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Running head: EMDR AND TEST ANXIETY

**Eye Movement Desensitization and Reprocessing:
An Evaluation of Single Session Treatment of Test Anxiety**

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**Thesis submitted in partial fulfillment of the requirements
for the degree of Master of Arts in Clinical Psychology**

Lakehead University

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Abstract

Eye movement desensitization and reprocessing (EMDR) is a structured comprehensive therapeutic procedure that appears to desensitize the distressing emotions related to past disturbing and traumatic events, while simultaneously restructuring related negative cognitions and relieving accompanying physiological hyperarousal. This study evaluated the effectiveness of a single ninety minute EMDR session in reducing the symptoms and anxiety associated with test anxiety. It was hypothesized that EMDR would effectively treat test anxiety by alleviating physiological distress, eliminating negative self-preoccupied cognitions, and decreasing the fear of negative evaluation. Seventeen second-year psychology students with test anxiety were randomly assigned to Immediate treatment and Delayed treatment conditions. Standardized objective measures (the Test Anxiety Inventory [TAI], the Fear of Negative Evaluation Scale, and the State Trait Anxiety Inventory) were taken pre- and post-treatment and at two-month follow-up. Results showed that EMDR significantly decreased the symptoms of test anxiety and evaluation fears of the Immediate group compared to the Delayed group, with effects being maintained at two-month follow-up. Large treatment effects were achieved and were reflected in large drops in percentile ranking on the TAI. The Subjective Units of Disturbance Scale and Validity of Cognition ratings also improved significantly, showing large treatment effects, which is consistent with Shapiro's findings of rapid and significant reductions in presenting complaints and anxiety. When the Delayed group received treatment, it was found that the effects of treatment were equivalent for the two groups. One session of EMDR appears to be an effective treatment for test anxiety for students.

**EYE MOVEMENT DESENSITIZATION AND REPROCESSING:
AN EVALUATION OF SINGLE SESSION TREATMENT OF TEST ANXIETY**

Eye movement desensitization and reprocessing (EMDR) is described as "a model, set of principles, procedures and protocols that together represent a new approach to psychotherapy" (Shapiro, 1994, p.155). EMDR is believed to facilitate the accessing and processing of traumatic memories and to bring these to an adaptive resolution by desensitizing emotional distress, restructuring associated negative cognitions, and relieving accompanying physiological arousal. This complex multi-component process is said to diminish the intensity of perceptual, cognitive, emotional, and physiological reactions to distressing memories. The initial response to treatment is a marked lessening of the affect associated with the event, as well as an alteration of the associated negative semantic content of self-appraisals.

Treatment Protocol

EMDR is a complex multi-component, multi-staged process, which structures many elements of other effective therapies into a comprehensive treatment protocol (Hyer & Brandsma, 1997). These components include exposure, distraction, desensitization, cognitive restructuring, relaxation, and self-efficacy elements. EMDR consists of eight phases, each considered essential for effective application (Shapiro, 1995; Shapiro & Silk Forrest, 1997). During the first two phases the therapist develops a treatment plan, assesses the client's suitability for EMDR, and prepares the client by educating them about the process. In the third phase the client identifies a specific target memory, with its

related image, affect, cognitions, and body sensations. The client is assisted in identifying a “negative cognition” which is a current negative self-referencing belief elicited by the target memory and in developing a related “positive cognition”, which expresses a desired sense of empowerment and agency. The client rates the validity of that positive cognition on the Validity of Cognition Scale (VOC). The client identifies the related emotions and body sensations and gives a Subjective Unit of Distress Scale (SUDS) rating for the level of distress.

In the fourth phase, the desensitization phase, the client focuses on this material while experiencing bilateral stimulation in sequential dosed exposures. The client holds all these elements in mind (the image, negative cognition, affect, and body sensation) while simultaneously moving their eyes from side to side for approximately 30 s, following the therapist’s fingers as they move across the visual field. After the set of eye movements the client is told to take a deep breath, and then is asked what new material was elicited in the process. The new material (image, thought, sensation, or emotion) then becomes the target of the next set of eye movements. This cycle of eye movements while focusing on the elicited material, followed by client feedback, continues until periodic checks of the SUDS level, and of the original target, indicate that the memory has been desensitized. A SUD rating of 0 or 1 indicates completion of this phase. If the processing stalls, the therapist uses “cognitive interweaves” which are specialized interventions to facilitate information processing. Other bilateral stimuli such as hand-tapping or aural stimulation can replace the eye movements (Shapiro, 1994a, 1995).

In the fifth phase, cognitive installation, the therapist invites the client to pair the

previously identified positive self-referencing belief with the original traumatic image, using bilateral stimulation. The efficacy of this phase is measured by the client's self-reported VOC. An attempt is made to bring the VOC to a score of 6 or 7. EMDR theorists believe that there is a "physical resonance to unresolved thoughts" (Shapiro & Silk Forrest, 1997, pp. 54-55) and that processing is not complete until the client can bring the traumatic memory into consciousness without feeling any body tension. This is assessed in phase 6, preparatory to closure in phase 7. The therapist assesses that the material has been adequately worked through, and if not, assists the client with self-calming interventions. Reevaluation (phase 8) takes place at the beginning of every EMDR session. The therapist checks with the client to assure that the treatment gains have been maintained, via SUD, VOC and body self-report measures. These reevaluations assist the therapist in continuing to direct the treatment trajectory toward maximum benefit for the client.

History

Treatment Development

In 1987 Francine Shapiro thought she had discovered a simple behavioral technique that could provide rapid desensitization of emotional distress. While walking in the park, she noticed that her disturbing thoughts had disappeared when she moved her eyes rapidly from side to side (Shapiro, 1995; Shapiro & Silk Forrest, 1997). She experimented with this technique and developed a treatment protocol that appeared effective, which she called Eye Movement Desensitization (EMD). She then conducted a

case study , and a controlled study for her doctoral thesis, which resulted in two published papers (Shapiro, 1989a, 1989b). The subjects were 22 individuals who were very disturbed by various traumas that had occurred an average of 23 years previously, and who had received an average of 6 years of unsuccessful treatment.

Shapiro (1989a) randomly assigned subjects to an EMD condition and to a control group that received a modified flooding procedure. She gave each EMD subject one 60 minute session, focusing on one traumatic memory. The subjects reported dramatic improvement: significant positive treatment effects were obtained for the EMD treatment group on the SUDS and behavioral indicators, which were independently corroborated at 1 and 3-month follow-up sessions. Shapiro then administered EMD to the control group. Although this study captured the attention and imagination of the psychological community, it had serious methodological flaws. There were no independent, standardized assessments, nor independent diagnoses. By providing treatment to the control group, Shapiro had eliminated their use as controls. Other objections identified the small sample size and the potential experimental bias of the treatment originator being therapist and author.

While working as a Research Fellow at the Mental Research Institute in Palo Alto California, Shapiro continued to refine the EMD procedure, and strived to develop a theory to explain the rapid treatment gains made by most clients. She realized that there was more going on with the clients besides desensitization: there appeared to be a cognitive restructuring of memories and personal attributions. Some clients were observed to be rapidly and spontaneously accessing a succession of related thoughts,

images, emotions, associations, and memories, and to be moving through these in an integrative way (Shapiro, 1995). Shapiro conceptualized this as “adaptive processing” and formulated the theory of Accelerated Information Processing (Shapiro, 1994). This theoretical development was accompanied by the continual development and refining of method protocols and procedures. The procedure was renamed EMDR to capture the concept of Reprocessing. The development of both the method and its theoretical framework “grew from an exploration of consistently achieved treatment effects, an exploration that refined the use of eye movements and additional elements of the procedure” (Shapiro, 1995, p.1).

Shapiro appears to have had “the conviction that she was on the edge of quantum leap in psychotherapy” (Butler, 1993, p.28). She became very zealous in promoting a technique that she believed could bring rapid treatment benefits to thousands of sufferers with posttraumatic stress disorder (PTSD). Shapiro (1993a) recognized the ethical dilemma created by the need to make the treatment available and the conflicting requirement to validate the treatment empirically. How could both these needs be met? She decided to train certified clinicians who could be assumed to use the technique responsibly, while simultaneously encouraging research. She also controlled the teaching of this technique so that every person practicing EMDR had identical training, and was following the same protocols. Shapiro held the first EMD training in 1990. By 1991, an EMDR National Training Schedule was established, featuring a recommendation from Wolpe, who is quoted as saying that EMD “has all the indications of being a major new resource in behavior therapy” (EMDR, 1991, p.1).

Meanwhile numerous uncontrolled research studies and case studies were being published, most of which provided some support for Shapiro's claims. McCann's (1992) report of a one session treatment is typical of many such case reports. His client had suffered from intense post traumatic stress disorder symptoms for 8 years. The man had been severely burned, with resulting massive scarring, total deafness, bilateral amputations of the arms above the elbows, and severely damaged feet and ankles. After the one EMD treatment, the patient reported complete absence of intrusive symptoms and obsessional thoughts. Within one month of treatment he had achieved large gains in independence and mobility and was discharged from hospital. At one year follow-up he continued to be asymptomatic, and was continually improving his life quality.

Silver, Brooks, and Obenchain (1995) worked in an inpatient veterans' PTSD program. They used EMDR with 100 subjects who had already received biofeedback and relaxation training. EMDR was found to be superior to the other methods on seven of eight dimensions of the Problem Report Form. EMDR significantly outperformed the other treatments on measures of anxiety, anger, depression, relationship problems, nightmares, intrusive thoughts, and flashbacks. EMDR treatment was found to improve treatment effects, when compared with controls, up to a factor of over 7 times. Although this was a retrospective add-on study, which lacked randomization, it allowed for the comparison of EMDR with other efficacious treatments. Such studies mobilized support for EMDR among clinicians.

Controversy

It may not be surprising that EMDR has met with substantial resistance. Although

EMDR has integrated elements of cognitive, psychodynamic, client-centered, and behavioral therapies in a unique and powerful way, it defies their basic theoretical assumptions (Butler, 1993). Behaviorists postulate that long and repeated exposure is necessary to extinguish the traumatic response; cognitive therapists believe that change happens as a result of changing faulty beliefs; psychodynamic clinicians believe that insight is essential for change; family therapists see change as a result of shifts in relationship patterns; person-centered therapists consider the quality of the therapeutic alliance to be the most essential feature in creating change (Corey, 1996). EMDR does not require any of these features to achieve its results, and consequently challenges these other therapeutic systems. EMDR also challenges the traditional belief that therapy must be slow to be effective, that no substantial change can happen rapidly. On the other hand, some critics insist that EMDR's only novel feature is the eye movement, and argue that the eye movement component is unnecessary and spurious. They maintain that EMDR is just a variant of cognitive behavioral therapy and exposure therapy (Lohr, Tolin, & Lilienfeld, 1998).

Many psychologists have been uncomfortable with the development of a therapeutic technique for which there is no theoretical explanation. Psychology's scientist-practitioner model calls for the development of theories, which are then tested, modified, retested, and eventually used to guide the development of clinical techniques. The assumption is that research should arise from theoretical considerations, and that the resulting research should guide clinical practice. Acierno, Hersen, Van Hasselt, Tremont, and Mueser (1994) articulate the scientist's perspective. They strongly assert that the

proper procedure is for there to be first the generation of hypotheses; next, tests of validity; then, after this is accomplished, and only then, should there be dissemination of knowledge, or training of others in a specific technique.

Arguing that the controversy about EMDR can be partly understood as a reflection of the fundamental historical conflict within the field of psychology, Baldwin (1997) describes the present debate as reminiscent of unresolved debates surrounding the mechanistic/ reductionistic versus holistic approach, and the humanistic versus scientific perspective. He concludes that the controversy over EMDR has resulted from a polarization of clinicians and researchers, who have differing values, use different language and constructs, and employ divergent standards to evaluate empirical data. Baldwin suggests that researchers value theoretical congruence and experimental data, and dismiss anecdotal evidence; while clinicians are more pragmatic, perhaps because they have learned to rely on their own feelings and observations. Practitioners have the opportunity to try out new procedures by making their own practical experimental applications, and assessing outcome with their own clients.

Excessive Claims?

The response to EMDR was polarized: skeptics denounced and satirized it, deriding the grandiose claims. Advocates embraced it, with enthusiastic anecdotal reports of rapid treatment success. Unfortunately some reacted to the excessive claims by prematurely concluding that they were bogus; while others reacted by uncritically accepting the claims. The controversy grew rapidly. It is indisputable that EMDR has poor face validity. People had a hard time believing that this simple, easily satirized,

treatment could possibly work. Not only was the EMDR process derided but even the suggestion that clients could make profound changes rapidly was dismissed by some professionals as completely unrealistic. Critics mocked EMDR as the "magic bullet" and "the quick fix" and compared it to the Holy Grail (Denicola, 1993). Some suggested that EMDR's influence might reside in the powerful demand characteristics elicited by therapists engaging in "ritualistic motoric acts" (Lohr et al., 1992). Therapists were strongly cautioned against uncritically accepting the procedure (Herbert & Mueser, 1992; Mueser & Herbert, 1993; Steketee & Goldstein, 1994). Numerous reviews of the literature highlighted the major methodological flaws of the research. In particular, reviewers pointed out the wide use of self-reports and the lack of objective or standardized diagnostic measures in the early research (Herbert & Mueser, 1992). Even negative anecdotal reports were published with brutal condemnations of EMDR (Metter & Michelson, 1993).

Ad Hominem Attacks

Shapiro was seen as a "neo-scientist" (Baldwin, 1997, p.7) who had not only accidentally stumbled upon a clinical technique but who had audaciously gone on to market it, before it had even received scientific acceptance. Butler (1993) suggests that some critics focused on Shapiro herself, an unknown woman with questionable credentials; they faulted her education, her training, her ethics, and her personal style. Even the truthfulness of her account of the original serendipitous discovery was called into question (Rosen, 1995; Welch, 1996). Shapiro is said to have reacted in a controlling and perhaps aggressive manner to the onslaught of attacks (Butler, 1993). Although it is very

rare for ad hominem attacks to be published in peer reviewed journals, Shapiro was a frequent target of what she termed as “vitriolic misrepresentations” (1993a). Fensterheim (1993) questioned the editorial practice of publishing comments that “besmirched” Shapiro in “vituperative” tones, “maligning her motives”, and accusing her of creating “cultist enthusiasm” (p. 189).

Marketing and Control of Training

Shapiro’s control of training was perceived by critics as profit mongering. The presentation of EMDR appeared to many to be more like a product being marketed than a professional treatment procedure being disseminated (Mueser & Herbert, 1993). Shapiro was criticized on one hand for making the training available without significant experimental basis, and on the other hand, for controlling and restricting access to training. Acierno et al. (1994) viewed Shapiro’s proprietary control as “not in accord with standard scientific procedure and (as violating) a major tenet of the public nature of scientific inquiry” (p. 297). The restriction of information was seen as running counter to scientific practice, and Acierno et al. derided EMDR as a “parascientific nonoperationalized intervention” (p. 298).

Shapiro (1993b) answered such critics by stating that there was no restriction on sharing information or demonstrating EMDR. The restriction was specifically related to training others in the application. - She explained that this decision had been made to ensure client safety, and to ensure method integrity. The purpose was that only licensed mental health professionals could be trained, and that all persons trained received the same training in the identical procedure, not an adapted version passed on from one person to

another. Shapiro continually maintained that EMDR, in the hands of an untrained or incompetent professional was potentially dangerous. In 1994, Shapiro allowed a few professionals who were closely involved in the development process to begin to hold official EMDR trainings; this group of official trainers now numbers seven and is provided through the EMDR Institute. When Shapiro published her book in 1995, the restriction on training was lifted. It is Shapiro's hope that EMDR will be taught as a course in graduate schools across the continent (Shapiro, 1995). Shapiro has now trained over 22,000 clinicians internationally and there are reports of more than 1,000,000 individuals treated (EMDR Institute, Inc., 1998). EMDR continues to grow in popularity and is becoming a recognized established treatment.

Research Controversies

Baldwin (1997) states that most treatment techniques follow a long and predictable course to establish efficacy. First there are anecdotal reports, then case reports, then controlled studies which improve over time as methodological essentials become established. It is interesting to note that for 13 years after PTSD was officially classified in the Diagnostic and Statistical Manual of Mental Disorders III (American Psychiatric Association, 1980) there were only 6 controlled clinical treatment studies cited in the literature and 4 of these used veterans as their subjects (Shapiro, 1994). In their review of empirically supported treatments for adult mental disorders, DeRubeis and Crits-Christoph (1998) comment that although there have been "literally thousands of empirical studies of psychological treatments" published, only a very small number are controlled studies that compare outcome between randomized groups.

