, SDs = 6.79 and 6.24), p = .508.

As a manipulation check, students in the treatment condition were asked at the end of the study whether they had used the app. Only one participant reported not using it, and they were retained in the analyses under an intention-to-treat approach. Excluding this participant yielded similar results.

Procedure

Four faculty members volunteered to recruit students from their psychology classes. Since each faculty member taught two classes, each of their classes was randomly assigned to either the treatment or the control condition, resulting in a total of eight classes (four per condition). While classroom-level randomization introduces the possibility of confounding differences between individual classes, this design helps minimize cross-group contamination and spillover effects in shared learning environments.

Students in the treatment condition were first introduced to the Flourish app as part of the study instructions prior to completing the baseline survey. After they completed the baseline survey, students were instructed to download the app, which featured 10 interactive well-being activities designed to take 2-5 minutes each (see Table 1) as well as Sunnie, the AI-powered chatbot that was extensively prompted by two co-authors and leveraged the most advanced Large Language Model at the time (GPT-4 by OpenAI). Students were instructed to complete at least two activities per week.

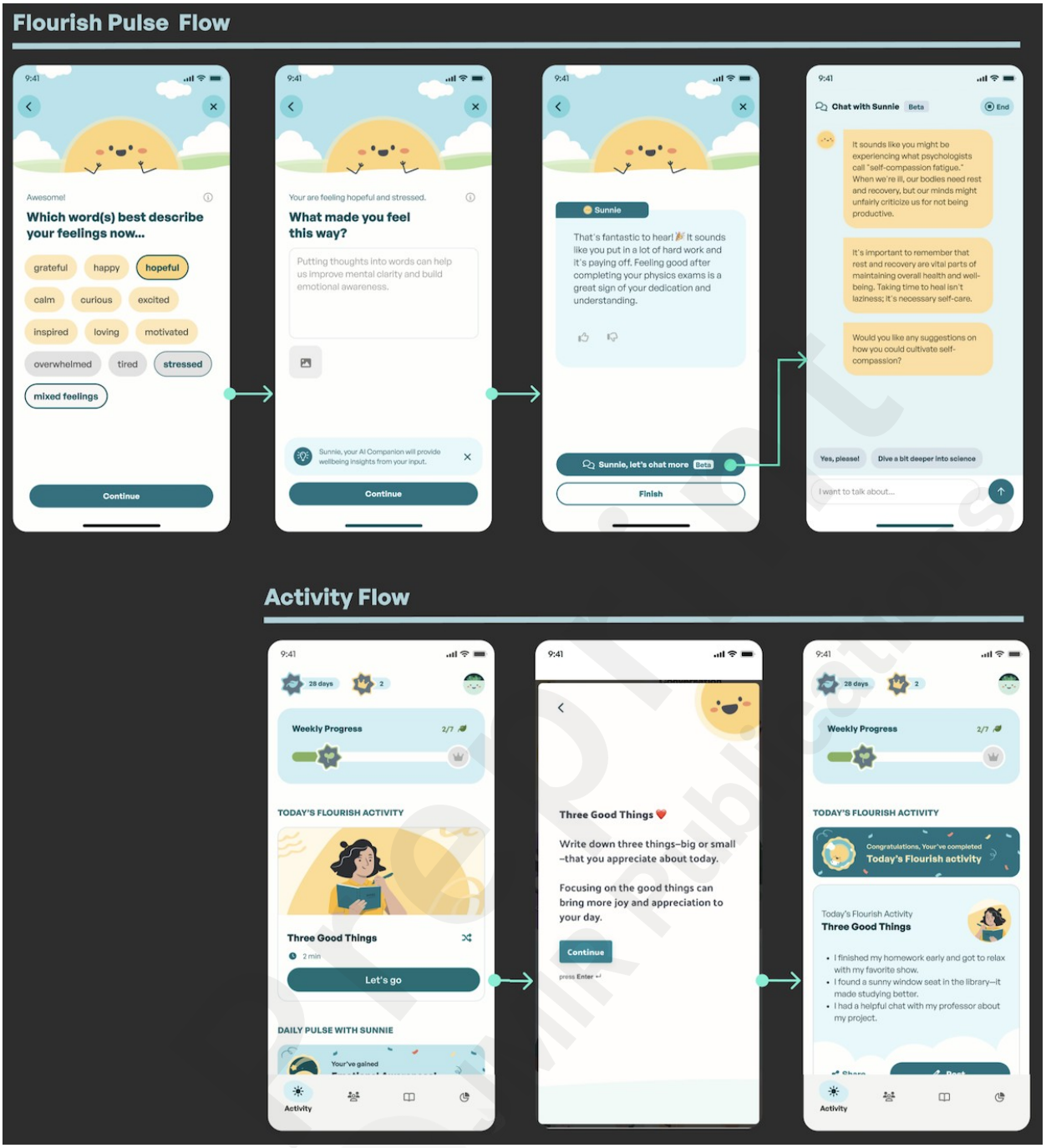
In contrast, students in the control condition continued with their usual routines and had access only to existing school resources. Students in both the treatment and control conditions were asked to complete weekly surveys assessing their well-being and other related variables. In addition to these measures, students in the treatment condition were also asked to report which well-being activities they completed each week.

