# Do Unified Protocol modules exert general or unique effects on anxiety, depression, and transdiagnostic targets?

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## Abstract

Several transdiagnostic cognitive-behavior therapies include multiple treatment components. However, it is unclear whether some components are more efficacious than others at reducing symptoms or whether these components uniquely influence their putative mechanism of change. Participants ($N = 70$; $M_{age} = 33.7$; 67.1% female, 74.3% White) with a primary anxiety or depressive disorder were randomized to one of three standard or personalized sequences of core Unified Protocol modules. Using hierarchical linear modeling, we tested (a) whether the average session-to-session change in anxiety and depression differed between modules and (b) whether the average session-to-session change in the putative mechanism of each module differed between modules. All modules led to similar changes in anxiety, but Confronting Physical Sensations led to significantly less change in depression than other modules. There were no significant differences among modules predicting putative mechanisms of change, although there was a trend for Mindful Emotion Awareness to predict greater improvements in mindfulness than Understanding Emotions. Consistent with its transdiagnostic nature, UP modules may exert similar effects on anxiety and putative mechanisms of change, although interoceptive exposures may be less impactful for changing depressive symptoms and the mindfulness module may promote relatively specific improvements in mindfulness.

Emotional disorders (e.g., anxiety, depressive, obsessive-compulsive, trauma, eating, insomnia, borderline personality, and related disorders) [12] are pervasive, costly, and

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impairing [26,27,31,32]. To date, there are nearly 50 evidence-based treatments for these conditions [21], and meta-analytic findings suggest that cognitive and behavioral therapies (CBTs) result in medium-to-large improvements in anxiety and depressive symptoms [14,28]. However, most of these evidence-based treatments are multi-component packages of therapeutic strategies (e.g., cognitive restructuring, exposure, mindfulness, etc.) delivered and tested in full, rendering it difficult to draw conclusions about the unique effects of each skill on specific outcomes (e.g., anxiety, depression). Given that over 20 million US adults with a mental illness do not receive treatment each year Center for Behavioral Health Statistics and Quality [CBHSQ] [16], in part due to long waitlists for high-quality care, it is necessary to increase the potency and efficiency of existing interventions by testing which therapeutic strategies affect specific outcomes [22,30,54]. By identifying which strategies affect specific outcomes, interventions can be adapted to only include the most impactful strategies for the outcomes that are most relevant to each patient, ensuring that patients receive the most potent intervention that should likely require fewer sessions, thus enhancing the efficiency of care.

Researchers have used broad meta-analytic and intensive longitudinal designs to extract information on the effects of common cognitive-behavioral strategies on anxiety and depressive symptoms from studies of CBT packages. For example, in a component network meta-analysis of CBT techniques for panic disorder, both interoceptive exposure and cognitive restructuring were associated with greater reductions in panic symptoms, whereas in vivo exposure, breathing retraining, muscle relaxation, and virtual reality exposure were associated with smaller reductions in these symptoms [41]. Similarly, in a longitudinal multilevel meta-analysis of mixed anxiety disorders, both exposure therapy and cognitive therapy led to similar improvements in anxiety, regardless of the specific anxiety disorder [40]. Specifically for patients with depression, a component network meta-analysis indicated that cognitive and behavioral interventions led to similar reductions in depressive symptoms relative to treatment-as-usual [34]. Of course, not all studies in these meta-analyses included comparisons of all pairs of therapy strategies examined which may limit the power to explore specific strategy-outcome effects.

Researchers have thus begun to use more intensive longitudinal designs to complement meta-analytic findings. In cognitive therapy for depression, the degree to which therapists used cognitive methods, but not behavioral methods, predicted in-session cognitive change [52], suggesting cognitive methods may exert a relatively specific effect on cognitive change. Similarly, when comparing CBT to acceptance and commitment therapy (ACT) for mixed anxiety disorders, there was a trend for participants to demonstrate greater acceptance at post-treatment and follow-up in ACT than in CBT [3], suggesting the mindfulness and acceptance techniques in ACT may promote acceptance more effectively than the cognitive and behavioral skills from CBT. In two studies of inpatients provided training in self-monitoring, cognitive restructuring, behavioral activation, mindfulness, acceptance, and dialectical behavior therapy (DBT) skills in a group format, greater use of mindfulness predicted improvements in both anxiety and depression, whereas DBT skills predicted reductions in anxiety and behavioral activation predicted reductions in depression [58,59].

Modular interventions [18], treatment packages in which therapeutic components are clearly distinguishable and can be delivered in isolation from each other, may be particularly useful for studying the unique contributions of discrete CBT skills. Specifying if or when each module is delivered allows researchers to test how symptoms and module-relevant processes change in response to the introduction of each therapeutic strategy. The Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (UP[8]) is a modular treatment package designed to treat a range of common mental health conditions by targeting temperamental processes shared among these conditions (e. g., neuroticism, aversive reactivity to emotional experiences, emotion-motivated avoidant coping [5]. The UP represents a useful context in which to explore the unique contributions of specific skills given that its five core modules consist of commonly used cognitive, behavioral, and third-wave strategies [60]. Specifically, the UP includes (1) psychoeducation and self-monitoring,[5] (2) mindful emotion awareness, (3) cognitive flexibility, (4) behavior change skills and in vivo exposure, and (5) interoceptive exposure. As a full package, the UP has led to significant decreases in anxiety and depressive symptoms [13,45], is generally efficacious for the full range of emotional disorders [15,29], and demonstrates improvements that are non-inferior to cognitive-behavior treatments designed for specific emotional disorders [6].

Researchers have also provided preliminary evidence of the relative efficacy of each discrete UP module in addressing anxiety and depression, as well as the specificity of these modules in engaging their component-relevant processes (e.g., does mindful emotion awareness training leader to increased capacity for present-focused, non-judgmental attention?). Evidence from single-case studies suggests the mindfulness and behavior change/exposure modules lead to decreases in anxiety and depression [1,10,48], although, in a larger sample, only cognitive flexibility was significantly associated with decreases in anxiety [49].

When examining the UP modules' effects on targeted psychotherapeutic processes, the mindfulness, cognitive flexibility, and interoceptive exposure modules led to relatively specific improvements in mindfulness [10,47], cognitive flexibility [47] (but cf. [10]), and anxiety sensitivity [11], respectively. By contrast, the psychoeducation/self-monitoring and behavior change/exposure modules have been associated with relatively broad changes in avoidant behaviors, mindfulness, cognitive flexibility, and negative beliefs about emotions [1,10,47,48]. These results suggest certain UP modules lead to symptom change (e.g., Mindful Emotion Awareness, Countering Emotional Behaviors, Cognitive Flexibility) and either relatively specific (e.g., Mindful Emotion Awareness, Cognitive Flexibility, Confronting Physical Sensations) or broad (e.g., Understanding Emotions, Countering Emotional Behaviors) changes in module-relevant processes.

## Current study

Despite the variety of constructs investigated in the UP, the majority of these results are drawn from single-case designs [1,10,47,48], limiting their generalizability. In the only larger study to examine the effects of module-specific mechanisms, all participants received

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[5]Although not identified as a core module in the initial conceptualizations of the UP (e.g., Wilamowska et al. [60]), the developers of the UP have more recently described the Understanding Emotions module, defined by psychoeducation and self-monitoring, as a core module based on clinical experience and empirical data demonstrating its engagement of putative mechanisms of the UP [10,47,5].

the UP modules in the same order described by Barlow et al. [8], conflating module-specific effects with time in treatment. Further, measures of module-specific constructs were measured throughout treatment and were not associated with the delivery of their associated module. Sauer-Zavala et al. [51] recently conducted a sequential multiple assignment randomized trial (SMART) testing personalized sequences of the UP modules relative to the standard, published sequence. Because patients received modules in idiosyncratic orders, it is possible to examine the unique contributions of each module over and above the effect of time in treatment in a larger sample than the preliminary UP module work described above. Thus, we conducted a secondary data analysis of this SMART. Our primary aim was to test whether certain UP modules demonstrated stronger effects on session-to-session changes in anxiety, depression, and module-relevant processes of change than other modules. Our secondary aim was to explore whether each UP module demonstrated relatively targeted or broad effects on symptoms and module-relevant processes of change. Because the UP consists of widely used cognitive-behavioral and mindfulness strategies, testing these questions can ultimately provide insights into how best to optimize transdiagnostic CBT by demonstrating (1) whether certain CBT modules can target specific clinical outcomes or a broad range of outcomes and (2) whether these modules differentially act on their purported mechanism of change.