It is indisputable that early EMDR studies suffered from major methodological flaws: they all had serious problems in some aspect of control or assessment. Internal validity concerns included demand characteristics, a failure to confirm diagnoses both pre and post treatment, lack of protocol fidelity, issues concerning subject factors, and a lack of objective and standardized measures. Failure to detect significant change following EMDR did not establish its lack of efficacy. Although even critics described the early results as "impressive" (Lohr et al., 1995, p. 298) the efficacy of EMDR was not established until recently when the research conformed with empirical standards. Later research incorporated many of the suggestions and some recent studies have met exemplary standards for empirical research.

In her original article, Shapiro wrote, "the evidence clearly indicates that a single session of the EMD procedure is effective in desensitizing memories of traumatic incidents" (1989a, p. 216), and "enough information has been given here to achieve complete desensitization of 75-80% of any individually treated trauma-related memory in a single 50 minute session" (1989a, p. 221). But she also cautioned that clients with more chronic PTSD might require numerous sessions and "supplemental training will be necessary for full therapeutic success" (1989a, p. 216). By 1993, Shapiro was very clear that "EMDR is not a simple technique as I had once thought" (1993b, p. 419). A number of researchers (Acierno et al., 1994; Bauman & Melnyk, 1994; Jensen, 1994; Sanderson & Carpenter, 1992) used the description of the EMD process provided by Shapiro in 1989 to test the technique and failed to find EMD more effective than controls. In spite of insistence that the procedure was adequately performed (Sanderson & Carpenter, 1994),

criticisms have been made of the lack of treatment fidelity (Greenwald, 1994, 1996; Shapiro, 1996a). For example, Sanderson and Carpenter "simplified" (1992, p. 269) the EMD procedure by omitting the cognitive component and by limiting subjects to a single image.

The Continuing Controversy

The interest of researchers and clinicians in EMDR is reflected in a large body of literature. As of December 1997, the PsychLit data base contained approximately 60 articles on EMDR. The degree of consistency, magnitude and stability of treatment effect over time has convinced many former skeptics that EMDR is a viable and useful treatment for trauma survivors (Greenwald, 1996).

Many questions still remain about the treatment's efficacy and applicability. In part, these are fueled by uncertainty about the identity of the mechanism of the treatment's effectiveness. Although much research has focused on dismantling the EMDR process, and in particular has examined the necessity of the eye movement component, the necessity and role of eye movement is still undetermined. It appears that eye movements may add nothing to the effect of the EMDR protocol with gaze fixation. While critics argue that non-eye movement EMDR is equivalent to cognitive behavioral therapy with exposure (Lohr et al., 1998), EMDR advocates locate the mechanism within the treatment protocol (Shapiro, 1996a, 1996b):

Although the majority of research studies have examined the use of EMDR with persons struggling with PTSD or other trauma-related symptoms, it is widely suggested by Shapiro and EMDR advocates that the treatment is effective for a wide range of

psychological problems. The EMDR web page (EMDR Institute, Inc., 1998) informs readers that EMDR "has successfully helped over a million individuals who have survived trauma, including sexual abuse, domestic violence, combat, crime, and those suffering from a number of other complaints including depressions, addictions, phobias and a variety of self-esteem issues". Critics denounce such broad claims, asserting that anecdotal clinical reports are no substitute for research.

A special edition of the Journal of Anxiety Disorders will focus on EMDR. It includes articles written on various topics by advocates and by critics. One of these is a historical comparison of EMDR with Mesmerism in which McNally (in press) finds numerous areas of similarity including pro bono work, nontraditional backgrounds, establishment of Institutes, charismatic leadership, praise from prominent individuals, grandiose claims, and comments from critics regarding the power of suggestion. The parallels that he draws, and the perspective that he takes, appear designed to denigrate EMDR and Shapiro herself.

As EMDR becomes more mainstream and more accepted, it appears that the critics become louder, the controversy more heated, and the issues more political. One wonders how adversarial positioning can advance scientific knowledge. Lipke (in press) describes the apparent failure of peer-reviewed journals to maintain their standards of scientific rigor by allowing the publication of "seriously flawed" studies such as that of Jensen (1994) and the recent biased and misrepresentative review by Lohr et al. (1998) which contains multiple errors. Lipke speaks of a "press toward rejection of the new method" rather than a willingness to objectively examine the scientific data. Lohr et al.

meanwhile insist that EMDR has failed to achieve its promise to establish itself as a new paradigm. They assert that most of the controversy could have been avoided if EMDR had only been "put forth as simply another variant of extant behavioral treatments" (p. 150).

Another recent criticism of EMDR comes from a prominent member of the False Memory Syndrome Foundation and his colleagues (Hudson, Chase, & Pope, 1998). They make false statements that EMDR is sometimes used in conjunction with efforts to "recover" memories of traumatic events and so caution against its use. They neglect to mention Shapiro's stated position that EMDR should never be used in this way (1995, pp. 293-296). Nevertheless her theory that trauma causes blocked information processing may bring EMDR into that political arena.

The Accelerated Information Processing Model

Shapiro (1995) designed an information processing model to explain the mechanism of EMDR, which she describes as a procedure that accelerates information processing. The model is based on observed treatment effects, and is said to be both explanatory and highly predictive of therapeutic response. Information processing models have long been used to understand and conceptualize fear-based psychopathology (Lang, 1977; Williams, Watts, MacLeod, & Mathews, 1997). Foa and Kozak (1986) suggested that fear could be reduced by accessing the memory, and by providing information incompatible with the information in the fear structure. They developed an exposure model to achieve habituation within and across sessions, pairing the feared stimulus with

lowered arousal. Foa, Rothbaum, and Molnar (1995) state that PTSD symptoms are improved by treatments that organize the trauma memory and which modify schemas of self and the world. Shapiro's information processing model differs from other standard exposure procedures by using alternating dosed exposure, and by achieving large treatment effects in brief periods of time.

Shapiro uses the language of neurobiology, but with terms that have no precise neurophysiological reference (e.g., bioelectrical valence). She states that she does this to emphasize the point that the validity of EMDR is not dependent on the accuracy of the physiological model and that the "physiological foundations, while undeniable, are currently unknown" (1995, p. 310). She presents the Accelerated Information Processing (AIP) model essentially as a working hypothesis (1994c). Unfortunately because she uses neurobiological language and constructs as metaphors the reader can become confused between the metaphorical application and the physiological application of these terms. To clarify this, in this paper Shapiro's metaphorical and/or hypothetical constructs will be identified in quotation marks (e.g., "synaptic potential").

The Information Processing System

In Shapiro's AIP model (1995), humans are understood to have an inherent "information processing system" that is physiologically geared, and neurologically balanced, to process information to a state of mental health. She proposes that information is normally processed to an adaptive state, where connections to appropriate associations are made, emotional distress is relieved, experiences are used constructively, and learning takes place. Information is understood as being stored in a system of

memory networks, or neuro networks, which are associated systems of information.

These memory networks contain related memories, thoughts, images, emotions, and sensations, which are stored and linked in associated channels of information.

Affect

In the AIP theoretical model (Shapiro, 1995) affect is seen as primary. Shapiro conceptualizes information as being at least partially organized by affect, and cognitions as verbalizations of the experienced affective state. Beliefs are hypothesized to represent attempts to make sense of experience (including affect). Affect is understood to stimulate cognitive content that has an equivalent "affective valence" (i.e., negative feelings result in negative thoughts). Shapiro speculates that memory networks, with their associated cognitive content, are organized by affect, and are linked with networks having similar affective valence. An important concept is that neuro networks only share information with other networks that have a similar affective valence. Shapiro also identifies a pivotal relationship between affect and level of function, and suggests that there may be an association between the valence of affect and certain behaviors.

Pathology

Pathology is seen as affect-driven, and is defined as "dysfunctionally stored information that can be properly assimilated through a dynamically activated information processing system" (Shapiro, 1995, p. 52). Dysfunction is said to result when there is an unbalancing of the system by trauma or stress, so that information acquired at the time of the traumatic event is not processed. Instead this information is maintained neurologically in a distressing, excitatory, state-specific form, and remains in this disturbing state, with its

sensory content. Shapiro writes of perceptions being “held in a biochemical stasis in an isolated neurophysiological network” (Shapiro, 1997, P. 240). Because the information is held in an excitatory form, it is more likely to be stimulated than other associations, and can continue to be triggered, causing distress; it may be expressed as the intrusive recollections of PTSD. Recollecting the event appears to elicit the same negative self-attributions, affect, and physical sensations as existed at the time of the event.

A distressing childhood experience has the potential to become a “primary self-defining event”, which is conceptualized in the AIP system as a memory node (Shapiro, 1995). Subsequent similar experiences link up with this node in channels of associated information. A memory network is then organized around the memory node of the primary self-defining event, with generalization of affect and self-attribution. Because this dysfunctionally stored information has a high negative valence, the memory network is effectively isolated so that no new learning can take place. There is no integration with existing positive or more adaptive information which is stored in networks with lower affective valences.

The Affect/Valence Hypothesis

Shapiro combines neurobiological theory and information processing terminology in her conceptualization of the critical role played by affect (Shapiro, 1995, pp. 315-319). She suggests that affect is linked to a particular “bioelectrical valence”, which is also referred to as the “synaptic potential”. The “synaptic potential” of the memory network is described as the “level of charge”, or the “receptor valence”, or the “level of resistance”. Strong affect is described as having a high level of “electrical charge” which prevents it

from linking with information in other memory networks that has a lower “electrical valence”. It is only by lowering the “synaptic potential” (“electrical valence”) of the targeted memory network that it is able to link with networks of lower valence that contain more adaptive material.

Successful Treatment

Lipke (1996) points out that “incomplete processing” is evident in a variety of ways. These can include PTSD-like symptoms, dissociation, numbing, excessive fear, related dysfunctional behaviors, and distorted negative schemas about self and the world. The event may be recalled in state-specific form, viewed from only one perspective, and always interpreted in the same way. “Complete processing” results in the elimination of maladaptive negative emotion, and in some kind of positive resolution. It may even include a positive schematic shift. For example, a person no longer sees himself as a victim, and instead claims his resiliency and strength.

Adaptive reprocessing takes place on a neurophysiological level. Desensitization and cognitive restructuring are understood to be byproducts of this reprocessing of the “dysfunctionally stored” information. Successful treatment results in a shift in how the memory is stored. Insight and integration are achieved when the dysfunctional memory network links up with more adaptive information. The AIP model postulates that adaptive resolution is achieved by activating the brain’s own information processing system, with its “inherent self-healing processes”. The adaptive resolution includes appropriate affect, self-attribution, and overall assessment. As well, because the information is linked associatively, treatment effects generalize to other similar memories, to all events clustered

in that memory network. All this can occur at a very rapid pace.

EMDR treatment is conceptualized as progressing through the memory networks (Shapiro, 1995). EMDR activates the "information processing system", so that the blocked information is brought to a state of "therapeutically appropriate resolution". The shifting of the "synaptic potential" of the memory network is understood to result in the "sequential processing" of the information until it reaches "adaptive resolution". As the "valence" is lowered, cognitive networks of "parallel valence" that contain different information are then activated and they integrate with the dysfunctional material.

Shapiro (1995) hypothesizes that the rhythmic quality of (eye) movements or repetitive bursts of attention play a role in lowering physiological synaptic potential. She also speculates that the neuronal bursts caused by eye movements may be essentially equivalent to a low-voltage current and therefore responsible for the synaptic changes. This kind of overlap between the hypothetical metaphorical model and the actual physiology of the brain gives the appearance of physiological support for her model when this is not substantiated. It also leaves her open to criticism from scientists who point out that her description of synaptic potential and valence is neurobiologically imprecise.

Limitations of the Neurophysiological Model

Although Shapiro (1995) states that her model is not dependent upon the accuracy of the proposed physiological hypothesis, she nevertheless grounds much of her explanations of EMDR's mechanism in neurophysiology. Her neurobiological constructs are imprecise and can detract from the potential clarity of the information processing model. She makes strong statements such as "EMDR's rapid, positive treatment effects

result from electro-biochemical changes that rebalance an inherent physiological system responsible for healthy assimilation of the traumatic event” (p. 19) and “the EMDR clinician catalyzes the appropriate biochemical balance through the interaction of electrical pulses and organic systems” (p. 49). Although she proposes this complex neurophysiological construct she also disclaims any knowledge of the related mechanisms: “Its physiological foundations, while undeniable, are currently unknown” (p. 310).

Certainly brain research has indicated that trauma impacts the neurophysiology of brain function and activity (Friedman & Yehuda, 1995; Perry, 1994, 1997; Pi, Gross, & Nagy, 1994; Post, 1992, 1995; Rausch et al., 1996; Torpy & Chrousos, 1996; van der Kolk, 1996). Among other findings is the indication that the autonomic nervous system becomes hyper-responsive, potentially undermining cognitive function. There may also be persistent alteration in hippocampal structures involved with the formation of declarative memory, working memory, and the matching of expectation to actual experience.

Rauch and colleagues (1996) conducted positron emission studies of patients with PTSD in which the patients were exposed to vivid, detailed narratives which they had written about their own traumatic experiences. Patients showed heightened activity only in the right hemisphere, in the areas most involved in emotional arousal, and heightened activity in the right visual cortex, reflecting the flashbacks reported by these patients. Perhaps most significantly, Broca’s area, the part of the left hemisphere which may be responsible for articulating personal experiences in communicable language, “turned off”. These findings indicate that PTSD symptoms are reflected in actual changes in brain activity. Van der Kolk and Levin (P. Levin, personal communication, April 1, 1997) are

presently conducting research on EMDR using SPECT scans pre and post-EMDR. Preliminary findings (with 6 PTSD subjects who each received 3 EMDR sessions) indicate clear metabolic changes in specific brain regions. Researchers found that two areas in the brain were activated after EMDR. The anterior cingulate region lights up bilaterally. This area moderates the experience of real versus irrational threat, indicating that after EMDR, PTSD sufferers may no longer be hypervigilant. The second area is in the left frontal lobe which relates to the ability to process information. Levin concludes that EMDR appears to facilitate information processing. The lack of a control group and of randomization limits the findings of this study.

Empirical Evidence of Efficacy

Methodological Controversies

Critics continue to dispute the effectiveness of EMDR and some (e.g., Lohr et al., 1998) dismiss all findings with critiques of methodology. It has appeared to some advocates (e.g., Greenwald, 1996) that EMDR research is often expected to meet impossibly high standards of proof by "hyperskeptic" critics who dismiss the large body of research demonstrating EMDR's efficacy. Silver (1998) reflects on the appearance that each new EMDR research study has been greeted with more rigorous standards, allowing critics to reject it as methodologically inadequate. He concludes that perhaps one of EMDR's greatest contributions to the field of psychotherapy will be found to be the influence that EMDR has had on the setting of standards. Lohr et al. (1998) justify the insistence for high standards, saying that EMDR proponents have "brought this upon

themselves" (p. 150). They maintain that treatments with extraordinary claims must present extraordinary proof.

Some of these published critiques of EMDR have contained substantial factual errors. For example, Lohr et al. (1995) misrepresented Wilson et al.'s (1995) article saying that the treatment of the wait list group did not result in a replication of significant treatment effects, while Wilson et al. report highly significant results. In the 1998 Lohr et al. article, the authors misrepresent most of the studies they report on. For example they dismiss most findings as being based solely on "subject self report" which is how these authors dismiss standardized psychometric measures with high validity and reliability. Lipke (in press) points out how Lohr et al. inaccurately reported the findings on treatment fidelity and misrepresented the research findings on the role of eye movements. Such misrepresentations and biased inaccuracies make it difficult for the casual reader to evaluate the claims. Unfortunately, such dialogues about methodology appear to be more about politics than about scientific truth.

