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A Comparison of Two Brief Interventions for Obsessional Thoughts: Exposure and Acceptance

Laura E. Fabricant, MA
Jonathan S. Abramowitz, PhD
University of North Carolina at Chapel Hill

John P. Dehlin, MS
Michael P. Twohig, PhD
Utah State University

Exposure and response prevention (ERP) is the most effective psychological treatment for unwanted, intrusive thoughts associated with obsessive-compulsive disorder (OCD). However, the procedures involved in ERP (i.e., exposure) are challenging, provoke high levels of anxiety, and may contribute to treatment refusal and dropout (Franklin & Foa, 1998). To address this problem, researchers have begun to evaluate alternative treatments for OCD, such as Acceptance and Commitment Therapy (ACT). Despite the value of both techniques, little is known about the differential impact of these strategies. This study examined the relative effects of a single session of ACT or exposure for obsessional thoughts. There were 56 undergraduate participants with obsessional thoughts randomly assigned to receive a brief intervention with the core components of exposure, ACT, or an expressive writing control condition. Obsessional symptoms and related process variables were assessed at baseline and at 1-week follow-up. There were no statistical differences in believability or acceptability of the 3 conditions. Significant reductions in obsessional severity, behavioral tests of distress and willingness to experience intrusive thoughts, and negative appraisals of intrusive thoughts occurred in all conditions, but no differences were found between these conditions. Furthermore, changes in dysfunctional beliefs, but not in willingness to experience intrusive thoughts, predicted changes in obsessional symptoms in both the ACT and exposure conditions.

Keywords: OCD; exposure; ACT; obsessions

Although obsessive-compulsive disorder (OCD) affects 2%–3% of adults (Karno, Golding, Sorenson, & Burnam, 1988), research shows that 80%–90% of the population at large experiences unwanted, negative intrusive “obsession-like” thoughts (Rachman & de Silva, 1978). Although such “normal obsessions” are less frequent and intense relative to their clinical counterparts, they are similar in content and form to clinical obsessions. That is, they can be unwanted and/or unacceptable personally relevant images, impulses, or doubts (e.g., the thought of stabbing a loved one, the image of having sex with one’s sibling). Furthermore, many individuals

who do not have OCD report experiencing distress associated with such intrusive thoughts, and they attempt to resist these thoughts as do people with OCD (Ladouceur et al., 2000).

The most espoused psychological model of obsessional problems, which is derived from Beck's (1976) cognitive model of emotion, posits that obsessions develop when unwanted intrusive thoughts are catastrophically misinterpreted (Rachman, 1997) as overly important or threatening. This misinterpretation evokes anxiety and a preoccupation with the thought; for example, one might believe that an unwanted thought of harming a loved one is actually indicative of deep-seated violent tendencies or that merely having this thought makes the corresponding event more likely. Misinterpreting unwanted, intrusive thoughts in this way not only leads to distress and preoccupation but also provokes "safety behaviors" (i.e., rituals, reassurance-seeking, avoidance) that maintain the misinterpretations (Rachman, 1997).

This model has implications for treatment, specifically that reducing obsessional problems requires correcting the misinterpretations about unwanted thoughts. One technique shown to produce such change is therapeutic exposure, which involves confronting feared stimuli until the associated anxiety/distress is reduced (Abramowitz, Deacon, & Whiteside, 2011). One particular form of exposure—imaginal exposure (IE)—has been used to specifically address obsessional problems. IE involves deliberately confronting anxiety-provoking intrusive thoughts (e.g., by writing and reading them over and over while resisting urges to perform safety behaviors) and not only teaches individuals that their distress will decrease in the presence of such thoughts but also teaches them to correct misinterpretations associated with these thoughts (Abramowitz et al., 2011). However, recent research has found that changes in cognitions may *follow* rather than *precede* symptom reduction (Woody, Whittal, & McLean, 2011). Regardless, this technique has substantial empirical support in the treatment of obsessions (e.g., Freeston et al., 1997). Treatments that use exposure (i.e., exposure and response prevention [ERP]) are currently the most effective psychological treatments for OCD, with symptom reduction rates ranging from 60% to 85% (Abramowitz, 1997).

Despite its efficacy, exposure therapy is a challenging treatment in that it provokes high levels of anxiety for the patient. This might contribute to the fact that between 25% and 50% of patients refuse this treatment, drop out prematurely, or do not adhere to the treatment instructions and show attenuated response (Franklin & Foa, 1998). To address this problem, researchers have begun to evaluate alternative or augmentative treatments for obsessional problems, such as Acceptance and Commitment Therapy (ACT), that might address some of these concerns (Twohig, Hayes, & Masuda, 2006; Twohig, Hayes, et al., 2010). Several studies have examined the effects of ACT for various psychological problems (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Most notably, Arch, Eifert, et al. (2012) conducted a randomized trial comparing ACT to cognitive behavioral therapy (CBT) for mixed anxiety disorders. Exposure techniques were used in both conditions; and although both were highly efficacious, only a small percentage of the sample had OCD. Thus, no study to date has directly compared ACT to exposure-based CBT specifically for obsessional problems.

