Changes in Negative Beliefs Following Three Brief Programs for Facilitating Recovery After Assault

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Abstract

Background—This study examines whether changes in negative beliefs about oneself, others, and the world occur as a result of early intervention aimed at preventing the development of chronic PTSD and further explores whether changes in negative beliefs during early intervention mediate long-term changes in psychopathology and functioning.

Methods—Ninety recent female assault survivors were randomized to four-week early intervention programs: brief cognitive behavioral intervention, weekly assessment, or supportive counseling. Changes in negative beliefs were examined from pre- to post-intervention.

Results—Negative beliefs improved across interventions, with somewhat less benefit reported by participants receiving supportive counseling. As expected, prior to intervention more severe negative beliefs were associated with higher initial trauma reactions and these negative beliefs generally improved from pre- to post-intervention. Moreover, for the brief cognitive behavioral intervention, changes in perceptions of self and one's safety mediated longer-term changes in trauma-related symptoms.

Conclusions—The present results highlight the potential importance of changes in negative beliefs in long-term adjustment of recent assault survivors.

Keywords

Cognitions; Early Intervention; Assault; PTSD; CBT

Many influential models of trauma-related psychological sequelae highlight the importance of individuals' negative beliefs about self, others, and the world[1-7]. Early cognitive theorists such as Janoff-Bulmann[4,5] suggested that posttraumatic stress disorder (PTSD) results from shattered beliefs about the *self* (e.g., the self is worthy) and the *world* (e.g., the world is meaningful and benevolent). Similarly, Foa and colleagues[3] emphasized the role of unrealistic cognitions in the development or maintenance of PTSD; namely that the *world* is extremely dangerous and the *self* is extremely incompetent. Epstein[2] emphasized key positive beliefs that may be impacted as a result of trauma exposure; specifically that the *self*

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is worthy, *others* are trustworthy, the *world* is benign, and the *world* is meaningful. Beliefs during the trauma itself have also been highlighted as important. Ehlers and Clark[1] suggested that one belief in particular, termed "mental defeat," reflecting the loss of personal autonomy during trauma exposure, might be a risk factor for future negative appraisals about *oneself* and *the world*. Thus, although these theorists emphasize different aspects of posttrauma beliefs, they highlight the centrality of negative beliefs about others, the self, and the world to the development of PTSD following traumatic events.

Consistent with this emphasis, such negative beliefs often discriminate between trauma-exposed individuals with and without PTSD.[8-10] Although factors other than beliefs following trauma exposure are more commonly explored as predictors of chronic PTSD,[11,12] recent studies highlight the role of initial negative appraisals in prospectively predicting the development of chronic PTSD.[13-16] In the aftermath of assault, in particular, globally negative beliefs, along with negative interpretations of symptoms, others' behavior, and one's safety may contribute to a sense of ongoing danger that contributes to the development of PTSD.[17]

Further, there is now emerging evidence to suggest that negative beliefs such as guilt, self blame, incompetence, and dangerousness of the world, become more positive/balanced following successful PTSD treatment.[18-21] Yet, less is known about the role of these beliefs in the context of preventing the development of chronic PTSD. Notably, none of the one-session intervention studies have examined changes in these beliefs. Moreover, none of the major early intervention trials aimed at preventing the development of chronic PTSD shortly after trauma exposure reported the presence or impact of such beliefs.[22-26] Thus, very little is known regarding the impact of these early interventions on key trauma-related beliefs.

The present study examined shifts in negative beliefs in ninety recent assault survivors who met symptom criteria for PTSD. Women were randomized to one of three, four-week psychological interventions: a brief cognitive behavioral intervention (B-CBT); a repeated assessment of PTSD symptoms (AC); or supportive counseling (SC). Specifically, we examined the potential impact of these interventions on beliefs about oneself, others, and the world and the ability of such beliefs to predict initial and later psychological and social adjustment. For more information regarding the methods and findings of the main trial, see Foa and colleagues.[25] We hypothesized that higher levels of negative beliefs about oneself, others, and the world would be associated with worse initial and later psychopathology and social functioning and that B-CBT would result in more adaptive, less negative beliefs at post-intervention than either AC or SC. We also hypothesized that changes in these beliefs pre- to post-early intervention would mediate long-term post-trauma adjustment.