Methodological Rigor

Division 12 of the American Psychology Association (APA) established a set of criteria to determine treatment efficacy (1995). The report and recommendations of the task force of the APA Division of Clinical Psychology (Division 12) included a condensed, preliminary set of empirically validated psychosocial treatment guidelines. The APA task force proposed three categories of treatment efficacy: well-established treatments, probably efficacious treatments, and experimental treatments (defined as treatments that have not yet been established as at least probably efficacious). The committee used the

criteria to allocate treatments to the first two categories. They identified 22 "well-established treatments" for 21 different DSM-IV syndromes; and 7 "probably efficacious" treatments for the same number of disorders. Almost all the "well-established" and "probably efficacious" psychosocial treatments were behavioral. Recently many of these task force members independently evaluated treatments to update the categories of treatment efficacy. In their report (Chambless et al., 1998), EMDR was rated as "probably efficacious" for PTSD treatment. They did not include the Scheck, Schaeffer, and Gillette (1998), Marcus, Marquis, and Sakai (1997), Carlson, Chemtob, Rusnak, Hedlund, and Muraoka (1998), or Rogers et al. (in press) studies in their analysis. The inclusion of these studies, which found EMDR significantly more effective than other treatment methods, would result in EMDR meeting the Division 12 criteria to be designated as a "well-established" treatment.

Foa and Meadows (1997) developed seven "Gold Standards" for the evaluation of methodology in treatment outcome studies. These include the following: (1) "Clearly defined target symptoms" (p. 453), so that appropriate measures can be employed to assess improvement, with specifications of inclusion and exclusion criteria. (2) "Reliable and valid measures" with good psychometric properties. (3) "Use of blind evaluators", not the treatment provider, to collect assessment measures. (4) "Assessor training" with demonstrated interrater reliability and regular calibration of assessment procedures. (5) "Manualized, replicable, specific treatment programs", requiring detailed treatment manuals to ensure consistent and replicable treatment delivery. (6) "Unbiased assignment to treatment", either random assignment to conditions, or stratified sampling, with

treatment delivered by at least two therapists. (7) "Treatment adherence" evaluated by treatment fidelity ratings. Most recent controlled EMDR studies have met the majority of these stringent standards.

Lohr et al. (1998) have now declared that the gold standards are not adequate to assess EMDR and that other criteria are required to evaluate treatment outcome. They insist that there need to be controls for the nonspecific effects of treatment, and they also require controls for exposure, for procedural artifacts, and for therapist allegiance effects. They recommend the use of behavioral indices such as tests of attentional bias like the Stroop task to assess treatment outcome, and take the position that self-reports are inadequate and fallible, even though such measures are well validated, reliable, and widely used everywhere. However, it is apparent that implementing such research methods would move the studies out of the clinics and into the laboratories. Such a focus on construct validity would result in a corresponding loss of generalizability and external validity. One of Lohr et al.'s recommendations appears to have merit: they suggest that EMDR studies should look at evaluating the EMDR theory and model of treatment: for example what is the role of emotional processing in treatment? The research has focused almost entirely on either efficacy or component studies or combinations of these. Feske (1998) recommends that a distinction be made between those studies that focus on component analysis (e.g., the role of eye movement) and those that examine efficacy. She argues that because it is impossible to determine if the treatment effects of component controls are greater than those of nonspecific therapeutic factors, component controls cannot be used to evaluate efficacy.

Treatment Efficacy Literature

Recent well designed research has supported claims of EMDR's remarkable efficacy with trauma victims (Rothbaum, 1997; Wilson, Becker, & Tinker, 1995; 1997). EMDR now meets the standards of the Division 12 Task Force (1995) to be classified as a "probably efficacious" treatment for PTSD (Chambless et al., 1998; DeRubeis & Crits-Christoph, 1998), with the likelihood of the higher "established" designation once more recent studies are reviewed. These studies indicated that after three EMDR sessions 84 - 90% of single trauma victims no longer met the criteria for posttraumatic stress disorder (PTSD). Additionally, EMDR has produced better outcomes than biofeedback-assisted relaxation training (Carlson et al., 1998; Silver et al., 1995); exposure or relaxation training (Vaughan, Armstrong et al., 1994); active listening (Scheck et al., 1998); and "standard" psychotherapy (Marcus et al., 1997). These better outcomes have been found with fewer treatment sessions than alternate methods in controlled comparison studies.

In a meta analysis that examined comparative efficacy of treatments for posttraumatic stress disorder, Van Etten and Taylor (in press) analyzed 61 treatment outcome trials from 39 studies of chronic PTSD, using pharmacotherapies, psychological therapies (behavior therapy, EMDR, relaxation training, hypnotherapy, and dynamic therapy), and control conditions (pill-placebo, wait-list controls, supportive psychotherapies, and non-saccade EMDR control). They found that psychological therapies were more effective for symptom reduction than drug therapies, and that both were more effective than controls. Among the psychological therapies, behavior therapy and EMDR were most effective, and generally equally so. The effect sizes (using Cohen's

d statistic) of all the various control conditions were about 0.3 and the effect-sizes of the exposure and EMDR therapies were about 1.8. They note that EMDR treatment had significantly fewer sessions than behavior therapy (4.6 vs. 14.8 sessions) and took significantly less time (3.7 vs. 10.1 weeks). The authors conclude that EMDR is an effective treatment for PTSD and “that it is more efficient than other treatments”, even though the mechanism of action is as yet unknown. They rule out the possibility of a placebo effect, because EMDR is far more effective than placebos and attributing the effectiveness of EMDR to nonspecific treatment effects is also dismissed by findings that EMDR is more effective than supportive psychotherapy.

Controlled Studies with PTSD and Traumatic Memories

The following controlled studies on the use of EMDR with traumatized subjects all meet at least 5 of Foa and Meadows 7 gold standards.

Wilson, Becker, and Tinker (1995, 1997) randomly assigned 80 trauma subjects (of whom 46% were objectively diagnosed with PTSD) to treatment or delayed-treatment EMDR conditions and to one of five trained clinicians. Each subject received three-90 minute EMDR sessions. An independent assessor administered all pre and post measures, consisting of the SUDS and three standardized tests with their various subscales: the Symptom Checklist-90-Revised, (SCL-90-R), the State Trait Anxiety Inventory (STAI), and the Impact of Event Scale (IES). The PTSD-1 was administered at pre-test only. Significant differences were found between groups and significant improvement was shown on all measures for the immediate treatment group. Before treatment, subjects scores on multiple standardized self-report measures were at or beyond the 84th percentile

in all assessed dimensions. After treatment, the mean of all scores went to a within-normal limits range. The replication of treatment effects for the delayed group showed significant effects for all measures, and was clinically equivalent to the immediate treatment group. A limitation of this study was that PTSD severity could not be quantified at post treatment and changes in PTSD symptoms were measured only on the IES: Wilson et al. created a revised version of the PTSD-1 in an attempt to identify short-term changes in PTSD symptoms. But when it became apparent that the revised PTSD-1 was invalid as a PTSD diagnostic instrument, it was not used in the data analyses for the 3 month post-treatment.

At 15 month follow-up with 63 of the original subjects (Wilson et al., 1997), the outcome measures and the PTSD-1 were re-administered by an independent assessor. Treatment gains were maintained at 15 month follow-up with no statistical differences between any of the post treatment measures. On the PTSD-1, all subjects reported significantly fewer PTSD symptoms compared to pretreatment. There was an 84% reduction in PTSD diagnosis at 15 month follow-up: only 5 of the 32 subjects diagnosed with PTSD at pretreatment still met the diagnostic criteria. When those subjects with PTSD at pre-treatment were compared to those with "partial PTSD", it was found that effect sizes were similar for both groups. However, statistical analysis showed significantly poorer treatment outcome related to PTSD diagnosis at pre-treatment. When individual response was examined, it was determined that while approximately two thirds of all subjects reported reliable improvement, the improvement of the other third could only be classified as "uncertain". The researchers do not identify any predictors for these poor responders. Limitations of this follow-up study include the 17% attrition rate, and

the lack of a control group.

Marcus et al. (1997) compared EMDR to "Kaiser Standard Care" which consisted of combinations of individual and group therapy and medication. Sixty-seven individuals diagnosed with PTSD according to DSM-III-R criteria were randomly assigned to EMDR treatment or Standard Care treatment. There was no limit to the number of sessions received. Data were collected by an independent evaluator who assessed participants at pretreatment, after three sessions, and at the completion of treatment using multiple standardized self-report measures. These included the Modified PTSD Scale (MPTSD), the Beck Depression Inventory (BDI), the STAI, the IES, and the SCL-90 (Global Severity Index, and Positive Symptom Distress subscales). She also rated participants on the DSM-III-R Global Assessment of Functioning scale (GAF) and the SUD scale. The individuals in the EMDR group attained symptom reduction with significantly greater rapidity and had significantly fewer treatment sessions than the Standard Care group. EMDR produced significantly lower scores than Standard Care after 3 sessions and at treatment completion for the MPTSD, the IES, the BDI, the STAI-trait, the SCL-90, and SUDS. The researchers note that the majority of symptom reduction occurred within the first three sessions of EMDR.

Carlson et al. (1998) tested the effect of EMDR on 35 Vietnam combat veterans suffering from PTSD. Subjects were randomly assigned to a biofeedback relaxation treatment group, to a wait list control, or to an EMDR group. The subjects in both treatment groups received 12 treatment sessions from trained and experienced clinicians. Standardized comprehensive measures were administered at pretreatment, post-treatment

and 3 month follow-up by the authors, and at 9 month follow-up, by a trained blind assessor. Measures included the Clinician Administered PTSD Scale (CAPS, at pretreatment and 9 month follow-up only), the Mississippi Scale for Combat Related PTSD, the IES, the PTSD Symptoms Scale (a nonstandardized measure), the BDI, and the STAI. Physiological measures were also taken in which previously taped traumatic scenarios of 30-45 s duration were played. Baseline physiological measures were taken during pretreatment assessment and at each of the assessment periods.

At 9 month follow-up, EMDR treatment was found significantly superior on the CAPS, BDI, Mississippi, and the Global Clinical Rating. A number of clients were symptom-free. On the physiological measures, there were no difference between groups and both treatment groups showed significant main effects for treatment. The decrease in physiological arousal was maintained at follow-up. The authors note that they had no treatment bias favoring EMDR having worked with other treatment models, and in particular with relaxation therapy, in the PTSD field for many years.

Twenty-one adult women who had been raped and who all met criteria for PTSD, were randomly assigned to EMDR, or to a wait-list control group in a study by Rothbaum (1997). After three EMDR treatment sessions, 90% of the participants no longer met full criteria for PTSD. Results were evaluated by a blind independent assessor. The scores of EMDR participants on the PTSD Symptom Scale, BDI, and IES showed a mean decrease of more than 2 Z scores. Results also showed large statistically insignificant decreases on other self-report measures. Only one member (10%) of the EMDR group met full criteria for PTSD at post-treatment, compared to 88% of the wait-list group.

In a study that controlled for the nonspecific effects of treatment, Scheck et al. (1998) compared EMDR to an Active Listening control with a group of 60 traumatized young women, 77% of whom were diagnosed with PTSD. Inclusion criteria were a traumatic memory and a recent history of "dysfunctional behavior" such as sexual promiscuity, runaway behavior, or drug and alcohol abuse. The women received two treatment sessions of 90 minutes each. Multiple outcome measures of depression (BDI), anxiety (STAI- state) self-concept (Tennessee Self-Concept Scale) and of post-traumatic stress (the Penn Inventory for PTSD [PENN] and the IES) were taken at pre and post treatment. Post treatment measures were collected by a blind assessor. Although Scheck et al. found that both treatments resulted in a significant reduction in pre and post self-reported symptoms, the effects of EMDR were significantly greater on all measures. The pre and post effect sizes for EMDR were approximately double that of active listening, indicating that the mechanism of EMDR cannot be equated to be nonspecific treatment effects.

Procedural Elements and Component Studies

Many studies have been conducted which attempted to determine the actual effective mechanism of EMDR. The components have been variously discussed, evaluated, subjected to dismantling experiments, dismissed, and embraced. Procedural components include the external focus (including eye movements), exposure, cognitive restructuring, and physiological arousal. A very critical and core controversy revolves around the question of what comprises an adequate control.

Originally Shapiro (1989a) believed that the rhythmic multi-saccadic eye movements were an essential feature of the EMD process. Later this was revised to include other rhythmic bilateral movement or stimulation such as finger tapping and audio stimulation. Then this requirement was further extended to include any external focus, including eyes focused and unmoving. There has been a substantial modification in what is meant by the "EM" of EMDR: it has changed from "eye movement" (Shapiro, 1989a) to "exposure mediated" (Shapiro, 1995). Although modifying theories to incorporate new empirical data is well within the standards of established science, critics argue that Shapiro continues to change the operational definition of EMDR. DeBell and Jones (1997) question if future researchers will be able to develop alternate controls that "Shapiro and her followers will not criticize as a type of bonafide EMDR" (p.161). Lohr et al. (1998) state that "control conditions for the complete EMDR protocol include designs that substitute eye movements with finger tapping, auditory stimulation, and no stimulation" (p. 126). EMDR advocates such as Greenwald (1996) argue that conditions such as finger tapping and auditory stimulation are variants of EMDR. Since at least 1991, such alternatives have been identified as EMDR bilateral techniques (Shapiro, 1991).

Eye Movements and External Focus

Most of the early published reports of attempted component analysis suffered from poor treatment fidelity. The results are unclear but seem to indicate that eye movement EMDR is sometimes superior to non-eye movement EMDR (Andrade et al., 1997; Boudewyns et al., 1993; Gosselin & Matthews, 1995; Renfrey & Spates, 1994; Shapiro, 1989a, 1989b; Vaughan, Armstrong et al., 1994; D. Wilson et al., 1996) and sometimes

not any different (Boudewyns & Hyer., 1996; Dunn, Schwartz, Hatfield, & Wiegele, 1996; Pitman et al., 1996). The Pitman et al. (1996) study compared EMDR to a control group with fixed eyes who engaged in alternate finger tapping following the hand movement of the therapist. They found no differences between groups. The Boudewyns and Hyer (1996) study had an eyes-closed-EMDR component which produced results not significantly different from standard EMDR. This suggests that no external stimuli may be necessary to achieve positive outcomes. This is of particular relevance because the EMDR model calls for an external focus. But it is important to note that both patients and therapists preferred standard EMDR over the control technique which was no-eye-movement- EMDR (Boudewyns & Hyer, 1996).

Although EMDR includes a number of other techniques to achieve bilateral stimulation, the efficacy of these has not been documented. That these are taught to trainees may reflect Shapiro's willingness to be responsive to anecdotal reports from clinicians. Wilson et al. (1996), and Andrade et al. (1997) used tapping as their control groups and found that it was not at all as effective as eye movement, while Pitman et al. (1996) found no differences. Clearly other studies need to address this issue.

Exposure Component

The EMDR process involves the activation of the traumatic memory and its neural network with associated links by having the client access related imagery, affect, physiological sensations, and self-referent cognitions. In the EMDR protocol, exposure has several essential elements: (1) it is dosed, and given in short bursts; (2) it is sequential, and moves with the client's linked associations; (3) it allows for client manipulation of the

material; (4) it rapidly activates fear-related memories with connected affects, arousal, and cognitions. The client moves sequentially through parts, or dimensions of the traumatic event, alternately diverting their attention towards it and away from it. Steketee and Goldstein (1994) point out that an aspect that may contribute to EMDR's efficacy is its strength in rapidly activating fear-related memories. They suggest that this results in the externalization of fear structures, even for those memories which were previously held out of awareness. This externalization of fear-structures allows for their manipulation and modification, with resulting integration. As the material is processed, it loses its evocative power, and the client experiences a sense of mastery and control (Kluft, 1995).

Alternating exposure to high levels of disturbance can be considered the unique contribution of EMDR methodology to standard exposure procedures. EMDR challenges the established concept that prolonged exposure is necessary to achieve extinction of conditioned responses in anxiety disorders such as PTSD (Foa & Kozak, 1986). It appears that the exposure component alone does not explain EMDR's treatment effect. During the EMDR process, clients may spend less than 5 minutes per session on actual exposure to traumatic material.

In the research done by Wilson et al. (1996), the control subjects received non-eye movement dosed exposure during the unsuccessful control application, and then a second dose of exposure when they were given EMDR at the completion of the experiment. Researchers found that receiving a "double dose" of exposure did not result in a greater or faster treatment effect. Similar results can be noted in other studies such as that by Montgomery and Ayllon (1994b). A meta analysis of the research found EMDR to be

more efficient than exposure therapies (Van Etten & Taylor, in press).

