

# Influence of Emotional Engagement and Habituation on Exposure Therapy for PTSD

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## ABSTRACT

This study examined 2 process variables, emotional engagement and habituation, and outcome of exposure therapy for posttraumatic stress disorder. Thirty-seven female assault victims received treatment that involved repeated imaginal reliving of their trauma, and rated their distress at 10-min intervals. The average distress levels during each of 6 exposure sessions were submitted to a cluster analysis. Three distinct groups of clients with different patterns of distress were found: high initial engagement and gradual habituation between sessions, high initial engagement without habituation, and moderate initial engagement without habituation. Clients with the 1st distress pattern improved more in treatment than the other clients. The results are discussed within the framework of emotional processing theory, emphasizing the crucial role of emotional engagement and habituation in exposure therapy.

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Beginning with Janet and Freud ( [Breuer & Freud, 1957](#) ; [Janet, 1889](#) ) and continuing into present conceptualizations ( [Foa & Kozak, 1986](#) ; [Horowitz, 1986](#) ), trauma theorists have postulated that emotional engagement with traumatic memory is a necessary condition for successful processing of the

event and resultant recovery. Conversely, deliberate avoidance of reminders of the trauma or emotional withdrawal and dissociation are thought to hinder recovery. Indeed, avoidance and numbing are symptoms of posttraumatic stress disorder (PTSD) in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [ *DSM—IV* ]; [American Psychiatric Association, 1994](#) ). Despite the popularity of the emotional engagement hypothesis among trauma theorists, empirical studies of the relationship between engagement and recovery are scarce. Retrospective reports of dissociative experiences during the trauma are related to more severe and persistent symptoms of PTSD later on ( [Bremner et al., 1992](#) ; [Marmar et al., 1994](#) ; [Tichenor, Marmar, Weiss, Metzler, & Ronfeldt, 1996](#) ). Two prospective studies showed that dissociative symptoms in the immediate aftermath of natural disasters predicted more severe PTSD symptoms 7 to 9 months later ( [Cardena & Spiegel, 1993](#) ; [Koopman, Classen, & Spiegel, 1994](#) ). In an analysis of facial fear expressions of female assault victims with PTSD undergoing prolonged exposure for PTSD, fear expression during the first reliving of rape memories were highly correlated with improvement at posttreatment ( [Foa, Riggs, Massie, & Yarczower, 1995](#) ). Studies of other anxiety disorders lend support to the highly related hypothesis that fear activation during exposure therapy is positively related to treatment outcome ( [Borkovec & Sides, 1979](#) ; [Foa & Kozak, 1986](#) ; [Kozak, Foa, & Steketee, 1988](#) ; [Lang, Melamed, & Hart, 1970](#) ; [Watson & Marks, 1971](#) ). In the present study, we further explored the engagement hypothesis by examining the relationship between fear activation (emotional engagement) during the first exposure session for PTSD and treatment outcome.

Another concept that derives from early behavioral theory of exposure therapy is habituation, the decrement in self-reported anxiety and in anxiety-related autonomic responses during confrontation with feared stimuli. Although the mechanisms underlying habituation are unclear, several studies have demonstrated that anxiety disordered patients exhibit reductions in heart rate or subjective ratings in anxiety within sessions during which they are exposed to feared stimuli (e.g., [Borkovec, 1972](#) ; [Foa & Chambless, 1978](#) ; [Grayson, Foa, & Steketee, 1982](#) ; [Nune & Marks, 1975](#) ; [Stern & Marks, 1973](#) ; [Watson, Gaid, & Marks, 1972](#) ). [Foa \(1979\)](#) has suggested that two separate processes, habituation within session and between sessions, mediate successful outcome of treatment for anxiety disorders. Support for a relationship of treatment outcome to between-session habituation comes from two studies of patients with obsessive—compulsive disorder treated with exposure and response prevention ( [Foa, Grayson, & Steketee, 1982](#) ; [Kozak et al., 1988](#) ). The present study further examined habituation processes during exposure therapy in individuals treated for chronic PTSD.

