



Qualitative examination of cognitive change during PTSD treatment for active duty service members



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ABSTRACT

The current study investigated changes in service members' cognitions over the course of Cognitive Processing Therapy (CPT) for posttraumatic stress disorder (PTSD). Sixty-three active duty service members with PTSD were drawn from 2 randomized controlled trials of CPT-Cognitive Only (CPT-C). Participants wrote an impact statement about the meaning of their index trauma at the beginning and again at the end of therapy. Clauses from each impact statement were qualitatively coded into three categories for analysis: assimilation, accommodation, and overaccommodation. The PTSD Checklist, Posttraumatic Symptom Scale-Interview Version, and the Beck Depression Inventory-II were administered at baseline and posttreatment. Repeated measures analyses documented a significant decrease in the percentage of assimilated or overaccommodated statements and an increase in the percentage of accommodated statements from the beginning to the end of treatment. Changes in accommodated statements over the course of treatment were negatively associated with PTSD and depression symptom severity, while statements indicative of overaccommodation were positively associated with both PTSD and depression symptom severity. Treatment responders had fewer overaccommodated and more accommodated statements. Findings suggest that CPT-C changes cognitions over the course of treatment. Methodological limitations and the lack of association between assimilation and PTSD symptom severity are further discussed.

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Many psychological theories have been proposed to account for the development and maintenance of posttraumatic stress disorder (PTSD; Brewin & Holmes, 2003). Cognitive processing theory focuses on the impact of a traumatic life event on a person's belief system, and how that affects cognitive, emotional, and behavioral responses (Resick & Schnicke, 1993). Cognitive behavioral

treatments for PTSD have long recognized the importance of the relationship between dysfunctional cognitions and PTSD symptoms (Ehlers et al., 1998; Resick & Schnicke, 1992). Indeed, the problematic nature of inaccurate trauma-related cognitions has been emphasized in the restructuring and revising of the diagnostic criteria for PTSD in the 5th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013), with the introduction of a new symptom criterion: negative cognitions and mood. This new symptom cluster includes "persistent and exaggerated negative beliefs or

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expectations about oneself, others, or the world” and “persistent distorted cognitions about the cause or consequence of the traumatic event(s) that lead the individual to blame himself/herself or others” (American Psychiatric Association, 2013, p. 272).

Cognitive Processing Therapy (CPT; Resick, Monson, & Chard, 2014; Resick & Schnicke, 1992) is a 12-session evidence-based treatment for PTSD with two decades of research supporting its effectiveness with a variety of populations (Galovski, Wachen, Chard, Monson, & Resick, 2015). CPT stems from the work of the constructivist, social-cognitive theorists including Horowitz (1986) and Janoff-Bulman (1985). CPT specifically targets negative cognitions about the meaning of the trauma. Following a traumatic event, an individual is confronted with new information that is often inconsistent with preexisting beliefs and schemas (Resick & Schnicke, 1993).

In order to reconcile a traumatic experience, individuals either accommodate, assimilate, or overaccommodate information about the traumatic event with previous beliefs. Through accommodation, existing schemas are modified to accurately incorporate new information resulting from the traumatic event, supporting a natural recovery process of trauma-related symptoms. In contrast, recovery from trauma can be interrupted by the development of trauma-related cognitions (i.e., assimilated beliefs) and/or overgeneralization of current or future-oriented beliefs about oneself, others, and the world (i.e., overaccommodated beliefs). People may have preexisting negative beliefs (perhaps stemming from a prior trauma history) that are reaffirmed by the traumatic event. Hindsight bias and erroneous blame of oneself or others are examples of assimilation. Also, an individual may change previous beliefs about oneself, others, and the world to the extreme, resulting in overaccommodated beliefs such as “nowhere is safe” or “I must have control at all times.”