## Materials and methods

### Participants

The sample was composed of 70 participants with one or more anxiety, depressive, or related disorders defined by the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5 [2]). Participants were an average of 33.7 years old ($SD = 12.6$), with a majority identifying as female ($n = 47$; 67.1%), White ($n = 52$; 74.3%), and heterosexual ($n = 52$; 74.3%), with a median household income between \$50, 000-\$99,999. Potential participants were eligible for the study if they met DSM-5 criteria for at least one of the following disorders: generalized anxiety disorder ($n = 33$; 47.1%), major depressive disorder ($n = 19$; 27.1%), social anxiety disorder ($n = 16$; 22.9%), persistent depressive disorder ($n = 12$; 17.1%), obsessive-compulsive disorder ($n = 5$; 7.1%), panic disorder ($n = 4$; 5.7%), posttraumatic stress disorder ($n = 3$; 4.3%), acute stress disorder ($n = 1$; 1.4%), or agoraphobia ($n = 1$; 1.4%). Participants met criteria for three diagnoses on average ($M = 3.0$, $SD = 1.8$), including premenstrual dysphoric disorder ($n = 12$; 17.1%), body dysmorphic disorder ($n = 7$; 10.0%), specific phobia ($n = 6$; 8.6%), somatic symptom disorder ($n = 6$; 8.6%), binge eating disorder ($n = 4$; 5.7%), hair-pulling disorder ($n = 4$; 5.7%), illness anxiety disorder ($n = 2$; 2.9%), hoarding disorder ($n = 1$; 1.4%), separation anxiety disorder ($n = 1$; 1.4%), and alcohol use disorder ($n = 1$; 1.4%). Potential participants were excluded if they reported symptoms requiring a higher, or different first-line, level of care (i.e., mania in the past year, acute suicidality, substance use disorder in the past three months, or psychotic features); had received at least five sessions of CBT in the past five years; were unwilling to stop concurrent treatment for an emotional disorder; or were unwilling to maintain a stable dosage of medication during study participation.

## Study design

The present study is a secondary data analysis of Sauer-Zavala et al. [51], a sequential multiple assignment randomized trial in which participants were first randomized to receive UP modules in one of three sequences[6]: (1) prioritizing modules that capitalized on patients' relative strengths ($n = 24$; 34.3%), (2) prioritizing modules that compensated for patients' relative deficits ($n = 21$; 30.0%), or (3) the standard published order of the UP modules ($n = 25$; 35.7% [8]). This process resulted in 41 unique sequences of UP modules. Between sessions 5 and 6 (i.e., just before mid-treatment), participants were again randomized to either discontinue treatment after session 6 (Brief treatment condition; $n = 35$; 50.0%) or complete sessions 7–12 (Full treatment condition; $n = 35$; 50.0%). See Sauer-Zavala et al. [51] for a full CONSORT diagram and Fig. S1 for an overview of the study flow. Participants completed the demographics form at a baseline assessment before starting treatment and completed all other measures below no more than 24 h prior to the start of each session via a REDCap link sent by their therapist. The study was approved by the local Institutional Review Board, all participants provided informed consent before engaging in any study procedures, and study procedures were carried out in accordance with the provisions of the World Medical Association Declaration of Helsinki (6th Revision).

## Study treatment

Participants received up to five core modules of the UP, each of which consisted of two 50–60 min individual sessions once per week with the exception of Countering Emotional Behaviors, which was delivered over four sessions once per week. Participants were randomized to either receive 6 or 12 total sessions so the total number of modules received ranged from two to five. Four therapists (a licensed clinical psychologist, a post-doctoral fellow, and two advanced clinical psychology graduate students; two men, two women), certified in the UP, provided the treatment. All sessions were audio recorded, and 20% were rated for competence (i.e., fidelity to the treatment protocol and therapeutic skill) on a 5-point scale. Therapists demonstrated relatively high levels of competence ($M = 4.26$, $SD = .54$). The treatment led to medium-to-large sized reductions in anxiety ($d$s: .53–.59) and depression ($d$s: .51–.65) across 6 and 12 sessions, with just over half ($n = 37$; 52.9%) of participants demonstrating clinically significant responses [51], in line with meta-analytic findings [57]. Of note, there were no significant differences in these outcomes among treatment sequencing or duration conditions, $p$s > .30 [51], so we collapsed across conditions in the current analyses.

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[6]Before the first session, participants completed measures of the module-relevant processes of change described in the Measures section below. Participants' scores on these measures were converted to $z$-scores based on a large reference dataset [46], rank-ordered from largest to smallest within each patient, and labeled with the relevant module. For instance, if a participant's highest $z$-score was on the Beliefs about Emotions Scale, this would be labeled as Understanding Emotions. Participants randomized to the strengths-based sequence received modules in order of $z$-scored modules from largest to smallest. Those randomized to the deficits-based sequence received modules in order of $z$-scored modules from smallest to largest. By contrast, those randomized to the standard condition received modules in the order described by Barlow et al. [8]. Of note, we found no significant differences in changes in anxiety, depression, or clinical severity based on module sequencing condition, $p$s > .30 [51].

### Measures

**Demographics**—Participants first completed a demographics form at the baseline assessment. They self-reported their age, gender, racial background, sexual orientation, family income, and level of education.

### Symptoms

**Overall Anxiety Severity and Impairment Scale.:** The Overall Anxiety Severity and Impairment Scale (OASIS [39]) is a 5-item self-report measure designed to assess both the intensity of and impairment due to anxiety symptoms over the past week. Items are rated from 0 to 4 with unique anchors for each item and summed to create a total score. OASIS items demonstrated acceptable-to-excellent internal consistency across all sessions (McDonald's omegas [ωs]: .79–.90).

**Overall Depression Severity and Impairment Scale.:** The Overall Depression Severity and Impairment Scale (ODSIS [9]) is a 5-item self-report measure designed to assess both the intensity of and impairment due to depression symptoms over the past week. Items are rated from 0 to 4 with unique anchors for each item and summed to create a total score. ODSIS items demonstrated excellent internal consistency across all sessions (ωs: .92–.95).

### Module-relevant processes of change

**Anxiety Sensitivity Index.:** The Anxiety Sensitivity Index (ASI [43]) is a 16-item self-report measure designed to assess a person's beliefs about the somatic consequences of anxiety symptoms, a process of change related to the Confronting Physical Sensations module. Items are rated from 0 (*very little*) to 4 (*very much*) and summed to create a total score. ASI items demonstrated good internal consistency across all sessions (ωs: .83–.89).

**Beliefs about Emotions Scale.:** The Beliefs about Emotions Scale (BES [44]) is a 12-item self-report measure designed to assess the degree to which people believe experiencing or expressing negative emotions is unacceptable, a process of change related to the Understanding Emotions module. Items are rated from 0 (*totally disagree*) to 6 (*totally agree*) and summed to create a total score. BES items exhibited good-to-excellent internal consistency across all sessions (ωs: .89–.95).

**Multidimensional Experiential Avoidance Questionnaire-Behavioral Avoidance subscale.:** The Multidimensional Experiential Avoidance Questionnaire-Behavioral Avoidance subscale (MEAQ-BA [25]) is an 11-item self-report measure designed to assess the degree to which people engage in overt, situational avoidance of distressing emotions or situations, a process of change related to the Countering Emotional Behaviors module. Items are rated from 1 (*strongly disagree*) to 6 (*strongly agree*) and summed to create a total score. MEAQ-BA items demonstrated excellent internal consistency across all sessions (ωs: .92–.95).

**Southampton Mindfulness Questionnaire.:** The Southampton Mindfulness Questionnaire (SMQ [17]) is a 16-item self-report measure designed to assess the degree to which people respond with nonjudgmental awareness to distressing thoughts or images, a process of

change related to the Mindful Emotion Awareness module. Items are rated from 0 (*disagree totally*) to 6 (*agree totally*) and summed to create a total score. SMQ items demonstrated good-to-excellent internal consistency across all sessions (ωs: .86–.96).

