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Randomized Controlled Trial of Cognitive Behavioral Therapy and Acceptance and Commitment Therapy for Social Phobia: Outcomes and Moderators

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Objective: Cognitive behavioral therapy (CBT) is an empirically supported treatment for social phobia. However, not all individuals respond to treatment and many who show improvement do not maintain their gains over the long-term. Thus, alternative treatments are needed. *Method:* The current study ($N = 87$) was a 3-arm randomized clinical trial comparing CBT, acceptance and commitment therapy (ACT), and a wait-list control group (WL) in participants with a diagnosis of social phobia based on criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994). Participants completed 12 sessions of CBT or ACT or a 12-week waiting period. All participants completed assessments at baseline and posttreatment, and participants assigned to CBT and ACT also completed assessments 6 and 12 months following baseline. Assessments consisted of self-report measures, a public-speaking task, and clinician ratings. *Results:* Multilevel modeling was used to examine between-group differences on outcomes measures. Both treatment groups outperformed WL, with no differences observed between CBT and ACT on self-report, independent clinician, or public-speaking outcomes. Lower self-reported psychological flexibility at baseline was associated with greater improvement by the 12-month follow-up in CBT compared with ACT. Self-reported fear of negative evaluation significantly moderated outcomes as well, with trends for both extremes to be associated with superior outcomes from CBT and inferior outcomes from ACT. Across treatment groups, higher perceived control and extraversion were associated with greater improvement, whereas comorbid depression was associated with poorer outcomes. *Conclusions:* Implications for clinical practice and future research are discussed.

Keywords: social phobia, acceptance and commitment therapy, cognitive behavioral therapy, moderators, randomized controlled trial

Cognitive behavioral therapy (CBT) is well established as an effective treatment for anxiety disorders. However, a substantial number of patients remain symptomatic, and response rates are low. Researchers have advocated better matching of treatments to individuals as one approach toward improving therapy outcomes, which in turn has motivated the search for alternative treatment approaches. Acceptance and commitment therapy (ACT), which emphasizes personal values and cognitive flexibility, offers one such alternative. In the current study, we compared CBT with ACT for social phobia, a highly prevalent condition. Also, we evaluated differential moderators of outcomes for each treatment approach.

The effectiveness of CBT for anxiety disorders is unquestioned. A review of meta-analyses of RCTs involving no-treatment, wait-list, or placebo controls reported a comparison-weighted grand mean effect size (Cohen's d) of 0.95 from pre- to posttreatment (Butler, Chapman, Forman, & Beck, 2006). Similar results were reported from subsequent meta-analyses (Norton & Price, 2007), with moderate effect sizes ($d = 0.43$) when CBT was compared with active treatment comparisons including psychodynamic therapies (Tolin, 2010).

However, several factors have led to the search for different treatment models. Although CBT is statistically superior to control conditions, substantial numbers of patients fail to complete treatment or achieve clinically significant improvement. For example, the attrition rate in studies of CBT for anxiety disorders published since 2000 ranges from 0% to 53% ($M = 15.5\%$, median = 12.5%; Loerinc, Meuret, Twohig, Rosenfield, & Craske, 2014). Of those who complete treatment, the mean response rates (albeit defined in a variety of ways) range from 3% to 100% ($M = 52.8\%$, median = 50%) for anxiety disorders (Loerinc et al., 2014). This finding begs for further research to either develop more effective methods overall or identify which of several different treatment approaches works best for a particular individual.

Second, meta-analyses and reviews have suggested that key components of CBT, such as cognitive restructuring skills aimed at explicitly regulating cognitive errors and somatic regulatory strategies like breathing retraining, do not raise effect sizes or improve outcomes when combined with exposure therapy compared with exposure therapy alone (Norton & Price, 2007).[1] As such, the extant data have raised significant concerns about the added value of therapeutic strategies that aim to directly regulate internal states.

Third, there is growing interest in behavioral approaches that do not rely on cognitive restructuring, such as behavioral activation treatment for depression (Dimidjian et al., 2006) and ACT (Hayes, Strosahl, & Wilson, 1999). ACT cultivates mindfulness, acceptance, and cognitive defusion (flexible distancing from the literal meaning of cognitions) to increase psychological flexibility and promote behavior change consistent with personal values. *Psychological flexibility* is defined as the ability to make contact with one's experience in the present moment and, based on what is possible in that moment, choosing behavior in the pursuit of goals and values (Hayes et al., 1999). Thus, ACT does not aim to correct cognitive errors or physiological dysregulation but rather uses an acceptance-based approach to manage internal experiences. Experimental data support the value of this approach. Instructions for emotional acceptance have been shown to lower distress and increase tolerance for experimentally induced symptoms of anxiety (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Levitt, Brown, Orsillo, & Barlow, 2004). In an open trial, patients with panic disorder ($n = 11$) trained to observe and accept rather than control their anxiety during exposures showed decreases in panic symptom severity, on par with what is typically seen in CBT (Meuret, Twohig, Rosenfield, Hayes, & Craske, 2012). In the first randomized controlled trial comparing ACT with CBT in patients diagnosed with anxiety disorders (Arch et al., 2012), comparable outcomes were found between CBT and ACT. However, the sample was composed of patients with mixed anxiety disorders and was too small to evaluate the relative effects of CBT and ACT for specific anxiety disorders. ACT was also shown to be effective for social phobia in a single case design study (Dalrymple & Herbert, 2007).

The first goal of the current study was to complete the first examination of the efficacy of ACT relative to CBT for social phobia. We focused on social phobia to decrease heterogeneity in this first comparison study and because social phobia is one of the most common anxiety disorders, with lifetime prevalence rates of 16.6% (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). Our second goal was to evaluate moderators of each treatment approach. Moderators establish subgroups of patients who respond differentially to one treatment versus the other, thereby increasing the utility of the findings for making treatment decisions (Kraemer, Wilson, Fairburn, & Agras, 2002). To our knowledge, only two studies have evaluated moderators of treatment outcomes for anxiety disorders in a comparison of two psychological treatments. In a panic disorder sample, Meuret, Hofmann, and Rosenfield (2010) found that lower perceived control was associated with poorer outcomes from a treatment aimed at changing respiration, whereas higher cognitive misappraisal of anxiety symptoms (i.e., anxiety sensitivity) was related to poorer outcomes from cognitive therapy. In a mixed anxiety disorder sample, (Wolitzky-Taylor, Arch, Rosenfield, & Craske, 2012), CBT outperformed ACT among those with moderate levels of anxiety sensitivity and with no comorbid mood disorder. Also, there were trends for CBT to outperform ACT at higher levels of experiential avoidance. ACT outperformed CBT among those with a comorbid mood disorder, and there were trends to outperform CBT at lower levels of experiential avoidance. Also, neuroticism was a predictor of poorer outcomes, regardless of treatment condition.

In our mixed anxiety disorder sample, we posited that ACT outperformed CBT among those with mood disorders because whereas CBT for anxiety disorders targets anxiety symptoms specifically, ACT addresses negative affect globally. We also hypothesized that moderate levels of anxiety sensitivity were optimal for CBT outcomes and outperformed ACT at this level because high anxiety sensitivity may involve beliefs too rigid to modify in a 12-session protocol, and low anxiety sensitivity may have led to a mismatch with a treatment targeting cognitive misappraisals. In the current study, we sought to examine whether these findings would replicate with a social phobia sample, thereby providing stronger support for these treatment moderators.

Consistent with our previous work, we chose atheoretical (e.g., mood disorder status) and theory-relevant (e.g., experiential avoid-

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[1] These studies establish the effects of coping skill *training*; it is conceivable that *implementation* of cognitive and somatic skills during exposure augments outcomes from exposure therapy but very few studies have evaluated this question (Meuret, Wolitzky-Taylor, Twohig, & Craske, 2012).

ance for ACT, fear of negative evaluation for CBT) putative moderators. We hypothesized that CBT would outperform ACT in a socially anxious sample among those who scored in the moderate range on a measure of cognitive misappraisals specific to social phobia (i.e., beliefs about being negatively evaluated by others), as this parallels our findings with anxiety sensitivity (a measure of cognitive misappraisals relevant to anxiety generally) in the mixed anxiety disorder sample. Based on our prior study, we hypothesized that CBT would outperform ACT in those with higher experiential avoidance and that CBT would outperform ACT among those without a comorbid mood disorder, whereas ACT would outperform CBT in those with a comorbid mood disorder. We chose to examine perceived emotional control as a putative moderator because of the centrality of this construct to CBT and its antithesis to ACT, which emphasizes acceptance rather than control. In line with our previous work showing that higher levels of neuroticism are generally associated with poorer outcomes, we examined whether this finding replicated in a social phobia sample. Finally, we speculated that extraversion would predict better outcomes in general, as extraverted individuals may be more willing to engage in social activities.