The goal of CPT is to help patients develop balanced thoughts (e.g., accommodated beliefs) through cognitive therapy (Resick et al., 2014). As such, cognitive change is believed to be the primary mechanism of symptom reduction. Several clinical trials of CPT have found reductions in trauma-related cognitive distortions over the course of therapy in addition to a reduction in PTSD symptoms (Owens, Pike, & Chard, 2001; Resick, Nishith, Weaver, Astin, & Feuer, 2002; Resick et al., 2008). Most recently, Schumm, Dickstein, Walter, Owens, and Chard (2015) found change in trauma related cognitions preceded change in PTSD symptoms though change in depression preceded both change in self-blame cognitions and PTSD symptoms. However, these findings were based on preselected forced-choice lists of cognitions, which limit the extent to which an individual's personalized cognitions can be evaluated. Sobel, Resick, and Rabalais (2009) examined cognitive changes among female sexual assault survivors before and after CPT by qualitatively coding patients' written impact statements about the meaning of the traumatic event. Within CPT, impact statements are assigned to help patients identify how the traumatic event has impacted their cognitions about the event, themselves, others and the world. Consistent with this theory, Sobel et al. (2009) found that reductions in dysfunctional cognitions (i.e., overaccommodation) and improvements in balanced, accommodated cognitions over the course of therapy were associated with reductions in PTSD symptoms. There were very few statements indicative of assimilation at both time points. The authors speculated that the small number of assimilated statements were likely to be related to insufficient instructions designed to probe for such statements, which is a problem addressed in revisions of the CPT manual (Resick et al., 2014) by including explicit instructions to describe why the patient believes the event occurred. Furthermore, when these participants were asked to write an impact statement at a long term follow-up (5–10-years post-treatment), reductions

in accommodated thinking and increases in overaccommodated thinking were associated with higher levels in PTSD and depression symptoms independent of status at posttreatment (Iverson, King, Cunningham, & Resick, 2015). In this study, the reverse was also true; in that, reductions in PTSD and depression symptoms were associated with improvements in accommodated thinking and declines in overaccommodated thinking.

The unique cognitive processes that contribute to the development of combat-related PTSD among active duty service members are worth noting. In particular, the cultural context of the military is essential to understanding how war experiences are processed and construed (More, 2011; Reger, Etherage, Reger, & Gahm, 2008). Each branch of service has a number of core beliefs and values that are instilled into new members during basic and advanced military training. For example, the U.S. Army has seven core values: loyalty, duty, respect, selfless service, honor, integrity, and personal courage (U.S. Army, n.d.). Following a traumatic life event, these core values or beliefs can become schemas through which traumatic experiences are interpreted. Although essential to the mission, internalization of core military values may lead to assimilated or overaccommodated beliefs following a traumatic life event.

For example, prior to losing a friend in a blast from an improvised explosive device (IED), a service member may have the belief “if everyone does their job, everyone comes home alive.” Accommodation would require reconciling the difficult reality of the trauma with preexisting beliefs and developing a new balanced belief such as “even if everyone does their job, people still sometimes die in war.” However, accommodation requires changing basic beliefs stemming from early life experiences and the warrior ethos, such as invincibility and the efficacy of training and preparation. In order to maintain preexisting beliefs, a service member may also assimilate an event consistent with prior instilled knowledge about responsibility for the safety of unit members, such as “my buddy died because I didn't do my job” or “it's my fault he died.”

The purpose of this study was to explore changes in cognitions over the course of treatment with Cognitive Processing Therapy-Cognitive only version (CPT-C) in relation to symptoms of PTSD and depression among active duty military personnel. There were three main predictions. First, it was anticipated that there would be an increase in the percentage of accommodated statements and a decrease in the percentage of assimilated and overaccommodated statements from pre-to posttreatment. Second, it was anticipated that changes in cognitions would be associated with changes in symptoms of PTSD and depression. Finally, it was predicted that treatment responders would have higher levels of cognitive change in comparison to treatment nonresponders from pre-to posttreatment. This study replicates and extends the findings of Sobel et al. (2009) by examining changes in the unique cognitions of military service members with combat-related PTSD.

