EMDR Treatment of Obsessive-Compulsive Disorder: Preliminary Research

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This article reports the results of two experiments, each investigating a different eye movement desensitization and reprocessing (EMDR) protocol for obsessive-compulsive disorder (OCD) and each with two young adult male participants with long-standing unremitting OCD. Two adaptations of Shapiro's (2001) phobia protocol were developed, based on the theoretical view that OCD is a self-perpetuating disorder, with OCD compulsions and obsessions and current triggers reinforcing and maintaining the disorder. Both adaptations begin by addressing current obsessions and compulsions, instead of working on past memories; one strategy delays the cognitive installation phase; the other uses mental video playback in the desensitization of triggers. The four participants received 14–16 one-hour sessions, with no assigned homework. They were assessed with the Yale-Brown Obsessive Compulsive Scale (Y-BOCS), with scores at pretreatment in the extreme range (mean = 35.3). Symptom improvement was reported by participants after 2 or 3 sessions. Scores at posttreatment were in the subclinical/mild range for all participants (mean = 8.5). Follow-up assessments were conducted at 4–6 months, indicating maintenance of treatment effects (mean = 7.5). Symptom reduction was 70.4% at posttreatment and 76.1% at follow-up for the Adapted EMDR Phobia Protocol and 81.4% at posttreatment and at follow-up for the Adapted EMDR Phobia Protocol with Video Playback. Theoretical implications are discussed, and future research is recommended.

Keywords: eye movement desensitization and reprocessing (EMDR); obsessive-compulsive disorder (OCD); treatment outcome research; Adapted EMDR Phobia Protocol; Adapted EMDR Phobia Protocol with Video Playback

Obsessive-compulsive disorder (OCD) is a psychological condition associated with anxiety and stress, experienced by about 1 in every 60 adults, 1.6% of the world population (Kessler et al., 2005). It can affect children as young as 6 or 7 years old and often first appears in adolescence (Heyman, Mataix-Cols, & Fineberg, 2006). There appears to be no difference in the incidence of OCD for men and women. Some research shows that OCD runs in families and that a genetic predisposition may play a role in the development of the disorder (Brady, 2003; Nauert, 2006). The World Health Organization (2011) has listed OCD in the top 20 most disabling illnesses in the world.

OCD is characterized by the presence of recurrent obsessions and/or compulsions that interfere substantially with daily functioning (American Psychiatric Association, 2000). *Obsessions* are "persistent . . . intrusive and inappropriate . . . and cause marked anxiety or distress" (American Psychiatric Association, p. 457). They can take many forms such as unwelcome thoughts, images, impulses, and doubts. Examples of obsessions include a focus on order and symmetry, thoughts about contamination, fears of harming self or others, and doubts about whether an action was completed. *Compulsions* are "repetitive behaviors or mental acts the goal of which is to prevent or reduce anxiety or distress" (American Psychiatric Association, p. 457). Examples of compulsions include excessive cleaning, hand washing, ordering, checking, counting, and mental compulsions. They are often performed in an attempt to alleviate the intrusive obsessions and reduce the fear, but actually increase anxiety (Heyman et al., 2006). A diagnosis of OCD requires that the obsessions and/or compulsions consume large amounts of time and impinge on important day-to-day activities.

Research suggests that OCD may be related to problems in communication between the front of the brain and the much deeper structures where serotonin is used as a messenger (Atmaca et al., 2011). It could be argued that a reduced level of serotonin is

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a contributing factor in the development of OCD, and antidepressant medications are often used in its treatment (e.g., Khouzam, Emes, Gill, & Raroque, 2003).

Treatment of Obsessive-Compulsive Disorder

In 1966, Victor Meyer reported on his successful treatment using exposure and response prevention with two individuals with washing rituals. Since that time, this treatment has been established as the therapy of choice for OCD (e.g., National Collaborating Centre for Mental Health, 2006). With many randomized clinical trials showing its efficacy, Exposure and Response Prevention Therapy (EX/RP) remains the most commonly provided treatment for OCD (Deacon & Abramowitz, 2004; Fisher & Wells, 2005; Franklin & Foa, 2011). A meta-analysis of OCD therapies was conducted by Rosa-Alcázar, Sánchez-Meca, Gómez-Conesa, and Marín-Martínez (2008). They reported that EX/RP, cognitive restructuring therapy, and a combination of the two were effective in reducing symptoms and showed similar effectiveness. They noted that EX/RP's simplicity makes it the treatment of choice for OCD and that further research is needed for cognitive therapy.

EX/RP involves exposing the individual to the feared situation and preventing the use of compulsions to reduce his or her anxiety, with both in session activities and daily homework (Foa & Kozak, 1997; Steketee, 1996; Steketee & White, 1990). This cycle of exposure and response prevention is repeated until the individual is desensitized to the obsessional anxiety and no longer performing ritualized compulsions. Franklin and Foa (2011) described current EX/RP treatments as typically including:

> prolonged exposure to obsessional cues, procedures aimed at blocking rituals, and informal discussions of mistaken beliefs that are often conducted in anticipation of exposure exercises. Exposures are most often done in real-life settings (in vivo) and involve prolonged contact with specific feared external (e.g., contaminated surfaces) or internal (e.g., images of having sex with religious figures) stimuli that the patient reports as distressing. (pp. 232–233)

Although EX/RP therapy can be highly effective for about 50% of people who complete EX/RP treatment, there are a number of recognized drawbacks (Maher et al. 2010). Individuals with OCD find EX/RP therapy challenging for a number of reasons. They may find it too frightening to face their worst fears; EX/RP is hard work, requiring homework completion; individuals may not be ready to change long-standing habitual behaviors; and, EX/RP therapy may not be as effective for individuals who experience obsessions without compulsions.

Assessment of Obssesive-Compulsive Disorder

The Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al., 1989) is considered the gold standard measure of OCD. It was developed as a clinician-administered measure, designed to rate the severity and types of symptoms. The Y-BOCS uses a 10-item scale, with each item rated from 0 (*no symptoms*) to 4 (*extreme symptoms*). The results of the questionnaire are categorized to provide a score for compulsions as well as obsessions, and these are added to provide the total Y-BOCS score. A total score of 0–7 is considered subclinical; 8–15 is mild; 16–23 is moderate; 24–31 is severe; and 32–40 is extreme.

The percentage of reduction in Y-BOCS scores is commonly used to evaluate improvement. The percentage of reduction is calculated by dividing the difference between pretreatment and posttreatment scores by the pretreatment score. Many OCD clinical trials have used percent reduction cutoffs on the Y-BOCS to determine treatment response, with cutoffs indicating good symptom response in medication trials at 20%–40% symptom reduction and cutoffs in cognitive behavior treatment (CBT) trials at 50% reduction (Tolin, Abramowitz, & Diefenbach, 2005).

Eye Movement Desensitization and Reprocessing

Eye movement desensitization and reprocessing (EMDR) is a therapy in which a structured approach is used to address past, present, and future aspects of disturbing memories. Shapiro's (2001) adaptive information processing (AIP) model, which provides the theory for EMDR treatment, conceptualizes psychiatric disorders as a manifestation of unresolved traumatic or disturbing memories. EMDR is recognized as an empirically based therapy for the treatment of posttraumatic stress disorder (PTSD), with approximately 20 randomized clinical trials supporting its efficacy for PTSD. Various meta-analyses (e.g., Bisson & Andrew, 2007/2009; Bradley, Greene, Russ, Dutra, & Westen, 2005) have found that EMDR is equivalent in effect to cognitive behavioral approaches such as exposure therapy and cognitive restructuring therapy in the treatment of PTSD. EMDR, exposure therapy, and cognitive restructuring therapy are all identified as first-line approaches for PTSD treatment in many

international guidelines (e.g., National Collaborating Centre for Mental Health, 2005; U.S. Department of Health and Human Services, 2011).

EMDR is administered according to a standard eight-phase procedure (Shapiro, 1995, 2001). Treatment starts with history taking, preparation, and memory assessment phases. If the client has difficulty identifying an etiological memory, the therapist can guide the client in a "floatback" technique to recall earlier events with similar affect and/or cognition (Browning, 1999). After this, the client focuses on aspects of the targeted memory while simultaneously engaging in eye movements for about 24 seconds, after which associations to other material (e.g., memory, affect, cognition, perceptions) are elicited. This procedure is repeated multiple times throughout the session and typically, these associations become more adaptive during the session. When the memory is desensitized (reflected in a rating of 0–10 on the Subjective Units of Disturbance [SUD] scale), the procedure continues with a focus on reprocessing related negative cognitions to strengthen a selected positive cognition. The memory is considered to be reprocessed when it no longer elicits any affective or somatic distress and when the client indicates that the positive cognition has high validity, as rated on the Validity of Cognition (VOC) scale.

Targeted memories are sequentially ordered, across sessions, in which the aforementioned procedures are applied according to a three-pronged protocol (Shapiro, 1995, 2001). First, the distressing past memories that are considered etiological to the disturbance are resolved. After this, the focus shifts to processing current triggers, which are environmental stimuli still eliciting distress. Finally, the treatment addresses future aspects of the disorder by incorporating a positive template for adaptive future action.

EMDR Treatment of Anxiety Disorders

Shapiro (2001) developed specialized applications of EMDR for anxiety disorders and phobias (Luber 2009a, 2009b; Shapiro, 2001, p. 228). Both applications sequence targets according to the three-pronged protocol, with past memories processed first, followed by current triggers, then by future action; each incident is fully processed according to the standard procedure. During the future template procedure in Shapiro's *EMDR Phobia Protocol* (Luber, 2009b), the therapist asks the client to "run a mental videotape" (p. 173) of the imagined future action to "incorporate a positive template for fear-free future action" (p.171).

