

Efficacy of a Modified Digital Unified Protocol Targeting Both Positive and Negative Emotion Regulation: A Randomized Clinical Trial

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Objective: The Unified Protocol (UP) has proven effective for treating emotional disorders; however, its standard format primarily focuses on regulating negative emotions. While difficulties with negative emotion regulation are common across these disorders, difficulties with positive emotion regulation are often overlooked. This study evaluated the efficacy of a digitally adapted UP incorporating positive emotion regulation strategies (iUP+). **Method:** In a randomized clinical trial, 120 adults ($M_{\text{age}} = 34.0$, $SD = 12.0$; 73% female; 74% white) with principal anxiety, depressive, or obsessive-compulsive disorders were assigned to the iUP+ ($n = 80$) or standard iUP ($n = 40$). Both 12-week programs occurred via an online platform with asynchronous clinical support through weekly messaging. Outcomes included anxiety, depression, and stress; positive/negative affect; functional impairment; savoring; positive mental health; and flourishing. Analyses included between- and within-group effect sizes, remission comparisons, and latent growth modeling. **Results:** Both groups demonstrated statistically significant reductions in anxiety, depression, stress, negative affect, and functional impairment ($ES_{\text{sg}} \approx -0.28$ to -1.13) that were maintained across 3-month follow-up. Statistically significant, small-to-moderate gains in positive mental health and flourishing ($ES_{\text{sg}} \approx 0.31$ to 0.37) were also observed and maintained. Positive affect and savoring significantly increased by week 8, but diminished and were no longer significant at follow-up. No group differences emerged for any outcome. **Conclusions:** Digital UP interventions were associated with symptom reduction and improvements in flourishing, but adding positive emotion regulation content did not yield incremental benefits. Future research should explore whether increased intensity or duration of these strategies improves outcomes. **Public Health Significance:** This study shows that digital, self-paced versions of the UP are associated with reductions in negative psychological symptoms and improvement in positive ones, regardless of whether strategies specifically aimed at boosting positive emotion regulation were added. Digital delivery may improve access to evidence-based care and support mental health in people who might not otherwise receive treatment. **Keywords:** Unified Protocol, digital mental health, positive affect, savoring, randomized trial.

Individuals with emotional disorders experience frequent, intense negative emotions and rely on maladaptive emotion-driven or avoidant responses to manage them (Barlow et al., 2014). These strategies may provide short-term relief but can paradoxically maintain or amplify symptoms over time (Barlow et al., 2014, 2021). Cognitive behavioral therapy (CBT) targets this key functional mechanism to effectively improve emotion regulation and reduce negative affect (NA) across various emotional disorders, including anxiety and depressive disorders (Cuijpers et al., 2016; Longley & Gleiser, 2023). However, such emotional disorders are marked not only by heightened NA, but also by deficits in the experience and regulation of positive affect or emotions (PA), reflected in greater PA dampening, reduced capacity to sustain PA, and disrupted reward-related functioning (Malivoire et al., 2022; Craske et al., 2023).

Although positive emotion regulation deficits manifest somewhat differently across emotional disorders, they reflect shared vulnerabilities in positive emotional and reward-related processing. Considering anxiety disorders, individuals with generalized anxiety disorder show elevated dampening of PA and diminished ability to maintain positive emotional experiences (Malivoire et al., 2022). In social anxiety disorder, fear of positive evaluation is associated with avoidance of positive social attention and affiliative experiences (Rassaby et al., 2024). Similar disturbances are evident in obsessive-compulsive disorder, as converging evidence highlights altered reward-related processes, including disruptions in reward anticipation and broader reward-processing abnormalities (McDonald et al., 2024; Wagner et al., 2025). In depression, these deficits are especially pronounced and include dampening of PA, fear and avoidance of positive emotions linked to anhedonia, and reward-processing hyporesponsiveness (Bean et al., 2022; Joshanloo, 2024; Wagner et al., 2025; Craske et al., 2023).

These deficits in positive emotion regulation are often underemphasized or overlooked in

prevailing CBT approaches (Carl et al., 2013). Upregulating PA (i.e., actively increasing the frequency, intensity, or duration of PA) may thus be a relevant yet underutilized treatment target for improving mental health. PA can undo the physiological effects of negative emotions and reduce stress responses (Fredrickson et al., 2000); it is also associated with increased resilience, goal-oriented approach behavior, and greater wellbeing (Carl et al., 2013; Fredrickson, 2001; van Steenbergen et al., 2021). The Broaden-and-Build Theory of Positive Emotions (Fredrickson, 2001) offers a framework for understanding these benefits: PA expands an individual's cognitive-behavioral repertoire, increasing flexibility, creativity, and prosocial behavior, which in turn fosters lasting personal and social resources. Through this process, upregulating PA may support upward spirals of optimal functioning. Indeed, our prior work (<redacted>., 2025) suggests that higher PA during treatment was associated with greater flourishing—a multidimensional conceptualization of wellbeing that includes happiness, meaning and purpose, health, and social connection (VanderWeele, 2017).

Recognizing that PA and NA regulation involves related but distinct processes has important implications for intervention design (Carl et al., 2013). Affective neuroscience suggests that PA and NA are mediated by overlapping but distinguishable neural systems, both of which warrant direct intervention (Craske et al., 2016). The Dynamic Model of Affect further indicates that the relationship between PA and NA is context-dependent: during moments of stress, they are more inversely correlated, whereas under low-stress conditions, they tend to operate more independently (Zautra et al., 2005). For example, engaging in pleasurable activities may increase PA without necessarily reducing concurrent NA (Watson et al., 1992), underscoring the utility of directly addressing both during treatment.

In line with this distinction, Carl et al. (2013) proposed a transdiagnostic model of PA

regulation that extended Gross's (1998) process model of emotion regulation. Gross originally identified five regulatory points in the emotion-generative process: situation selection, situation modification, attentional deployment, cognitive change, and response modulation; each of which can be strategically leveraged to increase PA. For example, individuals may choose to approach situations likely to elicit joy (situation selection), modify their circumstances to enhance enjoyment (situation modification), attend to uplifting aspects of their experience (attentional deployment), reframe events in a more positive light (cognitive change), or amplify their expression of PA (response modulation) (Carl et al., 2013; Spencer-Laitt et al., unpublished manuscript; Quoidbach et al., 2015). This framework underscores how addressing deficits in PA regulation can be an active, intentional process with the potential to enhance optimal functioning. Importantly, upregulating positive affect is not inherently adaptive in all contexts, just as attempts to downregulate negative affect are not always beneficial. Regulatory choices are shaped by individuals' goals and situational demands, and in some cases, reducing positive affect may serve adaptive functions (e.g., maintaining emotional predictability, preserving attachment to loss, or preventing vulnerability to future distress; Bonanno & Burton, 2013). From this perspective, interventions targeting PA regulation are best conceptualized as expanding regulatory flexibility and emotional choice rather than prescribing increased PA as a universal goal (Gross, 2015; Carl et al., 2018).

There is growing interest in directly targeting PA regulation along with NA regulation during psychotherapy to enhance positive mental health and flourishing in addition to reducing symptoms (Farchione et al., 2024; Freetly Porter et al., 2023). While numerous intervention strategies have been developed and informed by positive psychology (Bolier et al., 2013), fewer evidence-based, psychosocial interventions are designed specifically for treating emotional

disorders. One notable exception is Craske and colleagues' Positive Affect Therapy (PAT; Craske et al., 2022), which has shown efficacy for patients with anxiety and depression symptoms (Craske et al., 2016; 2019). PAT aims to address deficits in reward sensitivity by targeting components of the reward system, including anticipation-motivation and reward learning. Treatment modules include labeling emotions, pleasant event planning and actions, attending to positive experiences, and cultivating positive experiences (Craske & Meuret, 2022). An efficacy trial with patients ($N = 96$) selected based on clinically significant anxiety and/or depression symptoms, functional impairment, and low PA demonstrated that, compared to a NA-focused treatment, PAT yielded greater increases in PA and greater decreases in NA, anxiety, stress, and depression (Craske, 2019). Additionally, Taylor et al. (2017) developed a transdiagnostic positive activity intervention (PAI) consisting of activities for promoting positive affect, such as gratitude exercises, acts of kindness, and positive event planning. In their pilot trial with patients with clinically significant anxiety and/or depression ($N = 29$), those who received the PAI demonstrated significantly greater gains in PA and an index of perceived life satisfaction and enjoyment, as well as reduced NA, anxiety, and depression compared to the waitlist control. LaFrenier and Newman (2023) also developed SkillJoy, a smartphone app-based ecological momentary intervention specifically targeting savoring, offering strategies for fostering positive aspects of the present moment, engagement in and savoring enjoyable activities, reflection on positive experiences, and positive event scheduling. In a trial of patients with generalized anxiety disorder ($N = 85$), those assigned to SkillJoy showed larger decreases in depression and worry, as well as greater gains in PA and savoring, compared to the control.