**<u>Unified Protocol – Cognitive Skills Questionnaire.:</u>** The Unified Protocol – Cognitive Skills Questionnaire (UP-CSQ [47]) is a 7-item self-report measure designed to assess the frequency with which people used the cognitive skills taught in the UP over the past week, a process of change related to the Cognitive Flexibility module. Items are rated from 1 (*never*) to 5 (*always or when needed*) and summed to create a total score. UP-CSQ items demonstrated good-to-excellent internal consistency across all sessions (ωs :.87–.94).

## Data analytic method

We first examined descriptive statistics of the frequency and timing of UP modules. Given that not all participants received every module, we tested for differences both in demographic characteristics and session 1 symptom severity between participants who received each module and those who did not using a series of *t*-tests for continuous variables, Wilcoxon-Mann-Whitney *U* tests for ordinal variables, and chi-squared tests for dichotomous variables. We tested for differences in the average session at which each module was delivered using hierarchical linear modeling (HLM) in *proc mixed* from SAS Version 9.4. Using only the first session at which each module was delivered for each participant, we entered a dummy-coded indicator variable representing module as a predictor of session number. We used restricted maximum likelihood estimation, included random intercepts and slopes, and used the Kenward-Roger method to calculate denominator degrees of freedom. Finally, we explored whether there were differences in levels of symptoms and module-relevant processes of change at the start of each module. In a series of HLMs, we entered the dummy-coded indicator variable representing module as a predictor of each outcome of interest using the same random effects and model specifications as in the previous HLM. To control our Type I error rate for these analyses, we examined the omnibus Type 3 Joint Tests of Fixed Effects and followed up any significant omnibus tests by examining specific contrasts between modules.

To test our primary aim, we conducted a series of HLMs to compare session-to-session changes[7] in symptoms and module-relevant processes of change among the five core UP modules. Because participants completed all self-report measures prior to the start of each session, we entered next-session (i.e., time $t+1$) symptoms or processes of change as the dependent variable in all models. To assess residualized change in these outcomes, we entered current-session (i.e., time $t$) symptoms or processes of change as a predictor. We included a dummy-coded UP module indicator variable to test our primary hypotheses regarding differences in residualized change in our outcomes of interest by module. Because UP modules were delivered at different points in treatment for different participants and changes in symptoms [38] and processes of change [55] tend to occur

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[7]We tested session-to-session changes because not all modules were delivered for the same number of sessions and because we had no a priori hypotheses about how quickly certain modules would influence change in each outcome. Testing session-to-session changes thus allows for an estimate of the average change per session that occurs in each module, making these estimates more directly comparable between modules.

relatively early in treatment, we also entered session number at time *t* as a predictor. Finally, we included a dummy-coded therapist indicator variable to account for therapist effects[8] and a dummy-coded sequencing condition indicator variable to account for any effects of participants' randomly assigned sequencing condition. We applied restricted maximum likelihood estimation with random intercepts, an autoregressive lag-1 residual covariance structure given the temporal structure of the data, and the Kenward-Roger method to calculate degrees of freedom. The full model is demonstrated with OASIS scores in the following equation:

$$OASIS_{i+1,j} = \gamma_{00} + \gamma_{10}(OASIS_{ij}) + \gamma_{20}(UP\ module_{ij}) + \gamma_{30}(session_{ij}) + \gamma_{01}(therapist_j) + \gamma_{02}(seq\ condition_j) + e_{ij}$$

To evaluate the appropriateness of these modeling choices for the distribution of each outcome variable and to avoid overfitting, we compared this base model to several alternative models using the Aikaike Information Criterion (AIC): (1) the base model with an additional fixed quadratic effect of session, $\gamma_{40}(session^2_{ij})$; (2) model (1) with an additional fixed cubed effect of session, $\gamma_{50}(session^3_{ij})$; (3) the base model without between-person $\gamma_{01}(therapist_j)$ and $\gamma_{02}(seq\ condition_j)$ terms; (4) the base model with random intercepts and slopes but without the autoregressive lag-1 residual covariance structure (Table S1). We retained and interpreted the model with the lowest AIC of these five options.

To test our secondary aim and characterize the size of these effects, we calculated Cohen's *d* statistics, using the parameters from each HLM above, to estimate the average session-to-session change in each outcome resulting from each module [24]. In all models, we used the *ggeffects* package [35] in *R* Version 4.1.0 [42] to estimate the predicted next-session score and 95% confidence interval of each outcome, assuming the sample mean for that symptom or process at session 1 as the starting value. We calculated Cohen's *d* for each outcome by dividing the difference between the predicted next-session score and the sample mean at session 1 by the sample standard deviation of the symptom or process at session 1.

We used an extension of the simulation methods described by Lane and Hennes [33] to calculate our power to detect the omnibus Type 3 Joint Tests of Fixed Effects (see https://doi.org/10.17605/osf.io/rh7yu for full code). Because the omnibus test is used to compare differences in each module to the average across modules, it is more powerful when there is more variability in scores among modules. Thus, we conducted two sets of power analyses: (1) one in which there was relatively low variability among modules (i.e., only the reference module differs from the others) and (2) one in which there was relatively greater variability among modules (i.e., two modules are higher and two modules are lower than the reference module). Assuming relatively low variability among modules (i.e., 4 of 5 modules led to similar changes in outcomes and only the reference module differed), we had 80% power to detect a difference of +/− 1.1 points on the OASIS (*d* =.31), +/− .90 points on the ODSIS (*d* =.19), and +/− 1.0 points on the ASI (*d* =.09), BES (*d* =.09), MEAQ-BA (*d* =.09), SMQ (*d* =.07), and UP-CSQ (*d* =.19). Assuming relatively higher variability among modules (i.e.,

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[8]We included a fixed-effects therapist indicator variable to account for therapist effects rather than a random effect of therapists because modeling four therapists as fixed effects may produce less biased parameter estimates than modeling them as random effects [36], although we note how this strategy limits the generalizability of our results.

two modules led to greater reductions and two modules led to greater increases than the reference module, we had 80% power to detect differences of +/−.45 points on the OASIS ($d$ =.13), + / − .55 points on the ODSIS ($d$=.12), and +/− .40 points on the ASI ($d$=.03), BES ($d$=.03), MEAQ-BA ($d$=.04), SMQ ($d$=.03), and UP-CSQ ($d$=.08).

## Results

### Descriptive statistics

Due to the second-stage randomization of the parent study and participant dropout, not all participants received all modules. Most participants received Cognitive Flexibility ($n$ = 52) or Understanding Emotions ($n$ = 52), followed by Mindful Emotion Awareness ($n$ = 49), Countering Emotional Behaviors ($n$ = 40), and Confronting Physical Sensations ($n$ = 40). There were no significant differences between participants who did or did not receive each of these modules in age, gender, racial background, sexual orientation, income, or education level, $p$s > .10 (Table 1). Similarly, there were no significant differences in anxiety or depression at session 1 between participants who did or did not receive each module, $p$s .10 (Table 1).

Given that it is designed to last four sessions instead of two, Countering Emotional Behavior sessions occurred most frequently ($n$ = 152; 28.4%), followed by Cognitive Flexibility ($n$ = 104; 19.4%), Understanding Emotions ($n$ = 103; 19.2%), Mindful Emotion Awareness ($n$ = 98; 18.3%), and Confronting Physical Sensations ($n$ = 79; 14.7%). Patients did not complete 87 possible sessions (13.9%), and there were no consistent patterns in the last module participants completed before discontinuing: Understanding Emotions ($n$ = 3), Mindful Emotion Awareness ($n$ = 1), Cognitive Flexibility ($n$ = 1), Countering Emotional Behaviors ($n$ = 2), Confronting Physical Sensations ($n$ = 1). There were significant differences in when modules were delivered, $F(4, 504)$ = 11.04, $p$ < .01 (Fig. S2). Understanding Emotions and Mindful Emotion Awareness tended to occur earlier than all other modules, $p$s < .02, and Countering Emotional Behaviors tended to occur earlier than Confronting Physical Sensations, $B = −1.08$, $SE = .43$, $p = .01$, 95% CI [−1.92, −.24]. There were no significant differences between the timing of Cognitive Flexibility and Countering Emotional Behaviors, $B = −.24$, $SE = .40$, $p = .55$, 95% CI [−1.02,.54], or Confronting Physical Sensations, $B = .84$, $SE = .46$, $p = .07$, 95% CI [−.06, 1.74].

