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Experimentally reducing event centrality using a modified expressive writing intervention.

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Abstract

Event centrality, the extent to which one perceives a stressful or traumatic event as central to one's identity, has been shown to be one of the predictors of PTSD symptoms. Boals and Murrell (2015) found that an Acceptance and Commitment Therapy (ACT)-based, therapist-led treatment resulted in significant decreases in event centrality, which in turn led to decreases in PTSD symptoms. In the current study, a version of this treatment was administered using a modified expressive writing intervention. Participants were randomly assigned to learn core components about either ACT, Cognitive-Behavioral Therapy (CBT), or baseball (control) via audio analogues. The ACT and CBT groups then attempted to apply what they learned in two subsequent expressive writing sessions, while the baseball group wrote about a neutral topic. The results revealed that participants in the ACT and CBT conditions evidenced significant decreases in event centrality, if they followed the writing instructions correctly, in comparison to the control group. However, there were no group differences in changes in PTSD symptoms. These results suggest that principles of ACT and traditional CBT expressed using a modified expressive writing intervention hold great promise to help individuals recover from stressful experiences.

Experimentally Reducing Event Centrality Using a Modified Expressive Writing Intervention

When deciding how best to treat individuals who are distressed after experiencing a stressful or traumatic event, it is helpful to consider the contextual processes that facilitate and maintain that distress. One such process, event centrality, occurs when individuals come to view stressful events as core parts of their identities and sense of selves (Berntsen & Rubin, 2006). As an example, McNally, Lasko, Macklin, and Pitman (1995) noted that when treating Vietnam veterans for posttraumatic stress disorder (PTSD), clients who came to the clinic wearing military regalia had disproportionately higher rates of PTSD and were some of the most challenging clinical cases, in comparison to Vietnam veterans not wearing regalia. The Centrality of Events Scale (CES; Berntsen & Rubin, 2006) was recently created to assess individual differences in event centrality. The CES includes items such as “I feel that this event has become part of my identity”, “this event permanently changed my life”, and “this event has become a reference point for the way I understand myself and the world” (Berntsen & Rubin, 2006). Because they have become integrated into the life story, events high in event centrality are repeatedly reflected upon and can alter interpretations of past and current experiences. These event memories have also been referred to as “self-defining memories” (Singer, 1995). Such construal of events gives meaning and continuity to one's self and life story (McAdams, Josselson, & Lieblich, 2006) and can influence future behavior and goals (Sutin & Robins, 2008).

Studies have consistently found that event centrality is one of the strongest and most reliable correlates of PTSD symptoms (Berntsen & Rubin, 2007; Rubin, Boals, & Hoyle, 2014; Rubin, Boals, & Berntsen, 2008). Event centrality continues to predict PTSD symptoms, even after controlling for a variety of other predictors such as depression, anxiety, dissociation, and severity of the event (Berntsen & Rubin, 2007; Schuettler & Boals, 2011). Associations between event centrality and PTSD symptoms have been found in a variety of samples including college students (Boals, 2010; Rubin, Boals, & Berntsen, 2008), older adults (Berntsen & Thomsen, 2005; Boals, Hayslip, Knowles, & Banks, 2012), Iraq war veterans (Brown, Antonius, Kramer,

Root, & Hirst, 2010), those grieving the loss of a loved one (Boelen, 2012), victims of terrorism (Blix, Solberg, & Heir, 2014) and sexual assault victims (Robinaugh & McNally, 2011). In addition, event centrality has been found to predict psychological outcomes using longitudinal and prospective designs (Boals, 2014; Boals & Ruggero, 2015; Boelen, 2012).

