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Using Acceptance and Commitment Therapy to Increase Self-Compassion: A Randomized Controlled Trial

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Abstract

Self-compassion has been shown to be related to several types of psychopathology, including traumatic stress, and has been shown to improve in response to various kinds of interventions. Current conceptualizations of self-compassion fit well with the psychological flexibility model, which underlies acceptance and commitment therapy (ACT). However, there has been no research on ACT interventions specifically aimed at self-compassion. This randomized trial therefore compared a 6-hour ACT-based workshop targeting self-compassion to a wait-list control. From pretreatment to 2-month follow-up, ACT was significantly superior to the control condition in self-compassion, general psychological distress, and anxiety. Process analyses revealed psychological flexibility to be a significant mediator of changes in self-compassion, general psychological distress, depression, anxiety, and stress. Exploratory moderation analyses revealed the intervention to be of more benefit in terms of depression, anxiety, and stress to those with greater trauma history.

Keywords

Self-compassion; Acceptance and commitment therapy; Psychological flexibility; General psychological distress; Mediation; Moderation

The concept of self-compassion has been put forth as a healthy alternative to both self-criticism and high self-esteem and has been conceptualized as consisting of self-kindness, mindfulness, and common humanity (Neff, 2003b). Self-kindness involves extending understanding, patience, and benevolence to the self, especially in difficult times; Common humanity refers to a sense in which one is connected to others in and even through one's

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suffering, as suffering is in fact common to all human beings; And mindfulness involves holding painful experiences in awareness (that is, not denying or distracting from them) but at a distance so that one does not become overly identified with them. The relevance of self-compassion has been supported by recent research showing that self-compassion correlates negatively with depression, anxiety, worry, rumination, and PTSD avoidance symptoms (Neff, 2003a; Neff, Rude & Kirkpatrick, 2007; Raes, 2010; Thompson & Watzl, 2008). In addition, self-criticism and low self-compassion play a role in the development of psychological disorders in response to stressful life events, such as exposure to trauma (Cox, MacPherson, Enns, & McWilliams, 2004; Sharhabani-Arzy, Amir, & Swisa, 2005; Thompson & Watzl, 2008).

Interventions of various lengths and formats, from mindfulness-based stress reduction programs to very brief rationales, have been shown to increase self-compassion, as measured by Neff's Self-Compassion Scale (SCS; Neff, 2003a; for a review of research using the SCS, see Neff, 2012). One study showed that an 8-week mindful self-compassion course based on Neff's conceptualization improved self-compassion, mindfulness, compassion towards others, life satisfaction, avoidance, depression, anxiety, and stress significantly more than a wait-list control, with all improvements maintained at 6-month follow-up (Neff & Germer, 2013).

Some authors have suggested that acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 2012) overlaps with Neff's conceptualization of self-compassion considerably and that Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001), the basic science of language and cognition behind ACT, may be relevant to self-compassion as well (Neff & Tirsch, 2013). While research on ACT has not extensively examined self-compassion, ACT's process of change, psychological flexibility, which is measured by the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011), correlates with the SCS at $r = .65$ (Neff, unpublished data cited in Neff & Tirsch, 2013).

Psychological flexibility from an ACT perspective has 6 different dimensions. It consists of (1) deliteralizing language and cognition (defusion), (2) openly and willingly experiencing emotions and bodily sensations (acceptance), (3) flexibly and voluntarily attending to what is present (present moment awareness), (4) having a sense of self as the perspective from which life is experienced, as distinguished from one's identity or self-image (self-as-context), (5) flexible yet persistent self-directed behavior (committed action), and (6) freely chosen qualities of action that make behavior intrinsically reinforcing (values).

There are parallels and similarities between the concepts of psychological flexibility and self-compassion. First, from an ACT perspective, Neff's central concept of self-kindness may be closely linked to self-acceptance. The opposite of experiential acceptance, experiential avoidance, is viewed within ACT to include excessive evaluation of one's experiences as bad or wrong and is therefore highly self-invalidating. Acceptance of one's painful experiences, and of oneself when one is hurting, can thus be a stance of profound self-kindness. Further, contacting pain openly is necessary for extending understanding to oneself, a coping skill that is included in Neff's definition of self-kindness.

Second, from an RFT point of view, extending such self-understanding involves deictic relational frames (or perspective taking), which are defined as frames “that specify a relation in terms of the perspective of the speaker” (Hayes et al., 2001, p. 38). These very same deictic frames are involved in a sense of common humanity (an aspect central to self-compassion), since they allow one to see that both the self and others have moment to moment perspectives that can bear witness to difficult experiences. As perspective taking is strengthened, RFT argues that a larger common consciousness emerges that is extended across time, place, and person.

Third, Neff’s self-compassion conceptualization and ACT both emphasize mindfulness, which from an ACT perspective consists of defusion, acceptance, contact with the present moment, and self-as-context (Fletcher & Hayes, 2005). Defusion is important for self-compassion because it allows self-criticisms to pass through the mind without having to be believed, proven wrong, or otherwise engaged—a stance that is likely more workable than an agenda of cognitive change. Defusion from self-criticism is particularly well-suited to self-critics because instructions to be less self-critical will likely be taken as criticisms, and will strengthen the self-critical repertoire. Self-as-context, or the observing self, is a sense of self that emerges from defusion from self-conceptualizations. Unlike self-esteem, which depends on positive self-evaluations, self-as-context cannot be threatened by failures and is therefore consummately stable.

The Present Study

In summary, (1) research suggests that lack of self-compassion might play a role in general psychopathology and in individual’s response to trauma, (2) there has been a recent emergence in the literature of self-compassion as a treatment target, and (3) ACT and Neff’s conceptualization of self-compassion share a number of conceptual commonalities.

Despite the clear applicability of ACT to self-compassion work, and the relevance of self-compassion with regards to psychopathology, no study to date has examined the effectiveness of an ACT protocol targeted at self-compassion. In addition, the conceptual overlaps between the psychological flexibility model and self-compassion beg the question of whether psychological flexibility may account for changes in self-compassion.