Method

Participants

Participants were 90 female recent survivors of assault (sexual assault: $n = 57$, non-sexual assault: $n = 33$). Average time from assault to initial assessment was 20.5 days, with a range of 2 to 46 days. On average, women were 33.7 years old ($SD = 11.14$) and were from a variety of backgrounds: 62.7% African American, 31.3% Caucasian, 3.6% Hispanic, 1.2% Asian, and 1.2% were of other ethnicities.

Women were recruited through emergency rooms, victim assistance agencies, police officers, and advertisements. To be included in the study, participants had to meet DSM-IV symptom, not duration, criteria for PTSD. Participants were excluded if they were assaulted by an intimate partner with whom they had an ongoing relationship, had a primary diagnosis

of organic mental disorder, schizophrenia, bipolar disorder, or current alcohol/drug dependence. Unfortunately, participation rate could not be calculated because data on non-participation was not systematically recorded.

Clinician Administered Interviews

Structured Clinical Interview for DSM-IV PTSD (SCID-IV).[27]—The SCID-IV is a clinician administered diagnostic interview used to assess the presence or absence of DSM-IV Axis I disorders for inclusion and exclusion in the study. The SCID has acceptable inter-rater and test-retest reliability.[28,29]

PTSD Symptom Scale-Interview Version.[30]—The PSS-I is a 17-item interview providing a total PTSD severity score and PTSD diagnostic status. Each DSM-IV symptom is rated on a 4-point scale from 0 *(not at all)* to 3 *(very much)* during the past two weeks. The interview has good convergent validity, test-retest reliability, and interrater reliability.[31,32]

Self-Report Measures

World Assumptions Scale (WAS).[33]—The WAS is a 32-item self-report measure that assesses individuals' basic assumptions. Three subscales selected a priori were used in the present study: benevolence of the world, benevolence of people, and self-worth. Benevolence of World contains four items and captures the extent to which people view the world positively or negatively (e.g., "The world is a good place"). Benevolence of People contains four items and captures the extent to which people view others as kind, good, and caring (e.g., "Human nature is basically good"). The Self-worth subscale is four items and captures the extent to which an individual perceives themselves as good, worthy, and of deserving good outcomes (e.g., "I am very satisfied with the kind of person I am"). Items are rated on a 6-point Likert scale (*1 = strongly disagree* to *6 = strongly agree),* with higher scores reflecting *less* distorted beliefs. The WAS subscales have both good reliability (.66-.76) and face validity.[33]

Personal Beliefs and Reactions Scale (PBRS).[10,34]—The PBRS is a 55-item measure assessing beliefs of trauma survivors. Items are rated on a 7-point Likert rale (*0 = not at all true* to *6 = completely true),* with higher scores reflecting *less* distorted cognitions and dysfunctional beliefs. Three of the subscales selected a priori were used in the present study. The Self subscale contains 20 items and assesses general beliefs about the self as good or competent (e.g., "I feel pretty good about myself"). The Others subscale contains 20 items and assesses general beliefs about others as good, dependable, and/or trustworthy (e.g., "Most people are basically caring"). The Safety subscale contains eight items and assesses beliefs about safety (e.g., "I don't feel safe anywhere anymore."). The test-retest reliability on the PBRS is acceptable.[35,36]

Self-reported psychopathology—Main self-reported psychopathology measures were the Beck Depression Inventory (BDI)[37] and the Beck Anxiety Inventory (BAI).[38] Both measures are commonly used in the anxiety disorder literature and have solid psychometric properties.[37,38]

Intervention Conditions

Participants were randomized to one of three, four-week interventions: Brief Cognitive Behavior Therapy (B-CBT, *n* = 31); Assessment Condition (AC, *n* = 30); and Supportive Counseling (SC, *n* = 29). All sessions were approximately two hours in length and provided by Master's or Ph.D. therapists. B-CBT included psychoeducation, breathing retraining,

imaginal exposure, in vivo exposure, and cognitive restructuring. AC consisted of assessment of PTSD symptoms (PSS-I) and social functioning (SAS). SC focused on active listening, with no directed discussion of assault-related symptoms or processing of the trauma. More information on the interventions is provided in a previous report.[25]

Procedures

After informed consent, Master's or Ph.D. level clinicians, serving as independent evaluators (IE), conducted interview measures (SCID, PSS-I, SAS). After ascertaining eligibility, participants were given self-report measures to return at the first intervention session. Participants then completed the four-week intervention. The IE, blind to intervention condition, conducted the post- and follow-up evaluations (2, 3, 6, 9, and 12 months) using the same measures.