Carlson, Chemtob, Rusnak, & Hedlund (1996) point out that EMDR differs from traditional exposure in that it does not require the creation of an anxiety hierarchy, or training in relaxation. Subjects in Forbes, Creamer, and Rycroft's (1994) study had similar levels of outcome to that reported by other exposure treatment methods such as stress inoculation training (Foa, Rothbaum, Riggs, & Murdoch, as cited in Forbes et al., 1994). However, EMDR was far more efficient, requiring 59 % less treatment time than these other programs. Boudewyns and Hyer (1996) report that both patients and therapists reported a preference for the eye movement procedure over closed-eye-EMDR, and over direct therapeutic exposure, when clients receive non-dosed exposure of emotionally difficult material. Pitman et al. (1996) report that EMDR is preferred to flooding exposure techniques because it was "less anxiety provoking for patients (as well as for therapists), better tolerated, and productive of fewer adverse complications than flooding" (p. 428).

Physiological Component

Clients are asked to identify their ongoing physiological sensations and are encouraged to attend to these dispassionately. Throughout the session, clients often report a variety of shifting physiological sensations, such as pain, tension, warmth, coldness, discomfort, and tingling. These may become more intense as the session progresses and then improve as the material is worked through. Physiological symptoms are often targeted in the actual process. The EMDR protocol calls for ensuring that the client no longer experiences significant physiological discomfort before considering the

session completed. Clients are given the instruction to "just notice", and this directive is accompanied by the therapist's unalarmed curiosity regarding the physiological shifts. Throughout this process of heightened arousal with concomitant awareness, they are receiving reassurance and experiencing a present sense of safety. This may effectively decrease the clients' anxiety about any increasing or heightened arousal, and may promote cognitive separation of the physical sensations from negative interpretations. All of this is incompatible with an avoidant reaction and may help to create a counter-conditioning effect.

Consequently, one would expect that physiological measures would capture the decrease in arousal. Research by Wilson et al. (1996) directly studied the physiological effects of EMDR. Significant differences were found using measures that included galvanic skin response, skin temperature, heart rate, and the SUD Scale. The results revealed a one-session desensitization of subject distress, and an automatically elicited and seemingly compelled relaxation response, which arose during the eye movement sets. Researchers noted a profound and progressive relaxation response over the session. They suggest that one of the mechanisms operating during EMDR is desensitization by reciprocal inhibition, and that this is achieved by the pairing of emotional distress with an unlearned or compelled relaxation response, apparently created by the eye movements.

Some researchers measured pre and post treatment arousal by exposing subjects to their traumatic memory. This was often accomplished by replaying a taped script (Boudewyns, Stwertka, Hyer, Albrecht, & Sperr, 1993; Boudewyns & Hyer, 1996; Carlson et al., 1998; Vaughan, Armstrong et al., 1994) to which some subjects still

reacted physiologically post-treatment. It may be that use of the original script is not appropriate for assessing outcome: subjects in treatment may create new "scripts", as they resolve the traumatic story. Forbes et al. (1994) suggest that successful outcome might be conceptualized not as the original script losing its impact, but as a decrease in the number of stimuli that can activate that script. They found that reductions in baseline muscle tension (EMG resting) were correlated with overall improvements in symptoms, but that changes in EMG during imagery of the trauma were not related to improved symptoms. They refer to a study by Mueser, Yarnold, and Foy which indicated that changes in physiological measures taken at rest are more related to changes in symptoms than measures of arousal taken during imagery of the trauma. Also resolution of the targeted trauma may not necessarily change hyperarousal tendencies which have become generalized so that they are easily elicited by a variety of stimuli (Perry, 1994; Post, 1992, 1995; Torpy & Chrousos, 1996; van der Kolk, 1996, van der Kolk & McFarlane, 1996). In the neuro-physiological process of kindling, firing of the neural circuitry may occur in the absence of any external stimulus. Foa & McNally (1996) suggest that fear reduction involves the learning of new associations, the creation of new neuro networks that will inhibit activation of the old ones. Allen and Lewis recommend that treatment be conceptualized as creating new associations, new "pathways out of the network" (1996, p. 240).

Affective Component

In the EMDR model, affect is understood as the key organizing dynamic. Shapiro (1995) conceptualizes information as being organized by affect, and cognitions are seen as

verbalizations of the experienced affective state. Affect is a directive force in the EMDR healing process. At the beginning of the session, clients identify and give a SUDS rating for their affective distress. This often increases during the session and may become intense. Also the nature of the felt emotion may shift throughout the process, for example, from guilt, to rage, to grief, to acceptance. The session is not considered complete until the SUDS rating is 0 - 2, with clients reporting minimal distress. Armstrong and Vaughan (1996) discuss the inability of extinction and deconditioning models, such as that proposed by Dyck (1993), to explain either the increase of fear during the processing or the "plateauing" experience. Boudewyns and Hyer (1996) cite related research which has suggested that subjects with high initial emotional distress make better treatment gains with systematic desensitization. Similarly in a study on exposure therapy Jaycox, Foa, and Morral (1998) found that those clients who had a high level of initial emotional engagement made the best recovery.

Pitman et al. (1996) attempted to examine the role of emotion processing in EMDR. Seventeen chronic outpatient veterans were randomly divided into two EMDR groups, one using eye movement and the other a control group that used a combination of forced eye fixation, hand taps, and hand waving. Six sessions were administered for a single memory in each condition. Both groups showed significant decreases in self-reported distress, intrusion, and avoidance symptoms. Measures with significant decreases include: SUDS, SCL-90-R, and the IES. The two treatments were equally successful. SUDS scores and physiological process measures (heart rate, skin conductance, skin temperature, blood pressure, and electro-myogram) were obtained to assess affective

processing. There were no differences between the two groups, but there were significant differences on the SUDS, and on some of the physiological measures taken during baseline pre-session, peak arousal, and session end. The only correlation between these process measures and outcome measures was a decrease in the avoidance scale of the IES with the peak arousal SUDS (first session/last session) for the Fixed eye group, indicating only that those subjects reporting less distress at peak arousal during the last session scored lower on the IES avoidance scale. The statistical analysis used by these researchers appears to have been a series of simple regression analyses rather than canonical correlation. If this is so, one would question the effects of the loss of power, and their reported statistical outcome. Nevertheless, the significance of the process measures provides evidence that "partial emotional processing" occurs during EMDR treatment, even though it is not shown to predict treatment outcome.

Recent research with one-time trauma victims has found that EMDR is very effective in creating positive change on numerous self-report scales of affective experience. Wilson et al. (1995) found significant improvement on both Trait and State dimensions of the State-Trait Anxiety Inventory (STAI), and the Anxiety, Interpersonal Sensitivity, Depression, and Somatization dimensions of the SCL-90-R. Many other researchers have found mixed responses on the global measures such as the STAI especially for those subjects with histories of multiple traumas (Carlson et al., 1998; Marcus et al., 1997, Rothbaum, 1997). Shapiro (1995, 1996) points out that global measures may not be sensitive enough to measure the changes that result from treatment that focuses on just one aspect of a complex problem.

Cognitive Component

The AIP model theorizes that the negative semantic content of self-appraisals associated with the traumatic event is altered when the negative beliefs within the neural network are reprocessed and integrated with more realistic and positive information about the self. This may even result in a transformation of self-image. At the beginning of the session, trauma-related negative beliefs are identified and an alternate realistic positive cognition is developed. These cognitions are rated on the Validity of Cognition (VOC) scale which is a Likert scale with a range from 1-7. The development of these cognitions serves to identify the irrationality of the negative belief attached to the traumatic memory. The articulation of the positive and negative cognitions can take substantial work and time, and may constitute a "significant piece of cognitive therapy" (Allen & Lewis, 1996, p. 246). At the completion of the desensitization stage, the therapist will then commence the installation phase which concentrates on the integration of the positive cognition, and which attempts to bring the VOC to a score of 6 or 7 for the positive cognition. The VOC scale has been criticized (Lohr, 1995) for being unvalidated and for primarily measuring affective lability, not cognitive change. The VOC however is probably an accurate measure of the client's confidence in the positive belief statement.

During the EMDR process clients will often report a rapid flow of thoughts and ideas, memories and images. This has been compared to free association; and because EMDR is primarily client directed, new thoughts or ideas often become the target of eye movement sets. Sometimes clients become blocked in their processing and the therapist then uses "cognitive interweaves" to facilitate reprocessing (Shapiro, 1995). Cognitive

interweaves are used only sparingly and allow the therapist to gently challenge irrational thoughts, to create links with past material, and to specifically connect the traumatic material with more adaptive information.

Constructivist and narrative therapists understand successful outcome as the creation of more positive realistic narratives and EMDR appears to facilitate the creation of such new narratives. Van der Kolk and McFarlane (1996) maintain that the successful treatment of trauma results from an integration of the negative dissociated memory fragments. They explain the need for the modification and transformation of the memories so that they are "reconstructed in a personally meaningful way" (p.18). Boudewyns and Hyer (1996) point out that EMDR structures a procedure whereby the client moves from exposure to metacommunication, back to exposure, back to metacommunication. They cite Rennie who maintains that the "best" process in story-telling in psychotherapy is that in which the client shifts from reflexive/participant to nonreflexive/ observer positions, thus creating an interplay between inner and outer dialogues. EMDR does this in a dosed manner, chunking the problem into tolerable bits.

No EMDR studies have examined the cognitive component in any detail. Future research on the role of cognitive restructuring would be a valuable adjunct to the field in determining if positive therapeutic outcome is associated with changes in attitudes and beliefs, and in assessing if EMDR contributes to this process.

Procedural Integrity

The EMDR process organizes its treatments components into a rational, structured comprehensive protocol that maximizes effectiveness. The structured integration of these

elements is fundamental to effective treatment outcomes. Studies where these procedural elements were not used with fidelity to the appropriate protocol have showed limited or no treatment benefit (e.g. Jensen, 1994; Sanderson & Carpenter, 1992). The specific accurate use of the EMDR protocol may be essential to achieve successful outcome. Lohr et al., 1995 question if the entire protocol is required for therapeutic change and recommend component analysis to determine which elements most contribute to efficacy. But as they also state, treatment fidelity is critically important when the procedure being tested is "structured and prescriptive, as is EMDR" (p.287). Poor fidelity may increase the likelihood of Type II (false negative) errors. Assessment of its empirical validity requires the faithful application of the protocol.

Kluft (1995) describes the quality of the EMDR therapeutic relationship as "unlike that in more traditional therapies" (p. 138). The therapist keeps out of the way as much as possible, in accordance with the AIP model, which proposes that the client's own information processing system has inherent healing qualities. The therapist's role is to facilitate that process, not to interfere with or direct it. Shapiro (1995) points out that many therapists have difficulty in maintaining the balance between the nonintrusive client-directed quality of the basic protocol and the skillful and highly directive nature of the cognitive interweave.

Shapiro (1996a, 1996b) and Greenwald (1996) in their reviews of the research demonstrate that research done by EMDR-trained practitioners has almost invariably shown significant efficacious results. They maintain that treatment outcome is directly related to fidelity to the EMDR protocol. Lohr et al. (1995) disagree with Shapiro's

conclusions, stating that in their opinion, the studies by Acierno et al. (1994), Jensen (1994), and Boudewyns et al. (1993) all had adequate treatment fidelity even though their results were negative. Greenwald and Shapiro do not consider the first two studies to have had adequate fidelity. There is a question then, as to how fidelity should be determined, and by whom. EMDR advocates have recommended that treatment fidelity checks be incorporated in research designs. This suggestion has been met with contempt by some researchers who complain that this would stifle "disinterested research" (Sanderson & Carpenter, 1994). Critics suggest that those EMDR experts providing fidelity assessments are biased, having substantial investments in EMDR, and consequently not at all objective (Van Ommeren, 1996). Devilly and Spence (in press) chose an "independent assessor for therapist adherence" who used the EMDR fidelity check-list devised by the Institute and who was not associated with the EMDR Institute. This assessor gave Devilly and Spence very high ratings (4.9 on a 1-7 Likert scale) which is a higher score than that ever given by the EMDR Institute, in spite of the fact that they used a different SUDS scale and did not report VOC scores. The EMDR clients received insufficient preparation in Phase 2 and there was a 37% drop out rate in the EMDR group. Additionally, the improvement of EMDR subjects in this study was not maintained at follow-up, a finding very different from other published research.

Lohr et al. (1998) emphasize the possibility that treatment allegiance creates strong experimenter effects, and suggest that most findings of treatment success can be attributed to investigator bias. They inaccurately report that Pitman et al. (1996) found "relatively weak relationships" between treatment outcome and fidelity ratings (p. 144). These

findings are reported in more detail by Lipke (in press) as a mean correlation of .36, with a correlation of .60 on the CAPS scale.

Empirical evidence for a neurophysiological mechanism

At this point in time, it is difficult to empirically evaluate the neurophysiological basis of Shapiro's Accelerated Information Processing model. It has generated a number of hypotheses regarding potential bioneurological mechanisms, some of which are more easily empirically tested than others. These include neuronal bursts leading to a shift in synaptic potential, a compelled relaxation response (deconditioning), the direct effect of eye movements on cortical function, and the distortion of response stereotype/ orienting response. Although most of the suggested bioneurological mechanisms relate to eye movement, the research has not provided strong empirical support for the importance of eye movements. Pitman et al. (1996) address the related theoretical issue: that if eye movements are not required for therapeutic benefit, this falsifies neurologic theories of the role of eye movements in the mechanism of action. However it has been Shapiro's position that the complexity of systems involved in eye movement can be duplicated with other stimuli (1995).

Neuronal Bursts Leading to Shift in Synaptic Potential

Referring to a number of animal studies exploring the role of repetitive low-voltage currents on memory processing by changing synaptic potentials, Shapiro (1995) speculates that the rhythmic quality of eye movements may play a role in lowering the synaptic potential of the targeted network. She hypothesizes that eye movements cause neuronal bursts, and that these may be equivalent to a low-voltage current and thereby

create synaptic changes thus enabling it to link with networks of previously lower valence that contain more adaptive material.

Direct Effect of Eye Movements on Cortical Function

An early explanation made by Shapiro (1989a, 1989b) was that the eye movements of EMD might activate a brain mechanism similar to that in REM sleep. Most theories of REM sleep consider its role in information processing to be essential (Lipke & Botkin, 1992). Hong, Gillin, Callaghan, and Potkin (cited in Shapiro, 1997) demonstrated that the more emotional the dream, the faster a person's eyes move, indicating that rapid eye movement appears to facilitate the processing of emotional information.

Hassard (1996) applies reverse learning theory to EMDR. The function of reverse learning is to stabilize and classify information in a network, either as routing maintenance, or to solve the problem of overload. Hassard suggests that trauma memories may overload the system, with the consequence that reverse learning fails to process this information from working memory to long-term memory information. He hypothesizes that EMDR induced eye movements generate waves of electrical activity within the visual system and that this electrical activity is directed at the traumatic material in the overloaded node because the client's attention is kept there by the demands of the EMDR process.

There is also the possible lateralization of emotional processing. Right and left cerebral hemispheres appear to have different, very specialized functions in mediating emotion. Although Shapiro (1995) suggests that bilateral voluntary eye movements alternately activate the two hemispheres, Allen and Lewis (1996) point out that any

technique, even one as basic as talking, can alter complex memory networks and foster interhemispheric integration. Nicosia (cited in Shapiro, 1995) used a quantitative analysis of electroencephalography (QEEG) to study the effect of EMDR on cortical function. He found evidence of slow brain wave synchronization of the cortical hemispheres after EMDR treatment. EMDR appeared to cause a normalization of previously depressed function. Nicosia suggests that trauma may result in interhemispheric asynchrony, which would inhibit integrative memory processing. EMDR, with its rhythmic repetitive alternation, may work to resynchronize hemispheric activity.

Distortion of Response Stereotype/ Orienting Response

The AIP model suggests that traumatic memories are fused in state specific configurations, and that accessing these memories activates the related automatic physiological state. The EMDR process may create a new set of physiological states and responses which interfere with and disrupt the habitual physiological responses. Three different theories suggest possible ways in which EMDR interferes with or disrupts the response stereotype.