ACT is based on relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001), which posits that psychopathology is primarily the result of the verbal context through which one experiences thoughts and feelings rather than the result of the content, form, or frequency of the thoughts and feelings themselves (Twohig, Plumb, Mukherjee, & Hayes, 2010). Instead of primarily addressing the specific relational qualities of obsessions through Socratic or logical discussion, ACT tries to regulate their functional impact through acceptance and mindfulness processes. The focus in ACT is, thus, not on the validity of cognitions and emotions (as in exposure) but on the context in which the cognitions and emotions occur.

In the application of ACT for obsessions, exercises and metaphors are used to illustrate the futility of resisting, fighting, or trying to control unwanted internal experience (i.e., intrusive

thoughts and anxiety; Twohig, 2009). This work is designed to foster willingness to engage with obsessions and related anxiety without challenging or resisting them. In this way, ACT seeks to help patients adopt a more psychologically flexible relationship with their cognitions and emotions. ACT also aims to increase quality of life by focusing on patients' values, or what is most important in the patient's life (Hayes, Strosahl, & Wilson, 1999). Unlike traditional exposure exercises, the goal of ACT is not to directly reduce obsessional symptoms but to help patients function with them in a way that is consistent with their values. An initial multiple baseline study evaluated eight sessions of ACT, without in-session exposure, in four participants with OCD and reported that all participants had significant reductions in compulsions at the end of treatment (Twohig, Hayes, & Masuda, 2006). A subsequent randomized control trial compared ACT to progressive relaxation training and found that ACT, without in-session exposure, was an effective (clinical response rates: ACT post = 46%–56%, follow-up = 46%–66%; progressive relaxation training [PRT] post = 13%–18%, follow-up = 16%–18%) and acceptable (4.38 on a 5-point scale) intervention (Twohig, Hayes, et al., 2010).

Despite the value of both exposure and ACT, little is known about the relative impact of these strategies in treating obsessional problems. ACT and exposure share similarities in that both are problem-focused, behaviorally based treatments (Hofmann & Asmundson, 2008) that aim to broaden the patient's engagement with feared stimuli (i.e., intrusive thoughts). Furthermore, both treatments encourage interaction with feared stimuli and discourage strategies to resist or avoid them. However, these approaches have fundamentally different goals and are thought to bring about change by acting on different psychological processes. IE therapy seeks to reduce obsessional thought frequency and distress following prolonged confrontation with unwanted thoughts. ACT seeks to change one's *relationship* with obsessional thoughts and anxiety by increasing the patient's willingness to accept these experiences as part of the normal human experience, see them as just thoughts, and continue pursuing one's values.

Accordingly, the aim of this study was to examine proposed differences between ACT and IE as used in the treatment of obsessional thoughts. Specifically, we were interested not only in how distilled versions of these two interventions affect obsessional symptoms, but in how they might affect variables thought to be related to the interventions' change processes. To accomplish these aims, undergraduate participants who scored in the clinical range on a measure of unwanted intrusive thoughts were randomly assigned to receive a brief (single session) intervention with the core components of IE, ACT, or an expressive writing (EW) control condition. Obsessional symptoms and related cognitive-behavioral and acceptance-based variables were assessed at baseline and at 1-week follow-up. To minimize potential allegiance effects, this study was conducted at two sites: one with expertise in ACT and the other with expertise in exposure based treatments. Each intervention was conducted at both sites, with close coordination to ensure appropriate delivery.

Although a limitation of using brief, one-session interventions is that we were unlikely to observe substantial symptom reduction, researchers routinely use single session interventions to isolate and evaluate proposed change processes in anxiety symptoms (e.g., Deacon, Sy, Lickel, & Nelson, 2010; McManus et al., 2009; Salkovskis, Thorpe, Wahl, Wroe, & Forrester, 2003). Our interventions were thus designed to emphasize the core components of each treatment, allowing us to compare the differences between ACT and exposure rather than their similarities. Furthermore, an analog sample was selected for use in this study given research that suggests that obsessional symptoms occur on a continuum and that OCD and related symptoms can be effectively studied using individuals who score high on self-report measures of OCD symptoms (Burns, Formea, Keortge, & Strenberger, 1995; Gibbs, 1996).

We had the following hypotheses: (a) both IE and ACT would result in significantly lower scores on measures of obsessional symptoms at follow-up relative to the control (EW) condition; (b) ACT would result in significantly greater willingness to experience unwanted thoughts

relative to IE and EW; (c) IE would result in greater reductions in dysfunctional beliefs and interpretations of intrusive thoughts relative to ACT and EW; and (d) changes in willingness and dysfunctional beliefs would be related to changes in obsessional symptoms.