Results

Preliminary Analyses

Participants across interventions did not differ on measures of initial demographic, psychopathology, or negative belief variables; however, there was a difference in terms of assault type, $\chi^2(2, N = 90) = 12.00$, $p < .05$, with 77% of the B-CBT and 73% of the AC reporting an index trauma of sexual assault but only 38% of the SC condition reporting a sexual assault as the index trauma. Given that recovery is generally slower for sexual than non-sexual assault (Rothbaum et al., 1992), assault type was utilized as a covariate for subsequent analyses (0 = non-sexual, 1 = sexual assault). Overall, 24 participants (26.7%) dropped out prior to completing four sessions, leaving 66 completers. No differences were seen among interventions, $\chi^2(2, N = 90) = 2.09$, *ns*, nor were there differences between completers and dropouts on pre-intervention psychopathology and negative belief variables. However, there was a trend for a differences on beliefs about others (PBRS), $F(1, 80) = 3.19$, $p = .08$, with scores being slightly more dysfunctional for those who dropped out ($M = 3.02$, $SD = .78$) than those who did not ($M = 3.47$, $SD = 1.04$). Due to our primary interest in examining the impact of the interventions on negative belief variables, completer analyses are presented for intervention-related analyses. For these analyses, unless otherwise noted, the pattern of significance did not differ between completer and intent-to-treat (ITT) analyses. Last available follow-up using ITT was utilized for all follow-up and prediction analyses, with an average of 9.48 months post-assault ($SD = 3.86$). Greenhouse-Geiser correction did not change the results; therefore, uncorrected results are presented.

Initial Correlations Between Psychopathology and Belief Variables

For the negative belief variables (PBRS: Self, Others, World; WAS: Self-worth, Benevolence of People, Benevolence of the World), means and standard deviations are presented in Table 1. Correlations among these negative belief variables and psychopathology variables (PSSI, BDI, BAI, SAS) at pre-intervention, with family-wise Bonferroni correction, are presented in Table 2. At pre-intervention, as expected, more negative initial beliefs, across subscales, were associated with worse initial reactions; negative beliefs about others (PBRS: Others; WAS: Benevolence of People) showed some of the strongest and most consistent associations with worse initial reactions.

Change in Negative Beliefs Across Interventions (Completer Analyses)

Given the possibility that the partial null hypothesis is true, that is, that not all negative beliefs change to the same degree, and the desire to control for inflated Type I error rates across multiple outcome variables, separate univariate *F* tests on each outcome variable were conducted, forgoing MANOVA analysis, utilizing a Holm step-down correction

method within a family of contrasts.[39] Specifically, a series of 3 (intervention: B-CBT, AC, SC) × 3 (time: pre-, post-invention, last available follow-up) repeated measures ANCOVAs regarding beliefs about self (PBRS: Self; WAS: self-worth), others (PBRS: Others; WAS: Benevolence of People), and the world (PBRS: Safety; WAS: Benevolence of the World) as dependent variables, with assault type as a covariate, were conducted.

For views of the Self (PBRS), there was main effect of time, $F(2, 112) = 3.54$, $p < .05$, modified by a intervention × time interaction, $F(4, 112) = 2.65$, $p < .05$.[1] Only B-CBT showed a significant increase over time, $F(2, 36) = 9.80$, $p < .001$, partial $\eta^2 = .35$, with pre-intervention (adjusted $M = 3.18$, $SE = .23$) being lower than either post- (adjusted $M = 4.07$, $SE = .23$) or follow-up scores (adjusted $M = 4.14$, $SE = .24$). Both AC and SC showed no such effect. In contrast, when examining beliefs about Self-worth (WAS), there was only a main effect time, $F(2, 104) = 6.64$, $p < .05$, partial $\eta^2 = .11$, with significant increases from pre- (adjusted $M = 17.84$, $SE = .67$) to both post- (adjusted $M = 20.17$, $SE = .62$) and follow-up (adjusted $M = 20.41$, $SE = .59$).