1. Methods

1.1. Participants

Data were selected from two clinical trials studying the efficacy of CPT-C with active duty service members. Participants provided written informed consent before participating in treatment. Participants were active duty military personnel who were 18 years of age or older. Eligibility required participants to have experienced at least one Criterion A traumatic event during deployment to Iraq or Afghanistan and a diagnosis of PTSD as defined by the DSM-IV-TR (American Psychiatric Association, 2000). However, the worst traumatic event on which the diagnosis was based (i.e., “index

event”) did not have to be deployment-related. Exclusion criteria for the trials included active psychosis or acute suicidal or homicidal risk needing crisis intervention.

This study included participants who had completed both an initial and a final impact statement in the CPT-C condition ($N = 63$). The sample was primarily male (93.7%), married (74.6%), and enlisted in the Army (100%). All but three participants identified a deployment-related trauma as their index traumatic event. Two participants identified index traumas that occurred in adulthood in the civilian context, and one participant identified childhood sexual abuse as the index event. Table 1 provides descriptive information about the sample.

1.2. Measures

PTSD Checklist-Stressor Specific Version (PCL-S; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL-S is a self-report measure related to a specific trauma consisting of 17 items that evaluate how much a person is bothered by PTSD symptoms. The PCL-S has good to excellent internal consistency, good test-retest reliability and strong convergent validity with other validated measures of PTSD using the DSM-IV criteria (Keen, Kutter, Niles, & Krinsley, 2008).

Posttraumatic Symptom Scale-Interview Version (PSS-I; Foa, Riggs, Dancu, & Rothbaum, 1993). The PSS-I is a 17-item clinician-administered interview designed to determine a DSM-IV-TR diagnosis and the severity of PTSD. The PSS-I rates each PTSD symptom from 0 (not at all) to 3 (very much) based on frequency/severity. The PSS-I demonstrated strong internal consistency, inter-rater reliability, test-retest reliability, and convergent validity with other validated measures of PTSD (Kaloupek et al., 2010).

Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure for affective and somatic symptoms related to DSM-IV-TR depressive disorders. The BDI-II has well-established reliability and validity across a range of populations (Beck et al., 1996).

1.3. Procedures

Data for this analysis were collected from a group of active duty U.S. Army Soldiers stationed at Fort Hood in Killeen, Texas,

participating in one of two randomized clinical trials evaluating the efficacy of CPT-C. The studies were reviewed and approved by the Institutional Review Boards at Brooke Army Medical Center (BAMC), the University of Texas Health Science Center at San Antonio (UTHSCSA), and the VA Boston Healthcare System. The first of those clinical trials compared CPT-C and Present Centered Therapy (PCT), both administered in a group therapy format (Resick et al., 2015a, 2015b). The second clinical trial compared CPT-C administered in a group setting to CPT-C administered in an individual setting. The second trial has closed enrollment and is completing follow-up. Only data from patients who had been randomly assigned to the CPT-C condition, delivered in either an individual or group format, were used for the current analysis. The cognitive only version (CPT-C) differs from the original version of CPT by excluding the written trauma account (Resick et al., 2015a, 2015b). All participants were assessed at pretreatment and at approximately two weeks posttreatment by independent evaluators blinded to the treatment.

At the end of the first CPT-C therapy session, participants were asked to handwrite an impact statement about the meaning of the index trauma. Instructions for the impact statement said: “Please write at least one page on why you think this traumatic event occurred. You are not being asked to write specifics about the traumatic event. Write about what you have been thinking about the cause of the worst event. Also, consider the effects this traumatic event has had on your beliefs about yourself, others, and the world in the following areas: safety, trust, power/control, esteem, and intimacy” (Resick et al., 2014, p. C5). At the end of Session 11, participants were asked to write a similar impact statement emphasizing what they believe “now.”