METHOD

Participants

We tested our hypotheses using a sample of undergraduate students who scored ≥ 4 on the Obsessions subscale of the Obsessive-Compulsive Inventory—Revised (OCIR-O; Foa et al., 2002). This score is the empirically derived clinical cutoff score as reported by Foa et al. (2002). An important issue concerns whether use of such analog samples is relevant to understanding clinical obsessional problems. Burns et al. (1995) conducted a series of investigations on this issue and found that non-treatment-seeking individuals scoring highly on self-report measures of obsessive-compulsive (OC) symptoms (a) often met diagnostic criteria for OCD, (b) evidenced stability of symptoms over time, and (c) exhibited similar associated features (e.g., depression and generalized anxiety) as patients diagnosed with OCD. Thus, they concluded that results of studies using analog obsessional samples are relevant to understanding the symptoms of patients with clinical obsessions. Moreover, because a sensitive and specific clinical cutoff score on the OCIR has been identified (Foa et al., 2002), we elected to use this approach.

Participants were 56 undergraduate students (24 at the University of North Carolina at Chapel Hill [UNC] and 32 at Utah State University [USU]) who scored highly on a measure of the frequency of unwanted intrusive thoughts (the OCIR-O) and reported an unwanted, obsession-like, intrusive thought that produced at least moderate distress. The sample consisted of 22 females and 34 males, and was 87% Caucasian, 4% African American, 2% Hispanic, and 6% “other” ethnicities. The mean age of our sample was 20 years and 8 months. Aside from an outlier who was 53 years of age, the age range of this sample was 18–26 years.

Participants were randomized into three groups: IE ($n = 27$), ACT ($n = 20$), and EW ($n = 9$). At USU, there were 14 participants in the IE condition, 12 in the ACT condition, and 6 in the EW condition; at UNC, there were 13 participants in the IE condition, 8 in the ACT condition, and 3 in the EW condition. In exchange for participation, subjects received 3 hr of research credit. Only 1 participant (1.7%) discontinued participation in the study between the first session and the follow-up session.

Procedure

The procedures at the UNC and USU sites were identical and IRB approval was obtained at both institutions. Participants were recruited from Psychology 101 classes via e-mail or a brief in-class presentation by study staff. In the e-mail and presentation, potential participants were informed that this was an experiment examining how to manage unwanted thoughts and participation would require two visits to our laboratory over the course of 1 week. Students were then given the three items that comprise the OCIR-O (described next). Individuals scoring higher than the clinical cutoff on the OCIR-O (≥ 4) who expressed interest in participating were asked to contact the research team. A research assistant then provided additional details about the study to interested students over the phone, highlighting the various tasks involved in the study (i.e., filling out questionnaires; discussing an unwanted, intrusive thought with the experimenter; and participating in a brief intervention that may help with unwanted, intrusive thoughts). At this time the research assistant answered any questions and obtained a description of the individual's unwanted intrusive thought to ensure the presence of obsession-like intrusions. Specifically, to be included in the study, the participant must have

described the presence of one or more unwanted intrusive thoughts that caused moderate distress and included content similar to that observed in people with OCD (i.e., not primarily related to another construct such as trauma, eating disorders, or generalized worry). Participants were excluded if they described current suicidal ideation or overt psychotic features during screening. Participants who met entry criteria were invited to attend two individual experimental sessions. The first session lasted 90–120 min and the second session, a week later, lasted approximately 45 min. Experimenters were trained and supervised psychology research assistants at each site.

Upon arrival at the first session, the experimenter obtained informed consent from the participant and the participant was randomly assigned to receive IE, ACT, or EW. The participant then completed a battery of demographic and self-report questionnaires assessing obsessional symptoms and psychological mechanisms related to intrusive thoughts (see Measures described in the following text) on the computer using a web-based program called LimeSurvey. After completing these measures, the experimenter administered the 45-min intervention (IE, ACT, or EW). If the participant provided consent for audiotaping, the session was taped and later evaluated for adherence. Each of the interventions was administered in accordance with a structured protocol developed by psychologists with expertise in that intervention (Jonathan Abramowitz for IE and Michael Twohig for ACT).

After the intervention, participants were scheduled to return to the laboratory a week later for the follow-up session during which they completed a computerized battery of self-report measures assessing obsessional symptoms and psychological processes related to intrusive thoughts. At the end of the second lab visit, participants were debriefed and given credit for participation.

