

Associations Between Functioning and PTSD Symptom Clusters in a Dismantling Trial of Cognitive Processing Therapy in Female Interpersonal Violence Survivors

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This study conducted secondary analyses of a published trial and sought to determine if different domains of psychosocial functioning (e.g., daily living, work, nonfamily relationships) improved following trauma-focused treatment for posttraumatic stress disorder (PTSD). Cognitive processing therapy (CPT), an empirically supported treatment that involves evaluating trauma-related beliefs and written trauma accounts, was compared to its components: CPT without the written accounts or written accounts only in a sample of 78 women with PTSD secondary to interpersonal violence. Overall and individual domains of functioning significantly improved with treatment and results were similar across treatment groups, $F_s(2, 150) \geq 11.87, p_s < .001$. Additionally, we investigated whether changes in different PTSD symptom clusters were associated with outcomes in domains of psychosocial functioning, after collapsing across treatment condition. Multiple hierarchical linear regression analyses revealed that overall clinician-assessed PTSD symptom reduction was associated with outcomes in all domains of functioning, $\beta_s = .44$ to $.68, p_s < .001$. Additionally, improvements in the emotional numbing symptom cluster were associated with outcomes in the nonfamily relationships domain, $\beta = .42, p < .001$, and improvements in the hyperarousal symptom cluster were associated with outcomes in the overall, daily living, and household tasks domains, $\beta_s = .34$ to $.39, p_s < .01$. Results suggest that it may be important to monitor improvements in emotional numbing and hyperarousal symptoms throughout treatment to increase the likelihood of changes in psychosocial functioning.

Posttraumatic stress disorder (PTSD) is a mental health condition that is associated with significant psychosocial problems (see Galovski, Sobel, Phipps, & Resick, 2005 for a review). Cognitive processing therapy (CPT), a trauma-focused cognitive-behavioral therapy that incorporates cognitive therapy and written accounts about a traumatic event(s) (Resick, Monson, & Chard, 2008), has been found to be efficacious in the treatment of PTSD symptoms and comorbid problems, including some psychosocial problems (e.g., Chard, 2005; Forbes et al., 2012; Galovski et al., 2005; Monson et al., 2006, 2012; Resick, Galovski et al., 2008; Resick, Nishith, Weaver, Astin, & Feuer, 2002; Surís, Link-Malcolm, Chard, Ahn, & North, 2013). There is limited knowledge, however, regarding the extent to which outcomes in domains of psychosocial functioning

following treatment are associated with improvements in specific PTSD symptom clusters. The purpose of the present study was to determine whether outcomes in domains of psychosocial functioning were associated with changes in PTSD symptom clusters in a dismantling trial comparing the efficacy of CPT and its treatment components (CPT without the written accounts [CPT-C] or written accounts only; for a full description of CPT and its components see Resick, Galovski et al., 2008), in a sample of adult women with PTSD secondary to a sexual or physical assault (Resick, Galovski et al., 2008).

Although the impairments in psychosocial functioning associated with PTSD have been well established (see Galovski et al., 2005 for a review), relatively few studies have examined associations between PTSD symptom cluster changes with treatment and specific domains of psychosocial functioning. Among the available observational research, the emotional numbing symptom cluster of the 4-factor model of PTSD (e.g., Asmundson, Stapleton, & Taylor, 2004; King, Leskin, King, & Weathers, 1998) appears to be the most consistent predictor of impairments in domains of psychosocial functioning, especially within interpersonal

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domains (i.e., intimate relationships, family relationships, nonfamily relationships; e.g., Kuhn, Blanchard, & Hickling, 2003; Pietrzak, Goldstein, Malley, Rivers, & Southwick, 2010; Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010). Notably, the majority of the research to date has focused on mostly male military and veteran samples (e.g., Pietrzak et al., 2010; Shea et al., 2010). Although one study has replicated these findings within two samples of mostly female motor vehicle accident survivors (Kuhn et al., 2003), there remain important questions regarding the replicability and generalizability of these findings across samples with different trauma types and within female samples (i.e., female sexual and physical assault survivors).