Impact statements were qualitatively coded using the coding manual developed by Sobel et al. (2009). The coding manual guides the coding of thought units into four categories of cognitions: assimilation, accommodation, overaccommodation, and information. The information category described statements that were factual only and did not reflect an individual's cognitions. Independent raters were trained to use the coding manual and received ongoing consultation from the principal investigator of the two parent studies (Resick et al., 2015a, 2015b). First, the impact statements were separated into independent clauses. Each clause contained a complete thought with a subject and verb. Some sentences contained a single clause, while other sentences contained two or more clauses. To establish initial inter-rater reliability, a coding team consisting of three doctoral level psychologists coded practice impact statements not included in the study. Once members of the team were trained to 80% inter-rater reliability, two of the three team members functioned as the primary coding team for the final analyses. Before coding, any information (e.g., “before treatment,” or “after treatment”) that revealed whether it was a first or final impact statement was removed to prevent biasing the coding team. One team member coded all of the impact statements while the second team member coded 20% of these statements to determine inter-rater reliability. Final inter-rater agreement was 83% and the final Cohen's kappa was 0.76. According to Peat (2001, p. 228), a Kappa above 0.7 represents good agreement. In addition, our percent agreement and Kappa was similar to that of Sobel et al. who used the same coding manual and similar procedures.

1.4. Data analysis

Total counts of each category of cognitions for each clause were calculated for every impact statement. Analyses focused on the counts of accommodated, over-accommodated and assimilated clauses. Informational clauses were excluded from analyses in order to reduce analysis of nonmeaningful data. Proportions of

Table 1
Demographics and sample characteristics ($N = 63$).

Variable	<i>M</i>	<i>SD</i>
Age in years	33.6	6.9
Time in military service in years	11.3	6.2
Number of deployments	2.2	1.0
Variable	<i>N</i>	%
Gender		
Male	59	93.6%
Female	4	6.4%
Marital status		
Married/cohabitating	47	74.6%
Separated or divorced	11	8.5%
Unmarried	5	7.9%
Race/Ethnicity		
Caucasian	28	44.4%
African American	18	28.6%
Other	46	20.6%
Hispanic	10	16.1%
Education		
High school diploma	10	15.9%
Some college	19	30.2%
Associate's degree	21	33.3%
Bachelor's Degree	9	14.3%
Master's degree or higher	4	6.4%

accommodated, over-accommodated, and assimilated clauses were calculated for each impact statement by summing the total number of each clause type and dividing by the sum of all clauses excluding informational clauses.

Univariate descriptive statistics were examined to determine that the means and standard deviations of PCL-S and BDI-II symptom measures were within the appropriate ranges. For three cases with missing posttreatment PCL-S, PSS-I, and BDI-II measures, the total scores from the last assessment collected during weekly treatment were carried forward.

Most analyses were conducted on the full sample of 63 active duty service members. Paired-sample *t*-tests were conducted to examine change in symptom measures (i.e., PCL-S, BDI-II, and PSS-I) from pre- to posttreatment. A repeated measures MANOVA was used to examine change in the proportion of the three cognition types from pre- to posttreatment, and univariate analyses were examined to determine the change in the percentage of accommodation, overaccommodation and assimilation for each cognition type. Pearson's product-moment correlation coefficient was used to examine the correlation between the various symptom measures and the percent of clauses for each cognition as well as the association between the change in percent of clauses for each cognition type and change in symptom measures. A two-way mixed-design repeated MANOVA was used to examine the individual changes in the percentages of each cognition type across time (i.e., pre to post) for treatment responders. Treatment responders were identified as individuals who had a 15 point decrease on the PCL-S. A change of 10–20 points on the PCL-S is considered clinically meaningful (National Center for PTSD, n.d.) A decrease in score of 15 points was selected as the responder cut-off because some participants in this sample could not decrease 20 points due to low initial scores at baseline.

2. Results

All 63 participants met full *DSM-IV-TR* criteria for PTSD at baseline as measured by the PSS-I. Paired-sample *t*-tests indicated a significant change in mean PCL-S, PSS-I, and BDI-II scores from pre- to posttreatment. Specifically, mean PCL-S scores decreased from pretreatment ($M = 53.74$, $SD = 9.72$, Range = 31–73) to post-treatment ($M = 41.13$, $SD = 16.92$, Range = 17–84), $t(62) = 6.65$, $p < 0.0001$, $\eta^2 = 0.41$; mean PSS-I scores decreased from pre-treatment ($M = 23.53$, $SD = 5.84$, Range = 12–39) to post-treatment ($M = 16.78$, $SD = 11.10$, Range = 0–45), $t(59) = 6.16$, $p < 0.0001$, $\eta^2 = 0.38$; and mean BDI-II scores decreased from pretreatment ($M = 27.25$, $SD = 10.28$, Range = 5–51) to posttreatment ($M = 17.84$, $SD = 14.15$, Range = 0–58), $t(62) = 5.23$, $p < 0.0001$, $\eta^2 = 0.32$.

A paired-sample *t*-test comparing the mean total number of clauses in the first and final impact statements found no significant difference between the first ($M = 19.59$, $SD = 9.05$) and the final impact statements ($M = 18.67$, $SD = 10.05$, $t(62) = 0.90$, $p < 0.37$, $\eta^2 = 0.01$), indicating that there were no treatment effects on length of impact statements. The means and standard deviations for the numbers of accommodated, overaccommodated,

assimilated, and informational statements are shown in Table 2. The repeated measures MANOVA revealed an overall significant change in the percentages of accommodated, overaccommodated, and assimilated statements [$F(3, 60) = 50.79$, Pillai's Trace = 0.72, $p < 0.001$, $\eta^2 = 0.72$]. Univariate tests (results shown in Table 3) revealed significant changes in the percentage of each individual statement type including decreases in assimilation [$F(1, 62) = 55.54$, $p < 0.0001$, $\eta^2 = 0.47$] and overaccommodation [$F(1, 62) = 53.10$, $p < 0.0001$, $\eta^2 = 0.46$] and increases in accommodated statements [$F(1, 62), 132.21$, $p < 0.0001$, $\eta^2 = 0.68$].

Table 4 shows the Pearson product–moment correlation coefficients for the relationships among the changes in percentage of statement type and the change in PCL-S, PSS-I, and BDI-II scores. Change in percentage of accommodated statements was negatively correlated with change in PCL-S ($r = -0.39$, $p = 0.002$), PSS-I ($r = -0.40$, $p = 0.002$) and BDI-II scores ($r = -0.36$, $p = 0.004$), indicating that increases in more balanced, accommodated thinking were associated with decreases in symptoms of PTSD and depression. At the same time, the significantly positive correlations between change in overaccommodated statements and change in PCL-S ($r = 0.37$, $p = 0.003$), PSS-I ($r = 0.42$, $p = 0.001$) and BDI-II scores ($r = 0.37$, $p = 0.003$) indicates that the greatest reductions in overaccommodation are associated with the greatest reductions in PTSD and depression symptoms. Change in the percentage of assimilated statements was not significantly correlated with pre- to posttreatment changes in PCL-S, PSS-I, or BDI-II scores (Table 4). There was a strong negative correlation between percentage of overaccommodated statements and percentage of accommodated statements at posttreatment ($r = -0.94$, $p = 0.0001$). That could at post-treatment reflect the relative shift from overaccommodation to accommodation.

Table 5 shows the pre- to posttreatment percentages of the three types of cognitive statements broken down into the treatment responder and nonresponder groups (i.e., those with and without a 15-point decrease in PCL-S scores, respectively). The two-way mixed design repeated measures MANOVA showed an overall significant difference between responders and nonresponders in the percentage of accommodated, overaccommodated, and assimilated statements [$F(3, 59) = 3.21$, $p < 0.03$, $\eta^2 = 0.14$]. Univariate tests indicated that treatment responders as compared to non-responders had a significantly greater decrease in the percentage of overaccommodated statements [$F(1, 61) = 8.52$, $p < 0.005$, $\eta^2 = 0.12$] and a significantly greater increase in the percentage of accommodated statements [$F(1, 62) = 8.75$, $p < 0.004$, $\eta^2 = 0.13$], but the two groups did not differ or assimilated statements.

3. Discussion

This study supports the underlying theory of CPT-C by showing that cognitive change during treatment was associated with a reduction in PTSD and depression. While a previous study reported these same cognitive changes with CPT in a sample of female rape survivors (Sobel et al., 2009), this is the first study to qualitatively

Table 2
Means and standard deviations for each type of cognition.

Clause type	Beginning number		Ending number	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Accommodation	2.00	2.34	8.63	6.38
Overaccommodation	10.25	6.47	4.71	5.11
Assimilation	3.52	3.69	0.98	1.55
Information	3.79	3.98	4.29	5.27

Table 3
Repeated measures MANOVA of changes in percentage of clauses from beginning to end of therapy.

Clause type	Beginning %		Ending %		<i>F</i>	η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Accommodation	0.13	0.15	0.63	0.29	132.21***	0.68
Overaccommodation	0.63	0.22	0.31	0.27	53.10***	0.46
Assimilation	0.24	0.19	0.06	0.10	55.54***	0.47

*** $p < 0.0001$, all $df = 1, 62$.

Table 4

Pearson correlations among cognitions in the impact statements and changes in PCL-S, PSS-I, and BDI-II scores from the beginning to end of therapy.

Changes in clause type	Changes in assessment scores		
	PCL-S	PSS-I	BDI-II
Accommodation percentage	–0.39*	–0.40*	–0.36*
Overaccommodation percentage	0.36*	0.42**	0.36*
Assimilation percentage	0.01	–0.06	–0.04

* $p < 0.005$.

Note. PCL-S = Posttraumatic Stress Checklist-Stressor Specific Version; PSS-I = Posttraumatic Symptom Scale-Interview Version; BDI-II = Beck Depression Inventory-II.

Table 5

Means, standard deviations, and results of repeated measures MANOVA of changes in the percentage of clauses for treatment responders and nonresponders.

Clause type	Responder (<i>n</i> = 24)				Nonresponder (<i>n</i> = 39)				<i>F</i>	η^2_{p}
	Beginning		End		Beginning		End			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Accommodation	0.11	0.12	0.76	0.21	0.14	0.16	0.54	0.31	8.75*	0.13
Overaccommodation	0.66	0.15	0.18	0.18	0.61	0.26	0.38	0.28	8.53*	0.12
Assimilation	0.22	0.18	0.05	0.09	0.25	0.19	0.07	0.10	0.03	0.14

* $p < 0.005$.

Note. Responder defined as 15-point or greater decrease on the Posttraumatic Stress Checklist-Stressor Specific Version from pre-to posttreatment. All $df = 1, 61$.

examine cognitive change associated with a cognitive behavioral treatment for active duty service members with combat-related PTSD treated in garrison. Consistent with the predictions, there were significant improvements in cognitions across the course of therapy evidenced by change in the content of the impact statements. In particular, dysfunctional over-accommodated thinking decreased, while balanced, accommodated thinking increased, and the magnitude of these changes in thinking were associated with the magnitude of clinical symptom improvement. There was also some evidence for treatment-related decreases in assimilation, but these changes were not significantly related to the extent of clinical improvement in the current study.

These results partially support the theory of recovery transforming both assimilated and overaccommodated thinking into accommodated thinking, but were not nearly as robust as initially expected. At the beginning of treatment, one service member wrote the assimilated statement, “I believe this event happened because we were too relaxed and complacent, and thought nothing would happen.” By the end of treatment, his belief about the trauma was more balanced as evidenced by the accommodated, acceptance statement, “I think this event happened because we were at war.” For another service member, a pretreatment overaccommodated belief was, “I can’t trust anyone;” while at the end of treatment, his belief shifted to a more accommodated thought, “I can trust most people. I just need to make a judgment about who I trust and how much trust I give.” Not only do these examples provide qualitative evidence that supports the core cognitive agents for CPT-related clinical improvement, but they also are consistent with other studies reporting reductions in the severity of cognitive distortions during the course of CPT (Owens et al., 2001; Resick et al., 2002, 2008).