Armstrong and Vaughan (1996) suggest an orienting response model in which the therapist's waving hand triggers an intense orienting response which interrupts the escape/avoidance behavior associated with anxiety responses. This facilitates continuing attention to the memory without avoidance, thus allowing for effective input of new information. An alternate explanation was made by Marquis (1991) who posits that a neural process created by eye movements inhibits the evoking of the emotional response by interfering with the neural connections between the frontal lobes and the hypothalamus

and hippocampus. Shapiro (1995) dismisses both these theories as inadequate to explain the complexity of the observed effect of EMDR which often involves an increase in affect during early processing. Thirdly, Andrade, Kavanagh, and Baddeley (1997) suggest that eye movements reduce the vividness of distressing images by disrupting the function of the visuospatial sketchpad (VSSP) of working memory. EMDR appears through this mechanism to decrease the intensity of emotion associated with the image. They also note that in their research, the effectiveness of eye movement exceeded that of tapping, suggesting there is something "special" about eye movements (p. 220).

Compelled Relaxation Response (Deconditioning)

Wilson, Covi, Foster, and Silver (1996) found that EMDR eye movements caused a compelled relaxation response. Interestingly, they did not find this result with the handtapping group. However, tapping was done in time to a metronome, a practice not used clinically. These researchers used physiological measures (including galvanic skin response, skin temperature, and heart rate) to examine the effects of EMDR during treatment and post treatment. Significant results revealed a one-session desensitization of subject distress and an automatically elicited and seemingly compelled relaxation response, which arose during the eye movement sets. There was also a profound and progressive increased relaxation response over the session, with significant decreases in heart rate, skin temperature, and galvanic skin response for the EMDR group. Wilson et al. suggest that the effective mechanism may be a type of reciprocal inhibition, through a pairing of the distress with an internally generated and compelled relaxation response. Shapiro (1995) suggests that the EMDR directive to "just notice" the disturbing material may contribute

to this deconditioning effect.

EMDR and Other Anxiety Disorders

Almost all the research on EMDR has focused on posttraumatic stress and there have been only a few controlled studies that have examined its efficacy with other anxiety disorders such as test anxiety, public speaking anxiety, and performance anxiety.

In a partial dismantling study on public-speaking anxiety, Foley and Spates (1995) assigned 40 students to one of four groups: (1) standard EMDR, (2) moving audio stimulus, (3) eyes focused on own hands, and (4) no treatment. They did not collect SUD or VOC scores with the no treatment control group and the small sample sizes (n=10) limited the power. Measures used included four standardized objective measures of speech anxiety, and the SUD, and VOC Scales. The study demonstrated limited effectiveness. There were significant effects for all three treatments on process measures (SUDS and VOC) , and on one measure of public speaking anxiety. This study appears to support the hypothesis that eye movements are no more effective than variant conditions. No conclusions about efficacy can be made because it is not known if the treatment effects are greater than nonspecific therapy effects.

Gosselin and Matthews (1995) sought to investigate the effects of high and low expectancy and eye movement versus non eye movement conditions in reduction of test anxiety. They assigned 41 subjects to one of four conditions, in a 2 x 2 design. Subjects received one 60 minute session of either EMDR or EMDR without eye movements (the therapist's fingers remained stationary and subjects looked at them for 25 seconds). In the

high expectancy condition, subjects received introductory statements that said EMDR was a powerful new treatment. In the low expectancy condition, subjects were told that this was a new treatment with unknown effects. There was no effect found for expectancy; the eye movement condition was more effective in reducing SUDS, than the non eye movement condition. Scores on the Test Anxiety Inventory (TAI) for all treatment groups showed significant reduction. Researchers also noted that at follow-up, the EMDR subjects reported cognitive shifts and behavioral change.

Two groups of researchers have examined the efficacy of EMDR with spider phobia. Bates, McGlynn, Montgomery, and Mattke (1996) randomly assigned 14 subjects to EMDR or an assessment control. These researchers were not trained in the use of EMDR, but claimed procedural integrity. However, they misapplied the technique by having the subjects report the VOC after every second set of eye movements and did not allow the targeted image to change by focusing on the new elicited material. They failed to find significant results for EMDR in a one session treatment. When challenged about procedural errors by Lipke (1997) McGlynn (1997) replied that psychotherapy is complex and that the SUDS ratings did decrease.

Muris, Merckelbach, Holdrinet, and Sijtsenaar (1998) also failed to achieve positive effects with EMDR and spider phobia. They randomly assigned spider phobic children to 3 groups: EMDR, computerized exposure (a placebo treatment), and in vivo exposure. After a 2.5 hour treatment session, the children received a 1.5 hour in vivo exposure treatment. Although EMDR was followed by a large decrease in SUDS and VOC scores, the results indicated that those children who received 2 in vivo exposure treatments

showed the most improvement. They suggest that EMDR may be limited in reducing avoidant behavior. However, the researchers did not have the subjects work on their anticipatory anxiety, which is an essential aspect of the EMDR phobia protocol.

EMDR and Test Anxiety

Test anxiety can be understood as “those phenomenological, physiological, and behavioral responses that accompany concern about possible failure” (Sieber, 1980, p.17). It is experienced as a fear of failure, related to concerns with social evaluation, coupled with self-denigrating thoughts about potential catastrophe. Characterized by the intrusion of apprehensive ruminations, it is accompanied by significant emotional distress. The examinee’s attention is distracted by thoughts about how poorly they are performing and how disastrous the consequences of failure will be, with subsequent impairment of performance (Leary & Kowlaski, 1995).

There is a large body of literature which suggest that social phobias often originate in early problematic social experiences. In research on the psychosocial correlates of childhood anxiety disorders, Messer and Beidel (1994) found suggestions of familial transmission of anxiety. Ost and Hugdahl (cited in Emmelkamp & Scholing, 1994) found that 58% of social phobics recalled an earlier traumatic social experience. This research supports Shapiro’s hypothesis that small “t” traumas can become primary self-defining events (Shapiro, 1995). These nodal events are held dysfunctionally in the information processing system and are triggered by similar events, cognitions, affect or physiological states. The AIP model predicts subsequent interference of past negative experiences with present social performance.

Hypotheses

This research was designed to explore the application of EMDR to the problem of test anxiety. Barlow (1988) describes social phobias as typically discrete and limited to one or two specific situations where performance deteriorates in front of others. He compares persons with phobias to persons who have PTSD: both experience true and false alarms, and both develop anxiety over potential intrusive attacks of anxiety. Both PTSD and social phobias are anxiety disorders, and both are characterized by distressing emotions, intrusive thoughts, physiological arousal, and avoidant behavior. Because EMDR has established efficacy in the treatment of PTSD, reducing related arousal, changing negative cognitions, and relieving emotional distress, it may be very effective in eliminating the similar symptoms of test anxiety. Shapiro (1995) has developed a phobia protocol even though there has been only limited empirical evidence of EMDR's efficacy with phobic populations. It is the purpose of this research to fill this short-fall.

The individual with test anxiety reacts instantly to evaluative cues with an established set of negative and self-derogatory cognitions (Wine, 1980). These arousal-driven negative thoughts distract the person's attention, prevent successful task accomplishment, and result in a significant performance deficit. Test anxiety is characterized by feelings of impending doom, of helplessness, and apprehension. The accompanying high levels of physiological arousal are interpreted as dangerous and threatening. Negative self-referential thoughts dominate the conscious mind, with frequent reminders of inadequacy and incompetence.

EMDR has proven very successful in stopping the intrusive thoughts of PTSD, in

reducing physiological distress, in relieving overwhelming anxiety, and in changing negative self-defeating cognitions. There is also evidence that EMDR may assist in the restructuring of core schematic beliefs, resulting in substantial changes in self-concept and related behaviors.

Hypothesis 1

The treatment of test anxiety has as its goals: the alleviation of physiological distress, the elimination of negative self-preoccupied cognitions, and the increase of self-efficacy, with resulting improvements in performance. It appears that EMDR should therefore be a viable treatment, one that could be particularly effective in simultaneously addressing all these therapeutic goals. Consequently it is predicted that EMDR should result in significant decreases in scores in the Test Anxiety Inventory (with its 3 scales: Total, Emotionality, and Worry) and the SUD Scale.

Hypothesis 2

EMDR is reportedly effective in changing frequently repeated patterns of negative self-attributions to more positive, realistic self-concepts. There is empirical evidence that test anxiety is related to the fear of negative evaluation: individuals fear that their poor performance may result in a negative evaluation and their apprehension about this distressing possibility interferes with their performance. Consequently a decrease in scores on the Fear of Negative Evaluation Scale (Watson & Friend, 1969) and an increase in scores on the VOC are anticipated.

Hypothesis 3

EMDR treatment of a particular memory network is said to generalize to other

memories within that same network. It is also suggested that the effects will influence other linked neuro networks. Although Shapiro (1995; 1996) has cautioned that the effects of treating specific memory may not be captured by global measures such as the STAI, some researchers (Wilson et al., 1995) have found positive results on such scales. Because test anxiety is a fairly circumscribed specific anxiety it is expected that there should be a decrease in scores on the State and Trait measures of the STAI as a result of treatment.

Method

Participants

The researcher made a presentation about the study to the second year psychology students in the introductory statistics course, Psychology 2101, "Statistical Methods for Behavioural Research", at Lakehead University. A Descriptive Handout (see Appendix A) was distributed to those students interested in participating. Forty-four students completed the Consent Form (see Appendix B) and the preliminary screening tests. Two male and 3 female students were excluded because of high scores (average 38.9) on the Dissociative Experiences Scale (DES), and 3 men and 15 women were excluded for low scores (average 38.7) on the Test Anxiety Inventory (TAI). Four female students who had completed the screening and were accepted as participants did not complete the preliminary testing. Two men and 15 women students participated in the experiment. The 17 subjects were randomly assigned to either the Immediate Treatment or the Delayed Treatment Group. One woman in each group did not complete the Time 2 tests so there

were 15 subjects who completed the experimental process.

Screening Criteria

Students were asked in the Descriptive Handout to exclude themselves from participation if they met any of the following exclusion criteria: vision problems, epilepsy, pregnancy, neurological impairment, psychosis, dissociative disorders, or major depression. Two screening measures were administered: the TAI and the DES. Scores lower than 50 on the TAI and higher than 30 on the DES constituted exclusion criteria.

Test Anxiety Inventory (TAI). The TAI (Spielberger, 1980) is a 20 item questionnaire that yields a total score and two subscale scores, Emotionality and Worry (see Appendix C). The items assess reactions before, during, and after exams. The inventory asks subjects to rate their agreement on a four point scale (1 = totally untrue, 4 = totally true) with statements such as "During tests I feel very tense". Validity coefficients are about .82, with a reliability of .80. The TAI correlates negatively with grades, with correlations ranging from -.18 to -.31. The mean score on the TAI for female college students is 42 and for male students 39. A score of 50, which is 0.5 standard deviation above the mean, was set as an exclusion criterion for this study.

The Dissociative Experiences Scale (DES). The DES (Bernstein & Putnam, 1986) is a 28 item self-administered questionnaire that assesses dissociative symptoms (see Appendix D). Scores higher than 30 indicate a probable dissociative disorder, and thus constitute exclusion criterion for this study.

Investigator

The principal investigator was also the therapist. She has had 5 years of

experience in the use of EMDR and was trained by Francine Shapiro in both Levels I and II in 1993. She is a Registered Clinical Counsellor (B.C.) and was a founding member of EMDRAC, the EMDR Association Canada.

Process Measures

Process measures were taken by the therapist at the beginning and end of the treatment session. EMDR uses ratings of the Subjective Units of Disturbance Scale (SUDS) and the Validity of Cognition Scale (VOC) to measure therapeutic progress during the session.

SUDS. The SUD Scale (Shapiro, 1989a; Wolpe, 1991) measures Subjective Units of Distress on a Likert scale from 0 [none] to 10 [the worst possible]. It is a single-item measure of present anxiety. The identification and rating of emotions is an integral part of the EMDR process. The SUDS measure provides a baseline to assess progress during the session. Consequently this measure was collected by the therapist at both the beginning and end of the therapy session. The beginning and final scores were recorded.

VOC. The VOC (Shapiro, 1989a) is a single-item measure of the validity of a positive cognition. First the client was asked to identify the negative cognition which is associated with the traumatic event, and then to construct a preferred positive cognition. The client then rated how "true" that positive cognition seemed to them. This is the Validity of Cognition rating. It measures the degree of acceptance on a Likert scale of 1 [completely untrue] to 7 [completely true]. The identification of these cognitions is an integral part of the EMDR process. The measure provides a baseline to assess progress during the session. Consequently this measure was collected by the therapist at the

beginning of the therapy session and during the Installation Phase. The beginning and final scores were recorded.

Measurement Times: Time 1, Time 2, and Time 3

The time intervals between Time 1 and Time 2, and between Time 2 and Time 3, were approximately one month each (see Table 1). Pre-treatment measures were taken at Time 1 and included the TAI scores collected at the screening administration. The Immediate Treatment Group received treatment between Time 1 and Time 2. Measures collected at Time 2 serve as the post-treatment assessment for participants in the Immediate Treatment Group and as a second pretreatment measure for the Delayed

Table 1

The Experimental Design

| | | Times of Measurement | | |
|---------------------|----------|----------------------|------------|-----------------------------|
| | | Time 1 | Time 2 | Time 3 |
| Treatment Condition | | | | |
| Immediate EMDR | pretests | EMDR | post-tests | follow-up tests |
| Delayed EMDR | pretests | | post-tests | EMDR follow-up tests |

Treatment Group. Measures collected at Time 3 constitute the follow-up measures for the EMDR condition, and were collected 6 weeks post-treatment. Participants in the delayed-EMDR condition received EMDR between Time 2 and Time 3. Measures collected at Time 3 serve as the post-treatment measures for that group.

Outcome Measures

The outcome measures included the TAI, the STAI, and the Fear of Negative Evaluation Scale (FNE). These measures were given at Time 1, Time 2, and Time 3.

Fear of Negative Evaluation Scale (FNE). The FNE (Watson & Friend, 1969) measures apprehension about and avoidance of negative evaluation by others (see Appendix E). The psychometric properties are adequate; the normalization sample was college students (Scholing & Emmelkamp, 1990). There is a test-retest reliability of .78 and a moderately high correlation with other instruments.

State-Trait Anxiety Inventory (STAI). The STAI (Spielberger, 1983) measures trait anxiety and state anxiety (see Appendix F). There are 40 items, half of which measure trait anxiety, and half of which measure state anxiety. There is substantial evidence to confirm the psychometric properties of the STAI. Test-retest reliabilities for the trait anxiety range from .73 to .86. State anxiety varies from time to time and from situation to situation, and the state scale shows an expected low reliability from .16 to .54. Concurrent validity studies show that the STAI trait scale correlates well with other measures of trait anxiety. Internal consistency ranges between .83 and .92. Factor analysis studies support the two-dimensional structure, confirming that state and trait are two different dimensions (Kaplan & Saccuzzo, 1997). Normal controls usually score

around 38 on each scale.

EMDR Treatment Procedure

EMDR was individually administered in a single 90 minute session. Each session included six phases: (a) preparation, (b) baseline assessment, (c) desensitization, (d) installation of the positive cognition, (e) body scan, (f) closure. The preparation phase included a description of the EMDR process, and a discussion of the problem that the individual was experiencing with test anxiety. Shapiro's phobia protocol (1995, p. 222) includes targeting the original childhood incidents when the anxiety was first created and dismantling the core schemas that resulted from that disturbing event. Treatment includes the EMDR processing of (a) the first time the fear was experienced; (b) the most disturbing experiences; (c) the most recent experience; (d) associated present stimuli; (e) physical sensations; (f) a positive template for future fear-free action and, (g) "video tape" imagery. Because this research provided only a one-time session it was decided to target the experience which elicited the greatest present emotional distress. Clients identified the first time, the worst time, and the most recent time that they had experienced test anxiety and discussed their future fears. They then decided which of these they wished to target and the EMDR process focused primarily on that experience and early related incidents.

During baseline assessment, the subject identified the affect, body sensations, and cognitions that are related to the targeted experience, and rated these on the SUD and VOC scales. During the desensitization phase, the subject held in mind the image of the distressing experience, the negative cognition, body sensations, and affect while simultaneously moving his/her eyes back and forth, following the therapist's fingers. The

average set of eye movements was 24-60 traverses, lasting about 30 seconds each. At the end of each set the therapist asked the subject what emerged and then guided the subject in the focus for the next set of eye movements. This focus could be the material that emerged with the previous set of eye movements, or previously reported affect or cognition, or a synthesis of material. The procedure continued for approximately 60 minutes and included a segment that targeted fears related to future exams. The installation phase started when the SUDS score was low (0-3); the therapist then installed the positive cognition with additional eye movements. Before closure, the therapist had the subject scan their body by closing their eyes and noticing if there is any emotional distress or tension in the body: if so, more desensitization was done to eliminate this.