Similar to the observational literature, two of the three treatment-based studies examining associations between changes in PTSD symptom clusters and changes in domains of psychosocial functioning or quality of life (a closely related construct) were conducted with mostly male military and veteran samples (Lunney & Schnurr, 2007; Monson et al., 2012). The third was conducted with women who experienced a variety of traumatic events (Taylor, Wald, & Asmundson, 2006). Contrary to observational research, however, these studies have revealed somewhat inconsistent findings regarding the associations between changes in PTSD symptom clusters and changes in domains of psychosocial functioning and quality of life.

In a sample of male Vietnam veterans who participated in a trial of a trauma-focused group therapy for PTSD, improvements in the different PTSD symptom clusters were associated with improvements in all domains of quality of life (i.e., achievement; self-expression; relationships; and surroundings, which includes home, neighborhood, and community), except for the avoidance symptom cluster and the surroundings domain, which were not significantly associated with one another (Lunney & Schnurr, 2007). When the four PTSD symptom clusters were examined simultaneously, however, emotional numbing symptoms were uniquely associated with improvements in the relationships domain, improvements in the avoidance and hyperarousal symptom clusters were uniquely associated with improvements in the achievement domain, and improvements in the reexperiencing symptom cluster were uniquely associated with improvements in the self-expression domain.

In a sample of mostly male veterans with military-related PTSD who participated in a waitlist-controlled trial of CPT, Monson and colleagues (2006) found greater improvements in overall social adjustment for those receiving CPT compared to veterans in the waitlist condition. Results of a follow-up study revealed differential associations between changes in PTSD symptom clusters and domains of social adjustment (Monson et al., 2012). Specifically, reductions in avoidance symptoms were associated with improvements in housework adjustment, but with more impaired extended family adjustment. Reductions in emotional numbing symptoms were associated with improvements in overall social adjustment, extended family adjustment, and housework adjustment. These associations were found to exist over and above the effect of treatment, suggesting that the improvements in psychosocial functioning

were the result of symptom reduction rather than the treatment itself.

Taylor and colleagues (2006) investigated associations between improvements in PTSD symptom clusters and improvements in occupational and social functioning 4 months after the completion of individual psychological treatment for PTSD (i.e., eight sessions of eye-movement desensitization and reprocessing, exposure therapy, or relaxation training) in a mostly female community sample who experienced a variety of traumatic events. Collapsing across treatment conditions, results indicated that treatment-related improvements in reexperiencing symptoms were associated with improvements in work impairment, social and leisure impairment, and family and home impairment; avoidance symptoms were also associated with improvements in social and leisure impairment; and hyperarousal symptoms and emotional numbing symptoms were associated with improvements in work impairment.

Together, the observational and treatment-based literature raise a number of concerns regarding our understanding of the associations between changes in PTSD symptom clusters and domains of psychosocial functioning. Although assessment studies suggest that emotional numbing symptoms may be most consistently related to, and predictive of, impairments in psychosocial functioning, the treatment literature is less consistent. The dearth of studies regarding treatment, and inconsistent findings in this area, is further compounded by the predominant use of male veteran and military samples, which include the potential confound of both participant sex and trauma type.

The current secondary analysis sought to extend the research in this area by investigating changes in different PTSD symptom clusters and domains of psychosocial functioning in a sample of adult women with PTSD secondary to a sexual or physical assault who completed CPT or its treatment components. Based on previous findings, we first hypothesized that all domains of psychosocial functioning would improve as a result of treatment, regardless of treatment condition. Second, weighing the evidence of observational and treatment studies and their inherent limitations based on sample and methodology, we hypothesized that there would be positive associations between changes in overall PTSD symptoms and outcomes in the various domains of psychosocial functioning. Third, we hypothesized that changes in emotional numbing would be positively associated with outcomes in all domains of psychosocial functioning with the other PTSD symptom clusters of the 4-factor model of PTSD in the analysis.

Method

Participants

The current study conducted secondary analyses from a larger dismantling trial of CPT in a sample of women with PTSD secondary to childhood or adult sexual or physical assault (Resick, Galovski et al., 2008). All participants were at least 3 months posttrauma; medication use was permitted if it was stabilized.