Three emails were sent over the course of two weeks: the first email (Week 0) was to encourage students to enroll, and the second and third were reminders to complete the surveys. After completing all surveys, students received extra credit in their course.

The Flourish App

Behavioral health research indicates that small, consistent practices can foster lasting improvements in mental health by building sustainable habits of well-being [25]. The Flourish app thus turned this knowledge into interactive activities, guided students to go through an activity step by step, and inspired them to build positive habits by repeatedly practicing activities that work the best for them (see Figure 1).

Figure 1. *Sample app screens showing Flourish Pulse and activity flow.*



The nine activities included in the Flourish app were chosen to cover a wide variety of topics and practices (see Table 1). For example, upon opening the app, students were encouraged to complete a daily mood check-in (“Flourish Pulse”), which asked them to select emotion keywords, and reflect on their feelings, thereby promoting emotional awareness and emotion regulation. This was followed by a personalized note from Sunnie, the AI well-being chatbot, drawing on the benefits of self-compassion [26] and cognitive reappraisal [27,28] to help reframe thoughts and regulate emotions effectively. After receiving the note, students also had the option to chat with Sunnie, which offered personalized, science-based insights and guidance to help students process their emotions in a supportive and structured way.

Other activities fostered emotional resilience [29,30,31], such as recording three positive moments from the day to amplify positive affect and counter the negativity bias (“Three Good Things” [32]) and writing letters to themselves from the future to provide advice on current

challenges through techniques such as self-distancing and self-compassion (“Letter from my Future Self” [33,34]). Activities promoting stress reduction and mindfulness included taking a simple stroll to notice sights, sounds, and smells (“Nature Walk” [35,36,37]) and appreciating small yet beautiful moments in everyday life (“Beautiful Moment” [38]).

Additionally, to foster social connection, the toolkit provided activities that prompted students to give compliments (“Gifting a Compliment” [39,40,41]), engage in deeper, more meaningful conversations (“Meaningful Conversation” [42,43]), send short notes of gratitude to others (“Gratitude Note” [44,45]), and reflect on shared past experiences (“Blast from the Past” [46,47]).

Since the conclusion of this study, the Flourish App has undergone multiple design iterations and incorporated more recent AI technologies, such as multimodal interaction, long-term memory, action planning, goal-setting, and gamification. As a result, the information above only reflects the app experience as it was during the study.

Table 1. *List of Flourish Activities, one-liners, and domains at the time of the study (February 2024).*

Activity Name	One-Liner	Domain
Flourish Pulse	*This is your personal sanctuary—a safe space to take a break and connect with yourself.*	Emotional awareness and regulation
Three Good Things	*Write down three good things—big or small—that you appreciate about today.*	Emotional resilience
Letter from my Future Self	*Time travel to the future and write a letter to yourself. You'll discover your inner wisdom!*	Emotional resilience
Nature Walk	*Go on a simple stroll and discover 3 new S's: a new Sight, a new Sound, and a new Smell.*	Stress reduction
Beautiful Moment	*While going about your day today, look for a beautiful moment, however small.*	Stress reduction
Gifting a Compliment	*Let's not forget to tell the wonderful people in our lives how amazing they are!*	Social connection
Meaningful Conversation	*Dive into a meaningful conversation! It can leave you feeling more inspired and connected.*	Social connection
Gratitude Note	*Send a short note to someone who deserves a thank you. It will make their day—and yours, too!*	Social connection
Blast from the Past	*Rediscover a photo of an "ordinary moment" from the past, and share it with someone!*	Social connection

Ethical Considerations

This study was conducted following the approval of the Institutional Review Board of Sinclaire Community College (protocol title: "Study of Student Flourishing"). The approval

underscores the study's commitment to ethical standards, ensuring the protection of participants' privacy and safety throughout the research process.

To ensure voluntary participation, students were offered alternative methods to earn extra credit in their classes. To protect participant confidentiality and privacy, all survey data were anonymized and not linked to their app accounts. Participants were informed that their survey data would be used exclusively for research purposes, and the consent process emphasized their right to withdraw at any time without penalty. Finally, participants were thoroughly debriefed after the study, and those in the control condition were given free access to the Flourish app upon completing the final survey.

To ensure student safety in the case of emergency, the AI system has included a detailed crisis handling protocol. This protocol begins with detecting the presence and intensity of an ongoing crisis from the chat. Based on the crisis level, Sunnie provides recommendations such as self-care activities (e.g., deep breathing or grounding techniques), relevant crisis-related helplines and emergency services, and appropriate language for seeking help based on their current experiences.

Measures

Positive and Negative Affect

A shortened version of the Affect Valuation Index [48] was used to measure positive and negative states. Participants were asked to "read each word and rate how often you actually have that feeling over the course of a typical week" and responded along a scale of 1 (*Never*) to 5 (*All the time*). We created a composite score of positive affect aggregates by averaging ratings of *happy, satisfied, excited, enthusiastic, relaxed,* and *calm* (Cronbach's alpha = .87), and a composite score of negative affect aggregates by averaging ratings of *lonely, sad, nervous, fearful, sleepy,* and *sluggish* (Cronbach's alpha = .87).

