Social engagement, self-efficacy, and posttraumatic stress symptoms across 6 months of psychotherapy

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Abstract
Objective: The current study was conducted in a naturalistic treatment setting to examine whether and how perceptions about social engagement, trauma coping self-efficacy, and posttraumatic stress symptoms (PTS) influence one another across 6 months of psychotherapy for trauma survivors.
Method: The sample included 183 clients who reported exposure to traumatic events and significant PTS (PCL-5 ≥ 33). Participants (M_age = 37.8, 53.6% female) completed surveys at intake, 3 months, and 6 months into treatment. A cross-lagged panel analysis was used to test the relationships among perceived social engagement, coping self-efficacy, and PTS across three assessment points.
Results: PTS at 3-months was a mediator in the relationship between intake perceived social engagement and 6-month coping self-efficacy and between intake perceived social engagement and 6-month perceived social engagement.
Conclusions: PTS several months into treatment may serve as a mechanism between intake perceived social engagement and functional outcomes such as coping self-efficacy.

Keywords
- coping self-efficacy
- functional outcomes
- posttraumatic stress
- social engagement
- social functioning
- treatment
Clinical outcome research on evidence-based treatments for trauma has been critiqued for not reflecting real-world therapy settings (Carey & Stiles, 2016; Lundh, Petersson, & Wolgast, 2016). The purpose of this investigation was to test theoretically important mechanisms of change as targets for treatment (see Kazdin, 2007) and how these mechanisms function in a noncontrolled naturalistic treatment setting. Social cognitive theory identifies important mechanisms of trauma adaptation involving the interplay of self-efficacy, social environments, and psychological distress (Bandura, 1998) offering a useful framework to understand real-world trauma therapy response.

1.1 Proposed social cognitive mechanisms and psychological distress in trauma treatment

Benight and Bandura (2004) argued that trauma adaptation is a function of self-appraisals of one's coping capacity interacting with social environmental conditions and behavior. Referred to originally by Bandura (1997) as triadic reciprocal determinism, each of these factors influences the other in a bidirectional fashion to adapt to ever-changing posttraumatic recovery demands. Indeed, self-regulation includes self-evaluation of one's successes or failures to attain desired outcomes (Bandura, 1997; Benight, 2012). Posttraumatic distress requires individuals to deploy a multitude of coping strategies, challenging coping competency appraisals and straining social connections to provide support in a time of extraordinary need. Appraisals about coping capability and social engagement capability interact to influence posttraumatic goal setting, behaviors, and symptom expression (Bandura, 1997; Benight & Bandura, 2004). Coping self-efficacy, trauma coping self-efficacy in particular, is conceptualized as a central mechanism of trauma recovery (Benight & Bandura, 2004). Trauma coping self-efficacy refers to a person's perception of their ability to manage (i.e., cope with) trauma recovery demands. In one meta-analysis, the effect sizes (r) associated with coping self-efficacy predicting posttraumatic mental health outcomes ranged from −.36 to −.77 in cross-sectional models, and from −.55 to −.62 in longitudinal models (Luszczynska, Benight, & Cieslak, 2009). A multitude of studies has demonstrated that changes in self-efficacy perceptions are instrumental in positive therapeutic responses across a variety of settings including HIV group therapy (Chesney, Chambers, Taylor, Johnson, & Folkman, 2003), web-based trauma recovery (Benight, Shoji, Yeager, Weisman, & Boult, 2018), smoking cessation (Taniguchi et al., 2018), cognitive behavioral therapy (CBT) for panic (Fentz et al., 2013), and agoraphobia (Breuninger, Tuschen-Caffier, & Svaldi, 2019).

Such coping self-appraisals occur in dynamic social environments, with evidence that having higher coping self-efficacy facilitates engagement in supportive social environments (Schwarzer & Knoll, 2007), whereas having lower coping self-efficacy often prompts disengagement (Bandura, 1997). The relationship between coping self-efficacy, social environments, and psychological distress is essential to understanding trauma adaptation, especially given the negative social cognitive sequelae (social exclusion, isolation, and cynicism) that struggling trauma survivors often experience (see Nietlisbach & Maercker, 2009; Smith, Weisenbach, & Jones, 2018).

1.2 Social functioning and the role of perceived social engagement

Social functioning serves as a foundation of human thriving, meaning, and health (Ford & Smith, 2007; Holt-Lunstad, Robles, & Sbarra, 2017). The literature typically differentiates two latent components: structural (quantity of relationships, diversity of relationships types, frequency of interactions, and embeddedness within networks) and functional (perceptions of available support and support received from others; see Cohen, 2004; Eisenberger, 2013; Kaniasty & Norris, 2009; Schwarzer & Knoll, 2007). The trauma literature has overwhelmingly operationalized functional support in the form of perceived support that is available from others (e.g., Brewin, Andrews & Valentine, 2000). Evidence supports greater positive change in perceived support is related to lower PTS severity in trauma-focused treatment (Lord et al., 2019; Price, Gros, Strachan, Ruggiero, & Acierno, 2013; Thrasher, Power, Morant, Marks, &
Dalgleish, 2010). However, our ability to apply knowledge of social functioning in posttraumatic interventions has been limited by how we have conceptualized and operationalized the construct.