Interventions

Exposure. The IE protocol was developed based on the IE techniques described by Freeston et al. (1997) for the treatment of obsessional thoughts. All experimental sessions were conducted individually with participants. The experimenter first described the cognitive-behavioral model of obsessions, highlighting how these thoughts are believed to become distressing and interfering. The experimenter also provided an explanation of exposure, emphasizing the role of habituation (challenging thoughts and beliefs was not mentioned). Next, he or she introduced the exposure exercise and helped the participant develop a detailed description of his or her target thought (as identified during the phone screen). The participant then made a recording of this description using a digital voice recorder and the experimenter played the recording continuously for 30 min, asking for ratings of subjective discomfort (from 0 to 100) every 5 min. After the exposure exercise was completed, the experimenter obtained a final rating of discomfort and encouraged the participant to confront his or her intrusion in imagery throughout the week. No formal homework assignments were given, however.

Acceptance and Commitment Therapy (ACT). The ACT protocol was developed based on Twohig et al.'s (2006) ACT protocol for OCD. The experimenter first introduced the participant to the concept of acceptance or “getting out of the fight” with the unwanted, intrusive thought. Next, several verbal strategies and metaphors were used to illustrate how trying to resist or control an intrusive thought paradoxically increases the salience of the thought. The participant was led through an exercise that highlights the idea that rather than fighting or resisting the intrusive thought, he or she can accept it and allow it to “come and go naturally.” The experimenter also introduced the concepts of “willingness” (openness to experience thoughts, emotions, etc.), “defusion” (seeing thoughts as thoughts), and “values” (areas in life that are important to the individual) via metaphors and exercises as they relate to the problems of trying to change or control intrusive thoughts. The experimenter and participant discussed how these skills might be applied to the participant's life, in particular, over the next week. Again, no specific homework instructions were given.

Expressive Writing (EW). The EW condition was developed based on Pennebaker's (1997) EW protocol. This type of intervention has been found to be related to improvements in general psychological and physical health in nonclinical populations (Pennebaker & Beall, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1988) and thus served to control for potential nonspecific effects of the active interventions. This condition contained a treatment rationale and lasted the same amount of time (45 min) as the two active conditions. The experimenter first explained the connection between unwanted intrusive thoughts and unresolved emotional issues and how EW can help reduce distress. The participant was asked to write about unresolved emotional issues for 30 min. Following this, he or she was asked to discuss his or her thoughts about the exercise and encouraged to use this technique over the next week (but without formal instructions to do so).

Measures

Behavioral Approach Test (BAT). A Behavioral Approach Test (BAT) based on Steketee, Chambless, Tran, Worden, and Gillis (1996) was developed to provide an in vivo (behavioral) measure of the participant's discomfort with and willingness to experience his or her unwanted intrusive thought. Participants were asked to complete three separate tasks with their identified thought: (a) repeatedly read the thought, (b) repeatedly say the thought aloud, and (c) repeatedly write the thought on a piece of paper. Each task was stopped after 2 min and the participant rated their level of discomfort on a visual analog scale (VAS) from 0 to 100. Participants were instructed to inform the experimenter if they would like to stop before the 2 min have passed, or if they had distracted themselves from the thought. Distress scores were averaged across the three tasks.

To evaluate the validity of this BAT as a measure of obsessional distress, we examined correlation coefficients between the BAT-distress (BAT-D) ratings and ratings on widely used measures of obsessions. Scores on the BAT at pretest were positively correlated with scores on the obsessions subscale of the Dimensional Obsessive Compulsive Scale (DOCS; Abramowitz et al., 2010), $r = .39, p < .01$, and with scores on the OCIR (Foa et al., 2002) obsessions subscale, although this only approached significance, $r = .23, p = .08$. Scores on the BAT at follow-up were significantly, positively correlated with both the DOCS and OCIR obsessions subscales: $r = .63, p < .01$ and $r = .32, p = .02$, respectively.

Using the same VAS, the participant was then asked to indicate their willingness (0 = *completely unwilling*, 100 = *completely willing*) to complete the following activities regarding their target thought: (a) to keep this piece of paper with the thought written down in their pocket all day, (b) to sleep with this piece of paper with the thought written down under their pillow, (c) to write the intrusive thought on their hand in ink, (d) to start their day by reading and thinking about this thought, (e) to tell someone else about this thought, (f) to hope this thought comes true, and (g) to pray that this thought comes true. Reported willingness to encounter the target thought was averaged across the seven items. The term willingness is subsequently used to indicate participants' reported willingness to contact their thought as measured by the preceding questions. The BAT was administered at pretest and follow-up.

Believability and Acceptability of the Interventions. To assess how much participants found the three interventions acceptable and believable, we administered two additional instruments. First, the Personal Reactions to the Rationales questionnaire (PRR; Addis & Carpenter, 1999) was used to measure how much the participant perceived that the intervention would help them personally. It contains five items (e.g., "If you experienced intrusive thoughts and went to see a therapist, how helpful do you think this strategy would be for you?") rated on a 7-point scale from 1 (not at all) to 7 (extremely) with higher scores indicating more positive personal reactions. Second, the Treatment Evaluation Inventory—Short Form (TEI-SF; Kelley, Heffer, Gresham, & Elliot, 1989) modified for use with samples without development disabilities (Twohig & Woods, 2004) was

used to measure the acceptability of the interventions. The TEI-SF contains 7 items rated on a 5-point Likert-type scale, with higher numbers reflecting greater acceptability. Participants completed both of these measures at the end of the first experimental session following administration of the intervention they received.

Interpretation of Intrusions Inventory (III). The III (Obsessive Compulsive Cognitions Working Group [OCCWG], 2003, 2005) is a semi-idiographic measure used to assess negative appraisals of the participant's intrusive thought identified in the phone screen and targeted by the intervention he or she received. The measure includes 31 negative appraisals of the intrusion (e.g., "I would be a better person if I didn't have this thought") which the respondent rates his or her agreement with on a scale of 0–100. Although three theoretically derived subscales were initially proposed: (a) importance of thoughts, (b) control of thoughts, and (c) responsibility (OCCWG, 2003), data suggests that only a single factor exists (OCCWG, 2005). The III was used as a measure of misappraisals of intrusive thoughts and administered at pretest and follow-up.

Obsessive-Compulsive Inventory—Revised (OCIR). The OCIR (Foa et al., 2002) is an 18-item questionnaire on which participants rate the degree to which they are bothered or distressed by OCD symptoms in the past month on a 5-point scale from 0 (not at all) to 4 (extremely). Six symptom-based subscales, each consisting of three items include (a) Washing, (b) Checking, (c) Obsessing, (d) Neutralizing, (e) Ordering, and (f) Hoarding. The OCIR possesses a stable factor structure and sound reliability and validity, and its factor structure is similar among patients with OCD, those with other anxiety disorders, and unscreened college students (e.g., Abramowitz & Deacon, 2006; Foa et al., 2002; Hajcak, Huppert, Simmons, & Foa, 2004). Only the obsessions subscale was used as a measure of symptom severity and was administered at pretest and follow-up.

RESULTS

Pretest Group Differences

Demographic Characteristics. One-way analyses of variance (ANOVAs) and chi-square tests were conducted to examine group differences on demographic variables. These analyses revealed no significant differences between groups on age, $F(2, 53) = 0.22, p = .80$; gender, $\chi^2(2) = 1.49, p = .47$; or ethnicity $\chi^2(8) = 12.31, p = .14$.

Dependent Measures. Means and standard deviations for each measure by condition at each time point are reported in Table 1. To identify any pretest differences between the three conditions, we computed a set of one-way ANOVAs. No significant differences were found on the OCIR-O, $F(2, 53) = 0.26, p = .77$; BAT-D, $F(2, 53) = 0.10, p = .91$; or BAT-willingness (BAT-W), $F(2, 53) = 2.43, p = .10$. However, we did find a significant difference on the III, $F(2, 53) = 3.24, p < .05$, such that the ACT group scored significantly higher than did the IE group. As a result, we controlled for pretest III scores in all subsequent analyses using this measure.

Believability and Acceptability of the Interventions

Group means on the PRR were 24.23 ($SD = 5.75$) for IE, 25.80 ($SD = 4.54$) for ACT, and 25.56 ($SD = 7.09$) for EW, indicating that participants believed that all three interventions would be helpful in reducing distress related to their intrusive thoughts. The range of group mean scores on the TEI was similarly narrow: 30.40 ($SD = 2.76$) for ACT, 30.69 ($SD = 4.54$) for IE, and 30.78 ($SD = 4.27$) for EW, indicating that participants found all three interventions highly acceptable. Not surprisingly, one-way ANOVAs indicated no group differences in ratings on either measure ($ps < .05$).

TABLE 1. MEANS (AND STANDARD DEVIATIONS) ON ALL MEASURES BY CONDITION AT PRETEST AND FOLLOW-UP

	Pretest			Follow-up		
	ACT	IE	EW	ACT	IE	EW
OCIR-O	7.30 (1.87)	7.78 (1.92)	7.44 (3.94)	5.10 (2.17)	5.69 (3.00)	5.00 (3.84)
BAT-D	63.80 (18.24)	61.09 (20.01)	62.11 (28.19)	34.37 (21.42)	26.09 (23.61)	44.70 (26.46)
BAT-W	15.72 (13.02)	25.13 (19.04)	14.51 (15.48)	30.74 (21.18)	38.16 (28.87)	10.93 (10.22)
III	178.15 (62.2)	130.96 (60.6)	141.00 (70.4)	91.65 (53.24)	92.50 (65.87)	120.33 (61.9)

Note. ACT = Acceptance and Commitment Therapy; IE = imaginal exposure; EW = expressive writing; OCIR-O = Obsessions subscale of the Obsessive-Compulsive Inventory—Revised; BAT-D = Behavioral Approach Test—distress; BAT-W = Behavioral Approach Test—willingness; III = Interpretation of Intrusions Inventory.

