Article

Quality of Life in Heterogeneous Anxiety Disorders: Changes Across Cognitive-Behavioral Treatments

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Abstract

Quality of life is lower among individuals with anxiety disorders; however, this construct is rarely a focus in treatment research. This study explores changes in quality of life in a randomized, controlled trial of several cognitive-behavioral treatments (CBTs) for anxiety disorders. Adults with heterogeneous anxiety disorders ($N = 223$) were randomly assigned to (a) unified protocol for transdiagnostic treatment of emotional disorders, (c) a single-disorder protocol targeting their principal diagnosis, or (c) a waitlist control condition, and assessed at baseline, posttreatment, and 6-month follow-up. At baseline, the sample evidenced deficits in quality of life, with no significant differences in quality of life across diagnoses or condition. Results suggest improved quality of life among participants in treatment, at similar rates across treatment

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condition and diagnostic category, and at levels significantly higher than the waitlist. Improvements were maintained through 6-month follow-up. This study supports CBT as effective in promoting quality of life.

Quality of life generally refers to subjective aspects of one's experience that make life fulfilling and meaningful (Angermeyer & Kilian, 1997; Mendlowicz & Stein, 2000), though several definitions of this construct exist. For instance, Aaronson and colleagues (1998) proposed that the evaluation of quality of life include the following four areas: (a) physical functional status, (b) disease- and treatment-related physical symptoms, (c) psychological functioning, and (d) social functioning. The World Health Organization Quality of Life Assessment Group (WHOQOL Group) defines quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns" (WHOQOL Group, 1994, p. 28; Wood-Dauphinee, 1999). For example, commonly used measures of quality of life often assess such constructs as individuals' satisfaction with life, physical health, social relationships, and work achievement (Endicott, Nee, Harrison, & Blumenthal, 1993). Interestingly, data suggest that objective metrics of life quality (e.g., education level, socioeconomic status) are only marginally related to individuals' experienced quality of life (Gallagher et al., 2013) and one's subjective perceptions are most closely linked to functional impairment, a related construct that refers to the degree to which individuals feel unable to perform day-to-day activities in social, occupational, and personal roles (Mundt, Marks, Shear, & Greist, 2002).

Mental disorders are associated with significantly reduced quality of life and increased functional impairment (Koran, Thienemann, & Davenport, 1996; Olatunji, Cisler, & Tolin, 2007; Rapaport, Clary, Fayyad, & Endicott, 2005; Rubin & Peyrot, 1999; Safren, Heimberg, Brown, & Holle, 1996). In fact, individuals with mental disorders report greater deficits in quality of life than those with chronic medical conditions (Sherbourne, Wells, & Judd, 1996; Spitzer et al., 1995). In particular, quality of life has been shown to be impaired among individuals with anxiety disorders (Candilis et al., 1999; Koran et al., 1996; Rubin & Peyrot, 1999; Wittchen & Beloch, 1996). For example, patients with panic disorder are likely to report marital disputes and financial problems (Weissman, 1991), and patients with social anxiety disorder (SOC)

demonstrate significant impairment in interpersonal relationships, as well as difficulty engaging in social and leisure activities (Lochner et al., 2003; Stein & Kean, 2000). In addition, individuals with generalized anxiety disorder (GAD) were found to have higher rates of divorce and disability than those without GAD (Blazer, Hughes, George, Swartz, & Boyer, 1991). Moreover, there is research to suggest that those with obsessive–compulsive disorder (OCD) have particular deficits of social, occupational, and mental health aspects of quality of life (Bystritsky et al., 2001; Koran et al., 1996; Kugler et al., 2013; Lochner et al., 2003).

Despite these deficits in quality of life, cognitive-behavioral researchers and clinicians treating anxiety disorders have historically focused on reducing symptoms, such as frequency of panic attacks or number of worry episodes (Gladis, Gosch, Dishuk, & Crits-Christoph, 1999). However, there is increasing support for the notion that mental health is more than simply the absence of mental illness (Keyes, 2005). For example, research has shown that quality of life can predict levels of functional impairment even after controlling for severity of psychopathology (Cramer, Torgersen, & Kringlen, 2005; Gallagher et al., 2013; Rapaport et al., 2005). Thus, treatment stands to benefit from extending the focus of care beyond the reduction of symptoms to also include cultivation of quality of life–related domains.