Conceptualizing social functioning as “perceived social engagement” may promote our ability to target social functioning in trauma treatment. Perceived social engagement refers to subjective self-perceptions about one’s ability to participate in the activities and roles that comprise meaningful engagement in social relationships (Cella et al., 2010). Perceived social engagement is fundamentally unique in that it serves as a self-perception of social agency separate from the uncontrollable actions of others (differentiating this concept from perceived social support). Indeed, self-perceptions about social engagement and perceived social support from others are related yet distinct constructs (e.g., r = .55, Kuwert, Knaevelsrud, & Pietrzak, 2014). Importantly, self-perceptions reside at the core of human empowerment and agency (Bandura, 1997; Benight, 2012).

By distinguishing perceived social engagement from other forms of social functioning (e.g., perceived social support), a useful target for intervention and empowerment may emerge. For example, through fostering social behavior activation that targets social values and goals (e.g., to feel more socially connected, to contribute more in relationships, to be more emotionally available to an intimate partner), patients become empowered within their social world. Rather than reacting and isolating in response to uncontrollable negative social interactions that prevent further social engagement, patients can identify more effective ways to reach out to social environments (see Smith et al., 2018).

Social engagement can become the foundation to nurture coping self-efficacy with the sense of security in the posttraumatic environment, and conversely, coping self-efficacy may facilitate this process by giving individuals confidence to explore their re-engagement in their social roles and activities. This underscores the bidirectionality of these two constructs. Determining how social engagement, coping self-efficacy, and PTS interact is essential for understanding these possible mechanisms of change within a therapeutic environment.

1.3 | Modeling how perceived social functioning, coping self-efficacy, and posttraumatic stress symptoms work in concert

1.3.1 | Social erosion and social causation

To understand how social environments and PTS directly relate, two primary hypotheses have emerged: social erosion and social causation (Shallcross, Arbisi, Polusny, Kramer, & Erbes, 2016). Social erosion describes how symptoms of PTS lead to a poverty of social resources via interpersonal dysfunction, whereas social causation examines the causal effect that social resources exert on PTS and trauma recovery. Evidence supports both social erosion and social causation (Evans, Cowlishaw, & Hopwood, 2009; Freedman, Gilad, Ankri, Roziner, & Shalev, 2015; King, Taft, King, Hammond, & Stone, 2006), implying a simultaneously complex reality that supports ecologically valid clinical insights: (1) social resources and posttraumatic recovery factors (e.g., PTS) likely influence one another in a bidirectional manner over time (see Shallcross et al., 2016), and (2) healthy use of social resources is a crucial part of regaining a foothold to recover after trauma. Social erosion and causation questions have yet to incorporate a measure of perceived social engagement, constituting a first focal point of the current study.

1.3.2 | Enabling and cultivation

To understand how social environments, cognitive appraisals, and posttraumatic stress adaptation work in concert, enabling and cultivation frameworks have arisen out of social cognitive theory (Schwarzer & Knoll, 2007). In the enabling pathway, social resources facilitate trauma adaptation by boosting coping self-efficacy. In contrast, the cultivation pathway posits that stronger coping self-efficacy facilitates recovery by more effective utilization of one’s social resources. Evidence for both models exists in diverse contexts of stress-related outcomes. For example,
evidence supports the enabling model in mass violence survivors and combat veterans (Smith, Benight, & Cieslak, 2013; Smith, Donlon, Anderson, Hughes, & Jones, 2015), and the cultivation model emerged among mental health professionals and cancer patients (Hohl et al., 2016; Shoji et al., 2014). This literature, however, has not specifically incorporated perceived social engagement, as these studies have largely operationalized social functioning as perceived social support. Further, the literature examining the cultivation or enabling model has not incorporated tests of how PTS may play an influential predictive role versus being the predominant outcome variable.

Collectively, the previous research on social functioning, coping self-efficacy appraisals, and PTS suggests the bidirectional influence. It also points toward important causal influence related to changes in self-efficacy and social support perception in positive responses to trauma treatment. The present investigation advances this literature by testing these key variables within a naturalistic trauma treatment setting by modeling possible causal bi-directionality across three time points in a cross-lagged panel model.

1.4 | The current study

The current study was conducted in a naturalistic trauma treatment setting to examine whether and how perceived social engagement, coping self-efficacy, and PTS influence one another across 6 months of psychotherapy for trauma survivors. Six factors drive the motives for the current study, hypotheses, and analytic strategy: (1) the need to identify mechanisms of change (Kazdin, 2007) in naturalistic treatment settings; (2) the potential importance of perceived social engagement and coping self-efficacy in trauma treatment (Bandura, 1997; Benight & Bandura, 2004); (3) competing support for social causation and coping self-efficacy models, without knowledge about the role of perceived social engagement; (4) limited literature examining the role of social perceptual factors in response to trauma-focused therapy (Lord et al., 2019; Price et al., 2013; Thrasher et al., 2010) with no such studies in naturalistic trauma treatment settings and that specifically examined perceived social engagement; (5) empirical support for both enabling and cultivation models, and; (6) no treatment research that examines the interplay of all three variables in concert. We used a cross-lagged panel model approach to examine directional effects of the relationship between perceived social engagement and PTS (i.e., social causation and social erosion models; alternative Hypotheses 1 and 2), and directional effects to examine the relationships among perceived social engagement, coping self-efficacy, and PTS (cultivation and enabling models; alternative Hypotheses 3 and 4). The hypotheses for this study were developed based on reciprocal relationships outlined by Bandura (1997).