Method

Participants

One hundred participants who met the criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) for principal or co-principal social phobia, generalized type, were randomized to ACT ($n = 34$), CBT ($n = 40$), or wait list (WL; $n = 26$). All participants who began treatment ($n = 87$) were included in the intent-to-treat (ITT) sample ($n = 29$ ACT, $n = 33$ CBT, $n = 25$ WL). We used a modified ITT approach in that we did not analyze 10 of the original 100 participants who dropped out prior to treatment initiation before they were aware of their randomization to ACT or CBT: they did not differ from nonattriters on sociodemographic variables ($ps > .12$), clinical severity ratings ($p = .85$), or assignment to ACT ($n = 4$) versus CBT ($n = 5$) versus WL ($n = 1$; $p = .48$). We chose this modified approach because pretreatment attrition gave us no information about treatment preference or response. An additional three participants were subsequently identified as ineligible.[2] See Table 1 for ITT sample characteristics and Figure 1 for patient flow.

Participants were recruited from local flyers, Internet and local newspaper advertisements, and referrals. The study took place at the Anxiety Disorders Research Center in the Department of Psychology at the University of California, Los Angeles. Participants were either medication-free or stabilized (including medications taken as needed) for 1 month for benzodiazepines and beta-blockers and 3 months for selective serotonin reuptake inhibitors/serotonin-norepinephrine reuptake inhibitors and heterocyclics. Also, they were psychotherapy-free or stabilized on alternative psychotherapies (not cognitive or behavioral therapies) that were not focused on their anxiety disorder for at least 6 months. Exclusion criteria were active suicidal ideation; severe depression (clinical severity rating >6, see later discussion); history of bipolar disorder or psychosis; substance abuse or dependence within the previous 6 months; and respiratory, cardiovascular,[3] pulmonary,

neurological, muscular–skeletal diseases, or pregnancy. Because our study included neuroimaging (results reported elsewhere), additional exclusion criteria were left-handedness, metal implants, and claustrophobia.

Design

Participants were assessed prior to treatment (Pre), immediately after treatment (Post), and 6 months (6MFU) and 12 months (12MFU) after Pre. *6MFU* refers to approximately 3 months after treatment completion, and *12MFU* refers to approximately 9 months after treatment completion. Assessments included a diagnostic interview, self-report questionnaires, and a 2- to 3-hr laboratory assessment that included tasks to assess public speaking, emotion regulation, and attentional bias (the laboratory assessment was not conducted at 6MFU). Participants were stratified by age and gender in CBT, ACT, and WL.

Treatments

Participants in the CBT and ACT groups received 12 weekly, 1-hr individual therapy sessions based on detailed treatment manuals.[4] ACT and CBT were matched on number of sessions devoted to exposure but differed in framing of the intent of exposure. Following the 12 sessions, therapists conducted follow-up booster phone calls (20–35 min) once per month for 6 months to reinforce progress consistent with the assigned therapy condition. The majority completed therapy within 12–16 weeks (range: 11–18 weeks).

Cognitive behavioral therapy. CBT for social phobia was derived largely from standard CBT models (e.g., Hope, Heimberg, Juster, & Turk, 2000). This particular CBT has been effective for individuals with social phobia within larger primary care (Craske et al., 2011) and clinic (Arch et al., 2012) samples. Session 1 focused on assessment, self-monitoring, and psychoeducation. Sessions 2–4 emphasized cognitive restructuring errors of overestimation and catastrophizing regarding negative evaluation, combined with hypothesis testing, self-monitoring, and breathing retraining. Exposure to feared social cues (including in-vivo, imaginal, and interoceptive exposure combined with in-vivo exposure) was introduced in Session 5 and emphasized strongly in Sessions 6–11. Cognitive restructuring and breathing retraining were encouraged as coping tools during exposure, with the goal of eventual fear reduction. Session 12 focused on relapse prevention.

Acceptance and commitment therapy. ACT for anxiety disorders followed a manual by Eifert and Forsyth (2005).[5] Session 1 focused on psychoeducation, experiential exercises, and discussion of acceptance and valued action. Sessions 2–3 explored creative

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[2] One patient was diagnosed with a neurological condition, one patient began a new medication during treatment, and one patient was advised by a physician not to participate due to medical concerns.

[3] Medical exclusions were based on participant report of a medical condition diagnosed by a physician; in the case of uncertainty, clarification was obtained directly from physicians. However, participants were not excluded if certain medical conditions were well controlled (e.g., elevated blood pressure, hypothyroidism).

[4] See author for a copy of the CBT treatment manual; the ACT manual is published (Eifert & Forsyth, 2005).

[5] Creative hopelessness was moved from Session 1 to Session 2.

Table 1
Demographic and Clinical Characteristics of Randomized Participants

Characteristic	Total	CBT	ACT	WL	F or χ^2	p
Gender (female)	45.98% (40/87)	42.42% (14/33)	48.28% (14/29)	48.00% (12/25)	0.27	.873
Mean age (years)[a] (range: 19–44)	28.37 (6.76)	29.80 (7.42)	27.42 (5.56)	27.64 (7.08)	1.16	.320
Education (years) (range: 11–19)	15.04 (1.95)	15.55 (1.82)	15.00 (1.87)	14.44 (2.10)	2.36	.100
Marital status					6.91	.141
Married/cohabiting	11.49% (10/87)	21.21% (7/33)	0.00% (0/29)	12.00% (3/25)		
Single	79.31% (69/87)	69.70% (23/33)	89.66% (26/29)	80.00% (20/25)		
Other	9.20% (8/87)	9.09% (3/33)	10.34% (3/29)	8.00% (2/25)		
Reported race/ethnicity[b]					1.02	.602
White	50.57% (44/87)	57.58% (19/33)	48.28% (14/29)	44.00% (11/25)		
Hispanic/Latino/a	17.24% (15/87)	12.12% (4/33)	17.24% (5/29)	24.00% (6/25)		
African American/Black	2.30% (2/87)	3.03% (1/33)	3.45% (1/29)	0.00% (0/25)		
Asian American/Pacific Islander	18.39% (16/87)	15.15% (5/33)	20.69% (6/29)	20.00% (5/25)		
Children (1+)	5.75% (5/87)	9.09% (3/33)	3.45% (1/29)	4.00% (1/25)	1.01	.576
Social phobia: Mean CSR score (range: 4–7)	5.59 (0.97)	5.73 (0.91)	5.45 (1.02)	5.56 (1.00)	0.64	.528
Currently on psychotropic medication[c]	32.18% (28/87)	27.27% (9/33)	27.59% (8/29)	44.00% (11/25)	2.24	.325
Comorbid anxiety disorder (1+)[d]	22.99% (20/87)	27.27% (9/33)	27.59% (8/29)	12.00% (3/20)	2.39	.302
Comorbid depressive disorder[d]	18.39% (16/87)	15.15% (5/33)	20.69% (6/29)	20.00% (5/25)	0.38	.829
Comorbid anxiety or depressive disorder	22.99% (20/87)	24.24% (8/33)	20.69% (6/29)	24.00% (6/25)	0.13	.937
Comorbid anxiety and depressive disorder	9.20% (8/87)	9.09% (3/33)	13.79% (4/29)	4.00% (1/25)	1.54	.462

Note. CBT = cognitive behavioral therapy; ACT = acceptance and commitment therapy; WL = wait-list control group; CSR = clinical severity rating. [a] Demographic data were missing for one person. [b] For race/ethnicity, analyses assessed group differences in minority versus White status. [c] Medications include selective serotonin reuptake inhibitors/serotonin-norepinephrine reuptake inhibitors, other antidepressants/mood stabilizers, benzodiazepines, and as-needed medications. [d] Comorbidity was defined as a CSR of 4 or above on the Anxiety Disorders Interview Schedule–IV.

hopelessness, or whether previous efforts to control anxiety had "worked" and how such efforts had led to the reduction of valued life activities, and encouraged acceptance. Sessions 4 and 5 emphasized mindfulness, acceptance, and cognitive defusion, or the process of experiencing anxiety-related language (e.g., thoughts, self-talk, and so forth) as part of the broader, ongoing stream of present experience rather than getting stuck in responding to its literal meaning. Sessions 6–11 continued to hone acceptance, mindfulness, and defusion, and added values exploration and clarification with the goal of increasing willingness to pursue valued life activities. Behavioral exposures, including interoceptive, in-vivo, and imaginal, were used to practice making room for, mindfully observing, and accepting anxiety and to practice engaging in valued activities while experiencing anxiety. Session 12 reviewed what worked and how to continue moving forward.

Wait-list control condition. WL participants waited to begin treatment for 12 weeks from the date of their baseline functional MRI assessment. They rated daily anxiety and depression and were contacted biweekly by the research coordinator who assessed whether symptoms had worsened and whether referrals were warranted (no WL participants were referred out of the study). After Post assessment, participants were offered treatment free of charge and were able to choose either CBT or ACT. No follow-up assessments were conducted for the WL group.