Exclusion criteria included illiteracy, current psychosis, suicidal intent, and current substance dependence if not abstinent for the past 6 months. Current substance abuse was permitted if participants agreed to desist from using while completing treatment. In addition, participants were excluded if they were currently being stalked or currently involved in an abusive relationship. In the parent trial, the final intent-to-treat sample included 150 women. For the purposes of the current study, only women who completed at least 75% of therapy sessions, and completed the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) and the Behavior and Symptom Identification Scale (BASIS-32; Eisen, Dill, & Grob, 1994) at the pretreatment, posttreatment, and 6-month follow-up assessments were included in the analyses. This resulted in a sample of 78 participants: 24 women in the CPT group, 29 in the CPT-C group, and 25 in the Written Account group. Attrition analyses were conducted using a one-way analysis of variance (ANOVA) to test for differences between those who were included (completers) and those who were excluded (noncompleters) on PTSD severity (total and symptom clusters) and psychosocial functioning measures (total and individual items). There was only one difference between completers ($n = 78$) and noncompleters ($n = 72$) at baseline; noncompleters reported higher levels of reexperiencing symptoms – $F(1, 148) = 3.92, p = .049$.

Participants in this subsample ranged in age from 19 to 74 years ($M = 36.17, SD = 12.59$). Sixty-seven percent were White, 26.0% were African American/Black, 3.0% were Native American or Alaska Native, and 4.0% identified another ethnicity or cultural background. Participants were primarily low income, with nearly half of the sample (46.2%) earning \$20,000 or less per year. The average number of hours worked per week was 20.49 hours ($SD = 19.94$). Participants reported a mean education level of 14.08 years ($SD = 3.00$) and only 23.1% reported being either married or cohabitating. The mean time since trauma was 14.76 years ($SD = 14.81$). This sample was highly traumatized, with 44.9% of women reporting more than 10 adulthood incidents of victimization (e.g., sexual victimization, physical assault) and 43.6% of the sample reporting experiencing more than 10 instances of childhood victimization.

Procedure

For a full description of study procedures, please see Resick, Galovski, and colleagues (2008). Participants were recruited from a large city in Missouri, primarily through community advertisements and referrals. They were then randomly assigned to one of three treatment conditions: CPT, CPT-C, or Written Account and assessed at a pretreatment, posttreatment, and 6-month follow-up assessment. CPT is a well-established, first-line treatment for PTSD that combines cognitive therapy with written accounts about a traumatic event(s). CPT-C included the cognitive therapy elements of CPT without the written accounts, and the Written Account condition involved only structured writing and reading the accounts back to the therapist who

did noncognitive processing. Participants in the CPT and CPT-C conditions received twelve 60-minute sessions of therapy. Participants in the Written Account condition received seven sessions of structured writing over the course of 6 weeks. The first week consisted of two 60-minute sessions and the subsequent 5 weeks each included one 120-minute session (each totaling 12 hours of therapy). The parent trial was approved by the Institutional Review Board at the University of Missouri-St. Louis, and analyses were approved by the VA Boston Healthcare System.

Measures

The CAPS (Blake et al., 1995) is a widely used clinician-administered interview designed to diagnose PTSD based on the criteria given in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000). It has been shown to have strong psychometric properties (Weathers, Keane, & Davidson, 2001). In the parent trial from which this study was derived, internal consistency was strong ($\alpha = .91$) and interrater reliability with an expert was excellent for both diagnostic PTSD ($\kappa = 1.00$) and the three diagnostic symptom clusters: reexperiencing ($\kappa = .87$), avoidance/emotional numbing ($\kappa = .72$), and hyperarousal ($\kappa = .69$; Resick, Galovski et al., 2008).