Although the primary focus of treatment for anxiety disorders has historically been reducing symptoms rather than enhancing quality of life, pharmacological and psychotherapeutic treatment studies for social anxiety disorder and panic disorder that have included measures of positive functioning have demonstrated improvements in this construct (Mogotsi, Kaminer, & Stein, 2000). However, there appears to be limited research with regard to whether symptom-focused treatments improve quality of life in the context of other anxiety disorders.

Recent advancements in treatment development for anxiety disorders may have particular relevance for simultaneously addressing both symptoms and quality of life. Specifically, newer transdiagnostic interventions with the goal of targeting shared functional processes important for the development of a range of diagnoses and difficulties (Sauer-Zavala et al., 2017) may provide an opportunity to discuss a broader range of topics, beyond symptoms. For example, the Unified Protocol (UP) for Transdiagnostic Treatment of Emotional Disorders (Barlow, Farchione, et al., 2017; Barlow, Sauer-Zavala, et al., 2017) is a leading transdiagnostic intervention that was developed to address the aversive, avoidant reactions to emotions thought to maintain anxiety disorders (see Barlow, Sauer-Zavala, Carl, Bullis, & Ellard, 2014) via a variety of cognitive-behavioral techniques; a detailed review of treatment components is described elsewhere (Payne, Ellard, Farchione, Fairholme, & Barlow, 2014).

The focus on emotional avoidance more broadly may allow therapists to discuss anxiety disorder symptoms (e.g., engaging in compulsions, getting off public transportation when distressing physical sensations arise), as well as other manifestations of this process more closely aligned with quality of life that do not necessarily fit within a diagnostic category (e.g., willingness to have difficult conversations with loved ones to improve relationship satisfaction, pursuing a promotion to increase career satisfaction). In fact, the UP approach has demonstrated large reductions in anxiety disorder symptoms (Barlow, Farchione, Bullis, et al., 2017; Ellard, Fairholme, Boisseau, Farchione, & Barlow, 2010; Farchione et al., 2012), as well as promising preliminary improvements in quality of life (Gallagher et al., 2013). Most recently, in a randomized controlled trial of cognitive-behavioral treatments (CBTs) for 223 patients with heterogeneous anxiety disorders, the UP demonstrated equivalence in reducing clinical severity of symptoms to standard, evidence-based, single-disorder protocols (SDPs) from baseline to posttreatment (β = .25, 95% confidence interval [CI] = [−0.26, 0.75]), and results were maintained through 6-month follow-up (β = .16, 95% CI = [−0.39, 0.70]). Furthermore, the UP evidenced less attrition than did the SDPs (odds ratio [OR] = 3.11, 95% CI = [1.44, 6.74]), and both UP (Cohen d = −0.93, 95% CI = [−1.29, −0.57]) and SDP (Cohen d = −1.8, 95% CI = [−1.43, −0.74]) conditions were superior to a waitlist control (WLC) condition in acute outcome, lending support for the potential efficiency of transdiagnostic treatment (for full details, see Barlow, Farchione, Bullis, et al., 2017).

Although there is a strong theoretical rationale for why transdiagnostic interventions such as the UP may be particularly suited to address both symptoms and quality of life, there is limited empirical evidence for this assertion. Thus, the purpose of this article is to describe the effects of a transdiagnostic treatment on quality of life within the aforementioned randomized controlled equivalence trial comparing the UP with SDPs. Specifically, we characterized quality of life (both total score and domain subscales) across the sample by diagnosis, examined whether CBT results in significant improvements in quality of life (compared with a WLC condition), whether quality of life changes as a function of diagnosis at baseline, and explored whether transdiagnostic CBT (compared with cognitive-behavioral interventions targeting a single anxiety disorder) resulted in more robust effects in this assessment domain.

We were also interested in examining baseline clinical characteristics that might moderate the magnitude of change in quality of life. Consistent with literature suggesting that individuals with greater baseline severity have more room for improvement (Bower et al., 2013; Driessen, Cuijpers, Hollon, & Dekker, 2010), we predicted that patients high in experiential avoidance (i.e.,

avoiding situations that elicit strong emotions, regardless of goals), negative affect, and with a greater number of comorbid conditions would demonstrate greater change in quality of life from pre- to posttreatment. Given the UP's focus on reducing aversive reactions to frequently occurring negative emotions and its ability to simultaneously address comorbid conditions, we also explored experiential avoidance, negative affectivity, and number of comorbid disorders as moderators of the effect of active treatment condition on quality life. It is possible that people with deficits that are a better match for the mechanistic targets associated with the UP (e.g., higher in experiential avoidance, negative affect, and number of comorbid conditions) would demonstrate greater pre- to posttreatment improvements in quality of life following treatment with this intervention, compared with those who received SDP. In addition, we explored whether principal diagnosis at baseline moderated the effects of treatment condition on quality of life.

