

# Emotional Processing and Outcome of Imaginal Flooding Therapy in Vietnam Veterans With Chronic Posttraumatic Stress Disorder

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This study examined emotional processing and outcome in 20 Vietnam veterans with chronic posttraumatic stress disorder (PTSD) who underwent imaginal flooding therapy. Results supported the occurrence of emotional processing, as manifest in significant activation, within-session habituation, and partial across-session habituation of physiologic and self-reported process variables. The flooding therapy produced only modest overall improvement, which was statistically significant for avoidance symptomatology measured by the Impact of Events Scale (IOES) and number of intrusions per day recorded by the subject in a log.

**D**IRECT THERAPEUTIC exposure has been defined as "repeated or extended exposure, either in reality or in fantasy, to objectively harmless, but feared, stimuli for the purpose of reducing negative affect."<sup>1</sup> (p. 3) Foa and Kozak<sup>2</sup> have offered a model of improvement during exposure therapy based on the concept of emotional processing. Lang<sup>3</sup> observed that processing of conceptual emotional information always involves some degree of visceral and motor outflow, implying that psychophysiology may be useful in tracking its course. Foa and Kozak propose that successful processing of pathologic fear requires activation of the fear structure, followed by modification of this structure through incorporation of corrective information. They identify a set of changes held to occur during the course of treatment of subjects who improve with exposure treatment that serve as indicators of successful emotional processing. These include physiologic responses and self-reports that indicate activation of emotion during exposure, a gradual reduction (habituation) of the magnitudes of these reactions within exposure sessions, and a reduction of the magnitudes of these reactions across exposure sessions. Psychophysiological and self-reported process measures obtained during imaginal and in vivo exposure therapy of subjects with obsessive-compulsive disorder (OCD) supported this formulation.<sup>4</sup>

Posttraumatic stress disorder (PTSD) may be particularly suitable for treatment by imaginal exposure (or flooding) because a past event that

Symptomatic improvement appeared to generalize from a treated to an untreated experience. Heart rate activation during the first flooding session predicted a decrease in daily number of intrusive combat memories across the therapy. Otherwise, there was little association between extent of emotional processing and therapeutic outcome. The results provide limited support for the notion that mobilization of psychophysiological arousal during exposure therapy predicts improvement.

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cannot be readily recreated in reality underlies the disorder.<sup>5</sup> Earlier case reports<sup>6-11</sup> and later controlled studies,<sup>12-16</sup> a number of which used combat veteran subjects, have reported positive therapeutic results with imaginal exposure in PTSD.

In anecdotal case vignettes taken from six PTSD Vietnam veterans treated within the study of imaginal flooding of combat-related PTSD reported herein, we described untoward complications, including exacerbation of depression, relapse of alcoholism, and precipitation of panic disorder.<sup>17</sup> We suggested that a feature of several of these complications appeared to be mobilization or exacerbation of a negative self-appraisal of the person's actions or inactions in the traumatic situation, accompanied by guilt and shame. We speculated that these emotions may not obey the same law of extinction as does anxiety on which the rationale for exposure therapy is based.

To our knowledge, the emotional processing model of therapeutic improvement during expo-

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sure therapy<sup>2</sup> has not been quantitatively tested in PTSD. This constituted the goal of the present study. We hypothesized that (1) PTSD subjects undergoing imaginal flooding therapy would show evidence of emotional processing in the form of activation, within-session habituation, and across-session habituation of physiologic and self-report measures of negative emotions; (2) subjects would show improvement with imaginal flooding, manifest in decreased levels of PTSD symptoms indexed by several outcome measures; and (3) the extent of each of the three dimensions of emotional processing would predict the amount of improvement. Because of its capability of measuring PTSD intrusion and avoidance symptomatology associated with a specific combat-related event that constituted the object of treatment, a priori emphasis was given to the Impact of Event Scale in assessing outcome of flooding therapy.