Although EMDR is established as an effective treatment for PTSD, there has been much less research on its application with anxiety disorders (Shapiro, 2001). In their comprehensive review, de Jongh and ten Broeke (2009) posited that the strong research base for CBT of anxiety disorders may have limited interest in the exploration and investigation of EMDR and other possible treatments. Also, with its focus on traumatic memories, EMDR may not have been considered a viable treatment for anything other than PTSD, even though disturbing events may have played a catalytic part in the initial onset of some disorders. For example, anxiety disorders often begin following a stressful life event (de Silva & Marks 1999; Kleiner & Marshall, 1987), and McNally and Lukach (1992) stated that many patients will also suffer PTSD-like symptoms as a direct result of their first panic attack. De Jongh and ten Broeke suggested that EMDR may be effective in treating anxiety disorders in which there is a specific disturbing or traumatic etiology—for example, the treatment of dog phobia following a dog bite.

There is some preliminary support for EMDR's effectiveness in the treatment of anxiety disorders. Limited research on EMDR treatment of panic disorder has showed some good effects (e.g., Feske & Goldstein, 1997; Goldstein & Feske, 1994). However, research on panic disorder with agoraphobia has yielded mixed results (e.g., Fernandez & Faretta, 2007; Goldstein, de Beurs, Chambless, & Wilson, 2000), with the suggested possibility that more work may be needed in the preparation phase of EMDR, so that anxious patients can better tolerate exposure to their fears during trauma processing. In a randomized clinical trial evaluating EMDR treatment of test anxiety, Maxfield and Melnyk (2000) found that in comparison to a waitlist control, a group of university students treated with a single session of EMDR showed significant improvement, with maintenance of effects at follow-up and a reduction in scores on the Test Anxiety Inventory from the 90th to the 50th percentile.

Several case studies have reported the successful EMDR treatment of specific phobias (e.g., de Jongh, van den Oord, & ten Broeke, 2002). Recently, a large randomized clinical trial (de Jongh, Holmshaw, Carswell, & van Wijk, 2010) compared EMDR (with self-initiated in vivo exposure) to trauma-focused CBT (imaginal exposure, with elements of cognitive restructuring, relaxation, and anxiety management) for 184 people suffering from travel fear and travel phobia following road traffic accidents. Participants in both groups were encouraged to confront anxiety-provoking stimuli between sessions. The mean number of sessions was 7.3, and both treatments resulted in equivalent effects, with

significant decreases in symptoms of anxiety, depression, and posttraumatic stress, and avoidance of travel.

EMDR and the Treatment of Obsessive-Compulsive Disorder

Although there have been anecdotal reports and occasional conference presentations (e.g., Allemagne, 2009) on the treatment of OCD with EMDR, little research has been done on this application. Bae, Kim, and Ahn (2006) presented two clinical OCD cases in which they were unable to demonstrate any measurable success with EMDR. The participants were two men, diagnosed with chronic OCD, who had shown no response to pharmacological or psychotherapeutic interventions. Bae et al. provided Parnell's (2007) modified EMDR protocol with both patients, identifying and resolving feeder memories, in accordance with Shapiro's (2001) AIP theoretical model that addressing etiological events with EMDR will decrease the client's symptoms. OCD symptoms were unchanged by treatment.

Böhm and Voderholzer (2010) described research by Bekkers, who in 1999 reported significant symptom reduction in 4 out of 5 compulsive patients treated with EMDR. Böhm and Voderholzer cautioned however that Bekkers performed EX/RP simultaneously with EMDR, "in unreported sequences, making it difficult to clearly assign the effects to a single therapeutic element" (Böhm & Voderholzer, 2010, p. 176). Bekkers reportedly described EMDR's contribution as the accessing of emotion and creating insight, with associative links between affect, compulsions, and their apparent purpose. EMDR was reportedly viewed by Bekkers not as a stand-alone therapy, but as a helpful adjunct in EX/RP therapy.

Böhm and Voderholzer (2010) investigated the effects of EX/RP + EMDR for three adults diagnosed with OCD while receiving 8–12 weeks of inpatient treatment. The first two patients received a course of either EMDR or EX/RP and then a course of the alternative treatment. This design allowed for the evaluation of the incremental effects of each treatment. The Y-BOCS (Goodman et al., 1989) was administered at pretreatment, after completion of the first course of treatment, and at posttreatment. The first participant was a 34-year-old man with checking compulsions. He received 6 weeks of EMDR, addressing traumatic experiences of abandonment during childhood, but apparently without addressing current triggers or future action with EMDR. There was a reduction in his Y-BOCS score from 36 to 32. This was followed by administration of EX/RP, with a reduction in his Y-BOCS score from 32 to 9. Effects were maintained at follow-up, and he reported that the benefit of EMDR was increased insight into his compulsions, with resultant ability to tolerate the exposure therapy.

The second participant was a 24-year-old woman with aggressive and sexual obsessions. She first engaged in 7 weeks of EX/RP, with a reduction in her Y-BOCS (obsessive thinking only) score from 16 to 12. This was followed by administration of 4 weeks of EMDR, focusing first on a traumatic fall in childhood, and then on an obsessive image. After EMDR, her Y-BOCS (obsessive) score had dropped from 12 to 8. Although at follow-up, the Y-BOCS score had increased to 11, she described much improved function. The third participant was a 27-year-old man with ordering and checking compulsions, with a fear of losing some possessions. He received 10 weeks of alternate sessions of EMDR and EX/RP. He reported no traumatic events in his history. His EMDR sessions did not follow standard procedures. Instead, a strategy that the authors called "the EMDR absorption technique (resource building)" (Böhm & Voderholzer, 2010, p. 180) was applied, in which he engaged in eye movements while simultaneously imagining successfully resisting the compulsive behaviors. His Y-BOCS score decreased from 35 at pretreatment to 16 at posttreatment, with effects maintained at follow-up. Böhm and Voderholzer (2010) recommended the use of EMDR as an augmentation method with EX/RP to assist clients in emotional mastery.

Current Study

The literature shows that clients treated with EX/RP have a 60%–80% reduction in OCD symptoms. About 25% of clients choose not to engage in this form of therapy when they realize that they will have to confront their fears. Consequently, when four patients were referred for alternative OCD treatment, it was decided to develop a treatment approach using EMDR. All four cases had previously been treated by health care professionals for OCD and had failed to engage successfully with the CBT practitioner. It was not possible to say whether this was as a result of the client being unprepared to change or whether the treatment was not optimally applied; whatever the cause, the participants were still struggling with severe OCD symptoms and unwilling/unable to participate in further CBT therapy. They had either dropped out of treatment or had been deemed as unsuitable for EX/RP or cognitive therapy by their individual therapist. Indeed it was reported by the referring source that the OCD symptoms in all four

cases appeared to have been exacerbated by the previous use of EX/RP and/or cognitive therapy.

It was hypothesized that EMDR could provide a viable and realistic treatment option for those suffering from OCD and that processing the overwhelming fears and ritualized behaviors at the epicentre of OCD could decrease symptoms of OCD. These hypotheses were based on research findings that a probable trauma in the client's past may be directly linked to the onset of OCD. They were also based on the main theoretical principle of the EMDR AIP model that posits that resolving disturbing memories will resolve related symptoms (Shapiro, 2001).

Additionally, it has been the therapist's experience that OCD is maintained by current thoughts and behaviors. He views it as a self-perpetuating disorder, composed of multiple linked complex behaviors, thoughts, and events, occurring in the present time. It was hypothesized that this pattern of self-perpetuating, self-reinforcing behavior could be effectively addressed by first processing the current triggers, obsessions, and compulsions, prior to targeting historical traumatic events.

Two adaptations of Shapiro's (2001) phobia protocol were developed by the author, the Adapted EMDR Phobia Protocol and the Adapted EMDR Phobia Protocol with Video Playback. These were tested in this study. Each experiment provided the treatment to two individuals who had not benefited from previous CBT treatment for OCD.

Experiment 1

Method

Treatment. The therapist was the author, and he is a qualified counselor with advanced training in CBT and at the time of this study, had been trained in, and using EMDR for over 2 years. Sixteen sessions were provided to each of the participants.

As with standard EMDR, a full client history was taken, thus providing the therapist with insight into the client's issues. Then in the preparation phase, the clients were prepared as per standard EMDR procedures with a calm place, and with the addition of an imaginal nurturing figure, strength figure, or a protection figure if needed. The stop signal was taught, and a dry run of the therapy was conducted using a minor issue with little subjective distress. The history taking and preparation phases were completed in two sessions.

The EMDR processing phases were administered using the specialized EMDR protocol developed by the author: The *Adapted EMDR Phobia Protocol*. In this adaptation, targets are desensitized in the following sequence: starting with the current triggers (OCD compulsions and obsessions), followed by the future template (imagining successful future action), and then by past-related disturbing memories (if any). Following desensitization of all targets, the positive cognition is developed and installed.

Assessment. The Y-BOCS was administered by the author at pretreatment and posttreatment. The follow-up administration was conducted by an independent nontreating psychologist at 4–6 months posttreatment. The participants' contact with the therapist had stopped at the end of treatment.

Participants. As described previously, two men with current OCD diagnoses were referred for treatment because they had not responded to previous CBT treatment of OCD. James was 28 years old; Michael was 24 years old. Note that client information has been altered to protect the participants' identities.