Female victims of rape or aggravated assault were treated with repeated imaginal exposure to the trauma memory (trauma reliving) and in vivo exposure to situations that evoked anxiety because of their association with the trauma. This treatment has been found to be effective in the treatment of chronic PTSD (see [Foa & Meadows, 1997](#) , for a critical review). Subjective reports of distress during imaginal reliving of the trauma were used as indicators of emotional engagement and habituation. We hypothesized that emotional engagement in the beginning of therapy and habituation across sessions would predict greater improvement during therapy.

## Method

### Participants

Participants were 37 female assault victims treated for chronic PTSD as part of a larger treatment

outcome study ( [Foa, Dancu, Hembree, Jaycox, & Meadows, 1997](#) ; [Foa et al., 1994](#) ). The sample was composed of all treatment completers who received imaginal reliving as part of their therapy, and for whom subjective units of distress (SUDs) ratings were available. Ages ranged from 18 to 55 years (  $M = 36.1$ ;  $SD = 10.4$ ); 15 women (40%) were African American and 22 (60%) were Caucasian. Participants' median income was approximately \$15,000 per year per person in the household, and median education was some college coursework.

Clients were recruited through advertisements and referrals from local crime victim agencies. Women were offered free treatment if (a) their assault occurred at least 3 months prior to intake, (b) they met criteria for current PTSD related to the target assault, (c) they did not meet criteria for substance abuse or dependence, (d) they did not have depression severe enough to warrant immediate treatment for depression, and (e) they did not meet diagnostic criteria for a psychotic disorder, organic disorder, or bipolar disorder.

In the parent study, clients were randomly assigned to one of four conditions: stress inoculation training (SIT) alone, prolonged exposure (PE) alone, the combination of stress inoculation training and exposure (SIT/PE), and a wait-list control group. In this study, only those clients in the PE and SIT/PE conditions were included. A total of 55 clients were entered into these two treatment conditions in the parent project, but 3 of 25 (12%) dropped out of the PE condition and 8 of 30 (27%) dropped out of the SIT/PE condition. Of the remaining 44 clients who received exposure and completed treatment, therapists' recordings of in-session data were missing for 7 clients, resulting in a final count of 19 (51%) clients who received PE alone and 18 (49%) clients who received SIT/PE.

Clients received individual therapy for nine sessions. Imaginal exposure occurred during six of the SIT/PE condition sessions and seven of the PE condition sessions. Imaginal reliving followed the basic procedures used in a previous study with female sexual assault victims with PTSD ( [Foa, Rothbaum, Riggs, & Murdock, 1991](#) ). Participants closed their eyes and recounted the details of the assault "as if it were happening now," focusing on the details of the assault as well as on their emotions and thoughts during the trauma. Exposure lasted 45—60 min in each session; if participants finished recounting before the end of the time period, they were asked to go back to the beginning and start again. Thus, each exposure session could contain several recountings of the trauma, depending on the length of the assault narrative (for details, see [Foa et al., 1995](#) ; [Jaycox & Foa, 1996](#) ). Each session, the clients' narratives were audiotaped, and clients were instructed to listen to the tapes once a day, imagining that "the assault is happening now," with attention to details of the assault and their emotions and thoughts during the assault.

## **Interview Measures**

With the exception of the Standardized Assault Interview, which was conducted by the therapist in the first session, all interviews were conducted by trained evaluators who were blind to treatment condition and the self-ratings of anxiety.

### **PTSD Symptom Scale–Interview (PSS—I; [Foa, Riggs, Dancu, & Rothbaum, 1993](#) ).**

This is a 17-item interview that assesses the symptoms of PTSD as defined in the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev. [ *DSM—III—R* ]; [American Psychiatric Association, 1987](#) ). This scale has good internal consistency and an interrater reliability of .97 for overall PTSD severity. In addition, it was shown to have high concurrent validity with the Structured

Clinical Interview for DSM—III—R, Patient edition (SCID-P; [Spitzer, Williams, Gibbon, & First, 1989a](#)) among female assault victims, correctly diagnosing 94% of cases.

*Structured Clinical Interview for DSM—III—R—Patient Edition With Psychotic Screen (SCID—P; Spitzer et al., 1989a)*. This structured interview was conducted at pretreatment to diagnose Axis I mental disorders according to *DSM—III—R* criteria ([American Psychiatric Association, 1987](#)).

