

IMAGINAL FLOODING AS A SUPPLEMENTAL TREATMENT  
FOR VIETNAM VETERANS SUFFERING RE-EXPERIENCING STRESS

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(Abstract)

A delayed type of combat-related disorder among Vietnam veterans has resulted in increasing numbers of such veterans seeking mental health assistance and the inclusion of post-traumatic stress disorder (PTSD) as a new classification in the DSM III. With symptoms of re-experiencing, emotional numbing, hyper-alertness, sleep disturbance, survival guilt and avoidance, PTSD can be extremely disruptive of social, intellectual, and occupational functioning.

While imaginal flooding of combat scenes has been shown to dramatically reduce PTSD symptomatology, the only supporting evidence published to date has been case studies. This is the first controlled study of the treatment using a clinical sample of the population.

Subjects were sixteen male Vietnam combat-exposed veterans who sought out patient treatment at the VAMC in Salem, Virginia. Aged 33 to 40, they all suffered from PTSD. A yoked design was utilized in which one group (n=8) received a supplemental flooding treatment and the other (n=8) did not. All subjects received standard hospital out patient treatment which generally consisted of both Vietnam veteran group and individual therapy.

In the experimental group, subjects also received the supplementary treatment of imaginal flooding. Several problematic scenes were identified for each veteran and presented in a hierarchical order for up to one-and-one-half hours per session of imaginal exposure. After all identified scenes had been flooded (for a maximum of 14 sessions including introductory and assessment sessions), the supplemental treatment was terminated.

Assessments were conducted before (pre) and after (post) flooding treatment and at three month follow-up in addition to continuous self-monitoring of sleep and nightmares. Subjects were administered the Spielberger State/Trait Anxiety Inventory (STAI/State and Trait), the Beck Depression Inventory (BDI), and the Modified Vietnam Experiences Questionnaire (MVEQ) at pre, post, and by mail at follow-up. Also, during pre and post testing a Behavioral Avoidance Test (BAT) was used which required the subjects to watch a ten minute Vietnam-related slide-tape show while heart rate (HR), subjective anxiety (SUDS), and avoidance were recorded.

Data support the hypothesis that the treatment is effective and, specifically, that it extinguishes anxiety to Vietnam-related stimuli and decreases re-experiencing problems. Three four veterans were excluded because the time limitations precluded adequate treatment for such extensive trauma. In spite of the consequent reduction of n to seven per group, all eleven dependent variables changed in a positive

direction over time. Four univariate tests tapping situational anxiety and re-experiencing problems, which were the areas most directly relevant to the flooding treatment, were significant for group \* time interaction at  $p < .05$  [STAI/State ( $F=5.58$ ), BAT/SUDS ( $F=15.26$ ), MVEQ/Sleep Disturbance ( $F=11.12$ ), and self-monitored nightmares ( $F=6.08$ )]. Two other variables were significant at  $p < .1$  [MVEQ/Hypersensitivity to Sound ( $F=4.23$ ) and MVEQ/Psychotic-like Symptoms ( $F=4.48$ )]. The completeness of the treatment program for the control group and improvement for all subjects increases the weight of the interaction. Many treatment gains appeared to be maintained after termination of flooding, but follow-up data were too sparse to yield meaningful statistical analysis.

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## I. INTRODUCTION

### Statement of Problem

In spite of the severity of problems and the increasing numbers of Vietnam veterans seeking mental health assistance, there is as yet no controlled treatment study in publication, a fact noted by Egendorf (1982) and reconfirmed by Foy, Donahoe, Carroll, Gallers, and Reno (1985). Although analogue studies are of particular relevance in generating and developing theoretical understandings, they cannot simulate combat exposure. On the other hand, while case studies do deal directly with the population, provide valuable demonstrations and suggest viable techniques, generalizability from such cases is severely limited. Even experimental studies may be inconclusive and, especially in a treatment setting, are hampered by clinically and ethically dictated limitations. Nevertheless, a series of replications of controlled experimental studies is the best available means for determining optimal treatment as well as the next logical step in the scientific process.

### Vietnam Veterans and Post-Traumatic Stress Disorder

Because this study focuses on Vietnam veterans, it is important to establish not only the most relevant diagnostic category, but also the unique characteristics of the population. These characteristics bear heavily on the development and severity of symptoms as well as treatment implications. In addition, they raise questions about the limits of

generalizability of other studies to Vietnam veterans and of the current study to non-veteran clients.

A major advance in the diagnosis and treatment of Vietnam veterans occurred in 1980 with the recognition of a new classification of responses to extraordinarily psychologically traumatic events. The American Psychiatric Association (APA) developed a diagnostic category called post-traumatic stress disorder (PTSD) in their third edition of the Diagnostic and Statistical Manual for Mental Disorders (APA, 1980). Descriptive of a more general class of responses, the four diagnostic criteria nonetheless characterize some of the problems common to and prevalent among Vietnam veterans. They include: (1) "existence of a recognizable stressor that would evoke significant symptoms of distress in almost everyone" (p. 238); (2) Re-experiencing the event in nightmares, intrusive thoughts and/or flashbacks; (3) withdrawal or becoming "numbed" to the environment. This can be indicated by a loss of interest in people or activities, dampened emotional responsiveness or interpersonal distancing; (4) the existence of at least two of the following symptoms:

- (a) hyperalertness or exaggerated startle response
- (b) sleep disturbance
- (c) guilt about surviving when others have not, or about behavior required for survival
- (d) memory impairment or trouble concentrating
- (e) avoidance of activities that arouse recollection of the traumatic event
- (f) intensification of symptoms by exposure to events that symbolize or resemble the traumatic event (p. 238).

Further, if symptoms persist more than six months, the disorder is classified as "chronic," if they begin after this time period, it is "delayed," and if they begin and end within the first six months post trauma, it is "acute."

#### Incidence and Demographics

The war in Vietnam was unique in many ways, resulting in a unique pattern of stress reactions among its veterans. Although combat neuroses and psychoses were markedly decreased, (particularly during the war years) relative to previous wars, there is an unusual trend of increasing reports of stress disorder over a decade after the fact. Thus, instead of the rapid and dramatic peak in stress disorders witnessed in 1945, following World War II, there has been a gradual, insidious rise, the azimuth of which is still unknown. While 13% of Vietnam veterans experienced serious adjustment problems in 1970, the rate had risen to 38% by 1980 (Williams, Note 1). Wilson (Note 2) stated:

given the delayed stress reaction growth curve for psychotic disorders it is likely that the number of Vietnam veterans in need of professional help will continue to increase in the next decade (p. 167).

In his monumental "Forgotten Warrior Project," Wilson (1978) estimated that 25 to 33% of this population was in need of mental health treatment. In testimony to the U.S. Senate, he quoted rates by 1980 of 40 to 60% in "chronic or cyclical forms of post-traumatic stress

disorder" (Note 3, p. 11).

Of the 2.8 million men who served in the military service in Southeast Asia between 1964 and 1973, close to one million lives were at high risk. Although some of the trials and trauma experienced by these men and the 303,598 injured were common to soldiers from other wars, previous wars had not created:

an existential quagmire of such intensity or absurdity so as to render ideological justification nearly impossible short of psychological delusion (Wilson, Note 2, p. 134).

In addition, the Vietnam War has been called our first teenage war with the average age being 19.2 as opposed to 26 for World War II. Some of the impact of combat experiences on the development of independence and intimacy has been attributed to this youthfulness (Wikler, 1980, Wilson, Note 2). At an age ordinarily devoted to the quest for intimacy and independence, the veterans were immersed in issues of mortality.

A study (Egendorf, Kadushin, Laufer, Rothbart, & Sloan, Note 4) was commissioned by the VA due to a consensus of personnel, patients and citizens that 20% of Vietnam era veterans continued to experience adjustment problems. Results of particular importance indicate that while, in general, adjustment problems had dissipated such that veterans were comparable to peers, certain areas remained problematic. Vietnam veterans reported more anger than peers and significantly more stress (more than one-third of heavy combat veterans were stressed today as opposed to less than 20% of non-veterans and Vietnam era veterans).

Studies of PTSD in War Veterans

Perhaps due to the severity, duration and frequency of events, veterans tend to display a wider range and greater intensity of symptoms than other PTSD sufferers. Researchers at the Brentwood Veterans Administration (Foy, Sippelle, Rueger, & Carroll, 1984 and Carroll, Rueger, Foy, & Donahoe, 1985) found several additional symptoms to be associated with PTSD in Vietnam combat veterans. Discriminant analyses of two independent samples of such veterans yielded symptoms of "tension or anxiety, disgust, alcohol abuse, suicidal thoughts, hostility, marital problems, depression, and irritability" (Foy et al, 1985, p. 1).

In addition, Wilson, Smith and Johnson (1985) in a comparative study, demonstrated dramatically inflated questionnaire scores for Vietnam combat veterans (p. 10) relative to other stressed groups. The two veteran groups consisted of: (1) 74 volunteers from the Northern Ohio Veteran Association and (2) a national sample of 114 clients from the Veterans' Administration's Readjustment Counseling Program. The other stressed categories included individuals who had suffered rape (n=9), death of a significant other (n=96), divorce (n=13), critical illness (n=19), life threat (n=62), family trauma (e.g. alcoholism, divorce, etc.; n=16), multiple events (more than one of above categories; n=27), and a control group without a stressful event (n=93). Using a priori hypotheses and division of categories, the study demonstrated the importance of degree of loss (of significant others)

and amount of life threat, both high for the Vietnam veterans. As a group, the Vietnam veterans indicated severe symptomatology with scores of subscales of the Vietnam Era Stress Inventory (Wilson & Krauss, 1980) inflated anywhere from one-third (Physical Symptoms) to six times (Intrusive Imagery) as much as for the next highest-scoring group. Other scales included Depression (twice as high), Stigmatization (six times as high), Sensation Seeking (50% higher), Rage/Anger (40% higher) and Intimacy Conflict (twice as high). Scores on the Beck Depression Inventory were also twice as high as for any other group while the Impact of Event Scale yielded scores similar to the rape and divorce groups and higher than the other categories (ranging up to twice as high for "no event" for Intrusion and Avoidance).

#### Treatment of Vietnam Veterans with Imaginal Flooding

While group therapy is currently the "treatment of choice" for Vietnam veterans with PTSD, intensification of symptoms (especially nightmares, flashbacks and intrusive thoughts) frequently occurs, leading to high levels of dropout from and discomfort in treatment. The technique of imaginal flooding, grounded in the learning principle of extinction, has been used successfully at the Jackson, Mississippi VA Medical Center (Keane, Note 5) for several years. Flooding has been claimed to decrease such symptoms as flashbacks and nightmares and the associated anxiety. However, to date only case studies have been reported in the literature and consequently the method is not broadly

utilized. The current study is a first attempt to test the validity of the flooding approach in a controlled study.

Because flooding treatment is derived directly from learning theory it has three distinct advantages. First, it provides a clear rationale with sufficient face validity that the client can comprehend the treatment with relative ease. Second, if the client can begin to understand his symptoms as natural, learned responses to unusually severe events rather than as some indication of inherent "craziness," this is less damaging to his self-esteem. Third, if the symptoms have been learned, they can be unlearned and the client has reason to feel hopeful. PTSD sufferers are especially well-suited for this approach since the relevant learning history is often apparent and, in fact, is the first criterion for diagnosis. The approach is invaluable in explaining and treating re-experiencing symptoms and, as a result, may have a positive impact on related problems such as sleep disturbance, depression, and anxiety.

To begin with the basic principles underlying the flooding technique, Mowrer's two-factor learning theory (1960) provides an easily understood explanation for avoidance behavior. In the first step, classical conditioning with a strongly aversive stimulus leads to a conditioned emotional response (CER). For example, a person who has been in an automobile accident (USC = pain or injury) may subsequently feel anxious or fearful (CER) about riding in a car. In step two,

avoidance behavior is operantly learned because of the reinforcing effects of avoiding cars and thus avoiding the associated negative CER.

A common consequence of veterans' traumatic experiences is that they developed CER's to many associated stimuli and subsequently learned to avoid them as much as possible. Unfortunately, this solution has proven inadequate. Such varied stimuli as the smell of diesel fuel, the sound of helicopters and the sight of oriental people still elicit strong emotional responses well over a decade after the original learning experience. Some veterans avoid crowds or noisy events while others may simply have learned to think about other things when painful memories intrude in their lives. Although many have adapted well, they may still be plagued by re-experiencing symptoms.

Imaginal flooding with Vietnam veterans utilizes the clients' memories to reconstruct scenes that continue to produce anxiety. It involves maintaining exposure for a sufficient duration to allow extinction of the CER's. Imagery is a powerful tool which the therapist can use to include the whole context of events as experienced in all sensory modalities. This is important in achieving an optimal extinction effect as opposed to extinguishing only certain elements or aspects of the memories.

Flooding does not make the veteran forget what happened. To the contrary, memories generally become clearer and additional detail is remembered as therapy progresses. The treatment serves to make the

memories tolerable by extinguishing the CER and subsequent avoidance responses. Veterans often express boredom after repetitions of a scene that originally evoked considerable anguish.

## II. LITERATURE REVIEW

Several areas of theory and research are germane to this study of imaginal flooding as a treatment for Vietnam combat veterans suffering from PTSD and will be discussed below. Starting with theoretical aspects, the major etiological question of whether PTSD is predominantly due to trauma or predispositional factors strongly influences professional conceptualization of the disorder, treatment course, and prognosis. It will be argued that the trauma itself is most important to the development of PTSD. Next examined will be data pertinent to the question of the applicability of learning theory to the etiology and treatment of PTSD. This will consist of a discussion of treatment approaches that have been used for PTSD followed by an explanation of the learning theory perspective used in this study and specifically of flooding treatment for anxiety disorders in general and PTSD in particular. Finally, the section will conclude with a brief summary and a presentation of the hypotheses.

### Impact of Premorbid Adjustment vs. Stress

Because the flooding treatment focuses on traumatic events as they are re-experienced by the client, it is crucial to establish the importance of these events to his pathology. If the predominant determinant of PTSD were premorbid adjustment, then the expectation for treatment effectiveness would be decreased since there is no reason to postulate any impact of flooding on pre-trauma mental disorders.