Case 1—James

James was a 28-year-old university graduate, who lived with one of his parents. His obsessions were about infection and the spread of disease; his related compulsions included checks for sexually transmitted infections (STI) every 4 months. Other compulsions included excessive hand washing; not directly touching door handles, light switches, or toilet seats. In addition, he was unable to touch another person without feeling infected. This latter compulsion was a great concern since he aspired to have a girlfriend and eventually a family. During history taking, James reported that his OCD would consume almost every moment of his day. A floatback technique (Browning, 1999) was used to identify possible etiological events. It was discovered that his fears were probably initiated by comments made around the time of the initial advertising campaign associated with HIV and AIDS; he was about 13 or 14 years of age and was told to be careful about who and what he touched so as not to catch AIDS. Although this early event, which could be called the "presenting issue," would be considered the primary target in standard EMDR therapy, it was decided to administer the Adapted EMDR Phobia Protocol, and to target this event after all the triggers were processed.

An active avoidance list of feared stimuli was made of each aspect of his OCD, and this became the list of triggers to be targeted. Each trigger was treated as a single event. The first OCD stimulus to be processed was his fear of catching germs from touching door handles: the target image was "the millions of germs living in the dirt"; his emotion was fear, with a bodily sensation of being nauseous. After the disturbance

related to this event was reduced to 0, the next OCD stimulus to be processed was skin-to-skin contact: the target image was of him trying to kiss a woman he was attracted to; his emotion was an overwhelming fear of catching an illness if they touched, with a bodily sensation described as a rock in his throat.

After desensitization of all his current triggers (feared stimuli), James was able to establish a relationship with a young woman. Holding hands that would have been absolutely out of the question at the start of treatment was now easy for James. However, he was anxious about the idea of kissing and sexual intercourse, and the future template was conducted. Following this, the early warning about HIV/AIDs was processed, addressing his fears about being careful about whom and what he touched so as not to catch AIDS. On the 10th session, the positive cognition was developed and installed according to standard EMDR procedures. This cognition stated," I am safe."

After completing 10 EMDR sessions and installing the positive cognition, James reported he had been able to kiss his girlfriend and indeed had gone on to have sexual intercourse. Previous to EMDR, this would have been cause for a severe abreaction and the need for skin to be scrubbed clean; bedding burnt; and a trip for tests by both of them to ensure no infections had been shared. At follow-up, James reported that he was no longer using hand sanitizer and was now able to feel comfortable with physical contact within a relationship. James's Y-BOCS scores showed substantial decreases, from the extreme range to the mild range, with treatment effects maintained at follow-up (see Figure 1).

Case 2—Michael

Michael was a 24-year-old man, who was unable to maintain employment. He had worked in a number of different jobs and had been unemployed for the past 4 years. Michael's OCD revolved around obsessional thinking. He also had an ordering/sequencing compulsion; he had to have everything lined up on his desk and would align objects on other people's desks. Time was also a big issue for this client: Start and finish times had to be precise. It was decided to administer the Adapted EMDR Phobia Protocol.

During Phase 1 history taking, Michael reported that both his parents, with whom he still lived, had some OCD traits. His mother had a different day for every job in the house and would not deviate from her schedule. His father organized everything both at work and at home: "A place for everything and everything in its place." Michael identified a few past issues that could be worked on, but none appeared linked to his OCD. The floatback technique was used, but no precipitating incidents were recalled.

The *EMDR Anxiety Protocol* was used with Michael. Treatment started with desensitizing all the current OCD events causing distress. The first OCD event to be processed was his fear that if things such as papers or pens were not in exact order, he would be disowned by his family and unacceptable loneliness

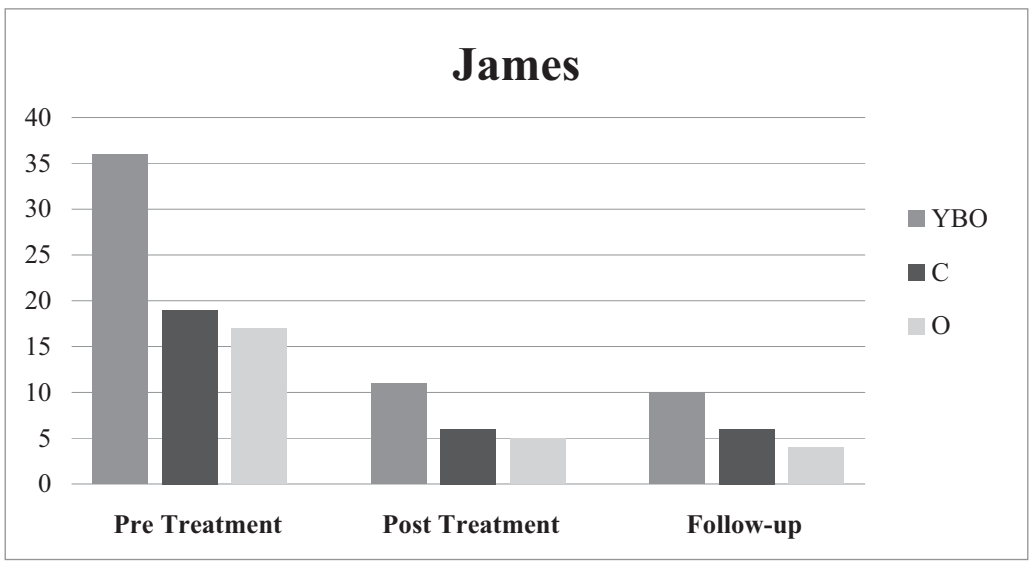

FIGURE 1. James's Y-BOCS scores.
Note. Y-BOC = total Y-BOCS score; C = Y-BOCS score on compulsions symptoms subscale; O = Y-BOCS score on obsessive symptoms subscale.

would follow. During the EMDR sessions, processing elicited a number of forgotten memories, providing insight into many aspects of his obsessional behavior patterns. As treatment progressed, it became obvious to the therapist, the client, and other people that his obsessional thinking patterns were also subsiding.

His core obsessional belief was the need to demonstrate to his father that he was good at something. This obsession was targeted only after all other OCD events were desensitized. Prior to this, it was observed that Michael had developed clarity of thinking and that the obsessions had lost their strength. Although the need to process this area seemed unnecessary at the time, the protocol was followed. Since this was the last event to be processed, the full standard procedure was applied. The image representing his obsession was his father's disappointment when his school report stated he could not concentrate on anything; the negative cognition and positive cognition were "I am useless" and "I am proud of me"; his emotion was "lost." Processing of this target elicited trails of memories around a need to remind his parents to do things, to think things through for people, and to be aware of his and their actions.

At follow-up, Michael reported he was now employed in a charity shop and that he was enjoying working in this disorganized workplace. He had been able to talk to his family who had been able to express how proud he was that he was now settling down. Michael's Y-BOCS scores showed substantial decreases, from the extreme range to the mild range, with treatment effects maintained and in the subclinical range at follow-up (see Figure 2).

Experiment 2

Method

Treatment. The therapist was the first author, and he is a qualified counselor with advanced training in CBT, and at the time of this study, had been trained in EMDR for over 2 years. Fourteen sessions were provided to each of the participants. History taking and preparation phases followed standard EMDR procedures as described previously in Experiment 1. They were completed in two sessions for Case 3, whereas Case 4 required four history taking sessions.

The participants received treatment according to the specialized EMDR protocol developed by the author: The *Adapted EMDR Phobia Protocol with Video Playback*. In this OCD protocol, targets are fully processed in the following sequence: starting with the current triggers (OCD compulsions and obsessions), followed by past related disturbing memories (if any), and then by the future template (imagining successful future action).

Assessment. The Y-BOCS was administered by the therapist at pretreatment and posttreatment. The follow-up administration was conducted by an independent psychologist at 4–6 months posttreatment. The participants' contact with the therapist had stopped at the end of treatment.

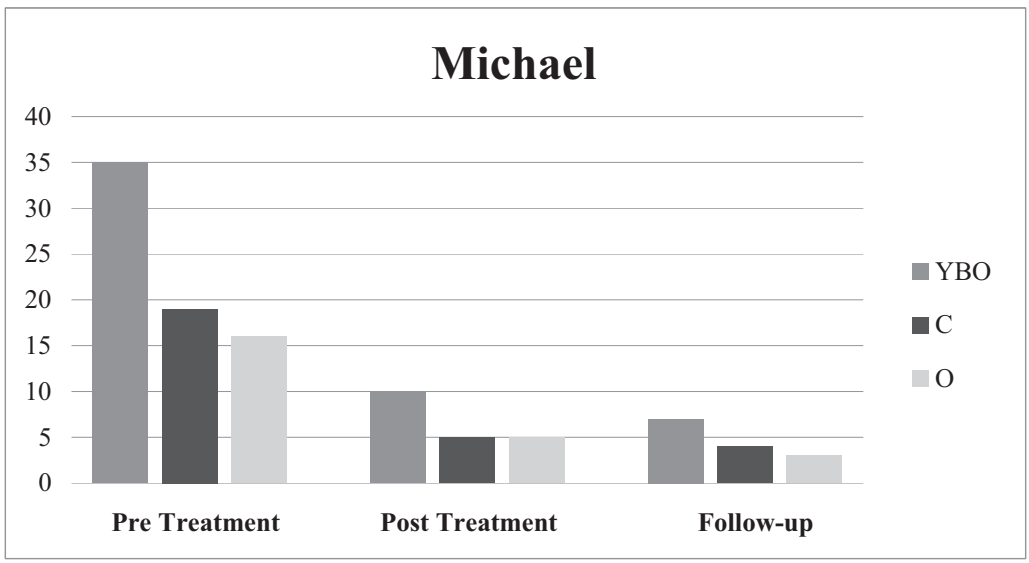

FIGURE 2. Michael's Y-BOCS scores.
Note. Y-BOC = total Y-BOCS score; C = Y-BOCS score on compulsions symptoms subscale; O = Y-BOCS score on obsessive symptoms subscale.

Participants. As described previously, two men with current OCD diagnoses were referred for treatment because they had not responded to previous CBT treatment of OCD. Robin was 19 years old; Alex was 26 years old. Note that client information has been altered to protect the participants' identities.