H1 (social causation model): perceived social engagement at an earlier time point in therapy would be negatively associated with PTS at a later time point.

H2 (social erosion model): PTS at an earlier time point would be negatively associated with perceived social engagement at a later time point.

H3 (cultivation model): coping self-efficacy at an earlier time point would be positively associated with perceived social engagement at a later time point.

H4 (enabling model): perceived social engagement at an earlier time point would be positively associated with coping self-efficacy at a later time point.

2 | METHOD

2.1 | Participants

Data were collected from client files between 2014 and 2017. Participants were clients from the local community who received therapy at a behavioral healthcare specialty clinic serving survivors of psychological trauma housed
at a medium-sized university in the Mountain region of the United States. This clinic specializes in helping people recover from challenges associated with trauma and typically does not serve local community clients with more general psychological issues unrelated to trauma. Inclusion criteria for this sample included clients who endorsed a history of trauma, significant PTS severity (PCL-5 score ≥ 33; Bovin et al., 2016), and completed the intake and 3-month follow-up assessments. A total of 629 clients completed the intake assessment, 265 clients completed the 3-month assessment, and 155 clients completed the 6-month assessment. Out of 265 participants who completed the first two assessments, 183 (69.1%) had initial PCL-5 scores greater than or equal to 33, which indicated a probable posttraumatic stress disorder (PTSD) diagnosis (N at the 6-month assessment = 104). Thus, all final analyses included these 183 participants (see Table 1 for demographic characteristics). There were 429 clients with intake PCL-5 scores ≥ 33 among 629 clients who completed the intake assessment. We used a full information maximum-likelihood (FIML) method to handle missing data in a cross-lagged analysis. Newman (2003) demonstrated that errors in coefficients in a cross-lagged analysis became pronounced when missing data exceeded 50% of all data. Thus, we selected 183 participants as the final sample to mitigate this bias due to a large amount of missing data.

Participants were between 17 and 78 years of age (M age = 37.77; SD = 13.62) at the intake assessment. The sample was 75.1% White and 53.6% female. Thirty-five percent of the sample had a bachelor’s degree or higher, and 68.9% had a military background. Table 2 displays the mental health diagnoses that therapists assigned for these clients. Treatment approaches used by clinicians during the first 3 months of treatment included: CBT (74.3%), dialectical behavior therapy (36.1%), eye movement desensitization and reprocessing therapy (27.3%), and cognitive processing therapy (CPT; 14.8%). CBTs that were not CPT were primarily trauma-focused depending on the referral question. “Trauma-focused” could include the use of the trauma account in therapy and/or focus on trauma-specific cognitions. Some participants received more than one type of therapy (see Table 3 for a list of the treatment). Of note, for clients who received manualized EBTs for PTSD, they often received skills training before trauma processing, depending on the complexity of their history and presenting issues. Additionally, if PTSD symptom improvement was not observed for one modality, other therapies were introduced. Most of clients (96.2%) analyzed in the present study received more than one type of therapy (see Table 3 for a list of the treatment). The mean number of therapy sessions was 24.86 (SD = 19.24) and is representative of the complexity of cases seen in this specialty trauma clinic.

2.2 | Measurements

Data were collected using self-report questionnaires for all variables including the demographic and clinical information. Participants responded to queries about their demographics including age, gender, racial category, highest education level, partner status, employment status, annual household income, head injury history, and military status. Clinical information including discharge status, diagnoses, and types of treatments was reported by the therapists.

2.2.1 | Perceived social engagement

Perceived social engagement was assessed using Ability to Participate in Social Roles and Activities-Short Form 8a (Cella et al., 2010) from the Patient-Reported Outcomes Measurement Information System (PROMIS) Item Bank v2.0, an instrument menu designed to evaluate physical, mental, and social health based on patient-report outcomes. The PROMIS Ability to Participate in Social Roles and Activities measures the perceived ability to take part in social activities via eight items on a 5-point scale, ranging from 1 (always) to 5 (never). The total score was used, with higher scores representing better abilities to perform in social roles and activities. Sample items include
TABLE 1  Demographic characteristics of the study participants (N = 183)