Method

Participants

Treatment-seeking participants were recruited from a large, university-based community mental health clinic at Boston University; see Barlow, Farchione, Bullis, et al., 2017 for full study details. The university institutional review board approved all study procedures, and informed consent was obtained from patients prior to study participation. Participants were deemed eligible for the study if they met the following criteria: (a) principal (most interfering and severe) diagnosis of panic disorder, with or without agoraphobia (PD/A), GAD, OCD, or SOC, as assessed using the Anxiety Disorders Interview Schedule (ADIS; Di Nardo, Brown, & Barlow, 1994—see descriptions below); (b) 18 years or older; (b) fluent in English; and (d) able to attend all study visits. Individuals taking psychotropic medications were required to be stable on the same dose for at least 6 weeks prior to study enrollment and maintain these medications and dosages during treatment. Exclusion criteria consisted largely of any condition that would necessitate immediate or concurrent care that could potentially interact with the study treatment in unknown ways (e.g., current diagnosis of bipolar disorder, schizophrenia, schizoaffective disorder, or organic mental disorder; current high suicide risk; or recent history of substance abuse or dependence). In addition, excluded were individuals who previously attended eight or more CBT sessions within the past 5 years.

A total of 223 participants were randomized in the parent clinical trial, including 88 to the UP condition, 91 to the SDP condition, and 44 to the WLC

condition. A total of 160 participants completed posttreatment measures. The sample was largely White (83.4%), female (55.6%), and college educated (66.8%) with a mean age of 31.1 years ($SD = 11.0$ years). The mean clinical severity rating (CSR—described below), the primary outcome of the parent trial, was 5.46 across diagnoses, indicating moderate to severe disorder severity. Of note, participants in the UP condition (77 of 88 [87.5%]) were significantly more likely to complete treatment (defined as having completed $\geq$ 75% of sessions), than those in the SDP condition (63 of 91 [69.2%]; OR = 3.11, 95% CI = [1.44, 6.74]). A complete detailed description of the sample is reported in the parent study (see Barlow, Farchione, Bullis, et al., 2017).

Procedures

The trial consisted of two phases: (a) a 16-session acute treatment (12 sessions for patients with a principal diagnosis of PD/A) or 16-week WLC phase and (b) a 6-month follow-up phase (for which WLC patients were not included). The acute treatment phase was limited to a maximum of 21 weeks (16 weeks for PD/A). In the case that patients were unable to adhere to this timeline, treatment was terminated and follow-up assessments were conducted. Participants were randomized by principal diagnosis by a 2:2:1 allocation ratio to UP, SDP, and WLC conditions, respectively. The project coordinator was blind to participants' study conditions until the diagnostic evaluation for which final study eligibility was determined.

Interventions

Number and length of treatment sessions were determined based on each SDP's recommended dose of treatment (described below). To ensure no differences between the active treatment conditions in the amount of treatment patients received, treatment dosage for the UP was matched to each principal diagnosis' corresponding SDP.

UP. The UP was delivered in accordance with the published therapist guide (Barlow, Farchione, et al., 2011) and client workbook (Barlow, Ellard, et al., 2011). The UP consists of five core treatment modules: (a) mindful emotion awareness, (b) cognitive flexibility, (c) countering emotional behaviors, (d) awareness and tolerance physical sensations, and (e) emotion exposures. Prior to the five core modules, patients received one module focused on enhancing motivation, readiness for change, and treatment engagement, as well as an introductory module on the adaptive nature of emotions that provides a framework for understanding emotional experiences. Following the

core modules, patients received a final module focused on reviewing treatment progress and planning for relapse prevention.