Despite these differences in module timing, there were no significant differences among modules in the average severity of anxiety or depression at the start of each module, $F$s < .60, $p$s > .70 (Table 2). Similarly, there were no significant differences in module-relevant processes of change at the start of each module, $F$s < 2.15, $p$s > .05, except for mindfulness, $F(4, 175)$ = 2.79, $p = .03$. Participants tended to report greater mindfulness abilities at the start of Cognitive Flexibility, $B = 7.21$, $SE = 2.35$, $p < .01$, 95% CI [2.58, 11.85], Countering Emotional Behaviors, $B = 5.89$, $SE = 2.57$, $p = .02$, 95% CI [.82, 10.95], and Confronting Physical Sensations, $B = 5.31$, $SE = 2.52$, $p = .04$, 95% CI [.33, 10.29], than at the start of Mindfulness (Table 2).

### Primary aim: differences between UP modules in predicting session-to-session changes

**Symptoms**—All modules led to small-sized session-to-session changes in anxiety ($d$s: .04–.21; Table 3), and there were no significant differences between modules, $F(4, 224) = 1.00$, $p = .41$ (Table S2). However, as depicted in Fig. 1, the Understanding Emotions module led to numerically larger decreases in anxiety than the other modules, $B$s: .54–.63, $p$s: .08–.20. By contrast, there were significant differences between modules when predicting session-to-session changes in depression, $F(4, 251) = 2.76$, $p = .03$ (Table S3). All modules led to significantly larger decreases in depression than Confronting Physical Sensations, $B$s: −1.45–−.90, $p$s: .01–.045 (Fig. 1). All modules except Confronting Physical Sensations led to small-to-medium sized decreases in depression ($d$s: .12–.24; Table 3).

**Module-relevant processes of change**—The omnibus test comparing session-to-session change in mindfulness in each module to the grand mean was not significant, $F(4, 272) = 1.77$, $p = .14$ (Table S4). However, there was some evidence that the Mindful Emotion Awareness, $B = 2.21$, $SE = 1.07$, $p = .04$, 95% CI [.11, 4.31], module led to greater increases in mindfulness than the Understanding Emotions module. All modules except Understanding Emotions led to small sized changes in mindfulness ($d$s: −.02–.14; Table 3; Fig. 2).

Similarly, there were no significant differences among modules in predicting improvements in cognitive flexibility, $F(4, 266) = .64$, $p = .63$ (Table S5). When examining specific modules, the Cognitive Flexibility and Mindful Emotion Awareness modules led to small-sized effects ($d$s: .21–.24; Table 3). All other modules led to very small-to-small sized effects ($d$s: .13–.15; Table 3).

All modules led to nearly identical reductions in negative beliefs about emotions, $F(4, 247) = .16$, $p = .96$ (Table S6), anxiety sensitivity, $F(4, 272) = .29$, $p = .88$ (Table S7), and behavioral avoidance, $F(4, 283) = .57$, $p = .69$ (Table S8). The effects on negative beliefs about emotions ($d$s: .16–.20; Table 3) and anxiety sensitivity ($d$s: .12–.17; Table 3) were generally small-sized, whereas the effects on behavioral avoidance were generally very small-sized ($d$s: .01–.10; Table 3).

### Secondary aim: differences within UP modules in predicting session-to-session changes

**Symptoms**—When examining effect size estimates, Understanding Emotions led to similar session-to-session reductions in both anxiety and depressive symptoms (Understanding Emotions column, Table 3). By contrast, Mindful Emotion Awareness, Cognitive Flexibility, and Countering Emotional Behaviors led to numerically larger reductions in depression than anxiety and Confronting Physical Sensations led to numerically larger reductions in anxiety than depression, although all confidence intervals overlapped.

**Module-relevant processes of change**—Understanding Emotions led to nearly identical improvements in most module-relevant processes of change (Understanding Emotions column, Table 3). Mindful Emotion Awareness led to numerically larger improvements in cognitive flexibility than behavioral avoidance but similar levels of change

as other processes. Cognitive Flexibility also led to numerically larger improvements in cognitive flexibility than behavioral avoidance and similar levels of change in other processes. There was some evidence that Countering Emotional Behaviors led to numerically larger improvements in negative beliefs about emotions than behavioral avoidance and mindfulness but similar levels of change in other processes. Finally, Confronting Physical Sensations led to numerically larger improvements in negative beliefs about emotions than behavioral avoidance, with similar levels of change in other processes.

## Discussion

In this study, we tested whether core modules from the UP differentially predicted session-to-session changes in anxiety, depression, and processes of change relevant to each module. In general, we found little evidence that UP modules exerted differential effects on these outcomes. However, Confronting Physical Sensations produced less robust improvements in depression than all other modules, and there was some evidence that Mindful Emotion Awareness predicted greater increases in mindfulness than Understanding Emotions. Similarly, most modules exerted relatively broad effects on symptoms and processes of change, with Mindful Emotion Awareness and Cognitive Flexibility demonstrating theoretically consistent effects on module-specific targets and all other modules demonstrating novel effects.

We found no significant differences among modules in predicting changes in anxiety, suggesting that all UP modules led to similarly-sized reductions in anxiety, consistent with Podina et al.'s [40] longitudinal multilevel meta-analysis. Although there is some visual evidence that Understanding Emotions may exert a somewhat stronger effect than the other modules, this difference was not statistically significant. Our results contrast somewhat with those of Pompoli et al. [41] and Webb et al. [58,59], which suggests our results may not generalize to panic disorder specifically or to inpatients, although we encourage replication in these areas.

There were significant differences between modules when predicting changes in depression. The Confronting Physical Sensations led to smaller decreases in depression than all other modules, which suggests that interoceptive exposures may be unnecessary when targeting depression among outpatients with emotional disorders. Although not significantly different, Mindful Emotion Awareness led to the numerically largest improvements in depression, in line with Webb et al. [58, 59] (cf. Bai et al. [4]), suggesting it may be a particularly potent component. There was also some evidence that Mindful Emotion Awareness may be more efficacious for depression than anxiety, although future researchers should replicate this finding.

Across module-specific processes, there was only a marginally significant difference between modules when predicting changes in mindfulness, with Mindful Emotion Awareness predicting greater improvements in mindfulness than Understanding Emotions. This novel finding is in line with results from single-case studies [10,47] and suggests that mindfulness skills target mindfulness somewhat more specifically than simply tracking the associations among one's thoughts, emotions, and behaviors. However, because the joint

test across all modules was non-significant, these results highlight that Mindful Emotion Awareness demonstrates some degree of specificity in promoting mindfulness, but all UP modules lead to some improvements in mindfulness in line with the aim of the UP [8].

Similarly, there were no other between-module differences in processes of change. These findings suggest all UP modules lead to similar levels of change in cognitive flexibility, negative beliefs about emotions, behavioral avoidance, and anxiety sensitivity. The lack of differences across these processes may reflect that all of these processes, including mindfulness, are thought to be specific instantiations of aversive reactions to negative emotions [12,5,50,53,7]. In this model of emotional disorders, elevated levels of neuroticism (i.e., more frequent experiences of negative emotions) are thought to transact with aversive reactions to negative emotions to lead to avoidant behavioral responses that are expressed as symptoms of emotional disorders (e.g., rumination, compulsions, self-harm, etc. [7]. The UP has been theorized to treat neuroticism across emotional disorders by reducing patients' aversive reactions to and emotion-driven avoidant coping with their negative emotions [5,50]. These results may thus suggest that all UP modules exert similar effects on several aspects of this holistic process of change, apart from mindfulness.

Alternatively, it is possible that the measures used were not distinct enough to indicate differential change by module or that we were underpowered to detect differential effects by module. The measures used in this study were developed independently across nearly 30 years, reducing the likelihood that they share a common developmental process. Future researchers may assess the factor structure of these measures to determine if certain items represent a core of aversive reactivity while others indicate more specific factors that may be uniquely impacted by certain UP modules. Second, the largest difference in effect sizes between modules in processes of change was $d = .21$, a small-sized effect similar to the suggested smallest effect size of interest in clinical trials [19]. Thus, even with greater power to detect smaller effects, these differences between modules may not be clinically meaningful.