Collectively, these findings justify directly targeting PA regulation during anxiety and depression treatment. Although a few existing interventions aim to enhance PA, none to our

knowledge embed this focus within a full transdiagnostic CBT protocol optimized for broad digital access (e.g., smartphones, tablets, and computers). A transdiagnostic, digitally delivered intervention has the potential to reduce barriers to care, increase reach, and efficiently address co-occurring symptoms across emotional disorders, including deficits in PA regulation. The present study addresses this gap by adapting a well-established transdiagnostic CBT intervention—the Unified Protocol (UP)—to additionally target deficits in positive emotion regulation among individuals with emotional disorders within a digital format.

The Unified Protocol is a transdiagnostic treatment for emotional disorders developed to target shared temperamental vulnerabilities—including neuroticism and associated emotion-motivated avoidant coping—across anxiety, depressive, and related disorders (Barlow et al., 2017a). Designed to provide an efficient alternative to multiple disorder-specific CBT protocols in the context of high diagnostic comorbidity, the UP was evaluated in a large randomized controlled trial and demonstrated equivalent efficacy in reducing anxiety and depression symptoms compared to single-disorder CBT protocols, along with fewer dropouts and comparable outcomes across a three-year follow-up period (Eustis et al., 2020; Bullis et al., 2023). Since its initial validation, the UP has been successfully adapted across diverse clinical contexts and treatment populations (Farchione et al., 2024), with meta-analytic evidence supporting its efficacy in diagnostically heterogeneous samples (Carlucci et al., 2021; Longley & Gleiser, 2023).

The UP primarily targets maladaptive responses to negative emotional experiences, which are common among individuals high in neuroticism (Barlow et al., 2021; Farchione et al., 2024). Though the UP also considers PA (e.g., pride, joy), it does not include explicit interventions or exercises directly targeting PA regulation. Indeed, in our aforementioned

randomized controlled equivalence trial (including the UP and single-disorder CBT protocols), 38% of participants reported both low NA and high PA following treatment, reflecting a favorable outcome profile (Spencer-Lai et al., 2023), however, 25% reported low NA alongside relatively low PA, suggesting that symptom reduction does not necessarily coincide with gains in positive emotional functioning. This underscores the potential need to explicitly address PA regulation in service of broader mental health. As such, we previously piloted ($N = 9$) a novel PA regulation augmentation module to address PA regulation difficulties following the standard UP or single disorder CBT treatment (Carl et al., 2018). This module included PA regulation psychoeducation, positive emotion awareness, cognitive and behavioral PA regulation strategies (e.g., cognitive flexibility, behavioral activation, savoring), positive emotion exposure, and skills review. Preliminary findings reflected improvements in anxiety and depressive symptom severity, PA and NA, functional impairment, and quality of life.

While typically delivered in a therapist-led, individual treatment format, the UP is well suited for digital delivery given its modular, principle-based structure and transdiagnostic focus on shared emotional processes rather than disorder-specific content (Barlow et al., 2017a). Accordingly, there is emerging empirical support for the feasibility and acceptability of internet-delivered UP interventions across adult and youth samples, including randomized and pilot trials demonstrating meaningful symptom reductions and satisfactory engagement in guided online formats (Sandín et al., 2020; Schaeuffele et al., 2022). In parallel, a substantial literature indicates that internet-delivered transdiagnostic cognitive behavioral therapy (iCBT) is feasible and effective for anxiety and depressive disorders, with meta-analytic evidence demonstrating significant and sustained symptom improvement relative to control conditions, outcomes comparable to face-to-face CBT even with minimal clinician guidance (Karyotaki et al., 2021;

Zainal et al., 2024), and adherence and attrition rates broadly similar to those observed in traditional psychological treatments (Christensen et al., 2009; Linardon et al., 2025).

Building on this work, we developed the iUP, a digital mental health intervention (DMHI) adapted from the original face-to-face UP to closely follow the 2nd edition of the protocol (Barlow et al., 2017b). Ongoing efforts to evaluate the iUP in routine care settings further support the feasibility of this delivery format (e.g., Timulak et al., 2022). Although the iUP includes components that may indirectly enhance positive affect, such as promoting mindful emotional awareness and engagement with previously avoided or potentially rewarding experiences (consistent with behavioral activation and mindfulness approaches that have been shown to increase positive affect; Dimidjian et al., 2006; Fredrickson et al., 2008; Mazzucchelli et al., 2009), it does not explicitly target positive emotion regulation. Accordingly, we also developed the iUP+, an enhanced version of the iUP that more directly targets PA regulation. The iUP+ incorporates PA regulation strategies informed by our PA regulation augmentation module (e.g., savoring, the silver linings exercise) and prior approaches like PAT (Craske et al., 2019), particularly the use of positive emotion exposure to enhance reward sensitivity and approach motivation. It also aligns with the broader literature on behavioral activation, flexible thinking, and the role of PA in fostering optimal functioning. Importantly, the iUP+ retained all core components of the standard iUP, with no content removed or abbreviated; rather, modifications were additive and designed to more explicitly target positive emotion regulation within a transdiagnostic framework. Promising preliminary results from an initial iUP+ pilot (<redacted>, 2024) led to the present randomized clinical trial to evaluate the iUP+ in a larger, adequately powered sample.

The central aim of this study was to evaluate the efficacy of the iUP+ in an RCT for

patients with principal anxiety, obsessive-compulsive, or depressive disorders. This study compared the efficacy of the iUP+ to a group receiving the standard iUP on 1) emotional disorder symptoms and functional impairment; and 2) PA, savoring, positive mental health, and flourishing. We expected that both the iUP and iUP+ would lead to reductions in emotional disorder symptom severity, including NA, anxiety, stress, and depression, as well as functional impairment (Hypothesis 1). We also expected the iUP+ to lead to greater gains in savoring, PA, positive mental health, and flourishing compared to the iUP (Hypothesis 2).

Method

Participants

Treatment-seeking adults ($N = 120$) were recruited from an outpatient mental health clinic ($M_{\text{age}} = 34.0$, $SD = 12.0$; 73% female; 74.17% white; Table 1). A priori analysis indicated $\geq .80$ power to detect moderate effects at this sample size. Eligible participants were aged 18+ and met criteria for a principal diagnosis of a DSM-5 anxiety, depressive, or obsessive-compulsive disorder, scoring a ≥ 4 (definitely distressing/disabling) on the 0-8 clinical severity rating (CSR) scale from the Anxiety Disorders Interview Schedule for DSM-5 for Adults (ADIS-5).¹ This semi-structured, clinician-administered interview assessed anxiety, mood, somatic symptoms, substance use, and other disorders (Brown & Barlow, 2014). Participants were excluded for acute risk requiring a higher level of care, inability or unwillingness to follow study procedures, recent (within 6 weeks) or planned psychotropic medication changes during the study, or unwillingness to pause outside individual treatment for targeted mental health problems while enrolled ($n = 13$).

The present sample exhibited high rates of diagnostic comorbidity, with the majority of

¹ One participant met eligibility criteria but was missing ADIS data.

participants (79.17%, $n = 95$) meeting criteria for more than one psychiatric disorder at baseline ($M = 2.66$, $SD = 1.37$, $Mdn = 2$). When both clinical and subthreshold diagnoses (i.e., CSRs < 4) were considered, participants met criteria for an average of 3.59 diagnoses ($SD = 1.84$, $Mdn = 3$), and only 12 participants (10%) met criteria for a single diagnosis without reporting subclinical symptoms of any other psychiatric disorder assessed at baseline. Within this context of substantial diagnostic overlap, most participants (82.3%, $n = 99$) met criteria for a primary anxiety disorder at baseline, with generalized anxiety disorder (35.8%, $n = 43$) and social anxiety disorder (29.2%, $n = 35$) as the two most prevalent principal diagnoses. However, a substantial proportion of participants met criteria for a depressive disorder (26.7%, $n = 32$) and/or an obsessive-compulsive or related disorder (26.7%, $n = 32$) as either a primary or comorbid diagnosis at baseline.

Of the 120 participants at baseline, 43 were taking stable doses of psychotropic medication and 30 were receiving outside psychological services that they were willing to pause during the active phase of the study (See Table 1). Among participants who completed the post-treatment assessment, 5 reported psychotropic medication changes, 2 reported receiving CBT outside of study services, 2 reported receiving other psychotherapy or counseling, and 2 reported attending outside self-help groups (e.g., Alcoholics Anonymous, workshops) since the start of the study. At follow-up, participants were asked about treatment utilization since the post-treatment assessment. Fourteen participants reported medication changes, 8 reported receiving cognitive behavioral therapy, 17 reported other psychotherapy or counseling, and 4 reported attending outside self-help groups since post-treatment.