One of the few studies of this issue in the literature espousing a predispositional view was conducted by Helzer, Robins, Wish and Hesselbrock (1979) as a follow-up to their earlier work (Helzer, Robins & Davis, 1976) comparing 571 Vietnam veterans and 284 "matched civilian controls." A liability scale was used to control for preservice demographics, delinquency and drug use. Depression found during the initial interviews among veterans one year post combat seemed to have dissipated by the time of the latter interviews. The authors suggest that depressive symptoms (an "associated feature" of PTSD according to the DSM III, p. 237) are transitory and could, three years post combat, be almost totally accounted for by predispositional factors. Extent of combat exposure was not considered as a variable.

Borus (1974) also found that such supposedly predispositional factors as age, education, draft status and rank differentiated "adjusted" from "maladjusted" (those who sought mental health assistance or who had been disciplinary problems in the service) veterans among 64 enlisted men one year post Vietnam. Again, he failed to account for combat exposure. Since older, higher ranking, better educated men were much less likely to be exposed to heavy combat, this may represent a serious confound.

On the other side of the ledger, many investigators have emphasized the importance of traumatic stress to subsequent symptomatology. Repeated findings have demonstrated that as the degree of stress

involved increases, the importance of other factors diminishes until, at an extreme level, all survivors suffer impairment from the trauma. Hocking (1965, 1970) found this to be true for a sample of over 300 World War II veterans he studied and the same pattern has been verified for Buffalo Creek flood disaster victims (Lifton & Olson 1976, Stern, 1976, and Titchener & Kopp, 1976), Cambodian refugees (Kinzie, Fredrickson, Ben, Fleck & Karls, 1984), substance abusing Vietnam veterans (Penk, Robinowitz, Roberts, Patterson, Dolan, & Atkins, 1981), and Vietnam veterans in general (Frye & Stockton, 1982, Strayer & Ellenhorn, 1975, Egendorf et al, Note 4, Stampler & Sipprelle, Note 6, and Barret-Ruger & Lammers, Note 7). While the latter results demonstrated the influence of other variables as well, all of these papers concluded that for severe stress levels, the impact of the trauma itself prevailed over all other variables as a prediction factor. For example, people experiencing total devastation in the Buffalo Creek flood ubiquitously demonstrated symptoms (Lifton & Olson, 1976). Also, all thirteen Cambodian refugees had had PTSD for at least three years (Kinzie et al, 1984). In addition, Stampler and Sipprelle, (Note 6) showed a strong direct correlation between combat exposure and PTSD among 43 Vietnam era veterans with the highest exposure score (for three tours of duty) corresponding to 100% incidence of PTSD.

Finally, Ursano (1981) presented six cases of Vietnam POW's who had undergone extensive pre-trauma evaluations. Three who had been

preselected as excellent specimens of mental health all showed symptoms of depression or PTSD while three who had been diagnosed as personality disordered showed no signs of pathology. This study demonstrated that stress can evoke pathology even in very stable individuals and that even documented pre-existing adjustment problems do not necessarily predict post trauma disorders.

In conclusion, while individual differences may certainly effect a person's response to stress, several reviewers (Buck, 1982, Chamberlin, 1980, Ewalt & Crawford, 1981, and Lipkin, Scurfield & Blank, 1983) concur that predispositional factors are inadequate predictors of PTSD relative to severity of the stress itself.

#### Treatment Approaches Previously Used for PTSD

In general, there is a dearth of controlled experimental research in the area of PTSD. There have been numerous studies dating from the Coconut Grove Nightclub fire (Cobb & Lindemann, 1943 and Adler, 1943) and covering such diverse disasters as floods, famine and nuclear bombs as well as such personal crises as rape, murder and accidental death. Most of these studies, however thorough, have been descriptive in nature, elaborating either on the symptoms exhibited or their rate of incidence (Chamberlin, 1980).

Lifton's work with survivors of Hiroshima (Lifton, 1967), flood victims from the Buffalo Creek disaster (Lifton & Olson, 1976), and Vietnam veterans (Lifton, 1980) has led him to some valuable insights.

He conceptualizes five patterns of survivor imagery (1975) including "death imprint," "death guilt," "psychic numbing," "suspicion of the counterfeit in all relationships" and finally the "overall struggle... to give form, significance, and meaning to the death immersion" (p. 182). Victor Frankl (1959), based on his personal experience and observations in a Nazi concentration camp, constructed his logotherapy around a search for meaning, comparable to Lifton's fifth pattern.

More recently, Horowitz and Kaltreider (1979) published three goals they consider fundamental to PTSD treatment. The first is to assist the survivor in recovering self-esteem. Second is to help him or her to resume constructive and adaptive behavior. Third is to process the traumatic stress reactions so that they no longer evoke intense emotional responses.

In a more directly treatment-oriented statement, Dixon (1979) recommended verbalization of the traumatic memories and concurrent feelings followed by cognitive restructuring. Frederick (Note 8) advocated systematic desensitization, flooding, hypnosis and supportive psychotherapy for mitigating the anxious component of PTSD.

John Wilson (Note 9) summarized the state-of-the-art in understanding some of the parameters of trauma and their effect on PTSD presentations. As the degree of life threat or exposure to death and dying increase, subsequent anxiety, intrusive imagery and hyperaltness are intensified. Degree of loss of significant others impacts more

specifically on depression, grieving, rage at the source of loss, and search for meaning. Increases in suddenness of the trauma and potential for recurrence both increase anxiety and feelings of helplessness. Greater durations of traumatic events increase overall severity of symptoms, especially emotional numbing and denial. Displacement from the home community (generally due to its destruction as in the Buffalo Creek disaster) tends to precipitate anomie and delinquent behavior. High degrees of moral conflict are frequently associated with somatic symptoms. Finally, the person's role in the trauma is thought to influence his symptomatology with the agent being more prone to guilt and suicidal behaviors while the victim tends to be paranoid and angry.

Lindy (Note 10) expounded further on the unique qualities of survivor-therapist interactions, making several recommendations for the interpersonal approach. He began by explaining that during recovery the survivors maintain a "fragile equilibrium" which a "trauma membrane" protects from intrusion. Essentially, people protect themselves while processing the trauma, carefully restricting new people and resources and barring interactions with any but those perceived as helpful. Others who shared the experience are generally accepted within the "membrane" but strangers are immediately suspect. Often the responsible institution (if one exists) strives to shift the blame away from itself and deny culpability. In contrast, the survivors are frequently enraged at such institutions and may fix the blame more emphatically than is

warranted.

Next, given this basic survivor pattern, Lindy (Note 10) made several suggestions to therapists working with these populations. First, survivors tend to be more comfortable with temporary service systems which have a low association with the system they perceive to be at fault. Second, survivors are very sensitive to the therapists' familiarity with events, ability to listen and empathic responsiveness. Lastly, it is important if the therapist is to penetrate the trauma membrane that s/he be seen as a genuinely caring individual or friend rather than as strictly professional or glory-seeking.

Ochberg's (Note 11) therapeutic bias was immediately clear as he described two types of psychotherapy for PTSD. One deals with the predispositional aspects while the preferred second type concentrates on recent events, coping skills and "real options." He emphasizes the importance of therapist assumptions in setting the therapeutic relationship, strongly advising respect for the client's dignity and deferment or omission of an exploration of weaknesses.

Ochberg continued by elaborating five stress response paradigms and his suggestions for treatment of each. (1) "Bereavement" is a painful but normal reaction to loss. Griefwork includes expression of feelings and of the meaning of the loss and eventual reattachment to new significant others.

(2) During the "Victimization" process, the survivor feels

humiliated, exploited and shamed, isolated and angry. Because people need to believe in their own personal immunity to disaster and death, they commonly "blame the victim," attributing his suffering to some predispositional characteristic or poor judgment. Thus the culture aggravates the survivors' sense of victimization and isolation. The therapists' role is to help the client understand his feelings as a normal process which will heal with time.

"Arousal" involves an adaptive physiological response or autonomic nervous system activation in response to danger. Initially, it is usually experienced as fear but with the passage of time the source becomes obscured and the arousal is experienced as anxiety. Ochberg suggests using medications to alleviate this anxiety while the current study tests the efficacy of a behavioral alternative to drugs.

(4) Lifton's "death imagery" or "death immersion" occurs because the usual "veil of denial" is lost in the trauma and the survivor's own death seems much more real and imminent. Therapy recommendations include developing coping skills and creating an atmosphere of security.

(5) Lastly, "negative intimacy" results from traumas in which personal space is violated as when the individual is raped, physically attacked or held hostage. The victim tends to feel degraded and disgusted with himself. Ochberg claims examination and discussion of the details of the event usually help erase these feelings. He reports "...when it's on the table it goes away."

There are a limited number of descriptive reports of treatment of non-combat PTSD. In the study mentioned above, Kinzie and his colleagues (1984) treated thirteen Cambodian refugees psychodynamically. All survivors of concentration camps exhibiting PTSD symptoms, the refugees were reluctant to report their experiences and such discussion precipitated intensifications of symptoms. Although Kinzie et al blamed cultural differences and language barriers for the treatment failures, there is an alternative explanation. By discussing a plethora of memories, the therapists presented a multitude of CS's, each raising its associated CER. In all likelihood no CS was presented for sufficient time to allow for an extinction to occur. Rather than extinguishing the anguish, each presentation strengthened the conditioning effect leading to intensified intrusions and efforts to avoid.

Lindy, Green, Grace and Titchener (1983) treated thirty survivors of the Beverly Hills Supper Club fire. Therapists were directed to elicit all thoughts and feelings about the incident before, during, and after it transpired, to relate these to the fire and to encourage griefwork. They were instructed to make the following interpretations for the clients: (1) apprehensions of being retraumatized were fears stemming from the trauma rather than current realities, (2) it was irrational to feel guilty or ashamed, and (3) feelings perceived as rage were in actuality feelings of helplessness. Ten individuals completed the six to eight week treatment program and claimed their symptoms were

alleviated. Especially due to the immediacy of the intervention, normal recovery might be expected to occur during the treatment time frame. Therefore it is impossible without any form of control group to attribute improvements to the crisis intervention rather than to a normal recovery process.

Cienfuegos and Minelli (1983) reported high success rates for their treatment of thirty-nine survivors of politically-motivated torture, exile, and execution in Chile. During a three to six week treatment program, the victims reported their experiences twice, wrote essays testifying to and protesting the injustice and violence exercised against them and were helped through further discussion to integrate the events into their lives. Cienfuegos and Minelli admitted that their "testimony" technique was ineffective with relatives of missing persons in which cases the outcome of the trauma was uncertain and the trauma essentially still in process. Unfortunately, their claims to success with the other victims are subject to the same criticism as Lindy et al (1983) since there is no untreated control group.

Two case study reports of accident victims (one helicopter and one automobile) were presented by McCaffrey and Fairbank (Note 12). A multimethod assessment was used to record physiological, behavioral and cognitive responses to a videotape before and after treatment. Relaxation training, flooding and in vivo exposure treatments were used in the therapeutic regimen. While both subjects were successfully

treated, the tripartite assessment showed differential improvements with cognitive gains for one and physiological for the other.

A final case report of a twenty-two year old incest victim (Rychtaric, Silverman, Van Landingham, & Prue, 1984) avoids one of the pitfalls of the previous studies due to the chronic nature of the symptoms. In other words, any normal recovery processes would have been completed prior to treatment and recovery can more easily be attributed to the therapy. Five consecutive days of imaginal flooding extinguished her arousal to the initial incestuous events, to stimuli conditioned with them and those generalized from them. Autonomic responses were reduced over treatment and intrusive memories faded and eventually ceased. At a one year follow-up the woman reported no recurrence of these incest-related problems.

In conclusion, the scant literature available on treatment of non-combat PTSD seems to indicate that several styles of therapy are effective in reducing symptoms. To date, all of the apparently successful methods involve extensive exposure to the details of the traumatic event. Some therapists prefer to use psychotherapeutic working through and in-depth explorations of the meaning of the event while others prefer cognitive or behavioral approaches. The only reported treatment failures, Kinzie et al's Cambodian refugees, were much more severely and extensively traumatized and not as intensively treated with regard to the trauma.

Learning Theory Perspective

Mowrer's two-factor learning theory (1947 and 1960) provides a reasonable explanation to practically all symptoms of PTSD. In this theory the original classically-conditioned responses (the first factor) fail to extinguish with the passage of time because they are avoided. The avoidance (the second factor) is negatively reinforcing. In other words, when exposure to a CS such as the sound of helicopters elicits a CER (e.g. anxiety), the veteran will exert energy to distract himself and stop thinking about the Vietnam memories. This distraction is subsequently rewarded by a decrease or cessation of the noxious CER such that the efforts to avoid are maintained. In the case of the Vietnam veteran, avoidance was further reinforced by the vast majority of people in the United States who did not wish to hear any more about Vietnam, who simply could not comprehend the veteran's experience or who responded in a derogatory manner. In a similar fashion, nightmare and flashback CER's are evoked by CS's and cause considerable distress, but there may be a greater state-dependent lag time before the avoidance mechanisms become effective.

Specifically, Vietnam veterans developed a multitude of classically conditioned responses to stimuli associated with traumatic events. Such secondary stimuli as sounds (e.g. munitions, helicopters, planes, mosquitoes), sights (e.g. flares, oriental people, sunsets, camouflage fatigues, fog), smells (e.g. diesel fuel, feces, blood, mildew, burned

flesh, putrefied bodies), tastes (e.g. salty sweat, c-rations, rice), "feels" (e.g. heat, humidity, leeches, itching, fever, dehydration) and thoughts, through association, came to elicit startle responses, intrusive thoughts, nightmares and flashbacks, anxiety, depression and related CER's. Some additional stimuli became conditioned due to association with the original CS's (higher order conditioning) and others due to similarity to the original CS's (generalization). Much to their embarrassment, many veterans have "hit the dirt" in response to a noise such as a car backfiring, thus combining a classically conditioned startle response, an operantly reinforced "dive to safety" and generalization from gunfire to another loud sound.

