



The credibility of exposure therapy: Does the theoretical rationale matter?



Joanna J. Arch^{a,*}, Michael P. Twohig^b, Brett J. Deacon^c, Lauren N. Landy^a, Ellen J. Bluett^b

^a University of Colorado Boulder, Department of Psychology and Neuroscience, 345 UCB Muenzinger, Boulder, CO 80309-0345, United States

^b Utah State University, Department of Psychology, 2810 Old Main Hill, Logan, UT 84322-2810, United States

^c School of Psychology, University of Wollongong, Northfields Avenue, Wollongong, NSW 2522, Australia

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ABSTRACT

Objective: Little is understood about how the public perceives exposure-based therapy (ET) for treating anxiety and trauma-related disorders or how ET rationales affect treatment credibility. Distinct approaches to framing ET are practiced, including those emphasized in traditional cognitive behavioral therapy, acceptance and commitment therapy, and the more recent inhibitory learning model. However, their relative effect on ET's credibility remains unknown.

Method: A final sample of 964 U.S. adults provided baseline views of ET. Participants rated ET treatment credibility following a simple ET definition (pre-rationale) and following randomization to rationale modules addressing ET goals, fear, and cognitive strategies from distinct theoretical perspectives (post-rationale). Baseline ET views, symptoms, and sociodemographic characteristics were examined as putative moderators and predictors.

Results: At baseline, the majority had never heard of ET. From pre- to post-rationale, ET treatment credibility significantly increased but the rationales' theoretical perspective had little impact. More negative baseline ET views, specific ethnic/racial minority group status, and lower education moderated or predicted greater increases in treatment credibility following the rationale.

Conclusions: ET remains relatively unknown as a treatment for anxiety or trauma, supporting the need for direct-to-consumer marketing. Diverse theory-driven rationales similarly increased ET credibility, particularly among those less likely to use ET.

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Cognitive-behavioral interventions that emphasize exposure to feared stimuli have demonstrated strong efficacy for a variety of anxiety disorders (Hofmann & Smits, 2008), representing first line treatments (Norton & Price, 2007; Olatunji, Cisler, & Tolin, 2010). Despite their strong empirical support, however, only a minority of patients with anxiety disorders are treated with exposure-based interventions (Gunter & Whittal, 2010; Marcks, Weisberg, & Keller, 2009). Many patients thus invest time and resources in less effective treatments (Lilienfeld, Lynn, & Lohr, 2003), if they are treated at all (Wang et al., 2005).

One potential reason for exposure therapy's (ET) low utilization is that we generally market exposure-based therapies to mental

health professionals and overlook the actual patient consumer (Gallo, Comer, & Barlow, 2013). One benefit of directly promoting ET through "direct-to-consumer" marketing is that as patient interest in ET grows, patients place enough demand on the field that therapists will seek out and use their training in exposure-based therapy to meet that demand (Santucci, McHugh, & Barlow, 2012). Little empirical work, however, directly addresses public knowledge of ET or how to best frame ET to patients and the public more generally. Thus, research that informs dissemination of exposure-based treatment to consumers represents an important priority. Understanding what the public thinks about exposure-based treatment and how we might best market exposure to increase its credibility, desirability, and ultimately, demand, represent key steps towards addressing this priority.

Marketing exposure therapy requires addressing the question of what type of exposure-based treatment to promote. Currently, there are somewhat distinct and competing theory-driven approaches to framing ET, including traditional cognitive behavioral

* Corresponding author.

E-mail addresses: Joanna.Arch@Colorado.edu (J.J. Arch), Michael.Twohig@usu.edu (M.P. Twohig), bdeacon@uow.edu.au (B.J. Deacon), Lauren.Landy@colorado.edu (L.N. Landy), ejbluett@aggiemail.usu.edu (E.J. Bluett).

approaches (CBT) that emphasize fear/anxiety reduction and physiological symptom control strategies (Craske & Barlow, 2007), optimizing inhibitory learning approaches that emphasize fear toleration and no symptom control strategies (Craske et al., 2008), and acceptance and commitment therapy-based (ACT) approaches that emphasize fear acceptance and valued living with less focus on symptom reduction (Eifert & Forsyth, 2005; Hayes, Strosahl, & Wilson, 1999). Traditional CBT and optimizing inhibitory learning approaches to exposure also emphasize testing thoughts, whereas ACT emphasizes cognitive defusion or flexible distancing from the content of anxiety-related thoughts rather than modifying thought content. Thus, distinct goals of exposure (anxiety reduction vs. valued living), approaches to feelings of anxiety/fear (control and relaxation vs. fear toleration vs. acceptance), and approaches to anxiety-related thoughts (testing vs. defusing from) are emphasized to a greater or lesser extent in some approaches than others, with significant overlap among them (e.g., Mennin, Ellard, Fresco, & Gross, 2013). Importantly, proponents of each approach argue for the scientific superiority of their approach over alternative approaches. For example, Eifert and Forsyth (2005; Forsyth, Eifert, & Barrios, 2006) argue that anxiety control efforts play a causal role in the development of anxiety disorders and thus with regard to the treatment of anxiety disorders, acceptance is better than control, and cognitive defusion is better than cognitive restructuring. Similarly, Craske et al. (2008), Craske, Treanor, Conway, Zbozinek, and Vervliet (2014) argue that inhibitory learning and fear toleration approaches to ET will promote better outcomes than approaches that focus on short-term anxiety reduction/habituation. The resulting debates have inspired (some might say, ignited) events at numerous behavioral therapy conventions over the past decade. Scientifically, we believe in the importance of continually refining the theory and science of ET and thus laud these efforts.

Each of these approaches to framing exposure is backed by a distinct theoretical foundation and some degree of empirical support. Traditional CBT and ACT approaches that utilize exposure have shown similar efficacy for treating mixed anxiety disorders and social anxiety disorder (Arch, Eifert, et al., 2012; Craske, Niles, et al., 2014), particularly in the short term, with possible advantages for ACT over follow up (Arch, Eifert, et al., 2012). The optimizing inhibitory learning approach has demonstrated initial efficacy in enhancing exposure outcomes in clinical analog samples (Deacon et al., 2013; Kircanski, Lieberman, & Craske, 2012). The purpose of these newer approaches is to increase efficacy or enhance theoretical understanding of ET, and their alleged theoretical advantages appeal to many scientists and clinicians (based on robust citations, for example). However, a key related question remains unanswered. If the theoretical and possible empirical advantages of these newer approaches appeal to some scientists and clinicians, we believe it is worth investigating whether they offer an advantage in increasing the appeal of ET to potential psychotherapy consumers, that is, to the public. This question is particularly worth investigating in light of the recent calls for direct-to-consumer marketing of evidence-based psychosocial treatments such as ET (Gallo et al., 2013; Santucci et al., 2012). Yet to date, the manner in which these various approaches to exposure-based treatment are perceived by the public or affect initial treatment credibility remains unknown. Within the context of acknowledging the overlap among these models, we set out to study the impact of whether these more recent approaches offer advantages in boosting ET's treatment credibility over traditional cognitive behavioral therapy approaches.