Emotional Challenge

Emotional challenge was measured by asking participants, "During the past week…" which included the following items: "have you had any difficulties with your school, work or daily life due to any emotional problems, such as feeling depressed, sad or anxious?", "how often has your mental health affected your ability to complete homework, work or daily duties?", "how often have you gone through a tough emotional situation?", and "how often were you really happy?", with the last item being reverse-coded. Participants responded along a scale of 1 (*Not at all*) to 5 (*Very often*) and were aggregated to calculate a composite score (Cronbach's alpha = .84).

Perceived School Support

To measure how supported students felt by their school, we asked, "My school prioritizes my well-being" on a 7-point Likert scale (1 = *Strongly disagree*, 7= *Strongly agree*).

Other Measures

We also collected several additional scales assessing social well-being and overall flourishing. Given the small pilot sample, we present only the outcomes showing preliminary intervention effects; all other non-significant findings are summarized at the end of the Results section.

Transparency and Openness

All study materials, data, and analysis code have been made publicly available at the Open Science Framework [49]. Data were analyzed using R, version 4.2.3 [50] and the package ggplot, version 3.5.0 [51].

Results

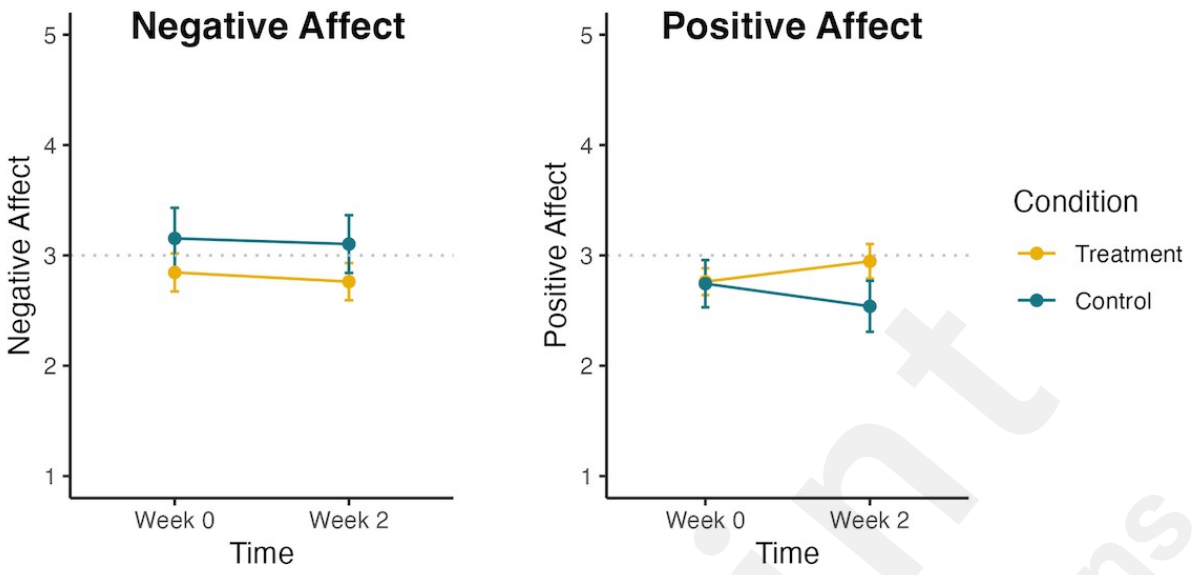
Positive and Negative Affect

We focused on comparing students' responses at the start of the study to their responses at the end of the study. We conducted a 2 (Condition: Treatment vs. Control) × 2 (Time: Before vs. After) repeated-measures ANOVA on positive and negative affect, respectively. Simple effects analyses were conducted to examine differences within each condition and time point.

For positive affect, there was no main effect of Condition, $F(1, 39) = 0.80$, $p = .377$, nor main effect of Time, $F(1, 39) = 0.52$, $p = .477$. However, consistent with our hypothesis, there was a significant Condition X Time interaction, $F(1, 39) = 4.56$, $p = .039$, $\eta^2 = 0.10$, $\varepsilon^2 = 0.08$ (see Figure 2). While the two groups had comparable positive affect at the beginning of the study, $p = .943$, 95% CI [-0.50, 0.53], after two weeks, those in the treatment condition reported a marginally significant increase in positive affect from Time 0 ($M = 2.76$, $SE = 0.12$) to Time 2 ($M = 2.95$, $SE = 0.16$), $p = .080$, 95% CI [-0.39, 0.02], $d = 0.18$. In contrast, those in the control condition did not significantly change in positive affect from Time 0 ($M = 2.74$, $SE = 0.21$) to Time 2 ($M = 2.54$, $SE = 0.23$), $p = .182$, 95% CI [-0.10, 0.51]; in fact, the means indicate a slight directional decrease in positive affect over time for this group.

For negative affect, there was no main effect of Condition, $F(1, 39) = 1.18$, $p = .285$, nor main effect of Time, $F(1, 39) = 0.96$, $p = .332$. We also did not find a Condition X Time interaction, $F(1, 39) = 0.04$, $p = .842$. This suggests that the affective benefits of being in the treatment (vs. control) condition were specific to increasing positive affect rather than reducing negative affect.