Therefore, this study aims to test the efficacy of an ACT approach to self-compassion, test the mediational role of psychological flexibility, and explore the moderating role of trauma history on the efficacy of the intervention. Drawing from the ACT model and its underlying theory of language and cognition, RFT, we designed an ACT intervention aimed at:

1. *weakening fusion with self-criticism and self-conceptualizations.* A defused stance is adaptive in that it involves flexibility in terms of the extent to which self-criticisms and self-conceptualizations govern behavior. For example, defusion frees individuals from pursuing lives centered around disproving self-criticisms through rigid perfectionism, but it also allows individuals to recognize areas of weakness so as to empower personal growth.

2. *strengthening deictic framing repertoires, which are involved in cultivating self-perspective-taking and self-as-context.* Deictic framing is involved in perspective-taking and compassion. Because these processes are usually thought of in terms of what one does with respect to others (e.g., “putting oneself in another’s shoes”), the idea of applying them to the self may seem odd. However, through self-conceptualizations as “good,” “bad,” “okay,” “broken,” etc., self-as-content/self-as-object becomes more salient. Thus, defusion from self-as-content and the cultivation of self-as-context are central to the self-empathy involved in self-compassion.
3. *constructing and enacting a value of self-kindness through acceptance and self-acceptance.* Just as compassion towards others may be conceptualized as empathy plus kindness (Lazarus, 1991), self-compassion may be conceptualized as self-perspective-taking plus a value of self-kindness. One way to enact such a value is to embrace the suffering parts of the self with love and acceptance rather than avoiding thoughts and feelings linked to them.

Consistent with ACT’s theoretical model and with previous ACT research, we hypothesize that the ACT intervention will lead to improvements in self-compassion and general psychopathology. Likewise, we hypothesize that such improvements will be mediated by increases in psychological flexibility. Given previous research indicating the role of self-compassion among victims of trauma, an exploratory aim of this study was to examine whether the ACT intervention was more efficacious for individuals with a history of trauma.

Method

Participants

Participants were undergraduates ($N = 73$) 18 years of age and older enrolled in psychology classes at the University of Nevada, Reno. So that the intervention could be tested on those for whom it would be most relevant, and to avoid ceiling effects, participants were screened for low self-compassion, which was defined as a score on the SCS below the mean score for undergraduates in the original validation sample, 18.25. For similar reasons, participants were also screened for high psychological distress, as indicated by a score on the General Health Questionnaire (GHQ; Goldberg, 1972) of 10 or higher, which indicates the presence of a current DSM-IV Axis I disorder with a sensitivity of 78% and a specificity of 60% in this approximate age group (Baksheev, Robinson, Cosgrave, Baker, & Yung, 2011). Participants completed the screening instruments and all subsequent measures on SurveyMonkey (<http://www.surveymonkey.com/>) after signing up through a research sign up system maintained by the Psychology Department.

Those who qualified for the study were invited by email and/or by phone by the first author to attend a 20-minute informed consent meeting where the study was described. Each participant who consented was then assigned to either the ACT workshop or waitlist condition via a random number generator (<http://stattrek.com/statistics/random-number-generator.aspx>). Participants in the ACT condition were scheduled to attend a workshop to occur within 11 weeks of the date they gave consent. Three workshops were given for ACT

participants, and therefore the participants were grouped into 3 cohorts. Waitlist participants were then grouped into 3 corresponding cohorts according to when they consented. For example, the earliest consenters were asked to complete the assessments during the same weeks as were the ACT participants receiving the first workshop, and so on. Participant flow is shown in Figure 1.

Measures and Assessment Schedule

In addition to a variety of demographic variables (see Table 1) the following measures were taken.

Outcome measures—The Self-Compassion Scale (SCS; Neff, 2003a) measures self-compassion through 26 self-report items rated on a 5-point Likert scale ranging from *almost never* to *almost always*. The SCS has good internal reliability, both in its validation study ($\alpha = .92$) and in the present study ($\alpha = .90$). The SCS yields an overall score and consists of six subscales: Self-Kindness (e.g., “When I’m going through a very hard time, I give myself the caring and tenderness I need.”), Self-Judgment, Common Humanity (e.g., “When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.”), Isolation, Mindfulness (e.g., “When I fail at something important to me I try to keep things in perspective”), and Over-Identification.

The General Health Questionnaire (GHQ; Goldberg, 1972) is a 12-item Likert self-report scale that measures general psychological distress by assessing the extent to which certain experiences have been present recently, such as “thinking of yourself as a worthless person” or “feeling reasonably happy, all things considered.” The GHQ has been used extensively as a screening instrument for psychopathology among young people (Tait, Hulse, & Robinson, 2002). Internal consistency is good in college-aged individuals (Cronbach’s $\alpha = .84$; Winefield, Goldney, Winefield, & Tiggemann, 1989) and was good at pretreatment in the current study ($\alpha = .87$).

The Depression Anxiety and Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995) are 3 7-item self-report scales measuring the severity of depression, anxiety, and stress over the past week. Items are presented together in a 21-item questionnaire and are rated on a 0–3 scale. Internal consistency has previously been shown to be good (α for each scale $> .87$; Antony, Bieling, Cox, Enns, & Swinson, 1998), and was acceptable to good at pretreatment in the present study (α s for depression, anxiety, and stress = .86, .76, and .84, respectively). Sample items include, “I felt downhearted and blue,” (Depression), “I felt I was close to panic,” (Anxiety), and “I tended to over-react to situations,” (Stress).

Process measure—The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) is a measure of psychological flexibility. The AAQ-II’s 7 self-report items are rated on a 7-point Likert scale ranging from *never true* to *always true*. Item ratings are added together, and higher scores indicate higher levels of psychological inflexibility. The AAQ-II is more internally consistent than the original AAQ (Hayes et al., 2004) with an $\alpha = .84$ in its validation study and $\alpha = .87$ in the present study. The AAQ-II correlates very highly with the AAQ-I ($r = .97$), which has mediated ACT treatment effects in many outcome studies (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Items include, “My painful experiences and

memories make it difficult for me to live a life that I would value,” and “I’m afraid of my feelings.”