Procedures

Informed consent was obtained remotely via Zoom using a Qualtrics form. After an

initial assessment, eligible participants were randomized to the iUP+ ($n = 80$) or iUP ($n = 40$) using a 2:1 allocation ratio. Unequal allocation was selected to improve the precision of estimated within-condition change parameters while maintaining adequate statistical power for between-group comparisons on primary outcomes within available trial resources. Treatment lasted 12 weeks. Participants completed post-treatment and 3-month follow-up (3MFU) assessments, which included self-report questionnaires and diagnostic interviews. The Consort diagram in Figure 1 outlines participant flow and attrition. Of the 120 participants randomized, 86 fully completed the post-treatment procedures, 6 partially completed them (i.e., either the questionnaires or the ADIS interview, but not both), and 28 completed none of these procedures (due to withdrawal, dropout, or loss of contact). At the 3MFU, among the 86 participants eligible to complete 3MFU procedures (i.e., those who had not withdrawn or dropped out, had consented to the 3MFU, and were not lost to contact), 75 fully completed them, 9 partially completed them (i.e., either the questionnaires or the ADIS interview, but not both), and 2 did not complete any.

Treatments

The iUP and the iUP+ treatment programs consisted of 8 self-paced modules, delivered across 12 weeks via a digital platform (SilverCloud Health by Amwell®) with clinical support. Each module integrated psychoeducation with skill-building exercises to help participants respond to their emotions in adaptive, goal-directed ways (see Supplemental Materials). The iUP+ also included content specifically targeting PA regulation, integrated across various modules. *Module 1: Getting Started*, included a focus on identifying and setting positive goals. *Module 2: Understanding Emotions* featured expanded descriptions of a wider range of positive emotions like joy and pride, which were not addressed in the iUP. *Module 4: Flexible Thinking* added a “silver linings” exercise to promote cognitive flexibility around difficult experiences.

Module 5: Emotional Behaviors discussed positive emotional behaviors (e.g., motivating continued engagement in rewarding experiences) and included a savoring exercise. *Module 6: Facing Physical Sensations* provided additional examples of physical sensations associated with PA. *Module 7: Emotion Exposures* encouraged patients to explore positive emotional experiences. *Module 8: Progress and Practice* included a review of PA related content. No specific PA content was added for *Module 3: Mindful Emotion Awareness*. See Eustis et al. (2024) for details on iUP+ development. Each participant was assigned a supporter—a licensed clinical psychologist, post-doctoral pre-licensed clinician, clinical psychology doctoral student, or research technician trained in the UP—that was supervised by a licensed clinical psychologist with UP expertise. The support protocol, based on the Efficiency Model of Support (Schueller et al., 2017), involved weekly asynchronous written messages from supporters offering feedback, responding to questions, and addressing challenges. Written messaging was paused after two weeks of inactivity but resumed upon re-engagement. A protocol change was later implemented to increase engagement with the digital interventions, so that most participants ($n = 82$) were asked to attend two 20-to-30-minute Zoom meetings with their supporter at baseline and mid-treatment. These meetings allowed for questions, setting treatment goals, and addressing challenges with adherence. The proportion of participants enrolled under the updated protocol including supporter Zoom meetings did not differ significantly by condition, with 55 of 80 (68.8%) in UP+ and 27 of 40 (67.5%) in UP enrolled after the protocol change, $\chi^2(1) = 0.01, p = .89$. Supporter messaging concluded at post-treatment, but participants could access the program for an additional three months.

Measures

The Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond) is a 21-item

self-report measure that assesses depression, anxiety, and stress symptoms with distinct subscales, using a 4-point Likert scale. Internal consistency was acceptable to excellent across assessment timepoints for the depression (Cronbach's $\alpha = .90-.95$), anxiety ($\alpha = .77-.88$), and stress ($\alpha = .83-.88$) subscales.

The Work and Social Adjustment Scale (WSAS-SR; Marks et al., 1973) assesses functional impairment caused by mental health problems in domains of work, home management, social leisure, private leisure, and personal relationships. The self-report version is a 5-item scale rated on a 9-point Likert scale, which showed acceptable to high internal consistency across time ($\alpha = 0.79-.92$).

The Positive and Negative Affect Schedule–Expanded (PANAS-X; Watson & Clark, 1994) is a 60-item self-report measure of emotional states, including PA and NA, using a 5-point Likert scale. The PA ($\alpha = .88-.94$) and NA subscales ($\alpha = .87-.90$) had high internal consistency.

The Mental Health Continuum-Short Form (MHC-SF; Keyes, 2005) is a self-report measure of positive mental health that encompasses 14 items on psychological, social, and emotional wellbeing (the latter including the frequency of PA), with items rated on a 6-point Likert scale. The scale showed excellent internal consistency ($\alpha = .93-.96$).

The Flourish Index (VanderWeele, 2017) includes 10 items assessing five domains of flourishing (happiness and life satisfaction, mental and physical health, meaning and purpose, character and virtue, and close social relationships) that are rated on a 11-point Likert scale. This self-report scale demonstrated good to excellent internal consistency across time ($\alpha = .87-.94$).

The Savoring Beliefs Inventory (SBI; Bryant, 2003) is a 24-item self-report measure of savoring positive emotional experiences in the moment, through anticipation, and reminiscence.

It has 4 positively- and 4 negatively worded (reverse scored) items in each timeframe that were rated on a 7-point Likert scale and averaged. Internal consistency was excellent ($\alpha = .94-.97$).

Measures were administered at baseline, weeks 4, 8, and 12 (post-treatment), and 3MFU. The DASS-21 and Flourish Index were also administered weekly during treatment.

Analytic Plan

Descriptive statistics and logistic regressions were conducted in SPSS (see supplemental materials for correlations). Chi-square tests compared demographic, diagnostic, and other treatment utilization variables at baseline across conditions, using Monte Carlo simulation (10,000 replicates) in R to address low expected cell counts; Fisher's Exact Test was used for sparse 2×2 tables (e.g., ethnicity) when χ^2 assumptions were not met. Standardized mean gain effect sizes (ES_{sg}; See Lipsey & Wilson, 2001) were calculated to determine mean change in outcomes between baseline and major timepoints within treatment conditions and the full sample; between-condition effect sizes (ES; sample size corrected Hedge's g) were calculated to examine group differences. Missing data were handled with multiple imputation (conducted in Mplus; Muthén & Muthén, 2017) when calculating these ES. Logistic regressions compared post-treatment remission rates (i.e., ADIS CSR ≤ 3) for both the primary disorder and all initial diagnoses between groups, with odds ratios (OR) and 95% confidence intervals (CI) calculated from observed rates. Latent growth modeling was conducted to examine whether within-person trajectories of change in clinical outcomes differed between treatment conditions; modeling change at the latent level better accounts for measurement error in observed indicators and provide a more reliable test of between-condition differences in rates of change over time. Latent growth models with linear slopes and slope difference scores by treatment condition ($iUP+ = 0$, $iUP = 1$) were fit in R (Version 4.4.3; R Core Team, 2025) using full information

maximum likelihood estimation. Differences in engagement metrics were compared across conditions using t-tests or a Mann-Whitney U test when appropriate (e.g., due to non-normal distribution of proportion data). Exploratory post-hoc logistic regression examined whether treatment condition ($iUP+ = 1$, $iUP = 0$) predicted treatment completion.

A priori power calculations focused on the between-groups superiority comparison ($iUP+$ vs. iUP) for the main outcomes. Power was computed assuming a medium standardized between-groups effect (Cohen's $d \approx 0.52$) with 2:1 allocation favoring the $iUP+$ and two-sided $\alpha = .05$. Under these assumptions, a total sample of $N = 120$ provided 80% power to detect a between-condition difference of this magnitude. The targeted ES was informed by prior work comparing an intervention that aimed to enhance rewards sensitivity by directly targeted positive affect versus CBT targeting threat sensitivity (akin to the standard iUP), which reported effects in the medium range (Craske et al., 2019).

Transparency and Openness

The study was conducted in compliance with Boston University's Institutional Review Board (Protocol #5724E) and was preregistered at ClinicalTrials.gov (NCT05120232). We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. Intervention content for both the standard internet-delivered Unified Protocol (iUP) and the enhanced version ($iUP+$) was delivered via the SilverCloud Health by Amwell® digital platform. Treatment materials consist of proprietary digital modules and interactive tools that are not publicly available due to commercial licensing and intellectual property protections. A description of intervention components is provided in the manuscript and supplementary table to support transparency, and prior treatment development work describing $iUP+$ content is cited (Eustis et al., 2024). De-identified data and analysis code are available

from the last author upon reasonable request.