Figure 2. *Negative and positive affect changes by condition (error bars represent ±1 standard error of the mean).*

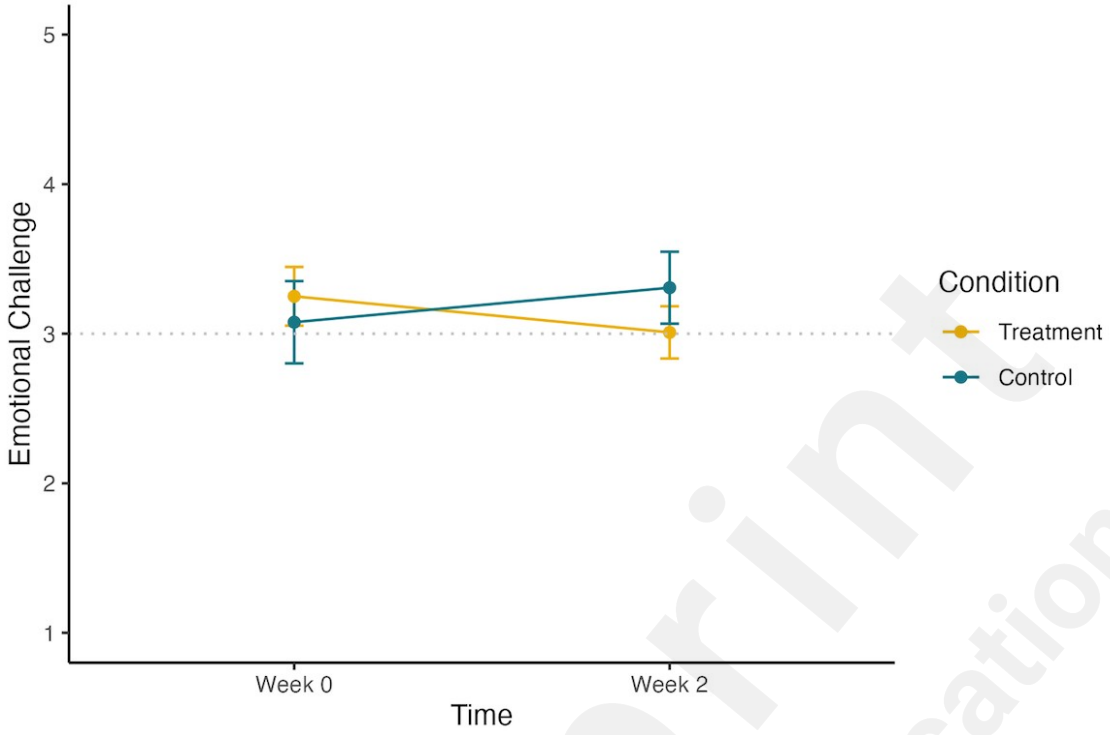


Emotional Challenge

We conducted a 2 (Condition: Treatment vs. Control) × 2 (Time: Before vs. After) repeated-measures ANOVA on emotional challenge. Simple effects analyses were conducted to examine differences within each condition and time point.

There was no main effect of Condition, $F(1, 39) = 0.042$, $p = .838$, nor main effect of Time, $F(1, 39) = 0.78$, $p = .382$. However, consistent with our hypothesis, there was a significant Condition X Time interaction, $F(1, 39) = 4.50$, $p = .040$, $\eta^2 = 0.10$, $\varepsilon^2 = 0.08$ (see Figure 3). While the two groups had comparable emotional challenges at the beginning of the study, $p = .596$, 95% CI [-0.48, 0.83], after two weeks, those in the treatment condition reported a marginal *decrease* in emotional challenge from Time 0 ($M = 3.25$, $SE = 0.20$) to Time 2 ($M = 3.01$, $SE = 0.17$), $p = .062$, 95% CI [-0.01, 0.49], $d = 0.19$. In contrast, those in the control condition did not significantly change in emotional challenge from Time 0 ($M = 3.08$, $SE = 0.28$) to Time 2 ($M = 3.31$, $SE = 0.24$), $p = .217$, 95% CI [-0.60, 0.14]; in fact, the means indicate a slight directional increase in emotional challenge over time for this group.

Figure 3. *Change in emotional challenge by condition (error bars represent ±1 standard error of the mean).*