As Vietnam veterans enter treatment and begin to discuss and contemplate their experiences, their symptoms tend to intensify. In particular, the exacerbation of re-experiencing increases the difficulty of maintaining a therapy regimen and dropout is frequently a problem (Scurfield, 1984, and Williams, 1980). These common and distressing symptoms, incorporated as criterion #2 in the DSM III diagnostic definition of PTSD are specifically the recurrence of nightmares, intrusive thoughts about the war and/or flashbacks. Keane, Zimering and Caddell (1985) call these symptoms the "benchmark symptoms" of PTSD (p. 10). Almost 35% of the 900 veterans interviewed by Figley and Southerly (1980) reported recurring dreams or nightmares and 26.3% had sought professional help for that reason. Dividing their sample into

four groups by their military experience [(1) wounded in combat, (2) involved in daily combat but not wounded, (3) stationed in Vietnam but not in daily combat and (4) stationed elsewhere than Vietnam], Figley and Southerly discovered that close to 2/3 of the first two groups (65.8% and 60.5%, respectively) reported dreams and nightmares while only 43.2 and 33.9% of the latter groups did so. (These groups correspond, respectively, to 5, 3 or 4, 1 or 2, and 0 on the Vietnam Experience Scale discussed above.) The first two groups were also liable to report more nightmares with such disturbing content that many feared sleep. These were likely to persist over many years for the combat groups.

Most Vietnam veterans report attempts to avoid traumatic memories due to the intensely negative emotional response associated with them. While this avoidance may initially prove to be an effective coping mechanism, usually the prevalence of CS's (including higher order stimuli and generalized stimuli) becomes impossible to avoid. As intrusions increase and the individual becomes less able to control his arousal, he becomes more likely to seek professional help.

Often there is a long history of re-experiencing symptoms and the question arises as to why the CER and avoidance responses do not extinguish. The simple explanation would be that the exposure duration was insufficient. However, a second type of veteran has sat through war movies, had lengthy nightmares, etc. and protests that he does not avoid thinking or talking about Vietnam. The author's experience has

generally been to discover on further investigation that these "Type II" veterans, too, make efforts to escape the traumatic memories as the intensity becomes painful. Assuming that CER's increase and eventually decrease over time, we could loosely describe an "inverted U" function. As a CS (e.g. the sound of helicopters) is presented, it begins to elicit a CER, for example anxiety, associated with a traumatic memory involving helicopters. The "Type I" veteran quickly diverts his attention whereas the "Type II" waits until his anxiety increases to a high level. Ultimately, both avoid the memory but the result is an additional pairing of the CS with an aversive CER which, if anything, strengthens the conditioned response. If the avoidance response can be prevented (flooding) until the CER has increased to its maximum and then begun to decrease, then the CS is paired with a decreasing, lower level of anxiety. The veteran can be said to "unlearn" or extinguish his CER. In essence, he learns that the memories, though painful, are not currently dangerous.

It is also theoretically and practically important to note that conditioning occurs not to a single, isolated stimulus, but to a context of stimuli. Levis and Hare (1977) conclude from an extensive review of the laboratory research that "the most efficient (way extinction of the CER) can be achieved is to present the total CS complex in the absence of primary reinforcement" (p. 318). While in vivo flooding incorporates the context most fully and has proven an effective mode of treatment for

agoraphobics (Emmelkamp & Wessels, 1975; Mathews, Johnston, Lancashire, Munby, Shaw, & Gelder 1976) and for obsessive-compulsives (Rabavilas, Boulougouris, & Stephanis, 1976) it is clearly impractical for Vietnam combat veterans. Because of the multisensory nature of stimuli, Stampfl and Levis (1973) recommend the use of imagery for presentation. Stimuli from all sensory modalities can be presented and imagery techniques have been shown effective in a flooding study with agoraphobics (Chambless, Foa, Groves & Goldstein, Note 13) and in case reports of veterans with PTSD (Black & Keane, 1982, Fairbank & Keane, 1981, and Keane & Kaloupek, 1982).

If flooding is indeed effective, it can be expected to diminish the veteran's CER's (especially fear and anxiety) associated with the complex host of CS's or "triggers," reduce his avoidance responses and allow him to more comfortably discuss his memories and work through the issues involved (e.g. guilt, mourning). Once the CER's have been extinguished, the memories should no longer be "intrusive" and re-experiencing should be "de-traumatized."

#### Flooding Treatment

Exposure techniques have been utilized effectively in the treatment of such widely varying disorders as alcoholism, schizophrenia and insomnia however they are most commonly used in treating anxious and obsessive complaints. The most pertinent area to this study is the literature dealing with the treatment of anxiety disorders with

flooding procedures. Application of flooding to PTSD will also be addressed specifically. Finally some comments will be made concerning the inherent risks of the technique.

In the general class of direct exposure techniques, flooding is closely related to and frequently confused with implosion. While both work on extinction principles, the latter is psychodynamically oriented. Implosive therapists (Levis & Hare, 1977) work under the assumptions that: (1) phobic behavior is based not only on CS's, but also on the symbolic significance they carry and that (2) maximization of anxiety is necessary for effective treatment. These assumptions lead implosive therapists to use cues they hypothesize to be relevant based on psychodynamic principles and to exaggerate and embellish cues to intensify the treatment. In contrast, flooding is a more purely behavioral technique and relies on stimuli as reported directly by the client.

In spite of limited research on the relative effectiveness of the two methods, what exists appears to favor flooding. In one study, Prochaska (1971) found no benefit to using psychodynamic cues in implosive treatment of test anxiety. Further studies by Foa, Blau, Prout, and Latimer (1977) and Marshall, Gauthier, Christie, Currie and Gordon (1977) reported "horrific" cues to be detrimental to treatment. Levis and Hare proceed to use implosive therapy as a generic term since "the techniques differ procedurally only in the type of cue category

selected for presentation." (Levis & Hare, 1977, p. 327).

### Anxiety Disorders

As in most controlled treatment studies of flooding effectiveness Boulougouris, Marks and Marset (1971) compare it to systematic desensitization procedures. They perform a cross-over comparison of flooding and systematic desensitization on 16 phobic patients and had greater success with flooding, especially with the agoraphobics (as opposed to more circumscribed phobias). The cross-over design prohibited meaningful follow-up data.

Using a similar design with four agoraphobics and ten patients with specific phobias, Crowe, Marks, Agras, and Leitenberg (1972) found an in vivo shaping procedure to be the most effective of three treatments (as measured by behavioral tests of ability to approach) with imaginal flooding second and systematic desensitization last. In spite of these results, patient preference was for systematic desensitization.

Hussain's (1971) results of agoraphobic treatment were also in concordance, with imaginal flooding again surpassing systematic desensitization. Unfortunately, his results were not clearly interpretable due to the use of psychotropic medications and placebos.

Another study demonstrated marginal superiority of flooding over desensitization on several outcome measures although results were not significant overall. However, in this study, Gelder, Bancroft, Gath, Johnston, Mathews and Shaw (1973) also determined that six months after

treatment the groups were equivalent. A study reported by Shaw (1979) showed no treatment differences for flooding, desensitization and social skills training for social phobics with all three proving effective.

Finally, Griest, Marks, Berlin, Gournay, and Noshirvani (1980) compared the progress of thirteen phobic and four obsessive patients using an exposure vs. and avoidance treatment. Homework instructions for the former group encouraged maximum confrontation of the feared object while for the latter they discouraged any contact whatsoever. Once more, use of a cross-over design prohibited follow-up. Nonetheless, the exposure method resulted in significantly better treatment outcomes while avoidance slightly agitated the disorders.

Addressing the issue of session length and in vivo vs. imaginal flooding, Stern and Marks (1973) treated sixteen agoraphobics. The failure of imaginal flooding cannot easily be attributed to failure of the technique since there is a substantial discrepancy between the audio tape method used and live therapy. However, long exposure (two hours) did precipitate significantly greater improvement than short segments (four 30 minute exposures with 30 minute rests between) for the in vivo flooding condition.

The importance of exposure duration has also been demonstrated with obsessive-compulsive patients (e.g. Rabavilas et al, 1976) nursing students viewing surgical films (McCutcheon & Adams, 1975) and spider phobics (Mathews & Shaw, 1973). Mathews and Shaw found massed scene

presentations of 48 minute duration superior to six eight minute sessions with intermittent rests. In McCutcheon and Adams' experiments, 20 minute exposures resulted in sensitization while 60 minute exposures decreased GSR arousal and improved surgery-viewing tolerance. Available evidence concurs with the theoretical implication that insufficient exposure duration reinforces the CER and avoidance behavior whereas prolonged exposure allows extinction to occur.

#### PTSD

The earliest report known to this author of the successful use of flooding for PTSD was Herman's (Note 14) presentation to the Association for the Advancement of Behavior Therapy in 1974. He demonstrated dramatic reductions of intrusive war thoughts and drug abuse in a single case report with a Vietnam veteran.

Perhaps due to the failure to publish, there was apparently no additional support for use of the technique for this population for some time. Finally a group at the Jackson, Mississippi VAMC (Black & Keane, 1982; Fairbank & Keane, 1982, and Keane & Kalopuek, 1982) became active not only in utilizing the flooding technique, but also in publishing and presenting their clinical results.

To being with, Black and Keane (1982) reported their treatment of a 55 year-old World War II veteran who had been resistant to other forms of treatment over a multiple-problem (alcoholic, agoraphobic, PTSD, etc.) thirty-six year history including 15 hospitalizations in the

preceding three years. He was still doing well at two year follow-up after flooding. Although his history tends to validate that flooding was the key treatment in his improvement, this is impossible to determine conclusively.

Keane and Kaloupek also demonstrated flooding success with a Vietnam veteran and presented several measures of change, encompassing behavioral criteria (hours of sleep, frequency of nightmares and flashbacks), subjective judgments of anxiety, and one physiological indication of arousal during sessions (heart rate). Unfortunately, as the authors concede, inclusion of other treatments (problem-solving skills and relaxation) make it impossible to attribute improvements exclusively to flooding.

Finally, Fairbank and Keane (1982) presented a fascinating two-case study of generalization of flooding across combat scenes for two Vietnam veterans. They discovered that very similar scenes did generalize in that a probe of one scene elicited less anxiety (as measured by heart rate and by subjective units of distress) following treatment of a related scene. For example, after Subject #1 was flooded for the first scene of four ("The subject listened to the screams of an enemy combatant whom he shot and killed during a night ambush attack upon enemy troops," p. 500) his anxiety rating dropped for probes of both scene 1 and scene 2 ("The subject accidentally wounded one of the men in his own unit during a night ambush attack upon enemy troops.", p. 500)

but not for scenes 3 and 4 which involved river patrols and drownings. These results suggest the importance of extinguishing all major themes although some generalization can be expected among similar ones. Fairbank and Keane (1982) recommend that future research on these issues utilize "a wide range of outcome measures, extensive follow-up data, and large group designs" (p. 309).

#### Potential Risks

Many authors (e.g. Bandura, 1969; Coleman, 1976; Morganstern, 1973; Rimm & Masters, 1974; Singer, 1974; Wolpe, 1969) and professional psychologists and psychiatrists caution against the use of flooding due to some "dangers." Although the technique is certainly intense and requires careful preparation of both the therapist and client, it is difficult to substantiate the claims of hazard.

Marshall and Gauthier (1983) carefully review reports of treatment failures in flooding. In their definition of the method, they state that flooding procedures have the "... limited goal... (of) ...reduction of maladaptive responding to emotionally distressing stimuli" (p. 83). Improvements can be anticipated in terms of anxiety reduction, decreased avoidance behavior and decreased physiological arousal, but these will not necessarily generalize to such related problems as depression, family relations, or sexual dysfunction. The few failures they discovered were mostly attributable to errors in clinical judgment and application of the technique. The failures were also, perhaps

coincidentally, all obsessive-compulsive cases.

Marshall and Gauthier (1983) located only one (unpublished) report of the ultimate failure. A severely obsessional man was "successfully" treated with flooding for his contamination phobia but committed suicide three weeks later. Unfortunately, his interpersonal problems were neglected in treatment and he remained desperately lonely. The error appears to have been in the therapist's narrowness of focus or false assumption that successful flooding was a panacea, rather than in the flooding treatment itself.

Two studies of flooding with obsessive-compulsives (Foa, 1979, Marks, Hodgson & Rachman, 1975) and one survey of professionals who use the technique (Shipley & Boudewyns, 1980) reported treatment failures. Foa (1979) claimed an 85% success rate overall from her studies of flooding while ten cases either relapsed or failed to improve. Because she does not report her sample total, it is impossible to infer her precise rate of failure since the remaining 15% may be inflated with dropouts and failures to comply with treatment. Marks et al (1975) found 25% of their sample of twenty patients to be unresponsive to in vivo exposure.

Shipley and Boudewyns' (1980) survey gathered information from 70 therapists concerning the treatment of 3,493 people with flooding or implosion. Only nine of those treated experienced deleterious side effects as reported by six of the responding professionals. Two of the

four who underwent acute psychotic reactions had histories of paranoid schizophrenia and all four recovered rapidly with phenothiazine medication. Five patients experienced temporary panic reactions. Three of these five were nonetheless successfully treated with flooding while one reportedly recovered without further treatment and the last, dropping out after only one session, failed to improve.

Finally, Foa, Grayson, Steketee, Doppelt, Turner and Latimer (1983) published their effort to explicate determinants of failure among their flooded obsessive-compulsives. Of the forty-six for whom follow-up data was available, only one was reported to be a "failure" immediately post-treatment (as opposed to "improved" or "much improved") while eleven (24%) were so classified at follow-up (three months to three years later).

As Marshall and Gauthier (1983) conclude from their review:

There does not seem to be substantial evidence to support the often expressed concern that flooding may exacerbate rather than extinguish fears, nor are any significant other side-effects at all common. The literature and the comments of clinicians and researchers suggest that failures are no more common in flooding than they are in the use of other anxiety-management procedures, and may even be less frequent. Absolute failures, in the sense of no apparent benefits despite the patient's cooperation in an apparently adequate treatment program, appear to be rare (p. 99).