Therapists

Study therapists were advanced clinical psychology doctoral students and those who had recently received PhDs at UCLA who had at least 2 years of supervised training in delivering psychological treatments and at least 1 year training in CBT or ACT. In addition, therapists completed intensive in-person 2-day workshops for CBT or ACT. Therapists were assigned to ACT, CBT, or both (i.e., treatment in both CBT and ACT, though never at the same time), depending on need.[6] There were 28 therapists; 13 therapists worked exclusively in CBT, 12 worked exclusively in ACT, and three treated both ACT and CBT participants. There were no differences among therapists who provided CBT, ACT or both in terms of gender, age, or years since entering graduate school (ps > .39). Generally, therapists treated 1 or 2 patients at a time, and 2–5 therapists worked within each treatment condition at a time. The mean number of patients treated by CBT-only therapists was 2.38 (SD = 1.56; range = 1–6; total = 31 participants), by ACT-only therapists was 2.67 (SD = 1.30; range = 1–5: total = 32 participants), and by therapists who treated both ACT and CBT was 5.67 (SD = 2.52; range = 3–8; total = 17 participants).

Weekly, 90-min group supervision meetings were held separately for CBT and ACT. For CBT, the supervision was led by professors and postdoctoral fellows at UCLA and was held in person. For ACT, supervision was led via Skype by advanced therapists from the University of Nevada, Reno, where ACT was originally developed.[7]

Outcome Measures

Because CBT emphasized symptom reduction, whereas ACT emphasized psychological flexibility and valued living, we investigated two sets of primary outcomes: symptom reduction, and

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[6] Therapists who provided CBT and ACT had experience in both treatments.
[7] UCLA supervisors observed but did not participate in ACT supervision sessions.

Enrollment

Phone Screener (n=286)

Excluded (n=119)
- Not meeting study criteria (n=55)
- Declined in person interview (n=8)
- No show to in person interview (n=56)

In-person Interview (n=167)

Excluded (n=67)
- Not meeting study criteria (n=55)
- Time commitment (n=3)
- Refused fMRI (n=1)
- Lost contact (n=6)
- Other (n=2)

Dropped prior to tx (n=10)
- Lost Contact (4)
- Time Commitment (3)
- No medical clearance (1)
- Unknown (2)

Randomized (n=100)

Became ineligible (n=3)
- Physical condition (2)
- Began new medication (1)

Treatment

Allocated to CBT (n=33)   Allocated to ACT (n=29)   Allocated to WL (n=25)

Follow-up

Assessed at Post (n=21)
- Lost contact (2)
- Time commitment (3)
- Started other tx (1)
- Didn't like being in a study (1)
- Became ineligible (1)
- Missed too many sessions (1)
- Unknown (3)

Assessed at Post (n=23)
- Lost contact (2)
- Time commitment (1)
- Didn't like being in a study (1)
- Moved away (1)
- Missed too many sessions (1)

Assessed at Post (n=23)
- Time commitment (1)
- Started other tx (1)

Assessed at follow-up 1 (n=14)
- Unable to contact/schedule (7)

Assessed at follow-up 1 (n=18)
- Unable to contact/schedule (5)

Assessed at Follow-up 2 (n=16)
- Time commitment (1)
- Unable to contact/schedule (4)

Assessed at Follow-up 2 (n=18)
- Unable to contact/schedule (5)

Analysis

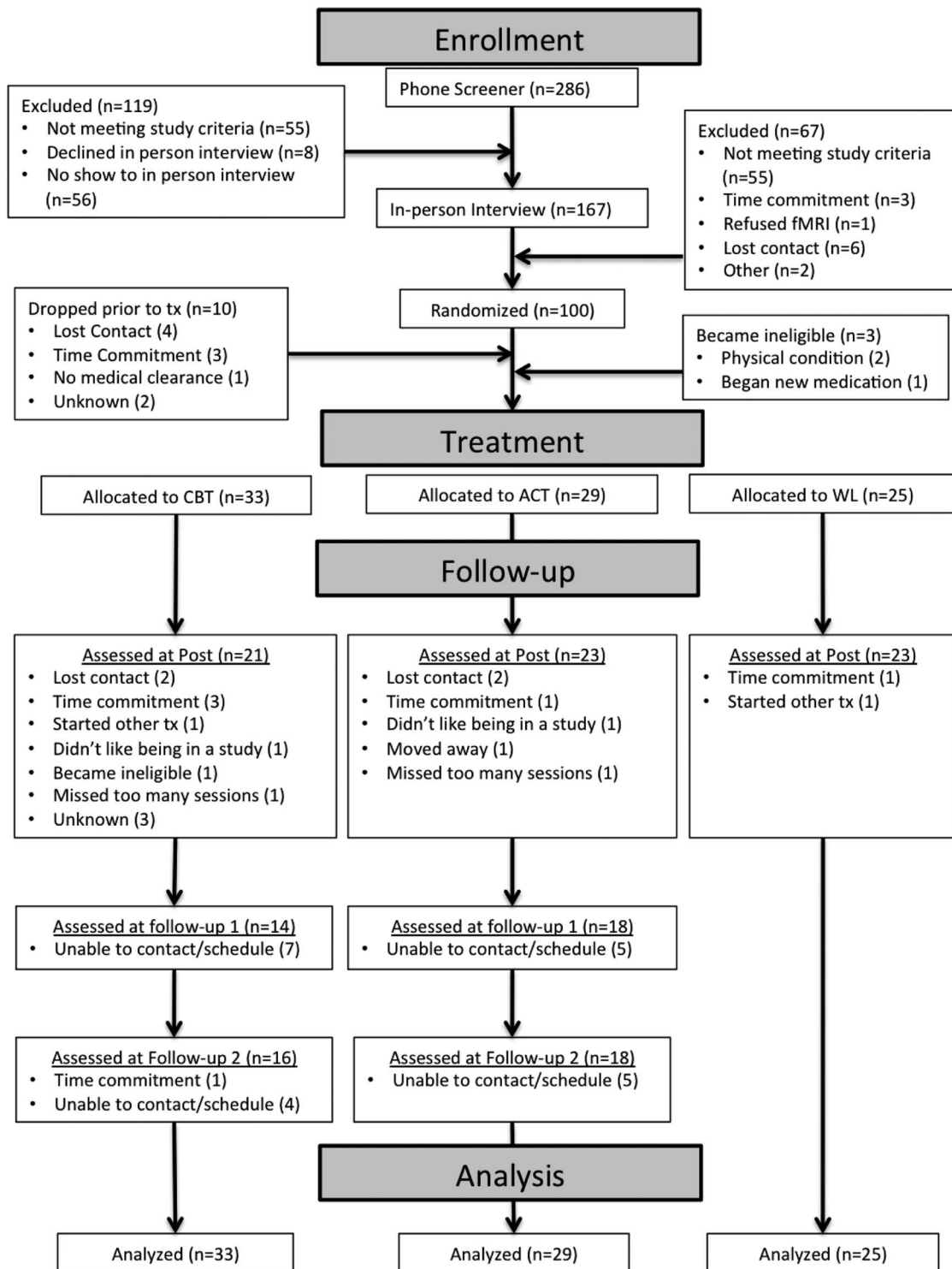Analyzed (n=33)   Analyzed (n=29)   Analyzed (n=25)

Figure 1. Patient flow chart. CBT = cognitive behavioral therapy; ACT = acceptance and commitment therapy; WL = wait-list control group; tx = treatment.

quality of life. Also, we investigated outcomes during a public speaking task.

Social anxiety symptoms.

Clinical severity rating (CSR). Clinical diagnoses were ascertained using the Anxiety Disorders Interview Schedule–IV (ADIS–IV; Brown, Di Nardo, & Barlow, 1994). Doctoral students in clinical psychology or research assistants served as interviewers after completing 15–20 hr of training and demonstrating adequate diagnostic reliability on three consecutive interviews. Clinical severity ratings (CSR) were assigned to each disorder on a 0 to 8 scale (0 = *none*, 8 = *extremely severe*). CSR ratings of 4 or higher indicated clinical severity and, in the case of social phobia, served as the cutoff for study eligibility. All interviews were audio-recorded, and a subset was randomly selected ($n = 22$) for blind rating by a second interviewer.[8] Interrater reliability on the principal diagnosis ($n = 22$) was 100%, and on dimensional CSR ratings for social phobia ($n = 10$) was 1.00 (intraclass correlation, or ICC; 100% agreement).

Fear and avoidance ratings. As part of the ADIS–IV, the clinician rated fear and avoidance, each on a 0-to-8 scale (from *none* to *extreme anxiety and avoidance*), for 13 social situations (e.g., parties, public speaking, dating, and speaking with unfamiliar people). Scores were summed and ranged from 0 to 208; Cronbach's αs = .88 (Pre) and .93 (Post). Fear and avoidance ratings are similar in structure and content to the widely used, clinician-administered Liebowitz Social Anxiety Scale (Liebowitz, 1987).

Self-report scales. We selected three widely used and well-validated self-report measures of social anxiety symptoms. The Liebowitz Social Anxiety Scale–Self-Report (LSAS–SR; Fresco et al., 2001) is a 24-item measure that assesses fear and avoidance of social interactional and performance situations. Each item is rated on a scale from 0 (*no fear/never avoid*) to 3 (*severe fear/usually avoid*). Scores were calculated as the sum of fear and avoidance ratings across social and performance situations. In the current sample, Cronbach's αs = .97 (Pre) and .94 (Post). The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) is a 20-item measure of cognitive, affective, or behavioral reactions to social interaction in dyads or groups. Participants respond on a Likert scale from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). Cronbach's αs = .96 (Pre) and .95 (Post). The Social Phobia Scale (SPS; Mattick & Clarke, 1998) is a 20-item measure describing situations or themes related to being observed by others. Participants rate the extent to which each item is characteristic of them on a 0 to 4 scale. In the current sample, αs = .93 (Pre) and .90 (Post).