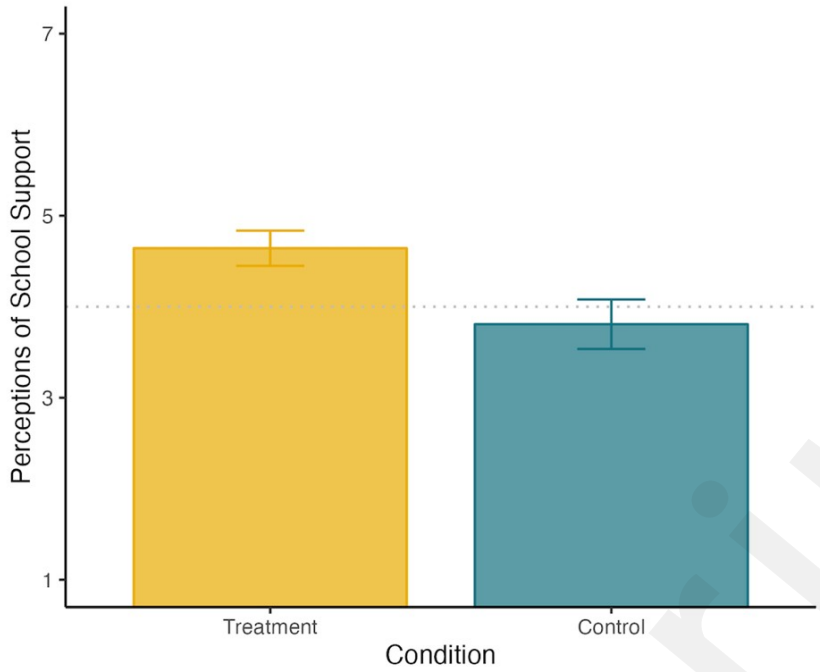
Perception of School Support

We conducted a 2 (Condition: Treatment vs. Control) × 2 (Time: Before vs. After) repeated-measures ANOVA on perception of school support.

As illustrated in Figure 4, there was a marginally significant main effect of Condition, $F(1, 39) = 3.68$, $p = .063$, $\eta^2 = 0.09$, $\varepsilon^2 = 0.06$; specifically, those in the treatment condition ($M = 4.64$, $SE = 0.19$) reported marginally greater perceptions of school support than those in the control condition ($M = 3.81$, $SE = 0.27$). There was no main effect of Time, $F(1, 39) = 0.02$, $p = .903$, nor a Condition X Time interaction, $F(1, 39) = 0.12$, $p = .729$, suggesting that the difference in perceptions of school support between the treatment and control conditions did not vary over time.

Notably, this main effect emerged even though participants in the treatment condition had only been introduced to the Flourish app at Time 0, without having used it. This suggests that mere exposure to the Flourish app—knowing it was available as a well-being resource—was sufficient to evoke a heightened sense of school support.

Figure 4. *Perceptions of school support by condition (error bars represent ±1 standard error of the mean).*



Other Measures

While directionally consistent, none of the additional social-well-being or flourishing measures showed a significant Condition × Time interaction (*p*s ≥ .121). A 2 (Condition) × 2 (Time) MANOVA that included all dependent variables likewise produced a non-significant multivariate interaction, Pillai's Trace = 0.30, $F(10, 30) = 1.30$, $p = .272$. Taken together, these patterns may suggest that any benefits of the intervention are most readily detected in the emotional-well-being domain; larger, well-powered studies will be needed to determine whether the observed patterns replicate and generalize.

Discussion

This pilot study provides initial evidence that a mobile app with brief, interactive, evidence-based well-being activities and an AI-powered chatbot can increase students' positive affect, strengthen resilience against emotional challenges, and improve perceptions of school support. These findings highlight the potential for leveraging positive psychology and social psychology for mental health promotion and prevention, thus contributing to a growing body of literature on digital mental health tools as accessible and scalable solutions for higher education institutions facing a mental health crisis.

Implications

A key strength of the Flourish app is its diversity of small, actionable activities, which allowed participants to choose those that resonated most with their needs and preferences. The ability for students to choose their own activity may have played an important role in the intervention's effectiveness, as previous research highlights the benefits of tailoring interventions to individual contexts and values [52]. Future studies could examine whether certain types of activities (e.g., those emphasizing social connection) are more impactful for specific student populations or stressors.

Additionally, one notable finding is the selective improvement in positive affect without a corresponding reduction in negative affect. This suggests that interventions targeting positive emotions may operate through mechanisms distinct from those addressing negative emotions and mental health conditions, aligning with previous research demonstrating their independent contributions to resilience [13]. The broaden-and-build theory of positive emotions [12] provides a useful framework for interpreting these results, as positive emotions may have expanded participants' coping strategies, helping them navigate emotional challenges more effectively. Furthermore, the observed reduction in emotional challenges is consistent with the idea that positive emotions serve as a pathway to building resilience over time [12].

Finally, from a policy perspective, our findings suggest that higher education institutions should integrate evidence-based digital well-being resources into their student support services. Additionally, a positive, proactive, and preventative approach to daily mental health and emotion regulation can play a unique role in fostering a resilient campus, complementing the more in-depth and reactive support provided by individual counseling. The immediate increase in students' perception of school support upon accessing the Flourish app also underscores how much students appreciate accessible mental health and wellness resources. Therefore, making these resources readily available is a critical strategy for fostering student well-being and resilience at scale, which can not only create more positive experiences for students themselves, but also reduce the burden on traditional counseling services while enhancing students' sense of institutional care.

Limitations and Future Directions

While this pilot study provides preliminary evidence on the efficacy of the Flourish app, several limitations remain. First, the small sample size likely reduced the statistical power of the study, which could explain the presence of weak or marginal effects and the lack of significance in several supplementary analyses. Future research with larger sample sizes is essential to further validate these findings.

