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Changes in positive affect in cognitive-behavioral treatment of anxiety disorders

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ABSTRACT

Objective: This study evaluated changes in positive affect within cognitive-behavioral treatments (CBT) for anxiety disorders. It was hypothesized that there would be significantly greater increases in positive affect in CBT conditions compared to the waitlist, and particularly higher in the Unified Protocol (UP) than the single disorder protocols (SDP) given the UP's focus on emotions (including positive emotions) rather than symptoms.

Method: Patients with heterogeneous anxiety disorders ($N = 223$) were randomly assigned to the UP, SDP or waitlist. Linear mixed model regression (intent to treat) analyses were used to compare change in positive affect, quality of life, and savoring between patients in the treatment conditions (UP and SDP) versus waitlist conditions. Between condition effect sizes were calculated to assess the magnitude of difference within conditions at post-treatment.

Results: Results indicated a significant Group (treatment vs. waitlist) \times Time (pre- post-treatment) interaction ($F(1, 154.36) = 6.75; p = .01$) for positive affect in which the treatment group showed significant improvements in positive affect pre- to post-treatment ($ESg = 0.37, SEg = 0.09, 95\% CI [0.20: 0.54]$) and the waitlist condition did not. There were no differences between UP and SDP conditions in positive affect at baseline or at post-treatment.

Conclusions: These results suggest CBT, which typically focuses on reductions in negative affect, may also improve positive affect. The importance of future research evaluating, targeting, and improving positive affect in CBT trials is discussed.

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1. Introduction

While negative affect has been widely studied in relation to the development and treatment of emotional disorders (i.e., anxiety, mood, and related disorders [1]), the role of positive affect in connection to these conditions remains under-studied [2]. In general, positive affect refers to pleasant states of emotion, including joy, enthusiasm, confidence, and love [3]. Of note, positive affect is not simply the opposite of negative affect, but rather an independent construct not always inversely correlated with negative affect [4–6], although this has historically been debated in the literature with others considering them to be bipolar ends of the same dimension [7], and still others integrating these perspectives within a hierarchical model [8].

Positive affect has been associated with many health-related

benefits in clinical and non-clinical populations. For instance, research suggests it may increase stress resilience and overall mental health and well-being [2,9,10]. In addition, positive affect has been associated with improved immune system functioning and reductions in pain levels [11,12]. Furthermore, more frequent instances of positive affect have been linked to improvements in overall functioning, such as an increase in problem-solving skills [13,14] and goal attainment [15], and academic achievement [16].

Emotional disorders are associated with deficits in positive emotions [17,18], over and above the contributions of negative affectivity [1]. This finding may be due to positive emotion dysregulation [2,19], specifically through excessive dampening of positive emotional experiences when they occur [20]. Theoretical accounts have postulated treatments aimed at enhancing positive affect may hold many benefits,

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such as decreasing the impact of negative emotional experiences, enhancing overall functioning [21,22], and potentially even offsetting risk of relapse [19]. Further, preliminary research has demonstrated that explicitly targeting positive affect in treatment through the addition of therapeutic strategies or modules, such as well-being therapy [23], quality of life therapy [24], positive psychotherapy [25], and a positive emotion regulation augmentation [26] can lead to improvements in positive affect. Taken together, literature suggests there is a benefit to increasing positive affect in treatment.

Despite the advantages of addressing positive affect for both emotional and physical health, the majority of psychotherapy interventions continue to focus on targeting negative affect. Correspondingly, most studies of leading treatments for emotional disorders remain focused on evaluating outcomes of reduced symptoms of negative affectivity [2], rather than increased positive affectivity. The question remains if and how existing treatments for emotional disorders change positive affect even though it is not their central focus. Cognitive-behavioral therapies (CBT) might be well-suited for enhancing positive affect [19], as specifically changing thought patterns and/or behavioral responses may lead to more positive interpretations and a willingness to approach, or even savor experiences previously considered negative. For a detailed review of cognitive-behavioral strategies aimed at enhancing positive emotion regulation, see Carl et al. [19].