SDPs. The SDPs included *Managing Social Anxiety: A Cognitive-Behavioral Therapy Approach–2nd Edition* (MSA-II; D. A. Hope, Heimberg, & Juster, 2000; D. A. Hope, Heimberg, & Turk, 2006); *Mastery of Your Anxiety and Panic–4th Edition* (MAP-IV; Barlow & Craske, 2000, 2007); *Mastery of Your Anxiety and Worry–2nd Edition* (MAW-II; Zinbarg, Craske, & Barlow, 2006); and *Treating Your OCD with Exposure and Response (Ritual) Prevention Therapy–2nd Edition* (Foa & Kozak, 2004; Foa, Yadin, & Lichner, 2012; Kozak & Foa, 1997). Consistent with recommendations by the protocol developers, patients with a principal diagnosis of SOC, GAD, or OCD received 16 sessions of treatment and patients with a principal diagnosis of PD/A received 12 sessions. Treatment sessions were approximately 50 to 60 min with the exception of patients with a principal diagnosis of OCD, for whom treatment sessions were 80 to 90 min.

Therapists and Treatment Integrity

Study therapists were doctoral students in clinical psychology, postdoctoral fellows, and licensed clinical psychologists with training and certification in the treatment protocols utilized (Barlow, Gorman, Shear, & Woods, 2000). Twenty percent of treatment sessions were randomly selected and rated for treatment fidelity and competence by independent raters associated with the development of the specific treatments. Treatment fidelity scores were good to excellent (*M*: UP = 4.44, SDPs = 4.09 out of 5).

Measures

Diagnostic assessment. The ADIS (Brown & Barlow, 2014; DiNardo et al., 1994), a semistructured clinical interview, was used by blinded study evaluators, to assess patients for current *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) diagnoses. Diagnoses are assigned a CSR on a scale from 0 (*no symptoms*) to 8 (*extremely severe symptoms*), with a rating of 4 or above (*definitely disturbing/disabling*) reflective of passing the *DSM* clinical threshold. The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) was published during the course of the trial, and as such, 168 patients (75%) were assigned diagnoses based on *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994) criteria and 55 patients (25%) were assigned diagnoses based on *DSM-5* criteria. To standardize CSRs within this variation, an additional rating was assigned to overall PD/A

symptoms for those patients diagnosed according to *DSM-5*, despite the separation of panic disorder and agoraphobia in *DSM-5*.

Primary outcome measure. The Quality of Life Enjoyment and Satisfaction Questionnaire–Short Form (Q-LES-Q-SF; Endicott et al., 1993) is a 16-item, self-report measure of quality of life. Respondents are asked to rate their satisfaction in the past week on in the following domains: physical health, subjective feelings, leisure activities, social relationships, general activities, medications, and overall life satisfaction. Each item is rated on a 1- to 5-point Likert-type scale, with 1 being *very poor* and 5 being *very good*, with a minimum score of 14, and a maximum score of 70. The last two items are not included in the total score, but can be viewed as standalone items. The total score then is transformed into a percentage maximum possible score calculated by subtracting 14 from the raw score and then dividing by 56. The Q-LES-Q-SF has demonstrated good psychometric properties in terms of reliability, validity, and sensitivity and specificity to change in diverse patient populations (Endicott et al., 1993; M. L. Hope, Page, & Hooke, 2009; Mick, Faraone, Spencer, Zhang, & Biederman, 2008; Müllerova et al., 2001; Ritsner et al., 2000; Rucci et al., 2007; Stevanovic, 2011; Wyrwich et al., 2009).

Potential moderators. The Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gámez, Chmielewski, Kotov, Ruggero, & Watson, 2011) is a 62-item measure that assesses the tendency to avoid or escape a wide range of internal experiences. The MEAQ has demonstrated good internal consistency, construct validity, and discriminant validity with markers of closely related constructs (e.g., neuroticism; Gámez et al., 2011).

The Positive and Negative Affective Schedule–Expanded Form (PANAS-X; Watson & Clark, 1999) is a well-established measure that assesses the extent to which patients experience various emotions. The Negative Affect Higher Order subscale captures how much someone feels negative emotions (e.g., distressed, upset, irritable). This subscale has demonstrated good psychometric properties, including internal consistency, convergent and discriminant validity, stability over time, and high correlations with associated measures of state affect and emotionality (Watson & Clark, 1999).

