

A Randomized Trial of an App-Enhanced Group Cognitive Behavioral Therapy for Adolescents With Mood or Psychotic Spectrum Disorders

Marc J. Weintraub¹, Megan C. Ichinose¹, Jamie L. Zinberg¹, Anabel Salimian¹, Robin D. Brown¹,
Georga Morgan-Fleming¹, Jennifer M. Gamarra², Tiffany Tran¹, and David J. Miklowitz¹

¹ Department of Psychiatry, Semel Institute for Neuroscience and Human Behavior, University of California, Los Angeles

² Graduate School of Psychology, California Lutheran University

Objectives: Evidence-based psychosocial treatments for the early stages of mood or psychotic spectrum disorders are difficult to find in public health settings, and the efficacy of these treatments is limited by inconsistent behavioral skill practice among youth between sessions. Treatments can be made more accessible and efficacious when delivered through a group format that makes use of mobile applications to remind users to practice skills. **Method:** We conducted a 9-week, randomized controlled trial of the unified protocol (UP) for cognitive behavioral therapy (CBT) delivered via telehealth in a group format, comparing an app-enhanced version of the treatment (AppUP) to standard UP for adolescents with mood and psychotic spectrum conditions. The app was designed to help participants review session content, practice treatment skills, and log their psychiatric symptoms. Study assessors evaluated adolescents for psychiatric symptom severity and psychosocial functioning prior to treatment, at posttreatment, and 3 months posttreatment. **Results:** Sixty adolescents ($M_{age} = 15.0$, $SD = 1.3$) initiated the trial (30 were randomly assigned to each condition) with 49 retained at posttreatment (9 weeks) and 48 retained at 3 months posttreatment. Adolescents in AppUP showed greater improvements in psychosocial functioning over the 5-month study compared with those in standard UP. AppUP was also associated with greater reductions in depression severity among youth with more self-reported skill practice compared to those in standard UP. **Conclusions:** This study supports the benefits of transdiagnostic CBT for youth with mood and psychotic symptoms. An adjunctive app appears to improve psychosocial functioning and mood among these youth, especially among those who practice behavioral skills regularly.

What is the public health significance of this article?

This study examined the acceptability and benefits of a transdiagnostic app-enhanced cognitive behavioral therapy (CBT), administered in a group format for youth with mood or psychotic spectrum conditions. Half of the youth were randomly assigned to use a mobile application (app) as an adjunct to the group treatment which allowed for review of treatment session content, practice of treatment skills, and monitoring of psychiatric symptoms; the other half were randomly assigned to group CBT without the app. We found that over 5 months, the app-enhanced group CBT was associated with greater improvements in adolescents' psychosocial functioning compared to group CBT without an app. Additionally, the app-enhanced treatment was associated with greater improvements in depressive symptoms among youth who more frequently practiced behavioral skills between sessions, compared to youth who received CBT without the app. There is a need for greater accessibility of evidence-based psychosocial treatments for youth with early onset, severe psychopathology. A mobile application may help to increase the efficacy and accessibility of transdiagnostic CBT.

Keywords: mobile health, application, youth, cognitive behavioral therapy, psychosocial treatment

Stephen Schueller served as action editor.

Marc J. Weintraub  <https://orcid.org/0000-0001-8724-120X>

This study was registered with <https://ClinicalTrials.gov> (Identifier: NCT04887155). There are no previously published or currently in-press works stemming from this data set. The authors compared the acceptability and efficacy of an app-enhanced group cognitive behavioral therapy with standard delivery of the same treatment without an app among youth with severe mood or psychotic spectrum disorders.

The authors have no conflicts of interest to declare. Marc J. Weintraub receives support from the National Institute of Mental Health, American

Psychological Foundation, Brain and Behavioral Research Foundation, University of California, Los Angeles Semel Institute, and AIM for Mental Health. Megan C. Ichinose reports support from the Max Gray Fund. David J. Miklowitz receives research support from the National Institute of Mental Health, the Danny Alberts Foundation, Attias Family Foundation, Carl and Roberta Deutsch Foundation, Kayne Family Foundation, AIM for Mental Health, and Max Gray Fund; and book royalties from Guilford Press and John Wiley and Sons. All other authors have no declarations of interest.

Financial support for this study was provided by the National Institute of Mental Health, National Institutes of Health, Grant K23MH124015 awarded to Marc J. Weintraub; the Shear Family Foundation; the Levin Trust; the

continued

Severe psychiatric disorders such as schizophrenia, recurrent major depression, or bipolar disorder often have their first onset in adolescence. Psychosocial treatments, such as cognitive behavioral therapy (CBT), interpersonal therapy, and family-focused therapy, have an established evidence base for improving psychiatric symptoms among early onset youth (Devoe et al., 2019; Hutton & Taylor, 2014; Miklowitz et al., 2023; Mufson & Sills, 2006). However, access to these interventions is limited in public health settings due to lack of insurance coverage and unequal geographic distribution of trained providers, particularly those trained to work with individuals with severe mental illness symptoms (Mongelli et al., 2020). Individuals with severe psychopathology are also commonly excluded from behavioral health programs when clinicians feel unprepared to treat these individuals (Humphreys, 2017; Wong et al., 2018). Randomized controlled trials of psychosocial treatments for mood and psychotic spectrum conditions suggest only moderate effects in improving psychiatric symptoms (Carlucci et al., 2021; Matsumoto et al., 2021). Furthermore, only about 50%–60% of adult psychiatric patients respond to current psychotherapies (Eckstain et al., 2020; Leichsenring et al., 2022). There is a substantial need to increase accessibility and demonstrate the efficacy of early interventions for youth in the beginning stages of severe mood (i.e., recurrent or persistent major depressive disorder or bipolar spectrum) or psychotic spectrum disorders (McGorry et al., 2018; Scott et al., 2024).

Transdiagnostic treatments (which include individuals across a range of mental health conditions) and group therapy are complementary approaches that can increase accessibility to mental health services among youth with emerging disorders (McGorry & Mei, 2021). A transdiagnostic CBT protocol, the unified protocol (UP) for adolescents, has an established evidence base for youth with emotional disorders (Ehrenreich-May, Kennedy, et al., 2017). Few studies, however, have examined its effects among youth with more severe psychopathology. We have previously provided a rationale for the use of UP in this population (Weintraub et al., 2020). In brief, the UP is based upon principles that apply across emotional disorders (e.g., mood and anxiety) and psychotic spectrum disorders due to their shared etiology, co-occurrence, and overlapping emotional, cognitive, and behavioral processes (Barlow et al., 2004; McGorry et al., 2018). We sought to broaden the accessibility of the UP by piloting it in a group format and including adolescents with more severe symptoms, including recurrent or persistent depressive disorders, bipolar disorders, and

psychotic spectrum disorders (Weintraub et al., 2020). We also added a parallel parent group in which parents were exposed to the same skills that their offspring learned in separate age-appropriate groups. Although this group treatment was feasible and acceptable in the pilot study, rates of adherence to assigned skill practices (i.e., practicing CBT skill such as cognitive restructuring or behavioral activation two-to-three times per week) were only about 50%. The broader literature of CBT trials for adolescents with mood disorders shows similar rates of adherence to assigned skill practices as well as declining skill practice over the course of treatment (Gaynor et al., 2006; Simons et al., 2012).

With 95% of adolescents in the United States having access to a smartphone (Anderson et al., 2023), mobile health applications (apps) have been proposed as a useful tool to increase therapeutic engagement (Wilansky et al., 2016). Mental health apps have been used to assess or monitor symptoms, as stand-alone treatments, and as adjuncts to psychosocial and pharmacological treatments (Jameel et al., 2022). Apps can facilitate many components of CBT, including psychoeducation, planning of behavioral skills, and rehearsal of behavioral activation and cognitive restructuring skills (Aguilera & Muench, 2012). Apps can also increase completion of between-session assignments through text reminders, rewards (e.g., earning tokens), or gamification systems to reinforce engagement (e.g., “leveling up”). For example, a mobile app for youth with anxiety that included gamified systems to encourage exposure tasks increased participants’ app usage compared to those who used a nongamified app (Pramana et al., 2018). However, the measurement of the degree to which apps can increase between-session skill practice has been understudied among adolescents with severe psychopathology (Patoz et al., 2021).