Effects of Interventions on Obsessional Symptoms

To test our hypothesis that, relative to EW, both IE and ACT would result in significantly lower scores on measures of obsessional symptoms at follow-up, we conducted two 2 (site) \times 3 (condition) \times 2 (time) mixed ANOVAs using the OCIR-O and BAT-D as the dependent variables. Group mean scores on these measures also appear in Table 1.

For the OCIR-O, we found a significant within-group effect of time $F(1, 49) = 47.96$, $p < .01$, $\eta_p^2 = 0.50$. We did not find a significant between-group effect of condition, $F(2, 49) = 0.81$, $p = .45$, $\eta_p^2 = 0.03$, but we did find a significant effect of site, $F(1, 49) = 5.93$, $p = .02$, $\eta_p^2 = 0.11$. As can be seen in Table 2, participants at USU had higher pretest and follow-up OCIR-O scores. There were no significant two-way or three-way interactions. For BAT-D, we found a significant effect of time $F(1, 49) = 57.84$, $p < .01$, $\eta_p^2 = 0.54$. We did not find a significant effect of condition, $F(2, 49) = 0.54$, $p = .59$, $\eta_p^2 = 0.02$, but we did find a significant effect of site, $F(1, 49) = 1.03$, $p = .01$, $\eta_p^2 = 0.14$. Again, as can be seen in Table 2, participants at USU had higher pretest and follow-up BAT-D scores. There were no significant two-way or three-way interactions. In summary, scores on both measures of obsessional symptoms significantly decreased from pretest to follow-up, but this change did not significantly differ between the three conditions. This pattern of results was identical at both UNC and USU, although participants at USU had higher scores than those at UNC on both measures at both time points.

Effect of Interventions on Psychological Processes

Our second and third hypotheses were that ACT would result in significantly greater reductions in acceptance-based variables relative to IE, whereas IE would result in greater reductions in cognitive-behavioral variables relative to ACT. To test this, we conducted a 2 (site) \times 3 (condition) \times 2 (time) mixed ANOVA for the BAT-W and one 2 (site) \times 3 (condition) ANCOVA (controlling for pretest III scores) for the III. The means and standard deviations for the two conditions' pretest and follow-up scores for each measure are also presented in Table 1.

For BAT-W, we found a significant effect of time, $F(1, 49) = 6.21$, $p = .02$, $\eta_p^2 = 0.11$, but no significant between-group effect of condition, $F(2, 49) = 2.84$, $p = .07$, $\eta_p^2 = 0.10$, or site, $F(1, 49) = 1.12$, $p = .40$, $\eta_p^2 = 0.02$. There were no significant two-way or three-way interactions. In other words, scores on our measure of reported willingness to experience the unwanted intrusive thought significantly changed from pretest to follow-up, but this change did not significantly differ between the three conditions or between the two sites.

For the III at follow-up, we did not find a significant between-group effect of condition, $F(2, 48) = 0.89$, $p = .53$, $\eta_p^2 = 0.46$, or of site, $F(1, 48) = 0.01$, $p = .92$, $\eta_p^2 = 0.00$. However, we did find a

TABLE 2. MEANS (AND STANDARD DEVIATIONS) ON MEASURES OF OBSESSIVE SYMPTOMS BY SITE AT PRETEST AND FOLLOW-UP

	Pretest		Follow-up	
	USU	UNC	USU	UNC
OCIR-O	8.13 (2.28)	6.79 (2.15)	5.84 (2.85)	4.75 (2.79)
BAT-D	67.45 (16.43)	55.14 (23.45)	36.69 (22.62)	23.69 (23.15)

Notes. USU = Utah State University; UNC = University of North Carolina at Chapel Hill; OCIR-O = Obsessions subscale of the Obsessive Compulsive Inventory—Revised; BAT-D = Behavioral Approach Test—distress.

TABLE 3. MEANS (AND STANDARD ERRORS) FOR FOLLOW-UP III SCORES BY SITE, CONTROLLING FOR PRETEST SCORES

Condition	USU	UNC
ACT	55.31 (14.21)	97.75 (15.86)
IE	120.45 (12.47)	91.25 (12.96)
EW	132.28 (18.55)	109.85 (27.20)

Notes. USU = Utah State University; UNC = University of North Carolina at Chapel Hill; ACT = Acceptance and Commitment Therapy; IE = imaginal exposure; EW = expressive writing.

significant interaction between condition and site, $F(2, 48) = 3.74, p = .03, \eta_p^2 = 0.14$. Adjusted means and standard errors for the III at follow-up for each condition by site are reported in Table 3. As can be seen, at USU, ACT was associated with substantially lower follow-up III scores than at UNC. In contrast, for IE, USU participants had substantially higher follow-up III scores than did the UNC participants. At both sites, scores on this measure were highest for the EW group. In other words, scores on our measure of dysfunctional cognitions about unwanted intrusive thoughts did not significantly differ between the three conditions or between the two sites but were influenced by the combined effects of condition and site.