Transdiagnostic treatments (e.g., the Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders [UP]; [27,28], which focus on the broad range of emotions rather than symptoms associated with a specific disorder, may be particularly helpful as they provide a platform to specifically discuss the range of emotions (including positive) across diagnoses. In the emotional disorder framework, an individual attempts to escape or avoid the aversive experience of frequent and intense negative emotions, which often backfires, resulting in continuation of this pattern [29]. This framework extends to positive emotions as well; some individuals find the experience of positive emotions distressing (e.g., worry about what might happen if one lets their guard down and feels happy, feel that they don't deserve to feel joy, feelings of happiness reminds them of times they felt happier) and engage in efforts to dampen or avoid such experiences. The UP then targets these patterns with each core skill (understanding emotions, mindful emotion awareness, cognitive flexibility, countering emotional behaviors, understanding and confronting physical sensations, and emotion exposures) aimed at changing the maintenance cycle of one's emotional experience its aversive associations, rather than an often disorder-specific context [27]. This emotion-focused approach coupled with the integration of many traditional CBT skills in one unified intervention makes the UP a potential treatment for addressing deficits in positive affect.

The present study aims to explore changes in positive affect within a large randomized controlled trial comparing various CBT protocols to a waitlist control condition. It was hypothesized 1) there would be significantly greater increases in positive affect amongst those in the treatment conditions compared to the waitlist condition and 2) these increases in positive affect would be higher in the UP condition than the single disorder protocol (SDP) condition (given the UP's explicit focus on emotions, rather than symptoms). Additionally, we predicted 3) increases in positive affect would be associated with decreases in anxiety, depression, negative affect, and clinical severity, as well as increases in quality of life and savoring beliefs, amongst those in treatment conditions.

2. Method

2.1. Participants

Participants (N = 223) were enrolled in a treatment trial and met criteria for a principal (most interfering and distressing) diagnosis of panic disorder, generalized anxiety disorder, social anxiety disorder, or

obsessive-compulsive disorder. On average patients were 31.06 (SD = 10.99) years old and the majority (n = 124) identified as female and Caucasian (n = 186). Additional inclusion/exclusion criteria and details of the sample have been described elsewhere (see Barlow et al. [23]).

2.2. Procedure

Once deemed eligible for the study, patients were randomized to treatment with the Unified Protocol (n = 88), SDP (n = 91), or a waitlist control (n = 44). The single diagnosis protocol corresponded with the patient's principal diagnosis: Managing Social Anxiety: A Cognitive-Behavioral Therapy Approach – 2nd edition (MSA-II; [30,31]; Mastery of Your Anxiety and Panic – 4th edition (MAP-IV; [32,33]; Mastery of Your Anxiety and Worry – 2nd edition (MAW-II; [34,35]; and Treating Your OCD with Exposure and Response (Ritual) Prevention Therapy – 2nd edition [36,37]. Patients with a principal diagnosis of panic disorder completed 12 weeks of treatment and all others completed 16. The university institutional review board approved all study procedures, and informed consent was obtained from patients prior to study participation. Additional study details, including a CONSORT diagram depicting participant flow, are available in the parent study (see: Barlow et al. [23]; [clinicaltrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT01243606) identifier: NCT01243606).