For views of Others (PBRS), there was a main effect time, $F(2, 112) = 3.39$, $p < .05$, partial $\eta^2 = .06$, with significant increases from pre- (adjusted $M = 3.47$, $SE = .13$) to both post- (adjusted $M = 4.06$, $SE = .13$) and follow-up (adjusted $M = 4.06$, $SE = .14$).[2] Similarly, for Benevolence of People (WAS), there was a main effect time, $F(2, 104) = 5.68$, $p < .05$, partial $\eta^2 = .10$, with significant increases from pre- (adjusted $M = 14.30$, $SE = .67$) to both post- (adjusted $M = 16.24$, $SE = .61$) and follow-up (adjusted $M = 16.93$, $SE = .60$).

Finally, for views of the world, examining perceptions of Safety (PBRS), there was main effect time, $F(2, 112) = 7.63$, $p < .05$, modified by a intervention × time interaction, $F(4, 112) = 3.01$, $p < .05$.[3] Both the B-CBT and AC showed a significant increase over time (respectively, $F(2, 36) = 6.17$, $p < .05$, partial $\eta^2 = .26$; $F(2, 36) = 3.74$, $p < .05$, partial $\eta^2 = .17$), with pre-intervention (respectively, adjusted $M = 1.61$, $SE = .30$; $M = 2.43$, $SE = .32$) being lower than either post- (respectively, adjusted $M = 3.36$, $SE = .34$; $M = 3.58$, $SE = .38$) or follow-up (respectively, adjusted $M = 3.74$, $SE = .33$; $M = 4.01$, $SE = .35$). SC showed no such effect. Finally, for Benevolence of the World (WAS), there was again only a main effect time, $F(2, 104) = 11.41$, $p < .05$, partial $\eta^2 = .18$, with significant increases from pre- (adjusted $M = 13.82$, $SE = .65$) to both post- (adjusted $M = 15.82$, $SE = .69$) and follow-up (adjusted $M = 15.60$, $SE = .69$).

Changes in Negative Beliefs as Mediators of Change in Psychopathology and Functioning (Intent-to-Treat)

A series of stepwise, simultaneous regressions were conducted to examine if observed changes in negative beliefs during from pre- to post-intervention mediated changes in psychopathology,[40] specifically when intervention effects for negative beliefs were observed above, namely for Self (PBRS: B-CBT vs. AC; B-CBT vs SC) and for Safety (PBRS: B-CBT vs SC; AC vs SC) related beliefs. Kraemer and colleagues[40] recommend using a linear model comparing intervention group (B-CBT or AC, coded as + ½) versus a comparison group (AC or SC, coded as - ½), with independent variables being group, centered pre- to post-intervention changes in the hypothesized mediator (Self$_{DIF, CTR}$; Safety$_{DIF, CTR}$), and the group × mediator interaction. The dependent variables were pre- to

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[1] In the ITT analysis, there a trend toward a main effect of time for self, $F(2, 112) = 2.46$, $p = .09$, with significant increases from pre- (adjusted $M = 3.27$, $SE = .12$) to both post- (adjusted $M = 3.88$, $SE = .13$).and follow-up (adjusted $M = 3.91$, $SE = .13$).
[2] In the ITT analysis, this was a trend toward a main effect of time, $F(2, 154) = 2.45$, $p = .09$, with significant increases from pre- (adjusted $M = 3.35$, $SE = .11$) to both post- (adjusted $M = 3.81$, $SE = .12$) and follow-up (adjusted $M = 3.81$, $SE = .12$).
[3] In the ITT analysis, this was a main effect of time, $F(2, 154) = 5.35$, $p < .05$, with significant increases from pre- (adjusted $M = 2.21$, $SE = .16$) to post- (adjusted $M = 3.08$, $SE = .19$) and from post- to follow-up (adjusted $M = 3.33$, $SE = .18$).