#### Summary

In conclusion, there are several areas of relevant research. The infrahuman literature has supplied the basic groundwork for understanding the learning principles. Case studies have specifically

demonstrated positive and frequently dramatic results for imaginal flooding with PTSD sufferers in general and Vietnam veterans in particular. Analogue studies indicate the importance of exposure duration and cue relevance. Several controlled treatment studies with obsessive-compulsives and phobic disorders demonstrate the efficacy of flooding. Some of these studies indicate a marginal advantage of flooding over systematic desensitization and other behavioral techniques although it is unclear whether the advantages are maintained over time.

A glaring deficiency is the absence of a controlled treatment study of flooding with a traumatically stressed population:

The ultimate validation of a therapeutic technique's effectiveness can only come about through systematic study of the technique using clients as the subject of study... one cannot over generalize from data collected on nonpatient populations (Levis & Hare, 1977, p. 351).

While some studies reported in the literature do treat the population of concern, these are limited to case studies, which:

have little, if any, formal scientific value, and at best provide very crude hypotheses about cause-effect relationships (Morganstern, 1973, p. 321).

In emphasizing the critical importance of research in the area, Penk, Robinowitz, Roberts, Patterson, Dolan and Atkins (1981) contend that:

this research should consist of field research and not analogue studies that have prevailed in the professional literature (p. 436).

The call for treatment studies with clinical populations in this area is as loud and clear as their absence is complete.

### Hypotheses

The following hypotheses were proposed a priori:

(1) Standard treatment plus flooding has a greater impact on mental health and on specific symptoms than standard treatment alone. This central hypothesis was tested by comparing the treatment progress of two groups (from "Pre" to "Post") receiving as nearly equivalent treatments as possible except that one group received flooding as a supplement while the other did not. Three questionnaires, a Behavioral Avoidance Test and self-monitored symptom samples were entered in an ANOVA design.

(2) Flooded subjects continue in treatment more than non-flooded subjects. It was expected that the flooding treatment would decrease re-experiencing symptoms so that treatment in general for PTSD issues would be less stressful. Dropouts from all treatment would be compared across the two groups.

(3) Flooded subjects improve more in post-flooding treatment. Because of the expected facilitating effect of flooding on treatment (see #2), it was anticipated that flooded subjects would improve more over the follow-up period than non-flooded subjects. This was tested by comparing progress from "Post" to "Follow-up" on the questionnaire and self-monitored samples, again using an ANOVA.

(4) Dropouts can be discriminated from continuers on the basis of tests and self-monitored data and hence are to some degree predictable. It was expected that those subjects who dropped out of treatment would

have more severe symptomatology or would in some measurable way be different from those who continued to participate. Results of "Pre" tests were compared for "dropouts" versus "continuers" using a  $\chi^2$  design.

### III. METHODS

#### Subjects

Any outpatient veteran exposed to severe combat-related trauma in Vietnam who continued to be troubled by re-experiencing that trauma in nightmares, flashbacks and/or intrusive thoughts was considered eligible for the study. All but one of these men were referred by the Vietnam veteran therapist to the investigator. The one exception was referred by a staff psychologist. (All participants happened to be male although females were not intentionally excluded.) Further screening by the investigator excluded subjects with cardiac disorders, documented or evident psychotic disorders, and/or POW experiences. While a PTSD diagnosis was not considered critical to the study, the belief that all participants met the DSM III criteria was verified by clinical interview, self-monitoring, questionnaires (BDI and MVEQ) and the BAT responses.

Of the thirty clients interviewed, twenty-six met the inclusion criteria, two were not bothered by re-experiencing symptoms, one was a psychiatric in-patient and one expressed psychotic (paranoid and hallucinatory) symptoms beyond the scope of PTSD. Hallucinations were differentiated from re-experiencing flashbacks on the basis of time of onset and content, according to criteria set prior to initiation of the study. Any hallucinations experienced previous to the Vietnam tour(s) or not involving actual traumatic events were considered grounds for

excluding the veteran from the study.

Further, four subjects decided not to participate and six subjects dropped out of the study at some point after agreeing to participate and signing consent forms. The remaining sixteen, eight in the control group and eight in the experimental group, completed the post-treatment assessments.

Subjects who completed the study had remarkably similar characteristics across groups. Since race was intentionally balanced, each group consisted of seven white subjects and one black. Ages ranged from 33 to 40 for the experimental group and 34 to 39 for the controls with an average age of 37 in each group. For both groups, the age on initial arrival in Vietnam ranged from 18 to 23 with an average of 20. Also in each group, 50% were married, 38% divorced and 12% separated. In the experimental group 75% and in the control group 63% were gainfully employed during some portion of the study.

Several studies have demonstrated facilitative effects of diazepam (notably, Hafner & Marks, 1976, and Marks, Viswanathan, Lipsedge & Gardner, 1972), IV thiopental (Hussain, 1971) and imipramine (Zitrin, Klein & Woerner, 1980) for flooding with specific conditions. Long term effects are still unknown. Particularly in view of these findings, which are suggestive though not directly applicable to PTSD, it is important to note that an effort was made to balance psychotropic medications across groups.

One treatment subject had been prescribed Doxepin Hydrochloride (anti-depressant) and Thiothixene (anti-psychotic) while a control subject was on Nortriptyline (anti-depressant) and Chlordiazepoxide (tranquilizer). A second treatment subject taking Maprotiline (anti-depressant) was matched with a control subject taking Amoxapine (anti-depressant). Finally, one treatment subject and two controls reported occasional use of tranquilizers (Diazepam, Diazepam and Alprazolam, respectively). Thus, the two discrepancies between groups were that (1) a treatment subject was taking an anti-psychotic while the matched control took a tranquilizer and (2) there was one extra control subject taking tranquilizers. Given that the groups were well-matched on a depression index, and tranquilizers tend to facilitate treatment, both differences would tend to "handicap" the experimental group thus keeping any biases conservative. The psychiatrist of the subject taking anti-psychotic medication was consulted regarding the treatment study. He assured the investigator that schizophrenic symptoms had been in remission for several years.

Three major diagnostic categories were considered in the study. As discussed above, all subjects were believed to suffer PTSD while schizophrenics were excluded. However, two subjects carrying histories of schizophrenia were included in the study following consultation with their psychiatrists and assurance that psychotic symptoms were in remission. One of these two was included in each group. Lastly,

depression was commonly severe as measured by the Beck Depression Inventory. This was generally assumed to be secondary to the PTSD and will be further elaborated in the "Results" section below.

Finally, although Vietnam experience was not elicited in detail from the control group, combat roles and tours of duty were comparable across groups. While the majority (50% of the experimental group and 63% of the controls) were regular combat soldiers, the experimental group also consisted of an artillery man, a Special Forces medic, a gunner and a tank commander. The control group included an artillery man, a Navy intelligence officer and a pilot (Green Beret).

Finally, all six dropouts agreed to participate and were assigned to either the control or experimental group before they dropped out (n = 6). (The four men who "dropped out" before signing consent forms are excluded since very little information was available and they had not been assigned to either group.) Three dropped out of all treatment while the other three dropped out of flooding but continued in other treatment(s). Unfortunately, information about the dropouts is scanty, but there were two striking differences between dropouts and completers. First, three of the six in the dropout category did not have telephones whereas all of the completers did have phones. Second, of the six dropouts, four were the first four subjects, (all assigned to the experimental group due to the demands of the yoked design). Because these two factors so strongly confounded the data, hypotheses two and

TABLE 1

EQUIVALENCY CHECK ON PRE-TREATMENT DEMOGRAPHICS AND DEPENDENT MEASURES

	<u>Experimental Group</u>		<u>Control Group</u>	
Age in Vietnam:	Mean	20		20
	Range	18-23		18-23
Tours:	Mean #	1		1
	Range	1-3		1-3
Medications:	4 clients:		4 clients:	
	1) Librax/Ludomil		1) Librium/Xanax	
	2) Valium		2) Valium	
	3) Navane/Doxipane		3) Xanax	
	4) Valium		4) Ascendin	
	<u>Mean</u>	<u>Standard Deviation</u>	<u>Mean</u>	<u>Standard Deviation</u>
Sleep per week	36 hours	7.3	33 hours	9.0
Nightmares	2.9/week	2.5	2.8/week	1.4
Mean Scores:	STAI/State	57	57	10.1
	STAI/Trait	55	53	10.1
	BDI	20	23	7.1
	MVEQ/SD	51	50	6.2
	MVEQ/HS	48	46	10.0
	MVEQ/PS	44	45	4.6
	MVEQ/CV	44	44	5.0
BAT Mean segments:	9	2.6	7	2.4
# S's to finish	7		4	
BAT Mean HR	80		84	
Mean SUDS	4.6		3.6	

four, concerning dropouts were no longer reasonable.

#### Procedure/Design

Veterans who were identified as Vietnam veterans at intake at the VA Medical Center in Salem, Virginia were generally referred to Dr. Lonquist, the Vietnam veteran therapist. Dr. Lonquist then referred to the investigator veterans with Vietnam combat exposure who were re-experiencing traumatic events from the war, were not POW's and did not have cardiac problems. The investigator further screened out veterans who were in-patient, who did not claim any current distress from re-experiencing (nightmares, flashbacks and/or intrusive thoughts), or who were believed to be actively psychotic. By a predetermined decision rule similar to that discussed above for hallucinations, "paranoid" symptoms explicable by events and not predating Vietnam were considered to be a PTSD feature. Extreme and/or irrelevant paranoia was classified as psychotic. Primary therapists were consulted for additional information in questionable cases (see above section).

During the initial session with the investigator, a basic description of the treatment and its expected assets as well as the nature of the work were shared with the veteran. He was also informed of the necessary paperwork and time commitment and of the fact that he might or might not receive the supplementary treatment. It was further explained that both standard and supplementary methods were expected to be effective and had been successfully used with other veterans but that

our purpose was to determine which program was more effective. The importance of continuing in treatment was emphasized and each subject was asked to sign a consent form (see Appendix A) in addition to the standard VA consent form. It was also explained that he had the option of dropping out of treatment at any time but that the primary reason for seeking a commitment was that premature termination might exacerbate his problems. Finally, it was made clear that refusal to participate would in no way affect the rest of his treatment program under any circumstances and he would be receiving the best treatment that was currently believed to be helpful for veterans with similar difficulties. These initial interviews continued until sixteen veterans finished the post-assessment for the study. Monitoring sheets for recording sleep and nightmares were issued and explained. (See Appendix B.)

Next, as soon as each veteran signed the consent forms agreeing to participate, he was randomly assigned to the experimental group or to the control group. Vets in the experimental group then received up to fourteen sessions of flooding for a maximum of one-and-a-half hours per session. Due to individual differences, neither the exact number nor the duration of sessions could be predetermined, but were dictated by the veteran's needs. Session length was determined by Subjective Units of Disturbance ratings (SUDS) and heart rate. (See "Dependent Measures.") The number of sessions, within limits of three and fourteen, was determined by extinction of anxiety response to all

accessible traumatic scenes. In actuality, the number of sessions varied from six to fourteen, including the introductory and assessment sessions, such that the maximum number of actual flooding sessions was nine.

Both groups received the standard group and individual treatment that they would ordinarily have been assigned by therapist Dan Lonquist, PhD. A Behavioral Avoidance Test (BAT, see "Dependent Measures") was conducted and three short questionnaires [Modified Vietnam Experiences Questionnaire (MVEQ), see Appendix, Beck Depression Inventory (BDI), and Spielberger's State-Trait Anxiety Inventory (STAI)] were administered after the interview sessions at the beginning of treatment (Pre) and after flooding was finished (or after a comparable number of weeks of treatment for the control vets) (Post). Each control veteran was yoked to a treatment vet to determine Pre or Post time interval for assessment purposes. The questionnaires were repeated at a three month follow-up in addition. Self-monitored data was collected from the first week through the post-assessment and for one week at follow-up.

#### Group Assignment

Once the subjects had agreed to participate in the study and signed consent forms, they were assigned to either the control or the experimental group. Efforts were made to preclude bias in assignment by maintaining as nearly random a procedure as possible. There were

several necessary exceptions which made the selection non-random however in most cases group assignment was predetermined before the subject agreed to participate. Thus experimenter bias was minimized and an equivalency check demonstrated remarkably similar pre-study profiles for the two groups.

There were three exceptions to the rule of predetermined random assignment. First, the "inter-test interval" between Pre and Post assessments for control subjects was determined by a yoking method. Therefore each control subject had to follow a treatment subject in order to schedule his Post test after a matched passage of time. This presented the difficulty of starting the experimental group before the control group. Ultimately, five experimental subjects were started in the study before yoking requirements could be met.

Second and third, as discussed previously, psychotropic medications and race were counterbalanced across groups. The first black subject was assigned according to the predetermined order to the control group while the second was automatically assigned to the experimental group. After the second black subject dropped out of the study, the third was also assigned to (and completed) the experimental group. In a similar manner, notations of psychotropic medications were made and clients taking them were assigned to the group which resulted in the best match at that time.

#### Supplementary Treatment/Experimental Group

The following treatment was scheduled prior to and/or concurrently

with group treatment and other individual treatment based on the recommendations of the Vietnam vet psychologist and the flooding therapist. Regular supervision meetings were scheduled for the flooding therapist to discuss individual cases and treatment progress with the psychologist.

#### Flooding Treatment: Overview

Once or twice weekly sessions were held with each subject in the flooding group. The first two or three interview sessions were devoted to establishing rapport and gathering information to be used in reconstructing scenes. The most personally relevant scenes were chosen for flooding, the number of scenes ranging from three to nine and sequenced such that the least distressing were first. The end of the second or third session was used to instruct the veteran in the use of neutral imagery and assess his imaginal capability and ability to relax.