Moderator measure—The Stressful Life Events Screening Questionnaire-Revised (SLESQ-R; Green, Chung, Daroowalla, Kaltman, & DeBenedictis, 2006) is a self-report instrument designed to screen for a history of events that could qualify as Criterion A stressors for PTSD. Each of its 13 items contains a yes-no question regarding history of a particular type of stressful event (see Table 2 for a list of these events). Follow-up questions for each item assess the age at which the stressor occurred as well as other details, but since the purpose was to assess whether participants had been exposed to potentially traumatic stressors, these were not used in the present study.

Assessment schedule—With the exception of demographic measures and the moderator measure (the *SLESQ-R*), taken only at baseline, all measures were taken one week before the intervention (“pre”), 1–2 weeks after the intervention (“post”), and 8–9 weeks after the intervention (“follow-up”). Two measures were taken at screening (the GHQ and SCS). Participants were compensated for assessment completion with research credits and a lottery for gift cards, which were funded through indirect funds of the second author’s research lab and through personal funds of the first author.

Intervention

The protocol for the 6-hour workshop was based on the manual used by Lillis et al. (2009) but was adapted significantly to focus on self-compassion (see Yadavaia, 2013 for the complete protocol). The present workshop focused on weakening fusion with self-criticism and self-conceptualizations, building self-perspective-taking and self-as-context, and strengthening a value of self-kindness through acceptance and self-acceptance. To foster defusion from self-criticisms, the unworkability of attempts to suppress or change self-critical thoughts was highlighted, for example using the *Chocolate Cake Exercise* (Hayes, Strosahl, & Wilson, 1999, pp. 124–125). Defused acceptance of self-critical thoughts was then presented as an alternative, as participants were asked to imagine writing their thoughts on leaves flowing down a stream and to watch for times when they fuse with thinking and lose the image of the stream. Defusion from self-as-content was also instigated by comparing self-conceptualizations to documentaries, in that both are based on “real footage” but are still merely content about something. That is, in the same way that a documentary about Africa is not Africa, our stories about ourselves are not us (Harris, 2008, pp. 155–156).

Experiential exercises were included to cultivate self-compassion through perspective taking and contact with self-as-context. For example, participants were led in an eyes-closed exercise called the *Child Exercise* (Walser & Westrup, 2007, pp. 186–190), in which participants are guided to imagine themselves as they were as small children walking through their childhood homes, asking their parents for what they would most want from them psychologically. Then, participants are guided to imagine their adult selves meeting their childhood selves, giving them what they feel the child needs or could benefit from, thus enacting a value of self-kindness.

The protocol then focused more on self-kindness as a value, with acceptance of one's experience presented as a way to enact a value of self-kindness. In the Stand and Declare Exercise, participants made public commitments to act in concert with their values, such as showing oneself greater kindness in difficult times.

Personnel—Each workshop was led by 2 clinical psychology doctoral students (from a total group of 3) who had received at least 3 semesters of practicum training in ACT and at least 1 year of experience using ACT with individual clients. The first author served as co-leader for all workshops.

Adherence—All workshops were audio recorded using MP3 recorders. Clinical psychology graduate students with a minimum of 1 year of practicum training in ACT rated each workshop using an adherence manual adapted from Plumb & Vilaradaga (2010) that assessed coverage of the 6 ACT flexibility processes and the absence of ACT-inconsistent approaches, e.g. cognitive disputation. Overall scores for each workshop were computed by averaging the individual item ratings, which could range from 1 to 5. To evaluate inter-rater reliability of the adherence instrument, 1 of the 3 workshops was randomly selected to be rated by 2 of the adherence raters. The raters' responses were never more than 1 point apart, and they agreed precisely 76% of the time. Overall adherence scores for the 3 workshops were high in all cases (4.59, 4.69, and 4.86; $M = 4.71$, $SD = .14$), indicating that the intervention was delivered skillfully and in depth.

Results

Participant Characteristics

A total of 532 participants were screened, of which 225 qualified; approximately 85 attended the informed consent session (38%). Of these, 78 (92%) agreed to participate, and 73 (86%) actually did so (as defined by supplying at least 1 assessment point). The ACT group was smaller ($n = 34$) than the waitlist group ($n = 44$) because of the unblocked randomization procedure, which could not ensure equivalence of group size. There was no difference on any screening measure or demographic variable (gender, racial/ethnic background, sexual orientation, or grade point average) between the two conditions, except that that ACT participants were significantly younger than waitlist control participants ($p = .04$), although the means differed by less than 1 year. See Table 1 for details on participant characteristics.

Distributional Assumptions

Before conducting formal statistical analyses, underlying distributional assumptions were examined, particularly skewness, kurtosis, outliers, and homogeneity of variance. Data from each condition at each time point were required to exhibit skewness between -2.00 and 2.00 and kurtosis between -4.00 and 4.00 . Only the Anxiety subscale of the DASS failed to meet criteria, but did so after 2 outliers were removed from follow-up. A summary of the means and standard deviations of all outcome and process variables are shown in Table 3.

Outcomes

Analytic Strategy—Although hierarchical linear modeling (HLM) was explored as a method of data analysis, in virtually all cases modeling time categorically rather than as a linear covariate provided a better fit as determined by a comparison of nested models using restricted log-likelihoods, and thus a mixed model repeated measures (MMRM) analysis was used. MMRM is a mixed regression model that retains most of the advantages of HLM for an intent-to-treat analysis (Raudenbush & Bryk, 2002) in using all available data from all subjects and taking into account the obtained outcome and missingness, thus reducing the problem of missing data. Although treatment occurred in groups, the analysis was not fully nested since the comparison condition contained no nesting variable at that level.

Several simpler and restrictive covariance assumptions were tested (compound symmetry, compound symmetry heterogeneous, Toeplitz) and the simplest model was used that was not significantly different than the unspecified covariance structure as determined by comparison of nested models through the restricted log-likelihood.

Denominator degrees of freedom for the fixed effects test statistics was based on the Satterthwaite approximation. Effect sizes (converted to Cohen's d), were derived from

the F -test statistic for the regression coefficients using the formula $d=2\sqrt{\frac{F}{df}}$ (with df constrained to be no larger than the number of participants), which is suggested for repeated measures and multilevel designs (Rosenthal & Rosnow, 1991; Verbeke & Molenberghs, 2000). Effect sizes for within group contrasts were calculated by the formula $[Mdiff/\{V(1) + V(2) - 2Cov(1,2)\}]$ where V = variance, Cov = covariance, and numbers refer to the measurement occasions compared (Wackerly, Mendenhall, & Scheaffer, 2008, p. 271). Effect sizes are discussed using the cutoffs suggested by Cohen (1988).