Data Analytic Strategy

The primary aim of the present study was to explore change in Q-LES-Q-SF as a function of treatment condition. Specifically, at baseline, quality of life was characterized across the sample by diagnosis. After treatment, comparisons

were made between active treatment (i.e., UP and SDP) and the WLC to explore effects of CBT, in general, on quality of life, along with between UP and SDP to evaluate whether there are advantages for transdiagnostic approaches. Given the diversity of domains of quality of life assessed with the Q-LES-Q-SF, exploratory analyses were then used to explore change in individual measure items. A number of potential moderators for treatment effects were also explored, including negative affectivity, experiential avoidance, principal diagnosis, and number of comorbid conditions at baseline. Normality of the outcome of interest (Q-LES-Q-SF) was assessed through both kurtosis and skewness measures. Significant deviation from a normal distribution was operationalized as a *z* score absolute value greater than 1.96 in either direction, in accordance with established recommendations (Kim, 2013). Other data quality checks analyzing between-group differences in important demographic or clinical variables at study baseline, as well as accommodation of missing data are reported elsewhere (see Barlow, Farchione, Bullis, et al., 2017).

To assess change over time in quality of life, means at each time point and within-condition effect sizes are reported. Next, linear mixed effects regressions were used, with random effects corresponding to variation in individual participants over time. This individual growth curve approach uses each participant as his or her own baseline, thus accounting for a wider range of potential treatment responses while still providing meaningful interpretations at a group level (Shek & Ma, 2011). In addition, mixed methods models, in general, account for missing data much better than traditional models as data are only excluded at individual time points without the necessity of complete data at *all* time points (Gueorguieva & Krystal, 2004). Analyses of between-group effects indicate that the intraclass correlation (ICC) of a model predicting time effects alone was above .25, which indicates a meaningful degree of variance (25%) explainable by higher level factors, as recommended by Shek and Ma (2011).

To explore the effects of moderators, baseline characteristics (i.e., diagnoses from the ADIS) and subscale severity scores on the MEAQ and PANAS (see "Potential Moderators" section above) were independently integrated into full linear mixed effects models as covariates along with time, measuring quality of life as the dependent variable collapsed across active treatment conditions. We evaluated independent group and time-by-group interaction effects on quality of life between treatment (i.e., UP and SDP combined) and WLC conditions, as well as specifically between UP and SDP conditions. There is limited previous literature to suggest a potential magnitude of an effect between conditions; thus, these moderation analyses are exploratory.

Table 1. Observed Quality of Life Between Conditions and Diagnoses Over Time.

Variable	N	Baseline	N	Posttreatment	N	6-month follow-up
Treatment condition						
UP	88	55.4 ± 16.1	63	67.3 ± 15.1	57	65.0 ± 18.8
SDP	87	52.7 ± 14.5	56	61.6 ± 16.6	56	64.5 ± 16.9
WLC	43	53.6 ± 18.0	32	57.0 ± 15.7	N/A	N/A
Principal diagnosis						
SOC	56	51.9 ± 16.7	43	65.0 ± 16.3	29	65.5 ± 17.3
PD/A	59	56.6 ± 17.1	36	64.7 ± 17.8	30	65.7 ± 20.1
GAD	61	52.9 ± 13.6	44	58.5 ± 16.0	34	63.3 ± 17.8
OCD	42	54.6 ± 16.0	28	64.8 ± 16.4	22	66.2 ± 15.7

Note. Statistics reported are mean ± *SD*. UP = unified protocol; SDP = single diagnosis protocol; WLC = waitlist control; SOC = social anxiety disorder; PD/A = panic disorder, with or without agoraphobia; GAD = generalized anxiety disorder; OCD = obsessive–compulsive disorder.

Results

Preliminary Analyses

A summary of means and standard deviations for our primary outcome variable, Q-LES-Q summary scores (quality of life), across all time points as a function of principal diagnosis and treatment condition can be found in Table 1. *Z*-score values for kurtosis and skewness of the quality of life distribution ranged from −0.57 to 0.98 and −2.64 to 0.21, respectively. The −2.64 figure comes in Week 16 posttreatment time point and includes all three conditions (i.e., UP, SDP, and WLC). By this time point, as indicated in Table 1, means for the active conditions had increased, whereas WLC means had not, thus skewing the overall distribution to the left. When separated into individual conditions, kurtosis and skewness fell back to normal limits. No other time points exceeded an absolute value of 1.96 for either measure, indicating that data are normally distributed and support our planned analyses. There were no significant differences in quality of life at baseline between treatment conditions ($F_{(2, 217)} = 0.65$, $p = .521$) or principal diagnoses ($F_{(3, 217)} = 0.97$, $p = .408$). Examination of means indicate that quality of life increased in both the UP and SDP conditions from pre- to posttreatment, but not in the WLC condition. Within-condition effect sizes (see Table 2) support these observations, suggesting statistically significant gains from pre- to posttreatment that were moderate/large in magnitude in the UP condition and moderate in the SDP

Table 2. Effect Sizes Within Conditions and Diagnoses.