<table>
<thead>
<tr>
<th>Variable</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>75.1</td>
<td>136</td>
</tr>
<tr>
<td>Black/African American</td>
<td>2.2</td>
<td>4</td>
</tr>
<tr>
<td>Native Hawaiian or other Pacific Islander</td>
<td>4.4</td>
<td>8</td>
</tr>
<tr>
<td>Asian</td>
<td>2.2</td>
<td>4</td>
</tr>
<tr>
<td>More than one race</td>
<td>6.6</td>
<td>12</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>6.1</td>
<td>11</td>
</tr>
<tr>
<td>Native American/Alaskan native</td>
<td>3.3</td>
<td>6</td>
</tr>
<tr>
<td>Highest education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate/professional degree</td>
<td>12.4</td>
<td>22</td>
</tr>
<tr>
<td>Bachelors</td>
<td>23.0</td>
<td>41</td>
</tr>
<tr>
<td>Some college</td>
<td>42.7</td>
<td>76</td>
</tr>
<tr>
<td>High school/GED</td>
<td>18.0</td>
<td>32</td>
</tr>
<tr>
<td>Less than high school</td>
<td>3.9</td>
<td>7</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>32.2</td>
<td>59</td>
</tr>
<tr>
<td>Part time</td>
<td>10.4</td>
<td>19</td>
</tr>
<tr>
<td>Retired</td>
<td>20.8</td>
<td>38</td>
</tr>
<tr>
<td>Not employed</td>
<td>36.6</td>
<td>67</td>
</tr>
<tr>
<td>Partner status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>18.1</td>
<td>33</td>
</tr>
<tr>
<td>Married</td>
<td>47.3</td>
<td>86</td>
</tr>
<tr>
<td>Separated</td>
<td>7.1</td>
<td>13</td>
</tr>
<tr>
<td>Divorced</td>
<td>12.6</td>
<td>23</td>
</tr>
<tr>
<td>Widowed</td>
<td>1.6</td>
<td>3</td>
</tr>
<tr>
<td>Committed relationship</td>
<td>7.7</td>
<td>14</td>
</tr>
<tr>
<td>Annual household income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$0–15,000</td>
<td>20.7</td>
<td>35</td>
</tr>
<tr>
<td>$15,001–45,000</td>
<td>36.1</td>
<td>61</td>
</tr>
<tr>
<td>$45,001–75,000</td>
<td>29.0</td>
<td>49</td>
</tr>
<tr>
<td>$75,001–above</td>
<td>14.2</td>
<td>24</td>
</tr>
<tr>
<td>$45,001–75,000</td>
<td>29.0</td>
<td>49</td>
</tr>
<tr>
<td>$75,001–above</td>
<td>14.2</td>
<td>24</td>
</tr>
<tr>
<td>Military status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active duty service member</td>
<td>12.6</td>
<td>23</td>
</tr>
<tr>
<td>Retired service member</td>
<td>32.8</td>
<td>60</td>
</tr>
<tr>
<td>Active duty family member</td>
<td>6.0</td>
<td>11</td>
</tr>
<tr>
<td>Retired family member</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>Reserves</td>
<td>2.7</td>
<td>5</td>
</tr>
<tr>
<td>Former military</td>
<td>20.8</td>
<td>38</td>
</tr>
<tr>
<td>Former military family member</td>
<td>2.7</td>
<td>5</td>
</tr>
<tr>
<td>No military background</td>
<td>16.4</td>
<td>30</td>
</tr>
</tbody>
</table>
I have to limit the things I do for fun with others, "I have to limit my regular activities with friends," and "I have to limit my regular family activities." Prior research has demonstrated good construct validity and reliability. Internal consistency for the current study was good, with Cronbach's α coefficients as follows: α = .93 (intake assessment), α = .95 (3-month assessment), and α = .95 (6-month assessment).

### 2.2.2 Trauma coping self-efficacy

Coping self-efficacy for trauma was measured using a 10-item scale designed to capture the self-perception of coping self-efficacy in dealing with trauma recovery (see Benight et al., 2015, for the validated 9-item version). One item was added in the clinic due to its clinical utility ("have conversations about what happened"). Respondents answer the items utilizing a 7-point scale, ranging from 1 (Not at all capable) to 7 (Very capable). The mean score was used, and higher scores represent higher self-efficacy to cope with one's trauma. Sample items include "deal with my emotions (anger, sadness, depression, anxiety) since the trauma," "get my life back to normal," and "have conversations about what happened." Convergent validity was supported with significant correlations with anticipated constructs (e.g., PTS; Benight et al., 2015). Internal consistency for the current study was good, with Cronbach's α coefficients as follows: α = .90 (intake assessment), α = .93 (3-month assessment), and α = 0.94 (6-month assessment).

### 2.2.3 Posttraumatic stress symptoms

Posttraumatic stress symptoms severity was assessed using the PTSD Checklist for DSM-5 (PCL-5) designed to measure symptoms of PTSD based on DSM-5 (American Psychiatric Association, 2013; Weathers et al., 2013). The PCL-5 comprises 20 items on a 5-point scale ranging from 0 (Not at all) to 4 (Extremely). The total score was used, and higher scores indicate higher posttraumatic distress. Sample items include "Repeated, disturbing, and unwanted memories of the stressful experience," "Loss of interest in activities that you used to enjoy," and "Feeling jumpy or
easily startled.” Previous research demonstrated good internal consistency, test–retest reliability, convergence validity, and discriminant validity (Bovin et al., 2016). Internal consistency for the current study was good, with Cronbach’s α coefficients as follows: α = 0.94 (intake assessment), α = 0.96 (3-month assessment), and α = 0.96 (6-month assessment).

### 2.3 | Procedures

Because the data were collected for quality assurance purposes for the clinic, an official informed consent for research was not obtained. Clients were able to opt out of the survey without any penalty. Approvals from the Institutional Review Board at the last authors’ institution were obtained to analyze deidentified data. Clients filled out the surveys before their therapy sessions every 3 months to inform clinical services.

### 2.4 | Data analysis

We conducted a cross-lagged panel analysis to test whether PTS severity, coping self-efficacy, and perceived social engagement would be associated with each other over time using Mplus version 8.3 (Muthén & Muthén, 2017). Missing data were handled using a FIML method in Mplus. Figure 1 shows the proposed cross-lagged panel model.