Case 3—Robin

Robin was a 19-year-old man, living with his mother. He had a complex history, which required an EMDR history taking assessment of four sessions. When Robin was 13 years old, there was a violent family breakup, which was followed by an exacerbation of preexisting OCD symptoms. His OCD became much more apparent and restrictive at that time and had continued without any benefit from prior attempts at CBT treatment.

Robin had a fear of shaking hands or touching bare flesh, and he constantly worried about electric plugs and running water. He unplugged all devices whenever he left a room and checked that all taps were turned off and not dripping. Sink and bathtub plugs were wound around the tap in a clockwise direction so that they could not fall and block the drain. All doors were locked and he checked this by counting the clicks of the key in the lock and checking the handle 20 times with each hand. If he was interrupted at any stage in his rituals he would have to restart the whole process. He estimated that it could take about 1.5 hours for him to be able to leave his home. He carried hand gel that he would use around 20 times a day.

The Adapted EMDR Phobia Protocol with Video Playback was provided. Robin chose to start work with his fear of shaking hands, which he saw as holding him back from gaining any future employment. The video playback technique was used to look at the first memory when Robin was afraid of shaking hands. He played the video in his mind, and when he became aware of feeling stress, he stopped. At that point, he identified the image, negative cognition, positive cognition, VOC, emotion, SUD, and body sensation. Standard procedures were used to process the memory. The video playback was used to monitor desensitization and to identify other incidents. Within three EMDR sessions, Robin was able to shake hands with certain people, with the subsequent use of hand gel. This then changed to shaking hands without the use of hand gel.

After addressing his fear of shaking hands, his obsession with electric sockets, water taps, and sink plugs was addressed in the same manner. He played a mental video in of his routine of checking everything, and when he felt some form of stress or anxiety, he signaled the therapist, who then followed standard EMDR procedures for processing the event. Once the stress or anxiety had subsided for that moment, he continued his video playback. Once again within three or four sessions, he reported significant improvement. He was now able to have a quick visual check and leave the house, without the need to physically plug and unplug electric sockets or turn on and off taps. His obsession about checking during door locking took more sessions but also resulted in substantial improvement. Rather than having to count the clicks of the key in the lock and checking the door handle 20 times with each hand, he was now able to simply lock the door and check the door handle twice with each hand.

Robin discovered a touchstone event during the processing of his OCD around the violent family breakup he had undergone. While Robin and his mother had been trying to flee the family home, they found their exit barred by a locked door. The target image that came to mind was his terrified expectation that his father would return home and confront them as they tried to leave. His negative cognition for this event was "I am to blame." His positive cognition was "I am free." The emotion that Robin attached to this memory was panic, with an SUD of 5; and he felt it in his bladder needing to urinate profusely. This was the final issue to be processed, and it was fully resolved with the standard protocol.

At follow-up, Robin reported he was no longer checking electric outlets or taps and sink plugs and that he no longer feels the need to use hand gel. He has found an interest in open water canoeing. Robin's Y-BOCS scores showed substantial decreases, from the extreme range to the subclinical range, with treatment effects maintained at follow-up (see Figure 3).

Case 4—Alex

Alex was a young man aged 26 years, living on his own, unemployed for most of his life since leaving school. He had recently separated from his partner and young child and was maintaining regular contact with the child and had limited contact with his partner. A full history was completed. Application of the floatback technique revealed that the vast amount of his OCD began at age 13 years when he discovered that the man whom he had always known as his father was not his biological father.

Alex's OCD impacted many different aspects of his life, from cleanliness of his own body, spending an hour cleaning and bleaching a bathtub or shower

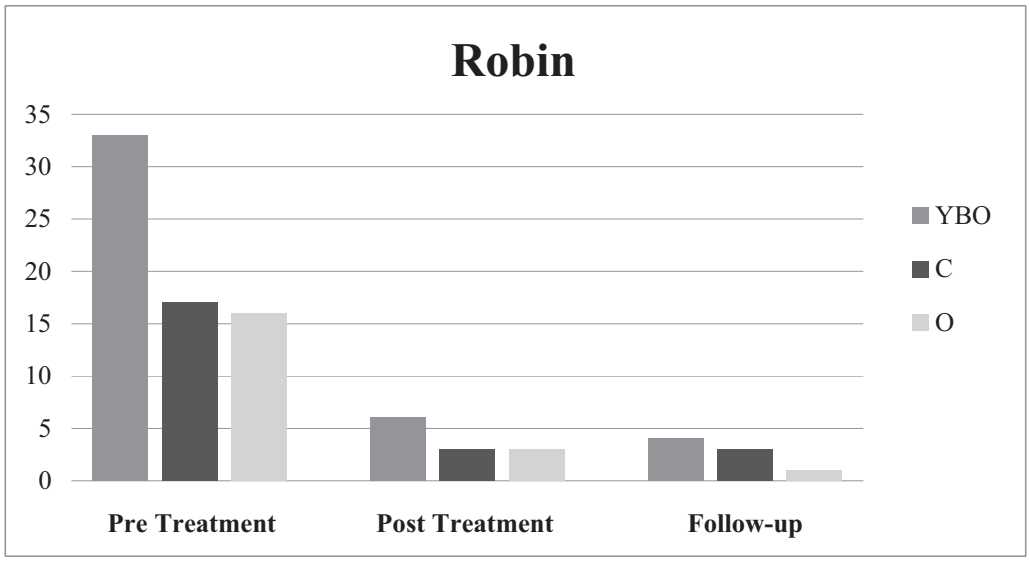

FIGURE 3. Robin's Y-BOCS scores.
Note. Y-BOC = total Y-BOCS score; C = Y-BOCS score on compulsions symptoms subscale; O = Y-BOCS score on obsessive symptoms subscale.

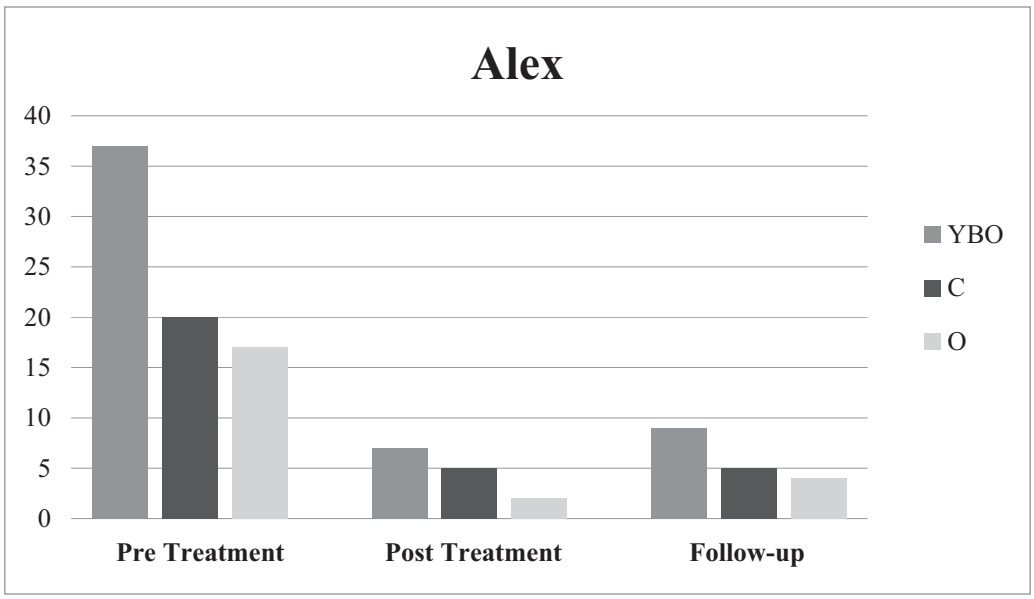

FIGURE 4. Alex's Y-BOCS scores.
Note. Y-BOC = total Y-BOCS score; C = Y-BOCS score on compulsions symptoms subscale; O = Y-BOCS score on obsessive symptoms subscale.

before he could use it, to having to clean and bleach the tub after he had used it. He carried his most prized personal possessions around with him and stored all his clothes and personal possessions in plastic storage boxes during the night. While he was obsessed with forming friendships and building a social life for himself, he was obsessed with not being able to trust people and measuring people against his high standards.

The Adapted EMDR Phobia Protocol with Video Playback began with processing OCD triggers. The first OCD event processed with EMDR was the compulsion to clean and bleach his bath tub or shower. Alex responded well, with the aid of the video playback technique, resulting in a dramatic reduction in the cleaning and bleaching behaviors. He no longer cleaned the bath/shower before use, unless it has been used by another, and his postbath/postshower

cleaning time was reduced from 60 minutes to 5 or 10 minutes.

The next target was his fear of losing his prized possessions and his compulsive behavior of carrying them around with him. Again the OCD protocol was used successfully. He began by leaving smaller items at home, and then larger items, such as TV and stereo, which he would previously have transported to his parents' home if he needed to leave his home.

The next target was his obsession with forming friendships and the trust issues. This was processed by playing a mental video playback of the last time he had met someone he felt could have been a friend. The image was about allowing this person into his home and then discovering he or she had stolen from him. The image was strong and vivid; the emotion attached was of loss, almost like that of bereavement, with a bodily sensation of emptiness in the pit of his stomach. Finally, treatment focused on his disturbing memories about his father.

This was followed by the future template installation in which Alex was able to successfully imagine satisfactory and rewarding employment and enjoyable social interactions with trustworthy friends. He then went on to picture himself having input and being involved with his son's life.

At follow-up, Alex reported that he was no longer carrying his possessions around with him and that he was able to talk to people without feeling that he had to repeat himself. His Y-BOCS scores showed substantial decreases, from the extreme range to the subclinical/mild range, with treatment effects maintained at follow-up (see Figure 4).