Self-Compassion—An MMRM analysis with a heterogeneous compound symmetry covariance structure best fit the data from the SCS and revealed a significant effect for treatment condition ($p < .001$) and time ($p < .001$), and a significant and medium time-by-condition interaction [$F(2, 102.61) = 10.18, p < .001$, effect size = .74]. The interaction reflected the differences in magnitude of improvement between conditions. More specifically, the waitlist participants showed a small significant improvement from pre to post ($p = .03$, effect size = .35) and from pre to follow-up [Estimate = 1.52, SE = .49, $t(109.56) = 3.08, p < .01$, 95% CI: .54, 2.49, effect size = .48], while ACT participants exhibited a significant large improvement from pre to post ($p < .001$, effect size = 1.15) and from pre to follow-up [Estimate = 4.82, SE = .59, $t(109.37) = 8.21, p < .001$, 95% CI: 3.66, 5.99, effect size = 1.54]. The pre to follow-up changes were significantly different between the two conditions [Estimate = -3.31, SE = .77, $t(109.45) = -4.32, p < .001$, 95% CI: -4.83, -1.79, effect size = 1.06, a large effect]. Figure 2 displays changes in the SCS across time points for each condition.

General Psychological Distress—An MMRM analysis with a heterogeneous compound symmetry covariance structure best fit the data and revealed a significant effect for treatment condition ($p < .001$), time ($p < .001$), and a significant and small time-by-

condition interaction [$F(2, 106.80) = 3.69, p = .03$, effect size = .45]. The interaction reflected the between-condition differences in the degree to which participants improved. More specifically, while the waitlist participants showed no improvement from pre to post ($p = .77$) and showed a significant medium improvement from pre to follow-up [Estimate = -3.54 , SE = 1.06, $t(108.29) = -3.34, p < .01$, 95% CI: $-5.64, -1.44$, effect size = .52], those in the ACT condition showed a significant medium improvement from pre to post ($p < .001$, effect size = .67) and large and significant improvement from pre to follow-up [Estimate = -7.06 , SE = 1.27, $t(108.08) = -5.56, p < .001$, 95% CI: $-9.57, -4.54$, effect size = 1.03]. The pre to follow-up changes were significantly different between the two conditions [Estimate = 3.52, SE = 1.65, $t(108.17) = 2.13, p = .04$, 95% CI: .24, 6.80, effect size = .52, a medium effect].

Depression—An MMRM analysis with a Toeplitz covariance structure best fit the data for the DASS-D and revealed a significant effect for treatment condition ($p = .01$) and time ($p = .03$), and a significant and small time-by-condition interaction [$F(2, 87.45) = 3.11, p = .0498$, effect size = .41]. The interaction reflected the fact that participants in the waitlist condition showed no improvement from pre to post ($p = .41$) or from pre to follow-up ($p = .34$), while ACT participants showed a significant small improvement from pre to post ($p = .01$, effect size = .48) and a significant medium improvement from pre to follow-up [Estimate = -5.72 , SE = 2.09, $t(63.18) = -2.73, p = .01$, 95% CI: $-9.91, -1.54$, effect size = .51]. Although pre to post changes were significantly different between the two treatment conditions [Estimate = 5.50, SE = 2.21, $t(133.02) = 2.49, p = .01$, 95% CI: 1.13, 9.86, effect size = .61, a medium effect], the pre to follow-up changes were not significantly different between conditions ($p = .15$).

Anxiety—For DASS-A scores, an MMRM analysis with an unstructured covariance structure best fit the data and revealed no effect for treatment condition ($p = .48$), a significant effect for time ($p = .04$), and a significant and medium time-by-condition interaction [$F(2, 67.21) = 7.48, p < .01$, effect size = .67]. The interaction reflected the fact that the waitlist participants showed a significant and small deterioration from pre to post ($p = .04$, effect size = .34) and no change from pre to follow-up ($p = .92$), while ACT participants showed a significant medium improvement from pre to post ($p = .01$, effect size = .53) and from pre to follow-up [Estimate = -5.17 , SE = 1.48, $t(71.37) = -3.48, p < .01$, 95% CI: $-8.12, -2.21$, effect size = .66]. The pre to follow-up changes were significantly different between the two conditions [Estimate = 5.29, SE = 1.92, $t(70.47) = 2.76, p = .01$, 95% CI: 1.46, 9.11, effect size = .68, a medium effect].

Stress—For the DASS-S, an MMRM analysis with a heterogeneous compound symmetry covariance structure fit the data best and revealed a marginally significant effect for treatment condition ($p = .06$), a significant effect for time ($p = .02$), and no significant time-by-condition interaction ($p = .13$). The waitlist participants showed no change from pre to post ($p = .42$) or from pre to follow-up ($p = .50$). Those in the ACT condition also showed no change from pre to post ($p = .16$) but showed a significant medium improvement from pre to follow-up [Estimate = -5.25 , SE = 1.74, $t(111.53) = -3.02, p < .01$, 95% CI: $-8.70, -1.80$, effect size = .56]. Evaluation of the difference in the pre to follow-up changes

between conditions revealed a non-significant trend towards a small effect in favor of the ACT participants [Estimate = 4.25, SE = 2.27, $t(111.64) = 1.88$, $p = .06$, 95% CI: $-.24, 8.75$, effect size = .46].