The BASIS-32 (Eisen et al., 1994) is an empirically derived measure developed to assess patients' psychosocial functioning and mental health symptoms. It includes 32 items that assess functioning and mental health symptoms across five subscales: Relation to Self and Others, Daily Living and Functioning, Depression and Anxiety, Impulsive and Addictive Behavior, and Psychosis. Each item was rated on a 5-point scale (e.g., 0 = *no difficulty*, 1 = *a little difficulty*, 2 = *moderate difficulty*, 3 = *quite a bit of difficulty*, 4 = *extreme difficulty*). Although many of the items on the BASIS-32 measure domains of psychosocial functioning, it does not have a psychosocial functioning subscale; thus, for the purposes of this study, we created an overall psychosocial functioning subscale using six items that assess domains of psychosocial functioning: Daily Living, Household Tasks, Work, Leisure/Recreational, Family Relationships, and Nonfamily Relationships. This subscale had reasonable internal consistency ($\alpha = .70$). Item-total correlation analyses for individual items were Daily Living, $r = .59$, Household Tasks, $r = .37$, Work, $r = .42$, Leisure/Recreational, $r = .46$, Family Relationships, $r = .40$, and Nonfamily Relationships, $r = .36$. In addition to the range of means reported in Table 1, at pretreatment, the median and modal responses ranged from 1 to 3, suggesting that this sample reported a range of difficulty on measures of psychosocial functioning at pretreatment.

Data Analyses

To determine if there were effects of time as well as between-condition differences, 3 (time) \times 3 (condition) mixed model ANOVAs were conducted for overall psychosocial functioning and each domain of functioning, as well as total PTSD

Table 1
Means and Standard Deviations by Time and Condition

Variable	Pretreatment		Posttreatment		6-month follow-up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Cognitive processing therapy (<i>n</i> = 24)						
CAPS						
Total	66.29	16.76	27.88	23.66	27.17	22.84
Reexperiencing	15.04	7.12	4.92	5.40	5.54	6.00
Avoidance	9.58	3.16	2.88	3.80	3.33	3.97
Emotional numbing	19.75	8.48	8.79	11.67	7.75	9.41
Hyperarousal	21.92	6.42	11.29	7.78	10.54	8.41
BASIS						
Overall functioning	1.93	0.79	1.24	1.09	1.10	0.90
Daily living	2.21	1.22	1.33	1.38	1.42	1.35
Household tasks	2.04	1.27	1.29	1.27	1.13	1.19
Work	2.08	1.61	1.29	1.55	1.13	1.54
Leisure/recreational	1.79	1.29	1.08	1.10	1.00	1.10
Family relationships	2.17	1.09	1.42	1.28	1.38	1.25
Nonfamily relationships	1.29	1.08	1.00	1.18	0.58	0.88
Cognitive processing therapy–cognitive only (<i>n</i> = 29)						
CAPS						
Total	72.03	21.56	29.79	29.23	30.45	29.12
Reexperiencing	17.59	9.07	7.24	9.02	6.59	8.69
Avoidance	10.90	3.56	2.90	4.49	3.14	4.32
Emotional numbing	21.14	8.31	8.38	9.37	9.93	9.88
Hyperarousal	22.41	7.59	11.28	9.95	10.79	10.12
BASIS						
Overall functioning	1.86	0.81	0.90	0.91	0.97	1.08
Daily living	1.93	1.44	1.07	1.33	1.10	1.26
Household tasks	1.97	1.25	1.10	1.26	1.17	1.28
Work	1.66	1.50	0.62	1.02	0.79	1.35
Leisure/recreational	2.31	1.14	1.00	1.25	1.03	1.35
Family relationships	1.86	1.30	1.14	1.27	1.00	1.36
Nonfamily relationships	1.41	0.91	0.45	0.69	0.72	1.00
Written account (<i>n</i> = 25)						
CAPS						
Total	67.88	18.44	33.28	27.19	26.32	19.83
Reexperiencing	16.24	7.15	6.88	6.54	5.84	6.15
Avoidance	10.36	2.64	3.28	4.07	2.84	3.02
Emotional numbing	18.36	8.76	9.68	10.59	7.76	9.44
Hyperarousal	22.92	6.30	13.44	10.38	9.88	8.84
BASIS						
Overall functioning	1.67	0.78	0.99	0.86	0.87	0.84
Daily living	1.60	1.12	0.96	1.10	1.12	1.17
Household tasks	1.72	1.17	1.04	1.14	1.04	1.14
Work	1.84	1.34	0.92	0.95	0.88	1.17
Leisure/recreational	1.96	1.24	1.00	1.04	0.68	1.15
Family relationships	1.72	1.17	1.12	1.27	0.92	1.12
Nonfamily relationships	1.16	1.07	0.88	1.33	0.56	0.92