Discussion

What is striking about this study is the fact that all four participants described experiencing symptom improvement within the first two or three sessions. These individuals had suffered with disabling OCD for many years and had attempted various other CBT therapies without achieving any relief. After 14–16 adapted EMDR individual sessions, each participant reported significant symptom improvement and a large decrease in distress, with the effects of treatment maintained at 4–6 months follow-up. Each young man also made substantial changes in life function and activities, reaching and maintaining a number of important personal goals.

The percentage of symptom reduction reported in this study is comparable to that reported with EX/RP. Participants receiving the Adapted EMDR Phobia Protocol reported symptom reduction of 70.4% at posttreatment and 76.1% at follow-up. Participants receiving the Adapted EMDR Phobia Protocol with Video Playback reported symptom reduction of 81.4% at posttreatment and 81.4% at follow-up. However, unlike EX/RP, EMDR treatment does not require any homework and the confrontation of fears is manageable and not overwhelming.

Conceptualization of OCD and Its Treatment

Shapiro (2001) views current symptoms and disorders as the manifestation of unprocessed past traumatic events, and her standard EMDR procedures are developed on the assumption that processing these early events will eliminate the presenting symptoms. Unfortunately, for those working with complex issues such as OCD, this straightforward approach often seems insufficient. Some clients deny early events; for others, processing early events does not seem to change entrenched ritualized OCD behaviors. It is often difficult for therapists to discover a method of dealing with issues that seem to have little or no foundation in either trauma or logic.

Although OCD may have originated in early experiences, it appears to be a self-maintaining disorder. The author hypothesizes that OCD is best understood as a series of self-perpetuating and interlaced traumatic events, or as a complex multiple event. Each current trigger—each obsession and compulsion—is viewed as a separate recent "traumatic event," which links with other related events, and with past memories, to reinforce and perpetuate multidimensional disturbing patterns of thoughts and behaviors. OCD is not one continuous event, but instead it is a number of interlaced events that both support and reindoctrinate each other.

Consequently, it is recommended that treatment starts by addressing the current events. Therapeutic interventions that begin by addressing past incidents will almost always be undermined by the more recent OCD events. OCD treatment is most successful when it focuses on first reducing the power of present experiences. By dealing with individual triggers from the present, the underlying events often become apparent; they can even dissipate without being directly addressed. Related past incidents and touchstone events are revealed naturally during processing of the current triggers, and their meaning and relevance in the present life is apparent and diminished. The past distressing memories lose their strength and power and are more amenable to processing after the current OCD events are resolved.

The Adapted EMDR Phobia Protocols

Two different adaptations of the EMDR Phobia Protocol were used. In both protocols, the current triggers (OCD compulsions and obsessions) were the first targets addressed with EMDR processing.

In the first experiment, using the Adapted EMDR Phobia Protocol, the participants brought up an image of the current trigger and identified the most disturbing part as in standard EMDR protocol, but with no cognitions identified. Processing began with a focus on the image, emotion, and bodily sensation. When one current trigger was desensitized, the focus turned to the next current trigger, until all triggers were desensitized. The future template was then installed and then past memories were desensitized. After all desensitization was completed, the positive cognition was installed. In some respects, this procedure can be understood as treating all triggers, fears, and memories as one complex multiple event, with each aspect representing a part of the whole, and desensitizing that whole target before moving to cognitive installation. In this protocol, the cognitive work is left to the end because of the potential for the obsessive thoughts to disrupt the emotional and somatic processing.

It is expected that this adaptation might be most effective for those clients whose obsessions seem to be overpowering and where there is a concern that destabilization and loss of gains would occur by moving into the cognitive phases of EMDR before completing desensitization of all triggers. Using this protocol desensitizes the triggers, reducing anxiety, so that the client decreases his or her engagement in the obsessions and compulsions, making successful behavioral changes. This seems to reduce the power of the core obsessions (negative cognition), defusing its potency before the client is required to directly confront it. Research is needed to investigate these hypotheses.

In the second experiment, the mental video playback of the recent trigger provides a method for the client to experience the trigger, emotions, and bodily sensation within a safe and protected environment. In standard EMDR, the targeted event is reassessed numerous times throughout a session by asking the client to return to the incident and report what they notice. In this protocol, the client is asked to return to the video playback and to run the movie again and again, stopping whenever they notice any disturbance. Subsequent processing uses the standard EMDR procedures to continue desensitization and cognitive installation until the trigger is fully resolved when, during video playback, the client reported no distress and full endorsement of the positive cognition. This process is repeated with the next trigger. When all current triggers are fully processed, EMDR is used to process past memories and then to install the future template.

It is expected that the Adapted EMDR Phobia Protocol with Video Playback might be most effective for those clients whose OCD obsessions and compulsions are complex, involving multiple activities. It breaks the anxiety down into small manageable pieces, so that the client only has to focus on one small step at a time. The video playback allows for detailed desensitization of every aspect of the OCD event, eliminating fears and empowering the client. Research is needed to investigate these hypotheses.

The Treatment of Severe Anxiety

In a research study investigating EMDR in the treatment of panic disorder with agoraphobia (Goldstein et al., 2000), the response of participants was less than optimal. The researchers speculated that the poor response may have been caused by the participants' need for more extensive preparation because they may have had difficulty tolerating the intense affect that can be elicited during EMDR (Shapiro, 2001). It is possible that the single session provided for history taking and preparation in that study was insufficient for this purpose. In a recent single case study with a woman with panic disorder with agoraphobia, Fernandez and Faretta (2007) provided three history taking plus three preparation phases, which were followed by 12 processing sessions, resulting in remission of the diagnosis. They attributed her ability to engage in successful in-session processing to the in-depth preparatory work.

In this study, history taking was completed in two sessions for three participants, with the fourth participant requiring four sessions because of a complex history. Unlike Fernandez and Faretta (2007) who taught their client "self-control techniques" (p. 51), no specific strategies were taught in this study for anxiety management. The preparation provided was the standard introduction to EMDR, using the safe/calm place procedure and a dry run with an insignificant target.

It is important to note that the participants' anxiety was managed in the adapted EMDR protocols developed by the author. These procedures titrate the anxiety, making it manageable and tolerable in session. Each fearful element of the participants' current triggers, obsessions, and compulsions, was broken down into small and manageable pieces and systematically targeted and desensitized through the

treatment process. This was a very tolerable process and did not elicit extreme anxiety. Instead the participants experienced rapid desensitization of the targets with subsequent relief and reprocessing of the related material. As a result of this effective procedure, the participants described the development of a sense of mastery, and changed their related behaviors with notable remission of symptoms.

Limitations of the Current Study

No definitive conclusions can be drawn from this preliminary research. Limitations of this study include the case study design. There is always the possibility of idiosyncratic responding based on individual personality, background, and life events. This is a preliminary study, and results may not generalize to other clients. However, the case study design allows for a careful examination of individual response and an examination of treatment process. It should be noted that these participants had long-standing OCD, which had not responded to prior CBT treatment; that improvement with the OCD protocols was apparent after only two or three sessions; and that the results were maintained at 4–6 months follow-up.

Two different adaptations of the EMDR Phobia Protocol were developed and tested in a case study design. The adaptations were based on the theoretical view that OCD is a self-perpetuating disorder, with OCD behaviors and current triggers reinforcing and maintaining the disorder. It is not possible to determine from this study if both approaches were equally effective, or if one approach was more suitable than the other for a specific type of presentation. Future research is needed to investigate these questions.

Standard EMDR procedures and protocols were modified to accommodate this view of OCD. Treatment began by addressing the current obsessions and compulsions, instead of working on past issues, even though the latter approach is standard EMDR procedure. Various other modifications to the standard procedures were made, including delaying the cognitive installation and the use of the mental video playback.

Another limitation of this study is that the first author was the therapist, who also conducted the Y-BOCS assessments at pretreatment and at posttreatment. However, the participants all came into treatment with a diagnosis of OCD from an independent referring professional, who further reported that the participants' OCD symptoms had not remitted with prior treatment. The follow-up assessments were conducted by independent assessors.

Future Research

Future research is needed to investigate the effectiveness of the two adaptations introduced in this study: the Adapted EMDR Phobia Protocol and the Adapted EMDR Phobia Protocol with Video Playback. It is hoped that this research can illuminate and clarify the most effective EMDR approach to assist clients with disorders, such as OCD, where function is impaired by the self-perpetuating pattern of obsessive thoughts and compulsive behaviors.

It is possible that these protocols might be suitable for other disorders, where the link to prior trauma is tangential and not particularly relevant and where the current symptom manifestation takes on a life of its own, becoming self-reinforcing and self-perpetuating. Some examples of this may be social phobia and panic disorder with agoraphobia, where the client's avoidance of fearful situations reinforces the anxiety. The protocols might be helpful with other disorders that are considered to be on the OCD spectrum, such as body dysmorphic disorder. It is also possible that depressive symptoms such as rumination and behavioral withdrawal may respond to these protocols. It is recommended that research be done to investigate these possibilities.

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The Effectiveness of Eye Movement Desensitization and Reprocessing in the Treatment of Traumatized Children and Youth

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This article provides a summary of all the studies that have investigated eye movement desensitization and reprocessing (EMDR) treatment of traumatized children and adolescents. The effectiveness of the treatment is revealed in more than 15 studies. This article considers the differences between Type I and Type II traumas and specifically examines the effects of EMDR on traumatic stress experienced by children and youth following Type I and Type II traumas. There is a considerable body of research evaluating EMDR treatment of Type I traumas, showing strong evidence for its efficacy, but there are few studies that have specifically investigated EMDR treatment of Type II traumas. The effect of EMDR on various symptoms and problem areas is also examined. Recommendations are made for the clinical application of EMDR and for further research.