Each flooding session began with a few minutes of conversation. Before the first flooding session, the veteran was also given a rationale of the technique and answers to any questions he raised. Then the first scene was presented. It was described in as much detail as possible using descriptive cues for various sensory modalities and eliciting information from the subject about the sequence of events. As anxiety increased, the veteran was asked to concentrate and remain focused on that scene while additional cues were supplied. After each presentation of the scene, a SUDS and HR measure were recorded and the

scene was repeated until anxiety decreased. Due to the complexity of individual differences and incongruence of measures, it was not possible to specify exact criteria. Optimally, the SUDS and HR returned to base line or at least dropped substantially below the maximum indications. Frequently it was necessary to make a clinical judgment using the two measures as well as the subject's behavioral indications and verbalizations, particularly when time became a limiting factor. Finally, there was time for the veteran to discuss the session and ask any questions he may have had regarding the scene. If the veteran was still experiencing high levels of anxiety as the one-and-a-half hour time maximum approached, he was switched to positive imagery and relaxation to insure that he not leave a session in an agitated state. By extinguishing relatively low anxiety cues first, the veteran was reinforced for his cooperation and more difficult problems became accessible to treatment. When the veteran had been exposed to all identifiable scenes and his anxiety had been extinguished, the flooding portion of his treatment program was terminated. In most cases he continued to deal with issues and problems in the standard individual and group therapies.

#### Flooding Treatment: Procedural Details

I. Introduction (session #1). The study was described to the client with a brief rationale for treatment and expected risks and benefits. Basic information concerning eligibility for participation

was gathered and the client was encouraged to ask questions and express concerns. He was discouraged from starting the program if he felt doubtful about completing it.

II. Information-gathering (sessions 2 and 3). The client was interviewed primarily about recurring thoughts and nightmares and asked to describe, at least in general terms, the real events that occurred during his tour(s) that still caused him distress. He was not pressured for much detail at this point, but an effort was made to cover all types of stressful traumatic events. Some probing was done of fields not spontaneously covered in an attempt to ascertain whether all major areas of difficulty has been mentioned (e.g. "Were any of your buddies killed?" "Did you see anyone trip a mine?" "Were you ever injured?", etc.). Particularly if the veteran had trouble self-disclosing these events, he was asked about things that bother him today (e.g. smells, weather, etc.) and then asked to describe his associations to these stimuli.

Several scenes were identified (usually four or five) and the client asked for feedback about whether or not these were representative. He was then prodded for some information about the relative amounts of distress the identified scenes caused him so that they could be sequenced in a hierarchy.

Usually toward the end of session two or three a relaxation exercise was introduced utilizing tension-release and imagery. The

veteran's response was discussed particularly with regard to what things helped him most, so that any future use of the relaxation exercise could be tailored to his needs and so that he would have some exposure both to relaxation methods and to the use of imagery.

III. Pre-assessment (session four). Assessments were administered in the following sequence: Behavioral Avoidance Test, State-Trait Anxiety Inventory, Beck Depression Inventory, and Modified Vietnam Experiences Questionnaire. After he completed all of the questionnaires, the client was allowed to discuss his reactions to the material and then released.

IV. Treatment sessions. (Overall description.) Beginning with the least threatening scenes, the client worked through the hierarchy until all identified scenes had been treated. He was encouraged to share with the therapist any additional scenes that occurred to him during the course of treatment. At times a client chose to tackle a particular scene "out of sequence." Ordinarily, this decision was respected and the ordering modified accordingly.

When all scenes had been worked through, a discussion was held to determine if there were any recognizable omissions and whether the client was still having problems with any of the flooded scenes. He was asked about each scene, how he felt if he contemplated it, whether he was thinking about it during the week and what that was like. If there was still doubt about the adequacy of exposure, brief probes were made

of a sampling of the scenes and the client was checked for increases in SUDS or HR. (Minimal changes relative to treatment session increases were considered negative indications for further treatment.)

V. Initial treatment session. After a few minutes of casual conversation, the client was asked to give a rating of his anxiety on a ten-point SUDS scale and his HR was measured. Then he was given the option of doing some relaxation to start the session, but this was not required if he claimed to feel sufficiently calm.

Next, the client was told to close his eyes. (If this was a problem he was sometimes allowed to open them as necessary to "check" the office but told to keep them closed and "stay with" the scene as much as possible.) He was also instructed to get as comfortable as possible (a reclining chair was used whenever available). The therapist then began by asking the client to envision a blank screen or a blackboard all around him. Out of this amorphous background, the therapist began to reconstruct the setting, supplying whatever details were at her command and soliciting others from the client (e.g. "There is dense jungle all around you so that it's almost dark even though it's daytime. It's very hot. Are you sweating? Can you feel it? What can you smell?"). Responses varied considerably such that with some veterans the therapist needed to ask many questions and others soon took over with a running narration of the scene. The first scene presentation usually took anywhere from ten minutes to a half hour. In

order to be certain of including all critical elements and ending at a more neutral scene, the client was asked to continue slightly beyond the event so that, for example, it might have included returning to a base following a firefight.

After a SUDS rating and HR were recorded, the scene was discussed. The client was commended for behaviors such as continuing the scene to the end, including various sensory modalities, recalling a lot of detail and getting highly involved in the imagery. He was then coached on ways of improving treatment effectiveness, which commonly included staying in the present tense ("as if you are there now") and holding the image longer at critical moments (e.g. when a friend was killed or a rocket attack began he might be told to "stop and look" or "slow it down" as if it were a motion picture). Finally, he was asked whether all of the important parts of that episode had been covered or if something crucial had been omitted.

Throughout treatment, an effort was made to communicate frequently, openly and directly for three major reasons: first, in order to assist the client in maintaining the imagery; second, to ascertain whether the client was indeed staying involved in the scene and third, to enable the therapist to provide cues, questions and assistance in a manner optimally suited to the individual such that they facilitated rather than disrupted treatment.

Next the scene was repeated until anxiety decreased as indicated by

the heart rate, SUDS, and behavioral indices. Optimally, all three decreased concurrently before the end of the session. However, it was frequently necessary to pass clinical judgment if it seemed clear the client was no longer anxious about the scene and/or if the time ran short. In the latter case, relaxation was usually utilized to calm the client before he left the office.

VI. Subsequent treatment sessions. Although generally one session per scene was sufficient, some scenes required as many as three sessions, particularly if much of the information was repressed and not immediately available to consciousness. Usually, each scene was remembered with increasing detail as it was repeated and, seemingly, as the client became better able to cope with his associated emotions.

VII. Post-assessment (final session). See "III. Pre-assessment."

#### Control Group

Procedures for the control group were identical to the experimental group with the exception of the flooding treatment. Subjects in both groups continued in their other individual and/or group treatments (although experimental subjects tended to cut back on their other therapeutic activities due primarily to scheduling difficulties). Subjects in both groups engaged in the introductory and assessment sessions (as described above). However, subjects in the control group did not participate in "Information-gathering" or "Treatment sessions" (also described above).

### Therapist

The therapist was a doctoral candidate at Virginia Polytechnic Institute and State University and the author of this dissertation. She was working under the supervision of Dr. Daniel Lonquist at the Va Medical Center in Salem and her dissertation committee at Virginia Tech (Dr. George Clum, Chairman).

### Dependent Measures

Dropout Rate. Premature termination of treatment, defined as dropping out of all forms of treatment against medical advice (i.e. against Dr. Lonquist's recommendation) was documented as a behavioral index of treatment failure. Dropout from flooding while maintaining other treatment was also recorded.

Self-Monitoring. Subjects were issued forms on which they were requested to tabulate any re-experiencing of war trauma (nightmares, flashbacks, and intrusive thoughts) and the number of hours slept each night. Forms were distributed and monitoring initiated the same day subjects agreed to participate in the study. (See Appendix B.) Monitoring continued through treatment and was solicited once more (for one week) at the three month follow-up.

Subjective Units of Disturbance Scale (SUDS). During flooding sessions in the experimental group, in addition to during the BAT (see below), subjects were asked to rate their anxiety on a ten point SUDS (1 = no distress, 10 = extremely distressed) at the beginning of each

session and at the end of each scene presentation. In general, treatment sessions were terminated after a SUDS decrease. This was assumed to indicate that the anxiety was extinguishing.

Heart Rate (HR). In order to measure the physiological component of the response, HR was recorded simultaneously with SUDS measures. Kaloupek (Note 15) hypothesized a direct correlation between intensity of anxiety and concordance of laboratory measures of it. This was consistent with results of Malloy, Fairbank, and Keane (1984) whose measures were very congruent for war veterans with extreme anxiety reactions. If HR did not return to base line by the maximum time limit for sessions and if the subject chose, relaxation was initiated.

A small hand held battery-operated instrument displayed instantaneous heart rate measures when a subject held both thumbs on the ends of the instrument. Digital readings flashed on the device every two or three seconds. Every third number was recorded, yielding from four to seven heart rates which were averaged to arrive at one HR. This was done immediately following the SUDS readings at the beginning of each session, after each scene presentation, and after each minute of exposure to the slide-tape show described below (BAT).

Questionnaires. Immediately following the BAT (at pre and post sessions) and at a three month follow-up (conducted through the mail) subjects completed the Spielberger State and Trait Anxiety Scales (STAI), the Beck Depression Inventory (BDI), and the Modified Vietnam

Experiences Questionnaire (MVEQ).

Spielberger State/Trait Anxiety Inventory (STAI). The STAI consists of two twenty-item scales designed to measure situational (State) and pervasive (Trait) anxieties (Spielberger, Gorsuch, & Lushene, 1970). Retest reliabilities ranged from .7 to .9 for the Trait scale and had a median of .3 for the State scale. Correlations for the two forms on the same occasion were between .4 and .7, indicating some confounding of the two scales. Since the two are routed in the same construct, the overlap is not surprising. This correlation fell to .3 to .5 for different occasions.

Both concurrent and construct validity have been established for the STAI. Scores on the Trait scale correlated highly with Cattell's IPAT anxiety scale (Cattell & Scheier, 1961) and Taylor's (Taylor, 1953) Manifest Anxiety Scale ( $r=.84$ ,  $p<.01$ , Zuckerman & Spielberger, 1976, p. 165). Items selected for the State scale were all higher in stress conditions than following relaxation. Trait scale items were relatively stable.

Beck Depression Inventory (BDI). The BDI consists of 21 items scaled from 0 to 3 for severity and summed. Reliability has been measured by internal consistency and stability and validity has been demonstrated by discriminative capacity, concurrent measures, and construct correlations.

Reliability was tested using three different methods: (1) each

item of the BDI was found to be significantly related to the total score at  $p < .01$ , (2) split-half Pearson  $r$  correlation for even and odd items was .86, and (3) test-retest scores reflected changes parallel to those of clinical judgment.

Validity was shown in the BDI's discriminative capability and in anticipated correlations with other measures of depression and with theoretically-related aspects of personality. In a study of 606 patients, the BDI correlated .59 with clinical ratings of depression and only .14 with ratings of anxiety, showing its capacity to differentiate. Among other indices of depression, clinical judgment correlated .65 and .67 ( $p < .01$ ), Lubin Depression Adjective Check Lists .40 to .66, and the MMPI (D Scale) .75 (Beck, 1961, 1967). Lastly, positive correlations were found to concepts associated with depression such as masochistic dreams, identification with loser images, childhood bereavement, underestimation of performance, and scores on a hostility-inward scale while negative correlations were found with such opposing assets as sense of humor and self-concept scores.

Modified Vietnam Experiences Questionnaire (MVEQ) (see Appendix C).

Although this was a new questionnaire (VEQ, Miller and Buchbinder, Note 16) and consequently lacking in validity confirmation, it was specifically geared to the population of interest. Modifications were made to (1) convert the questionnaire to a more sensitive seven point Likert-scale format and (2) select questions from the four areas that

had been determined to be most relevant in discriminating distress in this population (Miller and Masey, Note 17). These were classified by Miller and Buchbinder as (1) sleep disturbances (SD), (2) psychotic-like symptoms (PS), (3) hyper-sensitivity to sound (HS) and (4) perceived capacity for violence (CV). Some of the questions have also been altered in an attempt to increase clarity. One item (#17) has been introduced from the DSM III diagnostic definition of PTSD due to its relevance to flooding. The MVEQ was expected to be helpful in assessing relevant problem areas.

Response ratings were summed for questions in each of the four areas listed above then divided by the number of questions in that area (SD = 9, HS = 5, PS = 17, and CV = 13) to yield roughly comparable scores of symptom severity. SD and HS were expected to be most closely related to flooding treatment focus while CV provided a small check on the question of violence which seems to be the major concern of persons averse to using the method.

Behavioral Avoidance Test (BAT). At the beginning of each pre and each post-assessment the BAT was administered. The basic material for this measure was a ten minute slide-tape show of Vietnam. The sound track started with Billy Joel's "Goodbye, Saigon" and finished with battle sounds (mortars, rockets, sniper fire, choppers and jets). Slides, starting with rice paddies and landscapes, gradually increased in intensity to Vietnamese villages and eventually to severely injured

war victims. The following instructions are based on those used by Malloy et al (1984), but have been adapted to the conditions of this study:

I want you to watch a slide-tape show with some battle scenes and sounds. Try to imagine that you are in Nam and make it as real as possible. I will stop the tape several times and will ask you to tell me how nervous you feel on a scale from 1 to 10. One means you are very calm and 10 means you are extremely upset. I will also be recording your heart rate at those times. Please feel free to stop the tape at any time by saying "stop." I "do not want you to push yourself to the limit - stop if the scenes become upsetting to you. Your reaction to the tape will not affect your treatment" (p. 9). Do you have questions or are you ready to start?

The presentation was stopped as soon as the subject indicated he was uncomfortable about continuing. Subjects were discouraged from pushing themselves on this task. After each minute of the show, the slides and tape were turned off and SUDS and HR recordings made. The subject was then asked if he wished to continue. If he seemed hesitant or was exhibiting behavioral indications of anxiety (such as shaking or voice tremors), he was reminded that the procedure was for assessment purposes only and was reassured that it was all right to stop.