Because cognitive change is the putative core change agent of CPT, it was anticipated that reductions in dysfunctional cognitions and increases in balanced cognitions would be associated with a change in symptoms of PTSD and depression from the beginning to the end of treatment. Higher levels of accommodated thinking and lower levels of overaccommodated thinking were indeed associated with a medium to large reduction in symptoms of PTSD and depression throughout the course of therapy. However, consistent

with Sobel et al. (2009), change in assimilated thinking was not associated with a change in PTSD or depression.

The lack of an association between trauma-related assimilation and symptoms of PTSD and depression was unexpected because the instructions for the impact statement assignments were changed in order to encourage the generation of assimilated statements. There are several possible explanations for this null finding. First of all, some PTSD patients only had a few assimilated cognitions, with many more dysfunctional overaccommodated beliefs. Thus, an individual could begin treatment with only one or two assimilated cognitions (e.g., “It’s all my fault.” “I should have been able to

prevent the event.”). That combined with the small sample size, may have led to an insufficient level of power to detect change. In addition, it was found that, despite attempts to engender assimilated statements, study participants tended to focus exclusively on overaccommodated thinking. In these cases, the therapist would help the patient to identify assimilation during the second session of CPT-C, but this would not be reflected in initial impact statements. For example, in response to the cause of the traumatic event, one participant wrote, “I always think the same thing, people have right and wrong.” During the session, the therapist asked more questions and was able to identify “He should have known (that his actions were going to lead to a negative outcome)” as the underlying assimilated thought. Finally, it is possible that the omission of assimilated trauma-related cognitions was an expression of avoidance. For example, at posttreatment one participant wrote, “I realize that I could not prevent what happened.” However, examination of his pretreatment impact statement revealed no assimilation, even though his accommodated statement suggests a possible pretreatment assimilated cognition of “I should have prevented the trauma.”

The present study sample substantially differed from Sobel et al. (2009). The participants were more ethnically diverse and were exposed to highly variable war-related life-threat experiences, losses, and morally compromising events (Stein et al., 2012). Additionally, the sample, in Sobel et al. was predominantly female. However, the fact that two samples with such marked cultural and demographic differences found similar results substantiates the role of challenging cognitions in the subsequent changes in cognitions and symptom reduction.

There are noteworthy methodological limitations in this study. First, in terms of qualitative coding, for a small number of participants, the coders were able to determine whether or not the impact statement was from the beginning or end of treatment despite efforts to remove identifiers. The content of the statements often included qualifiers like “before I used to think ...” Because these qualifiers were disproportionately present in the end-of-treatment impact statement, removing the qualifiers or extensively altering the wording would have elicited the same identifying result. Additionally, the methods of the study required participants to

complete both an initial and final impact statement; therefore participants were excluded from analyses primarily due to attrition, although there was a small number of participants who did not complete either the first or second impact statement. It is also possible that the passage of time itself contributed to changes in impact statements. While these findings are consistent with an interpretation that cognitive therapy targeted changes in cognition that are associated with clinical symptom reductions, the correlational nature of the findings preclude a determination of whether the changes in cognitions precipitated symptom reduction or if symptom reduction resulted in cognitive change.

In summary, CPT resulted in reductions of assimilated and overaccommodated beliefs about the self, others, and the world. Specifically, changes in overaccommodation (e.g., overgeneralized beliefs) during treatment was associated with reductions in PTSD and depression symptoms after treatment, which provides partial support for the underlying theory of CPT. These findings suggest that targeting the patients' interpretation of the impact of the traumatic event led to positive cognitive changes over the course of treatment. This study's findings are important to inform our understanding of the mechanisms of change during CPT. The study's outcomes will help to make our current treatments as potent and effective as possible. Future research needs to examine whether cognitive change during the course of treatment precedes or follows symptom reduction over the course of CPT or whether other therapies such as Prolonged Exposure similarly change these cognitions. Future research examining qualitative analyses of practice assignments or session videos also could help clarify the relationship between cognitions and symptomatology over the course of treatment.

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