Results

Prior to analysis, the scores on the TAI, STAI, and FNE were examined for accuracy of data entry and missing values. Histograms were used to ensure that there were no outliers. Checks were completed for homogeneity of variance. The fit was confirmed between distributions of the variables and the assumptions of analysis of variance.

The two subjects who were missing all Time 2 entries were deleted, leaving 7 subjects in the Immediate treatment group and 8 subjects in the Delayed treatment group. One subject in the Immediate group had missing values for the STAI and the FNE and was not used in the analysis of those tests nor in the ANOVAs. There were no missing values for Time 1 and Time 2 for the remaining 14 subjects. Time 3 had 1 missing value for the

follow-up tests for the Immediate group. Two members of the Delayed group did not complete the post-treatment tests at Time 3. Independent t-tests were conducted on the Time 1 scores. There were no significant differences between the two groups at Time 1 on any measure. Table 2 contains the means and standard deviations of the outcome measures collected at each measurement time.

Mixed ANOVAs were performed on each measure to compare the change over time and to determine if the groups changed differently. Treatment effect sizes were computed by using Cohen's delta: the difference of the pretreatment mean minus the post-treatment mean was divided by the standard deviation of the pretreatment scores.

Process Measures

Subjective Units of Disturbance. SUDS ratings were taken at the beginning and end of each treatment session during administration of treatment to both the Immediate and the Delayed groups. The SUDS scores were analyzed by using a 2 (beginning vs. end of session) x 2 (Immediate vs. Delayed Treatment) ANOVA. There was no significant group x session interaction. However there was a significant main effect for treatment indicating a significant decrease in SUDS scores [$F(1,13) = 222.21, p < .001$] reflecting a decrease in reported distress at session's end (see Figure 1). There was large effect size of 3.25. Combined group means were 6.53 at session start ($SD = 1.66$) and 1.13 at session end ($SD = 1.29$).

Validity of Cognition. VOC ratings were taken at the beginning and end of each treatment session during administration of treatment to both the Immediate and the Delayed groups. The VOC scores were analyzed by using a 2 (beginning vs. end of

Table 2.

Means and standard deviations of measures at pre- and post-treatment and at 2 month follow-up, TAI percentile ranks (PR) for female subjects, and the F ratio for the Group x Time 1/Time 2 interaction, and level of significance.

| Variable | <u>IMMEDIATE</u> | | | <u>DELAYED</u> | | | F ratio |
|-------------------------------------|------------------|-------|----|----------------|-------|----|-----------------------------|
| | M | SD | PR | M | SD | PR | Interaction |
| Test Anxiety Inventory (TAI) | | | | | | | |
| Total Scale | | | | | | | $F(1,13) = 11.09, p = .005$ |
| Pre | 60.14 | 8.88 | 91 | 56.50 | 3.96 | 84 | |
| Post | 46.71 | 15.16 | 70 | 56.00 | 10.14 | 81 | |
| Follow-up | 39.71 | 12.88 | 52 | | | | |
| Emotionality Subscale | | | | | | | $F(1,13) = 9.18, p = .010$ |
| Pre | 27.71 | 3.73 | 93 | 24.50 | 2.39 | 82 | |
| Post | 19.86 | 6.31 | 64 | 23.62 | 4.34 | 77 | |
| Follow-up | 17.29 | 4.89 | 51 | | | | |
| Worry Subscale | | | | | | | $F(1,13) = 9.48, p = .009$ |
| Pre | 21.86 | 6.31 | 90 | 20.00 | 4.34 | 85 | |
| Post | 16.86 | 6.72 | 76 | 20.38 | 5.40 | 85 | |
| Follow-up | 13.14 | 5.58 | 50 | | | | |

Table 2 (continued)

| Variable | <u>IMMEDIATE</u> | | | <u>DELAYED</u> | | | F ratio | |
|---|------------------|-------|----|----------------|-------|----|---------------------------------|---|
| | M | SD | PR | M | SD | PR | Interaction | p |
| Fear of Negative Evaluation (FNE) | | | | | | | F(1,12) = 4.63, p = .053 | |
| Pre | 38.33 | 18.00 | | 35.38 | 8.07 | | | |
| Post | 30.50 | 12.94 | | 33.75 | 7.61 | | | |
| Follow-up | 30.83 | 15.33 | | | | | | |
| State Trait Anxiety Inventory (STAI) | | | | | | | | |
| State Subscale | | | | | | | F(1, 12) = .16, p = n.s. | |
| Pre | 41.17 | 21.37 | 68 | 44.13 | 14.11 | 71 | | |
| Post | 42.17 | 14.47 | 73 | 42.88 | 16.03 | 71 | | |
| Follow-up | 37.20 | 14.48 | 45 | | | | | |
| Trait Subscale | | | | | | | F(1,12) = 1.50, p = n.s. | |
| Pre | 48.67 | 12.56 | 87 | 47.75 | 15.09 | 72 | | |
| Post | 39.67 | 7.28 | 59 | 44.13 | 11.38 | 69 | | |
| Follow-up | 37.17 | 13.14 | 40 | | | | | |

session) x 2 (Immediate vs. Delayed Treatment) ANOVA. There was no group x session interaction but there was a significant main effect for treatment indicating a significant increase in VOC scores [$F(1,13) = 48.11, p < .001$] reflecting an increase in the subjects' belief in the truth of their positive cognitions (see Figure 1). There was large effect size of 2.02. Combined group means were 3.73 at session start ($SD = 1.31$) and 6.37 at session end ($SD = .83$). See Figure 1. The negative cognitions fell into 3 broad categories: 9 subjects expressed negative beliefs about coping/ competency ("I can't do it"); 4 subjects expressed negative beliefs related to success/failure ("I'm a failure"), and 2 expressed self-denigration ("I'm stupid"). The positive cognitions which were installed included statements such as "I am competent" "I'm okay, even if others think badly of me".

Outcome Measures

Test Anxiety Inventory. The Immediate treatment group showed significantly greater improvement for test anxiety symptoms between Time 1 and Time 2, as measured on the Total scale of the TAI, compared to the Delayed treatment group [$F(1,13) = 11.09, p = .005$], with a very large effect size of 1.50. The mean score for subjects in the Immediate group at Time 1 was 60.14 (See Figure 2). . The Professional Manual (Spielberger et al., 1980) states that this is equivalent to a percentile rank of 94 for male undergraduates and 88 for female undergraduates. At Time 3, their scores had decreased to a mean of 39.71. Because there were only 2 males in the groups, percentile ranks were calculated only for female scores as shown in Table 2. There was a decrease in percentile rank for the female Immediate group subjects from 91 percentile at Time 1, to 70 at Time

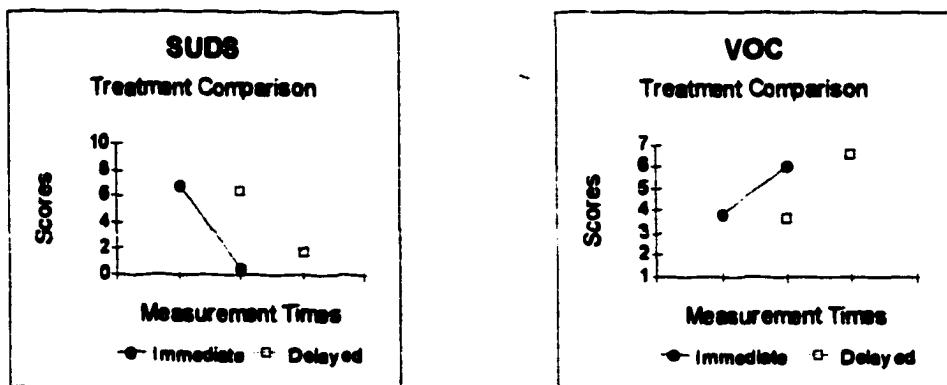


Figure 1.

Process measures: A comparison of the Immediate and the Delayed Treatment Groups, showing the equivalent effect of treatment for the two groups.

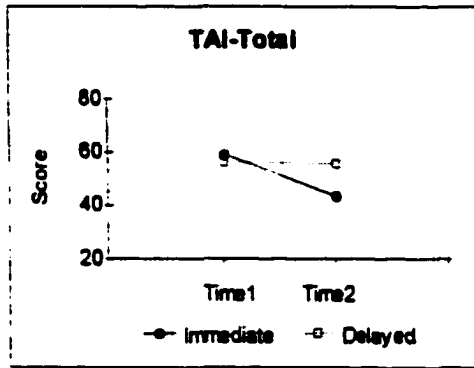
2, to 52 percentile at Time 3.

Emotionality. The Immediate group also showed a significant decrease on the Emotionality subscale of the TAI and a large effect size of 2.10, with a significant group x time interaction [$F(1,13) = 9.18, p = .01$]. At Time 1 the average score on the Emotionality scale for the Immediate group was 27.71; by Time 3, their score had decreased to 17.29. The percentile ranks for the women subjects decreased from 93 at Time 1, to 64 at Time 2, to 51 at Time 3.

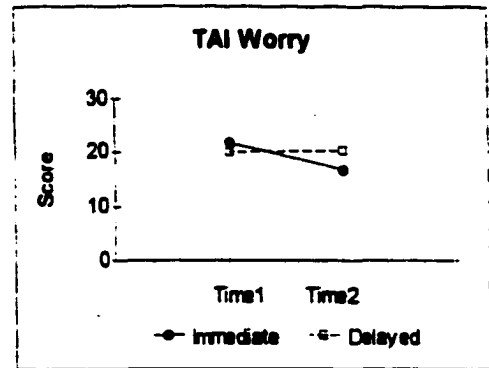
Worry. Scores for the Immediate subjects on the Worry subscale of the TAI decreased significantly more than the control group [$F(1,13) = 9.4, p = .009$] with a large effect size of .79, with a decrease in mean scores from 21.86 to 13.14 at Time 3. There was a corresponding decrease in percentile rank from 90 at Time 1, to 76 at Time 2, to 50 at Time 3.

Fear of Negative Evaluation. There was a marginally significant group x time interaction, indicating that the Immediate treatment group showed significantly greater improvement between Time 1 and Time 2 for symptoms related to fears of negative evaluation compared to the Delayed group [$F(1,12) = 4.63, p = .053$]. There was a medium effect size of .44. At Time 1 subjects in the Immediate group had a mean score of 38.33 and at Time 3 their scores averaged 30.83. The mean for college students on the FNE is 35.7, with a standard deviation of 8.10 (Leary, 1983).

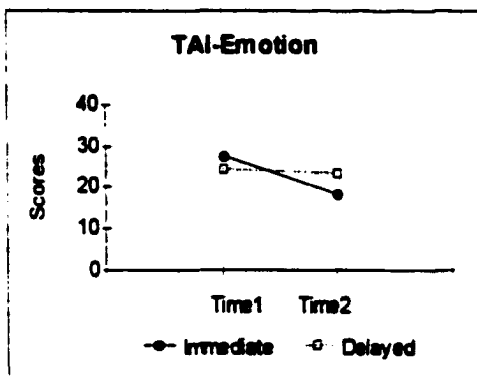
State Trait Anxiety Inventory. Mixed measure ANOVAs determined that there were no differences between groups on the STAI measures for any of the three Times. There was a main effect for Time on the Trait scale, with both groups showing a



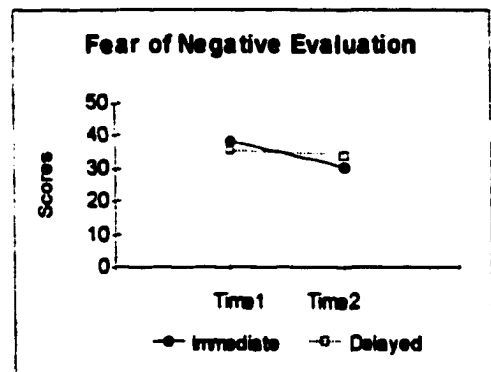
p. = .005



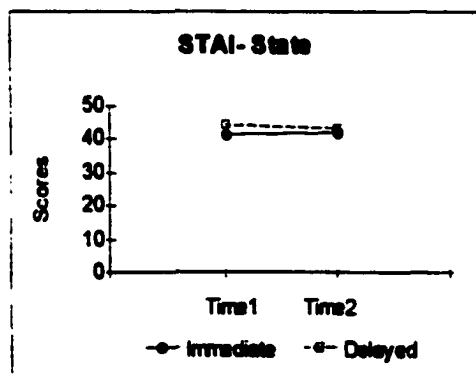
p. = .009



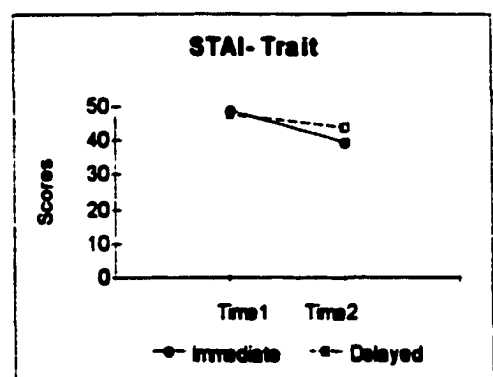
p. = .053



p. = .010



p. = n.s.



p. = n.s.

Figure 2. Changes on outcome measures for Immediate and Delayed treatment groups at Time 1 and Time2, with significance levels for Group X Time interaction.

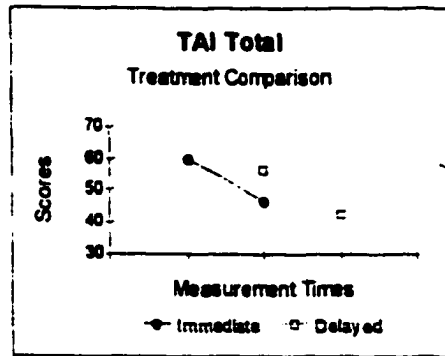
significant decrease in anxiety symptoms between Time 1 and Time 2 [$F(1,12) = 8.28, p = .014$]. Two of the subjects in the Delayed group reported substantial decreases on the Trait scale between Time 1 and Time 2. Percentile ranks on the Trait scale for female Immediate subjects decreased from 87, to 59, and to 40. For the female Delayed students the percentiles for Time 1 and Time 2 were 72 and 69.

Follow-Up

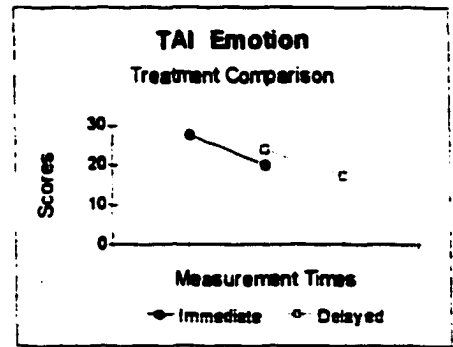
Maintenance for treatment effects for the Immediate group at 2 months was tested by comparing post-treatment scores at Time 2 with follow-up scores at Time 3 by using paired sample t-tests. There was a significant decrease on the Worry subscale of the TAI [$t(6) = 2.74, p = .034$] indicating that these subjects were experiencing less symptoms related to that scale at Time 3. None of the other tests showed any significant change and the means all decreased or remained the same (see Table 2). This indicates that the treatment effects were maintained at 2 month follow-up.