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**Table 3** Type of treatment at 3-month follow-up

<table>
<thead>
<tr>
<th>Treatment</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive behavioral therapy</td>
<td>74.3</td>
<td>136</td>
</tr>
<tr>
<td>Dialectical behavior therapy</td>
<td>36.1</td>
<td>66</td>
</tr>
<tr>
<td>Eye movement desensitization and reprocessing therapy</td>
<td>27.3</td>
<td>50</td>
</tr>
<tr>
<td>Cognitive processing therapy</td>
<td>14.8</td>
<td>27</td>
</tr>
<tr>
<td>Client-centered</td>
<td>8.2</td>
<td>15</td>
</tr>
<tr>
<td>Mindfulness/skill coaching</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>Heartmath</td>
<td>4.4</td>
<td>8</td>
</tr>
<tr>
<td>Relaxation techniques</td>
<td>2.7</td>
<td>5</td>
</tr>
<tr>
<td>Supportive psychotherapy</td>
<td>2.7</td>
<td>5</td>
</tr>
<tr>
<td>Family system intervention</td>
<td>2.2</td>
<td>4</td>
</tr>
<tr>
<td>Psychoeducation</td>
<td>2.2</td>
<td>4</td>
</tr>
<tr>
<td>Existential</td>
<td>2.2</td>
<td>4</td>
</tr>
<tr>
<td>Coping and communication skills</td>
<td>1.6</td>
<td>3</td>
</tr>
<tr>
<td>Psychodynamic therapy</td>
<td>1.6</td>
<td>3</td>
</tr>
<tr>
<td>Prolonged exposure</td>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>Solution focused brief therapy</td>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>Acceptance and commitment techniques</td>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>Creative therapies</td>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>Other trauma processing protocols</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: Therapists usually reported multiple treatment types for a client.*
we tested. The hypothesized model included crossed-associations between each variable including intake coping self-efficacy, intake PTS, intake perceived social engagement with 3-month coping self-efficacy, 3-month PTS, and 3-month perceived social engagement (see Figure 1 for the proposed model). The model also included crossed-associations between the same variables at 3 and 6 months. Coping self-efficacy, PTS, and perceived social engagement at the same time points were assumed to covary. Demographic variables such as age, gender, education, annual income, and head injury history were included in the model as covariates. The covariates were loaded on each variable at each time point. The hypothesized model was estimated using maximum-likelihood procedure.

The fit indices for testing the model-data fit included root mean square error of approximation (RMSEA; cutoff < 0.10; Browne & Cudeck, 1993), comparative fit index (CFI; cutoff > 0.90; Hu & Bentler, 1999), and standardized root mean residual (SRMR; cutoff < 0.08; Hu & Bentler, 1999). If the model-data fit was not adequate based on these fit indices, we constrained the association with the smallest standardized coefficient to zero for each endogenous variable to modify the model. Indirect effects between the intake variables and the 6-month variables through the 3-month variables were tested using 95% bootstrap confidence intervals (CI) with 5000 bootstrap samples, following the procedures proposed by Hayes (2009).

2.4.1 Missing data

Within the final sample of 183 participants, 5.0% of the data at the intake and 3.0% of the data at the 3-month follow-up were missing data. Among the 155 participants who completed the 6-month follow-up, 3.3% of the data were missing data. Data generally contain missing data displaying a certain pattern. Briefly, missing at random (MAR) means that the probability of missingness depends on observed variables (Schaefer & Graham, 2002). Missing

![Figure 1](image-url)  
**FIGURE 1** Cross-lagged panel model examining the longitudinal relationship among coping self-efficacy, posttraumatic stress symptoms, and perceived social engagement.  
***$p < .001$; **$p < .01$; *$p < .05$. For the simplicity, the variances between the errors were omitted from the figure. The variance between the errors of 3-month CSE and 3-month PTS = −0.71, $p < .001$; the variance between the errors of 3-month PTS and 3-month PSE = −0.64, $p < .001$; the variance between the errors of 3-month CSE and 3-month PSE = 0.48, $p < .001$; the variance between the errors of 6-month CSE and 6-month PTS = −0.45, $p = .01$; the variance between the errors of 6-month PTS and 6-month PSE = −0.44, $p < .01$; the variance between the errors of 6-month CSE and 6-month PSE = 0.49, $p < 0.001$. CSE, coping self-efficacy; e, error; PSE, perceived social engagement; PTS, posttraumatic stress symptoms.
completely at random (MCAR) refers to the probability of missingness not depending on either observed variables or unobserved variables. Missing not at random occurs when the probability of missing data depends on unobserved variables. Data have the least bias due to missing data when the probability of missingness displays MCAR.

A Little's MCAR test is one of the methods that evaluate whether missing data are MCAR. It provides an indication of MCAR although not definitive (Little, 1988). We conducted Little's MCAR tests using the Baylor-EdPsych package in R (Beaujean, 2012). Results of the Little's MCAR tests showed that the missing data were MCAR for all variables except for coping self-efficacy at the 6-month follow-up, $\chi^2(16) = 31.9, p = .01$. Because these results indicate some evidence for coping self-efficacy at the 6-month follow-up to be not MCAR, we conducted $\chi^2$ tests between missingness and the discharge status to evaluate whether missingness was potentially MAR or MNAR. Results showed that $\chi^2$ tests were significant for all items of coping self-efficacy at the 6-month follow-up, range of $\chi^2(1) = 5.69–6.16, p < .02$, indicating potential MAR in the missing data of those items as participants who were discharged had more missing data than those who were not discharged. Note that these results were not definitive as the missing data might always depend on some other unobserved variables. A possible reason for this missing data pattern depending on the discharge status is that clients might have felt that some items related to trauma were not applicable to them and skipped them because they spent time in therapy longer than usual when they answered the 6-month follow-up assessment. These clients were close to be discharged in the near future, indicating it is possible that they felt drained spending so much time in therapy or that their therapy was focusing on something different from trauma.