When comparing effects within each module, we found limited evidence of specificity. Relative to behavioral avoidance, both Mindful Emotion Awareness and Cognitive Flexibility led to greater changes in cognitive flexibility, and both Countering Emotional Behaviors and Confronting Physical Sensations led to greater changes in negative beliefs about emotions. Together, these findings suggest that behavioral avoidance demonstrates relatively small changes in response to UP modules and that Cognitive Flexibility exerts a relatively specific effect on its module-relevant processes, whereas all other modules are somewhat more broad and non-targeted in their effects in line with previous work [47]. Given the exploratory nature of these findings, we do not wish to overinterpret them, although we encourage future researchers to continue to compare changes in constructs beyond symptoms both between and within modules to better characterize the process of change in treatment.

These results should be considered in light of this study's limitations. Our results are most applicable to outpatients with mixed anxiety and depressive disorders and may not generalize as well beyond this context. We encourage future researchers to explore ways of

distinguishing patients who would respond to common factors from those who may benefit more from module-specific content [20], as these results may be most applicable to the latter patients. Although two-thirds of participants received modules in a personalized order, the standard order of UP module presentation was overrepresented which may have biased our results in favor of modules delivered earlier in treatment. We encourage future researchers to present fully randomized orders of modules to participants. Due to the second-stage randomization and somewhat differential patterns of dropout, not all participants received all 12 sessions of treatment, reducing our power to detect effects. Alternatively, differential dropout and levels of engagement in different modules, which we did not assess, could have contributed to a lack of differences among modules since different patients may have engaged in different modules to greater or lesser degrees. We encourage future researchers to assess engagement via homework completion and therapist reports and to explore whether certain patient characteristics predict engagement in particular modules. Because modules were not delivered in isolation, it is possible that earlier modules could have had carry-over or delayed effects on later modules, confounding these results. Given the relatively high competence demonstrated by therapists, we believe it is less likely that explicit content from different modules was presented during other modules, but we encourage future researchers to replicate these effects with standalone modules. Finally, although we explored within-module comparisons using confidence intervals of effect sizes, these estimates may be overly conservative or limited in their interpretability [61] so we encourage future researchers to adapt more directly comparable measures in future work.

Despite these limitations, this is the largest study to our knowledge to directly compare effects of UP modules presented in varied orders. We have provided preliminary evidence that Confronting Physical Sensations is less indicated for treating depressive symptoms; that Mindful Emotion Awareness may promote greater improvements in mindfulness than Understanding Emotions; but that, in general, UP modules exert similar effects on anxiety and other processes of change [56]. Clinically, these results suggest that providers targeting anxiety with patients may apply UP modules in different orders that may better suit the patient's or provider's preferences since they are likely to lead to similar reductions in anxiety. Providers targeting depression may apply any core UP modules except Confronting Physical Sensations, which may help streamline care. Similarly, providers may expect improvements across skill domains regardless of the module delivered, which may suggest that the UP modules exert broader mechanistic effects than previously expected [23]. However, providers who aim to improve patients' mindfulness abilities may give preference to the Mindful Emotion Awareness module over the Understanding Emotions module. These results contribute to our understanding of not only which components of treatment are most efficacious but also which processes they influence, allowing researchers to continue unpacking the black box of therapy [37].

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

## References

[1]. Altman AD, Shapiro LA, Fisher AJ. Why does therapy work? An idiographic approach to explore mechanisms of change over the course of psychotherapy using digital assessments. Front Psychol 2020;11:782. 10.3389/fpsyg.2020.00782. [PubMed: 32390922]

[2]. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). 10.1176/appi.books.9780890425596.

[3]. Arch J, Eifert GH, Davies C, Plumb Vilardaga JC, Rose RD, Craske MG. Randomized clinical trial of cognitive behavioral therapy (CBT) versus acceptance and commitment therapy (ACT) for mixed anxiety disorders. J Consult Clin Psychol 2012;80(5):750–65. 10.1037/a0028310. [PubMed: 22563639]

[4]. Bai Z, Luo S, Zhang L, Wu S, Chi I. Acceptance and commitment therapy (ACT) to reduce depression: a systematic review and meta-analysis. J Affect Disord 2020; 260:728–37. 10.1016/j.jad.2019.09.040. [PubMed: 31563072]

[5]. Barlow DH, Curreri AJ, Woodard LS. Neuroticism and disorders of emotion: a new synthesis. Curr Dir Psychol Sci 2021;30(5):410–7. 10.1177/09637214211030253.

[6]. Barlow DH, Farchione TJ, Bullis JR, Gallagher MW, Murray-Latin H, Sauer-Zavala S, et al. The unified protocol for transdiagnostic treatment of emotional disorders compared with diagnosis-specific protocols for anxiety disorders: a randomized clinical trial. JAMA Psychiatry 2017;74(9):875–84. 10.1001/jamapsychiatry.2017.2164. [PubMed: 28768327]

[7]. Barlow DH, Sauer-Zavala S, Carl JR, Bullis JR, Ellard KK. The nature, diagnosis, and treatment of neuroticism: back to the future. Clin Psychol Sci 2014;2(3): 344–65. 10.1177/2167702613505532.

[8]. Barlow DH, Sauer-Zavala S, Farchione TJ, Murray Latin H, Ellard KK, Bullis JR, et al. Unified protocol for transdiagnostic treatment of emotional disorders. 2nd ed..,. Oxford University Press,; 2018.

[9]. Bentley KH, Gallagher MW, Carl JR, Barlow DH. Development and validation of the overall depression severity and impairment scale. Psychol Assess 2014;26(3): 815–30. 10.1037/a0036216. [PubMed: 24708078]

[10]. Boswell JF, Anderson LM, Barlow DH. An idiographic analysis of change processes in the unified transdiagnostic treatment of depression. J Consult Clin Psychol 2014; 82(6):1060–71. 10.1037/a0037403. [PubMed: 25045911]

[11]. Boswell JF, Farchione TJ, Sauer-Zavala S, Murray HW, Fortune MR, Barlow DH. Anxiety sensitivity and interoceptive exposure: a transdiagnostic construct and change strategy. Behav Ther 2013;44(3):417–31. 10.1016/j.beth.2013.03.006. [PubMed: 23768669]

[12]. Bullis JR, Boettcher H, Sauer-Zavala S, Farchione TJ, Barlow DH. What is an emotional disorder? A transdiagnostic mechanistic definition with implications for assessment, treatment, and prevention. Clin Psychol Sci Pract 2019;26(2):e12278. 10.1111/cpsp.12278.

[13]. Carlucci L, Saggino A, Balsamo M. On the efficacy of the unified protocol for transdiagnostic treatment of emotional disorders: a systematic review and meta-analysis. Clin Psychol Rev 2021;87:101999. 10.1016/j.cpr.2021.101999. [PubMed: 34098412]

[14]. Carpenter JK, Andrews LA, Witcraft SM, Powers MB, Smits J, Hofmann SG. Cognitive behavioral therapy for anxiety and related disorders: a meta-analysis of randomized placebo-controlled trials. Depress Anxiety 2018;35(6):502–14. 10.1002/da.22728. [PubMed: 29451967]

[15]. Cassiello-Robbins C, Southward MW, Tirpak JW, Sauer-Zavala S. A systematic review of unified protocol applications with adult populations: facilitating widespread dissemination via adaptability. Clin Psychol Rev 2020;78:101852. 10.1016/j.cpr.2020.101852. [PubMed: 32360953]

[16]. Center for Behavioral Health Statistics and Quality. 2015 National survey on drug use and health: Detailed tables. Rockville, MD: Substance Abuse and Mental Health Services Administration,; 2016.

[17]. Chadwick P, Hember M, Symes J, Peters E, Kuipers E, Dagnan D. Responding mindfully to unpleasant thoughts and images: reliability and validity of the Southampton Mindfulness Questionnaire (SMQ). Br J Clin Psychol 2008;47(Pt 4): 451–5. 10.1348/014466508x314891. [PubMed: 18573227]

[18]. Chorpita BF, Daleiden EL, Weisz JR. Modularity in the design and application of therapeutic interventions. Appl Prev Psychol 2005;11(3):141–56. 10.1016/j.appsy.2005.05.002.