Second, while students were randomly assigned to conditions, this randomization occurred at the classroom level rather than at the individual level. While this quasi-experimental design was chosen to mitigate spillover effects between conditions, there may still be important differences between individual classes, such as teaching style, class dynamics, or student engagement, which could influence how the intervention is received. Future studies should consider randomizing students within classrooms to better control for class-specific variables.

Third, the study's two-week duration offers only a brief glimpse into the Flourish app's potential impact. Longer-term studies are needed to determine greater improvements in well-being and uncover potential downstream consequences such as academic performance and student retention. Additionally, longitudinal research could investigate how academic stress cycles and seasonal variations influence the efficacy of digital mental health interventions in educational contexts.

Fourth, we were unable to isolate the effects of the AI-powered chatbot from the rest of the positive psychology activities in the app. While the integration of a chatbot may have contributed to personalization and app responsiveness, future research should examine its impact in isolation. Relatedly, the use of AI-powered tools raises important safety, privacy, equality, and ethical considerations [53,54], such as preventing over-reliance on AI for mental health support [55], and addressing potential biases in chatbot interactions [56,57]. As these tools become more prevalent, future studies should assess their long-term impact on mental health and explore strategies to enable

personalization with ensuring ethical safeguards.

Fifth, while this study focused on general well-being and emotional resilience, future research should consider evaluating participants' clinical mental health status at baseline. For example, assessing initial levels of depression and anxiety would provide a more comprehensive understanding of the app's potential role in both prevention and symptom reduction. This would also help in identifying specific subgroups that might benefit most from the intervention.

Lastly, cultural differences in how people ideally want to feel [58] may shape how students engage with wellness activities. Future research should examine whether students from non-U.S. cultural backgrounds derive similar benefits from the mobile app, and whether adjustments are needed to tailor interventions for other cultural contexts.

Conclusion

This pilot study provides initial evidence that an engaging mobile app featuring positive psychology exercises and an AI-powered chatbot can foster positive emotions, enhance emotional resilience, and strengthen perceptions of institutional support among college students. By providing accessible, evidence-based resources, institutions can help students build sustainable well-being habits and foster a more resilient campus culture. These findings lay the groundwork for future research into scalable, personalized interventions that promote mental health, well-being, and flourishing in educational settings and beyond.

Acknowledgments

We thank Professors Florina Petcu, Tiffany Rideaux, and Nick Tuttle at Foothill College for their contributions to data collection. This study received no external funding.

Conflicts of Interest

Three authors (Xuan Zhao, Tianyi Xie, and Julie Y. A. Cachia) are co-founders of Flourish Science, Inc., which developed the Flourish app tested in this study. The other authors (Sunday Holland and Eta Lin) are affiliated with Foothill College and report no conflicts of interest.

Data Availability

All study materials, data, and analysis code have been made publicly available on the Open Science Framework [49].

Authors’ Contributions

Sunday Holland contributed to investigation, data curation, and writing—review and editing. Eta Lin contributed to investigation, data curation, and writing—review and editing. Xuan Zhao contributed to conceptualization, methodology, software, supervision, and writing—review and editing. Tianyi Xie contributed to conceptualization, software, resources, and writing—review and editing. Julie Y. A. Cachia contributed to conceptualization, methodology, software, formal analysis, visualization, and writing—original draft and review and editing.

Abbreviations

AI: artificial intelligence; ANOVA: analysis of variance; CI: confidence interval; IRB:

Institutional Review Board; LLM: large language model; OSF: Open Science Framework; RCT: randomized controlled trial; SD: standard deviation; SE: standard error.