Although these results of the tests for missingness were not definitive, the best available evidence indicated that missing data were MCAR or MAR. We chose an imputation method based on these assumptions. We used the sequential imputation (Verboven, Branden, & Goos, 2007) using the rrcovNA package in R (Todorov & Filzmoser, 2009). The sequential imputation is an imputation method robust under MCAR or MAR (Zhao & Yucel, 2009).

### RESULTS

Pearson’s correlations among the study variables showed that PTS severity at all assessment points was negatively correlated with perceived social engagement and coping self-efficacy (Table 4). Coping self-efficacy and social engagement were significantly, positively correlated with one another at all time points. PTS was significantly reduced from intake to 3 months (intake $M = 52.33$; 3-month $M = 43.60$), $t(182) = 8.31, p < .001$. Posttraumatic stress symptoms were not significantly different from 3 to 6 months, $t(103) = 1.95, p = .054$.

To contextualize levels of the study variables, we qualitatively compared them to other studies using the same measures. The mean intake coping self-efficacy score in the present study ($M = 3.73$), calculated with nine items reported in the measure’s validity study (Benight et al., 2015), was relatively lower than other samples including an online sample of people with a wide variety of traumatic experiences ($M = 4.15$; Samuelson, Bartel, Valadez, & Jordan, 2017), people who experienced sexual assault ($M = 5.03$; DeCou, Mahoney, Kaplan, & Lynch, 2018), and victims of human trafficking ($M = 5.23$; Olubukola, Folake, & Tom, 2018). As expected for a clinical sample, the mean intake PTS score in our sample ($M = 52.33$) was relatively higher than that of another sample of U.S. military veterans ($M = 40.8$; Brief et al., 2013) and comparable to another treatment-seeking sample ($M = 52.75$; Murphy, Ross, Busuttil, Greenberg, & Armour, 2019).

#### 3.1 Cross-lagged panel model

To test the longitudinal directionality among coping self-efficacy, PTS, and perceived social engagement, a cross-lagged panel analysis was performed. Results of the original model showed that the data did not adequately fit the
In the final model (see Figure 1), indirect effects results showed that the association between intake perceived social engagement and 6-month social engagement through 3-month PTS was significant, 95% bootstrap CIs = 0.01–0.12. Higher intake perceived social engagement was associated with lower 3-month PTS, which led to higher 6-month perceived social engagement. These findings supported both the social causation hypothesis (intake social engagement directly predicting 3-month PTS), and the social erosion hypothesis (3-month PTS mediating the relationship between intake social engagement and 6-month social engagement). In addition, 3-month PTS mediated the relationship between intake perceived social engagement and 6-month coping self-efficacy, 95% bootstrap CIs = 0.03–0.18. Higher intake perceived social engagement related to lower 3-month PTS, and this lower 3-month PTS related to higher 6-month coping self-efficacy, thus supporting aspects of the enabling hypothesis (H4). All other tests of indirect effects were not significant. Finally, the direct relationship between CSE and PTS indicated that intake PTS was negatively and significantly associated with 3-month CSE at 3 months, and that 3-month PTS was negatively and significantly associated with 6-month CSE. However, intake CSE was not significantly associated with 3-month PTS, and 3-month CSE was not significantly associated with 6-month PTS.

4 | DISCUSSION

Our findings suggest that the variables of interest in this study—perceived social engagement, coping self-efficacy, and PTS—function dynamically over 6 months in psychotherapy for trauma survivors. This study was conducted in the context of literature that demonstrates a confusing array of competing directional findings.

**TABLE 4** Means, SDs, and Pearson’s coefficients for the study variables

<table>
<thead>
<tr>
<th>1. PSEintake</th>
<th>2. PSE3-month</th>
<th>3. PSE6-month</th>
<th>4. PTSintake</th>
<th>5. PTS3-month</th>
<th>6. PTS6-month</th>
<th>7. CSEintake</th>
<th>8. CSE3-month</th>
<th>9. CSE6-month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.68**</td>
<td>0.63**</td>
<td>-0.57**</td>
<td>-0.49**</td>
<td>-0.47**</td>
<td>0.44**</td>
<td>0.33**</td>
<td>0.30**</td>
</tr>
<tr>
<td>2</td>
<td>0.78**</td>
<td>-0.47**</td>
<td>-0.74**</td>
<td>-0.60**</td>
<td>0.34**</td>
<td>0.55**</td>
<td>0.48**</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-0.45**</td>
<td>-0.65**</td>
<td>-0.70**</td>
<td>0.45**</td>
<td>0.51**</td>
<td>0.65**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.56**</td>
<td>0.55**</td>
<td>-0.56**</td>
<td>-0.41**</td>
<td>-0.34**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>0.71**</td>
<td>-0.37**</td>
<td>-0.75**</td>
<td>-0.59**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-0.45**</td>
<td>-0.55**</td>
<td>-0.68**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>0.50**</td>
<td>0.54**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.66**</td>
</tr>
</tbody>
</table>

Note: N = 183 for the values computed from the intake and the 3-month follow-up variables. N = 104 for the values computed from the 6-month follow-up variables.