Mediation Analyses

Analytic Strategy—The functional role of psychological flexibility (AAQ-II) in producing effects on the outcome measures was examined by mediation analysis. Testing the significance of the “*a*” and “*b*” cross product is recognized as perhaps the best all-around available method to test mediation (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). A nonparametric method using bootstrapped samples developed by Preacher and Hayes (2004, 2008) was used in the current study to test the statistical significance of the cross product of the coefficients. In the present set of analyses, parameter estimates were based on 3,000 bootstrap samples. The bias corrected and accelerated 95% confidence intervals were then examined. These confidence intervals are similar to the 2.5 and 97.5 percentile scores of the obtained distribution of the cross products over the *k* samples, but with z-score based corrections for bias due to the underlying distribution (Preacher & Hayes, 2004, 2008). If the confidence intervals do not contain zero, the point estimate was considered significant at the level indicated. In each mediational analysis, all time points were included, and therefore participants who missed 1 or more assessments were excluded ($N = 8$ of 73). Pre to follow-up changes in the outcome variable were entered as outcomes, and pre to post changes in the process variable (AAQ-II) were entered as mediators.

Self-Compassion—Pre to post changes in psychological flexibility (AAQ-II) significantly mediated ($p < .05$) pre to follow-up changes in self-compassion as measured by the SCS (bootstrapped point estimate = 2.51, SE = .86, 95% CI: .07, 2.01). The significantly better impact of the intervention on SCS pre to follow-up changes, $t(63) = 3.72$, $p < .01$, was reduced but continued to be significant after including the mediator, $t(63) = 3.03$, $p < .01$ (proportion of effect mediated = 28.1%).

General Psychological Distress—Pre to post changes in psychological flexibility significantly mediated ($p < .05$) pre to follow-up changes in general psychological distress as measured by the GHQ (bootstrapped point estimate = -1.78 , SE = 1.10, 95% CI: $-4.74, -.21$). The significantly better impact of the workshop on GHQ pre to follow-up changes, $t(63) = -2.01$, $p = .049$, was no longer significant after including the mediator, $t(63) = -1.14$, $p = .26$ (proportion of effect mediated = 46.9%).

Depression—Pre to post changes in psychological flexibility significantly mediated ($p < .05$) pre to follow-up DASS-D changes (bootstrapped point estimate = -2.89 , SE = 1.79; 95% CI: $-7.70, -.34$). Although the decrease in DASS-D scores from pre to follow-up was non-significant, $t(63) = -1.79$, $p = .08$, it was reduced after adjusting for the mediator, $t(63) = -.80$, $p = .43$ (proportion of difference mediated = 59.9%).

Anxiety—Pre to post AAQ-II changes significantly mediated ($p < .05$) pre to follow-up DASS-A change scores (bootstrapped point estimate = -1.78 , SE = 1.27, 95% CI: $-6.02, -.26$). The significantly better pre to follow-up DASS-A change scores observed in the ACT

condition, $t(63) = -2.40, p = .02$, became non-significant after including the mediator, $t(63) = -1.59, p = .12$ (proportion of effect mediated = 37.7%).

Stress—Pre to post changes in AAQ-II significantly mediated ($p < .05$) pre to follow-up changes in stress as measured by the DASS-S (bootstrapped point estimate = -2.09 , SE = 1.52 , 95% CI: $-7.04, -.09$). The non-significant trend towards superiority of the ACT condition in terms of pre to follow-up DASS-S change scores, $t(63) = -1.86, p = .07$, disappeared after including the mediator in the analysis, $t(63) = -1.09, p = .28$ (proportion of effect mediated = 44%).

Moderation Analyses

Analytic Strategy—To evaluate whether the workshop was differentially effective for individuals according to trauma history, the SLESQ-R (taken at pretreatment) was evaluated as a moderator of the effect of treatment condition on outcomes. Following the recommendations of Hayes (2013), linear regression was used to construct a model with the following predictors of outcome variables: SLESQ-R, treatment condition, and the interaction (i.e., product) of SLESQ-R and treatment condition. If the coefficient for the interaction term in a given analysis is significant, SLESQ-R may be regarded as a moderator of that outcome. Significant interactions were then probed by examining the conditional effects of condition on outcome at the 25th, 50th, and 75th percentiles of the SLESQ-R.

So that coefficients may be interpretable within the range of the data, both SLESQ-R and condition were mean centered prior to analysis (Hayes, Glynn, & Huges, 2012). Data for both pre and follow-up could only be collected from 93% of participants (68 of 73), meaning that 7% of pre to follow-up change data were missing. Because listwise deletion and single imputation may bias results in data sets with more than 5% missing data (Graham, 2009; Schafer, 1999), multiple imputation (Rubin, 1987) was used in these analyses. Multiple imputation is a Monte Carlo technique for handling missing data, in which multiple complete datasets are constructed by imputing missing data points with values generated based on individuals' scores on other variables. Each of the imputed data sets is then analyzed using standard techniques, and pooled estimates and confidence intervals for the coefficients of interest are constructed (Croy & Novins, 2005; Graham, 2009; Schafer, 1999). The statistical package *mi* from R statistics (R-3.0.1; R Core Team, 2013) was used to carry out this procedure (Su, Gelman, Hill, & Yajima, 2011). Using bootstrapping, 30 imputed datasets were generated, and missing data were imputed based on values for all other variables in the dataset. Confidence intervals constructed for each coefficient were used to evaluate statistical significance, and these statistics were complemented with visual inspection of plots of the interaction using the *car* package in R (Fox & Weisberg, 2011). Because statistical procedures have not yet been developed to incorporate multiple imputation into additional dismantling analyses, such as the probing of interactions, these analyses were performed on a non-imputed data set in which missingness was handled through listwise deletion.

Self-Compassion—The SLESQ-R did not significantly moderate the effect of treatment condition on pre to follow-up SCS change scores (coefficient of interaction term = $.73$, SE

= .43, 95% CI: -.14, 1.59). However, confidence intervals and visual inspection (see Figure 3) suggest a stronger association between the ACT intervention and self-compassion for those with higher scores in the SLEQ-R, suggesting a moderation trend.

General Psychological Distress—The SLESQ-R did not significantly moderate the effect of treatment condition on pre to follow-up GHQ change scores (coefficient of interaction term = $-.41$, SE = 1.12, 95% CI: $-2.64, 1.83$). As noted by the confidence interval, this moderation effect clearly included 0, suggesting a null effect.