Variable	Pre–post			Post-6MFU			Pre-6MFU		
	ESsg	SE	CI	ESsg	SE	CI	ESsg	SE	CI
Treatment condition									
UP	0.75	0.15	[0.46, 1.03]	−0.03	0.12	[−0.28, 0.21]	0.44	0.16	[0.14, 0.75]
SDP	0.53	0.16	[0.22, 0.85]	0.06	0.11	[−0.16, 0.29]	0.62	0.16	[0.31, 0.93]
Treatment	0.64	0.11	[0.43, 0.85]	0.02	0.08	[−0.15, 0.18]	0.52	0.11	[0.31, 0.74]
WLC	0.18	0.12	[−0.05, 0.41]		—			—	
Principal diagnosis[a]									
SOC	0.83	0.16	[0.51, 1.15]	−0.17	0.21	[−0.58, 0.24]	0.67	0.25	[0.17, 1.16]
PD/A	0.28	0.15	[−0.02, 0.58]	0.19	0.14	[−0.08, 0.46]	0.33	0.17	[−0.02, 0.67]
GAD	0.49	0.17	[0.16, 0.81]	0.03	0.12	[−0.20, 0.27]	0.55	0.23	[0.09, 1.01]
OCD	0.42	0.19	[0.04, 0.81]	0.01	0.23	[−0.45, 0.46]	0.66	0.24	[0.19, 1.12]

Note. Statistics are standardized gain effect size estimates (ESsg). 6MFU = 6-month follow-up; CI = confidence interval; UP = unified protocol; SDP = single diagnosis protocol; Treatment = UP–SDP combined; WLC = waitlist control; SOC = social anxiety disorder; PD/A = panic disorder, with or without agoraphobia; GAD = generalized anxiety disorder; OCD = obsessive–compulsive disorder.
[a]Change in each diagnosis was collapsed across active treatment conditions.

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condition, along with small, nonsignificant increases from posttreatment to the 6-month follow-up in both conditions. Change in quality of life from pre- to posttreatment was nonsignificant for the WLC condition. Within-condition effect sizes calculated as a function of principal diagnosis revealed significant pre- to posttreatment improvement in quality of life for SOC (large in magnitude), GAD (moderate), and OCD (moderate), but not for PD/A. No additional gains were observed from posttreatment to the 6-month follow-up for any diagnostic category.

Change in Quality of Life as a Function of Time and Treatment Condition

Next, to examine between-group differences in changes in quality of life across time points, linear mixed effects regressions were conducted. First, the preliminary unconditional mean model of quality of life was significant ($F_{(1, 207.97)} = 7,114.36$; $p < .001$) and contained enough random variability to analyze time effects (ICC = .625). The unconditional linear growth curve model of change in quality of life was also significant; fixed effects for the intercept, $F_{(1, 215.87)} = 5,799.86$; $p < .001$, and time, $\beta = .56$, $t_{(166.76)} = 7.52$, $p < .001$, indicated that, collapsed across condition, study participants experienced significant increases in quality of life from pre- to posttreatment. Furthermore, the model's residual variance decreased by 31.48 after adding time as a covariate, suggesting approximately 31.5% of the variance in quality of life is associated with linear change over time (Shek & Ma, 2011). Building on this analysis, we found a significant time-by-group effect, $\beta = -.46$, $t_{(167.18)} = -2.45$, $p = .015$, when comparing participants in active treatment (i.e., UP and SDP combined) with participants in the WLC condition over the same duration (pre- to posttreatment). This signifies that participants in active treatment experienced a greater improvement in quality of life from pre- to posttreatment beyond that which was found in the waitlist condition, consistent with our within-condition effect size analyses.

Next, we applied the same procedures of unconditional mean and unconditional linear growth curve models to explore group differences in quality of life as a function of active treatment condition (UP vs. SDP). In this case, time-by-group analyses were not significant, $\beta = -.09$, $t_{(135.36)} = -0.50$, $p = .618$, indicating similar rates of improvement in quality of life from pre- to posttreatment across UP and SDP conditions. This aligns with the parent trial's symptom-specific main outcomes (Barlow, Farchione, Bullis, et al., 2017).