Effectiveness for Delayed Treatment Participants

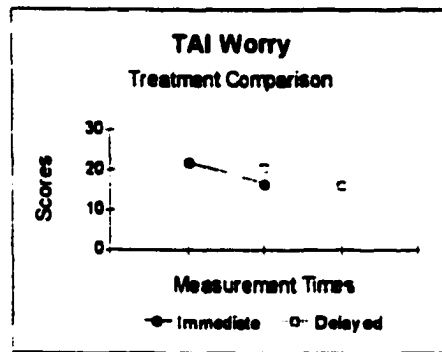
The Delayed group received treatment between Time 2 and Time 3. This replication of treatment allows for further assessment of EMDR. There were no group by treatment interactions, indicating that treatment had equivalent effects for the Delayed group (See Figure 3). The effects of treatment were found to be significant on all but the STAI-State measure. On the TAI -total scale the main effect of treatment was significant at $F(1, 11) = 32.56, p < .001$. Significant effects for treatment were also found on the TAI Worry subscale [$F(1, 11) = 17.46, p = .002$], the TAI Emotionality subscale [$F(1,11) = 28.34, p < .0001$], the FNE [$F(1, 10) = 9.91, p = .010$] and on the Trait subscale of



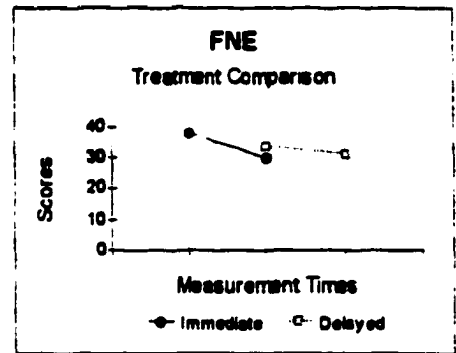
p. < .001



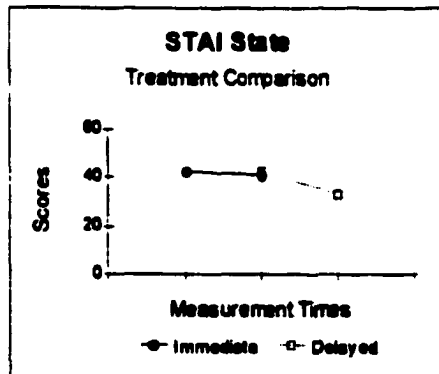
p. < .001



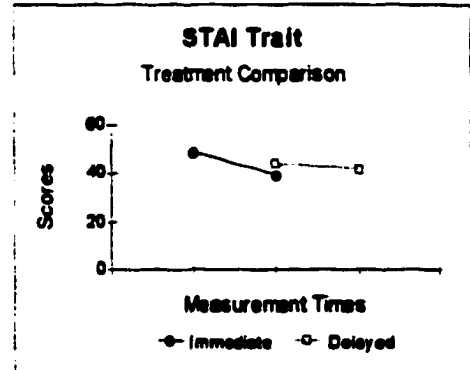
p. = .002



p. = .010



p. = n.s.



p. = .008

Figure 3. Comparisons of treatment for the Immediate group between Time 1 and Time 2 with treatment for the Delayed group between Time 2 and Time 3. Significance levels are for the main effect of treatment.

the STAI [$F(1, 10) = 10.93, p = .008$].

Targeted Material

Of the 17 subjects who participated in the experimental procedure, 9 of them identified family pressure as being the critical factor in their test anxiety, and a number of these described early related childhood experiences. One woman talked about her mother being very upset when she had, in grade 3, received a mark of "D" on a paper; another described her father constantly berating and criticizing her mother for being "stupid"; another was continually compared to smart and more successful siblings. Five of the 17 students described their first distressful experiences as occurring during high school examinations and some spoke of feeling shamed by teachers for their poor performance. Three of the subjects identified their distress as being related to external and realistic demands for superior performance, to maintain scholarships, or to be accepted into graduate school.

Correlations between Measures

A correlation analysis was performed on the Time 1 tests to determine the relationship between the various measures. As seen in Table 3, the Emotionality scale and the Worry subscale of the TAI correlate highly with the Total subscale with correlations .61 and .77, which is expected because these subscales are components of the Total subscale. The Worry and Emotionality subscales appear to be measuring different aspects of test anxiety because they have a low and nonsignificant correlation ($r = .23$) with each other. The Emotionality scale does not correlate with any other scale.

The Trait and State subscales of the STAI have a high and significant correlation

Table 3

Correlation Coefficients

| | TAI | | FNE | STAI | |
|--------------|------------|------------|------------|------------|------------|
| | Emotion | Worry | | State | Trait |
| Total | .6092 | .7702 | .4346 | .4829 | .6424 |
| | $p = .016$ | $p = .001$ | n.s. | $p = .080$ | $p = .013$ |
| Emotionality | | .2326 | .2745 | -.1837 | .1711 |
| | | n.s. | n.s. | n.s. | n.s. |
| Worry | | | .6170 | .4893 | .8269 |
| | | | $p = .019$ | n.s. | $p = .000$ |
| FNE | | | | .4996 | .6674 |
| | | | | n.s. | $p = .009$ |
| State | | | | | .7047 |
| | | | | | $p = .005$ |

($r = .70$). There also appears to be an overlap between the TAI and STAI-trait scale with significant correlations with the TAI-total scale ($r = .64$) and the TAI-worry scale ($r = .83$). The STAI-state scale does not correlate significantly with any of the other measures. The FNE scale has significant correlations with the TAI-worry scale ($r = .62$) and with the STAI-trait scale ($r = .67$).

Discussion

Overview

The results indicate that a single ninety minute EMDR session was successful in reducing symptoms of test anxiety and in increasing positive cognitions, with effects being maintained at two month follow-up. Subjects in the Immediate treatment group improved significantly on the Test Anxiety Inventory and on the Fear of Negative Evaluation Scale, compared to a Delayed treatment control group. The treatment gains of the Immediate treatment group were maintained or improved at 2 month follow-up, suggesting that these changes were persistent over time. This is especially relevant as the Time 3 measures were taken during the academic year's final exams. The large treatment effect sizes were reflected in large drops in percentile ranking on the TAI. When the Delayed group received treatment, it was found that the effects of treatment were equivalent for the two groups. The SUDS and VOC ratings also improved significantly, showing large treatment effects, which is consistent with Shapiro's findings of rapid and significant reductions in presenting complaints and anxiety (1989a).

In-Session Changes

The effects of EMDR treatment were apparent during the session itself as the subjects reported large shifts in affect and cognitions, with emotional distress being replaced by feelings of relaxation, and negative beliefs by more positive cognitions. EMDR appeared to bring about an in-session resolution of the targeted event in both its cognitive and affective aspects. The two measures used to monitor and assess in-session change showed large significant differences pre and post-treatment, with very large effect sizes.

At the beginning of the session, all subjects reported present emotional distress with regard to their experiences of test anxiety. The wide range of described feelings included "drained and horrible", "nervous", "tense", "anxious", "painful", "obligated", "jittery", "guilty", "frustrated", "like crying", "fear", and "disappointed". Most subjects located this affective distress in either their chest or stomach, and several showed the therapist how their hands were shaking. At session end, subjects reported significant relief from the emotional distress with which they had presented. When leaving the office, many spontaneously remarked that they now felt relaxed, or positive, or very encouraged.

During the session the clients' negative self-referencing beliefs were changed into more positive and adaptive ones. As the session began, the subjects identified prevalent negative cognitions reflecting fears of failure and beliefs of personal incompetency. These cognitions included such statements as "I just can't do it"; "I'm a failure". Most subjects described these cognitions as long-standing, explaining that they had believed this for years. By session end the subjects had adopted significantly more positive and realistic

self-referencing beliefs and expressed a sense of confidence and self-acceptance.

Post-treatment Changes

At post-treatment, the Immediate treatment group was found to have improved significantly on all scales of the TAI and marginally on the FNE compared to the Delayed treatment group. EMDR was very successful in eliminating the distress that the students had been experiencing before, during, and after their examinations. The scores of the control group on the TAI and FNE scales showed essentially no change (see Table 2), indicating that there was no regression to the mean and that the test anxiety of subjects in this sample did not spontaneously improve. It can be concluded that the significant improvement of the Immediate group was a result of the treatment.

Emotionality. At post-treatment the EMDR subjects reported a significant reduction of their high arousal symptoms, as measured by the Emotionality scale. This scale measures the physiological sensations of tension and nervousness which are often interpreted by the individual as dangerous and threatening, and which may elicit greater levels of arousal (Wine, 1980). The large reduction of these self-reported physiological symptoms by EMDR treatment is evident in the very large effect size. The Emotionality scale was not correlated with any scale (other than the TAI-total of which it is a subscale) indicating that Emotionality may measure a unique component.

Worry. Subjects in the EMDR group also showed a significant decrease at post-treatment on the Worry Scale, compared to the Delayed group. There was a large effect size. EMDR appears to have been very effective in decreasing the self-reported cognitive symptoms of fear, preoccupation with threat, confusion, and lack of confidence. EMDR

reduced the fear of failure, and decreased self-denigrating thoughts about potential catastrophe.

Fear of negative evaluation. The EMDR group showed a marginally significant greater improvement on the FNE compared to the control group, with a medium effect size. This indicates that EMDR reduced the fears of being evaluated, the expectations of being judged as inadequate, and accompanying negative and self-derogatory cognitions that accompany evaluation anxiety. Many of the students in this study focused on past experiences related to negative evaluation, most often by family, but also by teachers. That these experiences were successfully processed is evident in the significant decrease in scores on the FNE, reflecting a decrease in concern for the evaluations of others. These findings also support the hypothesis that test anxiety and evaluation anxiety are strongly related (Wine, 1980).

State trait anxiety. State anxiety appeared unaffected by this treatment. Scores remained constant for both groups at Time 1 and Time 2. The large decreases in test anxiety were not accompanied by changes in state anxiety. This seems to suggest that the treatment effects were specific to test anxiety and that they did not generalize to the other stresses experienced by these students. This also provides another control for regression to the mean. It is unclear from the findings of this study how the EMDR treatment affected trait anxiety. There was a decrease in scores for both groups at each measurement time. There may be some extraneous factors related to self-concept issues, as shown in the large drop in scores reported by two members of the Delayed group. Certainly young adulthood is a time when the sense of identity fluctuates. The small

sample size is very sensitive to large individual differences. No conclusion can be made concerning trait anxiety in this experiment.

Changes at Follow-Up

The treatment effects were maintained at 2 month follow-up. Because the Time 3 measures were taken during the final exams, the treatment was well tested. Subjects' responses showed that they were no longer experiencing severe test anxiety, and that they were now functioning at the 50th percentile on the TAI. This maintenance of treatment effects indicates that the single session EMDR treatment was highly successful in eliminating test anxiety.

The only significant change for the Immediate group at Time 3 was a decrease in the Worry scores. Because there was no control group at Time 3, it is impossible to conclude that this decrease is the sole result of treatment. However, this lowered score can be explained as the result of the post-treatment subjects having a number of successful experiences writing examinations, further decreasing their belief in the potential of failure, and thus decreasing worry.

Treatment Replication

When treatment was provided to the Delayed group their response paralleled that of the Immediate group. This replication of treatment effects with the Delayed group allows for the elimination of such threats to validity as time of treatment, history, subject factors, and repeated testing. The Immediate group received treatment mid-semester while the Delayed group received treatment at the end of the semester, just prior to final exams, and their post-tests were done during the final exams. This replication increases the

generalizability of the study, indicating that the results of the Immediate group were not specific to that particular group at that particular time. Similar replication results were found by Wilson et al. (1995) when they provided treatment to their control group.

Size of the Treatment Effect

Substantial treatment effects were found on all measures except for the STAI. Treatment effect sizes ranged from 0.44 to 3.25. These effects are also seen on the normed scale of the TAI, where subjects showed an average drop of almost 2 standard deviations. These results indicate that one session of EMDR was effective in eliminating test anxiety.

Number of Treatment Sessions

This was a one session study and was therefore limited in its treatment scope. It was only possible to target one incident. Although the treatment was successful it would probably be advantageous to offer students several sessions. Other treatment programs for test anxiety such as cognitive behavioral therapy, relaxation therapy, study skills counseling, and supportive counseling, all require a minimum of four sessions (Sapp, 1993). The fact that EMDR was effective in one session indicates that it may be of greater efficiency than other established treatments.

Comparison with Other Treatment Outcome Studies

In the Preliminary Professional Manual for the TAI, Spielberger (1980) reviews the use of the TAI in treatment programs for test anxiety. He discusses a study by Gonzalez who administered eight treatment sessions to test-anxious college students and found anxiety skills training significantly more beneficial than study skills training. In this study a

drop of 14 points of the TAI- total scale was considered indicative of good outcome. In another study by Algaze, cognitive behavior therapy was used alone or combined with study skills training or systematic desensitization. Students received eight treatment sessions. Results indicated that post-treatment scores were lower only on the TAI-total for those student who received only cognitive therapy, but were reduced on all three scales for those students receiving the combination treatments. The reported drop in the total TAI score was from 63 at pretreatment to 47.5 at post-treatment. A third study by Fletcher compared the use of cognitive therapy with rational emotive therapy. All students received seven sessions. The TAI-total score at pretest was 56. It decreased at post-treatment to 34.8 for the cognitive therapy group and to 39.1 for the rational emotive therapy group.

This research study reported pre-treatment TAI-total scores of 60, post-treatment scores of 46.7, and follow-up scores of 39.7. These results are comparable to the successful treatment effects of anxiety skills training, cognitive therapy (combined with study skills training or systematic desensitization) and rational emotive therapy. However, these studies all required a minimum of seven sessions, whereas the EMDR treatment provided only a single session. This indicates that EMDR is comparable in treatment effects, but that it is more efficient. This conclusion is similar to that made by Van Etten and Taylor (in press) in their meta analysis of studies on PTSD.

Nature of Test Anxiety

Although every student in this study had high test anxiety, they related various reasons for their anxiety. For some the anxiety appeared to be related to issues arising

from painful childhood experiences. For others the anxiety had arisen spontaneously in high school. For others the anxiety was a result of the realistic pressure to achieve high grades in order to keep scholarships or to get into graduate school. But all students described the anxiety as disabling, as interfering with performance, and as creating unhappiness and distress. They all expressed internalized beliefs of personal inadequacy and failure. Descriptions of the anxiety varied considerably. Some only became anxious in the testing situation; others were unable to study as the exam time approached; some were most anxious waiting for their marks; some were anxious about reporting their marks to family members; others described more generalized anxiety. No differences in results were noticed relating to differences in test anxiety. These findings support the work by others (e.g., Sieber, 1980) who describe test anxiety as a multi-faceted construct, involving physiological, cognitive, affective, and behavioral elements.

A Test of Shapiro's AIP Model

Shapiro's theory assumes that psychological distress results from an earlier traumatic event which created blocked processing, and that processing such historical incidents will result in relief for current related difficulties. It was hypothesized that subjects reporting test anxiety would also report a critical early incident. The majority of subjects did identify a past event which still carried an emotional charge and which they identified as being related to their present test anxiety. For some, this was a family related childhood event; for others, the incident was the onset of test anxiety in high school. It appears that the processing of these targeted events with EMDR significantly reduced test anxiety. This provides support for Shapiro's theory.

Individual Differences

Although EMDR was very effective in reducing test anxiety, there were individual differences in response. Some subjects moved through a broad range of associations, others repeated the same scene a number of times. There was also a difference in the content of the material that subjects worked on: some focused more on body sensations, others more on the earlier incident, others on issues such as fear of evaluation. Two of the 17 clients reported minimal effects. The reason for this is unknown. It may be that EMDR was not suitable for these individuals; that their test anxiety was related to other underlying issues not addressed; that these clients did not adequately engage in the EMDR process. In their case study on panic attacks, Goldstein and Feske (1994) comment that subjects have very different ways of moving through the material and question if this contributes to differences in outcome.

Strengths and Limitations

This study was quite sound methodologically, meeting five (and a sixth partially) of the seven gold standards (Foa & Meadows, 1997). These were (1) clearly defined target symptoms, with clear inclusion and exclusion criteria; (2) standardized measures were used; (3) an independent individual, who was blind to treatment condition, distributed and collected the assessment measures; (4) the assessor was trained in the use and scoring of standardized measures; (5) the program was manualized and so is replicable by others; (6) group assignment was randomized (although there was only one therapist). One standard was not met: (7) no treatment adherence ratings were done.

The lack of treatment integrity ratings means that degree of treatment fidelity is unknown. However, the experimenter was trained by Shapiro and had 5 years of experience in the use of the technique.

A critical limitation of this study is the use of a wait list control: this makes it impossible to rule out the nonspecific effects of treatment, and the findings are potentially attributable to placebo effects. However the very large effect size of 1.50 on the TAI-total is far greater than the placebo effect size of 0.30 calculated by Van Etten and Taylor (in press). This indicates that the effects of treatment are much greater than nonspecific treatment effects.

The use of the wait list control does not provide for any direct comparison of EMDR with other treatment methods. Although treatment results and relative efficiency can be compared, this is not the same as a immediate direct comparison of the same sample with such treatments as cognitive behavioral therapy or relaxation training. However, because the primary outcome measure was a standardized measure it was possible to compare the change in scores on the standardized norm. These changes are very large and substantially more than most treatments achieve with more treatment sessions.