Depression—The SLESQ-R was a significant moderator of the impact of treatment condition on the change in DASS-D scores from pre to follow-up (coefficient of interaction term = -3.11 , SE = 1.55, 95% CI: $-6.20, -.02$). Visual inspection (Figure 3) confirmed this pattern. Follow-up analyses based on a non-imputed dataset revealed that 8.2% of the total variance in DASS-D change scores was uniquely attributable to the interaction [$F(1,64) = 6.18, p = .02$]. Probing the interaction revealed that among those scoring low in depression (25th percentile) on the SLESQ-R, the effect of condition on DASS-D pre to follow-up change scores was non-significant ($p = .46$). However, among those scoring moderate (50th percentile) or high (75th percentile), DASS-D pre to follow-up change scores for the ACT treatment group were significantly better than those of the waitlist control (conditional effects of -5.11 and -9.04 respectively, ps both $< .05$). Thus, ACT was helpful with depression for the more traumatized participants.

Anxiety—The SLESQ-R significantly moderated the relationship between treatment condition and DASS-A pre to follow-up change scores (coefficient of interaction term = -2.63 , SE = 1.16, 95% CI: $-4.94, -.32$; see Figure 3). Analyses based on a non-imputed dataset showed that 9.5% of the total variance in DASS-A change scores was uniquely attributable to the interaction [$F(1,64) = 7.55, p < .01$]. Probing the interaction showed that among participants scoring low on the SLESQ-R, there was no significant effect of condition on pre to follow-up DASS-A change scores ($p = .59$). By contrast, among those scoring moderate or high, DASS-A change scores were significantly better in the ACT group (conditional effects of -5.09 and -8.40 , respectively, ps both $< .01$). Thus, ACT was helpful with anxiety for the more traumatized participants.

Stress—The SLESQ-R did not significantly moderate the impact of treatment condition on DASS-S pre to follow-up changes (coefficient of interaction term = -2.85 ; SE = 1.51; 95% CI: $-5.86, .016$; 90% CI: $-5.38, -.33$). As shown by Figure 3 and the interaction's confidence interval, a finer grain analysis and visual inspection of this association suggests a moderation trend. Additional analysis also showed that 7.2% of the total variance in DASS-S change scores in a non-imputed dataset could be uniquely attributed to the interaction [$F(1, 64) = 5.41, p = .02$]. Probing the interaction showed that among participants scoring low on the SLESQ-R, the effect of condition on DASS-S pre to follow-up changes was not significant ($p = .58$). However, among those scoring moderate or high, DASS-S changes were significantly better for ACT participants (conditional effects of -5.16 and -8.75 , respectively, ps both $< .05$). Thus, ACT was helpful with stress for the more traumatized participants.

Discussion

Given recent emphasis in the literature highlighting the relationship between low self-compassion and high levels of psychopathology, the present study was designed to test the efficacy of an ACT approach to self-compassion as compared to a waitlist control, and to examine its additional impact on general psychopathology. ACT's underlying process of change, psychological flexibility, was examined as a mediator of treatment effects, and exploratory analyses were conducted to evaluate the role of participants' history of trauma on treatment outcomes.

Efficacy of ACT Intervention and Mediation by Psychological Flexibility

The study showed that the ACT intervention led to large increases in self-compassion as compared to the waitlist control at post-treatment and two months after the intervention. The ACT intervention also led to moderate to large reductions in general psychological distress at two months, and as compared to the waitlist condition. Symptoms of depression were significantly reduced in the ACT group after the intervention and at two months follow up. Although improvements post-treatment were greater in the ACT condition than in the control condition, this difference disappeared after 2 months. Conversely, symptoms of anxiety improved in the ACT condition at each measurement occasion—improvements which were superior as compared to the waitlist condition. For the last outcome, stress, the ACT intervention led to moderate reductions over time, but between group differences only reached a trend, which could be due to insufficient power to detect small effects. Finally, psychological flexibility mediated the effect of the intervention on all outcomes, accounting for 28.1–59.9% of the effects of the ACT intervention.

Overall, these outcomes are consistent with our theoretical rationale, suggesting that this brief intervention was efficacious to improve self-compassion and symptoms of psychopathology, and that these improvements were mediated by the hypothesized process of change. Differences between group conditions in outcome and process measures were generally medium to large and always in favor of the ACT intervention. Particularly notable is the large effect size obtained on the self-compassion outcome (1.06), which is comparable to that produced by a much longer intervention from within the self-compassion tradition (effect size = 1.67, Neff & Germer, 2013). Taken together, these findings show that the intervention tested here was functionally an ACT-based workshop, and that with limited modification, ACT is a successful treatment for improving self-compassion.

Moderating Role of Trauma History

Exploratory analyses and visual inspection suggested that the workshop had a greater effect on self-compassion, depression, anxiety, and stress among those endorsing more types of stressful life events, including a history of trauma. However, there was no evidence of moderation for the general psychological distress outcome. Given the conceptual overlap between general psychological distress and depression, anxiety, and stress, it is puzzling that trauma history did not moderate the effects on general psychological distress. Still, these findings show that the workshop was more efficacious overall among those who were in greater need of it, an interpretation that comports with other research showing ACT to be

more beneficial for those higher in distress and experiential avoidance (e.g., Muto, Hayes, & Jeffcoat, 2011). Given the significant correlation between stressful life events and psychological flexibility in this study ($r = .24, p < .05$, 2-tailed; see Yadavaia, 2013), it may be that the workshop was more effective among the more traumatized participants at least partly because they were higher in experiential avoidance.

Limitations

First, the use of a waitlist rather than active control group does not allow the discrimination of placebo or demand effects from treatment effects. Second, the sample used in this study could limit its generalizability. As undergraduates in psychology classes, the participants were younger and higher in intellectual ability, socioeconomic status, and psychological mindedness than the general population. It could be argued that some of the concepts contained in the protocol could be too subtle and sophisticated for individuals of lower ability levels. However, evidence against the seriousness of this concern is provided by reports of the successful application of ACT in intellectually disabled (Brown & Hooper, 2009; Pankey, 2008) and brain-injured individuals (Sylvester, 2011). In addition, the fact that the sample was not treatment-seeking could limit the generalizability of these findings to a clinical population because, for example, treatment-seeking individuals may be even more distressed than the participants in this study. Finally, the use of the AAQ-II as a process of measure of psychological flexibility has been questioned in some studies and supported by others. Some authors have argued that the AAQ-II is simply a measure of psychological distress (Wolgast, in press), while others have shown that it explains additional variance above and beyond traditional measures of affect (Gloster, Klotsche, Chaker, Hummel, & Hoyer, 2011).