Subsequent to the performance of the study, but before data analysis, we formulated additional hypotheses that were based on clinical impressions during the course of the study's performance, reflected in our previous report on complications of flooding.<sup>17</sup> We hypothesized that activation of negative emotions other than fear, specifically anger and guilt (shame, unfortunately, was not measured), would predict a negative outcome, and that these emotions would not show the within- or across-session habituation expected for fear.

## METHOD

### *Subjects*

Subjects were 20 male Vietnam combat veterans meeting diagnostic criteria for PTSD as determined by the Structured Clinical Interview for DSM-III-R (SCID).<sup>18</sup> To participate, each subject had to describe two combat-related events he considered to have been emotionally traumatic and implicated in his subsequent symptoms. Subjects were recruited as part of an outreach effort and were not necessarily seeking treatment for their PTSD. Inpatients were excluded, as were subjects with an organic, psychotic, manic, or melancholic disorder, or with current alcohol or other substance dependence. Subjects enrolled in other individual or group psychotherapy were allowed to enter the study only if the concurrent therapy was supportive in nature and was not expected to overlap or conflict with the research therapy. Subjects who were on medication, including psychotropic medication or substances that could interfere with the physiologic responses to be measured, were asked to abstain from its use for a month prior to and for the duration of the study. Subjects in whom this was medically contraindicated or who were unwilling to meet this requirement were excluded.

Subject demographic and psychometric measures (mean  $\pm$  SD) were as follows: age,  $42.5 \pm 2.7$ , educational level (i.e., highest grade completed),  $14.8 \pm 2.0$ , and combat exposure,  $11.6 \pm 2.8$  (on a 0-14 scale).<sup>19</sup> Current comorbid axis I disorders included six (30%) major depression, three (15%) dysthymia, four (20%) panic without agoraphobia, two (10%) social phobia, two (10%) simple phobia, two (10%) generalized anxiety, one (5%) obsessive compulsive, one (5%) somatoform, and one (5%) alcohol abuse. Some subjects had more than one comorbid disorder; six (30%) had none.

All subjects were enrolled as Veterans Affairs (VA) Medical Center outpatients and were aware that their progress would be documented in their VA medical record. All gave written, informed consent for participation after the nature of the procedure and the risks and potential benefits had been disclosed to them.

### *Flooding Therapy*

One week prior to the first therapy session, a preparatory session was devoted to rapport building between subject and therapist and training the subject in relaxation and pleasant imagery techniques. Therapy was performed according to a PTSD Flooding Therapy Manual (available on request) based on a published procedure<sup>20</sup> modified for the purposes of the present study. So-called "hypothesized cues," i.e., cues representing the therapist's speculations regarding components of the event not reported by the patient, were not used.

The therapists were four doctoral-level, behaviorally trained therapists (authors B.A., R.E.L., R.E.P., and Dr. Evan Greenwald). The same therapist treated a subject throughout his participation. The therapists received special training and practice in implementing the therapy from an expert in the field (G.S.S.).

The expert rated videotapes of approximately one third of the flooding sessions for therapy integrity according to a score sheet (available on request) that used a 0 to 6 scale, with 0 indicating "unacceptable," 1 indicating "marginally acceptable," and 2 to 6 indicating "acceptable" in increasing degrees. Completed score sheets and suggestions for improving the therapy were fed back to therapists as therapy progressed.

A first (designated "A") series of six weekly flooding sessions focused on one of the subject's two reported personal traumatic combat events, selected at random. A second ("B") series of six weekly flooding sessions focused on the other reported personal traumatic combat event. The event that served as the focus of a given flooding series is referred to hereinafter as the "treated" (trt) event; the remaining event as the "untreated" (untrt) event.

### *Therapy Process Variables*

Physiologic process variables consisted of heart rate (HR), skin conductance (SC), left lateral frontalis electromyogram (EMG-frnt), and left corrugator EMG (EMG-corr), which were obtained according to instrumentation and techniques described elsewhere.<sup>21,22</sup> A behavioral process variable was derived from the number of total body movements during a given 10-minute segment, scored by

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