Correlations Between Process Change and Symptom Change

Our fourth hypothesis was that changes in willingness and dysfunctional beliefs from pretest to follow-up would be related to changes in obsessional symptoms from pretest to follow-up. To test this we calculated Pearson correlation coefficients between change scores on the BAT-W and III and change scores on the BAT-D and OCIR-O. We found that changes in dysfunctional beliefs about one's intrusive thoughts were significantly positively correlated with changes in obsessional symptoms as measured by the OCIR-O, $r(53) = .53, p < .01$, and as measured by the BAT-D, $r(53) = .46, p < .01$. However, we found that the correlation between changes in willingness to experience one's intrusive thoughts and changes in obsessional symptoms as measured by the OCIR-O, $r(53) = -.14, p = .33$, or as measured by the BAT-D, $r(53) = -.27, p = .06$, did not reach statistical significance. When we conducted the same analyses stratified by condition, an identical pattern of results emerged. That is, from pretest to follow-up, changes in dysfunctional beliefs, but not in willingness to experience intrusive thoughts, predicted changes in obsessional symptoms in both ACT and IE.

DISCUSSION

The aim of this study was to examine the effects of brief versions of exposure and ACT for intrusive, obsession-like thoughts on psychological processes and obsessional symptoms. Although both ACT and exposure are part of a larger constellation of cognitive-behavioral interventions, the goals and proposed change processes of these two interventions are purported to be different (see Öst, 2008). There is, however, debate regarding the extent of these differences (e.g., Hofmann & Asmundson, 2008). This study sought to shed additional light on this issue.

Our first hypothesis that both IE and ACT would result in significantly lower scores than EW on measures of obsessional symptoms at follow-up was not supported. Although scores on both measures of obsessional symptoms significantly decreased across time, this change did not significantly differ between the three conditions. The finding that ACT and IE were both associated with reductions in obsessional symptoms is consistent with research supporting the use of both

exposure techniques (Abramowitz, 1997) and ACT (Twohig, Hayes, et al., 2010) for treating obsessional symptoms. The lack of difference between these two active interventions is noteworthy given that exposure focuses directly on symptom reduction, whereas this is less explicit in ACT.

Our finding that EW was as effective as our active conditions was unexpected, although not necessarily undesirable; and there are several potential explanations for why this might have occurred. First, it is possible that among non-treatment-seeking individuals, simply thinking about unwanted thoughts, answering questions about them, and writing about past emotional experiences helps reduce obsessional symptoms. Second, participants found the rationale for the EW condition as believable as that for the IE and ACT conditions. Thus, consistent with previous research, expectancy and other nonspecific factors might have accounted for improvement in the EW group (Lambert & Ogles, 2004). Relatedly, the lack of a nontreatment control group prevents us from ruling out that such nonspecific factors (e.g., regression to the mean) accounted for the observed symptom changes in all conditions. Third, the BAT was administered to all participants. Although this task was designed as an assessment, it might have inadvertently functioned as a brief exposure exercise. That is, even participants in the EW condition were asked to reveal, discuss, and engage with their obsessional thought as part of this assessment. Among our non-treatment-seeking sample, perhaps this was sufficient to lead to reduction in obsessional distress. Fourth, positive impacts of “control” conditions on obsessions have been reported previously (Whittal, Woods, McLean, Rachman, & Robichaud, 2010); yet the success of the control condition in such a brief intervention in this study is noteworthy. Finally, it is possible that EW led to changes in other mechanisms (e.g., emotion regulation) that could have led to reductions in obsessional symptoms.

Our second and third hypotheses that (a) relative to IE and EW, ACT would result in significantly greater reported willingness to experience intrusive thoughts and (b) relative to ACT and EW, IE would result in reduced levels of dysfunctional beliefs about intrusive thoughts were not supported. While participants in both the ACT and IE groups reported an increase in willingness to contact intrusive thoughts and the EW group reported a slight decrease in willingness, there were no between-group differences. Furthermore, all three conditions reported a decrease in dysfunctional beliefs about intrusive thoughts, with no significant between-group differences. These findings indicate that exposure and ACT might influence similar psychological processes. This pattern was somewhat surprising given the distinct techniques and goals of the two approaches. Perhaps exposure, in addition to weakening dysfunctional beliefs, also increases tolerance of and willingness to engage with unwanted intrusive thoughts (as proposed by Craske et al., 2008). Even though our IE intervention did not include an explicit discussion of willingness, the exposure exercises required direct engagement with unwanted thoughts. Thus, IE might have implicitly encouraged willingness to experience such thoughts. Similarly, although our ACT condition did not involve directly challenging dysfunctional beliefs, perhaps the observed cognitive change was a result of changing one’s relationship with his or her thoughts. Furthermore, in light of recent findings that suggest that changes in obsessional symptoms precede changes in dysfunctional beliefs (Woody et al., 2011), it is possible that in the ACT condition, changes in dysfunctional beliefs occurred as a result of changes in obsessional symptoms.