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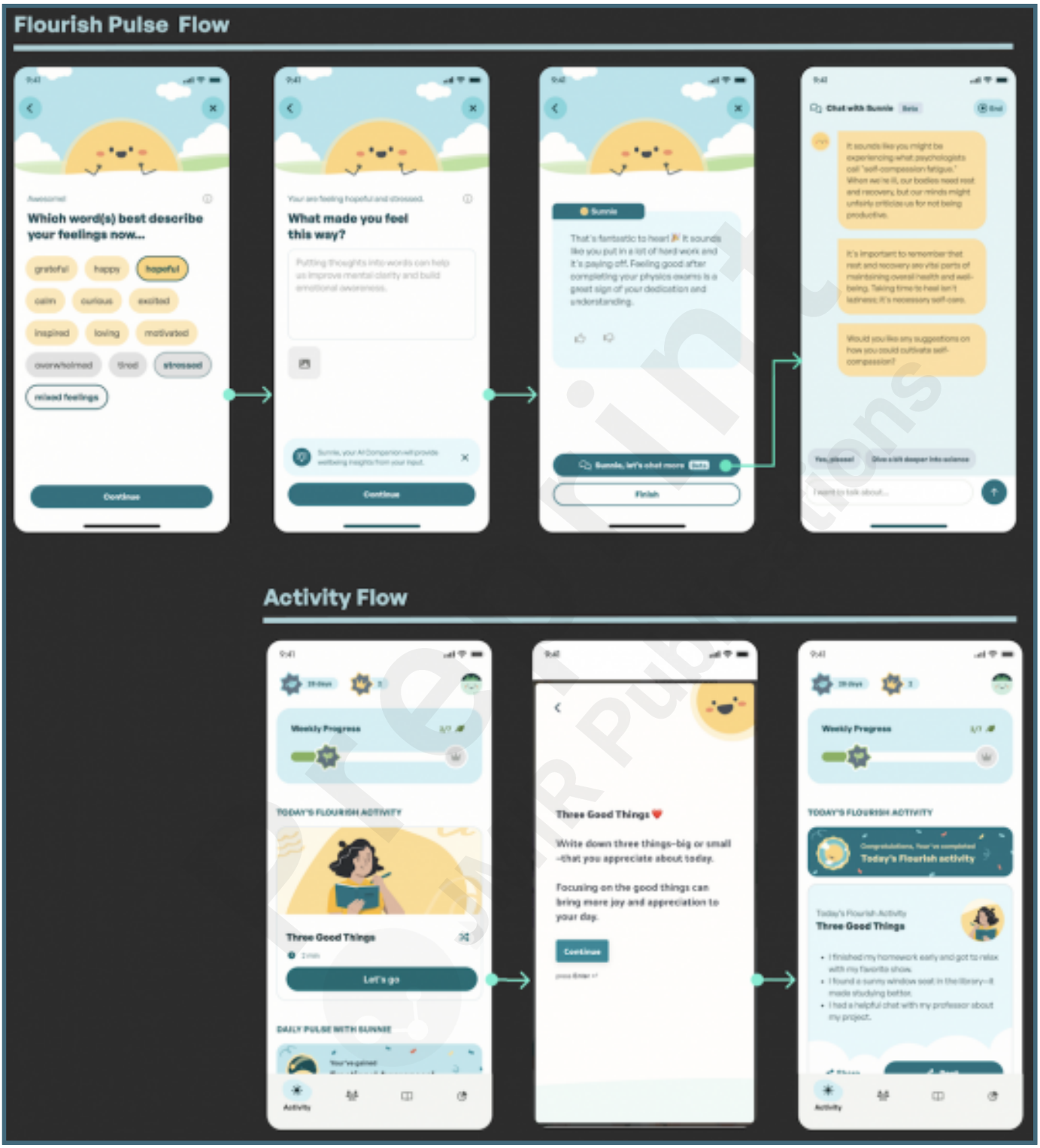
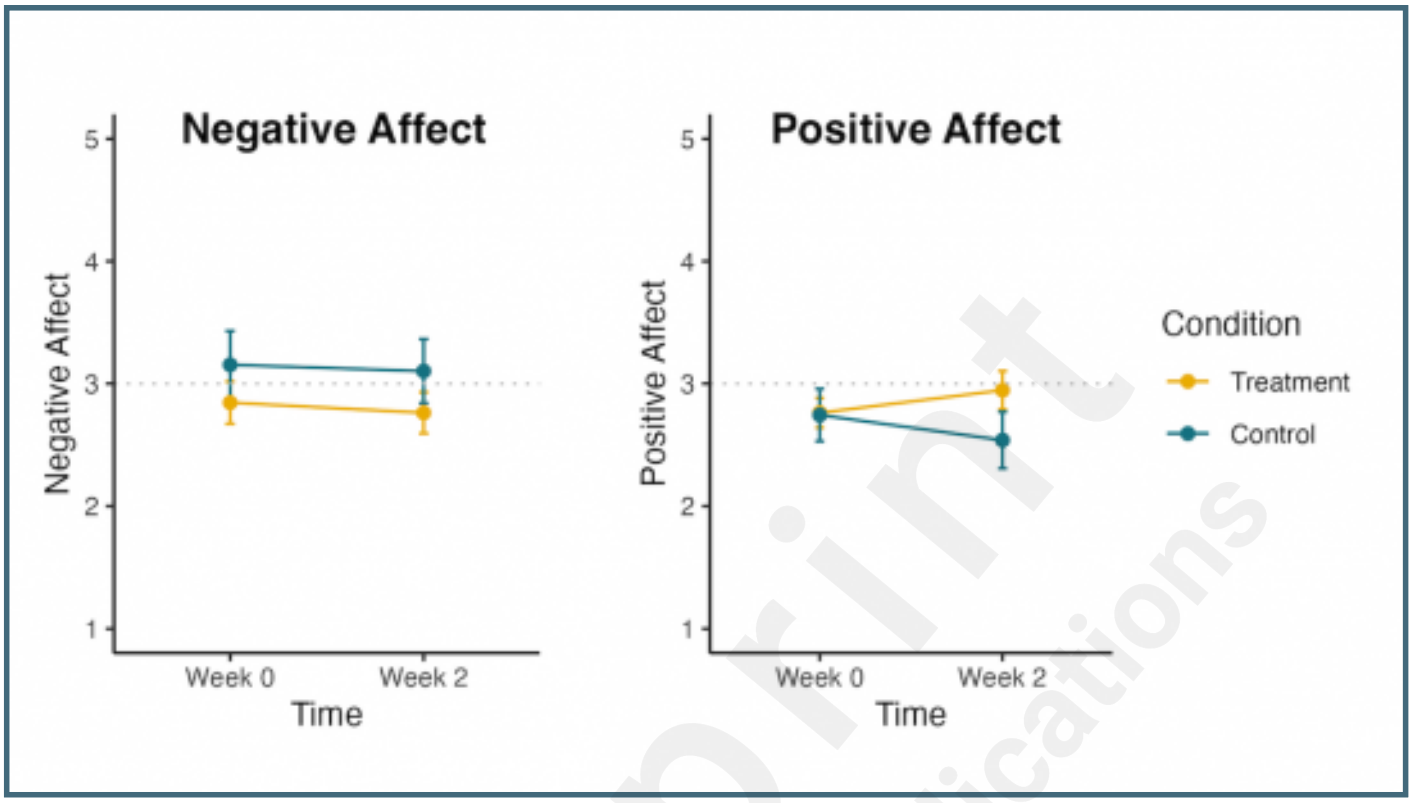
Supplementary Files