[19]. Cuijpers P, Turner EH, Koole SL, van Dijke A, Smit F. What is the threshold for a clinically relevant effect? The case of major depressive disorders. Depress Anxiety 2014;31(5):374–8. 10.1002/da.22249. [PubMed: 24677535]

[20]. DeRubeis RJ, Gelfand LA, German RE, Fournier JC, Forand NR. Understanding processes of change: how some patients reveal more than others-and some groups of therapists less-about what matters in psychotherapy. Psychother Res 2014;24 (3):419–28. 10.1080/10503307.2013.838654. [PubMed: 24219275]

[21]. Division 12 of the American Psychological Association. (2016). Psychological treatments. Retrieved July 25, 2021. 〈https://div12.org/treatments/〉.

[22]. Doss BD. Changing the way we study change in psychotherapy. Clin Psychol Sci Pract 2004;11(4):368–86. 10.1093/clipsy.bph094.

[23]. Elhusseini S, Cravens LE, Southward MW, Sauer-Zavala S. Associations between improvements in aversive reactions to negative emotions and increased quality of life in the Unified Protocol. J Behav Cogn Ther 2022;32(1):25–32. 10.1016/j.jbct.2021.12.001.

[24]. Feingold A Confidence interval estimation for standardized effect sizes in multilevel and latent growth modeling. J Consult Clin Psychol 2015;83(1):157–68. 10.1037/a0037721. [PubMed: 25181028]

[25]. Gámez W, Chmielewski M, Kotov R, Ruggero C, Watson D. Development of a measure of experiential avoidance: the multidimensional experiential avoidance questionnaire. Psychol Assess 2011;23(3):692–713. 10.1037/a0023242. [PubMed: 21534697]

[26]. GBD 2015 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 2016;388(10053):1603–58. 10.1016/S0140-6736(16)31460-X. [PubMed: 27733283]

[27]. Greenberg PE, Fournier AA, Sisitsky T, Pike CT, Kessler RC. The economic burden of adults with major depressive disorder in the United States (2005 and 2010). J Clin Psychiatry 2015;76(2):155–62. 10.4088/JCP.14m09298. [PubMed: 25742202]

[28]. Hofmann SG, Asnaani A, Vonk IJ, Sawyer AT, Fang A. The efficacy of cognitive behavioral therapy: a review of meta-analyses. Cogn Ther Res 2012;36(5):427–40. 10.1007/s10608-012-9476-1.

[29]. Hood CO, Southward MW, Bugher C, Sauer-Zavala S. A preliminary evaluation of the Unified Protocol among trauma-exposed adults with and without PTSD. Int J Environ Res Public Health 2021;18(21):11729. 10.3390/ijerph182111729. [PubMed: 34770243]

[30]. Kazdin AE. Mediators and mechanisms of change in psychotherapy research. Annu Rev Clin Psychol 2007;3:1–27. 10.1146/annurev.clinpsy.3.022806.091432. [PubMed: 17716046]

[31]. Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 2005;62(6):617–27. 10.1001/archpsyc.62.6.617. [PubMed: 15939839]

[32]. Konnopka A, König H. Economic burden of anxiety disorders: a systematic review and meta-analysis. PharmacoEconomics 2020;38(1):25–37. 10.1007/s40273-019-00849-7. [PubMed: 31646432]

[33]. Lane SP, Hennes EP. Power struggles: estimating sample size for multilevel relationships research. J Soc Pers Relatsh 2018;35(1):7–31. 10.1177/0265407517710342.

[34]. López-López JA, Davies SR, Caldwell DM, Churchill R, Peters TJ, Tallon D, et al. The process and delivery of CBT for depression in adults: a systematic review and network meta-analysis. Psychol Med 2019;49(12):1937–47. 10.1017/S003329171900120X. [PubMed: 31179960]

[35]. Lüdecke D ggeffects: tidy data frames of marginal effects from regression models. J Open Source Softw 2018;3(26):772. 10.21105/joss.00772.

[36]. McNeish D, Stapleton LM. Modeling clustered data with very few clusters. Multivar Behav Res 2016;51(4):495–518. 10.1080/00273171.2016.1167008.

[37]. Mulder R, Murray G, Rucklidge J. Common versus specific factors in psychotherapy: opening the black box. Lancet Psychiatry 2017;4(12):953–62. 10.1016/S2215-0366(17)30100-1. [PubMed: 28689019]

[38]. Niileksela CR, Ghosh A, Janis RA. The dose–effect and good enough level models of change for specific psychological concerns. J Consult Clin Psychol 2021;89(3): 200–13. 10.1037/ccp0000635. [PubMed: 33829808]

[39]. Norman SB, Cissell SH, Means-Christensen AJ, Stein MB. Development and validation of an Overall Anxiety Severity and Impairment Scale (OASIS. Depress Anxiety 2006;23(4):245–9. 10.1002/da.20182. [PubMed: 16688739]

[40]. Podina IR, Vîsl A, Fodor LA, Flückiger C. Is there a sleeper effect of exposure-based vs. cognitive-only intervention for anxiety disorders? A longitudinal multilevel meta-analysis. Clin Psychol Rev 2019;73:101774. 10.1016/j.cpr.2019.101774. [PubMed: 31707183]

[41]. Pompoli A, Furukawa TA, Efthimiou O, Imai H, Tajika A, Salanti G. Dismantling cognitive-behaviour therapy for panic disorder: a systematic review and component network meta-analysis. Psychol Med 2018;48(12):1945–53. 10.1017/S0033291717003919. [PubMed: 29368665]

[42]. R Core Team. R: A language and environment for statistical computing (Version 4.1.0) [Software] R Foundation for Statistical Computing,; 2021. 〈https://www.R-project.org/〉 .

[43]. Reiss S, Peterson RA, Gursky DM, McNally RJ. Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. Behav Res Ther 1986;24(1):1–8. 10.1016/0005-7967(86)90143-9. [PubMed: 3947307]

[44]. Rimes KA, Chalder T. The beliefs about emotions scale: validity, reliability and sensitivity to change. J Psychosom Res 2010;68(3):285–92. 10.1016/j.jpsychores.2009.09.014. [PubMed: 20159215]

[45]. Sakiris N, Berle D. A systematic review and meta-analysis of the Unified Protocol as a transdiagnostic emotion regulation based intervention. Clin Psychol Rev 2019; 72:101751. 10.1016/j.cpr.2019.101751. [PubMed: 31271848]

[46]. Sauer-Zavala S, Cassiello-Robbins C, Ametaj AA, Wilner JG, Pagan D. Transdiagnostic treatment personalization: the feasibility of ordering Unified Protocol modules according to patient strengths and weaknesses. Behav Modif 2019;43(4):518–43. 10.1177/0145445518774914. [PubMed: 29742904]

[47]. Sauer-Zavala S, Cassiello-Robbins C, Conklin LR, Bullis JR, Thompson-Hollands J, Kennedy KA. Isolating the unique effects of the Unified Protocol treatment modules using single case experimental design. Behav Modif 2017;41(2):286–307. 10.1177/0145445516673827. [PubMed: 28198196]

[48]. Sauer-Zavala S, Cassiello-Robbins C, Woods BK, Curreri A, Wilner Tirpak J, Rassaby M. Countering emotional behaviors in the treatment of borderline personality disorder. Personal Disord Theory Res, Treat 2020;11(5):328–38. 10.1037/per0000379.

[49]. Sauer-Zavala S, Rosellini AJ, Bentley KH, Ametaj AA, Boswell JF, Cassiello-Robbins C, et al. Skill acquisition during transdiagnostic treatment with the Unified Protocol. Behav Ther 2021;52(6):1325–38. 10.1016/j.beth.2021.03.001. [PubMed: 34656189]

[50]. Sauer-Zavala S, Southward MW, Semcho SA. Integrating and differentiating personality and psychopathology in cognitive behavior therapy. J Personal 2022; 90(1):89–102. 10.1111/jopy.12602.

[51]. Sauer-Zavala S, Southward MW, Stumpp NE, Semcho SA, Hood CO, Garlock A,et al. A SMART approach to personalized care: preliminary data on how to select and sequence skill in transdiagnostic CBT. Cogn Behav Ther 2022;51(6):435–55. 10.1080/16506073.2022.2053571. [PubMed: 35475947]

[52]. Schmidt ID, Pfeifer BJ, Strunk DR. Putting the "cognitive" back in cognitive therapy: sustained cognitive change as a mediator of in-session insights and depressive symptom improvement. J Consult Clin Psychol 2019;87(5):446–56. 10.1037/ccp0000392. [PubMed: 30998047]

[53]. Semcho SA, Southward MW, Stumpp NE, MacLean DL, Hood CO, Wolitzky-Taylor K, et al. Aversive reactivity: a transdiagnostic functional bridge between neuroticism and avoidant behavioral coping. J Emot Psychopathol 2023;1(1): 23–40. 10.55913/joep.v1i1.9. [PubMed: 37520406]

[54]. Southward MW, Cassiello-Robbins C, Zelkowitz RL, Rosenthal MZ. Navigating the new landscape of value-based care: an example of increasing access, improving quality, and reducing costs using the Unified Protocol. Behav Ther 2020;43(4): 134–7. 10.31234/osf.io/rvbzn.