There was no procedural control condition, so no conclusions can be made about treatment components. This study, however, did not seek to determine the mechanism of action. Although it remains unspecified, the mechanism appears to reside within the EMDR treatment protocol.

Because the researcher and the therapist were the same individual, there is the

possibility of experimenter bias. Attempts were made to minimize this by using only standardized measures. Demand characteristics were minimized by having the post measures distributed and collected by a disinterested objective person rather than by the researcher.

Small sample size limited the power of statistical tests. However, because the effect size statistics were generally in the large range, the small sample size was less of a concern. The small sample size may affect the representativeness of the sample, and thus limit generalizability. Minority groups were not represented. Comorbidity and study skills were not assessed, so it is not known to what extent these may have affected the results.

Although this was a controlled design with random assignment, treatment was provided to the control group between Time 2 and Time 3 to meet ethical obligations. This loss of the control group meant that there was no control for the Time 3 follow-up measures for the Immediate group. However, the replication of treatment effects with the Delayed group allowed for the exclusion of some threats to internal validity, including time of treatment, history, subject factors, and repeated testing.

Recommendations for Future Research

This research indicated that the resolution of a childhood event eliminated present-day test anxiety. These results provided evidence for Shapiro's AIP theory. Future research could compare the effectiveness and relative efficiency of treatment that focused on such early events as compared to research that focused on present function and future fears.

Shapiro suggests that EMDR, because of its rapid treatment effects, is like “a window into the brain” (1995, p. 324). Research using EMDR could provide greater understanding of memory systems and of cognitive and emotional processing, by studying what happens within the individual when an adaptive resolution is reached, and by looking at the inter-connections between memory, affect, schemas, and physiology in the healing process.

Identifying the active mechanism of EMDR is critical. Many studies indicate that eye movements are not essential. Research must continue to study the effective component(s). This would include work on the roles of reciprocal inhibition, distraction, external stimulation, exposure, affective processing, cognitive restructuring, and the nature of the targeted material. Determining what aspects of EMDR contribute to its efficacy will allow for the development and refining of therapeutic procedures in the field of psychotherapy.

It has not been established that a change in SUDS during therapy actually predicts a long-term change in information storage or processing. In the present research, students reported large reductions in SUDS and then later reported being significantly less disabled by test anxiety. Future research could examine the importance of the emotional engagement of the client, and the role of emotional processing, to determine how predictive this is of successful treatment outcome.

Shapiro’s theory suggests that cognitive restructuring is a key component of the therapy. Research could examine how cognitive changes during the session relate to and predict later shifts in beliefs and attitudes, and determine the importance of such schematic

changes. Many research studies have exposed clients to taped scripts of the presenting traumatic event. It would be interesting to determine if clients create revised scripts during therapy, and to examine the nature of these new narratives in comparison with the originals.

Physiological measures used in EMDR research have yielded very mixed results. It is not clear how and if EMDR affects the physiology of PTSD. Studies using improved methodology are required to examine the effects of EMDR on the prevalent physiological symptoms of anxiety. Behavioral and attentional bias tests would also provide more objective information about treatment outcome.

Research to explore the impact of therapist variables will be invaluable. Such studies could examine the role of treatment allegiance effects and treatment fidelity. Research also needs to study which aspects of the EMDR protocol are essential: for example, determining how important it is that the therapist not intervene when the client is rapidly processing material. The role of cognitive interweaves should also be assessed.

Identifying the client factors that contribute to positive treatment response is another valuable area for future research. Research also needs to be done to determine the applicability of EMDR for various disorders. For example, it is evident in many studies that clients show significant improvement on scales for depression; however, no study has ever specifically tested EMDR with individuals diagnosed with a major depressive episode. Specific protocols could be developed and tested for different client groups with various disorders with the goal of achieving rapid effective treatment.

EMDR has perhaps raised more questions about the delivery of psychotherapy and

the nature of pathology than has yet been answered. Future research on EMDR will have important implications for the development of the field of psychotherapy.

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Appendix A

Descriptive Handout

RESEARCH PARTICIPATION OPPORTUNITY for Individuals Suffering from Test Anxiety

You are invited to participate in an experiment to evaluate a treatment technique for severe test anxiety. The treatment is Eye Movement Desensitization and Reprocessing (EMDR) and it has been found very effective in the treatment of traumatic memories and with anxiety disorders. EMDR is used to desensitize the distressing emotions related to past disturbing and traumatic events, to change related negative cognitions, and to relieve accompanying physiological distress. Although there has been substantial research on the use of EMDR with many kinds of disorders, it has not yet been evaluated for use with test anxiety. This research attempts to determine its effectiveness with test anxiety.

The procedure begins with having the subject identify the last time, the worst time, and the first time that they experienced test anxiety, and to identify related images, emotions, negative self-statements, and body sensations. The subject also identifies a positive self-statement which they would like to believe at the completion of treatment. The subject then focuses intently on one of the identified incidents with its associated components, while moving their eyes rapidly from side to side, visually tracking the experimenter's moving hand for about 20 seconds. After the eye movement set, the person reports on any changes in image, thoughts, feelings, or sensations, and then engages in another set of eye movements focusing on the changing material. This process continues for about 60 minutes moving through each of the distressing incidents. Then the subject will visualize a positive future exam experience with eye movements. The treatment will finish with further eye movements focusing on the positive self-statement about future examinations.

Those persons with high test anxiety who participate in this study will receive one individual EMDR treatment session of about 60 to 90 minutes. Because this treatment technique focuses on your feelings and personal experiences of anxiety, during the experimental treatment you may feel anxious and uncomfortable.

Students who participate in this study will be asked to fill out questionnaires about experiences, thoughts and feelings that you may have had. These questionnaires will be filled out in 15 minute sessions on four occasions at the end of class in a large group with other study participants. Some of the questions are of a personal nature and may arouse feelings of discomfort.

If you are presently suffering from major psychological distress that is not related to test anxiety, we recommend that you do not participate in this study. We are not able to include in this study persons with vision problems, substance abuse problems, epilepsy, or neurological impairment or who are highly dissociative. Nor can we include pregnant women. This study is suitable for those students who are experiencing a lot of trouble performing on exams because of severe test anxiety.

You will also be asked to permit your examination marks to be given to the Researcher. All information will be kept confidential and person will be identified in any report or publication of the study. The data will be stored at the University for 7 years with all identifying marks or names removed. You can withdraw from the experiment at any time without penalty. If you are interested in participating, we will have a 15 minute meeting after the next class, where you will be asked to sign consent forms and to fill out the questionnaires.

Thank you for your consideration.

Appendix B
Consent Form



**Eye Movement Desensitization and Reprocessing and Test Anxiety:
An Evaluation of Single Session Treatment**

Consent Form

Eye Movement Desensitization and Reprocessing (EMDR) has been found to be very effective in the treatment of traumatic memories and with anxiety disorders. It is used to desensitize the distressing emotions related to past disturbing and traumatic events, to change related negative cognitions, and to relieve accompanying physiological distress. Although there has been substantial research on the use of EMDR with many kinds of disorders, it has not yet been evaluated for use with test anxiety. This research attempts to determine its effectiveness with test anxiety.

The procedure begins with having the subject identify the last time, the worst time, and the first time that they experienced test anxiety, and to identify related images, emotions, negative self-statements, and body sensations. The subject also identifies a positive self-statement which they would like to believe at the completion of treatment. The subject then focuses intently on one of the identified incidents with its associated components, while moving their eyes rapidly from side to side, visually tracking the experimenter's moving hand for about 20 seconds. After the eye movement set, the person reports on any changes in image, thoughts, feelings, or sensations, and then engages in another set of eye movements focusing on the changing material. This process continues for about 60 minutes moving through each of the distressing incidents. Then the subject will visualize a positive future exam experience with eye movements. The treatment will finish with further eye movements focusing on the positive self-statement about future examinations.

I understand that my participation involves taking part in several procedures at different times.

Step 1: completion of a 20 minute paper and pencil survey done on February 12.

Step 2: completion of a 20 minute paper and pencil survey done on March 3.

Step 3: a 90 minute individual session of the experimental treatment.

Step 4: completion of a 20 minute paper and pencil survey done by April 3.

I give permission, if included as a participant, for my examination scores in Professor Allan's course to be given to the main researcher.

I realize that this procedure is not suitable for persons who are pregnant, epileptic, or who suffer from neurological problems or who are highly dissociative. I am also aware that it is not suitable for persons suffering with any significant mental health problem. I affirm that none of these categories applies to myself.

understand that if I have significant distress following the experimental procedure that I can approach Dr. Melnyk and receive a referral for mental health services.

I understand that all the information I provide is confidential and that I will not be identified in the final report, and that data will be stored for seven years at Lakehead University and all names removed before storage. I can receive a summary of the project, upon my request, following project completion.

Signature

Date

Student Number

Telephone

Appendix C

Test Anxiety Inventory

APPENDIX A: TAI Test Form

NAME _____ DATE _____ SEX M F

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

T _____ W _____ E _____

ALMOST NEVER SOMETIMES ALMOST ALWAYS
OFTEN

- | | | | | |
|---|---|---|---|---|
| 1. I feel confident and relaxed while taking tests | ① | ② | ③ | ④ |
| 2. While taking examinations I have an uneasy, upset feeling | ① | ② | ③ | ④ |
| 3. Thinking about my grade in a course interferes with my work on tests..... | ① | ② | ③ | ④ |
| 4. I freeze up on important exams | ① | ② | ③ | ④ |
| 5. During exams I find myself thinking about whether I'll ever get through school | ① | ② | ③ | ④ |
| 6. The harder I work at taking a test, the more confused I get | ① | ② | ③ | ④ |
| 7. Thoughts of doing poorly interfere with my concentration on tests | ① | ② | ③ | ④ |
| 8. I feel very jittery when taking an important test | ① | ② | ③ | ④ |
| 9. Even when I'm well prepared for a test, I feel very nervous about it..... | ① | ② | ③ | ④ |
| 10. I start feeling very uneasy just before getting a test paper back | ① | ② | ③ | ④ |
| 11. During tests I feel very tense | ① | ② | ③ | ④ |
| 12. I wish examinations did not bother me so much | ① | ② | ③ | ④ |
| 13. During important tests I am so tense that my stomach gets upset | ① | ② | ③ | ④ |
| 14. I seem to defeat myself while working on important tests | ① | ② | ③ | ④ |
| 15. I feel very panicky when I take an important test | ① | ② | ③ | ④ |
| 16. I worry a great deal before taking an important examination | ① | ② | ③ | ④ |
| 17. During tests I find myself thinking about the consequences of failing | ① | ② | ③ | ④ |
| 18. I feel my heart beating very fast during important tests | ① | ② | ③ | ④ |
| 19. After an exam is over I try to stop worrying about it, but I just can't..... | ① | ② | ③ | ④ |
| 20. During examinations I get so nervous that I forget facts I really know | ① | ② | ③ | ④ |

Appendix D

Dissociative Experiences Scale

DES

Eve Bernstein Cohen, Ph. D. Frank W. Putnam, M. D.

DIRECTIONS

This questionnaire consists of twenty-eight questions about experiences that you may have in your daily life. We are interested in how often you have these experiences. It is important, however, that your answers show how often these experiences happen to you when you are not under the influence of alcohol or drugs.

To answer the questions, please determine to what degree the experience described in the question applies to you and circle the number to show what percentage of the time you have the experience.

EXAMPLE:

0% 10 20 30 40 50 60 70 80 90 100%
(never) (always)

1. Some people have the experience of driving or riding in a car or bus or subway and suddenly realizing that they don't remember what has happened during all or part of the trip. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
2. Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear part or all of what was said. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
3. Some people have the experience of finding themselves in a place and having no idea how they got there. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
5. Some people have the experience of finding new things among their belongings that they do not remember buying. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
6. Some people sometimes find that they are approached by people that they do not know who call them by another name or name that they have not heard before. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually are themselves as if they were looking at another person. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
8. Some people are told that they sometimes do not recognize friends or family members. Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%
9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Circle a number to show what percentage of the time this happens to you.
0% 10 20 30 40 50 60 70 80 90 100%

10. Some people have the experience of being accused of lying when they do not think that they have lied. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

11. Some people have the experience of looking in a mirror and not recognizing themselves. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

12. Some people have the experience of feeling that other people, objects, and the world around them are not real. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

13. Some people have the experience of feeling that their body does not seem to belong to them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

18. Some people find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

19. Some people find that they sometimes are able to ignore pain. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

21. Some people sometimes find that when they are alone they talk out loud to themselves. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing that (for example, not knowing whether they have just mailed a letter or have just thought about mailing it). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

25. Some people find evidence that they have done things that they do not remember doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

28. Some people sometimes feel as if they are looking at the world through a fog so that people and objects appear far away or unclear. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

Appendix E

Fear of Negative Evaluation Scale

FNE

NAME: _____

Read each of the following statements and indicate how characteristic it is of you according to the following scale

- 1 = Not at all characteristic of me.
- 2 = Slightly characteristic of me.
- 3 = Moderately characteristic of me.
- 4 = Very characteristic of me.
- 5 = Extremely characteristic of me.

- | | | | | | |
|--|---|---|---|---|---|
| 1. I worry about what people will think of me even when I know it doesn't make any difference. | 1 | 2 | 3 | 4 | 5 |
| 2. I am unconcerned even if I know people are forming an unfavorable impression of me. | 1 | 2 | 3 | 4 | 5 |
| 3. I am frequently afraid of other people noticing my shortcomings. | 1 | 2 | 3 | 4 | 5 |
| 4. I rarely worry about what kind of impression I am making on someone. | 1 | 2 | 3 | 4 | 5 |
| 5. I am afraid that others will not approve of me. | 1 | 2 | 3 | 4 | 5 |
| 6. I am afraid that people will find fault with me. | 1 | 2 | 3 | 4 | 5 |
| 7. Other people's opinions of me do not bother me. | 1 | 2 | 3 | 4 | 5 |
| 8. When I am talking to someone, I worry about what they may be thinking about me. | 1 | 2 | 3 | 4 | 5 |
| 9. I am usually worried about what kind of impression I make. | 1 | 2 | 3 | 4 | 5 |
| 10. If I know that someone is judging me, it has little effect on me. | 1 | 2 | 3 | 4 | 5 |
| 11. Sometimes I think I am too concerned with what other people think of me. | 1 | 2 | 3 | 4 | 5 |
| 12. I often worry that I will say or do the wrong things. | 1 | 2 | 3 | 4 | 5 |

Appendix F

State Trait Anxiety Inventory

SELF-EVALUATION QUESTIONNAIRE

Developed by Charles D. Spielberger

in collaboration with

R. L. Gorsuch, R. Lushene, P. R. Vagg, and G. A. Jacobs

STAI Form Y-1

Name _____ Date _____ S _____

Age _____ Sex: M _____ F _____ T _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel *right now*, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

VERY MUCH SO
MODERATELY SO
SOMEWHAT
NOT AT ALL

- | | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. I feel calm | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. I feel secure | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. I am tense | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. I feel strained | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. I feel at ease | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. I feel upset | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. I am presently worrying over possible misfortunes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. I feel satisfied | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. I feel frightened | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. I feel comfortable | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. I feel self-confident | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. I feel nervous | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. I am jittery | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. I feel indecisive | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. I am relaxed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. I feel content | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. I am worried | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. I feel confused | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. I feel steady | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. I feel pleasant | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Name _____ Date _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

ALMOST NEVER
SOMETIMES
OFTEN
ALMOST ALWAYS

- | | | | | |
|---|---|---|---|---|
| 21. I feel pleasant | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 22. I feel nervous and restless | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 23. I feel satisfied with myself | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 24. I wish I could be as happy as others seem to be | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 25. I feel like a failure | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 26. I feel rested | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 27. I am "calm, cool, and collected" | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 28. I feel that difficulties are piling up so that I cannot overcome them | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 29. I worry too much over something that really doesn't matter | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 30. I am happy | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 31. I have disturbing thoughts | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 32. I lack self-confidence | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 33. I feel secure | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 34. I make decisions easily | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 35. I feel inadequate | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 36. I am content | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 37. Some unimportant thought runs through my mind and bothers me | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 38. I take disappointments so keenly that I can't put them out of my mind | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 39. I am a steady person | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 40. I get in a state of tension or turmoil as I think over my recent concerns and interests | Ⓐ | Ⓑ | Ⓒ | Ⓓ |