Results

Between-Condition Comparisons of Participant Characteristics and Treatment Utilization

There were no significant differences between treatment conditions on any baseline demographic or diagnostic variable, including race ($\chi^2 = 6.61, p = .15$), ethnicity ($p = .35$), age ($\chi^2 = 1.35, p = .87$), sex ($\chi^2 = 0.14, p = .82$), highest level of education ($\chi^2 = 1.72, p = .70$), household income ($\chi^2 = 5.14, p = .28$), or principal diagnosis ($\chi^2 = 6.52, p = .61$). Furthermore, there were no differences between conditions in psychiatric medication use ($\chi^2 = 0.45, p = .50$) and other mental health treatment utilization ($\chi^2 = 0.80, p = .37$) at baseline.

Within and Between Condition Effect Sizes for Treatment Outcomes

A series of within-condition and between-condition analyses were conducted to examine change over time within each group and differences in treatment outcomes between conditions. Standardized mean gains scores (ES_{sg}) and between-condition ES (Hedge's g) with 95% CIs were calculated from imputed means and mean differences to characterize treatment outcomes within and across conditions for the intent-to-treat sample. ORs were also calculated to compare the likelihood of remission for patients across treatment groups based on observed rates.

With respect to clinical outcomes, anxiety, depression, stress, NA, and functional impairment were significantly reduced within both conditions and across the full sample between baseline and post-treatment (Table 2). Post-treatment ES reflected large reductions in stress (iUP+ ES_{sg} = -0.74, iUP ES_{sg} = -0.92), moderate-large reductions in anxiety (iUP+ ES_{sg} = -0.80, iUP ES_{sg} = -0.64), moderate reductions in NA (iUP+ ES_{sg} = -0.43, iUP ES_{sg} = -0.65), and small-moderate reductions in both depression (iUP+ ES_{sg} = -0.28, iUP ES_{sg} = -0.38) and

functional impairment (iUP+ ESsg = -0.28, iUP ESsg = -0.34). These changes were generally maintained across the follow-up period, as differences relative to baseline remained statistically significant. There was also a large, significant increase in primary diagnosis CSR (iUP+ ESsg = -1.01, iUP ESsg = -1.13) and max CSR across diagnoses (iUP+ ESsg = -0.89, iUP ESsg = -0.78) by post-treatment. This supports our first hypothesis that symptom severity and functional impairment would improve in both conditions.

Turning to indicators of positive functioning, participants exhibited baseline levels of positive affect, savoring, flourishing, and positive mental health (see Table 3) that were below population norms or levels observed in U.S. community samples (Geiger et al., 2016; Keyes et al., 2012; Watson & Clark, 1994; VanderWeele et al., 2025). For example, average positive affect (iUP+ M = 25.86, SD = 7.20; iUP M = 26.95, SD = 6.58) was lower than values reported in normative samples of U.S. adults (M = 31.1, SD = 7.5) and undergraduates (M = 32.4, SD = 7.3) in the PANAS-X manual (Watson & Clark, 1994). Similarly, baseline flourishing in the present sample (iUP+ M = 5.67, SD = 1.49; iUP M = 5.95, SD = 1.55) was below levels observed in a nationally representative U.S. community sample (M = 7.18, SD = 1.65; VanderWeele et al., 2025), indicating broadly reduced positive emotional functioning and well-being at study entry.

Participants in both conditions showed significant, small-to-moderate increases in positive mental health (iUP+ ESsg = 0.31, iUP ESsg = 0.34) and flourishing (iUP+ ESsg = 0.37, iUP ESsg = 0.34) by post-treatment. Increases in positive mental health were maintained across the follow-up, whereas levels of flourishing continued to rise, showing moderate, significant increases relative to baseline by the 3MFU. Participants in both groups generally showed small increases in PA, which were greatest at week 8 (iUP+ ESsg = 0.33, iUP ESsg = 0.33) and were

statistically significant both within and across groups. Both groups still showed small gains in PA (iUP+ ESsg = 0.20, iUP ESsg = 0.23) relative to baseline by post-treatment (which were statistically significant for the full sample but not within groups). However, PA declined during follow-up and was no longer statistically significant relative to baseline. Similarly, savoring increased by post-treatment in both conditions (iUP+ ESsg = 0.33, iUP ESsg = 0.29), but slightly declined during follow-up so that differences relative to baseline were no longer statistically significant (iUP+ ESsg = 0.09, iUP ESsg = 0.19). These findings are not consistent with our second hypothesis, which posited that the iUP+ would lead to greater gains in savoring, PA, positive mental health, and flourishing compared to the standard UP.

Furthermore, there were no statistically significant mean differences in treatment outcomes between groups at any assessment timepoint, and the corresponding ESs were consistently small (Table 3). There were also no statistically significant differences in rates of remission for primary diagnosis ($B = -0.65$, $OR = 0.52$, $p = .17$) between the iUP+ (31%, 20/64) and iUP (46%, 13/28), and neither group (23%, 15/64 for iUP+; 18%, 5/28 for iUP) was significantly more likely to achieve full remission (as indicated by the highest post-treatment CSR among diagnoses assigned at baseline; $B = 0.34$, $OR = 1.41$, $p = .55$). These findings are consistent with our first hypothesis but not our second hypothesis, which posited that the iUP+ would lead to greater gains in savoring, PA, positive mental health, and flourishing compared to the standard iUP.

Trajectories of Change in Treatment Outcomes

Latent growth modeling was also conducted to compare trajectories of change in treatment outcomes between the iUP+ and iUP during the intervention period. Model fit statistics for all latent growth models indicated acceptable fit, with nearly all demonstrating excellent fit

(see supplementary materials). Slope difference scores indicated no statistically significant differences in change between the UP and UP+ for any treatment outcome examined, and observed standardized ESs were generally small (Table 4).

Mean slopes (reflecting change within the iUP+ group) showed significant changes in all treatment outcomes except PA. While the PA standardized mean slope (.36) suggested a modest increase, it was not statistically significant (slope $M = 0.46$, $p = .12$). iUP+ participants did, however, show significant increases in savoring (Slope $M = 0.11$, Std $M = 0.92$, $p < .001$), positive mental health (Slope $M = 1.30$, Std $M = 0.63$, $p = .002$), and flourishing (Slope $M = 0.24$, Std $M = 0.98$, $p < .001$) by post-treatment. Likewise, mean slopes showed significant decreases in anxiety (Slope $M = -2.06$, Std $M = -1.25$, $p < .001$), depression (Slope $M = -1.00$, Std $M = -0.56$, $p = .003$), stress (Slope $M = -2.32$, Std $M = -1.41$, $p < .001$), NA (Slope $M = -1.45$, Std $M = -1.80$, $p < .001$), and functional impairment (Slope $M = -1.02$, Std $M = -0.64$, $p = .004$). Baseline levels of each outcome were not significantly associated with change in that same outcome, as indicated by non-significant slope–intercept covariances across all models.

Engagement and Attrition

To examine differences in engagement across conditions, we summarized and compared key metrics—number of logins, messages sent to supporters, tools used, and proportion of pages viewed. iUP+ participants showed significantly higher engagement across most metrics, averaging 25.80 logins [SD = 21.36] (Welch's $t(113.72) = -4.09$, $p < .001$, $d \approx 0.75$), 4.90 messages sent [SD = 5.67] ($t(118) = -2.20$, $p = .029$, $d \approx 0.40$), and 16.44 tools used [SD = 9.50] ($t(118) = -2.78$, $p = .006$, $d \approx 0.51$), whereas iUP participants averaged 13.32 logins [SD = 11.96], 2.74 messages sent [SD = 5.09], and 11.39 tools used [SD = 8.65]. Results reflected medium-to-large ES, with the largest difference in login frequency. The proportion of pages

viewed across modules did not significantly differ between conditions ($U = 1356.50, p = .17$); iUP participants viewed a median of 66% of pages (IQR = 87%) versus 85% for iUP+ participants (IQR = 65%).

Rates of treatment completion were also examined post-hoc and compared between treatment conditions using logistic regression. Treatment non-completers were defined as those who did not engage with all treatment modules and either formally discontinued participation or disengaged from the intervention and could no longer be contacted during the treatment period (as evidenced by absence of engagement with supporter messages and lack of progress through modules). Of the 40 participants assigned to the iUP, 11 (27.5%) did not complete treatment, whereas 13 out of 80 participants (16.25%) in the iUP+ condition did not complete treatment. Participants assigned to the iUP+ were about twice as likely to complete treatment compared to those in the iUP ($B = 0.67, OR = 1.96, p = .15$), though this ES was not statistically significant.

Discussion

In this RCT of two digitally adapted versions of the Unified Protocol, we observed significant changes in anxiety, depression, stress, NA, functional impairment, and clinical severity from baseline to post-treatment across both interventions, supporting our first study hypothesis. Importantly, these improvements were largely maintained at follow-up, with moderate-to-large ESs across several domains. In addition, there was a substantial decrease in clinician-rated clinical severity, both for the principal diagnosis and for the maximum CSR across all diagnoses. This suggests that both treatments not only reduced symptom severity but also had a broad impact on overall clinical impairment. These findings aligned with our expectations and with previous meta-analytic reviews demonstrating the efficacy of the UP across emotional disorders (Longley & Gleisser, 2023; Carlucci et al., 2021), and underscore

how DMHIs delivered in an individual, self-paced, online format with clinical support can achieve robust outcomes (Seegan et al., 2023; Babbage et al., 2022). Moreover, such DMHIs can conserve resources by offering immediate, scalable support for those awaiting specialized care or avoiding in-person treatment due to stigma (Seegan et al., 2023; Schueller et al., 2022). The digital UP may serve as a lower-intensity option within a stepped-care system, allowing more intensive treatments to be reserved for those with greater need.

In addition to reductions in symptoms, small-to-moderate increases in positive mental health and flourishing were observed in both conditions, with no added benefit of iUP+, contrary to our hypothesis. Notably, gains in positive mental health were sustained at follow-up while levels of flourishing had further improved, suggesting that some aspects of psychological growth may continue to unfold post-treatment. This pattern aligns with theories of positive psychological adaptation (Fredrickson, 2001) and underscores the potential for interventions to promote long-term optimal functioning alongside symptom reduction (Boiler et al., 2013). In addition, baseline levels of positive mental health and flourishing, along with savoring, were not significantly associated with trajectories of change, indicating that improvements in these outcomes were not limited to individuals entering treatment with particularly low initial levels. This suggests that attempts to enhance positive functioning may be useful regardless of how difficulties present initially.

Nevertheless, findings related to savoring and PA were more complex. While these outcomes increased during both treatments—particularly by week 8—these gains were not fully maintained at follow-up. At the 3MFU, PA levels had returned to initial levels, and while savoring still showed small ES improvements, these were no longer statistically significant relative to baseline. These findings suggest structured, DMHIs have the potential to enhance PA

and savoring, but additional strategies or a greater dose may be needed to maintain improvements. This may reflect the underlying nature of these constructs: PA and savoring reflect more hedonic, state-like aspects of wellbeing that naturally fluctuate, whereas flourishing and positive mental health are broader and also capture eudaimonic well-being, which tends to be more stable over time (Ryan & Deci, 2001; Trudel-Fitzgerald et al., 2021). As such, sustaining gains in PA and savoring may require ongoing engagement with PA regulation strategies to support lasting positive change. Overall, our findings suggest that DMHIs aiming to bolster positive functioning can confer mental health benefits regardless of starting point, supporting their broad applicability. However, the weaker effects observed for PA and savoring highlight the complexity of modifying these constructs in short-term DMHIs, suggesting a need for further research on factors influencing intervention response.

The increases in positive mental health and flourishing observed in this study potentially align with outcomes from other evidence-based interventions incorporating PA regulation strategies, though, gains in PA and savoring were not sustained over the long term in this trial. In addition to increased PA, Taylor et al.'s (2017) PAI produced lasting gains in wellbeing (e.g., perceived life satisfaction and enjoyment) alongside reductions in depression and anxiety, which were maintained over 6 months. Similarly, Craske et al.'s (2019) clinical trial of PAT showed reduced anhedonia and increased in PA, which persisted for 6 months. Notably, while both interventions had savoring exercises, neither formally measured changes in savoring. LaFreniere & Newman's (2023) trial of SkillJoy found that this brief transdiagnostic early intervention enhanced PA and savoring, while reducing worry and depression. Our findings generally follow this pattern, as both the iUP and iUP+ improved emotional disorder symptoms as well as positive mental health and flourishing. While there was some indication that savoring increased across

interventions, this growth was no longer statistically significant relative to baseline at follow-up. As no significant differences emerged between treatments, this suggests both may be similarly effective in promoting dimensions of optimal functioning. Indeed, the observed changes may reflect the impact of shared UP components, which can indirectly enhance well-being. However, the possibility that iUP+-specific positive emotion regulation strategies contributed cannot be ruled out, particularly given evidence that positive emotion regulation processes are modifiable in transdiagnostic treatments (e.g., Craske et al., 2019; Lafreniere & Newman, 2023).

Contrary to expectations, the iUP+ did not lead to greater improvements in PA regulation than the iUP. Since prior research suggests directly targeting PA regulation can enhance treatment outcomes (Carl et al., 2018; Craske et al., 2019), the iUP+ may not have delivered a strong or sustained enough dose to yield added benefits and to support longer-term change in PA-related outcomes, at least within our targeted population at these sample sizes. Many effective interventions targeting PA regulation, like PAT and Skilljoy, involve repeated and intensive skills practice. It is also possible that some participants were not motivated to increase positive affect given that downregulation of positive emotion can serve goal-consistent functions (Bonnano & Burton, 2013), potentially limiting engagement with PA-focused content. In this context, augmenting PA may require not only additional dose, but explicit attention to individuals' regulatory goals and ambivalence about positive emotion.

Future studies should examine whether increasing the intensity, duration, or supporter integration of PA regulation techniques within the iUP+ enhances its efficacy beyond the standard iUP. Additional research should also examine whether responsiveness to PA-focused interventions varies by factors like diagnosis, age, sex, or education. Interestingly, although the rate of treatment completion was not statistically significant between the two conditions, it was

higher for the iUP+ than the iUP, suggesting that the additional components in the iUP+ could support greater engagement and completion even in the absence of a particular advantage with respect to the outcomes investigated here. The present analyses, however, did not examine engagement as a moderator of treatment outcomes, track post-treatment engagement behaviors, or evaluate the role of engagement in predicting 3-month follow-up outcomes. These questions were beyond the scope of this clinical trial's primary outcomes and represent important directions for future research.

It is worth emphasizing that both interventions in this trial were associated with moderate improvements in symptoms that were comparable to other DMHIs, along with gains in positive mental health and flourishing. Prior meta-analyses have evaluated the effectiveness of DMHIs for depression and anxiety, and these studies generally report small-to-moderate ESs, with Hedges' g between 0.20 and 0.50 (Andersson et al., 2019; Karyotaki et al., 2018). In contrast, traditional in-person psychotherapy is associated with larger ESs (Andersson et al., 2019). The greatest ES for DMHIs are observed for guided interventions incorporating therapist support, compared to entirely self-guided programs. For example, Karyotaki et al. (2018) found that clinician-guided internet-based interventions led to clinically significant improvements in depression with better response and remission rates than self-guided formats. Other meta-analytic evidence also suggests guided DMHIs can yield comparable outcomes to face-to-face therapy, but unguided DMHIs are typically less effective (Pauley et al., 2023). These findings suggest DMHIs can be beneficial, particularly when guided.

This study's findings should be interpreted in light of its limitations. The lack of statistical significance across models suggests that any differences between the interventions are likely smaller in magnitude than anticipated. While future work with larger samples could reveal

differences not detected here, we think the magnitude of such effects are unlikely to be substantively meaningful. Further, the relatively short time frame (12 weeks) may not have been sufficient to induce meaningful change in certain outcomes like savoring, which may require more sustained practice. In addition, findings from this majority white, highly educated and predominantly non-Hispanic/Latinx sample may not generalize to more diverse populations.

We also note factors related to the study design. First, the absence of a control condition limits conclusions regarding the absolute efficacy of iUP or iUP+. Although participants were blind to condition assignment, and randomization therefore permits evaluation of incremental effects of positive emotion regulation content, improvements observed across both groups may reflect natural symptom fluctuation, regression to the mean, or nonspecific treatment factors common to both interventions (e.g., asynchronous support). Still, within-group improvements for the majority of symptom outcomes (e.g., anxiety, stress, negative affect) were moderate to large across both conditions and were accompanied by substantial reductions in clinician-rated clinical severity. Symptom reductions are interpretable within the broader evidence base demonstrating the efficacy of the UP and guided digital CBT interventions in randomized trials (e.g., Barlow et al., 2017; Zainal et al., 2024). In contrast, positive affect findings, particularly within-group increases, should be interpreted cautiously, as no control comparator was available to determine whether observed gains exceeded normative change over time. Accordingly, the present findings primarily inform comparative effectiveness between two active conditions rather than definitive causal claims regarding absolute treatment-induced change. Second, participants retained access to the digital intervention following treatment; however, engagement during the follow-up period was not systematically tracked. Accordingly, 3-month follow-up outcomes reflect symptom trajectories following supported treatment, but may have been influenced by continued self-

directed use of intervention content. Third, supporter variability effects were not addressed in this study due to the small number of supporters involved (<10) relative to the sample size. Prior methodological work indicates that reliable estimation of therapist/supporter-level variance requires a substantially larger number of therapists/supporters than was available in this study (Baldwin & Imel, 2013). Finally, the support protocol was modified to include pre- and mid-treatment Zoom meetings to reinforce the credibility of the supporter relationship and enhance engagement, but may limit the internal validity of comparisons across participants. Future research incorporating a minimal-contact or waitlist control would clarify the magnitude of intervention-specific effects in this delivery format and should explore potential treatment moderators like individual differences in engagement and clinical support, especially related to PA regulation-related content, to better understand who benefits most from PA regulation interventions and why.

Clinical Implications

These findings have important clinical implications for transdiagnostic DMHIs, particularly those that include PA regulation strategies. Observed improvements in emotional disorder symptoms, positive mental health, and flourishing suggest that interventions like the iUP and iUP+ are effective for a range of symptom profiles, supporting their use as scalable, accessible treatments. Yet, the lack of significant differences between them indicates that a more substantial or sustained focus on incorporating PA strategies may be needed. Future research should explore whether increasing engagement with PA regulation strategies, through interactive elements or additional coaching, enhances outcomes. One way to increase the effects of DMHIs is to supplement supporter training with content that is not typically emphasized in standard CBT/supporter training, particularly skills for reinforcing positive affect regulation in brief,

asynchronous digital contacts. Supporters in the present study were highly trained in the UP, which may have constrained the degree to which additional general training could yield incremental benefits, however, they did not receive specialized training focused on reinforcing PA regulation strategies when providing digital/asynchronous support. Future work may also focus on increasing the dose and reinforcement of PA content within the support protocol—for instance, by assigning multiple PA-focused exercises and encouraging weekly practice of strategies like savoring. Further, AI-based supervision or real-time feedback may ensure greater treatment fidelity. Future research could focus on ways to personalize training, optimal levels of supporter involvement, and the impact of supporter characteristics on treatment outcomes.

Conclusions

This study highlights the effectiveness of the digital UP for reducing emotional disorder symptoms and promoting positive mental health and flourishing. Improvements following both the iUP and iUP+ suggest that structured, evidence-based DMHIs can provide meaningful benefits across varied symptom profiles. Yet the lack of significant differences between them suggests the dose and range of PA regulation strategies offered in the iUP+ may not be enough to drive greater gains—though higher engagement metrics and the trend of lower attrition suggest it may still offer qualitative advantages. Future research should test if increasing the intensity, duration, or engagement with these strategies—and leveraging support to more directly encourage and reinforce their use—enhances their impact. Additionally, identifying characteristics that predict greater response to PA regulation techniques could help tailor interventions. As DMHIs expand, refining strategies to optimize symptom reduction and PA regulation will be key to improving optimal functioning.

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Table 1. Baseline Sample Characteristics Used in Chi-Square and Fisher's Exact Test Analyses

Characteristic	iUP (n = 40)		iUP+ (n = 80)		Full sample (n = 120)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Principal diagnosis						
GAD	15	37.5	28	35.0	43	35.8
SOC	14	35.0	21	26.3	35	29.2
PD or AG	2	5.0	8	10.0	10	8.3
SPEC-PHOBIA	2	5.0	4	5.0	6	5.0
Other Anxiety Disorder	3	7.5	2	2.5	5	4.2
OCD	0	0.0	5	6.3	5	4.2
Other OCRD	1	2.5	5	6.3	6	5.0
Traumatic Stressor Disorder	1	2.5	3	3.8	4	3.3
Depressive Disorder	2	5.0	4	5.0	6	5.0
Sex						
Male	11	27.5	20	25.0	31	25.8
Female	28	70.0	60	75.0	88	73.3
Intersex	1	2.5	0	0.0	1	0.8
Age Group						
18-25	13	32.5	20	25.0	33	27.5
26-35	14	35.0	30	37.5	44	36.7
36-45	5	12.5	14	17.5	19	15.8
46-55	5	12.5	8	10.0	13	10.8
56+	3	7.5	8	10.0	11	9.2
Race						
Asian	1	2.5	11	13.8	12	10.0
Black	5	12.5	3	3.8	8	6.7
White	31	77.5	59	73.8	90	75.0
Multiracial	1	2.5	3	3.8	4	3.3
Other	2	5.0	4	5.0	6	5.0
Ethnicity						
Latinx/Hispanic	6	15.0	7	8.8	13	10.8
Not Latinx/Hispanic	34	85.0	73	91.3	107	89.2
Education						
High School Diploma	1	2.5	2	2.5	3	2.5
Some College/Post-Secondary	6	15.0	13	16.3	19	15.8
Trade School						
Bachelor's Degree	12	30.0	33	41.3	45	37.5

Graduate or Professional Degree	16	40.0	24	30.0	40	33.3
Unknown/Unreported	5	12.5	8	10.0	13	10.8
Current Annual Household Income						
Less than \$25,000	8	20.0	19	23.8	27	22.5
\$25,000-\$54,999	8	20.0	12	15.0	20	16.7
\$55,000-\$74,999	3	7.5	5	6.3	8	6.7
\$75,000-\$99,999	1	2.5	12	15.0	12	10.8
\$100,000+	15	37.5	23	28.7	38	31.7
Unknown/Unreported	5	12.5	10	11.3	15	11.7
Other Treatment Utilization						
Pharmacotherapy	16	40.0	27	33.8	43	35.8
Other Mental Health Treatment ^a	8	20.0	22	27.5	30	25.0

Note. GAD = Generalized Anxiety Disorder; SOC = Social Anxiety Disorder; PD = Panic

Disorder; AG = Agoraphobia; OCD = Obsessive Compulsive Disorder; OCRD = Other

Obsessive Compulsive and Related Disorder (Trichotillomania, Excoriation Disorder, Body

Dysmorphic Disorder); Other Anxiety Disorder = Illness Anxiety Disorder or Unspecified

Anxiety Disorder; Traumatic Stressor Disorder = Post-Traumatic Stress Disorder, Prolonged

Grief Disorder, or Other Specified Trauma- and Stressor-Related Disorder; Depressive Disorder

= Persistent Depressive Disorder, Major Depressive Disorder, or Unspecified Depressive

Disorder. Some College/Post-Secondary Trade School included some college, associate's degree,

post-secondary trade school. Graduate or Professional Degree included professional or doctoral

degrees (e.g., M.D., J.D., or Ph.D.). The 'Intersex' category was excluded from chi-square

analyses due to low expected counts (violating test assumptions); 'Unknown/Unreported'

responses were treated as missing and excluded from analyses. Other treatment utilization

reflects baseline pharmacotherapy and non-study mental health treatment.

^a participants agreed to pause non-study psychosocial treatment during the intervention period per study protocol.