[55]. Southward MW, Sauer-Zavala S. Experimental manipulations to test theory-driven mechanisms of cognitive behavior therapy. Article 603009 Front Psychiatry 2020; 11. 10.3389/fpsyt.2020.603009.

[56]. Southward MW, Sauer-Zavala S. Dimensions of skill use in the Unified Protocol: exploring unique effects on anxiety and depression. J Consult Clin Psychol 2022;90 (3):246–57. 10.1037/ccp0000701. [PubMed: 34914417]

[57]. Springer KS, Levy HC, Tolin DF. Remission in CBT for adult anxiety disorders: a meta-analysis. Clin Psychol Rev 2018;61:1–8. 10.1016/j.cpr.2018.03.002. [PubMed: 29576326]

[58]. Webb CA, Beard C, Forgeard M, Björgvinsson T. Facets of mindfulness predict depressive and anxiety symptom improvement above CBT skills. Mindfulness 2019; 10(3):559–70. 10.1007/s12671-018-1005-1.

[59]. Webb CA, Beard C, Kertz SJ, Hsu KJ, Björgvinsson T. Differential role of CBT skills, DBT skills and psychological flexibility in predicting depressive versus anxiety symptom improvement. Behav Res Ther 2016;81:12–20. 10.1016/j.brat.2016.03.006. [PubMed: 27057997]

[60]. Wilamowska ZA, Thompson-Hollands J, Fairholme CP, Ellard KK, Farchione TJ, Barlow DH. Conceptual background, development, and preliminary data from the unified protocol for transdiagnostic treatment of emotional disorders. Depress Anxiety 2010;27(10):882–90. 10.1002/da.20735. [PubMed: 20886609]

[61]. Cumming G, Finch S. Inference by Eye: Confidence Intervals and How to Read Pictures of Data. American Psychologist 2005;60(2):170–80. 10.1037/0003-066X.60.2.170. [PubMed: 15740449]
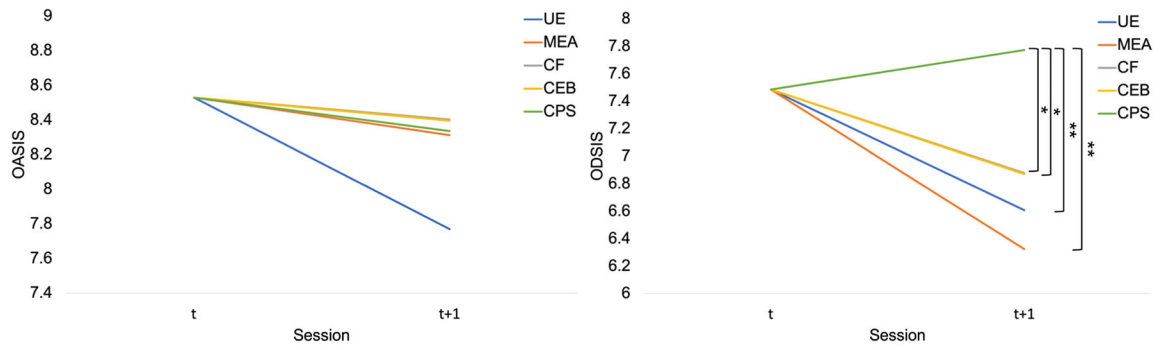
**Fig. 1.**
Predicted Session-to-Session Change in Anxiety and Depression by Unified Protocol Module. UE = Understanding Emotions. MEA = Mindful Emotion Awareness. CF = Cognitive Flexibility. CEB = Countering Emotional Behaviors. CPS = Confronting Physical Sensations. OASIS = Overall Anxiety Severity & Impairment Scale. ODSIS = Overall Depression Severity & Impairment Scale. $*p < .05$, $**p < .01$. All charts assume sample mean Session 1 scores for time $t$ values.
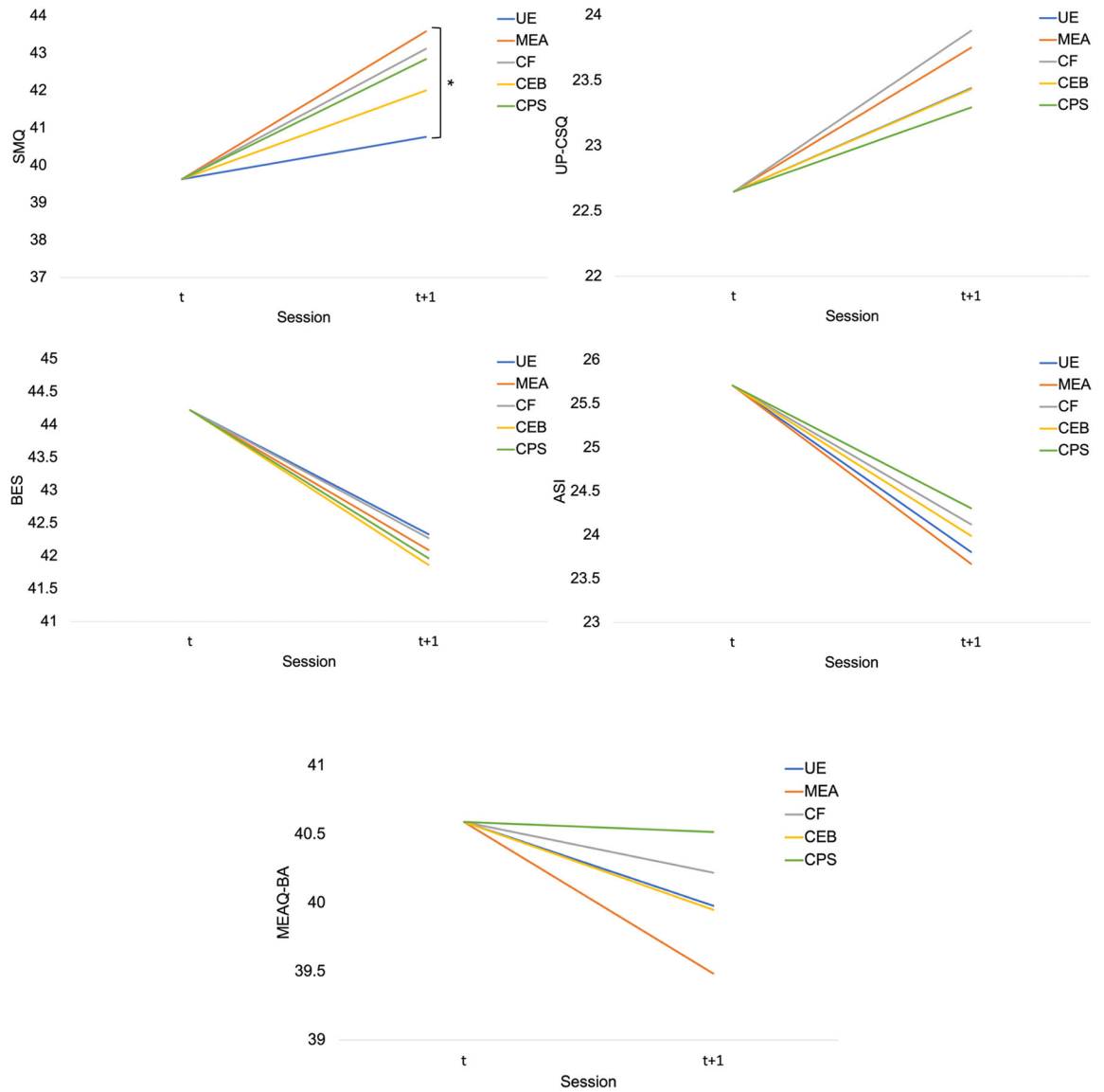
**Fig. 2.**
Predicted Session-to-Session Change in Transdiagnostic Constructs by Unified Protocol Module. UE = Understanding Emotions. MEA = Mindful Emotion Awareness. CF = Cognitive Flexibility. CEB = Countering Emotional Behaviors. CPS = Confronting Physical Sensations. SMQ = Southampton Mindfulness Questionnaire. UP-CSQ = Unified Protocol – Cognitive Skills Questionnaire. BES = Beliefs about Emotions Scale. ASI = Anxiety Sensitivity Index. MEAQ-BA = Multidimensional Experiential Avoidance Questionnaire. * $p < .05$, * * $p < .01$. All charts assume sample mean Session 1 scores for time $t$ values.