**Structured Clinical Interview for DSM—III—R Personality Disorders ([SCID—II, Spitzer, Williams, Gibbon, & First, 1989b](#))**.

A second structured interview was used to assess personality or Axis II disorders according to *DSM—III—R* criteria ([American Psychiatric Association, 1987](#)) at posttreatment.

**Standardized Assault Interview ([Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992](#))**.

This interview was developed for this study, lasted approximately 90 min, and contained 305 questions concerning (a) demographic data, (b) psychiatric history, (c) previous victimization, (d) alcohol and drug use, (e) information about the assault, and (f) the victim's immediate reactions to the assault. The interview was conducted by the therapist in the first therapy session.

**Self-Report Measures Beck Depression Inventory (BDI; [Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961](#))**.

This is a 21-item self-report scale used to assess cognitive and physical symptoms of depression. It has been used extensively in psychological research with numerous populations and psychiatric disorders, including PTSD. The split-half reliability of the BDI is .93, and it has been found to be correlated with clinician ratings of depression.

**State—Trait Anxiety Inventory (STAI; [Spielberger, Gorsuch, & Lushene, 1970](#))**.

This is a 40-item self-report scale, with 20 items assessing state anxiety and 20 items assessing trait anxiety. Internal consistencies for Trait and State subscales of the STAI range from .83 to .92. Test—retest reliability is .40 for state anxiety and .81 for trait anxiety.

**Dissociative Experiences Scale (DES; [Bernstein & Putnam, 1986](#))**.

This scale contains 28 items that assess the percentage of time that an individual has dissociative experiences such as absorption and imaginal involvement, depersonalization and derealization, and amnesic dissociation. This scale is widely used in research on dissociation. Its reliability and validity have been deemed adequate.

**Measures of Emotional Engagement and Habituation Subjective Units of Distress (SUDs)**.

This 0—100 scale is introduced to clients during therapy as a measure of overall distress, with 0 indicating calm and free from distress and 100 indicating the most distressed they can ever recall being. The scale is anchored with subjective experiences for each client individually. For most but not all clients, 100 was anchored as the degree of distress they felt during the worst moment of the target assault. For other clients, 100 was anchored as another experience in which they felt the worst distress they could ever recall feeling (e.g., seeing the assailant in court; having a panic attack). During imaginal exposure in 10-min intervals, the therapist asked the client to indicate her SUDs level. For each client, a mean SUDs score was calculated for each session, based on all SUDs ratings collected during that

session. Four clients had missing SUDs ratings for one session. The mean SUDs score for missing sessions was interpolated from the average of mean SUDs ratings of the preceding and following sessions.

Clients were classified according to their pattern of mean SUDs score during each of the six imaginal reliving sessions using an agglomerative hierarchical clustering analysis ( [SPSS, 1994](#) ). Because the PE condition received one more exposure session than the SIT/PE condition, only the first six mean SUDs ratings were used for the participants in the PE condition. The submission of a repeated measure to agglomerative hierarchical clustering follows the "dynamic typologies" procedures described in other studies ( [Morrall, Iguchi, Belding, & Lamb, 1997](#) ; [Prochaska, Velicer, Guadagnoli, & Rossi, 1991](#) ). The purpose of this analysis is to isolate groups of cases having similar treatment response profiles on a variable sampled over time. In agglomerative hierarchical clustering, a distance metric is first calculated to represent the dissimilarity between each pair of cases, based on their performance on the studied variables. This metric is subsequently used to join cases or groups of cases according to a systematic principle. This procedure results in a range of solutions, from the trivial *N* -cluster solution in which each of the *N* cases forms a separate cluster, to a one-cluster solution. Following [Morrall et al. \(1997\)](#) , we used a squared Euclidean distance metric, Ward's agglomeration schedule, and planned to accept the cluster solution maximizing the differentiation of the sample without producing clusters with too few cases to permit meaningful statistical analysis. Accordingly, we selected the solution with the largest number of clusters having no fewer than 8 participants in any group.

Within-session habituation was calculated using the formula described by [Kozak et al. \(1988\)](#) .

Accordingly, for each session the final SUDs level was subtracted from the highest SUDs level collected during that session. For each client these habituation scores were averaged across the six sessions, generating a mean within-session habituation score.

The duration of the exposures was estimated from the SUDs levels collected, with the time of the first and final SUDs ratings used to estimate overall imaginal exposure time of each session. Two scores were derived by adding the durations: one for duration across the six sessions that all participants completed, and one for total time in exposure that included the seventh session for those in the PE condition.

## Results

### Improvement During Therapy

Means and standard deviations were first calculated separately for pre and posttreatment scores for three measures of psychopathology: the PSS—I, the BDI, and the STAI. No statistically significant condition differences (PE or SIT/PE) were found on the three measures of psychopathology collected at pre- or posttreatment, so data were collapsed across conditions.

[Table 1](#) demonstrates that clients improved significantly on all measures of psychopathology. The mean improvement for the group was 56% on PTSD symptoms, 50% on depressive symptoms, 25% on state anxiety, and 19% on trait anxiety. Whereas all clients met criteria for PTSD before treatment, 60% no longer qualified for this diagnosis by the end of treatment. Thus, although the therapy proved effective overall, clients varied with respect to degree of improvement.

Because successful therapy should include improvements on several dimensions of functioning, outcome

is not well characterized by any single measure. Therefore, we generated a criterion for good end-state functioning that required improvement on measures of PTSD symptoms, depression, and anxiety. Trait anxiety was excluded for this criterion, because we expected trait anxiety to be an insensitive measure of improvement during treatment. Specifically, good end-state functioning was defined as (a) at least 50% improvement on the PTSD target symptoms assessed by the PSS—I, and (b) scores on the BDI and STAI—S (state anxiety) measures that were below the posttreatment means for our sample on these measures (BDI:  $M = 8.43$ ; STAI—S:  $M = 35.41$ ). These criteria assured substantial improvement in the target symptoms of PTSD as well as very low levels of related symptoms of depression and anxiety. One client was excluded from this analysis because her self-report data were missing.

Only 11 out of 36 clients (31%) achieved the status of good end-state functioning according to our stringent criteria for treatment responding. Although the remaining 25 clients did not reach this status, they did make notable treatment gains: Their mean improvement on the PSS—I was 45%. Group means for the good versus poor end-state functioning were the following: percent improvement on the PSS—I,  $M = .81$  ( $SD = .14$ ) versus  $M = .45$  ( $SD = .23$ ),  $F(1, 34) = 24.19$ ,  $p < .001$ ; BDI score,  $M = 2.36$  ( $SD = 2.38$ ) versus  $M = 11.09$  ( $SD = 8.01$ ),  $F(1, 34) = 12.39$ ,  $p < .01$ ; STAI—S score,  $M = 25.54$  ( $SD = 5.50$ ) versus  $M = 39.74$  ( $SD = 9.93$ ),  $F(1, 34) = 19.63$ ,  $p < .001$ . Thus, the 11 "good end-state" clients are those who improved dramatically during treatment.

### **Hierarchical Cluster Solutions**

The hierarchical clustering produced a three-profile solution. The mean ratings for each profile across sessions are presented in [Figure 1](#). Cluster 1 ( $n = 14$ ), high engagers/habitators (E/H), exhibited high SUDs in the first session, which gradually decreased over the six sessions. Cluster 2 ( $n = 14$ ), high engagers/nonhabitators (E/NH), began with high SUDs levels in Session 1, and showed only a slight decrease in SUDs over time. Finally, Cluster 3 ( $n = 9$ ), low engagers/nonhabitators (NE/NH), displayed only moderate SUDs levels in the first session, and little decrease over time. These three profiles reflect clinically familiar patterns of response to imaginal exposure, and therefore appear to have good face validity ([Foa, 1979](#); [Foa et al., 1982](#)).

To examine the internal validity of the three profiles, we evaluated the degree to which the hierarchical clustering differentiated between these SUDs patterns, using separate between-group analyses of variance (ANOVAs) on each of the six SUDs scores (see [Table 2](#)). In Session 1, the NE/NH group reported significantly lower SUDs levels than the other two groups. In Session 2, all three groups differed significantly from each other. In Sessions 3 and 4, the E/NH group reported significantly higher SUDs levels than the E/H or NE/NH groups. In Sessions 5 and 6, all three groups again differed from one another. Thus, the three clusters appear to describe distinct categories of SUDs patterns, indicating internal criterion validity.

Finally, the external criterion validity of the SUDs profiles was evaluated by examining whether profile membership predicts treatment outcome. Whereas 57% of the E/H clients achieved good end-state functioning, only 15% and 11% of the E/NH and NE/NH clients, respectively, had good end-states,  $\chi^2(2, N = 36) = 7.68$ ,  $p < .05$  (see [Table 3](#)). Indeed, the odds of achieving good end-state were more than eight times greater for clients with E/H profiles than for the other two profiles. Post hoc tests showed that the E/H group differed significantly from the E/NH group,  $\chi^2(1, N = 27) = 5.04$ ,  $p < .05$ , and from the NE/NH group,  $\chi^2(1, N = 23) = 4.87$ ,  $p < .05$ ; the E/NH and NE/NH groups did not differ from each other,  $\chi^2(1, N = 22) = 0.08$ ,  $p > .05$ .

To further examine the relationship between SUDs patterns and treatment outcome, we conducted a series of one-way ANOVAs using posttreatment severity scores as dependent measures. [Table 4](#) presents the means, standard deviations, and group differences for these measures. Significant between-group differences were detected for the re-experiencing and arousal subscales of PTSD, but not for avoidance or total symptom scores. Post hoc Tukey honestly significant difference tests revealed that the E/H group differed from the E/NH group on posttreatment re-experiencing symptom severity and that the E/H group differed from the NE/NH group for arousal symptoms. No group differences were detected for depression, state anxiety, or trait anxiety.

Analyses of covariance controlling for pretest symptom severity were conducted to examine group differences on treatment outcome (see [Table 4](#) for pretreatment means and standard deviations). These analyses were consistent with the above results: Group membership was significantly related to re-experiencing and arousal symptoms at posttreatment when pretest levels were controlled,  $F(2, 33) = 6.8$  and  $3.9$ , respectively; both  $p$ s  $\leq .05$ . Post hoc analyses again indicated that the E/H group had lower re-experiencing symptoms than the E/NH group and that the E/H group had lower arousal symptoms than the NE/NH group. On the other hand, no between-group differences were detected for avoidance symptoms, depressive symptoms, or state or trait anxiety,  $F(2, 33) = 0.09$ ,  $F(2, 32) = 1.99$ ,  $F(2, 32) = 0.87$ , and  $F(2, 32) = 0.97$ , respectively, all  $p$ s  $> .05$ .

### **Relationship Between Response Profiles and Pretreatment Factors Demographic and trauma history variables.**

No demographic or history variables were associated with response group membership. Analyses revealed no group differences on race,  $\chi^2(2, N = 37) = 0.85$ ,  $p > .05$ ; income,  $\chi^2(12, N = 37) = 10.26$ ,  $p > .05$ ; or education,  $\chi^2(12, N = 37) = 10.42$ ,  $p > .05$ . An ANOVA performed on age scores also revealed no group differences,  $F(2, 34) = 1.37$ ,  $p > .05$ . Additional chi-square analyses revealed no group differences in terms of the presence of another Axis I affective disorder, Axis II personality disorder, or a history of sexual or physical abuse in childhood or adulthood prior to the index trauma,  $\chi^2$ s(2,  $N = 37$ ) = 0.36, 0.47, 2.77, and 0.15, respectively, all  $p$ s  $> .05$ .

### **Pretest symptom severity.**

ANOVAs showed no group differences on pretreatment severity of PTSD, depression, state anxiety or trait anxiety (all  $p$ s  $> .05$ ; see [Table 4](#)). Similarly, in the 28 clients who completed the DES, dissociative symptom severity did not differ among the groups (E/H:  $M = 13.66$ ,  $SD = 11.0$ ; E/NH:  $M = 17.54$ ,  $SD = 15.1$ ; NE/NH:  $M = 15.28$ ,  $SD = 17.8$ ),  $F(2, 26) = 0.21$ ,  $p > .05$ .

### **Within-Session Habituation and Duration of Exposure**

To examine the hypothesis that between-session habituation was determined by the degree of habituation within-sessions, we conducted an ANOVA to examine between-group differences on within-session habituation. No differences emerged (E/H:  $M = 19.2$ ,  $SD = 12.6$ ; E/NH:  $M = 24.1$ ,  $SD = 15.1$ ; NE/NH:  $M = 24.3$ ,  $SD = 11.1$ ),  $F(2, 34) = 0.62$ ,  $p > .05$ . Also, the three groups did not differ with respect to the total time in minutes of exposure during the first six exposure sessions (E/H:  $M = 269.6$ ,  $SD = 53.9$ ; E/NH:  $M = 270.1$ ,  $SD = 46.6$ ; NE/NH:  $M = 257.9$ ,  $SD = 60.2$ ),  $F(2, 34) = 0.17$ ,  $p > .05$ . Nor did the groups differ in time of exposure when the analysis was repeated with the inclusion of the extra session of exposure given to the PE-only condition (E/H:  $M = 286.1$ ,  $SD = 71.3$ ; E/NH:  $M = 292.2$ ,  $SD = 66.5$ ; NE/NH:  $M = 276.7$ ,  $SD = 74.2$ ),  $F(2, 34) = 0.13$ ,  $p > .05$ . Furthermore, end-state functioning was not found to be

associated with either within-session habituation (good end-state:  $M = 22.13$ ,  $SD = 17.6$ ; poor end-state:  $M = 22.10$ ,  $SD = 11.4$ ),  $F(1, 34) = 0.00$ ,  $p > .05$ , or duration of exposure during the 6 or 7 sessions (6-session total, good end-state:  $M = 279.09$ ,  $SD = 48.2$ ; poor end-state:  $M = 264.68$ ,  $SD = 52.07$ ),  $F(1, 34) = 0.61$ ,  $p > .05$  (7-session total, good end-state:  $M = 301.82$ ,  $SD = 67.8$ ; poor end-state:  $M = 283.08$ ,  $SD = 67.9$ ),  $F(1, 34) = 0.58$ ,  $p > .05$ .

## Discussion

Using hierarchical cluster analysis, we detected three distinct patterns of emotional responses during imaginal reliving of rape memories in clients who completed treatment for chronic PTSD. The first group included clients who displayed high subjective anxiety in the first session (high emotional engagement) followed by a gradual decrease in anxiety over sessions (habituation; E/H). The second group included clients who displayed high initial engagement and low habituation (E/NH). The third group included clients with moderate initial engagement and low habituation (NE/NH). Consistent with our hypothesis, clients who showed both initial emotional engagement and across-session habituation benefited from treatment more than did clients in the other two groups. Whereas clients in all groups made some gains in treatment, those in the E/H group were eight times more likely to meet a stringent criterion for good end-state functioning, which included normal scores on measures of depression and anxiety as well as a reduction in PTSD symptoms by at least 50%.

These results are consistent with empirical findings and theoretical models of posttrauma psychopathology as well as with the mechanisms thought to underlie exposure therapy. Specifically, our findings support [Foa and Kozak's \(1985, 1986\)](#) emotional processing theory, proposing that anxiety disorders reflect fear structures that include pathological cognitive associations and that therapy aims at correcting the pathological elements of the specific fear structure targeted in treatment. Foa and her colleagues suggested that like other anxiety disorders, PTSD reflects an underlying pathological memory structure ([Foa & Jaycox, in press](#); [Foa & Riggs, 1993](#)). They further proposed that the pathological cognitions underlying this disorder are that the world is entirely dangerous, the self is entirely incompetent, and persistent PTSD symptoms are dangerous and are indicators of self-incompetence. Foa and Jaycox suggested that repeated reliving of the trauma ameliorates anxiety by disconfirming the client's belief that emotional engagement with the traumatic memory and the resultant PTSD symptoms are dangerous. In the absence of either engagement or habituation, the client is not provided with the corrective information necessary to change this belief. According to these theories, both emotional engagement and habituation are necessary conditions for the reduction of pathological anxiety by means of exposure therapy.

Our finding that the probability of good end-state functioning is much higher in the group exhibiting both high initial engagement and between-session habituation supports [Foa and Kozak's \(1986\)](#) proposition. Future research should examine the relationship between emotional engagement, habituation, and cognitive changes hypothesized by Foa and her colleagues ([Foa & Jaycox, in press](#); [Foa & Riggs, 1993](#)). Inconsistent with [Foa and Kozak's \(1986\)](#) theory, within-session habituation was not associated with treatment outcome. This finding, however, is consistent with results of other studies ([Foa et al., 1982](#); [Kozak et al., 1988](#)) that reported a relationship of treatment outcome to between-session, but not within-session, habituation.

Interestingly, the E/NH group showed no habituation, despite apparent emotional engagement or the

activation of the fear structure. Instead, this group reported consistently high levels of anxiety throughout the six sessions of exposures to the traumatic memory. Foa and Jaycox (in press) suggested several mechanisms underlying successful imaginal exposure. Of particular relevance here is the hypothesis that repeated reliving of the trauma helps sharpen the distinction between remembering and re-experiencing. In the absence of such a distinction, the traumatic memory is likely to arouse anxiety and flashbacks. Perhaps the absence of habituation across sessions in the E/NH and the NE/NH groups reflects the failure of repeated reliving to promote this distinction. Future research should examine this hypothesis.

Analyses conducted to detect possible differences between response groups all yielded negative results. No group differences were found on a host of demographic variables or on pretreatment psychopathology. Also, despite variability across patients in the total duration of exposure, length of exposure was unrelated to outcome or response pattern. Interestingly, the NE/NH group did not exhibit higher scores on the DES as might be expected. However, as noted by [Foa and Hearst-Ikeda \(1996\)](#), the DES may not be an adequate measure of the emotional numbing characteristics of individuals with PTSD.

The consistent finding that between-session habituation is implicated in successful treatment raises questions about what factors are associated with habituation and how it can be promoted in clients who fail to habituate on their own. Future research should examine the relationship between habituation and client experiences between sessions. These include the homework assignment of daily self-exposure to the trauma narratives, discussion of the traumatic experience with significant others, social support, and progress with in vivo homework assignments. Unfortunately, these factors were not systematically recorded in the present study.

Two treatment recommendations may be drawn from these findings. First, emotional engagement during exposure sessions appears to be important for treatment success. However, by definition, individuals with PTSD are reluctant to emotionally engage with their traumatic memories. Therapy should include a discussion about the importance of emotional engagement in order to overcome possible difficulties in this respect. If the client is unable to emotionally engage in the exposure, procedures for enhancing engagement should be introduced (see [Jaycox & Foa, 1996](#)). Second, habituation over the course of treatment is clearly important for successful outcome. As indicated above, at present we do not know why one client habituates and another does not. In the absence of such information, it is possible that some clients need more exposure sessions than others. The possibility that extending treatment could enhance treatment efficacy could not be examined in the present study because all clients received nine treatment sessions that included six or seven imaginal exposures.

Two caveats need to be noted. First, because the cell sizes were small in this study, there may not have been enough power to detect outcome differences between the groups. It is suggested that these patterns of response be replicated in a larger sample. Second, because the sample in the present study consisted of treatment completers only, our data cannot determine the prevalence of the three types of response patterns among treatment seekers in general. It is possible that individuals with high initial engagement and low habituation are more likely to drop out from treatment prematurely than are individuals who habituate over sessions. Future studies should examine this issue by comparing emotional engagement and habituation between completers and noncompleters.

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Figure 1. Average subjective units of distress (SUDs) ratings during reliving within each cluster.

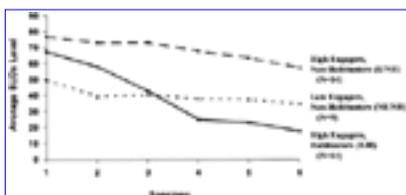


Table 1.

Table 1  
Treatment Effects for the Whole Sample

Measure	Pretreatment		Posttreatment		df	t
	M	SD	M	SD		
PSS-I	28.97	8.4	12.22	7.4	36	10.20***
BDI	18.45	11.4	8.43	7.9	35	6.91***
STAI-S	49.06	13.5	35.40	11.0	35	6.15***
STAI-T	51.20	11.8	40.90	11.3	35	5.70***

Note. PSS-I = PTSD Symptom Scale—Interview; BDI = Beck Depression Inventory; STAI-S = State-Trait Anxiety Inventory—State; STAI-T = State-Trait Anxiety Inventory—Trait.  
\*\*\* p < .001.

Table 2.

Table 2  
Difference in Average SUDs Ratings Between Clusters

Session	Average SUDs rating						Overall difference F(1, 36)
	df	SD	M	SD	M	SD	
1	47.05	13.0	56.75	15.0	49.75	14.6	6.2***
2	37.05	14.0	51.14	9.1	46.26	15.7	14.4***
3	42.96	14.3	53.26	7.0	49.51	12.2	13.3***
4	39.05	13.4	47.76	10.1	37.51	13.4	16.8***
5	37.05	9.1	43.76	14.1	37.76	11.5	16.2***
6	37.06	10.0	41.14	10.4	34.46	11.7	14.8***

Note. Means in the same row that do not share subscripts differ at p < .05 by the Tukey honestly significant difference comparison. BDI = high exposure/reliving (n = 11); BDI = high exposure/nonreliving (n = 10); PSS-I = low exposure/reliving (n = 10); PSS-I = low exposure/nonreliving (n = 10).  
\*\*\* p < .001.

Table 3.

**Table 3**  
*End-State Functioning Across Groups*

End-state functioning	E/H	E/NH	NE/NH	Total
Good	8	2	1	11
Poor	6	11	8	25
Total	14	13	9	36

Note.  $\chi^2(2, n = 36) = 7.68, p < .05$ ; E/H = high engagers/substitutors; E/NH = high engagers/non-substitutors; NE/NH = low engagers/non-substitutors.

Table 4.

**Table 4**  
*Pre- and Posttreatment Group Differences on Measures of Psychopathology*

Scale and subscale	E/H		E/NH		NE/NH		Statistical
	M	SD	M	SD	M	SD	
<b>PTSD Symptom Scale – Invariant</b>							
Total PTSD	38.70	8.1	34.70	8.0	33.60	7.0	$F(2, 30) = 0.40$
Panic/avoidance	9.30	2.1	11.80	4.2	11.10	3.0	$F(2, 30) = 8.78^*$
Reappraisal	8.00	2.4	9.80	3.3	8.10	2.6	$F(2, 30) = 0.70$
Panic/avoidance	1.20	1.4	1.20	1.7	1.70	2.2	$F(2, 30) = 1.20^{ns}$
Reappraisal	11.80	3.3	11.70	3.7	9.40	4.8	$F(2, 30) = 0.02$
Panic/avoidance	7.90	3.0	4.90	3.5	4.80	3.4	$F(2, 30) = 0.80$
Reappraisal	8.90	3.0	6.80	3.0	6.60	3.4	$F(2, 30) = 0.40$
Panic/avoidance	3.80	1.9	4.70	4.2	6.40	2.7	$F(2, 30) = 8.50^*$
Reappraisal	17.80	6.0	20.00	9.2	19.80	11.6	$F(2, 30) = 0.70$
Panic/avoidance	6.20	4.0	9.70	7.1	10.00	12.0	$F(2, 30) = 4.00$
<b>Non-Post Anxiety Inventory</b>							
Total anxiety	47.90	14.5	52.20	13.8	49.00	15.0	$F(2, 30) = 0.40$
Panic/avoidance	16.70	11.0	27.20	8.3	20.40	11.3	$F(2, 30) = 1.10$
Reappraisal	40.40	13.0	35.00	11.6	38.60	8.8	$F(2, 30) = 0.20$
Panic/avoidance	16.70	12.2	46.30	4.3	42.40	11.3	$F(2, 30) = 1.10$

Note. E/H = high engagers/substitutors ( $n = 14$ ); E/NH = high engagers/non-substitutors ( $n = 13$ ); NE/NH = low engagers/non-substitutors ( $n = 9$ ); PTSD = posttraumatic stress disorder.  
\*  $p < .05$ . <sup>ns</sup>  $p > .05$ .