Table 2. Standardized Mean Gain Scores with Imputed Data for Treatment Outcomes

Outcome	Group	Effect Size, ESsg (95% CI)			
		BL to S4	BL to S8	BL to PT	BL to FU
Anxiety	iUP+	-0.26 (-0.44, -0.08)	-0.59 (-0.80, -0.37)	-0.80 (-1.03, -0.55)	-0.68 (-0.93, -0.43)
	iUP	-0.18 (-0.47, 0.12)	-0.58 (-0.96, -0.20)	-0.64 (-1.00, -0.28)	-0.63 (-0.97, -0.30)
	Total	-0.24 (-0.39, -0.08)	-0.58 (-0.77, -0.40)	-0.75 (-0.95, -0.55)	-0.66 (-0.87, -0.46)
Depression	iUP+	-0.13 (-0.29, 0.04)	-0.36 (-0.53, -0.20)	-0.28 (-0.47, -0.08)	-0.35 (-0.58, -0.12)
	iUP	-0.11 (-0.35, 0.13)	-0.46 (-0.74, -0.18)	-0.38 (-0.68, -0.09)	-0.33 (-0.64, -0.02)
	Total	-0.12 (-0.26, 0.01)	-0.39 (-0.54, -0.25)	-0.31 (-0.47, -0.15)	-0.35 (-0.53, -0.16)
Stress	iUP+	-0.15 (-0.32, 0.02)	-0.53 (-0.72, -0.33)	-0.74 (-0.96, -0.51)	-0.87 (-1.15, -0.60)
	iUP	-0.22 (-0.52, 0.07)	-0.56 (-0.89, -0.22)	-0.92 (-1.29, -0.56)	-0.92 (-1.32, -0.52)
	Total	-0.17 (-0.32, -0.02)	-0.54 (-0.71, -0.37)	-0.79 (-0.97, -0.60)	-0.88 (-1.11, -0.66)
Negative Affect	iUP+	0.06 (-0.13, 0.24)	-0.17 (-0.34, -0.01)	-0.43 (-0.64, -0.22)	-0.32 (-0.52, -0.11)
	iUP	-0.23 (-0.52, 0.05)	-0.36 (-0.68, -0.04)	-0.65 (-0.96, -0.35)	-0.71 (-1.10, -0.32)
	Total	-0.04 (-0.19, 0.12)	-0.23 (-0.38, -0.08)	-0.50 (-0.67, -0.33)	-0.43 (-0.61, -0.24)
Positive Affect	iUP+	0.13 (-0.06, 0.33)	0.33 (0.08, 0.57)	0.20 (-0.02, 0.41)	0.04 (-0.19, 0.26)
	iUP	0.07 (-0.21, 0.34)	0.33 (0.03, 0.64)	0.23 (-0.08, 0.54)	0.17 (-0.17, 0.51)
	Total	0.11 (-0.05, 0.27)	0.33 (0.14, 0.52)	0.21 (0.03, 0.38)	0.08 (-0.11, 0.27)
Impairment	iUP+	-0.06 (-0.27, 0.14)	-0.27 (-0.50, -0.05)	-0.28 (-0.54, -0.03)	-0.46 (-0.74, -0.19)
	iUP	-0.10 (-0.40, 0.19)	-0.24 (-0.51, 0.04)	-0.34 (-0.64, -0.03)	-0.45 (-0.84, -0.06)
	Total	-0.08 (-0.24, 0.09)	-0.26 (-0.44, -0.08)	-0.30 (-0.50, -0.10)	-0.46 (-0.69, -0.23)
Flourishing	iUP+	0.15 (0.00, 0.31)	0.26 (0.10, 0.42)	0.37 (0.19, 0.56)	0.48 (0.27, 0.69)
	iUP	0.05 (-0.18, 0.29)	0.19 (-0.02, 0.41)	0.34 (0.06, 0.62)	0.41 (0.12, 0.69)
	Total	0.12 (-0.01, 0.25)	0.24 (0.11, 0.37)	0.36 (0.21, 0.52)	0.46 (0.29, 0.63)
Positive Mental Health	iUP+	0.13 (0.00, 0.27)	0.24 (0.09, 0.40)	0.31 (0.14, 0.49)	0.33 (0.14, 0.52)
	iUP	0.13 (-0.04, 0.31)	0.30 (0.08, 0.51)	0.34 (0.10, 0.59)	0.31 (0.08, 0.53)
	Total	0.13 (0.02, 0.24)	0.26 (0.13, 0.39)	0.32 (0.18, 0.46)	0.32 (0.17, 0.47)
Savoring	iUP+	0.13 (-0.02, 0.28)	0.23 (0.08, 0.37)	0.33 (0.16, 0.50)	0.09 (-0.12, 0.31)
	iUP	0.05 (-0.12, 0.22)	0.16 (0.01, 0.31)	0.29 (0.13, 0.45)	0.19 (-0.14, 0.52)
	Total	0.10 (-0.01, 0.22)	0.20 (0.09, 0.31)	0.31 (0.19, 0.44)	0.13 (-0.05, 0.31)
CSR - Primary	iUP+	—	—	-1.01 (-1.30, -0.72)	—
	iUP	—	—	-1.13 (-1.56, -0.71)	—
	Total	—	—	-1.05 (-1.28, -0.81)	—
CSR-Max	iUP+	—	—	-0.89 (-1.18, -0.61)	—
	iUP	—	—	-0.78 (-1.15, -0.41)	—
	Total	—	—	-0.86 (-1.09, -0.63)	—

Note. BL = baseline, S = session, PT = post-treatment, FU = 3-month follow-up, CSR = ADIS

clinical severity rating. Change scores reflect change from baseline to specified timepoint.

Negative changes scores and effect sizes indicate a decrease in the outcome within the condition;

positive changes scores and effect sizes indicate an increase in the outcome within the condition.

Total indicates the full sample, iUP+ n = 80, iUP n = 40.

Table 3. Group differences in imputed mean levels of treatment outcomes across time

Measure	Time	iUP+	iUP	iUP+ vs. iUP
		M (SD)	M (SD)	g (95% CI)
Anxiety	BL	11.01 (7.91)	10.90 (6.60)	0.01 (-0.37, 0.39)
	S4	8.98 (7.50)	9.62 (7.82)	-0.08 (-0.46, 0.30)
	S8	6.57 (7.17)	7.25 (5.84)	-0.10 (-0.48, 0.28)
	PT	5.01 (7.04)	6.49 (7.16)	-0.21 (-0.59, 0.17)
	FU	5.68 (7.71)	6.77 (6.47)	-0.15 (-0.53, 0.23)
Depression	BL	12.99 (9.63)	11.95 (9.06)	0.11 (-0.27, 0.49)
	S4	11.73 (10.07)	10.93 (8.97)	0.08 (-0.30, 0.46)
	S8	9.52 (9.44)	8.16 (6.90)	0.16 (-0.22, 0.54)
	PT	10.24 (10.16)	8.50 (8.86)	0.18 (-0.20, 0.56)
	FU	9.67 (9.11)	9.12 (8.01)	0.06 (-0.32, 0.44)
Stress	BL	18.49 (9.28)	17.7 (6.55)	0.09 (-0.29, 0.47)
	S4	17.10 (9.28)	15.98 (8.57)	0.12 (-0.26, 0.50)
	S8	13.86 (8.16)	13.68 (7.75)	0.02 (-0.36, 0.40)
	PT	11.71 (9.10)	11.06 (7.67)	0.07 (-0.31, 0.45)
	FU	10.80 (8.29)	11.22 (7.49)	-0.05 (-0.43, 0.33)
Negative Affect	BL	23.47 (8.57)	25.98 (7.62)	-0.30 (-0.68, 0.08)
	S4	23.93 (7.73)	24.19 (7.76)	-0.03 (-0.41, 0.35)
	S8	22.05 (7.66)	23.33 (7.08)	-0.17 (-0.55, 0.21)
	PT	20.06 (7.02)	21.15 (7.10)	-0.15 (-0.53, 0.23)
	FU	20.81 (8.31)	21.02 (6.18)	-0.03 (-0.41, 0.35)
Positive Affect	BL	25.86 (7.20)	26.95 (6.58)	-0.15 (-0.53, 0.23)
	S4	26.91 (8.51)	27.44 (7.88)	-0.06 (-0.44, 0.32)
	S8	28.39 (8.22)	29.54 (8.50)	-0.14 (-0.52, 0.24)
	PT	27.39 (8.22)	28.62 (7.67)	-0.15 (-0.53, 0.23)
	FU	26.14 (8.47)	28.24 (8.24)	-0.25 (-0.63, 0.13)
Impairment	BL	17.35 (8.63)	17.05 (8.35)	0.04 (-0.34, 0.41)
	S4	16.78 (8.99)	16.17 (8.48)	0.07 (-0.31, 0.45)
	S8	15.03 (8.38)	15.17 (7.53)	-0.02 (-0.40, 0.36)
	PT	14.77 (9.54)	14.33 (7.84)	0.05 (-0.33, 0.43)
	FU	12.92 (10.32)	12.99 (9.64)	-0.01 (-0.39, 0.37)
Flourishing	BL	5.67 (1.49)	5.95 (1.55)	-0.19 (-0.57, 0.19)
	S4	5.92 (1.67)	6.03 (1.52)	-0.07 (-0.45, 0.31)
	S8	6.12 (1.83)	6.25 (1.57)	-0.07 (-0.45, 0.31)
	PT	6.32 (1.86)	6.50 (1.64)	-0.10 (-0.48, 0.28)
	FU	6.50 (1.86)	6.58 (1.54)	-0.05 (-0.43, 0.33)
Positive Mental	BL	34.54 (14.20)	37.90 (12.80)	-0.24 (-0.62, 0.14)

Health	S4	36.49 (15.14)	39.73 (14.01)	-0.22 (-0.60, 0.16)
	S8	38.18 (15.36)	41.93 (13.97)	-0.25 (-0.63, 0.13)
	PT	39.24 (15.52)	42.50 (13.90)	-0.22 (-0.60, 0.16)
	FU	39.60 (16.11)	42.12 (14.31)	-0.16 (-0.54, 0.22)
Savoring	BL	4.53 (1.06)	4.71 (1.11)	-0.17 (-0.55, 0.21)
	S4	4.66 (0.91)	4.76 (1.09)	-0.11 (-0.49, 0.27)
	S8	4.76 (1.04)	4.89 (1.10)	-0.12 (-0.50, 0.26)
	PT	4.87 (1.02)	5.02 (1.03)	-0.15 (-0.53, 0.23)
CSR - Primary	FU	4.64 (1.24)	4.94 (1.29)	-0.24 (-0.62, 0.14)
	BL	5.00 (0.64)	4.85 (0.28)	0.24 (-0.14, 0.62)
	PT	3.79 (2.05)	3.57 (1.37)	0.16 (-0.22, 0.54)
	PT	4.04 (1.63)	4.08 (1.16)	-0.03 (-0.41, 0.35)

Note. BL = baseline, S = session, PT = post-treatment, FU = 3-month follow-up. UP+ n = 80, UP n = 40. Hedge's g was calculated using a correction for small sample sizes. Negative effect sizes indicate that the treatment listed first was associated with lower levels of the outcome and positive effect sizes indicate that the treatment listed first was associated with higher levels of the outcome.