Abbreviations: CSE, coping self-efficacy; PSE, perceived social engagement; PTS, posttraumatic stress symptoms; T1, time 1 (intake); T2, time 2 (3-month follow-up), T3, time 3 (6-month follow-up).

*p < .01.

**p < .001.

hypothesized model, RMSEA = 0.109 (90% CIs = 0.080–0.138), CFI = 0.932, SRMR = 0.094. To modify the model, we constrained the cross-lagged association with the smallest standardized coefficient for each endogenous variable to zero. This modified model also did not have adequate model-data fit, RMSEA = 0.066 (90% CIs = 0.043–0.087), CFI = 0.940, SRMR = 0.116. We then further modified the model by removing the covariates. The modified model showed adequate model-data fit, RMSEA = 0.097 (90% CIs = 0.062–0.134), CFI = 0.967, SRMR = 0.074, and was thus chosen as our final model (see Figure 1 for standardized coefficients in the model).
(e.g., Bosmans & van der Velden, 2015; Freedman et al., 2015; King et al., 2006; Shallcross et al., 2016; Smith et al., 2015). Whereas those studies provide support for their respective theories, researchers have struggled to resolve core questions about directionality, nonlinear functions, and dynamics over time. The current study tested models built upon social cognitive theory (Bandura, 1978; Benight, 2012; Benight & Bandura, 2004) that seeks to understand how these ecologically important and clinically valid constructs (perceived social engagement, coping self-efficacy, and PTS) work together to promote or deter health and change during therapy.

Our findings show that higher perceived social engagement at intake is associated with PTS reduction at the 3-month follow-up. This result supports the social causation model (Hypothesis 1) across the first 3 months of therapy, suggesting that trauma survivors’ engagement in social relationships can exacerbate or help to ease posttraumatic distress. In the current study, most of PTS changes occurred between the intake and the 3-month follow-up, suggesting that focus on improving early healthy social engagement might foster PTS improvement. Interestingly, our findings between 3 and 6 months of therapy support the social erosion model (Hypothesis 2). Clients with higher levels of 3-month PTS had lower perceived social engagement at 6-months, suggesting that clients’ social relationships may suffer over time if PTS remain elevated (treatment-resistant) across the first 3 months of therapy.

Together, our temporally sensitive findings coincide with evidence from a nonclinical, postdisaster setting, which showed that disaster survivors experienced early social causation (higher perceived social support early in the aftermath of natural disaster predicting lower PTS 6–12 months later), followed by later social erosion/deterioration (higher PTS predicting worse social support 18–24 months postdisaster; Kaniasty & Norris, 2008). This comparison should be considered in the context of different study settings (our trauma-focused clinical setting vs. Kaniasty and Norris’s nonclinical population trauma setting) and measurements (our operationalization of perceived social engagement vs. Kaniasty and Norris’s operationalization of perceived social support). Together these findings support temporal dynamics associated with how social engagement and trauma recovery influence one another over time (see also Sippel, Pietrzak, Charney, Mayes, & Southwick, 2015).

Our results also supported a nuanced version of the enabling hypothesis (Schwarzer & Knoll, 2007) by revealing 3-month PTS as a mediator between intake perceived social engagement and 6-month coping self-efficacy. Specifically, higher initial social engagement on treatment entry related to lower levels of PTS at 3-months, which then related to higher subsequent coping self-efficacy perceptions. Thus, although causation cannot be determined, one’s social network may provide important encouragement and reinforcement for therapy investment that helps to empower patients, demonstrated by effects on increasing coping self-efficacy.

Recent research by Lord et al. (2019) tested possible bidirectional relationships among two dimensions of social functioning (i.e., interpersonal relationship problems; social role functioning) and change in PTS in a controlled context during administration of cognitive processing therapy. Results supported such bidirectional dynamics, indicating that higher PTS symptoms prompted worse social role functioning and interpersonal problems and that worse social role functioning and interpersonal problems prompted worse PTS symptoms. Although differentiated by setting (our naturalistic vs. controlled) and sample (mixed naturalistic sample vs. military/civilian comparison), both studies support the heuristic notion that social role functioning and PTS interplay in a critical manner in trauma treatment: worse or unchanged social functioning propagates less improvement in PTS symptoms, and less improvement in PTS symptoms propagates unchanged or worse social functioning.

Our study is the first, that we know of, to test directional causation (i.e., social erosion vs. causation) and social cognitive models (i.e., enabling or cultivation), operationalizing “perceived social engagement” as the primary social functioning domain. To our knowledge, this is the first study to test the enabling and cultivation models in a trauma therapy setting. A strength of our study lies in the use of a cross-lagged panel analysis longitudinally analyzing the mediation effects of the study variables while accounting for the correlations among the variables within the same time points and the autoregressive effects of the same variables across time (Kearney, 2017).
4.1 | Implications

This study provides important clinical implications in trauma treatment settings regarding three key variables: perceived social engagement, perceptions of coping competence, and individual traumatic distress. Our findings suggest that by focusing on improving social engagement in therapy, benefits may extend to improvements in PTS and coping self-efficacy. This may be especially indicated in light of evidence documenting social dysfunction as a barrier to treatment response (Lord et al., 2019) and engagement in evidence-based treatments (Sayer et al., 2009), alongside the social disintegration and negative social cognitive-perceptual biases that are often experienced by individuals seeking trauma treatment (Smith et al., 2018).