Outside of these distinct approaches to framing exposure, a limited number of randomized studies have examined how different exposure frameworks affect patient or public perceptions of its credibility, acceptability, and effectiveness. For example,

Milosevic and Radomsky (2013) demonstrated that a cognitive rationale (vs. an extinction-based rationale) led to enhanced acceptability and lowered perceived discomfort of exposure therapy across clinical and student samples.¹ A study by Feeny, Zoellner, and Kahana (2009) manipulated the rationale for prolonged exposure therapy to include or omit a description of the theorized treatment mechanism. Inclusion of the mechanism description increased the positivity of personal expectations and stated willingness to do prolonged exposure, but not the less personal elements of treatment credibility (e.g., how logical the treatment seemed).² Thus, manipulating ET treatment rationale has been shown to affect treatment acceptability (Milosevic & Radomsky, 2013) and personal reactions (Feeny et al., 2009), suggesting that more broadly investigating the impact of ET rationale may inform how to optimally frame ET rationale when marketing to potential patients or to the public. In addition, low treatment credibility/expectancies³ can increase treatment attrition (Taylor, 2003) and negatively affect treatment outcomes (Deville & Borkovec, 2000; Westra, Dozois, & Marcus, 2007), suggesting that studying how to maximize ET's treatment credibility represents an important goal in itself. Similarly, a positive relationship between treatment rationale acceptance and CBT outcomes has been demonstrated in the treatment of major depression (e.g., Addis & Jacobson, 2000), pointing towards the transdiagnostic importance of providing credible, acceptable treatment rationale. Collectively, this work emphasizes the influences of expectancies, attitudes, and perceived benefits – each of which is often explicitly or implicitly addressed in psychotherapy treatment rationale (Addis & Jacobson, 2000) – in influencing subsequent behaviors (e.g., Ajzen, 1991), including engagement in psychotherapy (Sheeran, Aubrey, & Kellett, 2007).

We thus conducted this study to examine the extent to which different theory-driven approaches affect public perceptions of ET and specifically, to assess whether newer approaches to conducting or framing ET (ACT, inhibitory learning) lead to superior treatment credibility over more traditional CBT approaches. We originally set out to compare traditional CBT and ACT rationales for exposure therapy but quickly realized there were significant areas of overlap between them (e.g., Arch & Craske, 2008; Mennin et al., 2013). We also wanted to include new developments in inhibitory learning approaches to exposure (Craske et al., 2008; Craske, Treanor, et al., 2014; Deacon et al., 2013) that overlapped yet were not fully captured by either traditional CBT or ACT perspectives. The anxiety treatment typically provided by community practitioners suggests that various aspects of exposure approaches are often combined in a manner that does not follow a single theoretical perspective (Hipol & Deacon, 2013). Incorporating these observations into our experimental design, we decided to parse exposure rationale by its theoretically-informed core principals or components rather than by individual treatment approach. By presenting each rationale component separately and then combining these separate components in numerous ways, our approach resembles a “modular” approach to presenting the treatment rationale. Based on published rationales for exposure-based traditional CBT (e.g., Craske & Barlow, 2007), inhibitory learning (e.g., Craske, Niles, et al., 2014;

¹ Radomsky and colleagues also have investigated the impact of the judicious use of safety behaviors on exposure acceptability (e.g., Levy & Radomsky, 2014; Milosevic & Radomsky, 2013) but this work addresses a different set of issues than the current study.

² Note that apart from systematically manipulating the rationale for exposure therapy, additional work in PTSD/trauma has demonstrated the significant impact of treatment descriptions on treatment acceptability or preference (e.g., Tarrier, Liversidge, & Gregg, 2006).

³ The use of the term “treatment credibility” in the current study encompasses both treatment credibility and expectancies, see [Methods](#) and [Appendix](#)

Craske, Treanor, et al., 2014), and ACT approaches (e.g., Eifert & Forsyth, 2005), we distinguished and manipulated three central content dimensions (or modules) of ET rationale: (1) treatment goals, (2) ways of dealing with anxiety/fear, and (3) ways of dealing with anxiety-related thoughts.

Within a large general U.S. sample, we first aimed to assess baseline views of exposure therapy by investigating participants' baseline recognition, knowledge, and reactions to ET prior to providing a treatment definition or rationale. Second, we aimed to measure baseline credibility of ET following a simple definition. Third, we aimed to systematically manipulate the theoretical perspective of ET rationale along these three dimensions (goals, ways of dealing with anxiety/fear, ways of dealing with anxiety-related thoughts) and assess their impact on treatment credibility, over and above providing the simple definition of ET. This aim tested our hypothesis that treatment rationale modules reflecting ACT or inhibitory learning approaches to ET would result in greater treatment credibility than traditional CBT approaches. Fourth, we aimed to identify potential moderators and predictors of the impact of exposure rationale on treatment credibility. This aim addressed the important unexamined question of the person-level characteristics that shape preference for particular types of exposure rationale and response to exposure rationale more generally. Given that some types of people (white, more educated, higher income, positively inclined towards psychotherapy) are more likely to access psychotherapy than others (Wang et al., 2005), this aim also informed how to optimally frame ET for those who are less likely to use it.

1. Method

1.1. Participants

A total of 1117 participants were recruited online via Mechanical Turk (MTurk), a crowdsourcing site run by Amazon, and completed the study. MTurk is increasingly used as a research platform in psychology and has been shown to provide a valid and reliable site for recruiting large and diverse samples for psychological research (e.g., Buhrmester, Kwang, & Gosling, 2011; Crump, McDonnell, & Gureckis, 2013; Mason & Suri, 2012), including psychiatric samples (Shapiro, Chandler, & Mueller, 2013). On MTurk, participants (known as 'workers') can select Human Intelligence Tasks (HITs) by title, keyword, reward, eligibility, etc. Upon successfully completing HITs of interest, workers are paid by the HIT requester (here, the research team) via PayPal.

Participants were recruited from MTurk with the restriction that they were U.S. residents, fluent in English, and had at least a 95% requester approval rate for their previously completed HITs (i.e., had a history of highly reliable HIT completion). Non-U.S. residents and non-English fluent individuals were excluded because our measures were not universally validated in non-U.S. and non-English fluent samples. The study was listed on MTurk as "A survey about a particular approach for dealing with anxiety and emotions more generally". Consistent with MTurk payment rates, participants were paid \$.50 for survey completion. All participants provided informed consent and the University of Colorado Boulder Institutional Review Board approved the study.

Following the example of a previous MTurk study (Shapiro et al., 2013), we included an MMPI-2 scale of malingering – the infrequent psychopathology or $F(p)$ scale (Arbisi & Ben-Porath, 1995; see Measures, below) – as a validity check. We excluded participants from further analysis if they scored 3 SD or greater above the normed mean, a conservative standard given that the scale authors discuss a cutoff of 5 SD above the mean. Of the 1117 participants, 11% ($n = 119$) were excluded due to malingering scores that fell

Table 1
Sample demographic characteristics.

Variable	Total $n = 963^b$
Age, in years, mean (SD)	34.93 (12.51)
Female % (n)	63.8% (383/561)
Highest education, % (n)	
Some High School	1.0% (10/963)
High School Diploma/GED	9.4% (91/963)
Some College	33.4% (322/963)
2 Year College Degree	9.5% (92/963)
Bachelor's Degree	33.5% (323/963)
Graduate Degree (MA, PhD)	9.8% (92/963)
Professional Degree (MD, JD, MBA)	3.2% (92/963)
Household income, % (n)	
0–10K	11.0% (106/963)
11–20K	11.8% (114/963)
21–30K	15.7% (151/963)
31–40K	12.5% (120/963)
41–60K	20.4% (196/963)
61–80K	13.0% (125/963)
81–100K	7.2% (69/963)
100–150K	6.1% (59/963)
151K+	2.4% (23/963)
Reported race/ethnicity, % (n)	
White/Caucasian	78.1% (752/963)
Black/African Am	8.3% (80/963)
Hispanic/Latino	4.2% (40/963)
Asian Am/Pacific Islander	4.5% (43/963)
Alaskan Native/Native Am	.5% (5/963)
Biracial	3.6% (35/963)
Other	.8% (8/963)
Marital status, % (n)	
Married	36.9% (355/963)
Committed but not married	25.1% (242/963)
Single	27.9% (269/963)
Divorced/separated	8.3% (80/963)
Other	1.8% (17/963)
US region of residence^a, % (n)	
Northeast	18.1% (174/962)
Midwest	23.7% (228/962)
South	38.3% (368/962)
West	20.0% (192/962)

^a Northeast = New England and Mid-Atlantic, Midwest = East North Central and West North, South = South Atlantic, East South, and West South, West = Mountain and Pacific.