2.3. Measures

All measures were administered at baseline and post-treatment. Positive affect was measured using the positive affect subscale of the Positive and Negative Affect Schedule — Expanded Form (PANAS-X; [38], a self-report measure assessing affect. Participants rate the extent to which they generally have felt various emotions indicated by different affective descriptors (e.g., cheerful, excited, proud). Related constructs were also assessed to provide more comprehensive evaluation of one's experience of positive affect. Specifically, the Savoring Beliefs Inventory (SBI; [39]) was included as a measure to assess one's tendency to savor (hold onto/enhance) or dampen (minimize) positive emotions. Both the total score, calculated by subtracting the sum of the items assessing dampening from the sum of the items assessing savoring, as well as the savoring the moment subscale, referring to efforts to prolong positive emotions as they are happening (compared to the past/future) were used. The Quality of Life Enjoyment and Satisfaction Questionnaire (QLESQ; [40]) was also used as a measure of wellbeing, assessing enjoyment and satisfaction with various aspects of life (e.g., work, health, relationships). The neuroticism subscale of the Eysenck Personality Questionnaire (EPQ; [41,42] assessed neuroticism and symptoms of depression and anxiety were assessed using the clinical-rated Hamilton Depression Rating Scale (HAM-D; [43] and Hamilton Anxiety Rating Scale (HAM-A; [44], respectively. All measures are well-established and have demonstrated adequate psychometric properties. Clinical severity was assessed across time points by study assessors blinded to conditions, who assigned a dimensional clinical severity rating (CSR) on a scale from 0 (no symptoms) to 8 (extremely severe symptoms). A rating of 4 or higher represented the clinical threshold for DSM diagnostic criteria, assigned using the Anxiety Disorders Interview Schedule (ADIS), a semi structured clinical interview. Inter-rater agreement for assessment of principal diagnosis ADIS CSR was 98%, using criteria specified by Brown et al. [45]

3. Statistical analyses

Analyses were conducted in SPSS 20.0. Independent samples *t*-test were conducted to assess for differences across study conditions. Correlations were used to examine the associations between positive affect and related constructs at baseline within the full sample. Correlational analyses were also used to examine associations between

change in positive affect and change in these related constructs. Linear mixed model regression (intent to treat) analyses were used to compare change in positive affect, quality of life, and savoring (total score and savoring the moment subscale) between patients in the treatment versus waitlist conditions. As an intent-to-treat analysis, linear mixed model regressions do not require imputation of missing data. Main effects of group (treatment or waitlist) and time (pre- or post-treatment) were examined; however, the interaction between these effects was the primary outcome of interest in these analyses. To explore the magnitude of the interactions, Cohen's *d* effect sizes were used; these were interpreted conservatively with 0.2, 0.5, and 0.8 reflecting small, medium, and large effects, respectively [46]. In addition to Cohen's *d*, which examine differences between groups, standardized mean gain (*ESsg*) effect sizes were calculated to examine the magnitude of change within each condition (treatment versus waitlist). This effect size was used because it includes a correct for repeated measurements [47]; it was considered significant if its confidence interval did not include zero and was interpreted using the same standards as Cohen's *d*.

4. Results

At baseline, the sample evidenced significant deficits in positive affect ($M = 28.70$, $SD = 7.26$), falling a standard deviation below non-clinical norms ($M = 35.0$, $SD = 6.4$; [38]). There were no significant differences between UP ($M = 31.56$, $SD = 8.41$) and SDP ($M = 31.99$, $SD = 7.16$) conditions on levels of positive affect at baseline ($t(174) = 0.71$, $p = .48$) and post-treatment ($t(117) = -0.30$, $p = .76$), therefore data were collapsed across UP and SDP conditions for all further analyses in order to compare patients who received CBT to the waitlist control condition. In proceeding with analyses, an independent samples *t*-test indicated no significant differences in scores at baseline between those randomly assigned to treatment ($M = 28.61$, $SD = 7.04$) and waitlist ($M = 29.05$, $SD = 8.19$) conditions ($t(217) = -0.35$, $p = .30$). As seen in Table 1, correlation analyses indicated that savoring beliefs (total score), savoring beliefs (savoring the moment subscale), and quality of life were significantly positively correlated with positive affect, whereas negative affect, neuroticism, diagnostic severity, anxiety and depression were significantly negatively correlated with positive affect at baseline. As seen in Table 2, increases in positive affect were significantly associated with decreases in anxiety, depression, negative affect, and increases in quality of life, savoring beliefs (total score) and savoring beliefs (savoring the moment subscale), but not clinical severity.

Results from the linear mixed model regressions are presented in Table 3. Overall, all interactions were significant and the effect sizes

indicated the treatment group showed significant improvement on all outcomes whereas the waitlist condition did not. Results indicated a significant Group (treatment vs. waitlist) \times Time (pre- post-treatment) interaction ($F(1, 154.36) = 6.75$; $p = .01$) for positive affect in which the treatment group showed significant improvements in positive affect pre- to post-treatment ($ESsg = 0.37$, $SEsg = 0.09$, 95% CI [0.20: 0.54]) and waitlist condition did not ($ESsg = -0.02$, $SEsg = 0.10$, 95% CI [-0.23: 0.18]). Similarly, there was a significant interaction when examining changes in quality of life ($F(1,156.30) = 4.99$, $p = .02$) with the treatment group showing significant improvements of moderate magnitude ($ESsg = 0.64$, $SEsg = 0.11$, 95% CI [0.43: 0.85]) whereas the waitlist condition did not significantly improve ($ESsg = 0.18$, $SEsg = 0.12$, 95% CI [-0.05: 0.41]). There was also a significant interaction with regards to the savoring beliefs total score ($F(1, 163.19) = 5.30$, $p = .23$); the treatment group showed significant improvements ($ESsg = 0.43$, $SEsg = 0.08$, 95% CI [0.27: 0.58]) and the waitlist condition did not ($ESsg = 0.13$, $SEsg = 0.11$, 95% CI [-0.08: 0.34]). Finally, analysis of the savoring the moment subscale indicated a significant Group \times Time interaction ($F(1, 162,24) = 8.78$, $p = .004$) in which the treatment group showing significant improvement ($ESsg = 0.52$, $SEsg = 0.08$, 95% CI [0.37: 0.67]) and the waitlist condition did not ($ESsg = 0.13$, $SEsg = 0.10$, 95% CI [-0.06: 0.32]). All interaction effects were small to medium in magnitude (Table 3).

5. Discussion

The present studied evaluated change in positive affect within a randomized controlled trial comparing cognitive behavioral therapies to a waitlist control condition. Results suggest, consistent with study hypotheses, that those who received CBT showed significant improvements in positive affect pre- to post-treatment, while significant changes were not observed amongst those in the waitlist condition. Furthermore, change in positive affect was significantly associated with related constructs including quality of life, savoring beliefs, and savoring the moment, as well as anxiety, depression, and negative affect. Positive affect was only associated with clinical severity at pre-treatment, possibly due to the diagnostic heterogeneity of the sample, as research suggests different emotional disorders have different associations with positive affect [48], and future research may want to explore these relationships.

Contrary to hypotheses, there were no differences between the UP and SDP conditions in change in positive affect. This was surprising, given that the UP is designed to address avoidant responses to any emotion, including positive emotions. However, although the UP provides a framework to address deficits in positive emotions that may

Table 1
Baseline correlations with positive affect (full sample).

	Quality of life	Savoring beliefs (total score)	Savoring beliefs (savoring the moment subscale)	Neuroticism	Clinical severity	Anxiety	Depression	Negative affect
Positive affect	0.64**	0.54**	0.54**	-0.31**	-0.30**	-0.17*	-0.31**	-0.20**

* $p < 0.05$.

** $p < 0.01$.

Table 2
Change score correlations between positive affect and other study variables.

	Quality of life	Savoring beliefs (total score)	Savoring beliefs (savoring the moment subscale)	Neuroticism	Clinical severity	Anxiety	Depression	Negative affect
Positive affect	0.55**	0.34**	0.44**	-0.25**	-0.18	-0.42**	-0.37**	-0.26**

** $p < 0.01$.

Table 3

Linear mixed model analysis comparing pre- to post-treatment changes in positive affect, quality of life, and savoring between treatment and waitlist conditions.

		Pre-treatment <i>M (SE)</i>	Post-treatment <i>M (SE)</i>	Group × Time <i>F(df)</i>	<i>p</i>	<i>d</i>
Positive affect	TX	28.66(0.544)	31.54(0.69)	6.75 (1, 154.36)	0.01	0.42
	WL	29.05(1.10)	28.66(1.35)			
Quality of life	TX	44.34(0.67)	49.91(0.81)	4.99(1, 156.30)	0.027	0.43
	WL	44.00(1.35)	45.91(1.58)			
Savoring beliefs (total score)	TX	10.93(1.78)	21.06(1.90)	5.30(1, 163.19)	0.023	0.29
	WL	11.30(3.61)	13.61(3.72)			
Savoring beliefs (savoring the moment subscale)	TX	−1.01(0.73)	4.11(0.77)	8.78(1, 162.24)	0.004	0.40
	WL	−2.72(1.48)	−1.51(1.51)			

Note. Mean = estimated marginal means from Linear Mixed Model analysis; SE = standard error; TX = treatment condition; WL = waitlist condition; *d* = Cohen's *d* effect size for mean difference of groups with unequal sample sizes within a pre/post design [56], using more conservative raw scores and not linear mixed model estimates.

exist due to excessive dampening, it may be that specific, in-session attention on positive emotions is needed to maximize increases across treatment. Patients often explicitly express a desire to decrease negative symptoms (e.g., anxiety, depression) rather than increasing their positive emotions. The findings that there is no difference in change in positive affect between UP and SDP conditions, may represent a by-product of symptom remission whereby participants are improving with treatment, engaging more with the world, and having more perceived positive experiences. This interpretation of study results is generally consistent with the fact that the UP and SDPs are equivalent treatments in reducing principal diagnosis severity [28]. An interesting follow up study would be to ensure that explicit references to positive emotions are included in every module to address whether this leads to more robust gains in positive affect. For instance, the second edition of the UP workbook [49], developed after the present trial, explicitly includes positive emotion monitoring in each session, and a description about the functional nature of positive emotions, and it would be important to evaluate if this addition contributes to any change in positive affect.

These findings add to the limited existing research examining changes in positive affect as an outcome in CBT. Existing CBT interventions, including transdiagnostic treatments such as the UP, appear to improve both positive and negative affect. This result is promising, as it suggests brief, skills-based treatments can promote positive affect, a construct associated with wellbeing and flourishing [50, 51], which may reduce risk of relapse [19]. Given research suggesting that deficits in positive emotion regulation strategies occur across emotional disorders [19] additional focus on effectively increasing positive emotions in cognitive-behavioral treatments is warranted. For instance, specifically targeting positive emotions throughout treatment, or adding augmentative positive emotion enhancement interventions may be helpful [26, 52].

Results from the present study should be considered in light of several limitations. First, participants were generally of high socioeconomic and education status. Prior research has found specific demographic combinations may maximize or minimize positive emotions (i.e., happiness; [53], and there is some data to suggest positive affect is both associated with and precedes success in multiple life domains (e.g., education, employment; [15]). Thus, the sample may have had levels of positive affect that do not reflect typical samples of individuals with anxiety disorders which could have impacted the extent to which this variable was responsive to treatment, potentially limiting the generalizability of findings. However, as indicated in the results, the sample did evidence significantly reduced positive affect compared to non-clinical populations at baseline, suggesting minimal demographic effects. Second, our measure of positive affect, the PANAS-X, can be administered in reference to several windows of time (e.g., past week, past month, generally). The present study asked participants to endorse the degree to which they generally experience a range of positive emotions, which may have limited our precision in measuring changes in positive

affect. Third, the positive emotion words included on PANAS-X tend to be indicative of high-arousal states of emotion (e.g., “enthusiastic”, “excited”), and future research would benefit from additional, comprehensive assessment of positive affect.

Despite its limitations, the present study adds to the literature indicating positive affect is a malleable construct, and can be influenced by CBT. In light of the fact that positive affect has been associated with improved psychological [2] and medical outcomes [11], there may be utility in incorporating brief, CBT approaches in medical settings. Indeed, efforts for implementation of CBT in primary care or hospital settings are promising [54, 55]. Future research should continue to evaluate, target, and improve positive affect as a construct in CBT. Integrated assessment of positive affect in clinical trials, in addition to standard assessment of negative affect and symptom-specific measures is important moving forward to ensure comprehensive outcome evaluation. Furthermore, specific attention is needed to understand the mechanisms by which cognitive-behavioral treatments target and improve positive affect.

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