We have sought to improve treatment adherence and clinical outcomes among adolescents with mood and psychotic spectrum disorders by designing a mobile app as an adjunct to the UP (Weintraub et al., 2022). Through an iterative process based on participant and clinician feedback, we developed a pilot version of the app, delivering the app-enhanced, 9-week UP treatment (AppUP) to a cohort of participants with mood or psychotic spectrum disorders and their parents and conducted a second round of modifications. The app enabled participants to review prior session content, practice treatment skills, and log and track their psychiatric symptoms between weekly sessions. In the AppUP open trial of 31 adolescents, participants reported high acceptability of the treatment and mobile app and had improvements in depressive symptoms and

American Psychological Foundation, AIM for Mental Health, and the Attias Foundation. The authors thank Merelise Ametti, Amina Avion, Neda Awad, Rachel Bench, Monica Done, Oliver Flores, Dylan Hughes, Seohyun Joo, Mikaela Kupfer, Meghan Kussman, Sheena Salonga, Natalie Vandernoot, Sarah Wilkins, Zach Wong, and Wendy Zhang for their help in facilitating the groups.

Marc J. Weintraub played a lead role in conceptualization, formal analysis, funding acquisition, investigation, methodology, writing—original draft, and writing—review and editing. Megan C. Ichinose played a supporting role in project administration and an equal role in investigation and writing—review and editing. Jamie L. Zinberg played an equal role in investigation, project administration, and writing—review and editing. Anabel Salimian played a lead role in data curation and an equal role in investigation, project administration, visualization, and

writing—review and editing. Robin D. Brown played an equal role in investigation, project administration, and writing—review and editing. Georga Morgan-Fleming played a supporting role in investigation, project administration, and writing—review and editing. Jennifer M. Gamarra played a supporting role in investigation and writing—review and editing. Tiffany Tran played a supporting role in investigation and writing—review and editing. David J. Miklowitz played a supporting role in conceptualization and an equal role in investigation, methodology, and writing—review and editing.

Correspondence concerning this article should be addressed to Marc J. Weintraub, Department of Psychiatry, Semel Institute for Neuroscience and Human Behavior, University of California, Los Angeles, 760 Westwood Boulevard, Room A8-259, Los Angeles, CA 90095, United States. Email: mjweintraub@mednet.ucla.edu

psychosocial functioning over 9 weeks of treatment. Furthermore, the frequency of skill practice reported on the app—although averaging only 50%—was positively associated with improvements in depressive symptoms and psychosocial functioning.

In the present study, we conducted a randomized controlled trial comparing group-based UP with a mobile app (AppUP) to standard group-based delivery of the UP without a mobile app in adolescents (ages 13–17 years) with mood or psychotic spectrum disorders and their parents. All participants were followed for 5 months, which included nine weekly sessions of group treatment, during which participants logged their weekly skill practice and self-assessment of symptoms. Independent assessments of psychiatric symptoms and psychosocial functioning were conducted by blinded assessors at pretreatment, posttreatment, and a 3-month follow-up. We hypothesized that both treatment conditions would be associated with significant improvements in psychiatric symptoms and psychosocial functioning. We further hypothesized that the AppUP treatment would be more acceptable to participants than the standard UP. We also expected that AppUP adolescents would practice the treatment skills more frequently than adolescents in the standard UP and that skill practice would be associated with greater improvements in psychosocial functioning and psychiatric symptoms over the 5-month study.

Method

Participants

This study received Institutional Review Board approval at the University of California, Los Angeles. We recruited adolescents from two specialty outpatient programs at the University of California, Los Angeles, Semel Institute for Neuroscience and Human Behavior—the Child and Adolescent Mood Disorders Program and the Center for the Assessment and Prevention of Prodromal Syndromes, both of which conduct extensive psycho-diagnostic assessment prior to adolescents being offered services. Adolescents who had undergone either of the clinic's intake diagnostic assessments or who contacted the clinic seeking psychosocial treatment were recruited to participate in the study. Adolescent participants were required to meet the current *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.) criteria for a lifetime depressive or bipolar disorder, the “clinical high-risk syndrome” characterized by subthreshold psychotic symptoms and functional impairment, or a full-onset psychotic disorder (American Psychiatric Association, 2013). The Mini-International Neuropsychiatric Interview for children and adolescents was used to assess whether youth met the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.) criteria for depressive and bipolar disorders (Sheehan et al., 1998, 2010), and the Structured Interview for Prodromal States was used to assess for the psychosis-risk syndrome (Miller et al., 2003). Diagnostic assessments were conducted either by licensed clinical psychologists or by clinical psychology interns or psychiatry residents who were being supervised by licensed psychologists. Diagnostic results were presented to the study team, and final diagnoses were determined based on consensus by the team. Adolescent participants had to be between 13 and 17 years old, fluent in English, able to attend and appropriately participate in outpatient treatment, and have at least one parent willing to join all treatment sessions and study assessments. Participants were also required to have access to a smartphone.

Adolescents who were too ill to participate in outpatient treatment and/or were determined to be disruptive to the other group participants (e.g., significant behavioral issues such as aggression or oppositionality, active suicidality, substance abuse, or acute psychotic symptoms) were excluded.

Intervention

The treatment delivered in this study is a modified version of the UP for adolescents, a CBT protocol for adolescents with emotional disorders (Weintraub et al., 2022). The treatment included nine, 90-min weekly group sessions delivered in three modules—psychoeducation, behavioral skills, and cognitive skills. The group treatments were delivered via telehealth across six cohorts from January 2022 through November 2023.

The psychoeducation module consisted of outlining areas of difficulties and goal setting, identifying the pros and cons of making changes, learning about the functions of emotions, and communicating one's emotions. The cognitive skills include thought monitoring, identifying cognitive distortions (termed “thinking traps”), and cognitive reappraisal (termed “detective thinking”). The behavioral skills included activity monitoring, behavioral activation with pleasant activity scheduling, setting goals, and learning to respond to avoidance or approach tendencies that increase mood or psychotic symptoms with “opposite action.” When applicable, adolescents were coached in creating an exposure hierarchy if relevant to the participants' presenting problems or goals. Within each session of the behavioral skills module, adolescents were asked to identify specific behavioral changes they would like to make and then enact one of those behaviors in the upcoming week (e.g., engage in a relaxation technique, ask a question in one of their academic classes). Participants were asked to practice treatment skills at least three times each week. Between sessions, skill practices were completed on handouts for the standard UP participants and on the app for the AppUP participants. The treatment skills included (a) activity monitoring, (b) scheduling pleasant activities, (c) opposite action, (d) communicating emotions, (e) box breathing exercises, (f) thought monitoring, (g) catching thinking traps, (h) detective thinking, and (i) mindful breathing space.

Adolescents and at least one parent participated in the treatment. To encourage open disclosure and promote greater cohesion among group members, adolescents attended sessions with their peers, whereas parents attended a parallel group with fellow parents. Parents and adolescents were given the same treatment content and taught the same skills in their respective groups for the first 75–80 min of each treatment session. In the final 10–15 min of each 90-min session, the parents and adolescents joined together to discuss the skill(s) of the week, plan for how/when they would practice the skill(s), and share this plan with one of the group facilitators prior to ending the session. In addition to receiving the intervention, group cohorts were randomized to either receive the study's mobile app (see below) or were provided a paper copy of the study treatment handouts to practice the treatment skills as homework.

The group treatments for the adolescents and parents were each led by a doctoral-level psychologist and a master's-level therapist who had training and supervision in the UP. Doctoral psychology trainees (interns and externs) shadowed the sessions and helped conduct the family checkouts at the end of each session.

The Mobile Application (App)

The app was designed to help adolescents accomplish three treatment tasks: (a) review the treatment session content, (b) practice treatment skills, (c) and review and log their psychiatric symptoms and functional status (also known as the symptom check-in). Participants were able to review their treatment skill practice and track their symptoms in a section of the app called “Review My Progress.” The app was used as a direct tool in the therapy session, as it was used by clinicians to review the treatment materials and have the participants practice the treatment skills in sessions. Additionally, the app served as a method to bridge sessions by allowing participants to review the prior session’s content and practice treatment skills from their mobile devices. The app also contained three primary engagement features: (a) text reminders to conduct weekly skill practice and symptom logging, (b) emojis that were earned upon completion of the weekly treatment skill practice, and (c) a skills streak counter indicating the consecutive weeks the participant has completed their skill practices.

The app was accessible via a URL as a mobile-enhanced link. Thus, the app was accessible on any internet-accessible device, including mobile devices, tablets, and personal computers. Adolescents and their primary parent (self-identified by the parent, and based on who could attend treatment sessions) were provided unique login access to the app. Thus, parents could not see their adolescent’s app entries nor could adolescents see their parent’s app entries. In addition to practicing treatment skills at least three times each week, participants were asked to perform a symptom check-in at least once per week and were reminded via two weekly text reminders from the app to complete their weekly skills log and check-in.

The app also included a “provider” login (called the “Provider Portal”) that was used by treating clinicians between each session to see which of the skills the participants practiced and the results of their symptom check-ins. Throughout the course of the 9-week treatment for each cohort, clinicians examined the Provider Portal on a weekly basis for approximately 30 min during the group supervision meeting. During this time, the clinicians examined participants’ app entries (or lack thereof), shared their app entries with the team, and discussed how to best use that information during the treatment session and family checkouts. Clinicians were also able to set the “skill of the week” (e.g., activity monitoring, scheduling pleasant activities) to appear on participants’ app homepages. Information regarding the development of the app and images presenting various sections of the app has been published previously (Weintraub et al., 2022).

Study Outcome Measures

Independent evaluators conducted assessments that occurred at baseline (i.e., within 2 weeks prior to the start of treatment), posttreatment (i.e., within 2 weeks following the final group session), and 3 months posttreatment. Evaluators remained blind to treatment assignments through not being included in therapist supervision meetings.

Additionally, at each follow-up assessment, the assessors read a script to the participants indicating that they were unaware of the treatment condition and asking them to not share to which condition they were randomized.

Global Functioning

Adolescents’ global psychosocial functioning was measured by trained study assessors on a 100-point scale using the Clinical Global Assessment Scale (CGAS; Shaffer et al., 1983) based on the period of lowest functioning since the prior assessment (i.e., 2–3 months). Study evaluators also rated adolescents’ overall clinical improvement since the prior study assessment using the Clinical Global Impressions (CGI; Guy, 1976), which measures improvements on a 7-point Likert scale from 1 (*very much improved*) to 7 (*very much worse*).

Psychiatric Symptoms

Psychiatric mood symptoms were rated by the trained independent assessors using the Children’s Depression Rating Scale–Revised (CDRS; Poznanski & Mokros, 1996), which measures depressive symptom severity over the past 2 weeks, and the Young Mania Rating Scale (YMRS; Young et al., 1978), which measures (hypo)manic symptom severity over the prior 1 week. Prior to beginning the study, study assessors independently rated five prerecorded assessments using the CDRS and YMRS from a previous clinical trial. Interrater reliabilities (intraclass correlations) for the CDRS and YMRS were 0.91 and 0.87, respectively. Clinicians also administered the Prodromal Questionnaire Brief (PQ-B), a 21-item measure of subclinical psychotic symptoms, with items rated from 0 (*not present*) to 5 (*present and strongly agree that the experience was frightening, concerning, or caused problems for the individual*; Loewy et al., 2011).

In conjunction with the semistructured assessments that were conducted by the study assessors, adolescent participants self-reported their psychiatric symptoms using the Brief Symptom Inventory (Derogatis & Spencer, 1982), a 53-item short version of the Symptom Checklist–90, measuring nine symptoms dimensions (somatization, obsession–compulsion, interpersonal sensitivity, anxiety, depression, hostility, phobic anxiety, paranoid ideation, and psychoticism). Each symptom is rated on a 5-point scale measuring the distress over the past 7 days, from 0 (*not at all*) to 4 (*extremely*). Internal reliability was high for the Brief Symptom Checklist within our sample (Cronbach’s $\alpha = .96$). Adolescents and their parents provided ratings of the adolescent’s quality of life using the KINDL (Ravens-Sieberger & Bullinger, 2000), a 30-item measure of seven domains of functioning (physical well-being, emotional well-being, self-esteem, family, friends, school, and illness) rated on 5-point Likert scales. Internal reliabilities were high for both adolescent-reports and parent-reports of adolescent quality of life on the KINDL (Cronbach’s α s = .85 and .90, respectively).

Skill Practice

Skill practice data were collected through three different methods. (a) At the start of Sessions 2 through 9, participants in both treatment conditions indicated the number of days (from 0 to 7) that they practiced each skill treatment taught (there was no skill practice that participants were expected to compete for the first treatment session). In the first 5 min of each session, participants were sent a URL through a text message in which they confidentially reported their use of skills in the previous week. (b) During the “checkout” at the end of each session, clinicians inquired about adolescents’ skill

practice during the previous week to inform the plan for skill practice over the forthcoming week. A clinician-rated skill practice scale (rated from 0 = *no evidence of practice* to 2 = *skills practiced and homework completed as expected*) was developed in a prior investigation of a mobile-enhanced psychosocial treatment trial for youth with early stages of mood disorders (Miklowitz et al., 2023). Clinicians used this scale to rate adolescents' skill practice following each treatment session. (c) Within the AppUP condition only, the app catalogued the number of skill practices that each participant completed throughout the treatment.

Participant Treatment Acceptability

At the posttreatment assessment, adolescents in both treatment conditions rated the treatment's acceptability across four domains: information learned, enjoyment, burden, and overall satisfaction. Treatment acceptability items were rated on a 5-point scale from 1 (*not at all*) to 5 (*very much*). Participants in the AppUP condition were asked to rate the acceptability of the app-enhanced treatment (i.e., the app combined with the group treatment).

Clinician Treatment Acceptability

All study clinicians who conducted end-of-session checkouts with families rated the treatment's acceptability across five categories, using 7-point Likert scales (from 1 = *not at all* to 7 = *very much*): utility of content for the population, addressing the patient's needs, ease of delivery, length, and overall satisfaction. For each item, clinicians provided ratings of treatment acceptability based on two sources of information: their own impressions and their perception of the participants' perspectives based on what participants said in the check-out interviews. Clinicians made their ratings of acceptability after completing all of their assigned groups.

App Acceptability

Among adolescents who were randomized to the AppUP condition, app acceptability was rated at the posttreatment assessment. Adolescents rated the app's usefulness on three main technology features: the text reminder system to remind them to engage with the app and practice treatment skills, emojis they received as rewards for practicing their weekly treatment skill practice, and the skill streak meter. Adolescents also rated the app's ease of use and their overall satisfaction with the app. App acceptability across each of these domains was rated on a scale of 1–5, with 1 = *not at all* acceptable and 5 = *very* acceptable. Clinicians made similar ratings of app acceptability on six domains on a 7-point Likert scale from 1 = *strongly disagree* to 7 = *strongly agree*.

Data Analyses

Primary study variables (i.e., global functioning) and secondary variables (i.e., psychiatric symptom variables) were evaluated for normalcy of distribution and outliers. A square root transformation was used to correct for significant skewness and kurtosis in the psychotic symptom measure (PQ-B); all other outcome variables were normally distributed (i.e., skewness < |1|; kurtosis < |2|). Analyses of variance (ANOVAs) and chi-square tests were used to examine baseline differences between treatment groups on

demographic variables (e.g., gender, race, ethnicity), clinical variables (e.g., psychiatric symptom severity, psychiatric diagnoses), and session attendance. ANOVAs were also used to compare treatment groups on treatment acceptability. All statistical analyses were conducted in IBM's SPSS using intent-to-treat analyses, which used all available data. Data were not imputed for any statistical analyses. We conducted Little's Missing Completely at Random analysis across the study variables. The analysis indicated that missing data were missing completely at random, $\chi^2(39) = 46.68$, $p = .19$.

To produce the participant and clinician skill practice variables, participants' self-reported days of skill practice and clinicians' weekly reports of participants' skill practice were summed, respectively, across the 9-week group treatment. We used Pearson correlations to examine the concurrent relationship between participants' and clinicians' ratings of participants' skill practice as a validity check on the two ratings. ANOVAs were conducted to examine differences between treatment conditions on skill practice. Participants' baseline mood (depressive vs. bipolar spectrum) and the presence of a psychotic spectrum diagnosis were separately examined as covariates in the ANOVA models.

Repeated measure mixed-effect regression analyses were conducted to determine whether there were improvements in the primary outcome of global functioning (as measured by the CGAS and CGI) and secondary outcomes of psychiatric symptoms (depressive symptoms on the CDRS, manic symptoms on the YMRS, and psychotic symptoms on the PQ-B) and participant-reported quality of life (KINDL). Assessment interval (i.e., time: baseline assessment, posttreatment, and 3-month follow-up) was entered as the repeated variable within participants. Analyses were conducted with treatment condition, time, and their interaction as independent fixed effects. In separate mixed-effect models, we examined whether improvements in the AppUP condition versus the standard UP condition on functional and psychiatric symptom outcomes were moderated by adolescents' skill practice (as rated by adolescents and study clinicians) and psychiatric diagnosis.