One limitation of the research exploring the relationship between event centrality and PTSD symptoms is the correlational nature of the studies conducted thus far, limiting our understanding of any potential causal links. To our knowledge, there has only been one attempt to experimentally manipulate event centrality. Boals and Murrell (2015) attempted to reduce event centrality using a modified version of Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) in a sample of female victims of domestic violence seeking counseling at a community outreach center. ACT is a type of cognitive-behavioral therapy designed to increase individuals' abilities to be psychologically flexible, or to make contact with their thoughts and feelings in the present moment; and, depending on their values, either maintain or change their current behavior. Some components of ACT are particularly relevant to the role of event centrality in PTSD: self-as-context (a constant perspective from which to observe experiences); contact with the present moment (nonjudgmental awareness of experiences as they occur); and defusion (decrease in attachment to experiences). An ideal outcome (i.e., return to baseline or posttraumatic growth) for someone who has a high level of centrality also involves high levels of these three ACT processes. As these components were heavily emphasized in the Boals and Murrell (2015) study, that sample will be used to illustrate the overlap between centrality and ACT. Women who have survived domestic violence often are highly identified with the traumatic events they have experienced. Victimization is woven into their life stories and dealing with abuse is a core piece of their identities. They must frequently evaluate their worldviews about trauma and well-being for the very important purposes of staying alive and keeping their children safe. In ACT treatment, assisting clients to stay present to actual contingencies (as opposed to thoughts and feelings about those events) allows for learning vital information and for a broadening perspective – a chance to learn completely new perspectives, to see themselves and their worlds in all new ways. Perhaps, most important with

respect to centrality, clients can accommodate the idea that they experienced the trauma of domestic violence but they experienced many other things too.

Participants received either treatment-as-usual from the community outreach center (control group) or treatment-as-usual plus four 1-hour long ACT sessions conducted by a trained therapist (experimental group). The results revealed that participants in the experimental condition evidenced significant decreases in event centrality, whereas the control group evidenced no change in event centrality from pre- to post-intervention. In addition, the experimental group evidenced significant decreases in PTSD symptoms and depression. A mediation analysis revealed the effect of condition on PTSD symptoms was mediated by decreases in event centrality. Thus the results of this one study suggest that four sessions of ACT led by a trained therapist can result in reductions in event centrality for a stressful event.

Although there is an abundance of empirical evidence to support the efficacy of research supported treatments for PTSD, such as prolonged exposure and cognitive processing therapy, these treatments are not widely used in clinical practice (Becker, Zayfert, & Anderson, 2004). This example of the inability of science to influence real-world practice and improve patient care is unfortunate. Cook et al. (2004) identified a number of potential barriers to the use of exposure therapy in clinical settings. Some of the potential barriers for patients include a reluctance or inability to engage in trauma memories, belief that treatment will exacerbate symptoms and distress, and a desire to drop out of treatment. In fact, premature termination is a risk factor for any treatment that requires ongoing interaction between trained clinicians and clients. Across varied settings, rates of premature termination range from 19.7 percent (Swift & Greenberg, 2012) to 40 percent (Pekarik & Wierzbicki, 1986). In the aforementioned study using a therapist-led ACT intervention, 25% of participants failed to complete the entire intervention (Boals & Murrell, 2015). To address premature termination and related issues we considered modified expressive writing as an exposure analogue. Expressive writing about a stressful event may be less threatening to some individuals than seeing a therapist, and thus may overcome some of the aforementioned barriers to therapy.

Expressive writing intervention involves an individual writing about their “deepest thoughts and feelings” about a stressful event, typically two to four writing sessions, each session

lasting 20 minutes. Over 150 studies and three meta-analyses (Frattaroli, 2006; Frisina, Borod, & Lepore, 2004; Smyth, 1998) have found the expressive writing intervention leads to improved mental and physical health benefits. We hypothesized, given the results of Boals and Murrell (2015) that the benefits of expressive writing exposure could be bolstered through a modification - an additional experimental manipulation that targets event centrality. Thus participants in this study listened to a brief analogue of ACT therapy components very similar to the work conducted in the therapy sessions (i.e., self-as-context, contact with the present moment, and defusion). Then they were asked to apply the concepts they heard throughout an expressive writing intervention.

In order to adequately assess effects of the ACT analogue over and above exposure from the writing alone, it was necessary to include an active control condition. Given that ACT is a type of cognitive-behavioral therapy (CBT), there are numerous overlapping concepts between ACT and traditional CBT. However, traditional CBT does not have the same emphasis on self-as-context or defusion. From an ACT perspective, changing or reducing negative thoughts and feelings about a stressful event or trauma is not the goal. While a cognitive shift may occur during or post ACT, the change in thinking is more likely about how one considers thoughts and feelings generally, as opposed to changing specific thoughts or feelings. Further, decreases in elicitation and arousal in the presence of stressors will likely occur, but those are not the main desired outcomes from an ACT perspective as they are in some traditional CBT models. Rather, a critical outcome of the ACT model is that acceptance of unchangeable thoughts, feelings, and situations allows an individual to see those experiences as part of their lives, but not as the sum total of their identities. The goal of treatment is to change the power and literality of undesired private events. This outcome is, in summary, is reducing the centrality of the negative events. The emphasis on changing or reducing thoughts about negative events in CBT is less focused on decentralizing, and yet is a gold-standard in treating stress and trauma. Given that traditional CBT has both some overlap with and yet some features unique from ACT, a CBT analogue seemed fitting for comparison.