Keywords: children; trauma; post-traumatic stress disorder (PTSD); treatment; review; eye movement desensitization and reprocessing (EMDR)

Every day around the world, children and youth are exposed to various kinds of traumatic experiences. These can range from the horrors of war and the devastation of natural disasters to more personal traumas such as serious accidents, losses, violence, and sexual assault. Children, like adults, respond in various ways to these disturbing events. Although many show resilience and recover quickly, some experience disabling symptoms and others develop diagnosable disorders such as post-traumatic stress disorder (PTSD).

PTSD is an anxiety disorder that may be diagnosed in both adults and children following a traumatic event despite differences in symptomatology (American Psychiatric Association [APA], 2000). A diagnosis of PTSD requires that the child first experience a traumatic event involving actual or threatened death, serious injury, or threat to oneself or others. In response to this event, fear, horror, hopelessness, agitation, or disorganized behavior must be displayed, and other symptoms must also persist for at least 1 month and must significantly impair the child's functioning. These symptoms fall into three clusters: reexperiencing, avoidance and numbing, and hyperarousal. For children, reexperiencing may include nightmares, distress in response to cues that resemble or represent the event, and repetitive play or reenactments. Avoidance may be expressed not only toward aspects of the trauma, but also as a general numbing with diminished interest in activities, decreased range of affect, and a sense of foreshortened future. Symptoms of increased arousal may involve an exaggerated startle response, difficulty sleeping and concentrating, irritability, and hypervigilance for threat. The expression of these symptoms may vary over time, and transformations have been observed from one childhood developmental stage to the next (Kerig, Fedorowicz, Brown, & Warren, 2000).

Although some children's symptom presentation may be insufficient for a diagnosis of PTSD, they can still be very impaired by the disturbing memory of their trauma and related symptoms. For example, after a car accident, one child may experience overwhelming nightmares, whereas another child may be too terrified to ride in a car. Children whose traumas occur within interpersonal relationships may develop the associated symptoms of PTSD (APA, 2000). These include difficulties with trust, affect regulation, somatic problems, impulse control, and identity. Further, children who have been abused often develop additional symptoms related to self-efficacy and sexuality (Pelcovitz et al., 1997; Van der Kolk, 2002; Wolfe, Gentile, Michienzi, Sas, & Wolfe, 1991).

Terr (1991) identified two different types of trauma. *Type I* refers to unique, unexpected events, or single-incident traumas such as car accidents or natural

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disasters. *Type II* traumas are anticipated enduring experiences such as sexual abuse or war. Wenar and Kerig (2006) stated that Type II traumas can put the individual at a higher risk for PTSD, as well as producing more severe, chronic symptoms caused by repeated exposure. Other factors also influence the severity of symptoms, for example, events that involve human design and aggression and those that are directly experienced by the individual, as opposed to being witnessed, also tend to have a more negative outcome (Wenar & Kerig, 2006).

Although it appears that sexual abuse puts individuals at a higher risk for developing PTSD (Wenar & Kerig, 2006), some (e.g., Adler-Nevo & Manassis, 2005) have argued that child abuse, particularly of a sexual nature, can be differentiated from other types of trauma and thus the response differs from the traditional PTSD criteria that are specified in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV-TR*; APA, 2000). For example, attachment disorders and severe personality changes can be a greater issue (Terr, 1991), thus impacting on the required treatment.

Treatment of Traumatized Children and Youth

Cognitive Behavioral Therapy

Several international guidelines including those by the United Kingdom National Institute for Clinical Excellence (NICE; National Collaborating Centre for Mental Health, 2005), recommend the use of cognitive behavioral therapy (CBT) for the treatment of traumatized children. CBT utilizes a range of techniques such as psychoeducation, behavior modification, cognitive therapy, exposure therapy, and stress management to help the child change maladaptive beliefs, thoughts, and behavior. There is a large evidence base to suggest that CBT is effective in both individual- and group-based formats with a range of traumas including both Type I (e.g., natural disasters) and Type II traumas (e.g., sexual abuse), and its use is therefore recommended (Giannopoulou, Dikaiakou, & Yule, 2006; King et al., 2000). A meta-analysis by Wethington et al. (2008) compared individual- and group-based CBT to play, art, psychodynamic, and pharmacological therapies. They showed that, among children and adolescents exposed to various traumas, both types of CBT were most successful in reducing psychological harm including symptoms of PTSD, depression, anxiety, and suicidal behavior. A meta-analysis by Sánchez-Meca, Rosa-Alcázar, and López-Soler (2011) analyzed studies investigating treatment of sexually abused children and adolescents. They found that CBT, particularly when combined with other treatments such as supportive therapy or play therapy, achieved the greatest improvements in psychological well-being and was therefore efficacious in this application.

Pharmacological Treatment

The NICE guidelines (National Collaborating Centre for Mental Health, 2005) do not recommend the use of pharmacological interventions with children and adolescents. It is possible, however, that when young individuals are suffering with comorbid disorders, pharmacological treatment may provide a positive addition to a multiple modality treatment package. A review by Donnelly (2003) recommends selective serotonin reuptake inhibitors (SSRIs) because they have been shown to improve social and occupational functioning as well as symptoms of PTSD, anxiety, and depression (Donnelly, Amaya-Jackson, & March, 1999; Seedat, Lockhat, Kaminer, Zungu-Dirwayi, & Stein, 2001). It is also proposed that particularly problematic symptoms or disorders such as attention deficit and hyperactivity disorder (ADHD) can be targeted with specific agents (Donnelly, 2003).

Eye Movement Desensitization and Reprocessing

Eye Movement Desensitization and Reprocessing (EMDR) is also recommended for the treatment of PTSD in both adults and children by NICE (National Collaborating Centre for Mental Health, 2005) and by numerous other international guidelines such as the Cochrane Review (Bisson & Andrew, 2007), the U.S. Substance Abuse and Mental Health Services Administration (2011), the U.S. Department of Veterans Affairs and Department of Defense (2010), and the APA (2004). Research has indicated that it is more effective for adults than care as usual, no treatment, and wait-list control groups (Davidson & Parker, 2001; Lee, Gavriel, Drummond, Richards, & Greenwald, 2002; Marcus, Marquis, & Sakai, 1997) and equivalent (Bisson, et al., 2007; Foa, Keane, & Friedman, 2000; Van Etten & Taylor, 1998). Some researchers have viewed it as more effective than exposure-based CBT, both in vivo and imaginal, in improving the symptoms of PTSD particularly because of its rapid effects, low drop-out rates, and lower ratings of

distress following treatment (e.g., Ironson, Freund, Strauss, & Williams, 2002).

Description of Eye Movement Desensitization and Reprocessing

EMDR is a therapy that was developed for the treatment of traumatic memories in both adults and children (Shapiro, 2001). It is a standardized procedure, consisting of eight phases, progressing from history and treatment planning to a reevaluation of the improvements made at the beginning of the subsequent session. Once a full assessment has been carried out and the client has been taught relaxation, guided imagery, and eye movement techniques, target memories for reprocessing are identified in the form of a representative image, an associated negative cognition, and a desired positive cognition, although with children, there may be less focus on cognitions and emotions and more on imagery and sensations (Shapiro, 1989b; Smith & Yule, 1999). Where used, the positive and negative cognitions are assessed on the Validity of Cognition (VOC) scale (Shapiro, 1989a) and the Subjective Units of Disturbance (SUD) scale (Wolpe, 1982; where 0 = *no disturbance* and 10 = *worst possible disturbance*). These are rated numerically for adults and older children but can be indicated using the spread of a young child's hands or by drawing lines or shapes of different sizes.

During the dual attention treatment stages, the negative cognition is brought to mind together with the image, and the client is then told to track the therapist's fingers, which are moved repeatedly across the patient's line of vision (Shapiro, 1989b). The speed of the eye movements is gradually increased until it is as fast as is comfortable for the client to maintain accurate tracking. During this process, the patient is told to report any information that they become aware of, and once tracking is finished, they are told to "let it go" or "blank it out" (Smith & Yule, 1999, p. 269). This process is repeated until no further changes take place, SUD ratings are at 0 or 1, and when the original target memory is brought to mind, no further associations require processing. At this point, the positive cognition may be installed by simultaneously thinking of the event and the cognition during the completion of a further set of eye movements. For children it is more common to install a positive image, particularly when working with nightmare sufferers, which may show them or a powerful figure, such as a superhero, overcoming the object of their fear (Cocco & Sharpe, 1993). This is repeated until the VOC is reported as 7. A final set of eye movements are then carried out to target any residual tension that is noticed when the installed positive cognition and traumatic memory are attended to, known as a *body scan* (Smith & Yule, 1999). Lastly, relaxation or guided imagery techniques may be used to end the session. The number of sessions required varies depending on the type of traumatic event and the severity of the psychopathology (Rodenburg, Benjamin, de Roos, Meijer, & Stams, 2009).

A variant of EMDR, the EMDR-Integrated Group Treatment Protocol (EMDR-IGTP; Jarero, Artigas, & Hartung, 2006), was developed to provide rapid treatment to groups of people who have experienced a single-incident traumatic event such as a natural disaster or a large-scale terrorist attack. The EMDR-IGTP has been implemented successfully with all age ranges in a variety of disaster settings affecting children, demonstrating the efficacy of EMDR in group situations (Jarero, Artigas, Montero, & Lena, 2008). The EMDR group protocol and its successful treatment of recent trauma is beyond the scope of this article.

Research Investigating EMDR Treatment of Traumatized Children and Youth

Research investigating EMDR treatment of traumatized children and youth has evaluated the application using various research designs ranging from randomized clinical trials to single case designs. Although randomized clinical trials control for more variables than case series, case studies can provide a valuable contribution to the literature as well as being easier to conduct in field settings. This design assumes that any progress made while undergoing treatment is caused by the procedure itself and not merely a result of time. Support for this design comes from findings that chronic PTSD may not remit without appropriate treatment. For example, when Morgan, Scourfield, Williams, Jasper, and Lewis (2003) conducted a 33-year follow-up with the survivors of the Aberfan disaster in Wales, in which a coal mine landslide buried a primary school and killed 116 children, they found that approximately 29% of the survivors still suffered from PTSD. Similarly, Chemtob, Nakashima, and Carlson (2002) found that many traumatized children still presented with PTSD diagnoses 3.5 years after Hurricane Iniki. Fernandez (2007) has argued that childhood PTSD appears to persist in the absence of therapy.

A meta-analysis of seven studies by Rodenburg et al. (2009), including 109 children treated with between three and eight sessions of EMDR and 100 control-group children, all between the ages of 4 and 18, found a medium effect size for EMDR, indicating that

it is an effective treatment for traumatized children. They also found that it added a small but significant incremental value when compared to the results of children treated with other established treatments including CBT. The authors therefore concluded that it should be the treatment of choice, and recommended further research, particularly into its working mechanisms. Rodenberg et al. (2009) identified several factors, which were associated with lower effect sizes, including the use of child-report measures rather than parent-report or combined child–parent reports; a higher rate of treatment completers, perhaps because these studies also include the less successfully treated children; and a higher percentage of girls, perhaps because they are more at risk for developing PTSD symptoms following traumatic events and are less able to cope with these reactions.

The populations treated in EMDR research have ranged from children and youth showing only symptomatic distress to those diagnosed with PTSD. The types of trauma have varied greatly including sexual abuse and natural disasters. In the following summary, studies are organized according to the type of trauma.

EMDR Treatment of Type I (Single Incident) Traumas

Kemp, Drummond, and McDermott (2010) investigated the treatment of subclinical PTSD in a randomized clinical trial with Australian children, aged 6–12 years, who had been traumatized in motor vehicle accidents. Twenty-seven children were randomly assigned to four sessions of EMDR or to a 6-week wait-list control condition. Inclusion criteria were a minimum of two diagnosed PTSD diagnostic criteria (e.g., reexperiencing and hyperarousal criteria) and a moderate score on a self-report measure of traumatic stress. It was found that EMDR produced significant improvement on trauma measures compared to the wait-list, and that following EMDR treatment, only 25% of children met two or more PTSD criteria compared to 100% of the wait-list control group. These gains were maintained at 3- and 12-month follow-up. Although parent ratings of symptoms showed no improvement, it was noted that these symptoms were not at a high level at pretreatment.

Ribchester, Yule, and Duncan (2010) conducted a case series to evaluate EMDR treatment of 11 children aged 8–15 years with diagnosed PTSD following road traffic accidents in England. Children received one to four sessions of EMDR (mean = 2.4 sessions). A multimodal measurement approach was used with self-report measures, parent-report measures, standard clinical interviews with parents and children, and computer testing of attentional, memory, and attributional processes associated with PTSD. Prior to EMDR treatment, all 11 children were diagnosed with PTSD, 1 child was also diagnosed with major depressive disorder, and 7 were also diagnosed with generalized anxiety disorder. At posttreatment, none of the children met diagnostic criteria for any of these disorders except for one case of generalized anxiety disorder. Significant improvements were found on all self-report and parent-report measures of PTSD, anxiety, and depression both immediately following treatment and at a long-term follow-up. Improvement was also reported in the clinical interviews, and treatment was found to be associated with a significant trauma-specific reduction in attentional bias on the modified Stroop task. Ribchester et al. (2010) conclude that "EMDR is an effective and rapid treatment of single-incident PTSD in children" (p. 145).

Case studies, such as that documented by Cocco and Sharpe (1993), have reported improvements in PTSD symptoms following Type I traumas through the use of EMDR. They treated a 4-year-old boy who had developed PTSD following an armed robbery in his family home in which he and his parents were threatened and physically abused. An age appropriate adaptation of the standard EMDR protocol was used in which drawings replaced imaginal exposure and auditory finger clicks replaced visual tracking. The young boy became asymptomatic after one session of treatment, and these improvements were sustained at a 6-month follow-up. It was noted, however, that although the young boy no longer displayed symptoms of PTSD, behavioral issues, such as sleeping in his parents' bed and not wanting to go to the bathroom alone at night, resurfaced and required further treatment. Similar results were shown in a case series by Greenwald (1994) in which five children aged between 4 and 11 years were treated with either one or two 20–90 minute sessions of EMDR. The children were all presenting with symptoms of PTSD following Hurricane Andrew in Florida. Self-report and parent-report measures were used to monitor progress, although self-report measures were not taken at follow-up and were primarily used to indicate to the therapist the completion of a particular treatment focus. Parent-report measures were taken at pretreatment for prehurricane, posthurricane and pretreatment ratings, and again at 1- and 4-week follow-up. All the children had made improvements at 1-week follow-up and either maintained these gains after 4 weeks or continued to improve. All subjects had returned to their prehurricane levels on

all symptoms to within at least one rating unit and two subjects made improvements in some areas.

Also following a natural disaster, an example of a single-incident Type I trauma, Chemtob et al. (2002) conducted a randomized controlled trial to compare a wait-list control group to an EMDR treatment group. The sample consisted of 32 children aged 6–12 years in Hawaii who had been unresponsive to previous interventions and still met diagnostic criteria for PTSD following Hurricane Iniki 3 years previously. Three treatment sessions resulted in significantly reduced symptoms of depression, anxiety, and PTSD at posttreatment and 6-month follow-up.

A field study by Fernandez (2007) provided an average of 6.5 individual EMDR sessions over a 1 year period to 22 children aged 7–11 years who were buried alive when their school collapsed in an earthquake in Molise, Italy, killing many of their fellow students. Treatment resulted in a decrease, over the year, in the number of children meeting *DSM-IV* criteria for PTSD from 61% at pretreatment to 9% at posttreatment, with significant decreases in all clusters of PTSD symptoms.

A randomized control trial by de Roos et al. (2011) compared EMDR and CBT among 52 children aged between 4 and 18 years who had all been exposed to a Type I trauma when a fireworks factory exploded. The parents received up to four parental guidance sessions, and the children received up to four 60-minute sessions of their assigned treatment. PTSD symptoms, depression, anxiety, and behavior problems were all assessed at pretreatment, posttreatment, and 3-month follow-up using parent-report measures as well as self-report measures for those aged over 7 years. Both treatments lead to an improvement on all measures, and these were maintained at follow-up. It was also found that EMDR produced these improvements in significantly fewer sessions, and it was therefore concluded that although both interventions can significantly improve the functioning of children exposed to Type I traumas, EMDR appeared to be more efficient in achieving these developments.

Hensel (2009) recently showed that, following EMDR treatment, the improvements among 36 children and adolescents aged 1–18 years, all of whom had suffered a Type I trauma, not only remain stable at 6-month follow-up, but may even increase slightly. His study was also the first to recruit a sample of children younger than 4 years old, and he successfully demonstrated that children as young as 1 year and 9 months can be treated with EMDR with the same benefits as older school-age children.

EMDR Treatment of Type II Traumas

A randomized controlled trial by Jaberghaderi, Greenwald, Rubin, Zand, and Dolatabadi (2004) assessed self-reported symptoms of trauma, including but not limited to those required for a diagnosis of PTSD, and problem behaviors among a group of 14 sexually abused Iranian girls aged 12–13 years. They were randomly assigned to receive up to 12 sessions of either EMDR or CBT, with a minimum of 10 sessions of CBT and no minimum for EMDR. Measures included self-report, parent-report, and teacher-report, all of which were conducted at pretreatment and 2 weeks posttreatment. Both treatments were found to significantly improve both traumatic symptom and behavior outcomes with a large effect size for EMDR and a medium effect size for CBT. Although there was a trend for EMDR to improve self-reported traumatic symptoms more than CBT, this difference was nonsignificant. EMDR was found to be significantly more efficient, and although three participants in the CBT group had to be referred for further treatment, none from the EMDR group were.

War is another common Type II trauma that affects many children worldwide. Wadaa, Zaharim, and Alqashan (2010) evaluated EMDR for children following their immigration to Malaysia to escape the recent war in Iraq. Twelve children (aged 7–12 years) were assigned to 12 sessions of EMDR, and 25 children were assigned to a no-treatment control group. Self-report measures translated into Arabic were used to determine that at pretreatment, 68.5% of the children were suffering from symptoms of PTSD. At pretreatment, there was no difference between the groups in mean scores of PTSD symptoms, but at posttreatment, the scores for the EMDR group had decreased significantly.

Studies Evaluating EMDR Treatment of Children With Various Traumas

In Sweden, Ahmad, Larsson, and Sundelin-Wahlsten (2007) conducted a randomized controlled trial with 33 children and adolescents aged 6–16 years, all of whom met *DSM-IV* criteria for a diagnosis of PTSD after experiencing a range of Type I and Type II traumas such as sexual abuse and maltreatment, road accidents, and witnessing unnatural death. Compared to a wait-list control group, the participants who received EMDR reported greater PTSD symptom improvements, particularly those from the reexperiencing cluster, 2 months after receiving between one and eight sessions of EMDR (average 5.9). Ahmad

and Sundelin-Wahlsten (2008) commented that the children with Type I trauma following an accident required fewer treatment sessions than the other participants.

Scheck, Schaeffer, and Gillette (1998) assigned 60 traumatized adolescents and young females between the ages of 16 and 25 years to an EMDR group and an active listening control group, all of whom were also asked to keep a journal as a homework task. The women had been engaging in high-risk behavior such as substance abuse, sexual promiscuity, and runaway behavior, and 77% had a diagnosis of PTSD. They demonstrated that the young women had a greater reduction in standardized self-report measures of PTSD symptoms, depression, and anxiety, but not self-concept, following two 90-minute sessions of EMDR compared to active listening, also known as *supportive counselling*. Treatment gains were maintained at 3-month follow-up for both groups.

Discussion

Efficacy of EMDR for Different Types of Trauma

Clearly, not all traumatic events are the same and diverse responses can be observed. Adler-Nevo and Manassis (2005) suggested in their review that it is therefore possible that different treatments are most effective for different types of trauma and different combinations of symptoms.

Treatment of Type I Traumas. A number of studies have investigated the effect of EMDR on children following Type I traumas such as natural disaster (Chemtob et al., 2002; Fernandez, 2007; Greenwald, 1994), burglary (Cocco & Sharpe, 1993), and road traffic accidents (Kemp et al., 2010; Ribchester et al., 2010). These have shown that symptoms of PTSD, depression, anxiety, and behavior problems can be reduced to pretrauma levels following EMDR and that these improvements are maintained at follow-up. A comparison of EMDR and CBT by de Roos et al. (2011) found that although both treatments successfully reduced symptoms of trauma, EMDR did this in fewer sessions and the authors therefore concluded that EMDR is more efficient.

Treatment of Type II Traumas. Although the treatment of Type II traumas, particularly interpersonal violence, has been heavily researched in studies investigating CBT therapy (Sánchez-Meca et al., 2011), there has been only one EMDR controlled study that has focused on this trauma type with children (Jaberghaderi et al., 2004). This lack of EMDR research is surprising given that Type II traumas are related to an increased risk for PTSD as well as many other lifelong consequences (Wenar & Kerig, 2006). This lack of child research appears to parallel a lack of EMDR research investigating treatment of adults with complex PTSD from childhood interpersonal traumas (Korn, 2009).

The majority of CBT research with victims of sexual abuse has been shown to be effective in reducing the symptoms of PTSD in victimized children as well as symptoms of depression, behavior problems, and trauma-related shame and guilt (Cohen, Deblinger, Mannarino, & Steer, 2004; King et al., 2000). In a comparison of EMDR and CBT for sexual abuse victims, Jaberghaderi et al. (2004) found that both were effective in reducing measures of PTSD symptoms and that EMDR was more efficient and appeared to cause a greater reduction in symptoms than CBT, although this difference was nonsignificant.

Attachment disorders and severe personality changes can follow Type II traumas (Terr, 1991), thus impacting on the required treatment. In such cases, family therapy can be of great benefit and has been shown to be particularly advantageous in cases of domestic violence and abuse (Amaya-Jackson, 1995). The integration of EMDR with family therapy can address the complex sequelae that follow sexual abuse (Maxfield, 2007), and other interpersonal stressors such as divorce (Klaff, 2007). De Roos et al. (2011) offered parental counselling to the parents of all the children involved in their study. This enabled the parents to resolve their own anxieties and cognitive distortions regarding their child's traumatic exposure and provided them with psychoeducation and parental skills training that would help them support their child and correct maladaptive coping behaviors. Further research is needed to investigate the effects of an integrative approach such as this.

Efficacy of EMDR for Children of Various Ages

Young children are less able to retrieve traumatic memories and also have difficulties inhibiting their thoughts and emotions (Yule, Perrin, & Smith, 1999), thus resulting in fewer reexperiencing and avoidance symptoms. Although various authors have suggested that EMDR can be modified for younger children (Adler-Tapia & Settle, 2009; Ahmad & Sundelin-Wahlsten, 2008; Cocco & Sharpe, 1993; Tufnell, 2005), there has only been one study that directly investigated this factor. Hensel (2009) showed that children as young as 1 year and 9 months received the same benefits as older school-age children.

Efficacy of EMDR for Different PTSD Symptoms

Post-Traumatic Stress Disorder Symptoms

Reexperiencing Symptoms. Adler-Tapia and Settle's (2009) review documented that although randomized controlled trials have shown EMDR to be effective, in some cases more so than CBT, this seems to be limited to intrusive reexperiencing symptoms, with less improvement found for hyperarousal and avoidance symptoms. This may be because the EMDR procedure focuses on images, memories, emotions, and cognitions that intrusively enter one's mind and then target these for reprocessing. Children also often display fewer reexperiencing symptoms, which may contribute to the comparative success in this symptom cluster. Ahmad et al. (2007) found that, over time, the most significant between-group difference was the improvement in reexperiencing symptoms. This result was also mirrored in the Oras, de Ezpeleta, and Ahmad (2004) study.

Hyperarousal Symptoms. Two studies (Ahmad et al., 2007; Oras et al., 2004) have found that participants showed less improvement in hyperarousal symptoms compared to reexperiencing symptoms. Adler-Tapia and Settle (2009) suggested that the instability in the children's living environment may account for the lack of improvement found for hyperarousal symptoms. The children in the Oras et al. (2004) study were unsettled refugees, and in the Ahmad et al. (2007) study, the children had been exposed to an unusual and stressful social environment, having grown up among "criminality, substance abuse, chronic illness, handicap, or having the caregiver physically or mentally unavailable" (p. 350). Ahmad et al. (2007), however, suggested that this effect may be caused by the overlap of symptoms of possible comorbid disorders and hyperarousal symptoms because 26 of the 33 children they investigated had a second diagnosis.

Avoidance Symptoms. Tufnell and De Jong (2008) advised that EMDR is particularly effective with avoidant children as it relies less on verbal proficiency and a willingness to communicate orally with the clinician than CBT. One may therefore expect to see large improvements in avoidance symptoms, but this is contradicted by Oras et al. (2004), who found that, although significant, it was these symptoms that improved least following treatment. They note, however, that once the living situation of the refugees they investigated had stabilized, these symptoms improved, thus supporting Adler-Tapia and Settle's (2009) idea that the child's environment influences the resolution of PTSD symptoms.

Other Symptoms

Maladaptive Cognitions. Event appraisal and maladaptive cognitions associated with interpersonal trauma about oneself and loved ones are directly targeted in EMDR. Studies have used the SUD scale and the VOC scale to assess the amount of distress felt regarding a negative cognition and to what extent a positive cognition is believed to be true respectively. Eye movements are continued until SUD ratings are 0 and VOC ratings are 7, indicating that the memory associated with the cognitions has been successfully reprocessed. A 9-year-old boy described by Greenwald (1994) believed that the accidental death of a classmate was his fault and that he was next to die. Following two sessions of EMDR, he no longer felt guilty about the incident and reversed these statements.

Ribchester et al. (2010) criticized the use of verbal report measures such as the SUD and VOC scales because they are liable to demand characteristics and procedural limitations. They therefore adopted a multimodal approach to investigate attentional and memory biases using computer tasks for 11 children aged between 8 and 15 years with PTSD following road traffic accidents. Unlike previous research, the inclusion of these cognitive measures allowed the investigation of the cognitive change that is alleged to occur as a result of adaptive processing. Using the modified Stroop task, Ribchester et al. (2010) found that, at pretreatment, children took significantly longer to color-name PTSD words compared to neutral words, whereas at posttreatment, PTSD words were named significantly faster and interference of these words was significantly reduced. Neutral words, however, remained unchanged. It appears that EMDR caused a trauma-specific decrease in attentional bias, therefore suggesting that EMDR is effective in causing cognitive change in children.

Interpersonal Difficulties. Improving relationships and emotion regulation are also key factors that can be damaged by trauma but which are targeted for improvement with EMDR. A few studies have used interpersonal and social measures to assess outcome. For example, de Roos et al. (2011) and Kemp et al. (2010) both used "The Child Behavior Checklist" (Achenbach, 1991) to assess the improvement of behavior problems following EMDR. de Roos et al. (2011) found that scores were significantly reduced at 3-month follow-up, and the difference in scores between pretreatment and follow-up was greater for those treated with EMDR compared to CBT. Kemp et al. (2010) conversely found a nonsignificant effect of EMDR on scores from pretreatment to posttreatment

and 3-month follow-up. The authors point out, however, that pretreatment scores were notably low in this sample.

Greenwald's (1994) case series describes "improved concentration and school performance, more cooperative and responsible behavior, less emotional reactivity, and better sibling relationships" (p. 88) among other behavioral improvements determined using parental telephone interviews. These included no longer sleeping in the parents' bed, enhanced mood and communication skills with others, and better coping skills for personal difficulties and family conflicts. Cocco and Sharpe's (1993) case study also demonstrates that EMDR can help with behaviors that increase a child's independence such as sleeping alone and going to the toilet alone at night. It should be noted, however, that in this case, a relapse in these improvements occurred requiring further treatment.

Evaluation of Integration of EMDR With Other Treatment Modalities

There may be an advantage to integrating EMDR with other treatments, particularly when comorbid disorders or social issues also need to be targeted and may influence the treatment response. Early family experiences can often affect one's response to trauma and so it has been suggested that family therapy can be used alongside EMDR to target family relations (Shapiro, Kaslow, & Maxfield, 2007). It is therefore important that the therapist conduct a detailed assessment and get a full history in order to identify interpersonal factors that may be affecting the client's current pathology and therefore needs processing. For example, a mother's overprotectiveness may cause her child to feel hopeless and unable to cope, which in turn prevents him or her from developing adequate coping skills to deal with his or her most recent trauma. In this instance, it is not just the memories of the recent trauma that need to be processed, but also the memory of feeling hopeless. In such cases, EMDR may be used in conjunction with family therapy in order to target both internal processing and family understanding and interactions (Bardin, Comet, & Porten, 2007).

Bronner, Beer, Jozine van Zelm van Eldik, