Long-Term Functional Outcomes of Women Receiving Cognitive Processing Therapy and Prolonged Exposure

Jennifer Schuster Wachen and Sherlyn Jimenez
National Center for PTSD, VA Boston Healthcare System, Boston, Massachusetts and Boston University

Kamala Smith
National Center for PTSD, VA Boston Healthcare System, Boston, Massachusetts

Patricia A. Resick
National Center for PTSD, VA Boston Healthcare System, Boston, Massachusetts and Boston University

The current study sought to determine whether trauma-focused treatments for posttraumatic stress disorder (PTSD) improve psychosocial functioning outcomes, and whether treatment gains are maintained over a long-term follow-up (LTFU) period (5–10 years). The relationship between symptoms of PTSD and depression and psychosocial functioning also were explored. A sample of 154 female rape victims who received cognitive processing therapy (CPT) or prolonged exposure therapy (PE) were assessed at pretreatment, posttreatment, 9 months, and 5–10 years following treatment. Hierarchical linear modeling demonstrated significant improvements in overall functioning, social/leisure adjustment, family unit adjustment, and economic adjustment in both treatment conditions, with gains maintained over the LTFU. Lower household income at baseline was associated significantly with poorer overall functioning, social/leisure adjustment, and economic adjustment over time. Structural equation modeling revealed that poorer overall functioning at posttreatment was associated significantly with higher levels of depressive symptoms at 9 months, whereas higher levels of depressive symptoms at 9 months were associated significantly with poorer levels of overall functioning at LTFU. Findings suggest that both cognitive and exposure-based treatments for PTSD have the potential to impact functioning outcomes over a long period of time.

Keywords: posttraumatic stress disorder, psychosocial functioning, cognitive processing therapy, prolonged exposure, randomized controlled trial

Individuals with posttraumatic stress disorder (PTSD) experience deficits in a range of psychosocial functioning outcomes, including work, family, finances, and overall daily life (Kessler, 2000; Rapaport, Clary, Fayyad, & Endicott, 2005). Furthermore, it has been shown that some patients with PTSD have specifically severe functioning impairments compared to those suffering from other mood and anxiety disorders (e.g., Rapaport et al., 2005). From the studies that have examined this relationship, a wide array of functional domains have been identified as being impaired in individuals with PTSD, such as marriage and intimate relationships (Jordan et al., 1992; Riggs, Byrne, Weathers, & Litz, 1998), family functioning (Evans, Cowlishaw, Forbes, Parslow, & Lewis, 2010; Evans, Cowlishaw, & Hopwood, 2009; Jordan et al., 1992), friendships (Blanchard, Hickling, Taylor, & Loos, 1995), recreation (Kuhn, Blanchard, & Hickling, 2003), and employment (Savoca & Rosenheck, 2000; Zatzick, Marmar et al., 1997; Zatzick, Weiss et al., 1997). Deficits in psychosocial functioning have been found in individuals with PTSD including survivors of motor vehicle accidents and combat veterans (e.g., Jordan et al., 1992; Kuhn et al., 2003). However, there is little research examining psychosocial functioning in other trauma samples suffering from PTSD (Kuhn et al., 2003).

Although evaluating functional outcomes in relationship to PTSD has received little attention (Sayer, Carlson, & Schnurr, 2011), it is imperative to incorporate such assessments into treatment of individuals suffering from PTSD. Several studies have shown that the impact of the trauma on domains of psychosocial functioning may be even more meaningful to traumatized individuals than the specific symptoms of PTSD and other psychopathology (Galovski, Sobel, Phipps & Resick, 2005; Johnson, Rosenheck, Fontana, & Lubin, 1996). In an examination of impact...
LONG-TERM FUNCTIONING AFTER CPT AND PE

Participants and Procedure

Participants for this study were drawn from a large randomized controlled trial of cognitive–behavioral therapy for PTSD (Resick et al., 2002). The original study compared CPT, PE, and a wait-list condition in an intent-to-treat sample of 171 female survivors of sexual assault (Resick et al., 2002). Participants in the wait-list condition were also randomized into either the CPT or PE conditions to begin following a 6-week waiting period. The original study’s aims, design, and primary outcomes are detailed elsewhere (Resick et al., 2002).

To be included in the study, participants must have endorsed at least one discrete incident of completed rape (oral, anal, or vaginal), although 85% had more than one criminal victimization and 41% also experienced penetrative child sexual abuse. Participants were eligible if they had experienced multiple episodes of physical and/or sexual assault or any other lifetime traumatic events. In addition, participants met criteria for PTSD at the time of the initial assessment, were at least 3-months postrape, and were stable on any psychotropic medications. Women with substance dependence were included if or when they had been abstinent for 6 months. Those with substance abuse were permitted to participate in the study if they agreed to desist in usage during the period of treatment. Exclusion criteria included current psychosis, suicidal intent, active self-harm behavior, current dependence on drugs or alcohol, and illiteracy. In addition, participants could not be in a currently abusive relationship or a situation where they were being stalked.

In the original study (Resick et al., 2002) participants were assessed at baseline, posttreatment, and at 3 and 9 months follow-up. An additional assessment point was added later to examine long-term outcomes of participants 5 to 10 years after treatment (Resick, Williams, Suvak, Monson, & Gradus, 2012). Participants in the current study were 154 out of 171 participants from the parent study who completed questions with regard to functioning.
Measures

Demographics. Demographic characteristics were assessed using questionnaires from the Standardized Trauma Interview, adapted from Resick, Jordan, Girelli, Hutter, and Marhoefer-Dvorak's (1988) treatment study. This structured interview covered topics including demographic information, trauma history, information about the index assault, and treatment history. Variables used in this study included demographics (i.e., age, race, education, income, and marital status), and length of time since worst (index) rape.

Clinician Administered PTSD Scale. The Clinician Administered PTSD Scale (CAPS; Blake et al., 1990, 1995) is a structured clinical interview that rates PTSD symptoms on frequency (never to daily) and intensity (none to extreme), on a scale ranging from 0 to 4. Total CAPS score (sum of frequency and intensity ratings) was used as an assessment of PTSD symptoms at each time point. Alpha coefficient for this sample was .86. With regard to interrater reliability, the correlation between interviewer and rater scores was .97.

Social Adjustment Scale—Self-Report. To examine functioning outcomes, we used the Social Adjustment Scale—Self-Report (SAS-SR; Weissman & Paykel, 1974). This 54-item measure assesses role performance in areas including work, social activities, and family relationships. Participants respond only to the sections of the scale that apply to their current situation, so that nonapplicable items are omitted. Sample items include “Have you been able to do your work in the last two weeks?” and “How many friends have you seen or spoken to on the telephone in the last two weeks?” Participants respond to items on a 5-point scale, with higher values corresponding to poorer functioning. Scores for each role area are calculated by averaging the scores for all answered items in that area; the overall adjustment score is the average of all answered items. In the validation study of this measure, the mean overall adjustment score for female acutely depressed patients was 2.53, whereas a community sample had a mean overall adjustment score of 1.61 (Weissman et al., 1978). In this study, we used the overall adjustment score in addition to the subscales measuring social/leisure (11 items), work (18 items), relationship within family unit (three items), and economic status (single item) adjustment. Because of a small number of participants responding to the subscales of extended family, marital, and parental, these subscales were not included in analyses. The SAS-SR has demonstrated high internal consistency and test–retest reliability (α’s = .74 and .80, respectively; Weissman & Bothwell, 1976). Recent research (Monson et al., 2012) supports good internal consistency of the measure (α = .86 for overall functioning; subscale αs = .47 - .98). Alpha levels in the current sample for the subscales used ranged from .62 to .77.

Beck Depression Inventory. Depressive symptoms were assessed using the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), a 21-item self-report measure. Participants respond to each item on a scale of 0 to 3, with higher scores reflecting greater depressive symptomatology. Split-half reliability reported by Beck et al. (1961) was .93. In this study, the alpha coefficient was .86.

Therapies

CPT (Resick & Schnicke, 1993) is predominantly a cognitive therapy that focuses on challenging beliefs and assumptions related to the trauma, oneself, and the world. PE (Foa et al., 1994) is predominantly an exposure therapy including behavioral and imaginal exposures to the trauma and related trauma reminders. Both active treatments were conducted twice weekly for a total of 13 hours of therapy. PE began with an initial 60-min session, followed by 90-min sessions to enable adequate exposure. PE also required approximately 90 min of homework per day: 45 min of listening to taped exposure sessions and 45 min of in vivo exposure. CPT was administered with ten 1-hr sessions and two 90-min sessions to equate for session time with PE. CPT also involves daily homework, although it required less time allocation (15–30 min per day) than the PE assignments.

Data Analysis

Prior to analysis, data were examined, cleaned and recoded with SPSS 16.0. Independent t-tests and bivariate correlations were used to examine differences and associations in group assignment and baseline characteristics with overall adjustment. Between groups effect sizes (ES) at posttreatment were calculated using Hedges’ g (Hedges & Olkin, 1985), whereas within-group ES were calculated based on Equation 8 for repeated measures ES suggested by Morris and DeShon (2002). ES are characterized in terms of the Improvement Index, defined as Cohen’s U3 index minus 50%, or the expected change in percentile rank following an intervention (Cohen, 1988; Durlak, 2009). As an example, an overall Hedges’ g of 50% would translate to a U3 of 69%, which would indicate an improvement of 19%.

Hierarchical linear modeling was used to examine change over time in the variables of interest using the software package Hierarchical Linear and Non-Linear Modeling (HLM 6.34). HLM allows for use of all available data, accounts for missing within-participant observations, and more precise estimates of individual rate of change over time, and provides a flexible method for modeling linear and polynomial change over time. For our purpose, time was calculated as number of days since baseline assessment with the CPT group coded as 0 and the PE group coded as 1. A two-level (time and group) mixed model of the variables of interest was used to examine differences in linear and curvilinear rates of change (time modeled as the natural log transformation of the number of days since the baseline assessment) between the treatment groups.

To examine the prospective relationships between overall functioning and PTSD symptoms and between overall functioning and depressive symptoms and to infer causal relationships over time, we used a three-wave cross-lagged design structural equation modeling using AMOS 16 with maximum likelihood estimation.
For these analyses, we focused on data from posttreatment, 9-month, and LTFU (M = 6.15 years, range = 4.32–10.38 years). We left out the baseline data from the cross-lag model so we could examine the relationship between the variables of interest without the potentially confounding effects of a robust treatment, which, as expected, differs significantly from posttreatment data. Model fit was assessed using the chi-square goodness of fit statistic, the comparative fit index (CFI; Bentler, 1990), and the root mean square error of approximation (RMSEA; Steiger, 1989). Nonsignificant paths were trimmed from the model. Each variable from the follow-up waves was regressed on both variables from the prior wave. Our theoretical model assumes that prospective relationships between variables are stable over time. Therefore, we imposed equality constraints to the autoregressive paths. Correlations between the residuals of overall functioning and PTSD (or BDI) symptoms within the same assessment period were also estimated. Because household income was significantly associated with overall functioning, we included it in the model as a covariate. However, because treatment group was not significantly associated with any of the variables at any time point, it was trimmed from the model.

Results

Participants in the final sample (N = 154) had a pretreatment mean age of 32.1 (SD = 9.9) and an average of 14.4 (SD = 2.3) years of education. The sample was 71% Caucasian, 25% African American, and 4% of other racial backgrounds. The majority (74%) were single (never married, divorced, separated, or widowed), whereas 25% were married or living with a partner. With regard to household income, 56.4% reported income under $50,000, 10.4% reported income above $50,000, and 33.1% were missing income information. The average number of years since the index assault was 8.1 (SD = 8.3).

At baseline, no significant treatment group differences in any of the functioning domains were found. Participants who completed the SAS-SR were not significantly different on demographic or clinical characteristics from participants who did not complete the SAS-SR. Age, education, and length of time since the index sexual assault also were not significantly correlated with overall functioning. Initial analyses indicated that African American women had significantly poorer overall functioning compared to Caucasian women, t(1146) = 2.35, p = .02, and that participants who reported lower household income had significantly poorer social adjustment (r = −.248, p = .012). However, after controlling for household income, differences in social adjustment between African American and Caucasian women were no longer significant. Because of their significant association with overall functioning, race and household income were used as covariates in subsequent analyses.