The purpose of the current study was to test whether the expressive writing intervention, modified by either an ACT analogue or a CBT analogue, could effectively reduce levels of event

centrality. The analogues were 10-minute audio scripts that described typical ACT and CBT therapy work and included a related exercise. We then asked participants to apply the concepts in the audio scripts to help them cope with a stressful event during expressive writing sessions. As a control, we also created an audio script on the history of baseball and then asked participants in the control group to write about a neutral topic. This neutral manipulation and neutral writing combination was used as we needed to see what would happen to centrality levels over time when participants had no experimental interactions with their stressful or traumatic event. This was important for two reasons. First, it is fairly common for journaling and other related writing exercises (e.g., storyboard, values lifeline) to be used in ACT to address self-as-context and defusion (Hayes, Strosahl, & Wilson, 2012). Second, given that expressive writing has been shown to lower distress scores in other studies (Frattaroli, 2006), we hypothesized that the exposure provided in both the ACT and CBT groups would lead to some reductions in stress that would not be seen in the baseball group. Since centrality is most relevant in the context of stress and trauma, and the scores on PTSD symptoms and event centrality are positively correlated (Berntsen & Rubin, 2006), this neutral group allowed us to examine the clear and clinically meaningful effects of our experimental manipulation. Given the specific, intentional emphases on self-as-context and defusion in the ACT analogue, we further hypothesized that the decreases in event centrality would be larger in the ACT group.

Methods

Overview of Methods

Participants who indicated that they were experiencing significant levels of distress in reaction to a stressful event were randomly assigned to one of three conditions, 1) Expressive Writing – ACT (10 minute audio analogue of an ACT session, followed by two expressive writing sessions), 2) Expressive Writing – CBT (10 minute audio analogue of a CBT session, followed by two expressive writing sessions), or 3) Control (10 minute audio clip about the history of baseball, followed by two neutral writing sessions). All participants completed measures of event centrality and PTSD symptom severity three times - before writing, one-week post-writing, and four-weeks post-writing.

Participants

Participants were recruited via flyers and classroom announcements at a large university in the southern United States. Participants were paid \$10 for completing an initial online screener. A total of 204 participants completed the screener session. Participants who scored > 44 on the PTSD Checklist (Blanchard et al., 1996) were then invited via email to participate in the larger study. A total of 125 potential participants were invited, of which 79 agreed to participate. The flow of participants in each session is depicted in Figure 1. When cleaning the data, we realized some participants had completed the screener twice (they didn't complete the entire screener, so they started over on a different day and hence were in the screener data twice). These participants were removed from all analyses. Participants received \$60 in exchange for their participation--\$10 for completing the screener, \$10 per session, and a \$10 bonus for completing all four sessions. The average age was 21.2 years ($SD = 4.7$, range 18-54). The ethnicity profile of the sample was as follows: 31 Caucasian (44.3%), 23 Hispanic (32.9%), 11 African-American (15.7%), 2 Asian (2.9%), and 3 Other (4.3%).

Measures

Stressful Life Events Screening Questionnaire-Revised (SLESQ-R; Goodman, Corcoran, Turner, Yuan, & Green, 1998). The SLESQ-R is a 13-item self-report questionnaire that measures lifetime exposure of traumatic events. For each event, participants were asked to indicate whether the event occurred in "yes or no" format. This measure was included to help participants identify their most traumatic event.

Centrality of Event Scale (CES; Berntsen & Rubin, 2006). The CES measures the extent to which the traumatic event has been incorporated into an individual's identity. The CES contains 7 items rated on a scale from 1 (totally disagree) to 5 (totally agree). In the current study, the internal consistency was $\alpha = .93$ for the pre-treatment assessment, $\alpha = .91$ for the 1-week post-writing assessment, and $\alpha = .90$ at the 4-week post-writing assessment.