Note. CAPS = Clinician-Administered PTSD Scale; BASIS = Behavior and Symptom Identification Scale.

symptoms and PTSD symptom clusters. Bonferroni-corrected post hoc mean comparisons were used to further examine significant main effects of time (i.e., to examine if there were significant changes from pre- to posttreatment, pretreatment to 6-month follow-up, and posttreatment to 6-month follow-up). For analyses in which the assumption of sphericity was violated, the Greenhouse-Geisser correction was applied. Given our focus on examining associations between changes in PTSD symptoms and psychosocial functioning outcomes with treatment, domains of functioning in which there were significant changes from pre- to posttreatment were subjected to further analyses. For domains of psychosocial functioning in which there were significant pre- to posttreatment changes, multiple hierarchical linear regression analyses were conducted, with respective pretreatment psychosocial functioning scores entered at Step 1 and residualized change scores for total CAPS from pre- to posttreatment entered at Step 2 to predict posttreatment functioning in each domain. To investigate the relative importance of changes in different PTSD symptom clusters in predicting outcomes in domains of psychosocial functioning, additional models were constructed. These models replicated the procedure used above for Step 1, but included residualized change scores for all four PTSD symptom clusters of the CAPS from pre- to posttreatment, which were added simultaneously as a block at Step 2.

Results

Table 1 contains means and standard deviations by condition for the mixed-model ANOVAs conducted on the CAPS and domains of psychosocial functioning. Mixed-model ANOVAs showed significant main effects of time across all outcome variables, $F_s(2, 150) \geq 11.87, p_s < .001$. Bonferroni-corrected mean comparisons indicated that across all outcome variables, there were significant improvements in PTSD symptoms and domains of psychosocial functioning from pre- to posttreatment, $p_s = .006$ to $< .001$, and pretreatment to 6-month follow-up, $p_s < .001$. There were no differences, however, between the posttreatment and 6-month follow-up, $p_s = .37$ – 1.00 . Additionally, there were no significant condition effects, $F_s(2, 75) \leq 1.61, p_s = .206$ – $.901$, or time \times condition interactions, $F_s(4, 150) \leq 1.71, p_s = .160$ – $.991$. Thus, we focused the current study on examining associations between pre- to posttreatment changes in PTSD symptoms and domains of psychosocial functioning, irrespective of treatment condition.

The final multiple hierarchical linear regression models, presented in Table 2, indicate that changes in total CAPS scores were associated with outcomes in overall psychosocial functioning as well as all individual domains of psychosocial functioning. With the exception of the leisure and recreational and nonfamily relationships domains, which were marginally significant, all pretreatment domains of psychosocial functioning were significantly associated with their respective posttreatment domains. This pattern of findings was consistent for models

utilizing total CAPS symptoms as well as CAPS symptom clusters.

When the CAPS symptom clusters were entered simultaneously to predict outcomes in each domain of psychosocial functioning, differential associations were found. Specifically, improvements in hyperarousal symptoms were positively associated with outcomes in overall psychosocial functioning, as well as the daily living and household domains. Improvements in emotional numbing symptoms were positively associated with outcomes in the nonfamily relationships domain (see Table 2).

Discussion

The current study contributes to our understanding of the effects of receiving CPT and its individual elements (i.e., CPT-C and Written Account) on domains of psychosocial functioning among female survivors of interpersonal violence with PTSD. In addition, it adds to the literature examining the associations between outcomes in domains of psychosocial functioning and changes in PTSD symptoms with a course of therapy. Consistent with our first hypothesis, all domains of psychosocial functioning improved following the completion of CPT or its treatment components (i.e., CPT-C or Written Account). There were no significant condition effects or time by condition interactions, and there were also no differences between the posttreatment and the 6-month follow-up assessment across all variables.

These findings provide additional support to the existing body of literature indicating that front-line, trauma-focused cognitive-behavioral therapies can result in improvements in domains of psychosocial functioning and that these improvements are maintained following treatment (Galovski et al., 2005; Monson et al., 2006, 2012). Notably, Monson et al. (2012) found that outcomes in psychosocial functioning may be associated with improvements in various PTSD symptom clusters rather than the effect of treatment itself. Although the current study was unable to investigate this question due to the absence of a waitlist condition, each treatment condition in the current study produced significant improvements in PTSD symptoms, as well as all domains of psychosocial functioning at posttreatment. Thus, it is possible that the outcomes in psychosocial functioning that were observed in the current study were also a result of improvements in PTSD symptoms rather than the treatment components themselves; however, future research that includes a waitlist condition is required to test this hypothesis.

Consistent with our second hypothesis, there were significant positive associations between changes in overall PTSD symptoms and outcomes in all domains of psychosocial functioning, including overall, daily living, household tasks, leisure and recreational, family relationships, and nonfamily relationships. Partial support for our third hypothesis was also obtained. Specifically, changes in the emotional numbing symptom cluster were associated with outcomes in the nonfamily

Table 2

Two Sets of Final Models of Hierarchical Multiple Regression Analyses for Outcomes in Domains of Functioning Using Changes in Total PTSD and PTSD Symptom Clusters

Variable	Total PTSD symptoms					PTSD symptom clusters				
	ΔR^2	R^2	B	SE	β	ΔR^2	R^2	B	SE	β
Overall										
Final model	.46***	.53***				.47***	.54***			
PRE BASIS			0.38***	0.10	.31			0.37***	0.10	.30
Total			0.03***	0.00	.68					
Reexperiencing								0.03	0.02	.24
Avoidance								−0.01	0.03	−.03
Emotional numbing								0.02	0.01	.24
Hyperarousal								0.04**	0.01	.34
Daily living										
Final model	.30***	.42***				.32***	.43***			
PRE BASIS			0.42***	0.09	.43			0.42***	0.09	.43
Total			0.03***	0.00	.56					
Reexperiencing								0.04	0.03	.23
Avoidance								0.00	0.05	.01
Emotional numbing								0.01	0.02	.08
Hyperarousal								0.05**	0.02	.35
Household tasks										
Final model	.19***	.43***				.22***	.46***			
PRE BASIS			0.44***	0.08	.46			0.46***	0.09	.48
Total			0.02***	0.00	.44					
Reexperiencing								0.01	0.03	.08
Avoidance								0.00	0.04	.01
Emotional numbing								0.01	0.02	.04
Hyperarousal								0.05**	0.02	.39
Work										
Final model	.26***	.28***				.28***	.30***			
PRE BASIS			0.17*	0.08	.21			0.17*	0.08	.21
Total			0.02***	0.01	.51					
Reexperiencing								0.05	0.03	.28
Avoidance								−0.02	0.05	−.07
Emotional numbing								0.01	0.02	.11
Hyperarousal								0.04	0.02	.28
Leisure/recreational										
Final model	.37***	.39***				.38***	.39***			
PRE BASIS			0.14	0.08	.15			0.14	0.09	.15
Total			0.03***	0.00	.61					
Reexperiencing								0.02	0.03	.15
Avoidance								0.02	0.04	.06
Emotional numbing								0.03	0.02	.25
Hyperarousal								0.03	0.02	.25
Family relationships										
Final model	.25***	.40***				.25***	.41***			
PRE BASIS			0.33**	0.10	.32			0.32**	0.10	.30
Total			0.03***	0.01	.50					
Reexperiencing								0.04	0.03	.22
Avoidance								−0.00	0.05	−.01
Emotional numbing								0.03	0.02	.20
Hyperarousal								0.03	0.02	.18

(Continued)

Table 2
Continued

Variable	Total PTSD symptoms					PTSD symptom clusters				
	ΔR^2	R^2	B	SE	β	ΔR^2	R^2	B	SE	β
Nonfamily relationships										
Final model	.34***	.34***				.36***	.37***			
PRE BASIS			0.20	0.10	.19			0.17	0.11	.16
Total			0.03***	0.00	.59					
Reexperiencing								0.04	0.03	.25
Avoidance								−0.03	0.04	−.10
Emotional numbing								0.05**	0.02	.42
Hyperarousal								0.01	0.02	.10

Note. ($N = 78$). Step 1 of the multiple hierarchical linear regression models is not presented due to space limitations and can be obtained from the first author.

Δ = change in variance in posttreatment psychosocial functioning accounted for by changes in posttraumatic stress symptoms, after accounting for pretreatment psychosocial functioning. PTSD = posttraumatic stress disorder; BASIS = Behavior and Symptom Identification Scale; PRE = pretreatment. PTSD measured by the Clinician-Administered PTSD Scale.

* $p < .05$. ** $p < .01$. *** $p < .001$.

relationships domain, but no other domains, when all four PTSD symptom clusters were entered simultaneously into the regression model. Inconsistent with our third hypothesis, changes in the hyperarousal symptom cluster were associated with outcomes in overall psychosocial functioning, as well as with the daily living and household tasks domains.

Given the mixed findings in the existing treatment literature examining outcomes in psychosocial functioning and changes in PTSD symptom clusters, it is difficult to establish firm conclusions regarding these associations. Typically, emotional numbing has been closely linked to interpersonal functioning among assessment studies (e.g., Kuhn et al., 2003; Pietrzak et al., 2010; Shea et al., 2010). Though changes in the emotional numbing symptom cluster were not found to be associated with outcomes in the family relationships domain, this may be due to the low number of women who were married or cohabitating at pretreatment (i.e., 23.1%). At the same time, it may suggest that these treatments do not foster increases in one's ability to engage in close family relationships (i.e., intimate relationships), even among a treatment-completing sample. Nevertheless, outcomes in the nonfamily relationships domain were associated with changes in the emotional numbing symptom cluster. This suggests that emotional numbing may play an important role in interpersonal functioning more broadly, but the degree to which we can detect these improvements is contingent upon the types of relationships relevant to specific patients and the context in which these relationships exist.

The outcomes in domains of functioning associated with changes in the hyperarousal symptom cluster were not hypothesized, but do seem consistent with Lunney and Schnurr's (2007) findings that changes in hyperarousal symptoms are associated with improvements in the achievement domain. Certain hyperarousal symptoms (i.e., sleep disturbances, difficulty concentrating, and hypervigilance) may be particularly detrimental to one's ability to complete activities of daily living, such

as making everyday decisions, punctuality, running errands, and/or completing other household chores. Additionally, there is also research documenting significant associations between sleep disturbances and cognitive functioning, such as attention and working memory (e.g., Shekleton, Rogers, & Rajaratnam, 2010). Given that these cognitive abilities are likely needed to complete these activities effectively, it follows that improvements in the hyperarousal symptom cluster could be associated with outcomes in these domains of functioning. Based on this interpretation, one may have also expected that changes in the hyperarousal symptom cluster would have been associated with outcomes in the work domain. This association was found to be marginally significant ($p = .052$), suggesting that the current study may not have been sufficiently powered to detect a statistically significant association.

Overall results of the current study have important clinical implications. Although emotional numbing and hyperarousal symptoms were found to significantly decrease in the current study and to be associated with outcomes in domains of psychosocial functioning, previous studies have found that the emotional numbing symptom cluster may be least responsive to currently available treatments (e.g., Asmundson et al., 2004; Glynn et al., 1999) and that sleep problems may persist following the completion of cognitive-behavioural treatments for PTSD (e.g., Zayfert & DeViva, 2004). This highlights the importance of closely monitoring each PTSD symptom cluster, in addition to overall PTSD symptomatology, over the course of treatment to increase the likelihood of downstream improvements in domains of psychosocial functioning. Thus, even following a loss of a PTSD diagnosis, if symptoms in a particular symptom cluster persist, additional treatment interventions may be required to improve specific domains of functioning. Recent treatment innovations have begun to address this important clinical issue by targeting common interpersonal functioning problems through the use of couple/family-based interventions

(e.g., Monson & Fredman, 2012; Sautter, Glynn, Thompson, Franklin, & Han, 2009) and the inclusion of interpersonal skill development in individual-based interventions (e.g., Cloitre, Koenen, Cohen, & Han, 2002; Cloitre et al., 2010). Similarly, preliminary studies have investigated the effects of sleep treatments among individuals with PTSD (DeViva, Zayfert, Pigeon, & Mellman, 2005; Germain, Shear, Hall, & Buysse, 2007). Additional research is required, however, to examine whether these interventions translate to improvements in domains of psychosocial functioning.

The current study is among the first to examine the associations between outcomes in psychosocial functioning and changes in PTSD symptom clusters in a sample of female survivors of interpersonal violence who completed trauma-focused treatment. There are, however, a number of limitations that must be acknowledged. First, most of the women in our sample were of a similar demographic background; thus, additional studies should focus on examining more demographically varied samples. Second, although there were significant improvements in all domains of psychosocial functioning following treatment, an examination of pretreatment levels of psychosocial functioning revealed that the sample was relatively unimpaired, on average. This may have limited our ability to detect associations between changes in PTSD symptoms and changes in domains of psychosocial functioning. Third, it is also possible that the associations that were observed between the changes in emotional numbing and hyperarousal symptom clusters and outcomes in domains of psychosocial functioning were a result of how much of the total CAPS scores could be attributed to these two symptom clusters, as they had the highest means and greatest variability. Fourth, multiple analyses were conducted without adjusting for Type I error because of a priori hypotheses and to maintain statistical power. Moreover, the current study is limited by the measure used to assess domains of psychosocial functioning. The BASIS-32 was originally designed to assess five subscales that do not directly map onto the domains of functioning of interest within the current study. Thus, individual items were used to assess these domains. Although the BASIS-32 has not traditionally been used in this way, individual item analysis allowed us to conduct a fine-grained examination of specific domains of functioning in which individuals with PTSD commonly report impairments. It should be noted, however, that some items were found to have low reliability. Future studies should consider using alternative and more comprehensive measures of psychosocial functioning to further understand the specific domains of functioning that improve with treatment and establish potential underlying factors between them (e.g., interpersonal or relationship-oriented functioning). Similarly, studies that employ multilevel or structural equation modeling analyses may provide a more nuanced understanding of the associations between changes in PTSD symptom severity and psychosocial functioning. Finally, future research would also benefit from the inclusion of a wait-list condition to test whether the improvements in psychosocial functioning that were observed in the current study are

the result of changes in PTSD symptom clusters or treatment itself.

The PTSD treatment literature has consistently documented the efficacy of trauma-focused, cognitive-behavioral therapies to reduce PTSD symptom severity and diagnostic status (e.g., Forbes et al., 2012; Monson et al., 2006; Resick, Galovski et al., 2008; Resick et al., 2002). Similarly, improvements in psychosocial functioning following these treatments have also been documented (e.g., Galovski et al., 2005; Monson et al., 2006, 2012; Taylor et al., 2006). Only recently have we begun to examine the associations between outcomes in these domains and PTSD symptom clusters within the context of trauma-focused treatments. Given that existing treatments do not typically target psychosocial functioning, it is important to ensure that specific PTSD symptom clusters (i.e., emotional numbing and hyperarousal) are continually monitored throughout treatment to optimize improvements in domains of psychosocial functioning. Improvements in psychosocial functioning can ultimately be more significant in improving individuals' management of daily tasks and their quality of life over symptom reduction alone. Furthermore, as required by the *DSM-IV-TR*, either distress or functional impairment is necessary for mental health diagnoses. Thus, consideration of domains of functioning requires additional attention and investigation to ensure that first-line treatments for PTSD are in fact assisting individuals in improving these important areas.

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