The significant site by condition interaction we found for appraisals of intrusive thoughts indicates that at USU, those in the ACT group had the lowest average score on this measure, whereas at UNC, participants in the IE group had the lowest average score. This finding might be considered in light of the role of allegiance in psychotherapy outcome (Luborsky et al., 1999). Indeed, the UNC site specializes in exposure therapy for OCD, whereas USU specializes in ACT. It would not be surprising if each intervention was delivered in a more skilled manner at the site where it is routinely used. We attempted to minimize the effects of differential skill level by using manualized interventions, carefully training interventionists, and reviewing session audiotapes and sharing feedback about intervention delivery between sites. Nevertheless, we designed this

study to take place at these two sites to account for potential differences in both allegiance and skill. Although teasing apart the differences between allegiance and skill is beyond the scope of this study, it is clear that these variables may each play an important role in the delivery of these interventions.

Our fourth hypothesis that changes in psychological processes would be related to changes in obsessional symptoms was partially supported. Whereas changes in dysfunctional beliefs predicted symptom change in all three interventions, this was not the case for changes in willingness (which did not predict symptom change in either condition). The finding concerning dysfunctional beliefs is consistent with the broader idea that reductions in obsessional symptoms occur because of modifications to misinterpretations of unwanted intrusive thoughts with IE therapy (Rachman, 1997). However, it was surprising that this was also the case in the ACT condition. That is, even in the ACT group, changes in dysfunctional cognitions predicted changes in obsessional symptoms. As discussed previously, whatever implicit cognitive changes are occurring during ACT might be accounting for reductions in obsessional symptoms and distress associated with unwanted intrusive thoughts. It was also unexpected that changes in reported willingness were not related to changes in obsessional symptoms. Although all three treatment conditions demonstrated increased willingness at follow-up, these changes were not related to symptom change or changes in distress. It appears that changes in willingness occurred independently from symptom change.

Taken together, no clear pattern of results emerged to indicate substantial differences between ACT and IE in either efficacy or in change processes. Instead, these results suggest that there might be no differences in the processes by which ACT and IE produce change in obsessional symptoms. One of the major questions surrounding the use of third-wave cognitive-behavioral treatments such as ACT is the degree to which they are distinct from traditional CBT techniques (Hofmann & Asmundson, 2008). The results of this study raise the possibility that ACT and IE enact change using some similar mechanisms. Although work in this area is only beginning, other studies have shown differences in outcomes between ACT and traditional CBT interventions (Forman, Herbert, Moitra, Yeomans, & Geller, 2007; Lappalainen et al., 2007) with corresponding differences in processes of change (Arch, Wolitzky-Taylor, Eifert, & Craske, 2012; Forman et al., 2012). Specifically, Arch, Wolitzky, et al. (2012) found that cognitive defusion (a purported process of change in ACT) was a more robust mediator of symptom change than was anxiety sensitivity—in both ACT and CBT. Thus, additional processes of change are worth investigating.

This study had several limitations. First, our sample was composed of undergraduates who scored highly on a measure of obsessional thoughts rather than treatment-seeking individuals with a diagnosis of OCD. Although this analog sample reported scores on the OCIR-O that were consistent with clinical samples (e.g., Foa et al., 2002), it is likely that the interference associated with participants' unwanted, intrusive thoughts was lower than in a treatment-seeking clinical sample. This may have affected how participants responded to each condition. Second, this study consisted of a one-session intervention. Although this was designed to focus on the core processes of each intervention, it is difficult to enact substantial change in only one session. It is possible that a longer period would have been needed to result in differences between the conditions. Third, we did not measure adherence to the therapy instructions during the week between the initial appointment and the follow-up assessment. It is possible that there were systematic differences in how much participants employed the strategies they learned. A fourth limitation, as mentioned previously, is the lack of a wait-list (i.e., no treatment) control condition.

Given these limitations, future research is needed to truly understand the relative effects that IE- and ACT-based treatments have on obsessional thoughts. It seems particularly necessary for future investigations to examine the relative effects of multisession ACT and exposure-based treatments in patients with OCD. Although previous research suggests that ACT is an effective

treatment for OCD (Twohig, Hayes, et al., 2010), it is important to understand how this treatment compares to the gold standard intervention (i.e., ERP). Without this evaluation, our understanding of the relative effectiveness and mechanisms of change involved in these two treatments remains incomplete.

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Correspondence regarding this article should be directed to Laura E. Fabricant, MA, Department of Psychology, University of North Carolina at Chapel Hill, CB# 3270 (Davie Hall), Chapel Hill, NC 27599. E-mail: laura.fabricant@unc.edu