^b We were missing demographics for 1–2 participants, except where noted.

above the 3 SD cutoff and 3% ($n = 34$) were excluded due to completing the survey in less than the minimal time required to comprehend the questions (see Screening measures, below), producing a final sample of 964 participants.

Table 1 presents the sociodemographic characteristics of the final sample. Although the sample was relatively diverse, the majority of participants were white and relatively educated, representing the sociodemographic most likely to use psychotherapy (Wang et al., 2005). Although we did not restrict to a clinically anxious sample, Table 2 illustrates that over half of the sample had a history of seeking formal psychological intervention, and the average participant was in the clinical range for both anxiety and depression symptoms.

1.2. Procedures

As presented in Fig. 1, participants began with a series of baseline questionnaires, including one that assessed general treatment preferences and baseline views of ET. Next, we provided a basic definition and example of ET for the treatment of anxiety and assessed baseline ET credibility. We then first randomized participants to read one of three ET goal rationale (fear reduction, valued living, or their combination), and reassessed ET credibility "based on what you just read, RIGHT NOW ..." in order to emphasize that

Table 2
Participant clinical characteristics.

Measure	Mean (SD) ns = 963–964
State Anxiety (STAI-6)	11.23 (4.31)
Anxiety Symptoms (OASIS)	8.43 (4.36)
Depressive Symptoms (PHQ-9)	7.71 (5.99)
Anxiety Sensitivity (ASI-3): Total	20.44 (14.63)
Physical subscale	6.26 (5.70)
Cognitive subscale	4.61 (5.45)
Social subscale	9.57 (5.45)
Psychological flexibility (AAQ-7) ^a	33.72 (10.22)
History of seeking psycholog. services, % (n)	51.5% (496/963)

^a AAQ-7: Higher scores indicate greater psychological flexibility.

they were to base their ratings only on the currently presented (goal) rationale. Second, we randomized participants to read one of three ET fear strategies or ways to approach fear in the context of ET

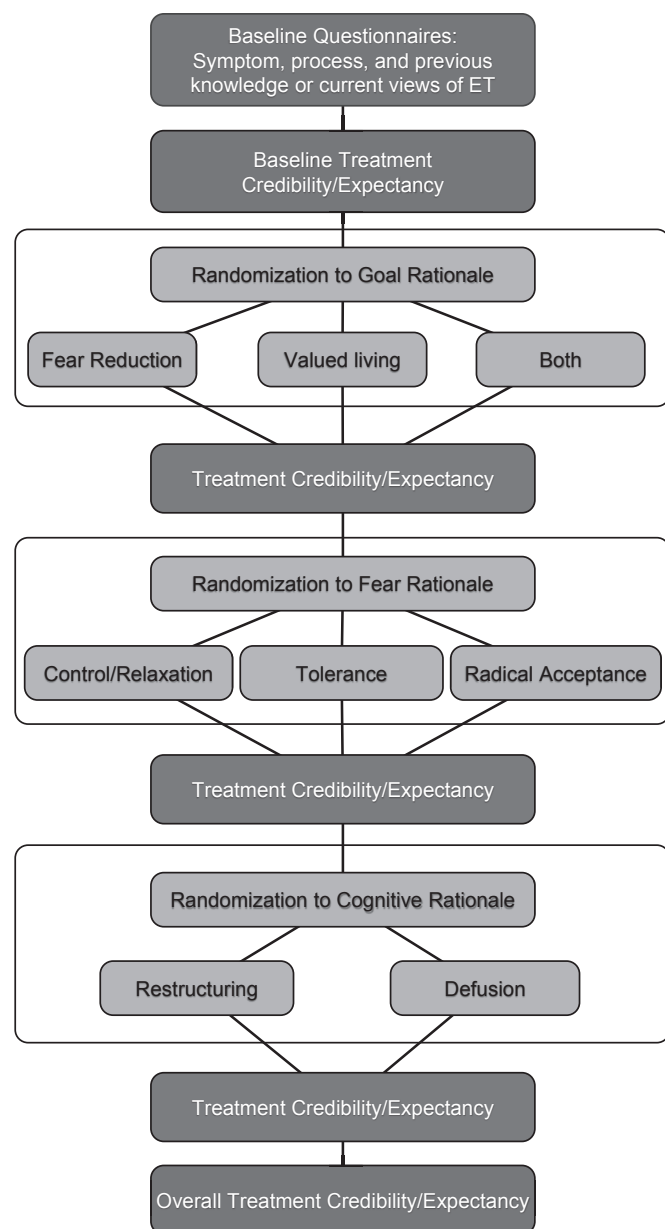


Fig. 1. Study sequencing.

(fear control/relaxation, tolerance, or radical acceptance), and reassessed ET credibility again based just on the fear strategy rationale. Third, we randomized participants to one of two ET cognitive strategy rationales (thought testing or cognitive defusion) and reassessed ET credibility based only on those. Prior to presenting each rationale the following screen appeared (with the goal rationale screen representing the example): “Now we explain the GOALS of exposure therapy. If you don’t have problems with anxiety, please imagine that you have problems with anxiety when you read this explanation and respond to the questions that follow.” Thus, participants were requested to maintain the perspective of having anxiety problems when they read the ET rationale and made ET credibility ratings.

Following the three sets of ET rationale and credibility ratings, the study asked participants to, “Please pause for a moment. Now putting all of the presented descriptions together ... based on everything you just read about exposure therapy ...”. The study then assessed final, overall ET credibility.

In summary, participants were randomized three times, once for each type of ET rationale. Thus, they could receive any combination of the rationale for ET goals, fear strategies, and cognitive strategies.

1.3. Conditions

Each condition consisted of a brief paragraph (between 94 and 139 words, depending on condition) matched for structure and phrasing whenever possible, with the exception of the combined goal rationale condition, which was longer (208 words) due to combining the anxiety reduction and valued living conditions. Please refer to the Supplemental Materials for full condition wording.

1.3.1. ET goal rationale: anxiety reduction, valued living, and their combination

The anxiety reduction rationale (see Supplemental Materials) stated that: “Exposure exercises aim to reduce or eliminate your anxiety and fear”, and explained that through repeated exposure, anxiety would habituate (and defined this). It continued: “By the end of treatment, the situations that currently trigger your anxiety should trigger little anxiety ...”. No mention of quality of life was made.

The valued living rationale stated that: “Exposure exercises aim to increase your quality of life” and explained that anxiety lowered quality of life when you let it “stop you from doing things that matter to you.” Exposure was defined as engaging in activities currently avoided due to anxiety, in order to “get back into your life and doing the things you really care about.” No mention of anxiety reduction was made.

Participants randomized to the combination condition (e.g., “Both” in Fig. 1) received contiguous descriptions of both the anxiety reduction and valued living conditions to test for synergistic effects of combining these two ET goals.