Specific support for the social causation and social erosion models demonstrates the importance of conceptualizing how perceived social engagement and PTS function in the triadic reciprocal process within the therapeutic context. Higher levels of social engagement may provide critical support for managing the challenges associated with trauma interventions. Over time, treatment-resistant PTS may wear down a patient's ability to manage social relationships and recruit support. Specific support for the enabling model further suggests the importance of considering the reciprocal process between social engagement, PTS, and coping self-efficacy. Individuals who experience higher social impairments and isolation may also lack the support to manage the distress that can arise during treatment. In addition, the finding from our study that those with lower clinical response (i.e., PTSD that remained resistant to change at 3-months) experienced worse social engagement at 6-months suggests that these individuals may need greater attention to improving their engagement in social relationships and facilitation of emotional self-regulation (e.g., worry; management of change). Notably, the mean number of therapy sessions was 24 and the percentage of clients who had PCL-5 scores greater than or equal to 33 at 3 months was 74.3% at the clinic where the data were collected. This naturalistic study of a specialty trauma clinic highlights the challenges of affecting PTSD change in chronic and complex cases and the need for a better understanding of mechanisms and change and alternatives to classic trauma processing treatments.

CBT broadly posits that change/improvement occurs through increasing healthy behaviors, decreasing unhealthy behaviors, restructuring negative/biased cognitions, and psychoeducation. Our findings suggest that intentional targeting of social engagement earlier in the therapy process may be warranted for improving better trauma-focused treatment response (lower PTS symptoms). Further, targeting social engagement earlier in the therapy process may improve longitudinal social engagement and coping self-efficacy, which serve as empowering mechanisms of future sustainable stress management. In traditional evidence-based CBT treatment approaches for PTSD (e.g., prolonged exposure therapy, eye movement desensitization and re-processing, cognitive processing therapy), clinicians may consider particular, explicit emphases on social behavioral activation (e.g., prioritizing increased quantity and quality of social engagements), social cognitive restructuring techniques (e.g., reappraisal of phenomenology of social interactions), and psychoeducation about the negative social biases that accompany trauma exposure may be a means of improving treatment response.

A useful framework may be available through third-wave CBT therapies (e.g., acceptance and commitment therapy [ACT]), applied specifically to target social functioning as a patient-centered or process-based therapy outcome (see Hofmann & Hayes, 2019). For example, ACT provides a framework for engaging patients in social relationship initiation, maintenance, and improvements as values-led, goal-directed processes and behaviors, seeking to develop the capacity to mindfully notice and transcend trauma-warped emotions, social cognition, and negative actions of others that otherwise derail initiation and improvement of social relationships (see Smith et al., 2018). These suggestions should all be considered with the caveat that there is limited clinical evidence for understanding how to best measure, change, and target social functioning change, an area in need of investigation.
4.2 | Limitations

The current study can be designated as a “naturalistic” study in that we drew our data and observations from a clinical population in an outpatient treatment center that does not specialize in randomized controlled trials for specific interventions. The generalizability of our findings is limited by the noncontrolled environment, and future studies interested in these concepts may provide valuable follow-up examinations by studying social engagement, CSE, and PTS across time in more controlled therapy contexts (e.g., in an EBT for PTSD). Whereas we view this as a strength, our study lacks controls associated with how clinicians administered the interventions, how they decided which therapy to use, and which interventions specifically were administered. Of note, all therapists were trained in evidence-based treatments for trauma. For clients engaging in CBT, which made up most of the sample, some received manualized approaches and others received a more dynamic approach where client presentation guided intervention decision making. Because the therapists identified that a minority of the sample received specific evidence-based treatments (cognitive processing therapy, prolonged exposure therapy, eye movement desensitization and reprocessing), our findings on the relationships among perceived social engagement, coping self-efficacy, and PTS change may not be generalizable to a sample treated in a specific evidence-based treatment. Future research should continue to examine relationships between social cognitive variables and PTS among clients treated in a specific treatment.

The clinic added one item in the measure for coping self-efficacy because of its perceived clinical relevance. However, it is unclear how adding one item influences a validated measure although internal consistency remained high. Participants responded to the questionnaires knowing that clinicians would check their responses as a part of the therapy session. This might have influenced how some participants responded in either a desirable or an undesirable way for the clinicians. Furthermore, we assessed at the 3-month and the 6-month follow-ups to reduce the burden of the clients and clinicians. This resulted in missing information on 364 clients who were discharged by the 3-month follow-up. These discharges were due to many reasons including successful treatment response, dropping out of therapy, or moving to a different clinic. If a follow-up assessment were conducted earlier than 3 months, results may have been different. Because the present study was naturalistic taking place in an outpatient community clinic, patients were not followed after they dropped out. Ideally, future research will assess client outcomes more often and before 3 months to best understand predictors of treatment response.

5 | CONCLUSION

The present study showed that PTS is an important mediator between social engagement and coping self-efficacy over 6 months among clients of a psychotherapy trauma treatment clinic. Our results support social erosion, social causation, and enabling models for the relationship between PTS, social engagement, and coping self-efficacy. Because of the naturalistic study design and focus on a population of symptomatic trauma survivors, the findings might be difficult to generalize to other populations of patients engaged in other types of therapies. Future studies will be needed to investigate the same hypotheses in other populations with larger samples and more frequent measurements to test the robustness and generalizability of our findings. Collectively, results suggest multiple entry points for affecting critical outcomes by targeting social engagement and posttraumatic distress.

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