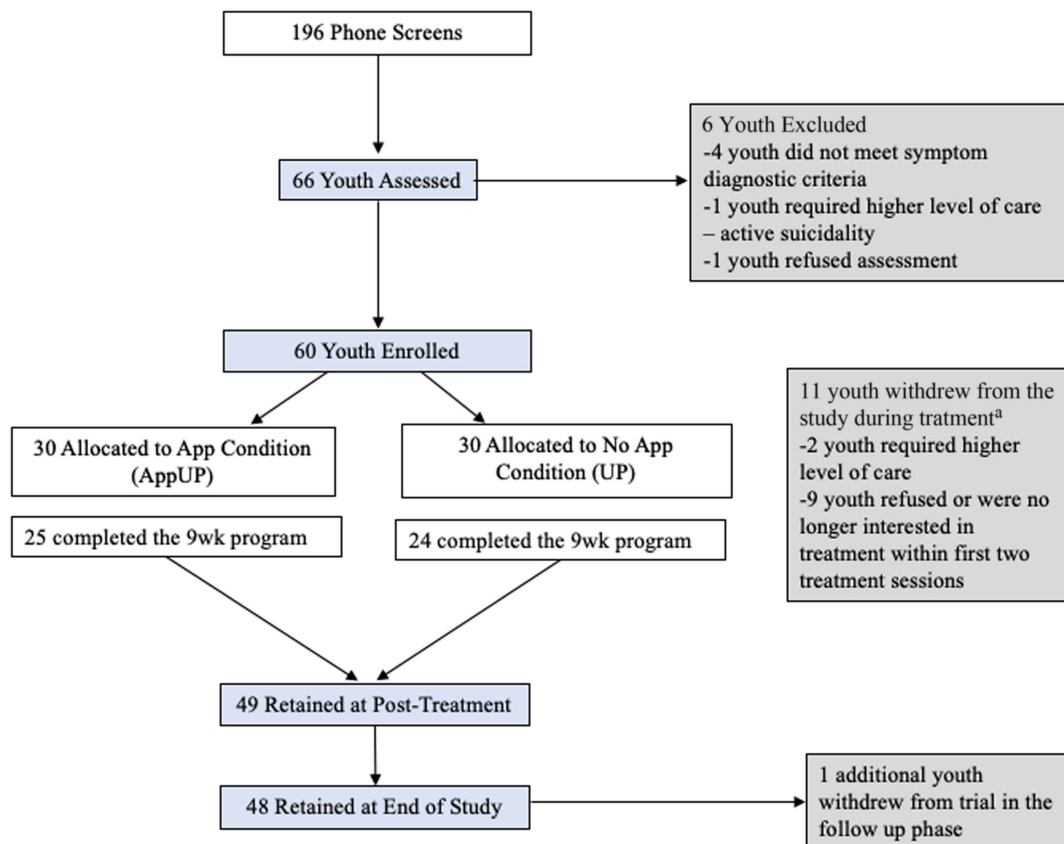
Results

Sixty-six adolescents were assessed for inclusion in the trial with 60 meeting eligibility criteria and enrolled. Forty-nine (81.7%) of the 60 enrolled adolescents were retained throughout the 9-week treatment and 48 (80%) were retained through the 5-month study (see Figure 1 for the Consolidated Standard of Reporting Trials flow diagram). At intake, the majority of adolescents enrolled met criteria for a depressive spectrum disorder ($n = 47$; 78.3%), 13 (21.7%) met criteria for a bipolar spectrum disorder, and 15 (25%) for a psychotic spectrum disorder. The 60 enrolled adolescents were randomized evenly (30:30) between mobile app conditions across six group cohorts. Of the 60 adolescents who were enrolled in the trial, the average number of sessions attended was 6.7 ($SD = 2.6$). The 49 adolescents who were retained throughout the treatment attended an average of 7.9 ($SD = 1.1$) of nine treatment sessions. The two treatment groups did not differ on any baseline demographic or clinical variables or session attendance (see Table 1).

Treatment Acceptability

Across the two treatment conditions, adolescents rated the UP groups with high overall satisfaction and relatively low burden;

Figure 1
CONSORT Diagram for Randomized Trial



Note. UP = unified protocol. See the online article for the color version of this figure.

^a Among the 11 youth who withdrew from the study during the treatment phase and refused follow-up, one participant did not attend any treatment sessions, four withdrew following the first treatment session, four withdrew after the second session, and the remaining two withdrew due to a need for a higher level of care following their participation in three and five treatment sessions, respectively. wk = week; CONSORT = Consolidated Standard of Reporting Trials.

they also rated the groups as moderately enjoyable and educational (see Table 2). There were no differences between the two treatment conditions in the adolescents' ratings of any of these domains of treatment acceptability. The study involved the use of four primary therapists (two who led the facilitation of the teen groups and two who led the parent groups); 15 additional clinicians served as cotherapists. Following the delivery of the treatment, the clinicians' mean acceptability ratings were high for each of the surveyed domains (see Table 2). There were no differences in clinician acceptability ratings between treatment conditions.

App Acceptability

Within the AppUP condition, the adolescents reported that the app was easy to use and rated it as high in overall satisfaction (Table 2). Participants rated the app's treatment features (i.e., session review, skill practice, and symptom check-ins) and the app's engagement features (i.e., text reminders, rewards, and gamification) between moderately and moderately highly acceptable. The clinicians rated the app as highly satisfying, including being easy to

learn and navigate and being helpful to themselves as providers and adolescent participants (Table 2).

Treatment Skill Practice

Adolescents reported having practiced their assigned treatment skills an average of 55.6 times ($SD = 38.9$) during the 9-week treatment phase, which is approximately six skill practices per week. Adolescents' self-ratings of skill practice throughout treatment were significantly correlated with clinician's ratings of adolescents' skill practice, $r(55) = 0.33$, $p = .01$. Within the AppUP condition, adolescents logged an average of 22.0 skill practices ($SD = 13.9$) and 5.3 ($SD = 2.8$) symptom check-ins on the app during the 9-week treatment. Among the adolescents in the AppUP condition, their self-ratings of skill practice did not correlate with their logged skill practice within the app, but clinicians' ratings of adolescents' skill practice correlated highly with adolescents' logged skill practice within the app, $r(29) = 0.81$, $p < .001$.

There were no main effects of treatment condition on the amount of skill practice as rated by adolescents or clinicians. Due to the large

Table 1
Baseline Demographic and Clinical Characteristics of Adolescent Participants

	AppUP (<i>n</i> = 30)	Standard UP (<i>n</i> = 30)	Total (<i>N</i> = 60)
Demographic	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Adolescent age (years)	14.9 (1.2)	15.1 (1.4)	15.0 (1.3)
Primary parent age (years)	49.9 (3.9)	48.5 (6.6)	49.2 (5.4)
Adolescent academic grade	10th (1.6)	10th (1.3)	10th (1.5)
Household income (selected in ranges)	\$100,000–\$149,000	\$100,000–\$149,000	\$100,000–\$149,000
Demographic	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Adolescent sex, female	21 (70)	18 (60)	39 (65)
Primary parent sex, female	26 (86.7)	29 (96.7)	55 (91.7)
Adolescent race			
White	21 (70.0)	19 (63.3)	40 (66.7)
Black or African American	1 (3.3)	5 (16.7)	6 (10.0)
Asian or Asian American	1 (3.3)	3 (10.0)	4 (6.7)
More than one race	7 (23.3)	3 (10.0)	10 (16.7)
Adolescent ethnicity			
Hispanic/Latino	12 (40.0)	10 (33.3)	22 (36.7)
Adolescent baseline illness characteristic	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Mood and psychotic spectrum diagnoses			
Depressive spectrum disorder	22 (73.3)	25 (83.3)	47 (78.3)
Psychotic spectrum syndrome	5 (16.7)	10 (33.3)	15 (25.0)
Bipolar spectrum disorder	8 (26.7)	5 (16.7)	13 (21.7)
Additional diagnoses			
Anxiety disorder	23 (76.7)	20 (66.7)	43 (71.7)
Attention-deficit/hyperactivity disorder	14 (46.7)	17 (56.7)	31 (51.7)
Obsessive-compulsive disorder	4 (13.3)	3 (10.0)	7 (11.7)
Conduct/oppositional defiant disorder	2 (6.7)	3 (10.0)	5 (8.3)
Symptom Severity Rating Scale	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Child Depression Rating Scale	46.2 (11.6)	45.7 (10.4)	46.0 (10.9)
Young Mania Rating Scale	9.6 (5.1)	10.3 (5.2)	10.0 (5.1)
Prodromal Questionnaire Brief	16.3 (23.2)	21.2 (16.20)	18.7 (19.9)
Psychosocial Functioning Scales			
Clinical Global Impressions	44.5 (7.5)	46.0 (7.4)	45.3 (7.4)
Child Global Assessment Scale	4.4 (0.9)	4.5 (0.9)	4.5 (0.9)

Note. AppUP = mobile application-enhanced Unified Protocol condition; Standard UP = Unified Protocol condition without a mobile application.

variability in adolescents' reported skill practice ($SD = 38.9$), we explored whether there was a treatment effect on adolescent skill practice based on adolescents who were high versus low in skill practice via a mean split of the adolescent-reported skill practice variable. Whereas there was no difference between conditions in adolescents' self-reported skill practice frequency among adolescents who were below the mean in skill practice ($ns = 18$ in AppUP and 12 in standard UP), the adolescents who were above the mean in skill practice in the AppUP condition ($n = 11$) reported significantly more skill practice than their counterparts who were above the mean in the standard UP condition, $n = 15$; $F(1, 44) = 6.44$, $p = .02$. Among the adolescents in the upper half of skill practice, adolescents in the AppUP condition reported practicing 110.2 skills during treatment ($SD = 23.3$) and adolescents in the standard UP condition reported practicing 80.5 skills ($SD = 19.24$). The interaction between treatment condition and skill practice was not significant based on clinician-reported skill practice.