Hierarchical Linear Model for Overall Functioning and Selected Subscales

Table 1 presents the means and standard deviations of the functioning variables at each assessment point. Participants exhibited significant improvement in overall functioning over time (b = .0001, t = 2.20, p = .029) with a significantly steeper rate of improvement from pre- to posttreatment (b = −.12, t = −5.64, p < .001) followed by a relatively flat maintenance of gains thereafter. Similarly, results showed significant improvements in social/leisure adjustment over time (b = .0002, t = 2.49, p = .014) with significantly steeper rate of improvement from pre- to post-assessment (b = −.115, t = −5.67, p < .001). Participants demonstrated significant improvement in family unit adjustment over time (b = .0003, t = 3.04, p = .003) with their rate of improvement also significant (b = −.15, t = −3.92, p < .001).

There was no significant linear change in work adjustment over time. However, the rate of change was significant, with a more rapid rate of change in levels of work adjustment from pre- to posttreatment (b = −.095, t = −3.70, p = .002) followed by a less pronounced change. That is, nonlinear change best explained the trajectory of work adjustment because much of the change occurred between baseline and posttreatment assessment. Finally, participants exhibited significant improvement in economic adjustment (sufficient money for financial needs) over time (b = .0003, t = 2.21, p = .028) with a significantly faster rate of improvement from pre- to posttreatment (b = −.190, t = −4.19, p < .001). Holding all variables constant, at baseline, lower household income was significantly associated with poorer economic adjustment (b = −.289, t = −4.44, p < .001), as well as poorer overall functioning (b = .109, t = −3.57, p = .001) and social/leisure adjustment (b = −.107, t = −3.58, p = .001).

No significant treatment group differences were found in any of these functioning domains (indicating that CPT and PE performed similarly), with the exception of economic functioning in which there were significant treatment group differences over time (b = −.0004, t = −1.98, p = .048). Treatment group differences in the rate of economic improvement were also significant, with the PE group exhibiting a slower rate of change than the CPT group and a reversal of some of its gains in economic adjustment at the final assessment period (b = .140, t = 2.27, p = .024).

Treatment effect size at the end of treatment was marginally, but not significantly, larger in the CPT group as compared to the PE group, with generally small effect sizes ranging from .16 to .25 (see Table 2).

Structural Equation Model of Overall Functioning, PTSD Symptoms, and Depressive Symptoms

To examine reciprocal relationships between overall functioning (SAS) and PTSD symptoms (CAPS), and between overall func-

\begin{table}
\centering
\begin{tabular}{|l|c|c|c|}
\hline
Variable & Pretreatment (SD) & Posttreatment (SD) & 9-month follow-up (SD) & LTFU (SD) \\
\hline
Overall social adjustment & 2.52 (.58) & 1.95 (.50)* & 1.88 (.45) & 1.97 (.63) \\
Social/leisure & 2.90 (.65) & 2.15 (.51)* & 2.16 (.50) & 2.33 (.74) \\
Work & 2.16 (.65) & 1.64 (.53)* & 1.62 (.33) & 1.53 (.52) \\
Family unit & 2.66 (.94) & 1.91 (.72)* & 1.80 (.59) & 2.04 (.83) \\
Economic & 2.62 (1.42) & 2.07 (1.15)* & 1.87 (1.00) & 2.03 (1.26) \\
\hline
\end{tabular}
\caption{Means and Standard Deviations of Functioning Variables As Measured by the Social Adjustment Scale—Self-Report}
\end{table}

\textit{Note}. LTFU = long-term follow-up. Lower scores reflect improved social adjustment. *Comparison between pretreatment and posttreatment means, p < .05.
Table 2

Post-Treatment and Long-Term Follow-Up Effect Sizes of Social Adjustment Domains

<table>
<thead>
<tr>
<th>Variable</th>
<th>Posttreatment</th>
<th>LTFU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Effect size (CI)</td>
<td>Improvement index</td>
</tr>
<tr>
<td>Overall social adjustment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPT</td>
<td>0.97 (0.83, 1.11)</td>
<td>33.4%</td>
</tr>
<tr>
<td>PE</td>
<td>0.96 (0.83, 1.10)</td>
<td>33.2%</td>
</tr>
<tr>
<td>Between-group difference</td>
<td>0.16 (−0.23, .55)</td>
<td></td>
</tr>
<tr>
<td>Social leisure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPT</td>
<td>1.32 (1.17, 1.46)</td>
<td>40.7%</td>
</tr>
<tr>
<td>PE</td>
<td>1.09 (0.94, 1.23)</td>
<td>36.2%</td>
</tr>
<tr>
<td>Between-group difference</td>
<td>−0.19 (−0.58, 0.20)</td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPT</td>
<td>0.87 (0.71, 1.00)</td>
<td>30.8%</td>
</tr>
<tr>
<td>PE</td>
<td>0.74 (0.59, 0.91)</td>
<td>27.0%</td>
</tr>
<tr>
<td>Between-group difference</td>
<td>0.19 (−0.22, 0.60)</td>
<td></td>
</tr>
<tr>
<td>Family unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPT</td>
<td>0.78 (0.52, 1.01)</td>
<td>28.2%</td>
</tr>
<tr>
<td>PE</td>
<td>0.72 (0.48, 0.94)</td>
<td>26.4%</td>
</tr>
<tr>
<td>Between-group difference</td>
<td>0.22 (−0.23, 0.68)</td>
<td></td>
</tr>
<tr>
<td>Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPT</td>
<td>0.58 (0.25, 0.90)</td>
<td>21.9%</td>
</tr>
<tr>
<td>PE</td>
<td>0.24 (−0.07, 0.55)</td>
<td>9.5%</td>
</tr>
<tr>
<td>Between-group difference</td>
<td>0.25 (−0.14, 0.64)</td>
<td></td>
</tr>
</tbody>
</table>

Note. LTFU = long term follow-up; CI = confidence interval. Between-group effect sizes computed as Hedge’s g (with confidence intervals) for cognitive processing therapy (CPT) versus prolonged exposure therapy (PE). Within group effect sizes computed as repeated measures effect size. Improvement index computed from Cohen’s U3 minus 50.

The final trimmed cross-lagged model for overall functioning and PTSD symptoms fit the data well, $\chi^2(14) = 14.50, p = .413, CFI = .997, RMSEA = .014, 90\% CI = 0.00–0.076, PCLOSE = .763$. Lower household income at baseline was associated with lower overall functioning at posttreatment, ($\beta = −.26, p = .013$) and at 9-months follow up, ($\beta = −.24, p = .001$). Household income at baseline was inversely related to PTSD symptoms at LTFU, ($\beta = −.19, p = .017$). PTSD symptoms at posttreatment were positively associated with PTSD symptoms at 9 months ($\beta = .36–.82$).

Table 3

Means, Standard Deviations, and Intercorrelations Among SAS, PTSD, and BDI Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>SAS Pre</th>
<th>SAS Post</th>
<th>SAS 9M</th>
<th>SAS LTFU</th>
<th>PTSD Pre</th>
<th>PTSD Post</th>
<th>PTSD 9M</th>
<th>PTSD LTFU</th>
<th>BDI Pre</th>
<th>BDI Post</th>
<th>BDI 9M</th>
<th>BDI LTFU</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>2.52</td>
<td>0.58</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Post</td>
<td>1.96</td>
<td>0.51</td>
<td>.45**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9M</td>
<td>1.91</td>
<td>0.49</td>
<td>.42**</td>
<td>.60**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>LTFU</td>
<td>1.99</td>
<td>0.64</td>
<td>.58**</td>
<td>.49**</td>
<td>.47**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>CAPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>74.27</td>
<td>19.28</td>
<td>.39**</td>
<td>.18</td>
<td>.16</td>
<td>.30**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Post</td>
<td>23.67</td>
<td>19.35</td>
<td>.01</td>
<td>.36**</td>
<td>.15</td>
<td>.13</td>
<td>.22</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9M</td>
<td>24.41</td>
<td>20.08</td>
<td>.11</td>
<td>.24**</td>
<td>.57**</td>
<td>.31**</td>
<td>.29**</td>
<td>.52**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>LTFU</td>
<td>25.95</td>
<td>24.64</td>
<td>.30**</td>
<td>.32**</td>
<td>.34**</td>
<td>.59**</td>
<td>.33**</td>
<td>.25**</td>
<td>.54**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>BDI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>23.44</td>
<td>9.39</td>
<td>.58**</td>
<td>.27**</td>
<td>.24</td>
<td>.41**</td>
<td>.56**</td>
<td>.11</td>
<td>.02</td>
<td>.29**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Post</td>
<td>8.89</td>
<td>7.88</td>
<td>.13</td>
<td>.62**</td>
<td>.49**</td>
<td>.26</td>
<td>.25</td>
<td>.71**</td>
<td>.47**</td>
<td>.21</td>
<td>.27**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9M</td>
<td>8.99</td>
<td>8.65</td>
<td>.28**</td>
<td>.50**</td>
<td>.78</td>
<td>.54**</td>
<td>.22</td>
<td>.30**</td>
<td>.75**</td>
<td>.46**</td>
<td>.17</td>
<td>.55**</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>LTFU</td>
<td>10.71</td>
<td>11.93</td>
<td>.43**</td>
<td>.50**</td>
<td>.41**</td>
<td>.82**</td>
<td>.35</td>
<td>.25</td>
<td>.28**</td>
<td>.68**</td>
<td>.45**</td>
<td>.37**</td>
<td>.54**</td>
<td>—</td>
</tr>
</tbody>
</table>

Note. SAS = Social Adjustment Scale; PTSD = posttraumatic stress disorder; CAPS = Clinician Administered PTSD Scale; BDI = Beck Depression Inventory; pre- = pretreatment; post = posttreatment; 9M = 9 month; LTFU = LTFU = long term follow-up.

$p < .05$.  **$p < .01$.**
.25, $p < .001$), which in turn was positively associated with PTSD symptoms at LTFU ($\beta = .64, p < .001$). Overall functioning at posttreatment was positively associated with overall functioning at 9 months ($\beta = .55, p < .001$), whereas overall functioning at 9 months was positively associated with overall functioning at LTFU ($\beta = .67, p < .001$). Level of overall functioning at posttreatment was not significantly related to posttraumatic symptoms at 9 months or LTFU.

The final trimmed cross-lagged model for overall functioning and depressive symptoms fit the data well, $\chi^2(15) = 17.00, p = .254$, CFI = .990, RMSEA = .036, 90% CI = 0.00 – .086, PCLOSE = .621. Household income at baseline was negatively associated with overall functioning at posttreatment ($\beta = -.25, p = .005$) and at LTFU ($\beta = -.14, p = .027$). Depressive symptoms at posttreatment were positively associated with depressive symptoms at 9 months ($\beta = .25, p = .012$), which in turn were positively associated with depressive symptoms at LTFU ($\beta = .75, p < .001$). Overall functioning at posttreatment was significantly positively associated with overall functioning at 9 months ($\beta = .60, p < .001$) whereas overall functioning at 9 months was not significantly associated with overall functioning at LTFU ($\beta = .22, p = .135$). Given that higher values on the SAS correspond to poorer adjustment, level of overall functioning at posttreatment was positively associated with levels of depressive symptoms at 9-months follow-up ($\beta = .40, p < .001$). In turn, levels of depressive symptoms at 9-months follow-up were positively associated with levels of overall functioning at LTFU ($\beta = .48, p = .004$).

**Discussion**

The present study was the first to examine a range of psychosocial functioning outcomes following treatment for PTSD over a long-term follow-up period. Results indicated significant improvement in overall functioning following CPT and PE treatment for PTSD. Significant improvement in the functioning domains of social/leisure, family unit, and economic functioning were also shown. These findings are consistent with previous research that has shown short-term improvements in functioning following treatment for PTSD (e.g., Foa et al., 2005; Galovski et al., 2005; Monson et al., 2012) and extend the literature by demonstrating that gains may be maintained over many years. The absence of differences in functioning outcomes (with the exception of economic adjustment) between the CPT and PE conditions suggests that both cognitive and exposure-based treatments for PTSD have the potential to impact outcomes beyond symptoms of PTSD.

This study also sought to examine the relationship between overall functioning and PTSD and depressive symptoms over time through use of cross-lagged structural equation modeling. The results failed to find a relationship between level of overall functioning at posttreatment and PTSD symptoms at 9 months or LTFU. In addition, levels of PTSD and depressive symptoms at posttreatment were not significantly associated with levels of overall functioning at 9 months. Although these results are contrary to our expectations, they are consistent with prior research that found initial PTSD symptom change to be unrelated to later changes in quality of life (Schnurr, Hayes, Lunney, McFall, & Uddo, 2006). However, for depressive symptoms, poorer overall functioning at posttreatment was significantly associated with higher levels of depressive symptoms at 9 months, whereas higher levels of depressive symptoms at 9 months were significantly associated with poorer levels of overall functioning at LTFU. These findings suggest that the relationship between depression and functioning may be more intertwined than PTSD and functioning, and that the improvements in functioning demonstrated by the treatments may be driven by improvements in depressive symptomatology. However, if functioning continues to be poor, there is greater likelihood of depression over the long term. Future studies examining the interrelationship between PTSD, depression, and functioning should further elucidate this issue.

Our results indicate that at baseline, overall functioning was significantly associated with household income. Baseline household income was also found to be significantly associated with posttreatment overall functioning outcomes, as well as PTSD severity at LTFU. These results are consistent with previous studies that have shown lower socioeconomic status to be associated with mental health symptoms and PTSD severity to be associated with work-related functional outcomes (Savoca & Rosenheck, 2000). Less is known about the direct long-term effects of income on PTSD and psychosocial functioning outcomes following PTSD treatment because generally this factor is not examined explicitly. Our findings argue for the importance of including socioeconomic status variables as a unique predictor of PTSD and functioning outcomes posttreatment. Notably, data on household income were missing on one third of the participants in this study, and the economic functioning outcome was assessed by only a single item, suggesting these results should be replicated in a sample with more extensive economic data. Furthermore, the significant relationship between socioeconomic status and functional outcomes suggests that in treatment planning for individuals suffering from PTSD, it may be beneficial to include interventions aimed at improving their economic status, such as vocational rehabilitation or educational initiatives. Although this study did not examine changes in income specifically as a result of treatment, it is possible that successful treatment of PTSD symptoms might make employment and educational goals more attainable.

These findings support that to fully assess the impact of traumatic exposure, psychosocial functioning should be included in standard evaluations of individuals with PTSD (Sayer et al., 2011) and suggest that functioning should be a primary outcome of interest in treatment trials for PTSD. However, clinical instruments for assessing the complex domains of overall functioning have been lacking. No “gold standard” exists for the assessment of psychosocial functioning in psychiatric disorders (Frueh, Turner, Beidel, & Cahill, 2001), although a new measure has been developed recently (Marx et al., 2009). A comprehensive evaluation of overall functioning should include multiple domains and incorporate a variety of assessment strategies, including self-report, clinician interview, patient ratings, and behavioral measures (Frueh et al., 2001). Collateral information gathered from friends, family, coworkers, and supervisors also may provide a more complete picture of functional status (Rodriguez et al., 2012).

Several limitations of this study should be noted. Because psychosocial functioning was not a primary outcome of interest in the original treatment study, a comprehensive assessment of these outcomes as suggested above was not conducted, and measurement of functioning relied on a single self-report instrument. In addition, there was a small sample responding to specific subscales...
of the SAS (i.e., extended family, marital, and parental) that prevented examination of functioning in these areas, although the lack of relationships may be meaningful for this population of victims of interpersonal violence. Finally, findings for this female sample of rape victims may not be generalizable to men or other trauma types. Future research focusing on functioning as a primary outcome using more diverse samples should ensure more complete and generalizable data. These studies should include objective and subjective measures of psychosocial functioning measured at frequent intervals during treatment to better determine the relationships between symptoms and quality of life outcomes.

Future research also should continue to compare deficits in different domains of psychosocial functioning among individuals with PTSD and those with other mental health conditions in order to elucidate the difficulties in functioning specifically related to PTSD. For example, a meta-analysis of quality of life in anxiety disorders (Olatunji, Cisler, & Tolin, 2007) found that impairments in some domains might be different across anxiety disorders. Examination of potential mediators and moderators of the impairments in particular domains is also important, because these variables then may become targets for therapeutic interventions. Notably, the treatments in this study did not seek to explicitly improve psychosocial functioning, yet benefits in these domains were shown. Future studies should further evaluate whether existing interventions are effective for improving psychosocial functioning. If so, determining which components of these treatments contribute to improved outcomes in specific domains will be important for developing new therapies targeting enhanced functioning and quality of life that may confer additional benefits beyond standard PTSD treatments. For instance, adding a social skills component to a trauma-focused treatment (Beidel et al., 2011) or providing additional services such as vocational support may enhance the benefits of treatment for PTSD.

References


Received March 19, 2013

Revision received October 31, 2013

Accepted December 2, 2013