Given that we found significant improvement in quality of life during treatment, analyses were repeated examining change from pretreatment to the 6-month follow-up time point, with identical methodology, to assess whether

these effects were maintained after treatment. Analyses included all previous time points with the addition of 6-month follow-up data. As previously stated, WLC evaluations were not conducted after treatment concluded, and as such, between-group analyses only compare UP with SDP conditions. The unconditional model explained enough variance to include time and between-condition variables (ICC = .577). Significant improvement over time, β = .27, $t_{(119.49)}$ = 7.11, $p < .001$, indicates that quality of life was maintained during the follow-up phase, consistent with within-condition effect sizes. Similar to acute treatment findings, the time-by-group analysis comparing UP with SDP through follow-up was nonsignificant, β = .02, $t_{(119.06)}$ = 0.31, p = .308.

As an exploratory analysis, change in individual items of the Q-LES-Q-SF as a function of treatment condition was explored in a similar manner. Items 11 (living/housing situation) and 12 (ability to get around physically without feeling dizzy or unsteady or falling) did not change significantly from pre- to posttreatment, whereas all others showed significant improvement over time ($ps < .05$). When comparing active treatment with WLC, six items showed significantly greater improvement from pre- to posttreatment: physical health, β = −.027, $t_{(182.33)}$ = −2.27, p = .025; mood, β = −.029, $t_{(183.10)}$ = −2.26, p = .019; social relationships, β = −.041, $t_{(182.13)}$ = −3.16, p = .002; ability to function in daily life, β = −.026, $t_{(185.60)}$ = −2.21, p = .028; sexual drive, interest, and/or performance, β = −0.027, $t_{(172.98)}$ = −2.12, p = .035; and overall sense of well-being, β = −.028, $t_{(179.67)}$ = −2.49, p = .014. These beta values, though negative, indicate a positive change over time in quality of life; this is a by-product of coding in the study data. When comparing UP with SDP, the same 12 items showed significant improvement over time (from pre- to posttreatment) but no significant difference in improvement between groups ($ps > .05$).

Potential Moderators

When incorporated into longitudinal mixed effects models, PANAS negative affect, β = .03, $F_{(1, 167.29)}$ = 10.57, p 0.001, was significantly negatively associated with change in quality of life within active treatment conditions; that is, greater levels of negative affect at baseline were associated with less improvement in quality of life for participants in active conditions during treatment. Scores on the MEAQ were nonsignificant in these analyses but remained at a trend level (β = .004, $F_{(1, 129.7)}$ = 3.53, p = .062) and were included in subsequent UP–SDP moderation analyses. In contrast, principal diagnosis, β = −.59, $F_{(1, 165.17)}$ = 0.74, p = .390, and number of comorbid diagnoses, β = .02, $F_{(1, 170.32)}$ = 0.306, p = .581, did not significantly affect the magnitude of change in quality of life across treatment. Note the reported

β values correspond to time-by-moderator interaction variables. Those for the PANAS and MEAQ, although numerically positive, reflect the described inverse relationship when combined with their respective main effect in the full regression model. Of these two measures, neither moderated response between the two active treatment conditions ($p > .05$); in other words, individuals' higher levels of negative affect and experiential avoidance did not display differential change in quality of life as a function of active treatment condition (UP vs. SDP).

Discussion

This study sought to evaluate change in quality of life across CBTs for heterogeneous anxiety disorders and, in particular, to explore whether transdiagnostic approaches demonstrate an advantage for addressing this construct. Of note, at baseline, the sample evidenced reduced quality of life compared with healthy samples, supporting previous research that quality of life is impaired among those with similar pathology (Harnam, Wyrwich, Revicki, Locklear, & Endicott, 2011). Furthermore, across diagnoses at baseline, there were no significant differences in quality of life, suggesting similar levels of impairment in this construct across different diagnostic presentations. Results suggest that participants in both treatment conditions exhibited significant improvement in quality of life compared with those in the waitlist condition at posttreatment, and that these gains were maintained through 6-month follow-up. Specifically, physical health, social relationships, ability to function in daily life, sexual functioning, and overall sense of well-being improved significantly within treatment conditions compared with the waitlist condition. These results underscore that quality of life is an important marker of mental health that is responsive to CBT, and a worthwhile construct for future research.