The frequency of skill practice (based on the adolescent report) was stable throughout the treatment, $F(7, 74) = 1.10$, $p = .37$. There was an interaction between treatment condition and time on adolescent-reported skill practice, $F(7, 74) = 3.45$, $p = .01$. The interaction indicated the AppUP participants reported greater skill practice frequency than the standard UP group in the first half of treatment (Sessions 2–5). The two groups were statistically equivalent at the sixth session, and the standard UP group reported greater skill practice frequency in the final three sessions of treatment compared to those in AppUP.

Adolescent- and clinician-rated skill practice did not differ by mood diagnosis or the presence of a psychotic spectrum condition. There was a significant interaction between treatment condition and baseline depressive symptom severity (as measured by the CDRS) on adolescent-rated skill practice, $F(1, 52) = 7.56$, $p = .008$, partial $\eta^2 = 0.13$. Adolescents in the AppUP condition with lower depressive symptom severity reported less skill practice than their

Table 2*Treatment and App Acceptability as Rated by Adolescent Participants and Study Clinicians*

Treatment acceptability	AppUP	Standard UP	Overall
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Adolescent ratings (out of 5)	<i>n</i> = 25	<i>n</i> = 24	<i>n</i> = 49
Treatment burden	2.0 (1.1)	1.8 (1.0)	1.9 (1.1)
Enjoyable	3.4 (1.1)	3.6 (1.1)	3.5 (1.1)
Educational	3.9 (1.1)	3.8 (1.0)	3.8 (1.0)
Overall satisfaction	4.1 (0.7)	4.2 (0.7)	4.2 (0.7)
Clinician ratings (out of 7)	<i>n</i> = 14	<i>n</i> = 13	<i>n</i> = 19
Treatment content	6.6 (0.5)	6.3 (1.4)	6.4 (1.0)
Treatment addressed adolescents' needs	5.7 (0.9)	5.8 (1.3)	5.7 (1.0)
Ease of delivering treatment	6.1 (0.9)	6.5 (0.5)	6.3 (0.7)
Length of treatment protocol	6.0 (1.0)	6.4 (0.7)	6.2 (0.8)
Overall satisfaction	6.1 (0.4)	6.5 (0.5)	6.3 (0.5)

App acceptability	AppUP
	<i>M (SD)</i>
Adolescent ratings (out of 5)	<i>n</i> = 24
Easy to use	4.1 (1.0)
Tracking symptoms	3.4 (1.3)
Reviewing treatment content	3.8 (1.4)
Practicing treatment skills	3.8 (1.2)
Text reminder system	2.3 (1.3)
Earning emojis for skill practice	3.6 (1.2)
Skill streak counter	3.0 (1.4)
Overall satisfaction	4.3 (0.8)
Clinician ratings (out of 7)	<i>n</i> = 14
Easy to learn	6.2 (0.6)
Easy to navigate	5.9 (1.0)
Useful for providers to review patient information	6.4 (0.5)
Useful for patients to review skill practice	6.6 (0.5)
Useful for patients to engage with treatment skills	6.2 (0.8)
Overall satisfaction	6.2 (0.4)

Note. AppUP = mobile application-enhanced Unified Protocol condition; Standard UP = Unified Protocol condition without a mobile application.

counterparts in the standard UP condition as well as adolescents in the AppUP condition with greater depressive severity. There were no differences in skill practice between conditions among adolescents with greater depressive symptom severity. There were no differences in adolescent- or clinician-rated skill practice based on baseline manic or psychotic symptom severity or functioning scores.

Treatment Effects on Global Functioning

Both treatments were associated with significant improvements among participants in global psychosocial functioning (as rated on the CGAS, based on the period of lowest functioning since the prior assessment [i.e., 2–3 months]) and overall global clinical improvements on the CGI over the 5-month study, $F(2, 49.75) = 47.01, p < .001$, partial $\eta^2 = 0.65$; $F(1, 44.2) = 9.58, p = .003$, partial $\eta^2 = 0.18$, respectively. Clinicians' reports (but not adolescents') of greater adolescent skill practice were associated with greater improvements in global functioning on the CGAS and global clinical functioning on the CGI, $F(1, 86.43) = 15.01, p < .001$, partial $\eta^2 = 0.15$; $F(1, 45.66) = 5.81, p = .02$, partial $\eta^2 = 0.11$.

There was a significant treatment condition by time interaction for the CGAS, $F(2, 49.75) = 3.90, p = .03$, partial $\eta^2 = 0.14$, which indicated that adolescents in the AppUP condition had greater

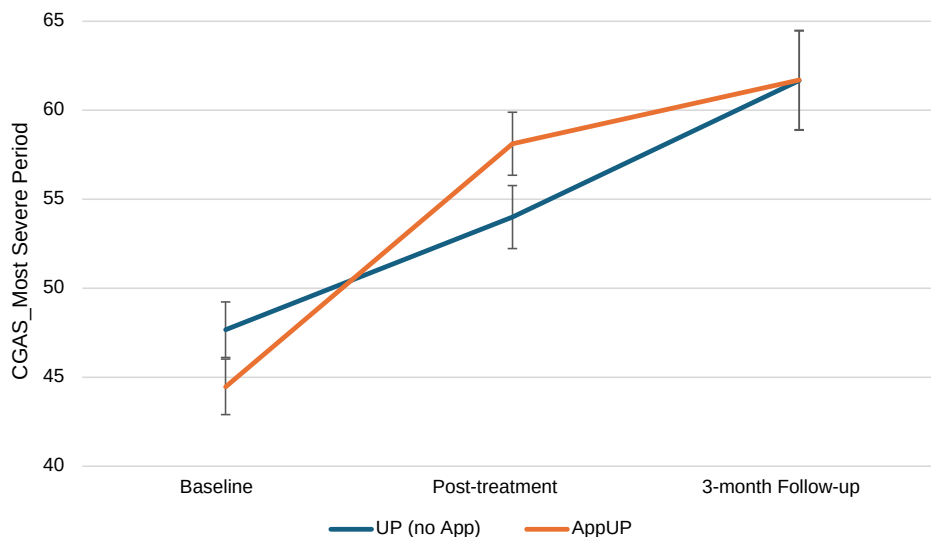
functional improvements from baseline to posttreatment compared those in the standard UP condition (see Figure 2). There was also a significant treatment effect indicating greater improvements in the CGI over the posttreatment period for the AppUP condition compared to the standard UP condition, $F(1, 45.93) = 4.25, p < .05$, partial $\eta^2 = 0.08$; Figure 3. Improvements in global functioning and clinical functioning did not differ based on adolescents' mood or psychotic spectrum diagnosis.

Differences Between Treatment Conditions on the Course of Psychiatric Symptoms

Specific psychiatric symptoms and self-reported psychosocial functioning were examined as secondary outcomes of the treatment. Over the 5-month study, both treatment conditions led to significant reductions in depressive symptoms as rated on the CDRS, $F(2, 57.74) = 41.78, p < .001$, partial $\eta^2 = 0.59$; (hypo)manic symptoms on the YMRS, $F(2, 58.10) = 10.11, p < .001$, partial $\eta^2 = 0.26$; and psychotic symptoms on the PQ-B, $F(2, 48.71) = 6.33, p = .004$, partial $\eta^2 = 0.21$. Clinician ratings of skill practice among adolescents were associated with greater improvements in depressive symptoms on the CDRS, $F(1, 58.72) = 4.76, p = .03$, partial $\eta^2 = 0.07$, with no differences between treatment groups.