#### IV. RESULTS

Results of the study indicated that flooding did increase the effectiveness of treatment, particularly in such areas of focus as re-experiencing symptoms and related sleep patterns. Tangential measures, such as the STAI and BDI, tended to be less strongly effected. In addition, improvements on the latter measures were more liable to dissipate over the follow-up time period. There were no significant results for physiological measures and there were too few follow-up responses for meaningful statistical analysis of the follow-up data. Process data for the experimental group also failed to yield any significant results. Dropout from flooding treatment was initially a problem which ended coincidentally with the first treatment completion.

It should be noted that, due to the pilot nature of the study, more dependent measures were utilized than the small number of subjects could support statistically. Because so little had been done in the area this statistical sacrifice was made in favor of a broader exploration. Therefore results should be interpreted as suggestive rather than conclusive.

Due to the brevity of treatment it was not possible to complete flooding for all important traumatic scenes for the one three tour veteran. It was felt that his experience was severe enough that he might represent a separate classification in terms of treatment needs (perhaps more similar to other multiple-tour veterans and POW's).

Because it was felt that his inclusion in the study might cause a major distortion in the results, statistics were completed both with and without data from the three tour veterans (one per group), although this yielded an even smaller sample and further limited generalizability.

#### Equivalence of Groups

Although assignment to groups was as nearly random as possible, it is especially important with a small sample size to check the actual equivalence of the groups. In fact, the match was very close (see Table 1). Average age on arrival in Vietnam was 20 with a range of 18 to 23 for both groups. Both groups averaged one tour of duty per veteran with a range of one to three. (One client in each group was a three tour veteran and one in the experiment group completed one-and-a-half tours. All the rest served a single tour in Vietnam.) As discussed previously, psychotropic drugs were carefully balanced across groups. During the week of pre testing, the experimental group indicated (on the self-monitoring forms) an average of 36 hours of sleep per individual while the control group averaged 33 hours. Over the same time period, the experimental group claimed an average of 2.9 nightmares while the controls reported 2.8.

Questionnaire score averages for the pre test were also remarkably similar. First, the STAI State scores averaged 57 for both groups while the STAI Trait was 55 for the experimental and 55 for the control group. Next, the BDI was slightly higher for the control group (23) than the

experimental (20). Finally, the MVEQ scores were nearly identical for the two groups. Experimental and control group scores were, respectively: 51 and 50 for SD; 48 and 46 for HS; 44 and 45 for PS; and 44 and 44 for CV.

The area of greatest discrepancy between the groups (still not significant) was in performance on the BAT. Fewer of the control clients (4 as opposed to 7) finished viewing the entire presentation and, on the average, they viewed fewer segments of the slide-tape show (7 rather than 9). Additionally, the heart rate was higher for the control group (84/80) although the SUDS were lower (3.6/4.6) for the two segments which all subjects viewed.

#### Treatment Effectiveness

Tables 2 and 3 show individual scores for the experimental and control groups, respectively, at pre, post and follow-up testing. Means and standard deviations for these scores are shown on Tables 4 and 5, where numbers in parentheses indicate the averages for the groups with three tour veterans excluded. These rough data show consistent improvement, especially for the experimental group and especially for this group with the three tour veteran excluded. While differences are less pronounced by follow-up, they are still consistently positive. SUDS ratings show a small but constant improvement (indicating less subjective anxiety to the slide-tape show) for the experimental group and a small constant sensitization effect for the control group. HR was

TABLE 2  
INDIVIDUAL SUBJECT SCORES ON DEPENDENT VARIABLES AT PRE, POST AND FOLLOW-UP FOR EXPERIMENTAL GROUP

Subject Code #	Time	State	Trait	BDI	SD	HS	PS	CV	Sleep	Night-mares	SUDS	HR	# Segments Viewed
7	Pre	48	51	10	47	40	43	41	43	1	4.2	89	10
	Post	30	37	0	26	30	24	28	48	0	2.4	74	10
	Follow-up	23	21	0	21	23	18	21	50	0	--	--	--
10	Pre	54	55	19	48	60	39	50	22	4	4.7	80	10
	Post	38	47	13	37	50	36	45	48	0	4.5	81	10
	Follow-up	45	54	21	47	58	38	50	43	0	--	--	--
14	Pre	61	56	24	53	42	49	42	35	2	5.7	71	10
	Post	54	52	20	32	40	32	38	26	0	4.6	72	10
	Follow-up	63	60	24	48	44	42	39	29	6	--	--	--
15	Pre	54	56	25	57	46	40	43	35	9	5.3	82	10
	Post	43	44	11	49	46	29	35	47	1	3.4	82	10
	Follow-up	36	35	7	42	42	28	27	39	0	--	--	--
18	Pre	47	50	15	50	40	35	44	35	2	6.6	62	10
	Post	36	36	0	38	28	30	40	43	0	2.1	87	10
	Follow-up	--	--	--	--	--	--	--	--	--	--	--	--
20	Pre	54	51	27	52	46	46	38	31	3	5.1	66	10
	Post	48	53	15	36	28	32	36	42	0	3.8	67	10
	Follow-up	51	48	8	34	46	32	37	45	0	--	--	--
22	Pre	76	68	25	47	58	49	45	48	1	4.8	102	2
	Post	56	54	22	48	50	48	44	47	0	3.5	84	7
	Follow-up	61	62	20	38	64	49	53	36	1	--	--	--
27	Pre	62	56	19	57	52	49	47	39	1	7.5	90	10
	Post	65	60	26	67	64	56	54	36	3	7.7	72	10
	Follow-up	65	60	26	67	60	58	58	31	4	--	--	--

TABLE 3

## INDIVIDUAL SUBJECT SCORES ON DEPENDENT VARIABLES AT PRE, POST AND FOLLOW-UP FOR CONTROL GROUP

Subject Code #	Time	State	Trait	BDI	SD	HS	PS	CV	Sleep	Night-- mares	SUDS	HR	# Segments Viewed
6	Pre	51	39	15	50	50	37	45	41	3	5.1	84	10
	Post	38	32	4	44	42	24	31	46	4	5.1	80	10
	Follow-Up	20	23	2	48	44	29	39	56	0	--	--	--
8	Pre	57	50	25	48	44	42	41	33	0	3.3	88	10
	Post	55	56	21	41	38	45	48	34	0	4.7	85	10
	Follow-Up	54	56	27	48	40	50	52	33	4	--	--	--
12	Pre	64	61	26	57	50	45	38	30	3	5.0	54	5
	Post	71	68	33	57	60	47	40	14	2	5.5	67	3
	Follow-Up	72	72	33	50	68	52	54	32	2	--	--	--
16	Pre	71	73	37	55	58	53	55	26	3	3.0	82	8
	Post	77	70	36	58	62	54	55	31	3	5.0	83	8
	Follow-Up	--	--	--	--	--	--	--	--	--	--	--	--
26	Pre	41	42	20	35	24	49	47	48	0	3.4	89	10
	Post	32	45	4	32	34	42	37	46	0	4.5	99	10
	Follow-Up	--	--	--	--	--	--	--	--	--	--	--	--
17	Pre	62	58	24	49	56	44	45	39	7	6.2	97	8
	Post	57	47	11	50	44	38	42	39	4	5.2	94	5
	Follow-Up	--	--	--	--	--	--	--	--	--	--	--	--
30	Pre	43	49	13	50	40	41	40	28	3	4.8	80	5
	Post	31	33	12	50	40	44	40	39	3	6.0	90	10
	Follow-Up	45	42	10	43	36	39	36	30	1	--	--	--
31	Pre	65	52	23	52	50	46	41	21	3	3.4	95	10
	Post	29	45	10	53	58	42	39	21	3	3.7	80	10

TABLE 4  
 MEAN SCORES AND STANDARD DEVIATIONS ON DEPENDENT MEASURES FOR EXPERIMENTAL GROUP

	Pre n=8 (n=7)		Post n=8 (n=7)		Follow-up n=7 (n=6)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
STAI/State	57	8.7	46	11.3	49	13.6
/Trait	55	5.3	48	7.9	49	14.2
BDI	20	4.9	13	6.1	15	7.3
MVEQ/SD	51	3.8	42	11.9	42	13.1
/HS	48	7.6	42	10.8	48	12.9
/PS	44	5.0	36	9.3	38	12.3
/CV	44	3.4	40	7.2	41	12.7
Sleep (hours/week)	36	7.3	42	7.2	39	7.0
Nightmares	2.9	2.5	.5	1.1	1.6	1.9
BAT/SUDS	5.5	.88	4.0	1.6		
/HR	60	12.6	77	6.6		

( ) Represent averages with three tour veterans excluded.

TABLE 5

## MEAN SCORES AND STANDARD DEVIATIONS ON DEPENDENT MEASURES FOR CONTROL GROUP

	Pre n=8		Post n=8		Post n=7		Follow-up n=4*			
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
STAI/State	57	10.1	(56)	10.4	49	17.9	(52)	17.3	48	18.7
/Trait	53	10.1	(53)	11.0	50	13.3	(50)	14.3	48	18.0
BDI	23	7.1	(23)	7.4	16	11.6	(17)	12.2	18	14.8
MVEQ/SD	50	6.2	(49)	6.6	48	8.1	(47)	8.6	47	2.5
/HS	46	10.0	(46)	10.8	47	10.1	(46)	10.2	47	12.4
/PS	45	4.6	(44)	4.9	42	8.2	(42)	8.7	42	9.2
/CV	44	5.0	(44)	5.2	42	6.7	(42)	7.2	45	7.9
Sleep (hours/week)	33	9.0	(35)	7.4	34	10.7	(36)	11.0	38	10.5
Nightmares	2.8	1.4	(2.7)	2.2	2.4	0.8	(2.7)	1.5	1.8	1.1
BAT/SUDS	4.3	1.1	(4.4)	1.1	5.0	0.6	(5.1)	.46		
/HR	84	12.5	(82)	12.6	85	9.5	(85)	9.7		

( ) Represent means with three tour veterans excluded.

\* Three tour veteran did not respond at follow-up.

more erratic with increases and decreases for both groups.

Univariate statistics with all subjects included show that several measures changed over the course of treatment for all subjects and that there were some significant interactions effects of group by time in areas most directly treated by flooding. The greatest impacts of time over all subjects ( $p < .01$ ) were measured on the BDI ( $F = 12.79$ ) and the STAI/State ( $F = 11.69$ ), with significance at  $p < .05$  on the STAI/Trait ( $F = 7.86$ ), the MVEQ/PS ( $F = 7.79$ ), the MVEQ/SD ( $F = 7.72$ ) and nightmares ( $F = 6.25$ ). Only BAT/SUDS ( $F = 13.29$ ) achieved significant results at the .01 level on the univariate interaction with MVEQ/SD ( $F = 4.38$ ) and Nightmares ( $F = 3.31$ ) significant at  $p < .1$ .

Next, with three tour veterans excluded, several additional univariate statistics reached significance (see Table 7). For all subjects over time, there were eight measures (all but self-monitored Sleep and BAT measures) significant at  $p < .01$  and  $p < .05$ . Then for the interaction effect, there were two at the .01 level (BAT/SUDS:  $F = 15.26$ , and MVEQ/SD:  $F = 11.12$ ), two at the .05 level (Nightmares:  $F = 6.08$ , and STAI/State:  $F = 5.58$ ), and two at the 0.1 level (MVEQ/PS:  $F = 4.48$ , and MVEQ/HS:  $F = 4.23$ ).

$t$  tests performed on the six significant interaction effects (Table 8) revealed highly significant changes for the experimental group and almost no change for the controls. Only SUDS changed significantly for control subjects ( $t = 1.97$ ;  $p < .1$ ) and the negative  $t$ -score indicated

TABLE 6

RESULTS OF INDIVIDUAL ANOVAS (PRE AND POST TREATMENT)  
WITH THREE TOUR VETERANS INCLUDED

Tests of hypotheses using the ANOVA MS for Time\*Subjects (Group) as an error term:

Source: Dependent Variable	Time		Group * Time	
	F Value	p	F Value	p
STAI/State	11.69	<.01	.25	<.65
/Trait	7.86	<.05	1.04	<.35
BDI	12.79	<.01	.03	<.9
MVEQ/SD	7.72	<.05	4.38	<.1
/HS	1.39	<.3	2.3	<.2
/PS	7.79	<.05	1.95	<.2
/CV	4.02	<.1	.16	<.7
Nightmares	6.25	<.05	3.31	<.1
Sleep	1.96	<.2	1.42	<.3
BAT/HR	.08	<.8	.44	<.55
/SUDS	1.72	<.25	13.29	<.01

TABLE 7

RESULTS OF INDIVIDUAL ANOVAS (PRE AND POST TREATMENT)  
WITH THREE TOUR VETERANS EXCLUDED

Tests of hypotheses using the ANOVA MS for Time\*Subjects (Group) as an error term:

Source: Dependent Variable	Time		Group * Time	
	F Value	p	F Value	p
STAI/State	20.53	<.01	5.58	<.05
/Trait	8.89	<.05	2.27	<.2
BDI	16.95	<.01	1.00	<.35
MVEQ/SD	19.26	<.01	11.12	<.01
/HS	4.84	<.05	4.23	<.1
/PS	12.07	<.01	4.48	<.1
/CV	6.31	<.05	.75	<.45
Nightmares	10.80	<.01	6.08	<.05
Sleep	2.33	<.2	1.71	<.25
BAT/HR	.21	<.7	.48	<.55
/SUDS	2.43	<.15	15.26	<.01

TABLE 8

t-TESTS BY GROUP OVER TIME (PRE TO POST TREATMENT) FOR SIGNIFICANT UNIVARIATE INTERACTIONS WITH THREE TOUR VETERANS EXCLUDED

	<u>Experimental Group</u>		<u>Control Group</u>	
	<u>t</u> -score	<u>p</u> value	<u>t</u> -score	<u>p</u> value
State	6.22	<.01	1.3	<.25
SD	4.28	<.01	1.22	<.3
HS	3.73	<.01	.09	<1.0
PS	3.73	<.01	1.03	<.35
Nightmares	3.24	<.05	.89	<.45
SUDS	3.41	<.05	-1.97	<.1

higher anxiety at post test than at pre test. In contrast, t tests for the experimental group showed highly significant change for all six variables with four at  $p < .01$  (State:  $t = 6.22$ , SD:  $t = 4.28$ , HS:  $t = 3.73$  and PS:  $t = 3.73$ ) and two at  $p < .05$  (Nightmares:  $t = 3.24$  and SUDS:  $t = 3.41$ ).