**Table 1**

Demographic Characteristics and Baseline Symptom Severity Between Participants Who Did and Did Not Receive Each Unified Protocol Module.

| Variable | | Understanding Emotions | | Mindful Emotion Awareness | | Cognitive Flexibility | | Countering Emotional Behaviors | | Confronting Physical Sensations | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |
| | | *n* = 18 | *n* = 52 | *n* = 21 | *n* = 49 | *n* = 18 | *n* = 52 | *n* = 30 | *n* = 40 | *n* = 30 | *n* = 40 |
| | | **25.7%** | **74.3%** | **30.0%** | **70.0%** | **25.7%** | **74.3%** | **42.9%** | **57.1%** | **42.9%** | **57.1%** |
| Age (Years) | M | 37.0 | 32.6 | 33.8 | 33.8 | 33.4 | 33.9 | 36.6 | 31.6 | 33.8 | 33.7 |
| | SD | 15.0 | 11.7 | 11.7 | 13.1 | 12.0 | 13.0 | 14.8 | 10.4 | 13.9 | 11.8 |
| Gender (Female) | n | 13 | 34 | 15 | 32 | 14 | 33 | 17 | 30 | 22 | 25 |
| | % | 72.2% | 66.7% | 71.4% | 66.7% | 77.8% | 64.7% | 58.6% | 75.0% | 75.9% | 62.5% |
| Racial Background (White) | n | 11 | 38 | 14 | 35 | 11 | 38 | 22 | 27 | 18 | 31 |
| | % | 61.1% | 73.1% | 66.7% | 71.4% | 61.1% | 73.1% | 73.3% | 67.5% | 60.0% | 77.5% |
| Sexual Orientation (Heterosexual) | n | 13 | 39 | 14 | 38 | 14 | 38 | 24 | 28 | 21 | 31 |
| | % | 72.2% | 75.0% | 66.7% | 77.6% | 77.8% | 73.1% | 80.0% | 70.0% | 70.0% | 77.5% |
| Family Income | Median | a | b | a | b | a | b | a | b | a | b |
| Education | Median | c | c | c | c | c | c | c | c | d | c |
| OASIS | M | 9.00 | 8.38 | 8.05 | 8.71 | 8.44 | 8.56 | 8.32 | 8.68 | 8.43 | 8.60 |
| | SD | 3.50 | 3.57 | 3.36 | 3.62 | 3.41 | 3.61 | 3.68 | 3.47 | 3.80 | 3.38 |
| ODSIS | M | 8.88 | 7.06 | 6.79 | 7.76 | 6.56 | 7.77 | 7.21 | 7.68 | 6.89 | 7.90 |
| | SD | 4.65 | 4.79 | 5.20 | 4.64 | 5.59 | 4.53 | 4.92 | 4.74 | 5.23 | 4.47 |

*Note.*

[a] $50,000–$74,999.

[b] $75,000–$99,999.

[c] Undergraduate degree.

[d] Associate's degree.

OASIS = Overall Anxiety Severity and Impairment Scale. ODSIS = Overall Depression Severity and Impairment Scale.

**Table 2**

Mean Score of Symptoms and Transdiagnostic Constructs at the Start of Each Unified Protocol Module.

| Outcome | Understanding Emotions $M$ ($SD$) | Mindful Emotion Awareness $M$ ($SD$) | Cognitive Flexibility $M$ ($SD$) | Countering Emotional Behaviors $M$ ($SD$) | Confronting Physical Sensations $M$ ($SD$) | Joint Test of Fixed Effects |
|---|---|---|---|---|---|---|
| OASIS | 7.61 (3.63) | 7.84 (3.33) | 7.29 (3.09) | 7.24 (3.56) | 7.20 (3.12) | $F(4, 182) = .36, p = .83$ |
| ODSIS | 6.04 (4.80) | 6.71 (4.47) | 5.98 (4.28) | 5.61 (4.42) | 5.73 (4.05) | $F(4, 175) = .52, p = .72$ |
| SMQ | 44.69 (14.55)$_{ab}$ | 41.80 (13.67)$_a$ | 49.13 (15.91)$_b$ | 45.73 (15.94)$_b$ | 46.66 (16.63)$_b$ | $F(4, 175) = 2.79, p = .03$ |
| UP-CSQ | 24.67 (4.97) | 25.20 (4.65) | 24.92 (4.59) | 24.66 (4.70) | 24.63 (5.61) | $F(4, 182) = .05, p = .99$ |
| BES | 41.10 (13.20) | 40.22 (14.16) | 37.35 (13.25) | 41.15 (13.43) | 38.49 (13.63) | $F(4, 170) = 2.12, p = .08$ |
| ASI | 21.84 (11.41) | 20.71 (12.40) | 19.44 (11.16) | 19.90 (10.39) | 19.02 (10.44) | $F(4, 171) = 1.11, p = .35$ |
| MEAQ-BA | 37.88 (9.69) | 38.76 (11.89) | 36.46 (12.03) | 36.63 (11.40) | 35.71 (10.32) | $F(4, 171) = 1.67, p = .16$ |

*Note.* OASIS = Overall Anxiety Severity & Impairment Scale. ODSIS = Overall Depression Severity & Impairment Scale. SMQ = Southampton Mindfulness Questionnaire. UP-CSQ = Unified Protocol-Cognitive Skills Questionnaire. BES = Beliefs about Emotions Scale. ASI = Anxiety Sensitivity Index. MEAQ-BA = Multidimensional Experiential Avoidance Questionnaire-Behavioral Activation subscale. Values with different subscripts differ significantly, $ps < .05$.

**Table 3**

Effect Sizes of Average Session-to-Session Change in Symptoms and Module-Relevant Processes by Unified Protocol Module.

| | Unified Protocol Module | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Understanding Emotions | Mindful Emotion Awareness | Cognitive Flexibility | Countering Emotional Behaviors | Confronting Physical Sensations |
| Outcome | *d* [95% CI] | *d* [95% CI] | *d* [95% CI] | *d* [95% CI] | *d* [95% CI] |
| OASIS | .21 [−.003, .43] | .06 [−.17, .29] | .04 [−.20, .27] | .04 [−.18, .25] | .05 [−.20, .31] |
| ODSIS | .18 [<−.01, .37] | .24 [.05, .43] | .12 [−.07, .32] | .13 [−.05, .31] | −.06 [−.27, .15] |
| SMQ | −.02 [−.19, .15] | .13 [−.05, .31] | .11 [−.08, .29] | .04 [−.14, .21] | .14 [−.05, .33] |
| UP-CSQ | .15 [−.02, .33] | .21 [.03, .40] | .24 [.05, .43] | .15 [−.02, .33] | .13 [−.08, .33] |
| BES | .16 [.02, .30] | .18 [.04, .33] | .17 [.02, .32] | .20 [.06, .34] | .19 [.03, .35] |
| ASI | .16 [.06, .26] | .17 [.07, .28] | .14 [.03, .24] | .15 [.05, .25] | .12 [<.01, .24] |
| MEAQ-BA | .06 [−.06, .17] | .10 [−.02, .21] | .03 [−.09, .15] | .06 [−.05, .17] | .01 [−.13, .14] |

*Note.* OASIS = Overall Anxiety Severity & Impairment Scale. ODSIS = Overall Depression Severity & Impairment Scale. BES = Beliefs about Emotions Scale. ASI = Anxiety Sensitivity Index. MEAQ-BA = Multidimensional Experiential Avoidance Questionnaire-Behavioral Avoidance subscale. SMQ = Southampton Mindfulness Questionnaire. UP-CSQ = Unified Protocol-Cognitive Skills Questionnaire. Effect sizes scored so that positive values indicate symptom or construct improvement.