Figure 2

Adolescent Global Assessment of Functioning Between Treatment Conditions Over the 5-Month Study



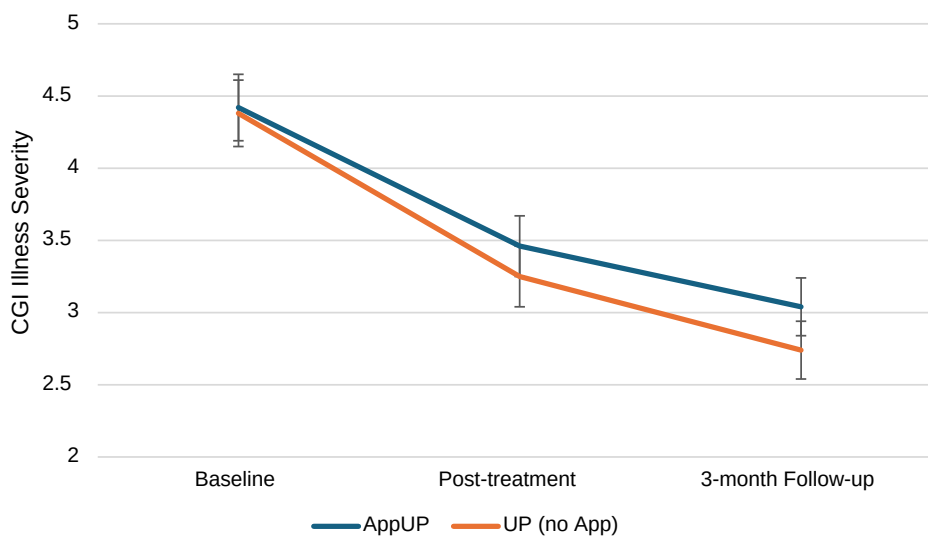
Note. Adolescents in the app-enhanced cognitive behavioral therapy (AppUP) showed greater improvements in clinician-reported global assessment of functioning (CGAS) between the baseline assessment and posttreatment assessment follow-up compared to adolescents in the standard UP condition. UP = unified protocol; CGAS = Clinical Global Assessment Scale. See the online article for the color version of this figure.

There was no main effect of adolescents' self-report ratings of skill practice on depressive symptoms, but there was a significant interaction between treatment condition, time, and self-reported skill practice on depressive symptoms, $F(2, 51.90) = 4.94$, $p = .01$,

partial $\eta^2 = 0.16$. In the AppUP condition, adolescents with more self-reported skill practice showed greater reductions in depressive symptoms during treatment compared to those in standard UP, $F(2, 21.02) = 3.54$, $p < .05$, partial $\eta^2 = 0.25$. Adolescent- and

Figure 3

Improvement in Adolescents' CGI Scores Between Treatment Conditions Over the 5-Month Study



Note. Adolescents in the app-enhanced cognitive behavioral therapy (AppUP) showed greater improvements in clinician-reported CGI scores over the 5-month study compared to adolescents in the standard UP condition. Lower scores indicate greater clinical global functioning. UP = unified protocol; CGI = Clinical Global Impressions. See the online article for the color version of this figure.

clinician-rated skill practice did not relate to changes in (hypo)manic symptoms or psychotic symptoms.

Across both conditions, there were significant improvements over the study period in adolescent-reported overall symptom severity on the Brief Symptom Inventory, $F(2, 48.02) = 8.43, p < .001$, partial $\eta^2 = 0.26$, including the subscales specific to depressive and anxiety symptoms— $F(2, 60.77) = 5.26, p = .008$, partial $\eta^2 = 0.15$; $F(2, 46.30) = 9.33, p < .001$, partial $\eta^2 = 0.29$, respectively. Adolescent- and parent-reported quality of life on the KINDL also improved across both conditions, $F(2, 49.65) = 7.38, p = .002$, partial $\eta^2 = 0.23$; $F(2, 55.56) = 12.22, p < .001$, partial $\eta^2 = 0.31$, respectively. There was no treatment condition by time interactions on self-reports of psychiatric symptoms or functioning, nor did skill practice relate to these outcomes. Additionally, adolescents' mood diagnosis or the presence of a psychotic diagnosis did not moderate self-reported psychiatric symptoms or functioning.

Discussion

In a randomized controlled trial of a group-based CBT using the UP, delivered with either an adjunctive mobile app (AppUP) or without an app (standard UP), adolescents with mood and psychotic spectrum disorders showed significant improvements in psychiatric symptoms and functioning over 5 months. Adolescents in the AppUP condition showed greater improvements in global psychosocial and clinical functioning compared to those in standard UP. Additionally, the addition of an app was associated with greater reductions in depressive symptoms among adolescents who showed more between-session skill practice. There were no overall differences found in skill practice between the two treatment conditions.

The two treatments were rated highly on acceptability and low on burden by adolescents and study clinicians, suggesting that the mobile app did not add any significant burden or obstacle to engaging in the treatment. Furthermore, study clinicians rated high levels of treatment satisfaction and ease of treatment delivery across treatment conditions. These findings suggest a relatively seamless addition of an adjunctive app for group-based CBT in the treatment of adolescents with mood and psychotic spectrum disorders. Contrary to our hypothesis, being in the app condition did not reduce the burden or increase enjoyment for adolescent participants compared to the standard delivery of the treatment, suggesting that the app did not increase the acceptability of group CBT.

This study, together with our previous piloting of this treatment (Weintraub et al., 2020, 2022), suggests that a group delivery of the UP is an acceptable and beneficial treatment for adolescents with mood or psychotic spectrum conditions. The UP for adolescents has an evidence base as an individual treatment for depressive spectrum and anxiety disorders (Ehrenreich-May, Rosenfield, et al., 2017; Kennedy et al., 2019). This study provides important evidence of the acceptability, feasibility, and benefit of a group-based CBT for adolescents with more severe psychopathology. Demonstrating the efficacy of the UP in adolescents with mood and psychotic spectrum disorders may increase the willingness of clinicians—particularly those already trained in the UP—to treat youth with these more severe presentations.

The finding that AppUP was associated with improvements in global psychosocial and clinical functioning, as opposed to symptom-specific outcomes, may reflect the heterogeneous presentations of adolescents recruited for this trial. These findings parallel previous

results found by our group in a trial of a mobile-enhanced family therapy, which was associated with improvements in global functioning among adolescents with depressive and bipolar disorders (Miklowitz et al., 2023). AppUP adolescents who practiced skills more frequently showed greater improvements in depressive symptoms.

There were no overall group differences in between-session skill practice between the AppUP and standard UP conditions. Compared to our open trial pilot of AppUP, adolescents in AppUP in this trial logged the same number of symptom check-ins but practiced skills approximately twice as often (Weintraub et al., 2022). It is unclear what led to greater app engagement in this trial compared to our preliminary testing of the app. It is also unclear what features of the app led to greater psychosocial benefits for participants in the AppUP condition compared to those in the standard UP condition. Possibly, the app may have helped to convey treatment concepts and skills more clearly to adolescents in AppUP even if it did not increase actual engagement in skill practice. The mechanisms by which mobile health apps, broadly, function remain a question in the empirical literature (Leech et al., 2021).

One unique element of the AppUP condition was the clinicians' access to the "Provider Portal" in the app. Clinicians could see the participants' weekly skill practice, which included specific details about participants' thoughts, feelings, behaviors, and social and familial circumstances. Clinicians could also see which participants did not engage in any skill practice. Clinicians could then use this information to guide treatment discussions, such as providing additional scaffolding of a treatment skill. Additionally, clinicians were able to provide more specific and, potentially, helpful clinical guidance to individual participants at the end of treatment checkouts. Together, the information gleaned by clinicians from the AppUP Provider Portal and consequent clinical follow-ups may have led to a greater effect on functional outcomes in the AppUP relative to the standard UP group. There has been considerable discussion of the potential of technology to enhance personalized psychiatric treatment (Marciano et al., 2023; Welch et al., 2022), much of which centers on the use of assessment tools. By having a provider portal in which clinicians can see their clients' engagement with the treatment and learn more about their emotions, thinking, and behavior, an adjunctive mobile app may help clinicians plan more personalized treatment.

Adolescent and clinician reports of skill practice were correlated in the full study sample; however, among adolescents in the AppUP condition, clinician reports of skill practice were more closely tied to the number of skills adolescents logged in the app. Adolescents may not be the most accurate reporters of their skill practice, as prior evidence suggests that other informants, including parents and teachers, are more accurate when reporting on adolescent behavior (Kahana et al., 2003). Alternatively, adolescents may have engaged in skill practices that were not reported in the app (e.g., conducting cognitive restructuring in their head)—a common refrain from many of the adolescents. Given that the clinician ratings of skill practice were more consistent predictors of adolescents' clinical and functional improvements than adolescent self-report, engaging in structured skill practice (either through the app or on treatment worksheets) may yield greater therapeutic benefits than less structured skill practices (such as relying on adolescents' remembering to rehearse skills between sessions). Structured skill practice may increase the probability that the adolescents engage in the skill as intended.

Structured skill practice may also increase participants' awareness of cognitive distortions and internalize more adaptive responses.

The self-reports of increased skill practice among AppUP adolescents (compared to the standard UP adolescents) who were above average in their total skill practice suggest that the app might help adolescents who are already engaged in skill practice further engage with the treatment. Treatment engagement is associated with increased benefits of CBT among adolescents with anxiety and depressive disorders (Glenn et al., 2013). There is a dearth of information in the psychosocial treatment or mobile health literature indicating what characteristics of adolescents are associated with greater engagement in or more positive expectations of treatment (Molloy & Anderson, 2021). Whereas it is helpful to increase engagement among already-engaged participants, it is especially important to ascertain how to engage adolescents who are not motivated for care. Future research should elucidate what leads to high app and treatment engagement among those who are already engaged (e.g., personality characteristics such as conscientiousness) and how to increase motivation among those who are less engaged.

Limitations

The study participants were primarily White and from relatively affluent families; therefore, future research is needed among more diverse populations. Although the sample was psychiatrically heterogeneous, most of the adolescents were diagnosed with a depressive spectrum disorder. Ratings of skill practice were made based on adolescent and clinician reports (which correlated with one another), but there was no definitive method of confirming skill practice completion in the standard UP group nor was there any examination of the proficiency/quality of skill practice across both conditions. Quality of skill rehearsal has been shown to predict improvements in depressive and anxiety symptoms and increase the likelihood of completing CBT (Conklin et al., 2021). Clinician ratings of skill practice among adolescents in the AppUP condition may have been influenced by their review of participant app entries in the Provider Portal prior to each therapy session, although it is notable that the two treatment conditions did not differ on clinicians' ratings of skill practice. Future research should examine the various components within the app (e.g., the gamification components) in a dismantling design to determine the unique contributions of each component on improving psychiatric symptoms and psychosocial functioning. It will also be important to examine the degree to which parent involvement in the treatment may have increased skill practice and psychosocial benefits.

The mobile app was developed by clinical psychology researchers who did not have expertise in computer coding and user experience/interface, which limited the researcher's ability to make an app that looked and functioned as well as apps that are available from technology companies. Additionally, the group treatment sessions were delivered via telehealth on Zoom, making it difficult for some of the adolescents to fully engage with the treatment and their peers. However, the telehealth format allowed families to participate who otherwise would not have been able to commute to the clinic. Furthermore, we had the assistance of psychological externs and interns to help conduct individual family checkouts with each adolescent and parent dyad at the end of sessions. It is unlikely that community provision of this treatment would have this level of personnel support available.

Conclusion

In this 5-month randomized trial, transdiagnostic group CBT enhanced with a mobile app was associated with greater global and clinical functional improvements in adolescents with mood or psychotic spectrum conditions relative to group CBT without a mobile app. These findings suggest that a transdiagnostic group CBT can be helpful in improving mental health outcomes for adolescents with heterogeneous psychiatric conditions and that a mobile app adjunct can augment the efficacy of this treatment. Future research should examine the mechanisms by which a mobile app is associated with greater functional improvements as well as whether the study results generalize to adolescents with different ethnic, racial, or socioeconomic backgrounds. To optimize mobile apps for mental health treatment, future researchers should seek partnership with technology companies. This partnership may improve app design and user experience, potentially increasing acceptability and engagement of psychosocial treatments.

References

- Aguilera, A., & Muench, F. (2012). There's an app for that: Information technology applications for cognitive behavioral practitioners. *The Behavior Therapist/AABT*, 35(4), Article 65.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*.
- Anderson, M., Faverio, M., & Gottfried, J. (2023). *Teens, social media and technology 2023*. Pew Research Center.
- Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behavior Therapy*, 35(2), 205–230. [https://doi.org/10.1016/S0005-7894\(04\)80036-4](https://doi.org/10.1016/S0005-7894(04)80036-4)
- Carlucci, L., Saggino, A., & Balsamo, M. (2021). On the efficacy of the unified protocol for transdiagnostic treatment of emotional disorders: A systematic review and meta-analysis. *Clinical Psychology Review*, 87, Article 101999. <https://doi.org/10.1016/j.cpr.2021.101999>
- Conklin, L. R., Curreri, A. J., Farchione, T. J., & Barlow, D. H. (2021). Homework compliance and quality in cognitive behavioral therapies for anxiety disorders and obsessive-compulsive disorder. *Behavior Therapy*, 52(4), 1008–1018. <https://doi.org/10.1016/j.beth.2021.01.001>
- Derogatis, L. R., & Spencer, P. M. (1982). *The Brief Symptom Inventory (BSI): Administration, scoring and procedures, Manual I*. Johns Hopkins University School of Medicine, Clinical Psychometrics Research Unit.
- Devoe, D. J., Farris, M. S., Townes, P., & Addington, J. (2019). Interventions and social functioning in youth at risk of psychosis: A systematic review and meta-analysis. *Early Intervention in Psychiatry*, 13(2), 169–180. <https://doi.org/10.1111/eip.12689>
- Eckstain, D., Kuppens, S., Ugueto, A., Ng, M. Y., Vaughn-Coaxum, R., Corteselli, K., & Weisz, J. R. (2020). Meta-analysis: 13-year follow-up of psychotherapy effects on youth depression. *Journal of the American Academy of Child & Adolescent Psychiatry*, 59(1), 45–63. <https://doi.org/10.1016/j.jaac.2019.04.002>
- Ehrenreich-May, J., Kennedy, S. M., Sherman, J. A., Bilek, E. L., Buzzella, B. A., Bennett, S. M., & Barlow, D. H. (2017). *Unified protocols for transdiagnostic treatment of emotional disorders in children and adolescents: Therapist guide*. Oxford University Press. <https://doi.org/10.1093/med-psych/9780199340989.001.0001>
- Ehrenreich-May, J., Rosenfield, D., Queen, A. H., Kennedy, S. M., Remmes, C. S., & Barlow, D. H. (2017). An initial waitlist-controlled trial of the unified protocol for the treatment of emotional disorders in adolescents. *Journal of Anxiety Disorders*, 46, 46–55. <https://doi.org/10.1016/j.janxdis.2016.10.006>
- Gaynor, S. T., Lawrence, P. S., & Nelson-Gray, R. O. (2006). Measuring homework compliance in cognitive-behavioral therapy for adolescent