One last measure on the BAT, the behavioral index of terminating the slide-tape show before the end, was not included in the ANOVA tests. Only five subjects asked to stop prior to the tenth segment and four of these were in the control group. Of these, two viewed fewer segments at post test (3 instead of 5 and 5 instead of 8), one watched 8 segments both times and one viewed only 5 at pre and all 10 at post. The experimental subject viewed 2 segments at pre and 7 at post. A Chi Square test of total segments viewed at pre and at post by group revealed no significant differences ( $\chi^2 = .09$ ,  $df = 1$ ,  $p < .8$ ).

In further validation of these results, the groups were compared in nonparametric tests for improvement from pre to post treatment on all dependent variables. Each subject whose score improved was so categorized while if his score stayed the same or worsened, he was considered "not improved." Chi square tests reconfirmed the impact of flooding on all four parts of the MVEQ (at  $p < .02$  and  $p < .1$ ) and on Nightmares and SUDS (at  $p < .01$ ).

As mentioned previously, there were too few dropouts to warrant statistical analysis with only four (subjects #3, #4, #19, and #21) who dropped out of treatment completely (as defined under "Dependent

TABLE 9

IMPROVEMENT VS. FAILURE TO IMPROVE FROM PRE TO POST TREATMENT  
ON DEPENDENT MEASURES FOR EXPERIMENTAL VS. CONTROL GROUP

<u>Variable</u>	<u>Experimental Group</u>		<u>Control Group</u>		$\chi^2$ (df=1)	p
	<u>Improved</u>	<u>Not Improved</u>	<u>Improved</u>	<u>Not Improved</u>		
STAI/State	7	0	5	2	2.3	<.2
/Trait	6	1	4	3	2.2	<.2
BDI	7	0	6	1	1.1	<.3
MVEQ/SD	6	1	3	4	3.7	<.1
/HS	6	1	3	4	3.7	<.1
/PS	7	0	3	4	5.6	<.02
/CV	7	0	3	4	5.6	<.02
Sleep	5	2	4	3	.3	<.7
Nightmares	7	0	2	5	7.8	<.01
BAT/HR	3	4	2	5	.3	<.7
/SUDS	7	0	1	6	10.5	<.07

Measures") and two more (subjects #1 and #2) who dropped out of just the flooding while continuing in other treatments. Although three of the first four and five of the total six were in the experimental group, two other factors could easily account for the dropout incidence.

First, four of the six (numbered by sequence of initial interview) were the first four subjects assigned to the flooding treatment. Once the first experimental subject completed treatment (#7) there was only one further dropout in each group.

Second, all three subjects in the study who did not have telephones at home or at work dropped out of treatment (#1, #3, and #19). All three coincidentally were assigned to the experimental group. If these had been excluded, the dropout rate, as defined, would have been one subject per group with one additional dropout from flooding treatment only. No further analyses of dropouts were deemed warranted.

#### Follow-up Results

In spite of a standard written prompt from the investigator three to four weeks post mailing of follow-up materials and two or three less formal urgings from the therapist, Dr. Lonquist, there were very few returns of follow-up questionnaires for statistical analysis of the post to follow-up progress. While seven of the eight experimental subjects returned their questionnaires and self-monitoring sample (six of the seven non-three tour veterans), only four of the control subjects (all four non-three tour veterans) did so yielding only six experimental and

four control subjects for analysis over the three assessment periods.

Univariate ANOVA tests conducted over all three assessment times (Table 10) with three tour veterans excluded and much follow-up data missing yielded low  $F$  scores and only two significant group\*time interactions at  $p < .05$  (SD:  $F = 4.22$  and PS:  $F = 3.51$ ). Univariate ANOVA's on the separate groups showed no changes for the control group and three for the experimental (Table 11: SD:  $F = 6.03$ ;  $p < .05$ , Nightmares:  $F = 3.60$ ;  $p < .05$ , and PS:  $F = 3.07$ ;  $p = .1$ ).

Means and Duncan Multiple Range Test Groupings are presented in Table 12 for the three variables which showed significant change in the experimental group and for CV. Means are listed according to the direction of change with the highest (most pathological) mean listed on top. Then the numeral in the "Time" column indicates to which assessment time each mean corresponds, with "1" = pre, "2" = post, and "3" = follow-up. Under "G" (grouping) column, different letters indicate significant differences. Thus, for the control group and for CV where all means are labeled "A," there were no significant changes. For both PS and Nightmares in the experimental group, pre (A) and post (B) were significantly different, but follow-up (labeled both A and B) was not significantly different from pre or post. Only SD maintained its significant pre-post change over follow-up.

Although there was no indication of significant change for CV, the means and groupings were presented due to the importance of the question

TABLE 10

INDIVIDUAL ANOVAS FOR PRE, POST & FOLLOW-UP WITH  
THREE TOUR VETERANS EXCLUDED

Error term - Time\*Subjects (Group)

<u>Source:</u> Dependent Variable	<u>Time</u>		<u>Group * Time</u>	
	<u>F Value</u>	<u>p</u>	<u>F Value</u>	<u>p</u>
STAI/State	6.47	<.01	1.46	<.3
/Trait	3.36	<.1	1.16	<.35
BDI	8.51	<.01	.88	<.45
MVEQ/SD	8.80	<.01	4.22	<.05
/HS	2.20	<.15	1.74	<.25
/PS	6.06	<.01	3.51	<.05
/CV	1.96	<.2	1.74	<.25
Sleep	1.80	<.2	1.16	<.35
Nightmares	2.80	<.1	1.44	<.3

TABLE 11

UNIVARIATE ANOVA'S FOR PRE, POST & FOLLOW-UP WITH  
THREE TOUR VETERAN EXCLUDED

<u>Source:</u> Dependent Variable	<u>Experimental Group</u>		<u>Control Group</u>	
	<u>F</u> Value	<u>p</u>	<u>F</u> Value	<u>p</u>
STAI/State	2.27	<.15	.29	<.8
/Trait	1.68	<.25	.14	<.9
BDI	2.38	<.15	.45	<.65
MVEQ/SD	6.03	<.05	.12	<.9
/HS	1.23	<.35	.02	<.1
/PS	3.07	<.1	.16	<.9
/CV	1.04	<.4	.35	<.75
Sleep	1.59	<.25	.1	<.95
Nightmares	3.60	<.05	.3	<.75

TABLE 12

DUNCAN MULTIPLE RANGE TEST GROUPINGS WITH THREE TOUR VETERANS EXCLUDED

DV	<u>Experimental Group</u>			<u>Control Group</u>		
	Means	Time*/G+		Means	Time/G	
MVEQ/SD	50.6	1	A	49.1	1	A
	38.3	3	B	47.4	2	A
	38.0	2	B	47.2	3	A
MVEQ/PS	43.0	1	A	44.4	1	A
	34.5	3	A B	42.5	3	A
	33.0	2	B	42.0	2	A
Nightmares	3.14	1	A	2.71	1	A
	1.27	3	A B	2.28	2	A
	.14	2	B	1.75	3	A
MVEQ/CV	43.3	1	A	45.2	3	A
	38.0	2	A	44.4	1	A
	37.8	3	A	41.8	2	A

\* Times: 1 = Pre; 2 = Post; 3 = Follow-up

+ G = Duncan Grouping. Means with the same letter are not significantly different ( $p < .05$ ).

of violence. For the control group, the highest (i.e. worst) scores were given at follow-up (N.B. 3-1-2 sequence) while the experimental scores showed non-significant improvements from pre to post and again from post to follow-up (N.B. 1-2-3 sequence).

## V. DISCUSSION

Overall, the results of this study supported the main hypothesis that flooding would increase treatment effectiveness while failing to support any of the secondary hypotheses. Data did not support hypotheses that flooded subjects would continue in treatment more than controls (although seven of eight experimental subjects did cooperate with follow-up data collection as opposed to only four of eight control subjects), nor did the dependent measures predict dropouts. Follow-up data did not show more improvement in post-flooding treatment for the experimental subjects, however, they did demonstrate some lasting effects on the flooded group as well as a non-significant trend toward less Perceived Capacity for Violence.

### Three Tour Veterans

Because the short term flooding treatment yielded negative treatment results for the only three tour veteran and because, as discussed previously, he did appear to represent a distinct, more severely traumatized population, results will be discussed with him and his matched three tour control subject excluded. This exclusion does narrow the generalizability of the results (as does the exclusion of POW's) but it seems to improve the accuracy of the study to admit that this brief therapy was inadequate for treating such extensive traumatization. Perhaps more extended treatment is needed or perhaps flooding is not an effective treatment for these clients. Since

treatment was limited such that only nine flooding sessions were allowed, these are questions the study must leave unanswered. The issue was further complicated by the fact that the three tour veteran was the only black subject in the experimental group. Since the therapeutic relationship seemed to be good, the client was highly cooperative in therapy and communicated freely, racial issues did not seem to be a problem. Because time ran short before all nine identified scenes were thoroughly flooded, the extent of his trauma appeared to be the problem.

#### Treatment Effectiveness

Because of the exploratory nature of the study, the small sample size, and large number of dependent variables, it was not possible to conduct a MANOVA test, but univariate results indicate that, overall, treatment was helpful for general conditions of anxiety (STAI/State and Trait) and depression (BDI) as well as for symptoms more specific to PTSD such as Sleep Disturbance, Nightmares and Psychotic-like Symptoms. In addition there were significant group \* time interactions for subjective anxiety over Vietnam-related stimuli (as measured by STAI/State and BAT/SUDS), for re-experiencing symptoms (Nightmares and MVEQ/Sleep Disturbance), and for other PTSD-relevant symptoms (Hyper-sensitivity to Sound and Psychotic-like Symptoms). The significance of these interactions was reconfirmed by t-tests (Table 8) showing high levels of significance for all six experimental group changes and marginal significance on only one measure of change for the control

group. Additionally, the latter control group change was in the opposite direction, indicating a sensitization effect on the SUDS measure. Theoretically, if the flooding treatment extinguished CER's, the above measures of situational anxiety (following exposure to the BAT as measured on the STAI and by SUDS), Hyper-sensitivity to Sound and re-experiencing are precisely the measures that would be most directly effected. Therefore, this pattern of significant changes increases the power of the data to support the extinguishing effects of flooding.

While it was hoped that improvements in these areas would generalize to trait anxiety, depression, sleep, and CV, these are less relevant to the flooding treatment and would be more directly treated by other therapies. Indeed, significantly more experimental subjects improved on CV as shown in a nonparametric test (Table 9); however flooding was not proposed as a panacea but rather as a supplemental treatment with specific purposes which seem to have been accomplished.

Unfortunately, the methodology utilized could not duplicate the sophistication of Keane and Kaloupek (1982) or Malloy et al (1983) who used electrodes, polygraphs and videotapes to select HR measures in the same phase of each scene for pre, post and follow-up tests. Also, the slide tape show used probably did not reach the intensity used by those researchers. These differences might account for the failure to find concordance of HR with the subjective measure (SUDS).

Finally, although only one experimental subject terminated the BAT

prematurely, he viewed much more at post than at pre (7 as opposed to 2 segments) while the control subjects who terminated early at pre test performed similarly at post test (one saw more, two less, and one the same amount). The discrepancy in viewing tolerance at pre test can most logically be attributed to time spent with the investigator by the experimental subjects. They had attended one or two additional sessions discussing Vietnam experiences and re-experiences, primarily nightmares. It appears that they had become more comfortable with the setting, the investigator, the material, or some combination of these factors or that some extinction may have occurred simply by discussing the scenes. The initial elevation of the control group anxiety (or suppression of the experimental group) strengthens the pre to post BAT/SUDS findings (Table 4) since regression toward the mean would have had the opposite impact.

#### Dropouts

It was hypothesized that flooding treatment would decrease the dropout rate, but this did not appear to be the case. Although seven experimental and only four control subjects responded at follow-up, there were actually more dropouts from all treatment in the experimental group than in the control.

As described in the Results section, two factors tangential to the treatment could easily account for the dropout rate. One factor is peripheral to the issue but may be an important consideration for the veteran population while the second factor is critical to initiating

such a program with this population.

The first factor, perhaps more relevant to the veterans as a population than to the treatment, may have important prognostic implications. The only three subjects in the study without phones at home or at work all dropped out of treatment. They may have intentionally isolated themselves if they were avoiding painful CER's, or they may not have been financially able to afford phones or emotionally capable of dealing with such availability. Whatever the case, men without telephones seemed to be a poor risk for treatment. Communication with them was difficult whether or not this was their intent.

The second, apparently critical factor had to do with novelty. Once the first experimental subject (#7) had completed treatment, the dropout problem diminished drastically. In contrast to the four subjects (1, 2, 3, and 4) who dropped out while the study was being started, only one (who had no telephone) dropped out of the flooding group afterwards.

There could be many explanations of this problem, including the inexperience of the therapist. However, the hypothesis that seems most plausible to the author is that the novelty of the technique and of the therapist in combination with the learned distrust of the client population and the intensity of the treatment procedures were sufficient to deter clients and swing the balance back toward avoidance. Once the

therapist and methods had been "proven" (i.e. there was a treatment survivor in the group), reputation was sufficient to overcome the initial reluctance. This pattern is consistent with Keane's (Note 5) admission that approximately one year was need to initiate the flooding program at the Jackson, Mississippi, VA Medical Center.

An additional difficulty was that, because of the experimental nature of the program, the treatment had to be presented with as little bias as possible. Clients were told "both the standard treatment and the flooding have been found effective for Vietnam veterans and we are trying to find out what works best." In contrast, a therapist in practice who used flooding would probably present it to clients as the best treatment known or certainly with his/her recommendations.

#### Follow-Up Progress

Because of the limited response to follow-up questionnaires, only guarded conclusions can be drawn. Indeed, only four control and six experimental subjects gave responses at all three times. Nonetheless, the data will be discussed since some of the tendencies suggested may be of value for further research.