Future Directions and Clinical Implications

The mediational analyses in this study were important in that they provided information as to the process by which the intervention brought about change, in this case psychological flexibility. However, because the AAQ-II measures several facets of psychological flexibility, and because the intervention targeted several of the 6 ACT processes, it is difficult to know which components of the intervention impacted which processes and were most beneficial. One way to examine processes of change with greater precision is to use laboratory analog studies to evaluate brief interventions that specifically target basic processes of interest (see Levin, Hildebrandt, Lillis, & Hayes, 2012 for a meta-analysis of such studies in the area of psychological flexibility). Another way is to use ecological momentary assessments and mobile technology to assess these processes in a dynamic and longitudinal fashion (e.g., Vilardaga, Bricker & McDonell, 2014; Vilardaga, Hayes, Atkins, Bresee, & Kambiz, 2013).

Still, the fact that psychological flexibility was such a consistent mediator in this study provides strong evidence that targeting self-compassion with high fidelity to the psychological flexibility model is effective. Our data suggest that self-critical thoughts may be noted without attachment instead of being struggled with or replaced, and self-kindness

work may focus on abandoning self-invalidating efforts at emotional control in favor of compassionate acceptance.

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Highlights

- We compared a 6-hour ACT workshop targeting self-compassion to waitlist control.
- The ACT intervention was efficacious in improving self-compassion and psychopathology.
- Those with greater trauma history benefit more from ACT for self-compassion.
- Psychological flexibility is a process of change in increasing self-compassion.