PTSD Checklist-Specific (PCL-S). The PCL-S (Blanchard et al., 1996) is a 17-item measure of PTSD symptoms in reference to a specific event. Participants are asked to identify

the most traumatic event they have experienced, then rate, on a scale of 1 to 5, how much that event has produced each of the official 17 symptoms of PTSD during the past month. In the current study, the internal consistency was $\alpha = .94$ for the pre-writing assessment, $\alpha = .93$ for the 1-week post-writing, and $\alpha = .95$ at the 4-weeks post-writing assessment.

ACT Analogue. The ACT analogue, a 10-minute recording, included an acceptance-based rationale and a guided mindfulness exercise. The rationale covered four points: (a) thoughts and feelings are often impossible to get rid of and difficulty in ridding oneself of thoughts and feelings may increase the more one tries, (b) thoughts and feelings are not causes of behaviors, (c) thoughts and feelings do not define the person who has them, and (d) a person may go through many changes in thoughts, feelings, or experiences over time but there is a core self that is not lost. After this four-point rationale for an acceptance-based exercise was presented, participants were guided by the audio script in an exercise known in ACT as “The Observer” (Hayes et al., 1999). This exercise is a guided imagery technique used by ACT clinicians to help clients increase awareness of what is called self-as-context in the ACT model. An individual is guided to look at thoughts, feelings, and experiences in the present moment. Part of the exercise is to note that there is a self who is noticing the experience and to label that self “the observer.”

The recording guides the participant through multiple bodily states, life events, and roles throughout the lifespan and encourages the person to notice the continuity of self that was present and aware for each of those events. The recording asks the individual to notice that there is a constant perspective (the “you”) that is always there observing these events, but that the constant, stable self (the “you”) is not made up of these events. The “you” is the context in which all these events happen, rather than the content.

CBT Analogue. Like the ACT analogue, the CBT analogue was a 10-minute audio recording with a 4-part rationale followed by a guided imagery exercise. The first point of the CBT rationale was that the mind has the ability to focus on what it chooses, and there are several techniques to change the mind's focus. The remainder of the rationale covered that the mind can be used to generally control the body and more specifically to tense and relax the body, and that - with practice - the mind and body can work together. Then, the participants were led through a positive, relaxing scene used in conjunction with work on breathing techniques. More

specifically, participants were instructed to take deep, slow breaths that slowly fill the abdomen with air followed by an exhalation that allowed the individual to release both the air and tension held in the muscles. Participants were asked to think of a place that they find comforting to stay in for a short while. The location was somewhere they chose, real or imaginary. Participants were encouraged to visualize the location they had chosen in as much detail as possible by thinking of objects and colors that surrounded them. The participants were asked to notice any tactile sensations, smells, tastes, or sounds that were present as well. There was also a specific instruction to use their minds to change any negative thoughts or feelings that occurred while they were relaxing.

Procedure

Since the purpose of the study was to examine a modified expressive writing intervention, we first needed to identify participants who were experiencing elevated levels of distress in response to a stressful event. Hence we conducted an online screener study that included the PCL-S (measure of PTSD symptoms in response to a specific event). The screener also included the CES, so we could obtain a pre-writing assessment of event centrality, along with several other measures that were not central to the hypotheses of this study. Participants who scored above the cutoff of 44 on the PCL (Blanchard et al., 1996) were invited to participate in a larger study. The first session of the larger study took place within one week of the screener completion.

Participants were randomly assigned to one of three conditions: 1) Writing-ACT condition – listened to ACT analogue and then completed two expressive writing sessions, 2) Writing-CBT condition – listened to CBT analogue and then completed two expressive writing sessions, or 3) Control condition – listened to audio script about the history of baseball, then completed two writing sessions about time management. This writing topic is a typical control group topic in expressive writing studies. All three audio scripts were 10 minutes in length and all participants were encouraged to write on their assigned topic for 20 minutes during each session. The expressive writing instructions stated:

For the next 20 minutes, I want you to let go and write about your very deepest thoughts and feelings about the event listed on the slip of paper. This is the event that you indicated was your most distressing event. In your writing, we ask that you think about what you just learned in the audio recording and how it might apply to you and the event you experienced. You might want to explore your emotions and thoughts about the negative event. We ask that you do not include any information that could identify you as we want this writing to remain confidential and for you to feel free to be able to write things you would not want tied to you. Only the researchers involved in this project will have access to read your essay. Therefore, your confidentiality is assured and your name will never be linked to anything you write. The important thing is that you really try to apply what you learned in the audio recording to how you might cope with your stressful event.