follow-up difference scores of the PTSD severity ($PSS-I_{DIF}$), depression (BDI_{DIF}), and anxiety (BAI_{DIF}). To show that a given variable is a mediator of intervention,[40] the mediator must be associated with treatment assignment, have a main or interactive effect on outcome, and changes in the mediator must precede changes in the dependent variable. Due to issues of simultaneous change within clinical trials, in order to help set temporal precedence, we utilized within intervention change to predict long-term change.[41] Specifically, we examined belief changes during time frame of the intervention to predicted long-term changes in psychopathology through follow-up. As mentioned above, given the strong role of natural recovery following trauma exposure, the examination of longer-term changes, as opposed to early change in psychopathology is particularly important. Thus, in the below analyses, given that we selected analyses based on the presence of the first criteria and set temporal precedence as describe above, we were specifically looking for either a main effect of negative beliefs ($Self_{DIF, CTR}$; $Safety_{DIF, CTR}$) or its interaction with group ($Self_{DIF, CTR} \times$ Group; $Safety_{DIF, CTR} \times$ Group) to show mediation. To control for the effects of assault type, assault type was entered into the first step of each equation. Key equations are presented in Table 3 and 4, showing only the second step testing mediation.

Changes in Self as a Mediator—As seen in Table 3, changes in $Self_{DIF, CTR}$ were associated with changes in PTSD severity ($PSS-I_{DIF}$), respectively, overall $R^2 = .20$, F (4, 47) = 2.89, $p < .05$ for B-CBT vs. SC, overall $R^2 = .24$, F (4, 51) = 4.12, $p < .05$ for B-CBT vs. AC. Similarly, changes in $Self_{DIF, CTR}$ were associated with changes in depression severity (BDI_{DIF}), respectively, overall $R^2 = .20$, F (4, 47) = 2.86, $p < .05$ for B-CBT vs. SC, overall $R^2 = .28$, F (4, 51) = 4.84, $p < .05$ for B-CBT vs. AC. Thus, changes in views of self served as a mediator of changes in PTSD and depression severity.

Similarly, as can be seen in Table 4, there was evidence consistent with mediation of anxiety (BAI_{DIF}) by $Self_{DIF, CTR}$, where there was a main effect of group (trend level for BP vs SC, significant for BP vs AC) and main effects of the mediator on outcome, overall $R^2 = .19$, F (4, 47) = 2.80, $p < .05$, comparing B-CBT to SC; and overall $R^2 = .23$, B-CBT to AC, overall F (4, 49) = 3.64, $p < .05$. Taken together, this suggests that changes in beliefs about oneself during the brief CBT intervention, but not during the supportive counseling intervention or assessment condition, mediated longer-term changes in symptoms.

Changes in Safety as a Mediator—As can be seen in Table 4, for PTSD severity ($PSS-I_{DIF}$), when comparing B-CBT to SC, there was evidence at a trend level that the B-CBT intervention mediated changes in $Safety_{DIF, CTR}$, with both main effect on outcome (ß = -.28, $p = .05$) and interaction effects (ß = -.26, $p = .06$), overall $R^2 = .16$, F (4, 47) = 2.19, $p < .09$. However, there was no group, main effect on outcome, or interaction effects when examining AC vs. SC, overall F (4, 49) = 1.91, ns. For depression (BDI_{DIF}), the mediation effect achieved significance, with an interaction effect and a trend toward a main effect on outcome (ß = -.26, $p = .06$), overall $R^2 = .18$, F (4, 47) = 2.65, $p < .05$. However, when examining AC vs. SC again there was no group, main effect on outcome, or interaction effects, overall F (4, 49) = 1.92, ns. For anxiety, there was also evidence consistent with a mediational model, where changes in views of $Safety_{DIF, CTR}$ mediated changes in anxiety (BAI_{DIF}), a main effect of group and an interaction, overall F (4, 47) = 5.17, $p < .01$, comparing B-CBT to SC; however, there was no indication of mediation for AC versus SC, overall F (4, 47) = 1.94, ns.

Discussion

Regardless of intervention type, over time, after an assault, women's views of themselves, others, and the world in general became more positive. This "healthy" shift in beliefs is consistent with patterns of natural recovery seen among assault survivors, where

psychological reactions such as PTSD symptoms and depression improve overtime for the majority of women with no intervention.[42] More specifically, however, the brief cognitive behavioral intervention, but not supportive counseling, was associated with a long-term improvement in one's sense of self and safety. Moreover, for the brief cognitive intervention, but not the assessment or supportive counseling interventions, changes in perception of one's self and safety mediated longer-term changes in trauma-related symptoms.