1.3.2. ET fear strategy rationale: fear control, tolerance, and acceptance

The fear control, fear tolerance, and radical acceptance of fear, rationale conditions described ways to approach or cope with fear and anxiety during ET. The fear control rationale stated that: “Exposure exercises should be completed with using slow breathing, relaxation techniques, and other strategies for controlling your body’s anxious arousal ... reducing the physical symptoms of anxiety and preventing anxiety from spiraling into full-blown panic ... help[ing to] control your anxiety so you are better able to face feared situations.” This rationale then explained how the therapist would teach these skills and that they would be practiced before

engaging in exposure. No mention of tolerating or accepting fear was made.

The fear tolerance rationale described the middle position between fear control and radical acceptance by stating that, “exposure exercises help you realize that anxiety is tolerable, just a part of life.” It explained that exposures should be “completed without using strategies that aim to reduce your anxiety such as slow breathing ...” because such strategies “send the message that anxiety itself is intolerable and must be controlled in order to cope with feared situations. This is the opposite message of what [ET] is designed to teach. Anxiety is only a problem if we allow it to be ...” This rationale stated that ET teaches how “you are able to live with the anxiety you experience.” No mention of controlling or welcoming in fear was made.

The acceptance rationale took this approach one step further by explaining that through ET you could learn how to “welcome” anxiety as “a meaningful part of your day-to-day experience.” Exposures, therefore, involved “entering feared situations while openly allowing anxiety to occur and not fighting against it ... becom[ing] less concerned with anxiety and ... treating your emotions in a more welcoming way.” No mention of controlling or merely tolerating fear was made.

1.3.3. ET cognitive strategy rationale: thought testing and defusion

Both the thought testing and cognitive defusion rationale described different ways to approach anxious thoughts during ET treatment. The thought testing rationale stated that: “Exposure exercises allow you to put your anxious thoughts to the test so that you can find out whether the negative outcomes you predict actually occur ... [or] are as bad as you expect” and explained that, “by conducting exposure exercises to test your negative predictions, you can learn that feared situations are not as dangerous or bad as you once believed them to be.” No mention of changing one’s relationship to thinking was made.

In contrast, the cognitive defusion rationale stated that: “Exposure exercises help you face feared situations so that you can practice seeing your thoughts for what they are, just thoughts ... you might learn how to watch anxious thoughts pass by like clouds in the sky ... [and] see that anxious thoughts are just what your mind sometimes produces. So you learn you can have anxious thoughts – and see that they are just thoughts ...” No mention of testing the validity of anxious thoughts was made.

1.4. Measures

1.4.1. Screening measures

To screen out participants who were likely exaggerating or dishonest (e.g., malingering) or responding randomly (e.g., not reading the item content) to the study questionnaires, we administered the MMPI-2 Infrequency Psychopathology or *F(p)* scale (Arbisi & Ben-Porath, 1995). This well-validated scale includes 27 true/false MMPI-2 items answered infrequently (<10% of the time) by both healthy control and psychiatric inpatient samples (Arbisi & Ben-Porath, 1995). The higher the *F(p)* score, the higher the likelihood that a participant has “faked bad” or responded randomly in response to the study. As previously noted, we used a conservative *t*-score cutoff corresponding to 3 standard deviations above the normed mean, in accordance with a previous MTurk study (Shapiro et al., 2013), and removed participants scoring above this cutoff from the study analyses. In addition, we piloted the study 12–15 times among lab members with the stated instruction to complete the study as quickly as possible while still responding meaningfully to questions. We took the fastest time from this group and excluded participants who completed the study in appreciatively less time (>30 s faster than the fastest time, $n = 34$) as a guard against those

who may not have read or responded meaningfully to the study questions.

1.4.2. Putative predictors and moderators of ET rationale outcomes (baseline measures)

1.4.2.1. Sociodemographics and clinical characteristics. A socio-demographic questionnaire inquired about age, race/ethnicity, education, relationship status, and employment status. A study-specific clinical history measure inquired about whether they had “ever been diagnosed with a psychological or emotional disorder” and whether they had currently or previously sought “treatment or help for anxiety, depression, distress, or any other emotional difficulties?” For respondents who endorsed this question, the study asked them to list the type(s) of treatment they were currently doing or had done in the past (with separate questions for past vs. present treatment).

Due to administrative error, we initially omitted sex from the survey. Upon realizing this error immediately following data collection, we used MTurk to recontact participants and asked them to provide us with their sex in exchange for \$.01 (male, female, or transsexual/transgender). The majority of participants (58.20%) responded to this recontact.

1.4.2.2. Baseline views of ET. Baseline views of exposure were assessed with the question: “What is your view of ‘exposure therapy’ for treating anxiety or trauma?” The 6 response choices included “I have no idea – I’ve never heard of this type of therapy”, “I have a neutral view of exposure therapy (neither positive nor negative)” and 4 separate response choices summarized as “I have a [highly negative/somewhat negative/somewhat positive/highly positive] view of exposure therapy.” This was followed by inquiries about prior experience with ET, specifically, whether they had “any prior knowledge of or experience with exposure therapy” and if so, whether it was from personal experience doing ET or reading or hearing about ET from others.

1.4.2.3. Anxiety and depression symptoms. To reduce participant burden, we employed brief, well-validated measures of anxiety and depression symptoms. To capture a range of relevant anxiety-related phenomenon, we used two measures to assess a range of anxiety dimensions of interest to the current study. The widely used *State-Trait Anxiety Inventory* (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) assessed state anxiety; to reduce participant burden, we used a 6-item version (Marteau & Bekker, 1992; Tluczek, Henriques, & Brown, 2009) which correlates highly with the original STAI ($r = .95$). The *Overall Anxiety Severity and Impairment Scale*, a well-validated 5-item measure, provided a dimensional measure of anxiety symptom severity and impairment in daily life (Campbell-Sills et al., 2009; Norman, Hami Cissell, Means-Christensen, & Stein, 2006), complementing the present-focused state STAI. The *Patient Health Questionnaire-9* (Kroenke & Spitzer, 2002), a validated 9-item measure, assessed depression symptoms. Current sample α 's were .89, .90, and .88, for each measure respectively. To reduce Type I error and redundancy in assessing putative moderators, we combined the anxiety and depression symptom measures into a single symptom composite by standardizing them and computing average scores across the three measures.

1.4.2.4. Process measures. We investigated two constructs, anxiety sensitivity and psychological flexibility, that have been found to serve as process or moderator measures within ACT or CBT for anxiety disorders (Arch, Wolitzky-Taylor, et al., 2012; Wolitzky-Taylor, Arch, Rosenfield, & Craske, 2012). Specifically, the *Anxiety Sensitivity Index-3* (Taylor et al., 2007) assessed anxiety sensitivity

(using total score) whereas the *Acceptance and Action Questionnaire-II* (Bond et al., 2011) assessed psychological flexibility. Both measures have been validated in large international samples (Bond et al., 2011; Taylor et al., 2007), with current sample α 's of .93 and .94, respectively.

1.4.3. Outcome measure

Outcomes were based on a 6-item version of the Credibility/Expectancy Questionnaire (Borkovec & Nau, 1972; Devilly & Borkovec, 2000), a measure of treatment credibility and expectancy validated in anxiety disorder treatment samples and predictive of specific anxiety disorder treatment outcomes (see Appendix A). We originally piloted the more recent version of this questionnaire (Devilly & Borkovec, 2000) but received consistent negative participant feedback regarding the second set of questions ("I couldn't take this seriously ..."), which require participants to close their eyes and "identify what you really feel." We thus adapted the five original questions from Borkovec and Nau (1972) and Set I from Devilly & Borkovec (2000) to the specific study context, and added an additional item of interest to the research team: "How enthusiastic would you be to participate in exposure therapy at this point?" (see Appendix A, item 5). Although we intended to analyze this item separately from the original items, it correlated highly with each original item (r s = .61–.91) and the 5-item total score (r s = .88–.92, depending on assessment point), which matched or exceeded the correlations among the original scale items in our sample and in the measure validation sample (Devilly & Borkovec, 2000). We thus combined the six items into the single questionnaire presented in the Appendix A. Although this questionnaire includes an assessment of treatment credibility and treatment expectancies, for the sake of brevity we refer to this scale as the "treatment credibility" questionnaire. The scale demonstrated excellent internal consistency, with current sample α 's = .94–.95 depending on the assessment point.

After the ET goal rationale and before assessing credibility we inquired, "If you had anxiety problems, how important would this goal be to you?" This question assessed differences in the personal importance of the particular ET goal provided in each goal rationale. We analyzed this outcome, relevant only to the goal rationale, separately from the credibility measure.

1.5. Statistical approach

The credibility measure utilized two rating scales, one from 1 to 9 and the other from 0 to 100%, which necessitated standardizing (z -scoring) each measure item so that they could be combined into a common metric (a procedure established by Devilly & Borkovec, 2000). In order to compare credibility scores at baseline to credibility scores following the rationale, we computed post-rationale credibility scores based on standardization of the baseline credibility scores, i.e., credibility following the basic baseline definition of ET. That is, we standardized the post-rationale credibility scale items based on the means and SDs of the pre-rationale credibility scale items (credibility following the basic baseline definition of ET) in order to assess change over time in credibility. If we had standardized the post-rationale items based on the *post-rationale* item means and SDs, this would have meant comparing a baseline standardized mean of 0 to a post-rationale standardized mean of 0, which prevents comparing change over time in credibility and is statistically untenable. Thus, credibility scores following each treatment rationale represent the standardized difference in credibility scores from the baseline mean. However, Table 3 presents the unstandardized means and SDs at baseline and following the rationale. Although we asked participants to rate ET credibility based only on the immediately

presented rationale (component), in order to account for the possibility that previous rationale component(s) influenced credibility ratings of subsequent rationale components, we report the main effects of the rationale both with and without controlling for the previous rationale conditions.

For outcomes that did not vary as a function of time, we used t -test or linear regression for continuous outcomes and chi-square tests for categorical outcomes. For the outcome (DV) of ET credibility, which we assessed repeatedly over time, we estimated two-level hierarchical regression models in HLM 6.08 with robust standard error terms. In predicting change in ET credibility, Level 1 represented the overall effect of having received that rationale (e.g., for ET goal, overall change in ET credibility from baseline to post-goal rationale) whereas level 2 tested the main effects of rationale condition (e.g., for ET goal conditions of valued living vs. fear reduction vs. their combination). For the moderator analyses, Level 2 additionally tested the putative moderator and the interaction of moderator with rationale conditions (e.g., how the three ET goal conditions interacted with participant sociodemographic characteristics to predict ET credibility [following the goals rationale]). One HLM model was built to assess ET credibility following each component of ET rationale (goals, fear strategy, cognitive strategy) and overall (see Procedures). We thus had two outcome data points (baseline and post-rationale ET credibility for each type of rationale) and employed random intercepts and fixed slopes (due to limited dfs). We used HLM to model ET credibility outcomes because it facilitated simultaneous examination of whether credibility differed at baseline as a function of variables such as sociodemographic characteristics (intercept), whether credibility changed over baseline (slope) and whether specific rationale content or putative moderators (level 2 predictors) significantly contributed to change in credibility. Because two ET rationale types (goals, fear strategy) contained 3 conditions each, the HLM approach also allowed for entry of multiple contrast-coded conditions on level 2 of the model. To code the 3-level conditions, we employed orthogonal contrast coding (2, -1, -1, and 0, 1, -1).

As noted, to investigate whether pre-selected baseline variables moderated change in credibility, we tested (in HLM) whether the putative moderator by condition interaction predicted change in credibility from pre (baseline) to post rationale. To reduce multicollinearity and aid interpretation, we standardized continuous variables prior to creating interaction terms. For race/ethnicity, we used dummy coding for Hispanic/Latino, Black/African American, Asian/Asian American, Biracial, and Other (including Native American), with White/Caucasian as the reference group. If the interaction lacked significance we reran the model without it, examining prediction of change in credibility across rationale conditions. Putative moderators and baseline credibility (following the definition of ET) were included as predictors of both intercept and slope, whereas condition was included only as a predictor of slope (because the intercept represented credibility assessed prior to condition assignment). Condition was included in all relevant models due to its theoretical relevance (regardless of significance), reflecting a theory-driven approach (see Hunsley & Meyer, 2003). Effect size (d) computations were based on the HLM-specific formulas put forth by Feingold (2009) based on earlier work by Raudenbush and Liu (2001).

2. Results

2.1. Aim 1: assess baseline views of exposure therapy

As illustrated in Fig. 2, at baseline, prior to providing an ET definition or rationale, the majority of participants (55.39%) had

Table 3
Treatment credibility/expectancy questionnaire pre to post rationale ratings.

Credibility/Expectancy questionnaire item:	Baseline mean (SD)	Post-rationale mean (SD)
1. How likely to participate?	5.02 (2.38)	6.07 (2.32)
2. How logical?	6.81 (1.81)	7.17 (1.84)
3. How successful?	5.66 (2.15)	6.29 (2.12)
4. How confident to recommend?	5.38 (2.28)	6.17 (2.16)
5. How enthusiastic?	4.66 (2.45)	5.80 (2.42)
6. How much improvement?	50.50% (25.10)	61.40% (26.96)

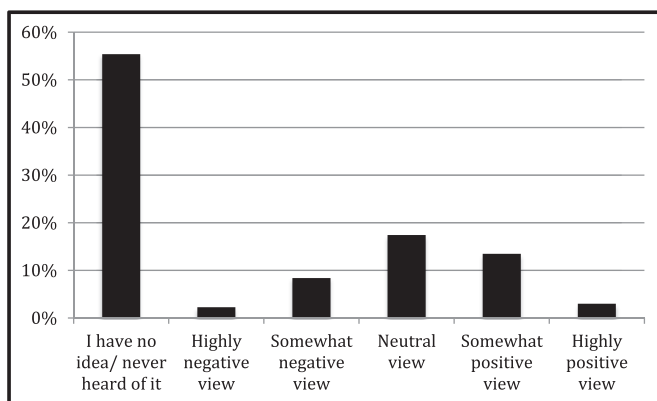
Note: For full measure item content, please refer to the [Appendix A](#) (items are shortened here for brevity). “Baseline” refers to ET credibility ratings following a basic definition of ET. “Post-rationale” refers to overall ET credibility following all rationale. Items 1–5 were assessed on a 1–9 Likert scale whereas Item 6 was assessed on a 0–100% scale.

never heard of ET or had “no idea” what they thought of it whereas most of the rest had neutral to positive views. Although nearly half of participants endorsed a baseline view of exposure therapy (as neutral, positive, or negative), only 22.30% (215/964) had “prior knowledge of or experience with” ET for the treatment of anxiety or trauma. Most of those with prior knowledge had merely “read or heard about” ET (72.09%, 155/215); only a minority had learned about ET through “personal experience” (27.91%, 60/215).