To make certain participants referred to the same event across sessions, at the start of the two expressive writing sessions, participants were given an event reminder. The event reminder is a slip of paper that listed their most distressing event that they had identified during the screener session. In addition, at the start of the second expressive writing session, participants were given a 'highlights' sheet that briefly reviewed the main points of the analogue they heard during the first session. The highlights sheet was used to assure that participants recalled what they learned in the analogue during the writing sessions. Participants in the control condition received no reminders during their two writing sessions. Both writing sessions occurred within the span of one week. Participants from all conditions then completed a 1-week and a 4-week post-writing assessment in which they completed the PCL-S and CES. The 4-week post-writing assessment was included in addition to the one-week post-writing session because the effects of the expressive writing intervention typically take a few weeks to occur (Frattaroli, 2006; Klein & Boals, 2001). All participants were given an event reminder at the beginning of the two post-writing assessments. At the end of the 4-week post-writing session, all participants were thanked and debriefed. This procedure was approved by the Institutional Review Board of the university where data collection occurred.

Results

The average word count was $m = 616.58$ words ($sd = 224.39$) for the first expressive writing essay and $m = 572.73$ words ($sd = 198.03$) for the second essay. Hence participants wrote an extensive amount in their essays, but as is typical in expressive writing studies, there was variability in the length of the essays. The average word count did not differ by writing condition for either the first or second essays (both $ts < 1$). We next examined the extent to which participants correctly followed the expressive writing instructions in their essays. Two independent coders, advanced graduate students trained in both ACT and traditional CBT, coded each essay for the extent to which participants attempted to apply what they learned in the analogue. Each essay received a score of 0 (did not follow instructions) or 1 (applied strategy from analogue to writing). Essays that were given scores of 0 typically had no mention of the audio recording or any strategies discussed in it. In cases that did mention the recording, references to audio material were either dismissive, inaccurate, or both. Further, there was no evidence of processing the covered traumatic event through strategies mentioned in the audio. An example of one sample scored 0 from the ACT condition contained phrases such as, "I don't think I can ever let it go," and "the audio recording sounds nice but I don't think it helps, because this is my whole life." That same essay reflected a lot of rumination and searching for answers. Essays that were coded with a 0 were followed up with coding on variables of reasons for not applying the strategy covered in the analogue: rumination, non-ruminative avoidance, time constraints, or difficulty understanding the directions. All of these codes were made on a 1 to 5 scale, for each writing sample. The two-way random intraclass correlation (ICC) for inter-rater reliability was $\alpha = .90$, indicating a high degree of agreement between the two coders. All essays that were given a score of 1 (applied strategy from analogue to writing) were followed up with a second code on a scale from 1 (slight evidence of strategy being applied) to 5 (strong evidence of following instructions). In the slight evidence rating category, essays showed accurate awareness of the techniques used in the audio recording and some attempt to apply them to the covered traumatic event. Essays that were scored with this rating, however, still contained errors in applying the techniques. A sample CBT essay scored a 1 contained the phrases, "...as I listened, I heard something about deep breathing," and "I tried relaxing like the audio said." The essay

specifically linked the techniques to the participant's traumatic event but also mentioned that relaxation was "boring" and that it would "probably not help for triggers." An example of a strongly applied (5) rating in the CBT condition – on the other hand – mentioned the audio in reference to turning negative thoughts about the trauma into neutral and positive thoughts instead. That same essay also included the phrases, "...I know I have control over what I think most of the time...this means I am in control of forgiving." A similar rating for an essay in the ACT condition reflected direct reference to learning tools in the audio recording that guided processing about self-as-context. An example essay included this statement: "The advice in the audio helped me understand that an experience might change me in the moment but not eternally." That participant also wrote directly about acceptance. For each participant, we took the average score for their two expressive writing essays. We refer to this variable as 'followed directions.' Unfortunately, there was a larger than expected number of participants who did not follow directions to a high degree. The frequency of scores for followed directions by condition is depicted in Table 1. Mean scores for followed directions did not significantly differ between the ACT condition ($m = 3.01$, $sd = 1.35$, range = 1-5) and the CBT condition ($m = 2.85$, $sd = 1.05$, range = 1-5), $t < 1$.