With regard to whether transdiagnostic CBT exerts more robust effects on quality of life than approaches focused on a single, discrete disorder, time-by-group analyses suggest similar rates of improvement in both UP and SDP conditions. This may be because psychopathological symptom levels resemble an inverse relationship with quality of life, such that greater psychological symptom severity indicates lower quality of life. As such, given that symptom reduction was equivalent across both treatment groups (Barlow, Farchione, Bullis, et al., 2017), it is understandable that comparable improvements in quality of life were observed following treatment, which may explain the nonsignificant finding between treatment groups. These similar outcomes could have important implications for dissemination, however. Namely, one transdiagnostic protocol that can be flexibly applied to not only

treat but also promote quality of life in a range of commonly co-occurring disorders may represent a more efficient, cost-effective intervention than SDPs, with potential implications for increased fidelity to evidence-based practice and reduced training burden.

Item-level analysis indicates that certain aspects of quality of life (namely, physical health, mood, social relationships, ability to function in daily life, sexual functioning, and overall sense of well-being) significantly changed as a function of CBT, whereas other aspects did not change significantly (living/housing situation and the ability to get around physically without feeling dizzy or unsteady or falling). This appears to be consistent with other study outcomes (e.g., depression) and scope of treatment. For example, it is reasonable to anticipate that someone with social anxiety may experience improvement in social relationships as a function of treatment, whereas one may not expect that more stable, external factors such as housing would change over the course of short-term treatment for anxiety. Indeed, individuals with social anxiety saw the greatest treatment effects on quality of life in this study. It is possible that this may be a function of the types of questions on the quality of life measure, namely, that several refer to social domains that may be impaired by social anxiety (e.g., social relationships, family relationships, work, sexual drive, interest, and/or performance). In addition, present results on the mood item of the quality of life measure are consistent with findings from the parent study demonstrating that across conditions, CBT significantly improved depressive symptoms over time (Barlow, Farchione, Bullis, et al., 2017).

Furthermore, moderation analyses suggest negative affect at baseline was the only significant specified moderator of the effect of treatment quality of life, whereas experiential avoidance, comorbidity, and principal diagnosis were nonsignificant. This indicates that level of negative affect may be a particularly salient contributor to individuals' perceptions of their quality of life. One may be more aware of the negative emotions they are feeling, compared with their avoidance of those emotions or the types of situations (e.g., disorder specific) that elicit anxiety, and interpret these emotions as more relevant to their quality of life. It is also possible that trait negative affectivity was captured by the current measures, rather than the ability to tolerate negative affect when it occurs; that is, individuals may be continuing to experience strong negative emotions, but their relationship to those emotions may have changed. Future research should continue to evaluate the link between negative affect and quality of life in CBT.

Results from the present study should be considered in light of several limitations. First, the WLC was not extended through 6-month follow-up as treatment was offered to those in the WLC condition at the time of posttreatment for the other conditions. Although this decision was made for ethical

purposes, the lack of a WLC at follow-up limits our ability to evaluate how the maintained gains in quality of life following treatment compared with the control group. Second, although the measure of quality of life used in this study assesses a range of life domains, other indicators of well-being were not included in the present study. Quality of life is a multifaceted construct (Gallagher, Lopez, & Preacher, 2009; Keyes, 2005), and other components (e.g., positive affectivity, self-actualization, flourishing) are worthwhile to evaluate in future research. Third, it is unclear whether there was sufficient power to detect effects within the moderation analyses. Moderators were chosen based on recently delineated transdiagnostic models of anxiety disorders (e.g., Barlow et al., 2014), and previous research has not yet confirmed these pathways of action (experiential avoidance, negative affectivity) are unique to the UP versus more traditional CBT approaches (i.e., SDPs). As such, the expected magnitude of a moderation effect is unclear, making it difficult to determine the number of subjects needed to detect an effect. Given this limitation, results of moderation analyses should be considered exploratory and further research, including the influence of other potential moderators, is warranted.

Despite these limitations, the current study builds on previous research demonstrating that the UP, and CBT in general, is helpful not only for the treatment of anxiety disorders but also for the promotion of positive facets of mental health across diagnoses. Continuing to assess how quality of life changes in treatment will help to ensure that patients not only decrease symptoms but also increase positive experiences in ways that foster well-being, thriving, and may buffer against future psychopathology.

Declaration of Conflicting Interests

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