Comparing those whose knowledge of exposure therapy was direct (personal experience) versus indirect (only hearing or reading about ET), those with direct experience were more likely to have a positive view of ET (63% vs. 41%), $p = .003$, Cramer's $V = .20$, and less likely to have a neutral view (8% vs. 40%), $p < .001$, Cramer's $V = .31$. In contrast, these groups did not differ in terms of the portion endorsing negative views of ET (28% vs. 19%), $p = .12$, Cramer's $V = .11$.

2.2. Aim 2: assess baseline credibility following the definition of exposure therapy

As [Fig. 1](#) presents, before randomizing participants to rationale conditions, we provided a brief descriptive definition of exposure therapy (see Supplemental Materials). Based solely on this definition, participants rated ET credibility in the middle of the 1–9 credibility scale ($M = 5.43$, $SD = 1.92$), that is, as “somewhat” credible, including an expected improvement of 50.50% ($SD = 8.10\%$) following ET.



Note: These ratings were made *prior* to participants receiving a basic definition or rationale for exposure therapy.

Fig. 2. Baseline view of exposure therapy for treating anxiety or trauma, $n = 964$.

2.3. Aim 3: assess the main effects of exposure therapy rationale components on credibility

2.3.1. Goal rationale: comparing anxiety reduction, valued living, and their combination

In rating the personal importance of the stated goal of ET, participants in the valued living (unstandardized $M = 8.42$, $SD = 1.82$, on a 0–9 scale) and combination (unstandardized $M = 8.47$, $SD = 1.84$) conditions did not differ, $p = .75$, indicating that these goals were highly and similarly important to them. However, participants in the anxiety reduction condition (unstandardized $M = 8.27$, $SD = 2.08$) rated this goal as slightly less important than the other two conditions, $b = .08$, $p = .03$, but the negligible effect size failed to add explanatory power to the model, $\Delta R^2 = .004$, $p = .10$. In sum, anxiety reduction, valued living, and their combination were each rated as highly important ET goals, with no substantial differences among them.

The goal rationale led to significant increases in credibility compared to credibility based on the baseline definition of ET, $b = .25$, $p < .001$, $d = .29$, that did not differ significantly by condition, $ps > .07$. In summary, providing a goal for ET increased treatment credibility over providing a simple definition of exposure, but the theoretical basis of that goal did not have significant impact.

2.3.2. Strategies for fear rationale: comparing fear control, tolerance, and radical acceptance

Relative to baseline, ET credibility increased following the fear strategy rationale, $b = .23$, $p < .001$, $d = .27$. Increases differed by fear strategy, such that the fear toleration ($M = .11$, $SD = .97$) and acceptance ($M = .18$, $SD = .88$) showed similar increases in credibility from baseline, but led to smaller credibility increases than anxiety reduction ($M = .32$, $SD = .89$), $b = .04$, $p = .001$, $d = .05$. The magnitude of this significant group difference, however, was very small. Covarying type of goal rationale (i.e., the previously read goal rationale) did not change these findings. In summary, providing a fear strategy rationale for ET significantly increased treatment credibility over providing a simple definition of ET, and the theoretical basis of the rationale mattered slightly.

2.3.3. Strategies for cognitions rationale: comparing thought testing and cognitive defusion

The cognitive defusion rationale ($M = .34$, $SD = .87$) and thought testing rationale ($M = .28$, $SD = .89$) both led to significant increases in ET credibility over baseline, $b = .29$, $p < .001$, $d = .34$, that did not differ by condition, $b = .03$, $p = .18$, $d = .04$. Covarying the goal and fear rationale conditions (i.e., the previously assigned rationales)

did not impact these findings.

2.3.4. Overall credibility and expectancy of exposure therapy

Following all rationale conditions, we inquired: “Putting all of the descriptions together, overall do these make you more or less likely to do exposure therapy?” Over three-quarters of participants rated that they were “a little more likely” (46.80%) or “much more likely” (30.60%) to do ET following the rationale, whereas a small minority rated that they were “neutral” (14.70%), “a little less likely” (4.30%) or “much less likely” (3.60%) to do ET. Condition (for goals, fear strategy, or cognitive strategy) did not predict change in likelihood to do ET, $ps > .19$.

Participants next made final, overall credibility ratings, with each credibility question preceded by, “Putting all of the descriptions together ...” Overall ET credibility increased from baseline, $b = .37, p < .001, d = .44$, but did not differ by (any level or type of) condition, $ps > .09, ds = .00-.03$.

2.3.5. Theoretical consistency of exposure rationale

Randomization to model-consistent rationale (i.e., all ACT- or traditional CBT-derived rationale) versus model-inconsistent rationale (a mix of ACT and traditional CBT-derived rationale) across the 3 rationale components did not significantly predict overall ET credibility, $ps > .29$. Thus, ET credibility increased regardless of whether the combination of rationale components was theoretically consistent.

2.4. Aim 4: assess baseline characteristics as (putative) moderators and predictors of ET credibility

2.4.1. Moderation and prediction by baseline view of exposure therapy

To examine baseline view of ET as a putative moderator of change in credibility following the rationale, we first created a continuous ‘baseline view’ variable by combining those with no knowledge of ET and those with neutral views of ET, justified by the finding that these two groups did not differ on credibility ratings at any point, $ps > .23$.

Baseline view of ET (prior to providing an ET definition or rationale) did not moderate change in credibility from baseline to post-goal rationale, (goal condition \times baseline view, $ps > .15$), post-fear strategy rationale (fear condition \times baseline view, $ps > .77$), or post-cognitive strategy rationale (cognitive condition \times baseline view, $p > .17$). Running the models without the interaction terms demonstrated that baseline view predicted change in credibility (slope) across goal conditions, $b = -.05, p < .001, d = .06$, fear strategy conditions, $b = -.06, p = .001, d = .07$, and cognitive strategy conditions, $b = -.08, p < .001, d = .09$, such that those with more negative baseline views of ET showed greater increases in credibility from baseline to post-rationale. Baseline view also predicted change in overall credibility following all ET rationale, $b = -.07, p < .001, d = .08$, such that those with more negative baseline views showed greater increases in overall credibility. Similarly, this effect was not moderated by condition, $ps > .21$.

As presented in Table 4, participants with baseline negative and neutral/no views of ET demonstrated overall within-group increases in ET credibility that were nearly twice as large as those with baseline positive views of ET, perhaps in part due to a ceiling effect in the latter group. Nonetheless, those with negative baseline views remained nearly half a standard deviation below the baseline mean for ET credibility even after reading the rationale.

2.4.2. Moderation and prediction by sociodemographic characteristics

We next examined sociodemographic variables, including age,

education, income,⁴ and race/ethnicity (dummy coded), as putative moderators or predictors of change in credibility following the rationale. Given the number of race/ethnicity variables, we simultaneously examined all sociodemographic variables in the same model. We ran the analyses with and without covarying baseline view of ET; covarying baseline view did not change any of the findings. For the sake of parsimony, the reported findings thus represent those without covarying baseline view of ET, except where noted. Due to the small number of participants in the “Other” race/ethnicity group ($n = 13$), we did not examine its interaction with condition.

In the model for change in credibility from baseline to post-goal rationale, income and several race/ethnicity variables served as moderators: income \times condition, $b = -.03, p = .03, d = .04$, Asian/Asian American \times condition, $b = -.13, p = .04, d = .15$, Black/African American \times condition, $b = -.10, p = .04, d = .12$, and Biracial \times condition, $b = -.19, p = .01, d = .22$. Thus, participants who self-identified in one of these three ethnic/racial minority groups responded to the combined goal rationale (valued living plus anxiety reduction) with greater gains in credibility than whites: Black vs. White $p < .01$, Asian vs. White $p < .01$, Biracial vs. White $p = .01$. However, these three groups did not differ from the white group on credibility gains following valued living alone, Black vs. White, $p = .82$, Asian vs. White $p = .96$, Biracial vs. White, $p = .31$. In other words, most racial/ethnic minority groups preferred the pairing of values with anxiety reduction goals over the values goal alone, relative to the white group. In contrast, those with lower income (-1 SD from mean) preferred the valued living rationale over the combined rationale, $p < .05$, whereas those with higher income ($+1$ SD from mean) did not demonstrate any goal rationale preference, $p = .83$, though this effect was very small. Education, age, and Hispanic/Latino status neither moderated nor predicted change in credibility following the goal rationale.

Sociodemographic variables failed to moderate change in credibility from baseline to post-fear strategy rationale, $ps > .07$. Running the models without the interaction terms, however, revealed significant predictor effects of education, $b = -.05, p = .008, d = .06$, and Black/African American status, $b = .13, p = .04, d = .15$, such that lower education and Black/African American status (related to White/Caucasian status) independently predicted greater increases in credibility following the fear strategy rationale, across conditions.

A single sociodemographic variable, Hispanic/Latino status, interacted with the cognitive strategy condition to moderate change in credibility from baseline to post-cognitive strategy rationale, $b = -.23, p = .04, d = .27$. No other putative sociodemographic moderators were significant, $ps > .08$. Parsing the significant interaction demonstrated that Hispanic/Latino participants showed a near preference for thought testing over cognitive defusion rationale, $p = .06$, whereas white participants rated both more similarly, $p = .10$. In addition, lower education predicted greater change in credibility following the cognitive strategy rationale (across conditions), $b = -.05, p = .006, d = .06$. No other sociodemographic variables served as predictors of response to cognitive strategy, $ps > .09$.

Change in credibility from baseline to post-all rationale was predicted by education, $b = -.04, p = .02, d = .05$, and biracial status, $b = .20, p = .02, d = .24$, such that lower education and biracial status were associated with greater increases in overall credibility.

⁴ We originally planned to combine income and education into a ‘SES’ composite but they were only modestly correlated ($r = .22$). We thus examined them separately.

Table 4

Overall credibility gains following the rationale by baseline view subgroup (in standardized scores).

Baseline view of exposure therapy	<i>n</i>	Baseline	Post	Baseline to post effect size (η_p^2)
Neutral view or no idea	702	-.04	.36	.33
Positive view	159	.69	.89	.17
Negative view	103	-.83	-.42	.32

2.4.3. Moderation and prediction by baseline symptoms and process measures

The anxiety and depression symptom composite and process measures, anxiety sensitivity and psychological flexibility, failed to moderate change in credibility from baseline to post-goal rationale (goal condition \times symptom/process variables, $ps > .32$), post-fear strategy rationale (fear condition \times symptom/process variables, $ps > .18$), or post-cognitive strategy rationale (cognitive condition \times symptom/process variables, $ps > .29$). Running the models without the interaction terms, however, revealed that several symptom and process variables predicted change in credibility across rationale conditions.

Specifically, the anxiety/depression symptom composite nearly predicted lower credibility gains from baseline to post-goal condition, slope $b = -.03$, $p = .06$, $d = .04$, which became fully significant, $b = -.03$, $p = .04$, $d = .04$, when baseline view and sociodemographics (the other baseline predictors) were included as covariates in the model. The symptom composite did not, however, predict change in credibility from baseline to post-fear strategy or post-cognitive strategy rationale, $ps > .69$, or change in overall credibility following all rationale, $p > .85$, with or without including baseline view and sociodemographics as covariates.

For process measures, psychological flexibility did not predict change in credibility following the goal rationale, $p = .32$, fear strategy rationale, $p = .40$, cognitive strategy rationale, $p = .13$, or overall credibility, $p = .29$. Anxiety sensitivity did not predict change in credibility following the goal rationale, $p = .91$, but predicted change in credibility following the fear strategy rationale, $b = .04$, $p = .01$, $d = .05$, cognitive strategy rationale, $b = .04$, $p = .03$, $d = .05$, and to some extent, overall credibility following all rationale, $b = .03$, $p = .07$, $d = .04$, such that higher anxiety sensitivity predicted greater increases in credibility (albeit by very small effect sizes). Including the baseline view of ET and sociodemographics as covariates in the models did not significantly change any of these findings.

3. Discussion

In a large U.S. sample, the present study addressed four questions regarding the credibility of exposure therapy for the treatment of anxiety or trauma: (1) baseline knowledge of exposure therapy and view of exposure therapy as a treatment for anxiety or trauma, (2) credibility of exposure therapy following a basic definition of exposure therapy, (3) the main effects of randomization to distinct theory-driven rationale on the credibility of exposure therapy, testing the hypothesis that ACT and inhibitory learning-based approaches to ET would be superior to traditional CBT approaches, and (4) the moderating or predictive effects of baseline views of exposure therapy, sociodemographic, and symptom/theory-related process variables on change in exposure therapy's credibility following the rationale. Although we did not require participants to endorse distress, the majority were in the clinical range for both anxiety and depression symptoms and reported a history of seeking psychological treatment. In sum, this study elucidated how a relatively large sample of U.S. adults view exposure therapy and whether providing theoretically grounded rationales improved those views, particularly if they reflected more

recent approaches. The findings inform practical questions regarding the direct-to-consumer marketing of exposure therapy (Gallo et al., 2013; Szymanski, 2012).

Prior to reading a basic definition of exposure therapy, the majority participants (55%) had not heard of or had no ideas about exposure therapy as a treatment for anxiety or trauma. This gap in public familiarity with exposure therapy supports the need for greater marketing on the part of the evidence-based psychotherapy community and the publically-funded institutions that support public education and research on mental health (see Deacon, 2013), with more concerted efforts to educate consumers about this approach. The vast majority of those who did indicate a baseline view of exposure therapy endorsed neutral to positive views. This study suggests that most people either do not know about exposure therapy or remain open to it – supporting the likely success of directly marketing exposure therapy to consumers (Gallo et al., 2013; Szymanski, 2012).

Randomizing participants to read brief, theoretically-grounded rationale on exposure therapy goals, fear strategies, and cognitive strategies led to significant, small to medium increases in credibility over reading the simple definition/example of exposure therapy. Importantly, however, we found no support for our hypothesis that ACT and inhibitory learning-based rationales for ET would result in higher treatment credibility ratings than traditional CBT approaches. In fact, the particular theoretical perspective of the rationale – ACT, traditional CBT, or fear tolerance – mattered very little. The one possible exception showed that fear reduction (derived from traditional CBT) led to greater increases in ET credibility than fear acceptance or toleration (derived from ACT and inhibitory learning approaches, respectively), albeit by an effect size so small ($d = .05$) as to lack clinical significance. Thus, the overall findings demonstrated that any of the diverse cognitive and behavioral theory-based rationales tested in this study improved perceptions of exposure therapy, suggesting that exposure education works. Of course, the results are applicable only to the theory-based rationales tested in this study, and cannot be presumed to generalize to rationales derived from other approaches to anxiety treatment (or to bogus rationale) unless directly tested. Further, this finding is limited to improving ET credibility and does not imply that all rationale tested here would lead to similar patient adherence or efficacy following ET initiation (see Bluett, Landy, Twohig, & Arch, under review, for research addressing these latter issues). The lack of meaningful differences in the influence of rationale components derived from these theoretical perspectives means that they were similarly appealing, and that more recent ACT and inhibitory learning approaches to framing ET were not superior to traditional CBT approaches with regard to treatment credibility (in the current sample).

Three types of baseline variables predicted and one moderated change in the credibility of exposure therapy following the rationale. First, receiving the rationale particularly benefitted those more neutrally to negatively inclined towards exposure therapy (see Table 4), suggesting that theoretically-grounded exposure rationales work particularly well for those with middle-of-the-road or skeptical views. This finding encourages us as a cognitive and behavioral therapy community to be more active about educating

potential patients and the public about exposure therapy, including the naysayers. Second, anxiety and other symptoms did not generally impede, and may have even enhanced, the rationale's positive effect on treatment credibility. This finding was encouraging because it suggests that the rationales were effective across the full range of emotion symptom levels. Thus, patients and non-patients alike are likely to respond well to exposure therapy rationale.

Third, sociodemographic variables, particularly those related to minority racial/ethnicity status, frequently moderated or predicted response to the rationale. Although the findings were not universal following all rationale components, generally, racial/ethnic minority status and lower education were independently associated with greater gains in credibility following the rationale. If replicated in larger minority samples, these findings stress the importance of providing rationale-based information about exposure therapy to those who are less likely to know about or engage in it (Roberts, Gilman, Breslau, Breslau, & Koenen, 2011; Wang et al., 2005).

In summary, baseline participant characteristics, particularly participants' baseline view of exposure therapy and ethnic/racial minority status, more strongly predicted (or moderated) change in exposure therapy's credibility following the rationale than did the particular theoretical perspective of the rationale. This finding is consistent with the previous finding by Feeny et al. (2009) that adding mechanism of action descriptions to exposure therapy rationale failed to influence exposure therapy credibility (though it influenced personal reactions). Although Milosevic and Radomsky (2013) found that cognitively-framed CBT rationale for anxiety was preferred by undergraduate students over extinction-framed CBT rationale, in the present study we employed a different set of rationale and a different measure of treatment credibility within a more demographically diverse sample.

To our knowledge, this represents one of the first studies to examine the effect of distinct theoretically grounded rationale on the credibility of exposure therapy. As noted, the current study employed an experimental design to systematically manipulate exposure therapy rationale, an approach used in only a few previous studies, each with different foci (Feeny et al., 2009; Milosevic & Radomsky, 2013). Given the link between treatment credibility (particularly treatment expectancy) and treatment outcomes in the anxiety disorder literature (e.g., Devilly & Borkovec, 2000), understanding how to enhance exposure therapy's treatment credibility/expectancy has important treatment implications.

3.1. Strengths, limitations and future directions

The large sample size, experimental design, and examination of baseline moderators and predictors of response to the rationale represented study strengths. Although the study focused on general adults rather than a formally diagnosed anxiety disorder population, the fact that the majority of these adults fell within established cutoffs for anxiety symptoms and had sought previous psychological treatment suggests that they approximated the target population for exposure therapy. Moreover, the sample reflected the study goal of assessing broader U.S. adults rather than a particular anxiety disorder community. This goal reflected the fact that many people are encouraged to seek help for psychiatric problems by concerned family members and friends (Vogel, Wade, Wester, Larson, & Hackler, 2007), demonstrating that exposure therapy rationale and education efforts must target a broader audience. A second strength reflects the fact that rather than comparing entire traditional CBT vs. ACT vs. inhibitory learning-based rationale for ET, we broke them down into constituent components or modules in recognition of areas of overlap vs. distinction.

A study limitation is that the number of ethnic/racial minority participants was relatively modest ($ns = 35$ to 80 per group); findings thus need to be replicated in studies with greater numbers of ethnic/racial minority participants before strong conclusions can be reached. Relatedly, administrator error precluded a more in-depth examination of sex/gender as a moderator or predictor, a variable that should be closely examined in future studies. Additionally, dividing ET rationales into constituent components had the advantage of allowing us to examine their individual impact (covarying the others) and their additive impact (at the end); however, a fully crossed factorial design would have facilitated analyses of interactions among the constituent components. Further, it would be interesting to assess whether ET credibility differs as a function of reading various combinations of rationale components altogether on a single screen/page versus individually (e.g., considering them altogether only after each individual component is presented, as done presently). Although we statistically controlled for the influence of the previous rationale components (none of which were significant), and instructed participants to rate ET credibility based only on the immediately presented rationale, the previous rationale components nonetheless may have exerted some influence over ratings of subsequent rationale components. Finally, increases in overall exposure credibility following all three sets of rationale were small-to-medium in magnitude. Exposure credibility, on average, remained closer to the "somewhat" credible (middle) anchor than to the "very" credible (highest) anchor even after providing the three sets of rationale. Future studies would benefit from examining whether more personal or engaging forms of exposure therapy rationale – videos, patient testimonials, positive visual images – would more dramatically increase exposure's credibility. Future studies would also benefit from testing "bogus" rationale against evidence-based rationale to assess whether the public can discern the difference, and defining ET and then testing whether the mere passage of time or regression to the mean leads to improved credibility. Additionally, future studies of inhibitory learning rationale should include "new learning" as a goal of ET. Finally, we examined only a small number of potentially interesting rationale components that could have been included, such as those derived from the guided mastery model (Williams, Dooseman, & Kleifield, 1984) or judicious use of safety behavior approaches (Milosevic & Radomsky, 2008).

3.2. Summary and conclusions

This study led to four conclusions: First, prior to reading the exposure rationale, the vast majority of this large sample had not heard about or lacked a positive view of exposure therapy. This highlights the need to heighten public knowledge of exposure therapy for the treatment of anxiety and trauma, such as through burgeoning direct-to-consumer marketing efforts (e.g., Gallo et al., 2013; Szymanski, 2012). Second, theory-derived rationales reflecting common cognitive and behavioral approaches improved the credibility of exposure therapy over and above providing a simple definition of exposure, which suggests that education about exposure works. Third, there were no meaningful differences in the influence of the theoretically distinct rationale, which means that they were all similarly appealing within this sample. Thus, contradictory to our hypothesis, ACT and inhibitory learning rationale for exposure therapy did not significantly boost treatment credibility compared to traditional CBT rationale. Fourth, participants whom previous studies indicate are least likely to seek out (Roberts et al., 2011) or receive (Wang et al., 2005) psychological treatment – ethnic/racial minorities, those with lower incomes, and those with negative to neutral views of exposure – responded most positively to the exposure rationale. Collectively, the findings suggest that we

join efforts to educate the public about the benefits of exposure therapy and not worry about the particular evidence-based theoretical framework within which such education occurs.

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Conflict of interest

None declared.

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Appendix A

Adapted treatment credibility questionnaire

Based on what you just read, RIGHT NOW:

1. How likely would you be to participate in exposure therapy?
2. *How logical does the therapy seem to you?
3. *How successful do you think this treatment would be in reducing your anxiety symptoms?
4. *How confident would you be in recommending this treatment to a friend who experiences anxiety problems?
5. How enthusiastic would you be to participate in exposure therapy at this point?
6. *By the end of therapy, how much improvement in anxiety symptoms do you think would occur?

*Indicates items from Devilly and Borkovec's (2000) and Borkovec and Nau's (1972) Credibility/Expectancy Questionnaire. Question 1 is adapted from a Borkovec and Nau item.

Note: Items 1–5 were on a 1 to 9 Likert scale whereas item 6 was on a 0–100% scale.

Appendix B. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.brat.2015.05.008>.

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