Only two variables, SD and PS (Table 10) showed significant univariate interactions when all three assessment periods were included in the analysis. Further explication (within-group ANOVA's) demonstrates that there were no significant changes for the control group and three (SD, PS and Nightmares) for the experimental group

(Table 11). Further, Duncan Multiple Range Tests (Table 12) on these three variables revealed that only SD maintained a significant pre-post improvement over the follow-up period. Especially given the focus of flooding treatment on Nightmares and the theoretical extinction of CER's to those memories, SD and Nightmares would be expected to show long term effects. The impact of treatment on PS may be a result of improved sleep or of the extinction process since many of the PS questions involved re-experiencing symptoms. PS and Nightmares, though they were significantly different from pre to post, regressed after the treatment period such that the follow-up scores were not significantly different from pre or post. In other words, some of the gains made in treatment appear to have dissipated. The consistency of this trend (i.e. improvement from pre to post with follow-up falling between the two) was seen over the other variables in the experimental group as well, such that all but CV (see below) showed this ("1-3-2") pattern. Although the control group generally improved (at non-significant levels) over time, they failed to do so on HS and CV where follow-up scores were higher than pre or post ("3-1-2"). While this sensitization effect is slight, it is also consistent with the thinking that standard treatment of Vietnam veterans may increase agitation, sometimes deterring veterans from treatment. Hyper-sensitivity to Sound in particular is an area of symptomatology that flooding would theoretically extinguish and which does seem to improve over time with flooding but not without it.

Risk of Violence

Because the issue of violence was so frequently raised as an argument against using flooding, it is important to comment on the actual responses to treatment. Admittedly, this direct exposure method is intense but there were no indications of danger. One subject vomited during his first flooding experience and another clenched his fist so hard that he reported a sore arm the following week. Tears, clenched fists, wrinkled and/or strained facial expressions, twitches, tremors and fidgeting were common behavioral signs of emotional turmoil. By the end of each session, subjects more commonly expressed boredom and/or fatigue. They usually relaxed in posture and facial expression.

Verbalizations of anger were usually connected with loss and/or frustration. As flooding progressed and the scenes of recurrent nightmares or intrusive thoughts became more clear and detailed, anger frequently evolved into delayed mourning. During combat, anger was the only emotion that could be expressed without weakening the soldier's defenses. Therefore they had learned to suppress their sadness (e.g. when friends were killed) to such extremes that many veterans could not remember feeling anything but anger. In their continued avoidance over the years, they seem to have been successful at avoiding the actual mourning process although high levels of depression were common. The exposure to the events and consequent conversion of some of the anger to sorrow may account for the failure of flooding to impact significantly

on depression. In any event, the Perceived Capacity for Violence changed in a positive direction (i.e. decreased) over treatment (pre to post) for seven of the eight flooded subjects (all but the three tour veteran) and for only four of the eight control subjects (including the three tour veteran). A Duncan Multiple Range Test on CV (excluding three tour veterans, Table 12) showed that CV decreased in the experimental group from pre to post to follow-up. For the control group, CV decreased from pre to post, but then increased over the follow-up period to a mean even higher than at pre test. Thus the trend suggests a slight agitation of violent impulses in the control group and a slight mollification in the experimental group. These findings, though weak, contradict contentions that flooding increases violence. While these differences are small, it is of interest that they are all in the "right" direction. In other words, they show a decreased inclination to violence after treatment especially in the experimental group. By follow-up there was an additional decrease, on the average, for the experimental group and an increase for the control subjects. Although these data are not strong enough to support a hypothesis that flooding decreases perceived violence, they certainly do not support any exacerbation of the problem.

## VI. CONCLUSIONS

Four important conclusions seem to be warranted by the data.

First, flooding seemed to be an effective supplemental treatment for the population in question and for the symptoms theoretically anticipated. Second, follow-up results suggested that some of these gains were maintained. Third, there was no indication of any increase in violence or in "Perceived Capacity for Violence" for the experimental subjects and, in fact, the trend was in the opposite direction. Fourth, dropout may be a problem while a program of flooding is being initiated.

### Effectiveness

Overall, the study supported the hypothesis that flooding is an effective supplemental treatment for Vietnam veterans with one to one-and-a-half tours of combat exposure who still suffer re-experiencing symptoms. Although this study was too small to provide conclusive statistical evidence, the data did show with marginal significance that flooded subjects demonstrated larger decreases over treatment in situational anxiety (STAI/State and BAT/SUDS) and re-experiencing symptoms (frequency of nightmares and MVEQ/SD) and, to a lesser degree on other symptoms that have been associated with PTSD (i.e. PS and HS, Miller and Buchbinder, Note 16) than non-flooded controls. Flooding did not have as strong an impact on more general measures of anxiety, depression, and sleep nor on other symptoms that have been associated with PTSD (i.e. PS and CV).

These results tend to confirm case study findings (Black & Keane, 1982, Fairbank & Keane, 1982, Keane & Kaloupek, 1982, and Herman, Note 14) and support the theoretical contention that flooding acts to extinguish CER's. All measures that tapped the anxiety associated with war memories (including State, SUDS, and HS) and the re-experiencing of them (i.e. Sleep Disturbance and Nightmares) showed significant interactions effects. Nonetheless, two major discrepancies between the current study and previous studies are that: (1) physiological findings (HR) in the present study failed to confirm results obtained from self-report and behavioral measures and (2) more general measures of anxiety (STAI/Trait) and depression (BDI) did not yield significant effects for the flooded group compared to the non-flooded group. While the failure to find changes in HR under stressful conditions seems to be primarily a measurement problem, failure to find differential improvement on general indices of anxiety and depression appeared to be a function of improvement on these measures occurring across treatments. Depression in particular showed one of the greatest improvements for all subjects ( $F=12.79$ ,  $p<.01$  and, excluding three tour veterans,  $F=16.95$ ,  $p<.01$ ). Any additional contribution of flooding seems to have been masked by the effectiveness of standard treatments.

#### Limitations

There are three areas of compromise that must be discussed due to the limitations they impose on the conclusions and/or the additional

information they provide. First is the problem of dropout where correlational factors yield strong clues to probable causes. Second is the problem of treatment for three tour veterans. Their treatment failure and exclusion from statistical analyses restricts the generalizability of the study and raises further questions about treatment for such special cases. Third, as discussed previously, there was no control for therapist variables. Therefore there is no way to estimate the contribution of such factors as female attention or personal attributes of the therapist.

In spite of the positive findings, dropout was a major concern. On one hand, no veteran who was cut off from immediate communications (by not having a telephone) completed treatment. Although there were only three such cases, it is worth noting that this subgroup may need special attention. On the other hand, dropout also seemed to be a function of the novelty of the program. Until a client from the Salem VAMC Outpatient Vietnam veteran population had successfully completed the flooding treatment, dropout (primarily from the supplemental flooding program) was definitely a problem. It seems reasonable to anticipate some reluctance among participants until a program can be established and develop a reputation.

No conclusions were made concerning three tour veterans, who appeared to represent a distinct, more severely traumatized group. Because only one was treated with flooding and because the limits set on

the treatment for the purposes of the study did not allow for extensive therapy, the reason for failure cannot be determined. Therefore conclusions are limited to veterans of one to one-and-a-half tours.

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APPENDIX A

Consent Form

Revised 2/6/83

Information about:  
Supplemental Treatment for Vietnam Veterans

I, \_\_\_\_\_, agree to participate in a treatment/research project under the direction of Nancy Miniszek, M.A. I understand that any information I provide will be used for research and treatment only. It will never be linked with my name in any unpublished or published paper and it will not be used against me.

The nature of the study has been explained to me by \_\_\_\_\_. I understand that the purpose of the project is to measure how well current treatments work in improving my general state of mental health as well as in reducing nightmares, sleep problems, flashbacks, and thoughts about the war. I understand that I will be asked to:

1. complete some questionnaires at different times in treatment,
2. record nightmares, flashbacks, war thoughts and hours of sleep per night beginning today and continuing for several weeks,
3. have treatment in individual and group therapy as recommended by Dan Lonnquist.
4. possibly be in an additional individual treatment. I will not know the exact length of the extra treatment, but it will be no longer than 14 sessions of no more than 1-1/2 hours each.

I understand that risks involved in participating in the study include some temporary worsening of symptoms. I will be asked to imagine war scenes and to view slides of war scenes while I hear a tape of combat sounds. I am expected to become upset, however the effect of this treatment is that my symptoms will decrease in the fastest and most complete manner possible. Care will be taken to see that I calm down before leaving each session. The extra treatment may also make it easier for me to work in group treatment and deal with war issues.

Although this is a research project with goals to improve treatment for veterans and disaster victims in the future, the first concern will always be the treatment of the participants. I understand that the benefits to me are that the treatment is expected to improve my mental health and well-being. Treatments will be aimed at decreasing symptoms and helping me to deal with personal problems and war issues. Further, a report of the findings will be given to me and published in a journal in order to provide health care workers with information on how best to help Vietnam veterans.

I understand that I have the right to receive the standard hospital treatment with or without participating in the study. Further, participation in the study will in no way affect my veteran's benefits or status. I understand that I can withdraw from treatment at any time without prejudice in any way (although this will be discouraged because it may be harmful to me). If I have questions I may call Nancy Miniszek at (703) 961-3761 (evenings). If an emergency should arise, I can come in to the VA at any time.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Date

APPENDIX B

Code Number: \_\_\_\_\_

Self-Monitoring Sheet

Please carry this sheet with you and turn it in to Ms. Miniszek weekly. Fold it and put it in your wallet or pocket or whatever's handy. Keep as accurate a record as you can.

**LAST NIGHT**

**TODAY**

Day & Date	Hours of Sleep	Nightmares	Flashbacks of 'Nam	Thoughts about 'Nam You Couldn't Stop



5. I | never-----about once-----always |  
          |          1          2          3          4          5          6          7 |  
          |          per week          |

find myself acting as if I were in Nam.

6. When I'm alone, I | never-----about once-----always |  
                          |          1          2          3          4          5          6          7 |  
                          |          per week          |

hear sounds I used to hear in Nam.

7. I | never-----about once-----always |  
          |          1          2          3          4          5          6          7 |  
          |          per week          |

see vivid images or flashbacks of people or events from Nam.

8. I | never-----about once-----always |  
          |          1          2          3          4          5          6          7 |  
          |          per week          |

wake up during the night.

9. My dreams are usually

| wonderful-----okay-----horrible |  
          1          2          3          4          5          6          7 |

10. When it's hot I | never-----sometimes-----always |  
                          |          1          2          3          4          5          6          7 |

feel as if I'm back in Nam.

11. I | never-----sometimes-----always |  
1 2 3 4 5 6 7 |

worry that I'll lose my temper and hurt somebody.

12. I am | extremely-----moderately-----not at all |  
1 2 3 4 5 6 7 |

sensitive to noise.

13. When I look at my hands they

| never-----sometimes-----always |  
1 2 3 4 5 6 7 |

seem as if they don't belong to me.

14. I | never-----sometimes-----always |  
1 2 3 4 5 6 7 |

have to restrain myself from punching somebody.

15. I think I have | zero-----moderate-----extremely |  
1 2 3 4 5 6 7 |  
high

potential to become violent.

16. I | never-----sometimes-----always |  
1 2 3 4 5 6 7 |

feel removed from my body.

17. I | never-----sometimes-----always |  
1 2 3 4 5 6 7 |

avoid talking about Nam.

18. I | never-----sometimes-----always |  
1 2 3 4 5 6 7 |

need a drink in order to go to sleep.

19. The sound of airplanes overhead

| doesn't-----upsets-----terrifies |  
bother me me me |  
1 2 3 4 5 6 7 |

20. I am | never-----sometimes-----always |  
1 2 3 4 5 6 7 |

irritated by things that people around me do.

21. I'm a(n) | extremely-----slightly-----extremely |  
impatient impatient patient | person.  
1 2 3 4 5 6 7 |

22. When I hear the sounds of airplanes and helicopters, I

| never-----sometimes-----always | think of Nam.  
1 2 3 4 5 6 7 |

23. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

need to take a pill in order to sleep.

24. When I get near bushes or shrubs, I

| never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

get suspicious that people might be lurking behind them.

25. I am | not at all-----somewhat-----extremely |  
| 1 2 3 4 5 6 7 |

afraid that someday I could kill someone without intending to.

26. When I see things that remind me of Nam, I

| never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

lose control.

27. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

feel that people are watching me.

28. It takes | a very slight-----a moderate-----an extremely loud |  
| 1 2 3 4 5 6 7 |

noise to wake me up.

29. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

feel as if I have to hit something.

30. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

think something is wrong with my mind.

31. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

see things that remind me of Nam.

32. I find that | <sup>many</sup> little-----a few-----almost |  
| things things nothing |  
| 1 2 3 4 5 6 7 |

bug(s) me a lot.

33. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

want to destroy things just for the hell of it.

34. I am a | light-----moderate-----heavy | sleeper.  
| 1 2 3 4 5 6 7 |

35. I get into an irritable mood

much more	-----			about as	-----			much less
often than				often as			often than	
1	2	3	4	5	6	7		

before I went to Nam.

never	-----			sometimes	-----			always
1	2	3	4	5	6	7		

get "panicky" inside.

never	-----			sometimes	-----			always
1	2	3	4	5	6	7		

jump when someone around me makes the slightest noise.

never	-----			sometimes	-----			always
1	2	3	4	5	6	7		

on my guard waiting for something to happen.

never	-----			sometimes	-----			always
1	2	3	4	5	6	7		

forget where I am.

never	-----			occasionally	-----			frequently
1	2	3	4	5	6	7		

hurt people without being aware of what I was doing.

41. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |  
hear my heart beat.

42. If someone touches me unexpectedly, I will

| never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

strike out before I have time to think about it.

43. Even though I know it's been a long time since I left Nam, it

| never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

feels as if it was only yesterday.

44. I | never-----sometimes-----always |  
| 1 2 3 4 5 6 7 |

find myself fascinated by weapons.

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