- depression: Review, preliminary findings, and implications for theory and practice. *Behavior Modification*, 30(5), 647–672. <https://doi.org/10.1177/0145445504272979>
- Glenn, D., Golinelli, D., Rose, R. D., Roy-Byrne, P., Stein, M. B., Sullivan, G., Bystritsky, A., Sherbourne, C., & Craske, M. G. (2013). Who gets the most out of cognitive behavioral therapy for anxiety disorders? The role of treatment dose and patient engagement. *Journal of Consulting and Clinical Psychology*, 81(4), 639–649. <https://doi.org/10.1037/a0033403>
- Guy, W. (1976). Clinical global impression. *ECDEU assessment manual for psychopharmacology*. National Institute of Mental Health.
- Humphreys, K. (2017). A review of the impact of exclusion criteria on the generalizability of schizophrenia treatment research. *Clinical Schizophrenia & Related Psychoses*, 11(1), 49–57. <https://doi.org/10.3371/1935-1232-11.1.49>
- Hutton, P., & Taylor, P. J. (2014). Cognitive behavioural therapy for psychosis prevention: A systematic review and meta-analysis. *Psychological Medicine*, 44(3), 449–468. <https://doi.org/10.1017/S0033291713000354>
- Jameel, L., Valmaggia, L., Barnes, G., & Cella, M. (2022). mHealth technology to assess, monitor and treat daily functioning difficulties in people with severe mental illness: A systematic review. *Journal of Psychiatric Research*, 145, 35–49. <https://doi.org/10.1016/j.jpsychires.2021.11.033>
- Kahana, S. Y., Youngstrom, E. A., Findling, R. L., & Calabrese, J. R. (2003). *Employing parent, teacher, and youth self-report checklists in identifying pediatric bipolar spectrum disorders: An examination of diagnostic accuracy and clinical utility* (Vol. 13). Mary Ann Liebert.
- Kennedy, S. M., Bilek, E. L., & Ehrenreich-May, J. (2019). A randomized controlled pilot trial of the unified protocol for transdiagnostic treatment of emotional disorders in children. *Behavior Modification*, 43(3), 330–360. <https://doi.org/10.1177/0145445517753940>
- Leech, T., Dorstyn, D., Taylor, A., & Li, W. (2021). Mental health apps for adolescents and young adults: A systematic review of randomised controlled trials. *Children and Youth Services Review*, 127, Article 106073. <https://doi.org/10.1016/j.childyouth.2021.106073>
- Leichenring, F., Steinert, C., Rabung, S., & Ioannidis, J. P. A. (2022). The efficacy of psychotherapies and pharmacotherapies for mental disorders in adults: An umbrella review and meta-analytic evaluation of recent meta-analyses. *World Psychiatry*, 21(1), 133–145. <https://doi.org/10.1002/wps.20941>
- Loewy, R. L., Pearson, R., Vinogradov, S., Bearden, C. E., & Cannon, T. D. (2011). Psychosis risk screening with the Prodromal Questionnaire—Brief version (PQ-B). *Schizophrenia Research*, 129(1), 42–46. <https://doi.org/10.1016/j.schres.2011.03.029>
- Marciano, L., Vocaj, E., Bekalu, M. A., La Tona, A., Rocchi, G., & Viswanath, K. (2023). The use of mobile assessments for monitoring mental health in youth: Umbrella review. *Journal of Medical Internet Research*, 25, Article e45540. <https://doi.org/10.2196/45540>
- Matsumoto, K., Hamatani, S., & Shimizu, E. (2021). Effectiveness of videoconference-delivered cognitive behavioral therapy for adults with psychiatric disorders: Systematic and meta-analytic review. *Journal of Medical Internet Research*, 23(12), Article e31293. <https://doi.org/10.2196/31293>
- McGorry, P. D., Hartmann, J. A., Spooner, R., & Nelson, B. (2018). Beyond the “at risk mental state” concept: Transitioning to transdiagnostic psychiatry. *World Psychiatry*, 17(2), 133–142. <https://doi.org/10.1002/wps.20514>
- McGorry, P. D., & Mei, C. (2021). Clinical staging for youth mental disorders: Progress in reforming diagnosis and clinical care. *Annual Review of Developmental Psychology*, 3(1), 15–39. <https://doi.org/10.1146/annurev-devpsych-050620-030405>
- Miklowitz, D. J., Weintraub, M. J., Ichinose, M. C., Denenny, D. M., Walshaw, P. D., Wilkerson, C. A., Frey, S. J., Morgan-Fleming, G. M., Brown, R. D., Merranko, J. A., & Arevian, A. C. (2023). A randomized clinical trial of technology-enhanced family-focused therapy for youth in the early stages of mood disorders. *JAACAP Open*, 1(2), 93–104. <https://doi.org/10.1016/j.jaacop.2023.04.002>
- Miller, T. J., McGlashan, T. H., Rosen, J. L., Cadenhead, K., Ventura, J., McFarlane, W., Perkins, D. O., Pearlson, G. D., & Woods, S. W. (2003). Prodromal assessment with the structured interview for prodromal syndromes and the scale of prodromal symptoms: Predictive validity, interrater reliability, and training to reliability. *Schizophrenia Bulletin*, 29(4), 703–715. <https://doi.org/10.1093/oxfordjournals.schbul.a007040>
- Molloy, A., & Anderson, P. L. (2021). Engagement with mobile health interventions for depression: A systematic review. *Internet Interventions*, 26, Article 100454. <https://doi.org/10.1016/j.invent.2021.100454>
- Mongelli, F., Georgakopoulos, P., & Pato, M. T. (2020). Challenges and opportunities to meet the mental health needs of underserved and disenfranchised populations in the United States. *Focus—American Psychiatric Publishing*, 18(1), 16–24. <https://doi.org/10.1176/appi.focus.20190028>
- Mufson, L., & Sills, R. (2006). Interpersonal psychotherapy for depressed adolescents (IPT-A): An overview. *Nordic Journal of Psychiatry*, 60(6), 431–437. <https://doi.org/10.1080/08039480601022397>
- Patoz, M.-C., Hidalgo-Mazzei, D., Pereira, B., Blanc, O., de Chazeron, I., Murru, A., Verdolini, N., Pacchiarotti, I., Vieta, E., Llorca, P.-M., & Samalin, L. (2021). Patients’ adherence to Smartphone apps in the management of bipolar disorder: A systematic review. *International Journal of Bipolar Disorders*, 9(1), Article 19. <https://doi.org/10.1186/s40345-021-00224-6>
- Poznanski, E. O., & Mokros, H. B. (1996). *Children’s Depression Rating Scale, Revised (CDRS-R)*. Western Psychological Services.
- Pramana, G., Parmanto, B., Lomas, J., Lindhiem, O., Kendall, P. C., & Silk, J. (2018). Using mobile health gamification to facilitate cognitive behavioral therapy skills practice in child anxiety treatment: Open clinical trial. *JMIR Serious Games*, 6(2), Article e9. <https://doi.org/10.2196/games.8902>
- Ravens-Sieberer, U., & Bullinger, M. (2000). *KINDL-R. Questionnaire for measuring health-related quality of life in children and adolescents, revised version. Manual*. <https://www.kindl.org/english/manual/>
- Scott, J., Iorfino, F., Capon, W., Crouse, J., Nelson, B., Chanen, A. M., Dwyer, D., Conus, P., Bechdolf, A., Ratheesh, A., Raballo, A., Yung, A., Berk, M., McKenna, S., Hockey, S., Hutcheon, A., Scott, E., McGorry, P., Shah, J., & Hickie, I. B. (2024). Staging 2.0: Refining transdiagnostic clinical staging frameworks to enhance reliability and utility for youth mental health. *The Lancet Psychiatry*, 11(6), 461–471. [https://doi.org/10.1016/S2215-0366\(24\)00060-9](https://doi.org/10.1016/S2215-0366(24)00060-9)
- Shaffer, D., Gould, M. S., Brasic, J., Ambrosini, P., Fisher, P., Bird, H., & Aluwahlia, S. (1983). A Children’s Global Assessment Scale (CGAS). *Archives of General Psychiatry*, 40(11), 1228–1231. <https://doi.org/10.1001/archpsyc.1983.01790100074010>
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., & Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, 59(Suppl. 20), 22–33.
- Sheehan, D. V., Sheehan, K. H., Shytle, R. D., Janavs, J., Bannon, Y., Rogers, J. E., Milo, K. M., Stock, S. L., & Wilkinson, B. (2010). Reliability and validity of the mini international neuropsychiatric interview for children and adolescents (MINI-KID). *The Journal of Clinical Psychiatry*, 71(3), 313–326. <https://doi.org/10.4088/JCP.09m05305whi>
- Simons, A. D., Marti, C. N., Rohde, P., Lewis, C. C., Curry, J., & March, J. (2012). Does homework “matter” in cognitive behavioral therapy for adolescent depression? *Journal of Cognitive Psychotherapy*, 26(4), 390–404. <https://doi.org/10.1891/0889-8391.26.4.390>
- Weintraub, M. J., Ichinose, M. C., Zinberg, J., Done, M., Morgan-Fleming, G. M., Wilkerson, C. A., Brown, R. D., Bearden, C. E., & Miklowitz, D. J. (2022). App-enhanced transdiagnostic CBT for adolescents with mood or

- psychotic spectrum disorders. *Journal of Affective Disorders*, 311, 319–326. <https://doi.org/10.1016/j.jad.2022.05.094>
- Weintraub, M. J., Zinberg, J. L., Bearden, C. E., & Miklowitz, D. J. (2020). Applying a transdiagnostic unified treatment to adolescents at high risk for serious mental illness: Rationale and preliminary findings. *Cognitive and Behavioral Practice*, 27(2), 202–214. <https://doi.org/10.1016/j.cbpra.2019.07.007>
- Welch, V., Wy, T. J., Ligezka, A., Hassett, L. C., Croarkin, P. E., Athreya, A. P., & Romanowicz, M. (2022). Use of mobile and wearable artificial intelligence in child and adolescent psychiatry: Scoping review. *Journal of Medical Internet Research*, 24(3), Article e33560. <https://doi.org/10.2196/33560>
- Wilansky, P., Eklund, J. M., Milner, T., Kreindler, D., Cheung, A., Kovacs, T., Shooshtari, S., Astell, A., Ohinmaa, A., Henderson, J., Strauss, J., & Mills, R. S. (2016). Cognitive behavior therapy for anxious and depressed youth: Improving homework adherence through mobile technology. *JMIR Research Protocols*, 5(4), Article e209. <https://doi.org/10.2196/resprot.5841>
- Wong, J. J., Jones, N., Timko, C., & Humphreys, K. (2018). Exclusion criteria and generalizability in bipolar disorder treatment trials. *Contemporary Clinical Trials Communications*, 9, 130–134. <https://doi.org/10.1016/j.cctc.2018.01.009>
- Young, R. C., Biggs, J. T., Ziegler, V. E., & Meyer, D. A. (1978). A rating scale for mania: Reliability, validity and sensitivity. *The British Journal of Psychiatry*, 133(5), 429–435. <https://doi.org/10.1192/bjp.133.5.429>

Received April 30, 2024

Revision received November 21, 2024

Accepted December 10, 2024 ■

E-Mail Notification of Your Latest Issue Online!

Would you like to know when the next issue of your favorite APA journal will be available online? This service is now available to you. Sign up at <https://my.apa.org/portal/alerts/> and you will be notified by e-mail when issues of interest to you become available!