Composite scale. A composite was created from the LSAS, SIAS, and SPS to generate a more reliable and valid index of social anxiety symptoms. Z scores were calculated for each measure at Pre, and standardization was based on Pre means and standard deviations for each subsequent assessment using the equation (Time 2 score − Time 1 mean)/(Time 1 SD). The composite score represented averages of the three measures.

Quality of life. The Quality of Life Inventory (QOLI; Frisch, 1994) assesses 16 life domains and has good test–retest reliability and internal validity (Frisch et al., 2005). The QOLI was selected since its measurement of importance of, as well as satisfaction with, different life domains parallels ACT therapeutic strategies. In the current sample, Cronbach's αs = .85 (Pre) and .84 (Post).

Subjective units of distress (SUDS) during public speaking. During the laboratory assessment, participants spoke before a two-member audience for 3 min on an experimenter-selected topic, while being videotaped. They were given 5 min to prepare their speech. A 2-min anticipation period preceded the speech. Participants who refused to give the speech were offered three alternatives: give the speech with no audience (Pre: $n = 2$, 2.3%; Post: $n = 2$, 3.0%; 12MFU: $n = 3$, 10.0%), read in front of the audience (Pre: $n = 5$, 5.8%; Post: $n = 1$, 1.5%; 12MFU: $n = 1$, 3.3%), or read with no audience (Pre: $n = 3$, 3.5%; Post: $n = 1$, 1.52%; 12MFU: $n = 0$, 0%). Participants rated their anxiety (SUDS) on a scale from 0 to 100 four times: before beginning and at 1-min intervals throughout (mean of the four ratings were analyzed). Those who chose an alternative speaking task were given SUDS ratings of 100.

Moderator Measures

Demographics. Demographic information (i.e., age, gender, and ethnicity) was collected during the ADIS–IV interview.

Theory-relevant moderators. The 10-item Self-Statements During Public Speaking Questionnaire (SSPS; Hofmann & DiBartolo, 2000) assesses fears of negative evaluation. After public speaking, participants rated the extent to which they experienced five negative and five positive thoughts during the speaking task. Sample items include "I'm a loser" and "What I say will probably sound stupid." The SSPS shows good internal consistency ($\alpha = .86$) and test–retest reliability ($r = .80$; Hofmann & DiBartolo, 2000). Mean ratings for negative thoughts were analyzed in the current sample: alphas were .88 (Pre) and .90 (Post). The 16-item Acceptance and Action Questionnaire–16 (AAQ; Hayes et al., 2004) assesses psychological flexibility (Bond et al., 2011). Sample items include "It's OK to feel depressed or anxious" and "There are not many activities that I stop doing when I am feeling depressed or anxious." The AAQ is sensitive to clinical change and has good internal consistency ($\alpha = .70$) and test–retest reliability ($r = .64$; Hayes et al., 2004). One- and two-factor solutions have been fit to the 16-item AAQ (Bond & Bunce, 2000). Herein, a one-factor scale was used, with higher scores indicating greater psychological flexibility: alphas were .83 (Pre) and .88 (Post).

Comorbidity, personality, and perceived control. From the ADIS–IV, we examined co-occurring anxiety disorders (yes = 1 and no = 0) and co-occurring mood disorders (yes = 1 and no = 0) with a CSR of 4+. The Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975) assessed neuroticism and extroversion, each with 12 yes–no items. Items were summed and higher scores represent higher neuroticism or extroversion. The questionnaire is well validated in adult samples, and neuroticism and extroversion consistently emerge as distinct personality factors (Kline & Barrett, 1983). Current alphas for neuroticism were .86 (Pre) and .84 (Post) and for extroversion were .90 (Pre) and .85 (Post). The Anxiety Control Questionnaire (ACQ; Rapee, Craske, Brown, & Barlow, 1996) assesses perceived control over anxiety. We used the revised 15-item version (Brown, White, Forsyth, & Barlow, 2004). Participants identify how much they agree with

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[8] Given the mixed anxiety disorder sample and subsequently low number of participants per disorder, ICCs for individual disorders should be interpreted cautiously.

each statement with higher scores indicating greater perceived control. The 15-item version has demonstrated adequate reliability (Brown et al., 2004). Current alphas were .89 (Pre) and .90 (Post).

Treatment Credibility

Prior to the second therapy session, after treatment rationales, participants completed a six-item treatment credibility questionnaire adapted from Borkovec and Nau (1972; $\alpha = .95$).

Treatment Adherence and Therapist Competence

We randomly selected 45 audio-taped sessions from 24 participants (12 in CBT, 12 in ACT) for treatment adherence and therapist competency ratings using the Drexel University ACT/CT Therapist Adherence and Competence Rating Scale (McGrath, Forman, & Herbert, 2014) which yielded five adherence items scales: general therapy adherence (seven items), general behavioral therapy adherence (seven items), cognitive therapy adherence (nine items), ACT adherence (11 items), and therapist competence (five items). A blind rater who had no involvement with the study but had extensive training in both ACT and CBT and had previously rated over 200 therapy sessions of ACT and CBT noted which adherence items occurred in each 5-min segment of therapy. Adherence scale scores were the percentage of time spent on treatment-specific behavior (0 = no time spent; 1 = entire session was devoted to the treatment-specific behavior). Overall adherence scores ranged from .17 to 1.0. Therapist competence was rated on five items (e.g., knowledge of treatment, skill in delivering treatment, and relationship with client; 1 = *poor*, 3 = *good*, 5 = *excellent*), and the mean was calculated. Rater reliability was assessed from audio-taped sessions from the current study and an earlier study using the same treatment protocols (Arch et al., 2012). Interrater reliability on 35 sessions was excellent (ICCs for scales ranged from .78 to .97). Intrarater reliability of the primary rater, which was assessed on 18 sessions, was excellent (ICCs for scales ranged from .98 to 1.0).

Statistical Analyses

Raw data were inspected graphically; one outlier ($\pm$ 3 *SD*s) was replaced with the next highest value using the Winsor method (Guttman, 1973).[9] Longitudinal data were analyzed with multilevel modeling (MLM) in Stata 12.0 using the xtmixed command. MLM accounts for nesting of time-points within subjects, allowing examination of change within and between subjects across Time (Pre, Post, 6MFU, 12MFU) and by group (ACT, CBT and WL). MLM includes participants with missing data and uses all available data to estimate the models. To test whether data were missing at random, we coded participant dropout using a dummy variable (0 = no dropout, 1 = dropout), and models were constructed controlling for dropout status using the guidelines proposed by Hedeker and Gibbons (2006). Results did not differ between models that included dropout as a predictor and those that did not. Residuals were normally distributed across all models.

Main effects of treatment. In the MLM, time was modeled at Level 1 (Pre, Post, 6MFU, 12MFU) using a piecewise approach (e.g., Roy-Byrne et al., 2005), which specifies a linear segment between Pre and Post (S1) and another linear segment for the subsequent 6MFU and 12MFU (S2). The two segments, S1 and S2, meet at Post. This approach models typical trends in treatment studies, where the greatest effects occur by Post, and change levels off over follow-up. Treatment group (CBT, ACT, WL) was included at Level 2. All models included random effects of the intercept, and random effects for S1 and S2 were included when significant. Unstructured versus heterogeneous variance/covariance structures were examined for model fit using likelihood ratio tests. The model with the best fit was selected, and if models did not significantly differ, the model with the fewest parameters was chosen. The variance/covariance structure of Level-1 residuals was modeled as independent (which was not significantly different from an autoregressive or exchangeable structure). We assessed between-group differences via marginal means at each time point and by comparing S1 in ACT, CBT and WL, and S2 in ACT and CBT. The MLM equation for a model with random effects for the intercept only is depicted as follows:

$$L1: Y_{ti} = b_{0i} + b_{1i}S1_i + b_{2i}S2_i + e_{ti},$$

$$L2: b_{0i} = g_{00} + g_{01} C_{ACT} + g_{02} C_{WL} + u_{0i}$$
$$b_{1i} = g_{10} + g_{11} C_{ACT} + g_{12} C_{WL}$$
$$b_{2i} = g_{20} + g_{21} C_{ACT},$$

where Y_{ti} = score on dependent variable (DV) at Time t for individual i; $S1_i$ = immediate treatment effect; $S2_i$ = follow-up treatment effect; C_{ACT} = treatment group (0 = CBT, 1 = ACT); C_{WL} = treatment group (0 = CBT, 1 = WL); b_{0i} = intercept of the DV for individual i; b_{1i} and b_{2i} = growth parameters; g_{00} = mean score on DV at Pre in CBT; g_{01} = mean difference between score on DV at Pre in ACT versus CBT; g_{02} = mean difference between score on DV at Pre in WL versus CBT; g_{10} = mean change on DV at Post in CBT; g_{11} = mean difference between change on DV at Post in ACT versus CBT; g_{12} = mean difference between change on DV at Post in WL versus CBT; g_{20} = mean change in DV at each subsequent follow-up in CBT; g_{21} = mean difference in change in DV at each subsequent follow-up between ACT versus CBT; u_{0i} = random error component for the deviation of the intercept of an individual i from the overall intercept; e_{ti} = Level-1 variance at time t for individual i.

Moderated effects. Consistent with prior studies of moderators (Wolitzky-Taylor et al., 2012), we chose a MLM, repeated-measures analysis of covariance (ANCOVA)-like design, implemented using the xtmixed command in Stata 12.0. Pre values of the dependent measures were included as a covariate, and Post, 6MFU, and 12MFU were levels of the repeated measures independent variable (time). Therefore, only participants with Post scores were included in the moderator analysis.[10] Intercept was included as a random effect, and the variance/covariance structure of the Level-1 residuals was modeled as independent.

Between-subjects variables consisted of group (CBT or ACT; WL was not included in moderator analyses), Pre level of the dependent variable (as a covariate), and moderators. A separate

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[9] Results did not differ between Winsorized/corrected and uncorrected data.

[10] Although multiple imputation can be used to estimate missing data, simulation studies suggest that with large amounts of missing data on the dependent variable (10–20%), multiple imputation can inflate standard errors and should not be used (von Hippel, 2007).

MLM analysis was performed for each moderator. Interactions with group and time and the triple interaction among moderator, group, and time were included. Quadratic terms for the moderator and its interaction with group and time were tested. When nonsignificant, the quadratic term was dropped, and linear relationships were tested. Similarly, when time did not significantly interact with the moderator or group, time was dropped, and two-way interactions were tested. Moderator analyses were limited to composite symptoms and fear and avoidance outcomes; CSR was excluded due to limited range in the data, and anxiety during public speaking was excluded due to a nonnormal distribution that produced inaccurate parameter estimates in the model.

Results

Pretreatment Group Differences

No significant differences emerged among ACT, CBT and WL on any outcome measures at Pre ($ps > .495$). No group differences were found in previous or concurrent use of psychotherapy (CBT = 52%, 17/33; ACT = 55%, 16/29; WL = 72%, 18/25; $\chi^2(2) = 2.67$, $p = .263$) or psychotropic medication (CBT = 27%, 9/33; ACT = 28%, 8/29: WL = 44%, 11/25; $\chi^2(2) = 2.24$, $p = .302$; see Table 1). ACT, CBT and WL did not differ on sociodemographic or clinical characteristics at Pre (Table 1).

Treatment Credibility

Treatment credibility ratings did not differ significantly between ACT ($M = 4.83$, $SD = 2.5$) and CBT ($M = 4.2$, $SD = 2.4$), $t(60) = -1.02$, $p = .311$.

Therapist Competence and Treatment Integrity

Therapist competence scores indicated "good" therapist skills in CBT ($M = 3.06$, $SD = 0.67$) and ACT ($M = 3.21$, $SD = 0.57$) that did not significantly differ, $t(42) = -0.76$, $p = .449$. As expected, cognitive therapy adherence was higher in CBT ($M = 0.55$, $SD = 0.29$) than in ACT ($M = 0.05$, $SD = 0.06$), $t(42) = 7.87$, $p < .001$, and ACT adherence was higher in ACT ($M = 0.87$, $SD = 0.17$) than in CBT ($M = 0.04$, $SD = 0.08$), $t(42) = -20.19$, $p < .001$. Scores for adherence to behavioral exposure were higher in CBT ($M = 0.61$, $SD = 0.29$) than in ACT ($M = 0.16$, $SD = 0.23$), $t(42) = 5.68$, $p < .001$. Overall, therapy adherence ratings were higher in ACT ($M = 0.87$, $SD = 0.17$) than in CBT ($M = 0.55$, $SD = 0.29$), $t(42) = -4.56$, $p < .001$, although therapists adhered strongly to their assigned treatments in both groups.

Regression analyses were conducted within the subsample of participants whose sessions had been rated to test whether therapist adherence to behavioral exposures was a significant predictor of symptoms, clinical severity rating, fear and avoidance ratings, quality of life, and SUDS during public speaking at Post, controlling for symptoms at Pre. Adherence to behavioral exposure was not a significant predictor of any outcome ($ps > .233$). In addition, therapist-rated homework compliance averaged across Sessions 6–12 (sessions in which exposure was emphasized) was examined as a predictor of the five treatment outcomes at Post. Homework compliance did not significantly predict any outcome ($ps > .302$).

Treatment Attrition

Of 62 participants, 46 (74%) completed all 12-treatment sessions: CBT = 67% (22/33) and ACT = 83% (24/29). Two completed one session, and 14 completed between two and 11 sessions. Attrition did not differ between CBT and ACT, $\chi^2(1) = 2.09$, $p = .149$. One participant dropped from WL.

Treatment Outcomes

First, p values from the Group $\times$ Time interaction are presented for S1 (modeling Pre to Post) and S2 (modeling Post through 12MFU). S1 compares ACT, CBT, and WL, and S2 compares ACT and CBT. Second, for significant Group $\times$ Time interactions, we present beta values for pair-wise slope comparisons (i.e., simple effects) and associated p values. Third, p values for S1 and S2 within each group are presented, comparing whether each slope differs significantly from zero. Results are displayed in Figure 2. Estimated means and 95% confidence intervals (CI) from the piecewise model for each group are displayed in Table 2. CIs and effect sizes for pair-wise group slope comparisons[11] are displayed in Table 3.

Symptom outcomes. The Time $\times$ Group interaction for composite symptoms was significant for S1 ($p < .001$) but not for S2 ($p = .318$). For S1 pair-wise group slope comparisons, CBT had larger reductions in symptoms than WL ($b = .80$; CI [0.40, 1.2]; $p < .001$), as did ACT ($b = .88$; CI [0.49, 1.3]; $p < .001$), whereas CBT and ACT slopes did not differ from each other ($b = -.09$; CI [−0.49, 0.32]; $p = .675$). S1 change slopes indicated composite symptom reductions in CBT ($p < .001$) and ACT ($p < .001$) but not WL ($p = .158$). S2 change slopes were not significant in CBT ($p = .089$) or ACT ($p = .736$).

The Time $\times$ Group interaction for clinical severity ratings was significant for S1 ($p < .001$) but not for S2 ($p = .629$). For S1 pair-wise group slope comparisons, CBT had larger reductions in clinical severity than WL ($b = 2.13$; CI [–1.29, 2.98]; $p < .001$), as did ACT ($b = 1.52$; CI [0.68, 2.37]; $p < .001$), whereas CSR slopes did not differ between CBT and ACT ($b = .61$; CI [0.20, −1.43]; $p = .140$). S1 change slopes indicated significant clinical severity reduction in CBT ($p < .001$) and ACT ($p < .001$), but not WL ($p = .343$). S2 change slopes were not significant in CBT ($p = .974$) or ACT ($p = .501$).

The Time $\times$ Group interaction for fear and avoidance ratings was significant for S1 ($p = .003$) but not for S2 ($p = .366$). For S1 pair-wise group slope comparisons, CBT showed larger reductions in fear and avoidance than WL ($b = 28.85$; CI [12.3, 45.4]; $p = .001$), as did ACT ($b = 18.00$; CI [1.4, 34.6]; $p = .033$), whereas the slopes did not differ between CBT and ACT ($b = -10.86$; CI [−27.0 to 5.3]; $p = .188$). S1 change slopes indicated significant fear and avoidance reduction in CBT ($p < .001$) and ACT ($p < .001$), but not WL ($p = .538$). S2 change slopes were not significant in CBT ($p = .605$) or in ACT ($p = .060$).

Quality of life. The Time $\times$ Group interaction for quality of life was not significant for S1 ($p = .539$) or S2 ($p = .427$). S1 change slopes were not significant for CBT ($p = .096$), ACT ($p =

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[11] Effect sizes are calculated based on the method described by Feingold (2009) that produces estimates analogous to Cohen's d for growth curve models in randomized clinical trials.
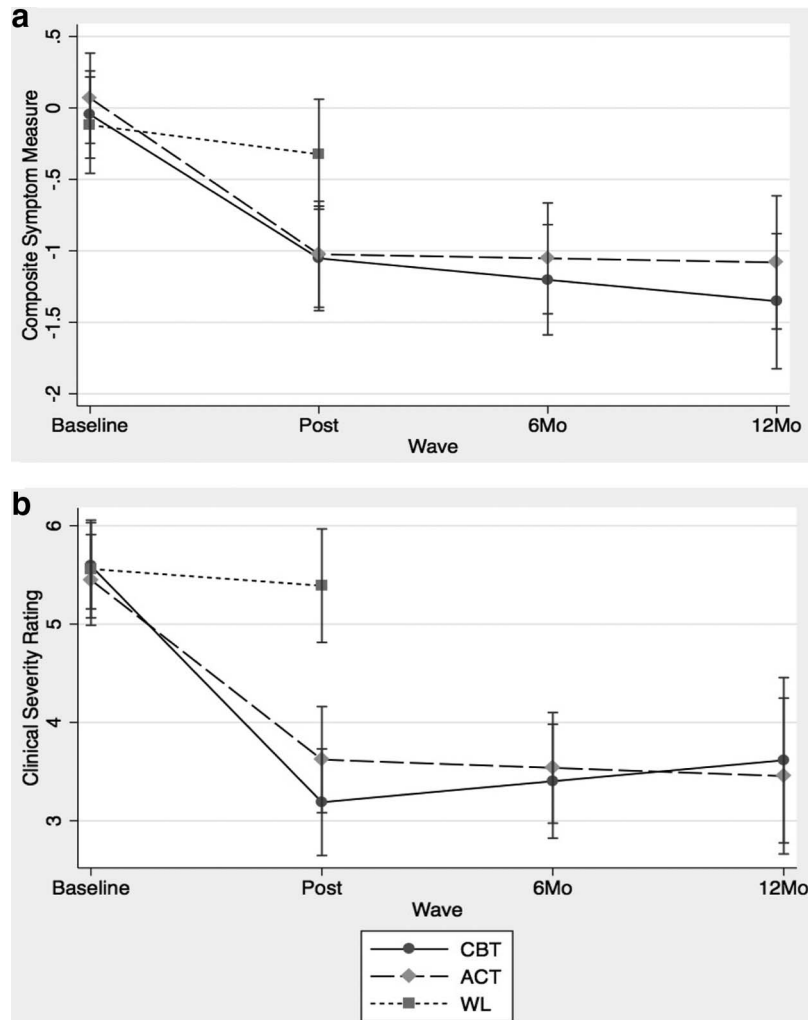
Figure 2. Main effects of cognitive behavioral therapy (CBT), acceptance and commitment therapy (ACT), and wait-list (WL) groups on (a) social anxiety symptom composite and (b) clinical severity rating. Post = posttreatment; Mo = month. Error bars represent standard error.

.788), or WL ($p = .774$). S2 change slopes were not significant for CBT ($p = .783$) or ACT ($p = .146$). Because graphical inspection of means yielded a linear as opposed to piecewise change in quality of life, analyses were retested with time modeled as a continuous linear predictor for CBT and ACT groups. The Time × Group interaction was not significant ($p = .937$), but there was a main effect of time ($b = .16$; CI [.03, .28]; $p = .015$), reflecting improvement in quality of life over the four assessment time points regardless of treatment group.

Public speaking. The Time × Group interaction was not significant for subjective distress during public speaking for S1 ($p = .469$) or for S2 ($p = .051$). S1 change slopes indicated a significant reduction in subjective distress in CBT ($p < .001$), ACT ($p < .001$), and WL ($p < .001$). S2 change slopes were not significant in ACT ($p = .096$) or in CBT ($p = .265$).

Clinically Significant Improvement

Participants were classified as having achieved clinically significant improvement if (a) their CSR for social phobia was ≤3, and (b) they showed statistically reliable change on either of the companion scales of performance (SPS) or interactional (SIAS) anxiety. Reliable change was calculated as outlined by Jacobson and Truax (1991) using Maassen's (2004) more conservative denominator. Rates at Post were as follows: CBT = 52.3% ($n = 11/21$), ACT = 40.9% ($n = 9/22$), and WL = 4.3% ($n = 1/23$); $\chi^2(2, N = 66) = 12.93$, $p = .001$. CBT and ACT both outperformed WL, $\chi^2(1, N = 44) = 12.77$, $p < .001$ and $\chi^2(1, N = 45) = 8.70$, $p < .01$, respectively, with no differences between CBT and ACT ($p = .45$). 6MFU rates were CBT = 57.1% ($n = 8/14$) and ACT = 53.3% ($n = 8/15$; $p = .84$). 12MFU rates were CBT = 40.0% ($n = 6/15$) and ACT = 41.2% ($n = 7/17$; $p = .95$). These percentages dropped slightly when we carried the last observation forward in an ITT analysis: Percentages of those achieving clinically significant change were 47.8%, 37.5%, and 4.3% for CBT, ACT, and WL, respectively, at posttreatment; 56.5% and 41.7% for CBT and ACT, respectively, at 6MFU; and 47.8% and 33.3% for CBT and ACT, respectively, at 12MFU.

Table 2

Estimated Means [and Confidence Intervals] at Each Time Point for Cognitive Behavioral Therapy (CBT), Acceptance and Commitment Therapy (ACT), and Wait-List (WL)

Measure and time point	CBT	ACT	WL
		Symptoms measures	
Composite symptom scale			
Baseline	−0.1 [−0.4, 0.3]	0.1 [−0.3, 0.4]	−0.1 [−0.5, 0.2]
Post	−1.1 [−1.4, −0.7]	−1.0 [−1.4, −0.7]	−0.3 [−0.7, 0.1]
6 months	−1.2 [−1.6, −0.8]	−1.1 [−1.4, −0.7]	
12 months	−1.4 [−1.8, −0.9]	−1.1 [−1.5, −0.6]	
Clinical severity rating			
Baseline	5.7 [5.3, 6.0]	5.4 [5.0, 5.8]	5.6 [5.2, 6.1]
Post	3.2 [2.7, 3.8]	3.6 [3.1, 4.1]	5.3 [4.7, 5.9]
6 months	3.2 [2.7, 3.8]	3.5 [3.0, 4.0]	
12 months	3.2 [2.5, 4.0]	3.4 [2.7, 4.1]	
Fear and avoidance ratings			
Baseline	97.1 [87.8, 106.5]	99.2 [89.2, 109.2]	103.3 [92.5, 114.0]
Post	64.5 [52.0, 77.0]	77.4 [64.8, 90.1]	99.5 [86.1, 112.9]
6 months	63.0 [51.2, 74.8]	72.4 [60.6, 84.3]	
12 months	61.5 [54.2, 80.7]	67.4 [54.2, 80.7]	
		Quality of life measure	
QOLI (weighted average)			
Baseline	0.4 [−0.2, 1.0]	0.5 [−0.2, 1.1]	0.0 [−0.7, 0.8]
Post	0.8 [0.1, 1.5]	0.5 [−0.2, 1.2]	0.1 [−0.6, 0.8]
6 months	0.8 [0.2, 1.5]	0.7 [0.1, 1.4]	
12 months	0.9 [0.2, 1.6]	0.9 [0.2, 1.6]	
		Public-speaking measure	
SUDS during speech			
Baseline	60.5 [51.4, 69.6]	64.6 [55.2, 74.0]	67.8 [57.4, 78.1]
Post	34.0 [23.0, 44.9]	41.9 [31.5, 52.3]	51.4 [40.9, 62.0]
12 months	41.9 [29.5, 54.2]	31.0 [19.3, 42.8]	

Note. Post = posttreatment; QOLI = Quality of Life Inventory; SUDS = subjective units of distress.

Additional Psychotherapy and Medication

From Post to 12MFU, eight participants stopped psychotropic medication (three in CBT and five in ACT), and three began medication (two in CBT and one in ACT). Over the same interval, no participant ended psychotherapy, and four began new psychotherapy (all four in the ACT group; all between 6MFU and 12MFU).

Moderators and Predictors

Moderators and predictors were evaluated in terms of self-reported composite symptoms and independent clinician ratings of fear and avoidance. Each variable was first tested for moderation (interaction between group and moderator), and if not significant, then tested as a predictor (main effect).

Demographics.

Moderator. Gender, age, and ethnicity did not significantly moderate composite symptoms or fear and avoidance ratings (ps > .062).

Predictor. Gender was a significant predictor of composite symptoms ($z = 2.01$, $p = .044$), with women reporting fewer symptoms than men ($b = -.43$; CI [−0.011, −0.84]), collapsed across groups and follow-up assessments. The same effect was found for fear and avoidance ratings ($z = 1.64$ $p = .024$) with women rated as less fearful and avoidant than males ($b = -16.60$; CI [−2.13, −31.06]) collapsed across groups and

follow-up assessments. Neither age nor ethnicity was a significant predictor of either outcome (ps > .230).

Theoretically relevant.

Moderator. The linear experiential avoidance (AAQ) term interacted with group and time to moderate composite symptoms, $\chi^2(1, N = 44) = 4.04$, $p = .044$. As shown in Figure 3, tests of simple effects revealed a significant interaction at 12MFU. For participants 1 standard deviation below the mean on AAQ (higher experiential avoidance), CBT resulted in greater symptom reduction than ACT ($b = 1.03$; CI [.055, 2.01]; $p = .038$). In addition, within CBT, participants 1 standard deviation below the mean on AAQ (higher experiential avoidance) showed greater symptom reduction than those 1 standard deviation above the mean ($b = 1.49$; CI [0.034, 2.95], $p = .045$). Experiential avoidance did not moderate fear and avoidance ratings (ps > .510).