Specifically, there was evidence that the effects of the brief CBT intervention produced changes in perceptions of oneself and one's safety and further that these changes mediated pre to follow-up changes in PTSD (at trend level for safety), depression, and anxiety symptoms. Although there was some evidence that both brief CBT and assessment produced improvement in these beliefs, there was no evidence of these changes having mediational effects for those receiving the assessment intervention. This suggests that the brief CBT affects perceptions of oneself and one's safety, which in turn reduces long-term symptoms. One obvious interpretation is that the inclusion of cognitive restructuring in the brief CBT, but not in the assessment intervention, directly reduced the negative beliefs and affected symptoms. Alternatively, the *in vivo* homework assignments in the brief CBT, that is, having individuals directly approach non-dangerous trauma-reminders, may have had a dual effect in that it reduced negative beliefs about one's safety; similarly both successful completion of imaginal and in vivo exposure disconfirm one's belief that they will not be able to cope with confronting trauma reminders and will "fall apart", thus increasing sense of one's self efficacy. Indeed, in the treatment of chronic PTSD, the combination of imaginal and *in vivo* exposure with cognitive restructuring has been shown to produce optimal outcomes over the individual components alone,[43] though patients in imaginal exposure were not allowed any discussion (i.e., processing) of their imgainal exposure experiences. Others have failed to find an additive benefit of cognitive restructuring over combined imaginal and *in vivo* exposure.[44-46] Indeed, Foa and Rauch[18] suggest that disconfirmation of negative beliefs about safety and self occurring during imaginal and in vivo exposure may be responsible for changes in these negative cognitions because treatment that included imaginal and *in vivo* exposure plus cognitive restructuring did not produce greater change in negative cognitions than imaginal and *in vivo* exposure alone. Similar arguments have been made more broadly by Hofmann.[47] Extending this to the prevention of chronic PTSD, it is unclear what are critical CBT intervention elements facilitating cognitive change at the present time. Another possible explanation is that the brief CBT was the only intervention where there was a direct expectation for belief change given to the client (i.e., cognitive restructuring); and therefore, there was an expectation that beliefs would change, and participants reported such shifts.

Key shifts in beliefs centered on views about one's self and one's safety. Specifically, positive shifts in these beliefs during the brief-CBT intervention mediated longer-term improvement in trauma-related symptoms. The importance of shifts in negative beliefs about one's self have long been highlighted in the development of chronic PTSD.[3,15,18,48-50] For example, in a non-intervention, prospective study, the appraisal that the trauma had permanently changed oneself in a negative way, negative appraisals of one's emotions, and mental defeat during the trauma predicted later PTSD severity over and above initial symptoms.[14] Yet, the present study is the first to extend this work to a prevention arena showing intervention-related mediational effects. Notably, negative beliefs about oneself are also central to depression,[51] and given the overlap between PTSD and depression,[52] these improvements in brief CBT may be particularly important to longer-term outcome. Shifts in perceptions of one's safety also emerged as a potentially important brief CBT intervention-related mediator of post-assault adjustment. Similar to the importance of self, fear of threat to one's safety or, one's sense of ongoing threat, has been highlighted in cross-sectional and prospective studies.[49,53,54] In association with trauma-related avoidance, it may be that, as

Ehlers and colleagues[54] suggest, intrusive memories, through temporal association with the trauma, serve as warning signals indicating impending danger. This sense of serious current threat to one's safety may be a fundamental part of a chain of cause and effect that forms a circuit or loop, that is, a key component of a negative feedback loop, surrounding the persistence of trauma-related intrusions and avoidance.

Finally, it is worth noting, for individuals in the supportive counseling intervention, beliefs about oneself (PBRS) and one's safety in the world (PBRS) failed to show reliable change over time. Thus, the present study also extends the findings of early intervention studies by Bryant and colleagues[22,23,55] suggesting supportive that counseling yields little or no symptom reduction to also suggest limited reduction in negative beliefs following supportive counseling.

Several additional limitations merit discussion. Given the desire to include an active control intervention and to compare the larger trial[25] to other similar intervention trials[22,23], a wait-list control was not included and thus did not allow for the examination of natural recovery. Further, these beliefs may be specific to reactions following assault, as our sample was limited to female assault survivors, and may not be as relevant for other traumatic events. Finally, the present design does not allow for full examination of the causal role of negative beliefs in impairing recovery; it may be that, while intervention-related changes in some of these beliefs temporally mediate long-term symptoms, they may still reflect correlates rather than causes of recovery. Further, establishing temporal precedence in clinical trials is difficult for variables that simultaneously shift over the course of intervention, which makes interpretation of mediation difficult at best. However, we have employed state-of-the-art methods suggested by Hofmann[41] to establish temporal precedence and Kraemer and colleagues[40] to best examine potential mediation. Regardless, the present study clearly shows "healthy" cognitive shifts in beliefs about oneself, others, and the world that coincide with recovery following assault. In addition, our findings highlight the importance of further examination of beliefs particularly related to one's sense of self and safety. Such work may lead to both a better understanding of natural recovery and more specific cognitive theories of acute and chronic PTSD.

Acknowledgments

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Table 1

Mean Cognitive Distortions by Intervention and Assessment Point (Completers)

	Brief CBT (B- CBT) M (SD)			Assessment (AC) M (SD)			Supportive Counseling (SC) M (SD)		
	Pre	Post	F/U	Pre	Post	F/U	Pre	Post	F/U
PBRS									
Self	3.18 (1.01)	4.07 (0.95)	4.16 (1.00)	3.16 (1.13)	4.02 (0.92)	4.42 (0.80)	3.51 (1.02)	4.00 (1.25)	3.77 (1.14)
Other	3.20 (0.88)	3.96 (0.98)	3.95 (1.23)	3.47 (1.23)	4.14 (0.91)	4.21 (0.91)	3.72 (0.97)	3.97 (1.25)	3.99 (1.04)
Safety	1.61 (1.35)	3.30 (1.47)	3.68 (1.52)	2.43 (1.51)	3.58 (1.66)	4.01 (1.55)	2.62 (1.62)	2.93 (1.89)	3.19 (1.54)
WAS									
Self-worth	18.78 (5.70)	20.70 (5.47)	20.50 (4.56)	15.37 (4.89)	19.70 (4.04)	20.10 (4.00)	19.37 (4.92)	20.05 (4.87)	20.36 (5.05)
People	12.56 (4.62)	15.52 (3.52)	16.24 (4.55)	14.58 (5.37)	16.30 (4.23)	16.85 (3.98)	15.74 (5.53)	16.86 (5.30)	17.77 (4.53)
World	11.94 (2.71)	15.57 (3.78)	15.24 (4.04)	13.00 (6.39)	14.70 (5.56)	15.25 (5.51)	16.53 (6.40)	17.23 (6.13)	16.68 (5.63)

Note. PBRS = Personal Beliefs and Reactions Scale; WAS = World Adjustment Scale. Higher scores indicate less maladaptive beliefs.

Table 2

Correlations between Initial Cognition Subscales and Pre-, Post-, and Last Available Follow-up Psychopathology

Initial Beliefs	Pre-Intervention				Last Available Follow-up			
	PSS-I	BDI	BAI	SAS	PSS-I	BDI	BAI	SAS
PBRS								
Self	-.34*	-.48*	-.32*	-.16	-.16	-.34*	-.10	-.26
Others	-.41*	-.53*	-.32*	-.29*	-.33*	-.42*	-.24	-.46*
Safety	-.30*	-.35*	-.34*	-.08	-.15	-.25	-.15	-.18
WAS								
Self-worth	-.12	-.32*	-.14	-.28	-.04	-.21	-.10	-.28
People	-.29*	-.36*	-.24	-.10	-.14	-.29*	-.10	-.20
World	-.17	-.25	-.19	.09	.08	-.08	.12	-.02

Note.

*
$p < .05$, with family-wise Bonferroni correction. For both the PBRS and WAS, higher scores indicate less maladaptive beliefs.

PSS-I = PTSD Symptom Scale-Interview; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; SAS = Social Adjustment Scale.

Linear Regressions Examining Changes in Negative Beliefs about Self as a Mediator of Change in PTSD, Depression, and Anxiety.

Comparison and Predictor	B	SE B	ß
Self as a Mediator of Changes in PTSD (PSS-I$_{DIF}$)			
Assault Type	-2.23	3.64	-.09
Group (B-CBT vs. SC)	-1.14	3.55	-.05
Self$_{DIF, CTR}$ (PBRS)	-6.83	2.08	-.46[*]
Self$_{DIF, CTR}$ × Group	-4.98	4.17	-.17
Intercept	19.46	2.73	
Self as a Mediator of Changes in PTSD (PSS-I$_{DIF}$)			
Assault Type	.41	3.73	.01
Group (B-CBT vs. AC)	3.10	3.15	.12
Self$_{DIF, CTR}$ (PBRS)	-8.13	2.14	-.49[*]
Self$_{DIF, CTR}$ × Group	-2.32	4.28	-.07
Intercept	15.20	3.27	
Self as a Mediator of Changes in Depression (BDI$_{DIF}$)			
Assault Type	-.73	2.75	-.04
Group (B-CBT vs. SC)	.33	2.68	.02
Safety$_{DIF, CTR}$ (PBRS)	-5.25	1.57	-.47[*]
Safety$_{DIF, CTR}$ × Group	-4.82	3.15	-.22
Intercept	8.19	2.06	
Self as a Mediator of Changes in Depression (BDI$_{DIF}$)			
Assault Type	2.57	2.82	.11
Group (B-CBT vs. AC)	-1.50	2.38	-.08
Safety$_{DIF, CTR}$ (PBRS)	-6.73	1.62	-.53[*]
Safety$_{DIF, CTR}$ × Group	-1.80	3.24	-.07
Intercept	6.42	2.47	
Self as a Mediator of Changes in Anxiety (BAI$_{DIF}$)[a]			
Assault Type	-4.22	3.89	-.16
Group (B-CBT vs. SC)	7.12	3.79	.27
Self$_{DIF, CTR}$ (PBRS)	-5.73	2.23	-.36[*]
Self$_{DIF, CTR}$ × Group	-6.39	4.45	-.20
Intercept	15.52	2.92	
Self as a Mediator of Changes in Anxiety (BAI$_{DIF}$)[a]			
Assault Type	.13	3.70	.00
Group (B-CBT vs. AC)	6.24	2.98	.26[*]
Self$_{DIF, CTR}$ (PBRS)	-6.12	2.09	-.40[*]
Self$_{DIF, CTR}$ × Group	-5.54	4.02	-.18
Intercept	-.13	3.70	

Note.

*
 p < .05.

The dependent variables are pre- to follow-up differences in PTSD severity (PSS-I), depression (BDI), and anxiety (BAI). The independent variables are Group (coded as + ½ for B-CBT, - ½ for SC; coded as + ½ for B-CBT, - ½ for AC), Self centered pre- to post-intervention difference scores (Self$_{DIF, CTR}$), and the interaction term (Self$_{DIF, CTR}$ × Group).

Table 4

Linear Regressions Examining Changes in Negative Beliefs about Safety as a Mediator of Change in PTSD, Depression, and Anxiety.

Comparison and Predictor	B	SE B	ß
Safety as a Mediator of Changes in PTSD (PSS-I$_{DIF}$)[a]			
Assault Type	-3.51	3.74	-.14
Group (B-CBT vs. SC)	-1.80	3.71	-.07
Safety$_{DIF, CTR}$ (PBRS)	-2.16	1.09	-.28
Safety$_{DIF, CTR}$ × Group	-4.26	2.17	-.27
Intercept	19.48	2.81	
Safety as a Mediator of Changes in Depression (BDI$_{DIF}$)[a]			
Assault Type	-1.73	2.77	-.09
Group (B-CBT vs. SC)	-.11	2.75	-.01
Safety$_{DIF, CTR}$ (PBRS)	-1.55	.81	-.26
Safety$_{DIF, CTR}$ × Group	-4.06	1.61	-.33[*]
Intercept	8.08	2.08	
Safety as a Mediator of Changes in Anxiety (BAI$_{DIF}$)[c]			
Assault Type	-5.44	3.61	-.20
Group (B-CBT vs. SC)	7.56	3.59	.29[*]
Safety$_{DIF, CTR}$ (PBRS)	-.49	1.05	-.06
Safety$_{DIF, CTR}$ × Group	-8.23	2.10	-.48[*]
Intercept	14.77	2.72	

Note.

[*] $p < .05$.

The dependent variables are pre- to follow-up differences in PTSD (PSS-I), depression (BDI), and anxiety (BAI). The independent variables are Group (coded as + ½ for B-CBT, - ½ for SC; coded as + ½ for AC, - ½ for SC), Safety centered pre- to post-intervention difference scores (Safety$_{DIF, CTR}$), and the interaction term (Safety$_{DIF, CTR}$ × Group).