We examined whether followed directions in the ACT and CBT groups was related to changes in our outcome measures. Due to the relatively small sample sizes in each condition, we collapsed scores in the ACT and CBT groups to examine followed directions. Followed directions was not significantly correlated with change in CES scores from pre-writing to one-week post-writing, $r(44) = .20$, ns , nor from pre-writing to four-week post-writing, $r(41) = -.12$, ns . However, higher scores for followed directions were significantly correlated with greater decreases in CES scores from one-week post-writing to four-week post-writing, $r(41) = -.45$, $p = .003$. The size of this correlation did not significantly differ between the two experimental conditions, $z < 1$. This result suggests that participants who attempted to apply the lessons learned in the treatment analogues evidenced decreases in event centrality, and the timing of these decreases mostly occurred between one and four weeks post-writing. Followed directions was unrelated to any changes in PCL scores (all $|r|$'s $< .12$).

We next tested whether participants in the two expressive writing conditions evidenced significant decreases in CES and PCL scores, in comparison to the control group. Before conducting further analyses, we determined that a score less than two for followed directions is insufficient to claim participants appropriately followed instructions. A total of 17 participants received a score of less than two and were removed from the subsequent analyses (10 from the ACT group and 7 from the CBT group). Hence the remaining analyses were conducted on a total sample size of 48 (ACT = 16, CBT = 10, and Control = 22). Participants who were excluded for not following directions did not significantly differ from included participants in pre-writing PCL scores ($t < 1$), or gender ($\chi^2 = 3.06$, ns). However, those who were excluded evidenced higher pre-writing CES scores ($m = 29.4$, $sd = 4.5$) than those who were included ($m = 25.1$, $sd = 7.0$), $t(64) = 2.22$, $p < .05$, $d = .73$.

After removing the aforementioned 17 participants, we conducted a 3 (condition) x 3 (time: pre-writing, 1 week post-writing, and 4 weeks post-writing) ANOVA with a repeated measures factor on the time variable on CES scores. There were no significant differences between conditions at pre-writing, $F < 1$. In addition, there was no significant main effect of condition ($F < 1$). However, there was a significant main effect of time, $F(2, 44) = 6.18$, $p < .01$, $\eta^2 = .08$. Post-hoc analyses revealed change in CES scores from pre-writing to one-week post-writing and from one-week post-writing to four-weeks post-writing were not significant, t 's < 1.2 . However, CES scores did significantly decrease from pre-writing to four-week post-writing, $t(45) = 2.59$, $p < .05$, $d = .33$. Importantly, there was also a significant interaction of time x condition, $F(4, 86) = 2.80$, $p < .05$, $\eta^2 = .09$. Post-hoc analysis revealed a significant change in CES scores across the three time points for the ACT group, $F(2, 14) = 4.10$, $p < .05$, $\eta^2 = .19$, and the CBT group, $F(2, 8) = 11.34$, $p < .01$, $\eta^2 = .35$. CES scores did not significantly change over time for the control group, $F < 1$. Further post-hoc analyses revealed that for the ACT group, CES scores significantly decreased from one-week post-writing to four-weeks post-writing, $t(13) = 2.42$, $p < .05$, $d = .52$. Changes in CES for the other two possible time changes (pre-writing to one-week post-writing and pre-writing to four-weeks post-writing) were not significant. For the CBT group, CES scores significantly decreased from pre-writing to four-weeks post-writing, $t(9) = 4.47$, $p < .01$, $d = 1.01$. Changes in CES for the other two possible

time changes (pre-writing to one-week post-writing and one-week post-writing to four-weeks post-writing) were not significant. There were no significant differences between conditions at either 1-week or 4-weeks post-writing, $F_s < 1$. As can be seen in Table 2, CES scores in the CBT group steadily decreased, while CES scores in the ACT group increased, then decreased. CES scores for the control group decreased, then increased.