Table 4. Results from Latent Growth Models Examining Between Group Differences in Change

Outcome	Slope Δ Score			Slope			Slope-Intercept Covariance			Intercept
	<i>B</i>	β	<i>p</i>	<i>M</i> (var)	<i>Std M</i>	<i>p</i>	σ	θ	<i>p</i>	<i>M</i> (var)
Anxiety	0.70	0.20	.13	-2.06 (2.59)	-1.25	<.001	-2.08	-.21	.32	10.98 (37.05)
Depression	-0.27	-0.07	.63	-1.00 (3.17)	-0.56	.003	-3.26	-.22	.31	12.45 (68.83)
Stress	0.03	0.01	.96	-2.32 (2.72)	-1.41	<.001	-2.39	-.20	.37	18.46 (51.97)
Negative Affect	0.23	0.14	.57	-1.45 (0.64)	-1.80	<.001	-1.30	-.25	.58	24.86 (41.47)
Positive Affect	0.01	0.01	.98	0.46 (1.70)	0.36	.12	0.28	.04	.90	26.42 (32.09)
Impairment	0.06	0.02	.92	-1.02 (2.59)	-0.64	.004	-0.61	-.06	.86	17.39 (41.67)
Flourishing	-0.07	-0.14	.46	0.24 (0.06)	0.98	<.001	0.11	.33	.15	5.74 (1.84)
Positive Mental Health	0.15	0.03	.84	1.30 (4.29)	0.63	.002	0.33	.01	.95	36.15 (171.24)
Savoring	0.01	0.05	.80	0.11 (0.02)	0.92	<.001	-0.01	-.10	.70	4.58 (0.89)

Note. Cov = covariance. Treatment was coded iUP+ = 0, UP = 1, The slope (M) represents the

mean of the latent slope, which reflects the average change in the iUP group. The standardized

difference score for the slope, β , represents between-group differences in change. The

standardized covariance (i.e., correlation) of the latent slope and intercept is represented by θ ,

which reflects the association between baseline levels and change in an outcome.

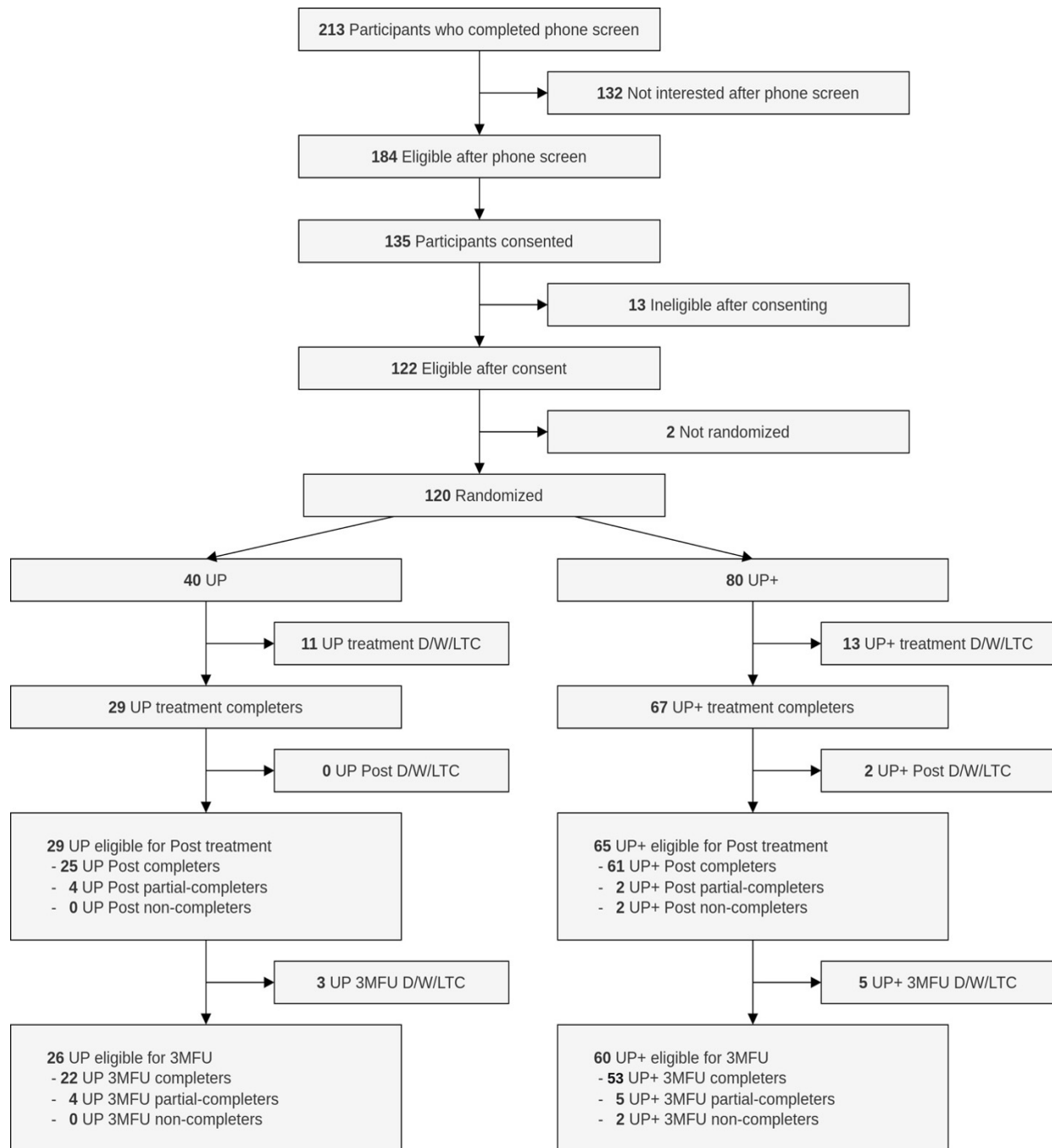


Figure 1

CONSORT flow diagram of participant recruitment, allocation, treatment completion, and follow-up in the randomized trial comparing the Unified Protocol (UP) and the Unified Protocol with positive affect regulation enhancement (UP+). D = dropped, W = withdrawn, LTC = lost to contact; 3MFU = 3-month follow-up.

Appendix: Masked Narrative Description of Prior Use of the Dataset for Reviewers

Data from the same clinical trial described in this manuscript were used in a separate publication, which focused more specifically on the temporal, bidirectional relationship between strengths use and symptom severity (anxiety, depression, and stress), using a random-intercept cross-lagged panel model. Although preliminary ANOVAs were conducted to assess equivalence between treatment groups, the final analyses combined participants across conditions, and the study did not report or interpret treatment outcomes or group comparisons. This manuscript focuses on main treatment outcomes from the clinical trial, including between-group comparisons of two treatment conditions (iUP vs. iUP+), within-group changes across multiple outcomes (e.g., symptom severity, functioning, wellbeing, positive affect), and remission rates. It employs a different analytic strategy, including between- and within-group effect size estimation and latent growth modeling to assess trajectories of change and group differences across time. While some overlapping variables (e.g., anxiety, depression, stress) appear in both papers, the analyses, hypotheses, and scope are distinct. Whereas the prior paper took a more mechanistic approach focused on within-person associations between strengths use and symptoms, the present manuscript provides a comprehensive report of treatment outcomes across a range of clinical and well-being indicators. Due to space limitations, we could not have feasibly included these outcome analyses in the earlier paper, nor would they have aligned with its analytic aims.

Feature	Current Manuscript	Prior Manuscript
Study Design	Randomized controlled trial comparing digital UP conditions (iUP vs. iUP+)	Same RCT sample
Sample Size	N = 120	N = 120
Variables Used	DASS-21 (Anxiety, Depression, Stress), PANAS-X, SBI, MHC-SF, WSAS, Flourish Scale, ADIS-5	DASS-21 (Anxiety, Depression, Stress), Strengths Use Scale
Primary Aim	Evaluate efficacy of the iUP+ vs. iUP on symptoms, functioning, PA, savoring, flourishing, and wellbeing	Examine within-person temporal dynamics between strengths use and symptoms across treatment
Analytic Approach	Between- and within-group effect sizes, remission rates, latent growth models, treatment engagement, attrition	Random-intercept cross-lagged panel modeling
Treatment Effects Reported	Reports condition-level outcomes and trajectories over time	Preliminary ANOVAs to justify collapsing the groups and using the full sample in primary analyses; no condition-level effects modeled
Group Comparisons	Yes — includes between-group comparisons (iUP vs. iUP+)	Preliminary ANOVAs tested equivalence; final models combined groups
Overlap in Measures	DASS-21	DASS-21
Distinct Contribution	Establishes efficacy of UP with and without PA regulation components; evaluates broader set of outcomes and mechanisms	Identifies bidirectional associations between strengths use and symptoms over time

Note. A separate pilot study on the development of the iUP+ was previously published, which informed the present RCT but used a distinct sample and dataset with no participant overlap