Figures

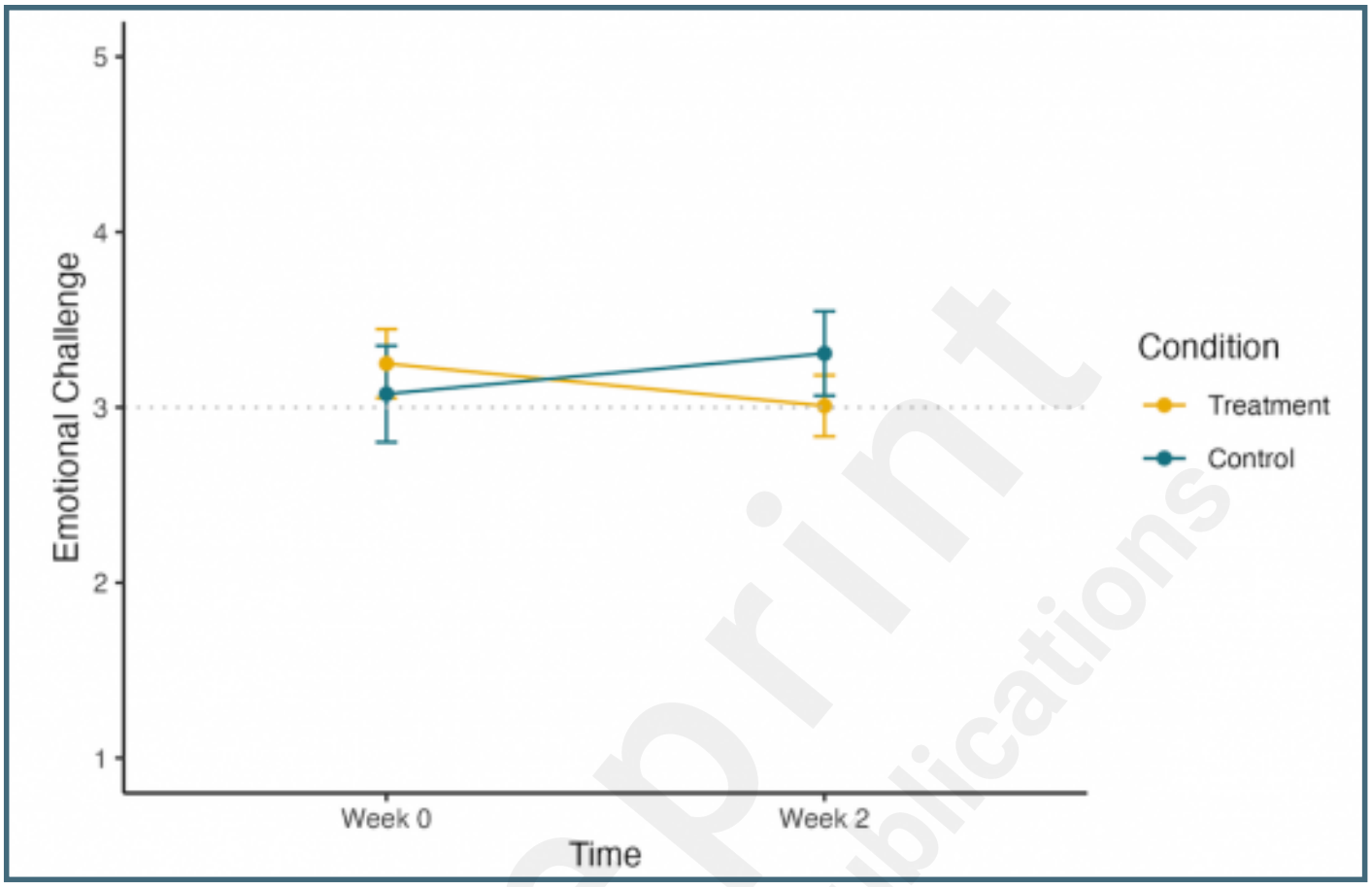
Sample app screens showing Flourish Pulse and activity flow.



Negative and positive affect changes by condition (error bars represent ±1 standard error of the mean).



Change in emotional challenge by condition (error bars represent ±1 standard error of the mean).



Perceptions of school support by condition (error bars represent ±1 standard error of the mean).