We next conducted the same 3 x 3 ANOVA on PCL scores. The same as with CES scores, there were no significant differences between conditions at pre-writing, $F < 1$. However, there was a significant main effect of time, $F(2, 90) = 29.00, p < .001, \eta^2 = .39$ such that scores for all participants decreased from pre-writing ($M = 48.7, SD = 14.0$) to one-week post-writing ($M = 37.7, SD = 14.5$) to four-weeks post-writing ($M = 34.6, SD = 14.7$). Post-hoc analyses revealed the decrease in PCL scores from pre-writing to one-week post-writing was significant, $t(47) = 5.79, p < .001, d = .83$, as was the decrease from pre-writing to four-weeks post-writing, $t(47) = 6.86, p < .001, d = 1.01$, as well as the decrease from one-week post-writing to four-weeks post-writing, $t(47) = 2.32, p < .05, d = .31$. However, there was no significant effect of condition and no time x condition interaction ($F_s < 1$). Means and standard deviations are depicted in Table 2.

Discussion

A previous study (Boals & Murrell, 2015) found that an intervention consisting of four 1-hour long ACT sessions, led by a trained therapist, resulted in significant decreases in event centrality and PTSD symptoms. In the current study, we wondered if a less intensive, lab-based version of this intervention could also be effective. We created an analogue of the ACT sessions in which participants listened to a brief audio clip and then attempted to apply what they learned via two expressive writing sessions. We also created an analogue of a CBT session to examine whether a CBT approach could also reduce event centrality. There was great variability in the extent to which participants applied what they learned in the audio scripts in their expressive writing. For participants in the ACT writing condition, higher ratings for following the directions was related to greater decreases in event centrality; however, this finding should be interpreted with caution due to small sample size. After participants who did not follow directions were

excluded, the primary hypothesis was partially supported – participants in the ACT and CBT conditions evidenced significant decreases in event centrality, in comparison to the control group. However, the decreases in centrality were not larger in the ACT group. The timing of the decreases in event centrality varied between the two expressive writing conditions. In the ACT group, participants evidenced a non-significant increase in event centrality directly after writing, but then evidenced a significant decrease from one-week to four-weeks post-writing. In the CBT group, event centrality scores decreased from pre-writing to one-week post-writing, but this decrease was not statistically significant until four-weeks post-writing. Hence the CBT group evidenced a steady decrease in event centrality over time, whereas for the ACT group, the impact of the expressive writing intervention took a few weeks to take effect. Previous studies have shown that participants tend to give traditional CBT more credibility than ACT (see Smout, Hayes, Atkins, Klausen, & Duguid, 2012 for review); this could be one reason the decrease in event centrality took effect sooner. The CBT rationale is also more consistent with the cultural agenda, so it is more "in-line" with what people are familiar with doing on a day-to-day basis. The delay before the effects of the expressive writing took place is consistent with past research on the timing of benefits of expressive writing (Frattaroli, 2006). This is also consistent with previous studies on ACT and other acceptance and mindfulness based treatments, which show stronger outcomes at follow-up than at immediate post-test (Smout et al., 2012). Consistent with previous findings (Boals & Murrell, 2015), the control group evidenced no significant change in event centrality, suggesting that—absent intervention—event centrality is fairly stable over time.

Although we found evidence that the two expressive writing groups experienced significant decreases in event centrality, we did not find a significant effect of writing on PTSD symptoms. This finding is consistent with a recent meta-analysis of acceptance- and mindfulness- based self-help studies. Cavanagh, Strauss, Forder, and Jones (2014) found that mindfulness and acceptance seemed to underlie the change in psychological symptoms. When mindfulness and acceptance were statistically accounted for, the relationships between ACT self-help treatment and decreases in anxiety and depression were no longer significant. This is not particularly surprising as the overarching goal of the ACT model is not to remove DSM symptoms. In ACT, the goal is not to feel *good*, but instead to *feel good*. As previously