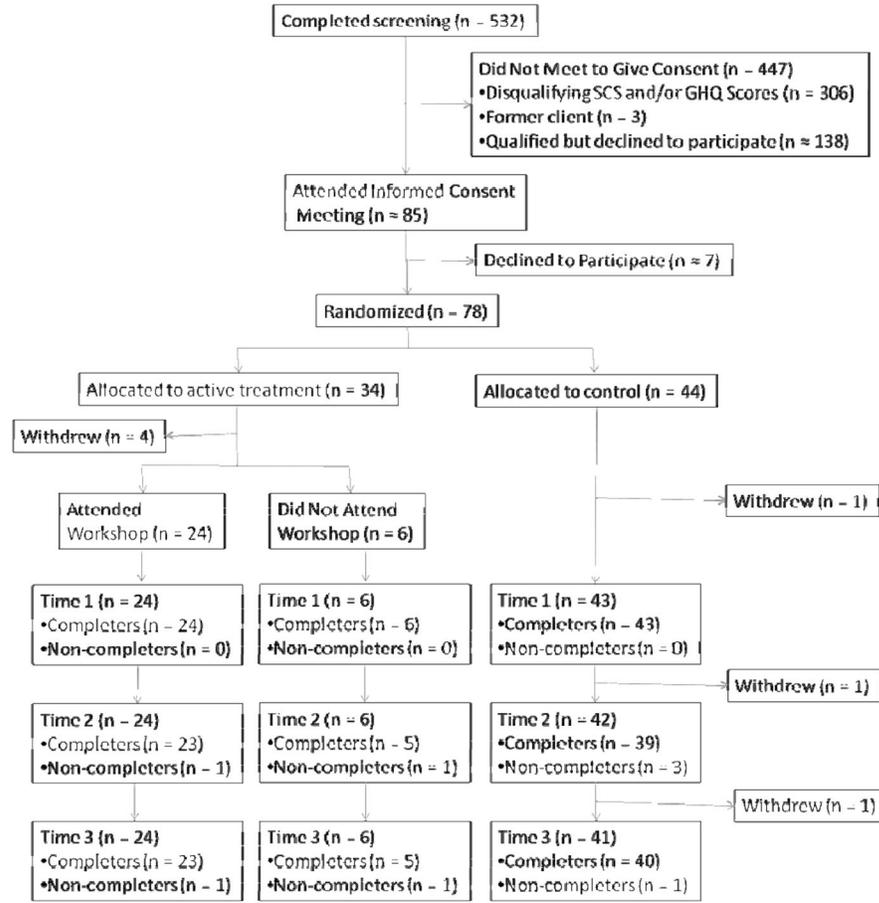


Figure 1.
Participant Flow

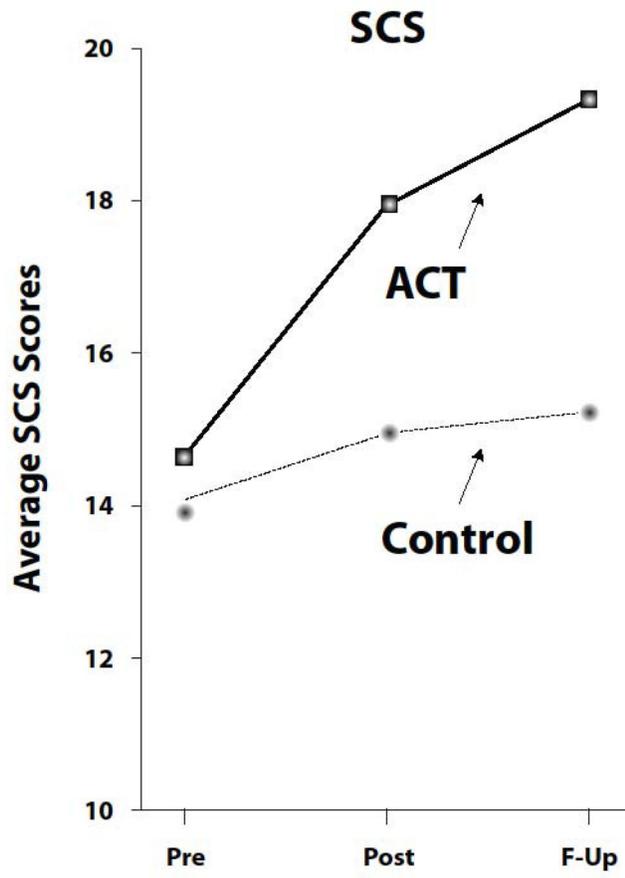


Figure 2.
Changes in SCS by Condition

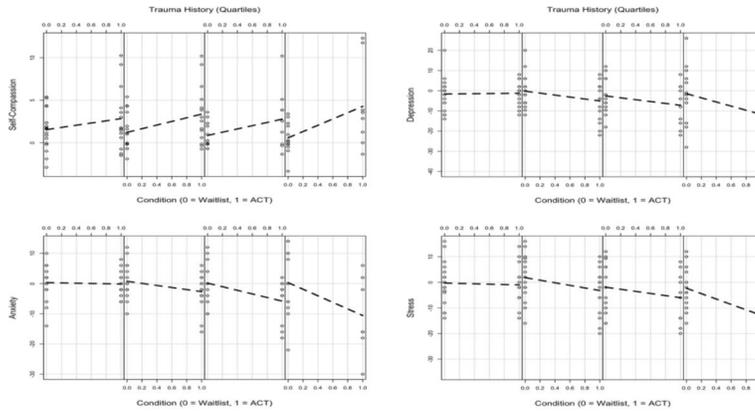


Figure 3.
Visual Inspection of Moderation Analyses

Note. Each figure provides a scatter plot between the outcome and the ACT intervention, with a linear regression line indicated in dashes. Within each figure, and from left to right, each panel indicates the association between the outcome and the ACT intervention at each level of trauma history (1st, 2nd, 3rd and 4th quartiles). As shown in the each figure, as trauma history increases, the association between the outcome and the ACT intervention increased in the expected direction for each outcome. Trauma History = SLESQ-R; Self-Compassion = SCS; Depression = Depression subscale of the DASS; Anxiety = Anxiety subscale of the DASS; Stress= Stress subscale of the DASS.

Table 1

Participant Characteristics

	ACT (N = 30)		Waitlist (N = 43)		Total (N = 73)	
	%	N	%	N	%	N
Female	70	21	77	33	74	54
Asian/Pacific Islander	17	5	16	7	16	12
African-American/Black	7	2	7	3	7	5
Hispanic/Latino	10	3	14	6	12	9
Native American	0	0	2	1	1	1
White/Non-Hispanic	77	23	72	31	74	54
Bisexual	3	1	2	1	3	2
Heterosexual	97	29	86	37	89	65
Gay	0	0	7	3	4	3
Lesbian	0	0	0	0	0	0
Questioning	0	0	2	1	3	2
Pansexual	0	0	2	1	1	1
	Mean	SD	Mean	SD	Mean	SD
Age	19.90	4.05	20.83	4.61	13.69	2.66
Grade Point Average (GPA)	3.42	.51	3.31	.48	16.49	4.84
Stressful Life Events (SLESQ-R)	1.93	1.78	1.86	1.57	1.89	1.66
Self-Compassion (SCS) at Screening	13.91	2.83	13.54	2.57	13.69	2.66
Psychological Distress (GHQ) at Screening	16.80	5.06	16.28	4.73	16.49	4.84

Table 2

Stressful Life Events Assessed by SLESQ-R

Stressful Life Events Assessed by SLESQ-R
Life-threatening illness
Life-threatening accident
Robbery or mugging in which physical force or a weapon was used against you
Death of an immediate family member, romantic partner, or very close friend because of accident, homicide, or suicide
Being physically forced to have intercourse or to have oral or anal sex against your wishes, or when you were helpless (e.g. when intoxicated)
Other than the above experiences, being touched in private body parts, being made to touch someone else's body, or experiencing someone try to make you have sex against your wishes
Being slapped repeatedly, beaten, or otherwise attacked or harmed as a child by a parent, caregiver, or other person
Being kicked, beaten, slapped around, or otherwise physically harmed as an adult
Being repeatedly ridiculed, put down, ignored, or told you were no good by a parent, romantic partner, or family member
Other than the above experiences, being threatened with a knife or gun
Being present when another person was killed, seriously injured, or sexually or physically assaulted
Being in any other situation where you were seriously injured or your life was in danger (e.g. military combat, living in a war zone)
Being in any other situation that was extremely frightening or horrifying, or one in which you felt extremely helpless

Table 3
Means, Standard Deviations, and Between-Condition Comparisons of Outcome and Process Variables at Each Time Point

	Pre			Post			Follow-up		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Self-Compassion (SCS)									
ACT	14.64	3.72	30	17.95	2.95	28	19.28	2.92	28
Control	13.87	3.00	43	14.98	3.31	39	15.26	3.96	40
<i>P</i> for between-group <i>t</i>	.33			.00			.00		
General Psychological Distress (GHQ)									
ACT	14.63	6.56	30	9.96	4.37	28	7.68	4.59	28
Control	15.35	5.12	43	15.05	5.92	39	11.88	5.07	40
<i>P</i> for between-group <i>t</i>	.60			.00			.00		
Depression (DASS-D)									
ACT	11.53	9.69	30	7.50	7.42	28	6.00	7.16	28
Control	12.84	8.00	43	14.09	12.30	39	11.28	9.18	40
<i>P</i> for between-group <i>t</i>	.53			.01			.01		
Anxiety (DASS-A)									
ACT	10.47	7.84	30	7.36	8.02	28	6.64	7.46	28
Control	8.09	6.73	43	9.54	9.85	39	8.25	7.57	40
<i>P</i> for between-group <i>t</i>	.17			.34			.39		
Stress (DASS-S)									
ACT	15.33	10.13	30	12.90	8.26	28	10.43	9.05	28
Control	15.98	8.27	43	17.18	10.45	39	14.98	8.31	40
<i>P</i> for between-group <i>t</i>	.76			.08			.04		
Psychological Flexibility (AAQ-II)									
ACT	25.40	9.41	30	20.86	7.61	28	17.61	7.93	28
Control	26.23	8.29	43	24.65	10.29	39	23.87	9.44	40
<i>P</i> for between-group <i>t</i>	.69			.10			.01		

Note. All comparisons were independent samples 2-tailed *t*-tests. SCS = Self-Compassion Scale; GHQ = General Health Questionnaire; DASS = Depression Anxiety and Stress Scales; AAQ-II = Acceptance and Action Questionnaire-II.