The quadratic fear of negative evaluation (SSPS) term significantly interacted with group and time to moderate fear and avoidance ratings, $\chi^2(1, N = 50) = 7.48$, $p = .01$. However, tests of simple effects revealed that the groups did not significantly differ from one another at any value of SSPS from 2 standard deviations below to 2 standard deviations above the mean at Post, 6MFU, or 12MFU (ps > .102). Although no significant simple effects were found, the groups showed inverse curvilinear relationships between fear of negative evaluation and outcomes (see Figure 4). Fear of negative evaluation did not moderate composite symptoms (ps > .223).

Table 3

Estimated Slopes (Change) From Pre- to Posttreatment (S1) and Posttreatment to 12-Month Follow-Up (S2), and Effect Sizes (Cohen's d) for Pair-Wise Group Slope Comparisons

Measure and slope	CBT β [95% CI]	ACT β [95% CI]	WL β [95% CI]	CBT vs. ACT d^{a}	ACT vs. WL d	CBT vs. WL d
		Symptoms measures				
Composite symptom scale						
S1	−1.0 [−1.3, −0.7]***	−1.1 [−1.4, −0.8]***	−0.2 [−0.5, 0.1]	0.11	0.97	1.02
S2	−0.1 [−0.3, 0.0]	0.0 [−0.2, 0.1]		0.23		
Clinical severity rating						
S1	−2.4 [−3.0, −1.9]***	−1.8 [−2.4, −1.2]***	−0.3 [−0.9, 0.3]	0.62	1.51	2.19
S2	0.0 [−0.3, 0.4]	−0.1 [−0.4, 0.2]		0.16		
Fear and avoidance ratings						
S1	−32.6 [−44.1, −21.2]***	−21.8 [−33.2, −10.3]***	−3.8 [−15.8, 8.2]	0.43	0.60	1.04
S2	−1.5 [−7.1, 4.1]	−5.0 [−10.2, 0.2]		0.31		
		Quality of life measure				
QOLI (higher numbers indicate improvement)						
S1	0.4 [−0.1, 0.9]	0.1 [−0.4, 0.5]	0.1 [−0.4, 0.6]	0.23	0.00	0.26
S2	0.0 [−0.2, 0.3]	0.2 [−0.1, 0.5]		0.17		
		Public-speaking measure				
SUDS during speech						
S1	−26.6 [−38.3, −14.8]***	−22.7 [−33.9, −11.6]***	−16.3 [−27.9, −4.8]**	0.15	0.26	0.44
S2	3.9 [−3.0, 10.9]	−5.4 [−11.8, 1.0]		0.80		

Note. CBT = cognitive behavioral therapy; ACT = acceptance and commitment therapy; WL = wait-list control group; CI = confidence interval; QOLI = Quality of Life Inventory; SUDS = subjective units of distress.
[a] Effect sizes are calculated using pooled standard deviations from the two groups included in the comparison at baseline for S1 and at posttreatment for S2.
** $p < .01$.   *** $p < .001$.

Predictor. Experiential avoidance did not predict fear and avoidance ratings ($p > .212$) and fear of negative evaluation did not predict composite symptoms ($p > .456$).

Comorbidity, personality, and perceived control.

Moderator. Comorbid depression, extroversion, perceived control, comorbid anxiety, and neuroticism did not significantly moderate composite symptoms or fear and avoidance ratings ($ps > .065$).

Predictor. Comorbid depression significantly predicted fear and avoidance ratings ($z = 2.28, p = .023$), with patients with comorbid depression rated as more fearful and avoidant ($b = 23.8$; CI [3.33, 44.33]). Extroversion was a significant linear predictor of composite symptoms ($z = 1.96, p = .05$). Participants higher in extroversion reported significantly fewer symptoms ($b = −0.08$; CI [0, −016]), collapsed across groups and follow-up assessments. The same direction of effect was found for fear and avoidance ratings ($z = 2.16 p = .031$), with those higher in extraversion rated as less fearful and avoidant ($b = −0.272$; CI [−0.25, −5.20]). Perceived control was a significant predictor of fear and avoidance ratings ($z = 2.00 p = .045$), with patients higher in perceived control reporting lower fear and avoidance ($b = −0.73$; CI [−.016, −1.44]), collapsed across group and follow-up assessments. Neither comorbid depression nor perceived control predicted composite symptoms ($ps = .067$), and neither comorbid anxiety nor neuroticism significantly predicted either outcome ($ps > .186$).

Discussion

The goals of this study were to compare the efficacy of CBT and ACT for social phobia and to assess which variables at baseline functioned as indicators of participants who did best with either treatment approach. Broadly speaking, the two treatments did not differ from each other in terms of self-report, independent clinician, or public-speaking outcomes, with each treatment superior to the wait-list control on the majority of measures. Individuals with higher experiential avoidance who received CBT fared better than those who received ACT, and there were trends for superior outcomes from CBT and inferior outcomes from ACT at the extreme ends of fear of negative evaluation. Also, individuals without comorbid depression or who were higher in extraversion or perceived control fared better than their counterparts with either treatment approach.

We measured treatment outcome using self-report measures of symptoms and quality of life, independent clinician ratings of fear and avoidance of social situations and overall clinical severity, and anxiety during a public-speaking task. These measures were repeated at pretreatment, posttreatment, and 6 months and 12 months following pretreatment (excepting absence of the public-speaking task from the 6-month assessment). The outcomes from CBT and ACT were remarkably consistent across measurement modality and across timing of assessment. One exception was a trend for ACT participants to show greater reductions in anxiety during public speaking from post to the 12-month follow-up than CBT participants. The results are generally consistent with a prior study (Arch et al., 2012), where few differences were found in outcomes between the two treatments for a mixed anxiety disorder sample, excepting greater improvements from post to follow-up on clinical severity ratings for ACT than CBT. In the current study, ACT and
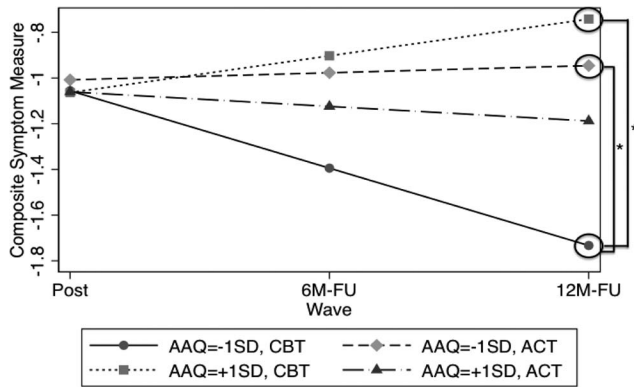
Figure 3. Group × Time moderation of cognitive behavioral therapy (CBT) and acceptance and commitment therapy (ACT) by experiential avoidance (Acceptance and Action Questionnaire; AAQ) on social anxiety symptom composite. $-1SD = 1$ standard deviation below the mean on AAQ; $+1SD = 1$ standard deviation above the mean on AAQ; Post = posttreatment; 6M-FU = approximately 3 months after treatment completion; 12M-FU = approximately 9 months after treatment completion. * $p <$ .05.

CBT produced similar rates of clinically significant improvement, that were comparable to published mean response rates for CBT for social phobia: 46% at posttreatment (12 studies, 29 data points) and 52.9% at follow-up (3 studies, 10 data points; Chen et al., 2007; Davidson et al., 2004; Olivares et al., 2002; Piet, Hougaard, Hecksher, & Rosenberg, 2010; Spence, Donovan, & Brechman-Toussaint, 2000; Stangier, Heidenreich, Peitz, Lauterbach, & Clark, 2003; Tillfors et al., 2008). Very few studies have used reliable change index methods to compute treatment response rates, but the few that have (Stangier et al., 2003; Tillfors et al., 2008) have reported evidence response rates comparable to those in the present study.

The lack of differences between CBT and ACT is not due to lack of effectiveness, since the two treatment conditions yielded superior outcomes to a wait-list comparison on most outcomes. That being said, clinically significant improvement rates in the active treatment conditions of 40%–57% beg the question of what can be done to improve outcomes. The search for moderators aims to improve outcomes. There were two measures on which differences from the wait-list control were not observed, the first being the self-report measure of quality of life, on which no group improved significantly by posttreatment. Yet, quality of life did significantly improve over the full 12-month period in treated participants. These data suggest that changes in quality of life may take longer than symptom changes, which is consistent with prior evidence for changes in quality of life by the 12-month follow-up, albeit more so following CBT than ACT (Arch et al., 2012). It is also possible that larger treatment effects, and even differences between ACT and CBT, would have been observed with more sensitive and multiple measures of quality of life. The second measure was anxiety during public speaking, on which all groups, including the wait-list group, improved significantly from pre to post. These data suggest that repetition of the public speaking task was alone sufficient to yield significant improvements in anxiety, although improvements that did not generalize to other measures

of social anxiety severity. The findings raise concerns about the value of such public-speaking tasks as a measure of treatment effectiveness in the absence of controls for repeated assessment.

The lack of outcome differences between ACT and CBT is also not due to confounding by baseline severity, acceptability of treatment, or delivery of treatment. That is, individuals assigned to ACT or CBT did not differ on baseline demographic or clinical variables. Nor did they differ in their rate of attrition or their perceived credibility in the treatment. Also, the two treatments were delivered with equivalent competency, as judged by an independent rater. Confounding influences from therapist allegiance were deemed unlikely given the junior status of the therapists. Rates of removal and addition of pharmacotherapy were equivalent across the two active treatment groups. Notably, whereas four participants in ACT added a new psychotherapy (although none achieved clinically reliable change despite additional therapy), none did so in CBT. Similarly, in the prior study, significantly more ACT participants continued or began new psychotherapy compared with CBT participants (Arch et al., 2012). It is unclear why ACT would increase or sustain involvement in psychotherapies.

Although involvement in alternative psychotherapy clouds the group comparison, the results indicate that individuals with social phobia will, on average, respond as well to ACT as they do to CBT. The results may derive from procedures and processes that are shared between these approaches. Similarities between ACT and CBT are discussed elsewhere (Arch & Craske, 2008). These include exposure to, rather than suppression of, anxious thoughts; active effort to deal with anxious thoughts; and attainment of strategic control over emotions albeit via different paths. The results may also derive from the common element of exposure therapy. As was the case in the earlier comparison of ACT and CBT for a mixed anxiety sample (Arch et al., 2012), the two treatments in the current study were structured to be equated on the amount of exposure to feared situations, albeit presented with different rationales (i.e., to gain control over fear responding in CBT and to achieve actions consistent with life values in ACT).
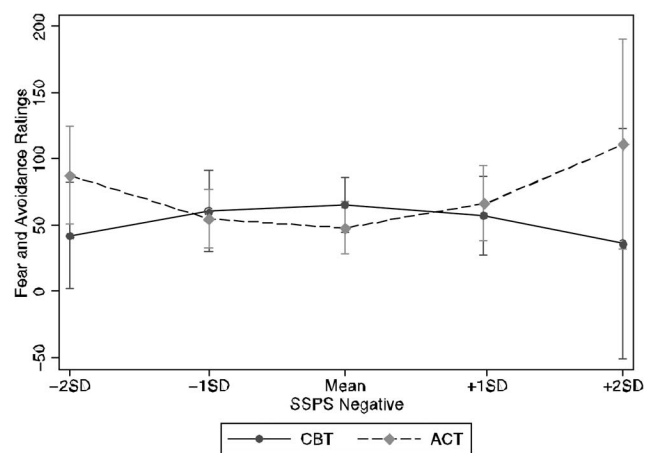

Figure 4. Moderation of cognitive behavioral therapy (CBT) and acceptance and commitment therapy (ACT) by fear of negative evaluation (Self-Statements During Public Speaking–Negative, or SSPS) at 12-month follow-up. Error bars represent standard error.

Given the potency of exposure for anxiety disorders (e.g., Norton & Price, 2007), it is conceivable that the shared component of exposure overrode other differences between the two treatments and thereby equated their effects. Overall, the current findings add to the growing body of literature supporting the efficacy of acceptance-based approaches as a viable alternative to cognitive behavioral therapies that aim to regulate internal (somatic and cognitive) state, at least given equivalent amounts of exposure to feared situations.

Our second goal was to discover whether certain subgroups of individuals would respond more positively to either treatment approach. Based on the prior study with a mixed anxiety disorder sample (Wolitzky-Taylor et al., 2012), we hypothesized that CBT would outperform ACT in those with moderate levels of fear of negative evaluation, without comorbid depression, and higher experiential avoidance, whereas ACT would outperform CBT in those with comorbid depression and lower experiential avoidance. Individuals with higher experiential avoidance fared better in terms of self-reported symptoms with CBT than ACT by the 12-month follow-up assessment; psychological flexibility had no bearing on response to ACT. Superior CBT outcomes as a function of higher experiential avoidance mirrors trends in the prior study (Wolitzky-Taylor et al., 2012). Theoretically, one might assume that those with the highest levels of experiential avoidance would respond best to a treatment designed to decrease such avoidance by increasing psychological flexibility (i.e., ACT). However, the current results suggest that high levels of experiential avoidance are a better match with the tenets of CBT. As discussed in Wolitzky-Taylor et al. (2012), perhaps those in CBT with high levels of experiential avoidance were more motivated to practice CBT skills in an effort to decrease negative affect. Given that this moderating effect occurred during the follow-up period, it is also possible that for those who began treatment with more experiential avoidance, CBT increased psychological flexibility more than ACT did, thereby leading to more engagement in self-directed exposure during the follow-up period for those who had received CBT. Another possibility is that lower levels of adherence to exposure in ACT were particularly detrimental to those with more avoidance at baseline, although the same reasoning cannot be applied to the earlier study (Wolitzky-Taylor et al., 2012) where ACT and CBT did not differ in terms of exposure adherence. Finally, results should be interpreted cautiously, given that the moderating effect of experiential avoidance was found only for self-reported symptoms and not for fear and avoidance ratings.

Over and above symptom severity, our measure of fear of negative evaluation, the SSPS, significantly moderated clinician-rated outcome, although interpretation is tempered by lack of significant simple effects. Visual inspection revealed inverse curvilinear relationships, with individuals scoring either the highest or the lowest on fears of negative evaluation tending to fare better with CBT and worse with ACT. Thus, the current results contrast with the prior report in which moderate levels of anxiety sensitivity led to better outcomes from CBT, whereas they did not affect ACT (Wolitzky-Taylor et al., 2012) and with the report by Meuret et al. (2010) who found higher levels of anxiety sensitivity led to poorer response to cognitive therapy and greater response to capnometry-assisted respiratory training. Conceivably, fear of neg-

ative evaluation for social anxiety does not function in the same way as anxiety sensitivity for panic disorder or for mixed anxiety disorders. As the moderating effect of fear of negative evaluation was found only for clinician-rated outcomes and not for self-reported symptoms and was not supported by significant simple effects analyses, it should be interpreted cautiously.

Several predictors of overall treatment outcome were identified. Female gender was associated with greater improvement across treatment groups. Gender was not a predictor of CBT outcomes in prior studies, including for social phobia (Schuurmans et al., 2009; Watanabe et al., 2010), and it was neither a predictor nor a moderator of outcome in the previous study of a mixed anxiety disorder sample (Wolitzky-Taylor et al., 2012). The gender effect may reflect selection bias rather than a replicable finding. Higher extraversion was also associated with greater improvement. To our knowledge, only one other study examined extraversion as a predictor of behavioral treatment in a social phobia sample, with null results (Chen et al., 2007). Depression was predictive of poorer outcome across both treatment conditions in the current study. It was previously found that comorbid depression led to greater improvement in ACT (Wolitzky-Taylor et al., 2012), and for CBT, depression either led to poorer outcome (Chambless, Tran, & Glass, 1997; Steketee, Chambless, & Tran, 2001) or had no association with outcome (Kampman, Keijsers, Hoogduin, & Hendriks, 2008; Schuurmans et al., 2009). Finally, higher levels of perceived control were predictive of better outcomes. Meuret et al. (2010) found that lower perceived control was associated with greater improvement in cognitive therapy for panic disorder. Thus, in all cases, the role of predictors of exposure-based treatment, whether cognitively based or acceptance based, is in need of further replication.

Despite the many strengths of the study, there are some limitations. Most notably, the sample size was relatively small, which may have led to insufficient power to detect differences between two active treatments and failure to replicate all findings from our prior study (Arch et al., 2012). Given our sample size, we had sufficient power (80%) to detect only large effects for the treatment group effects (Cohen's $d = 0.85$) and moderator analyses (Cohen's $f^2 = .45$). Power to detect moderate and small effects for both analyses was 40% and 20%, respectively. Thus, future studies with larger samples should attempt to replicate these findings before definitive prescriptive recommendations are made. Still, the fact that the current results mirrored our prior findings in terms of similarity in outcomes across CBT and ACT and trends for the positive predictive value of high experiential avoidance for CBT outcomes (Arch et al., 2012; Wolitzky-Taylor et al., 2012) suggests some degree of replicability and consistency across samples. Second, treatment was delivered by relatively inexperienced graduate students. Although this is common to many clinical trials and expert supervision was provided, the findings may have differed with more experienced clinicians. We failed to measure therapy allegiance of our therapists, although we presume that allegiance was a less significant factor than might otherwise be the case with highly experienced therapists. Also, we had a high level of treatment attrition (nearly 50% by 12-month follow-up), which may have reduced power and affected our ability to observe continued change over the follow-up period. Although multilevel modeling can produce less biased estimates when

data are missing, we do not know whether lower attrition would have influenced findings for the follow-up time points. Finally, some participants in ACT received additional treatment during the follow-up period, and we did not assess what type of treatment or the number of sessions they received. However, none of these four participants achieved reliable change criteria by the 12-month follow-up, suggesting that the findings were unlikely to be influenced by the additional treatment.

In sum, this study adds to the small but growing body of evidence indicating that CBT and ACT perform equally well for the treatment of social phobia and significantly outperform wait-list controls. As it becomes clear that ACT is a viable alternative to CBT, for whom each treatment works best becomes a question of central importance. This study also replicated a moderator finding from a previous comparison of CBT and ACT, showing that individuals with lower psychological flexibility respond more favorably to CBT.

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