mentioned, the cognitive change that is associated with ACT is more about how you related to your thoughts (and feelings), and less about changing specific thoughts or feelings. The intention of ACT is to fully experience all of the emotions (along with thoughts and bodily sensations) that are associated with living the varied experiences that are consistent with one's values. When someone is just beginning to do this for the first time, it may be unsettling. For someone who has equated herself only to her experienced trauma to see herself as much greater than that event is both empowering and terrifying. It takes time for the complex emotions to settle, and people often feel worse before feeling better. Once someone is engaged with their values, DSM symptoms might decline – as a side effect. It could be that two 20-minutes writing sessions, following a 10-minute audio script were just enough of an ACT intervention to manipulate centrality but not intense enough, or lengthy enough, to lead to decreases in trauma- or stress-related symptoms. Consistent with the idea that length of treatment matters, Boals and Murrell (2015) found decreases in both event centrality and PTSD symptoms. In longer and more intensive therapy work, it is more common for symptoms such as anxiety and depression to dissipate, (for review see recent meta- analyses: Öst, 2014; Ruiz, 2012). Four hours of intervention as compared to ten minutes may have led to a dose effect. In a meta-analysis by Cavanagh and colleagues (2014), the authors concluded that important therapeutic processes could be manipulated within the structure of a self-help paradigm, and that therapist support could be used as assistance. In the current study, we used a modified expressive writing intervention to manipulate event centrality. However, we acknowledge that there are likely many other ways one could manipulate event centrality. Any procedure that effectively encourages an individual to learn the core principles of self-as-context from the ACT paradigm, and subsequently apply them to stressful events they are coping with theoretically is capable of reducing event centrality. Achieving this goal via our modified expressive writing procedure has the advantage that it is relatively easy to implement, but appears to have the disadvantage that many participants, for likely a variety of reasons, chose not to apply what they learned in their writing sessions. Treatment adherence is critical to the success of any such interventions.

There were a number of limitations to the current study that need to be addressed in such future studies. First, this was a fairly small ($N = 79$, and 48 for some analyses), nonclinical

sample. Second, there were a large number of participants who did not follow instructions. More specifically, their writing samples did not reflect that they engaged with the analogue and used its strategies. Well-trained coders indicated that the most likely reason for this failure to follow instructions was that participants were being avoidant of interaction with trauma-focused material. Given this information, combined with no significant changes in PCL scores, some recommendations for future studies can be made. Efforts to recruit a larger and more diverse sample would help with both power and external validity. Having an experimental check on participants briefly with a gentle assurance of support and encouragement of following the analogue strategy may increase following instructions, which may in turn reduce avoidance and further reduce trauma symptoms. Another possibility is that the modified expressive writing instructions we used were not clear to participants. In the instructions we stressed the confidential nature of the writing, hoping participants would feel at ease about disclosing personal information. In retrospect, more emphasis and clarification could have been given concerning applying what they learned in the audio scripts in their writings. Lastly, the design of our study does not allow us to examine whether the modified writing instructions were necessary to have an effect. It is possible that standard expressive writing instructions would produce similar results. Further studies should examine the effects of standard versus modified expressive writing instructions on changes in event centrality.

Our finding that a modified expressive writing intervention can be used to manipulate event centrality holds promise for clinical practice. Event centrality has proved to be a highly reliable and particularly potent associate of PTSD symptoms (Berntsen & Rubin, 2007; Rubin et al., 2014). The ability to decrease event centrality holds great promise for improving existing treatments for trauma victims. If this can be achieved without the presence of a trained clinician, it expands its potential utility in both clinical and experimental applications. Initial efforts proved that, even without clinician engagement, event centrality could be reduced via an experimental manipulation, and these reductions were maintained over time. This could have implications both for research and application. In future studies and in self-help work, this highly cost-effective paradigm could be utilized to introduce exposure content in gentle and effective ways.

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Table 1. Frequency of scores for 'followed directions'.

Table 2. Means and standard deviations for event centrality and PTSD symptoms by time and condition.

		1 week	4 weeks
	Pre-Writing	Post-Writing	Post-Writing
Event Centrality			
ACT	23.85(7.95)	24.57(7.25)	21.93(8.01)
CBT	26.64(5.97)	25.73(3.99)	24.10 (4.69)
Control	26.00(6.36)	24.50(8.76)	25.41(7.35)
PTSD Symptoms			
ACT	50.59(14.29)	39.06(14.11)	38.89(15.85)
CBT	48.75(14.60)	37.75(12.49)	32.00(14.22)
Control	48.70(15.47)	38.64(15.75)	34.68(14.17)

Figure 1. Flow of Participants.

(n = 16)

(n = 10)

(n = 22)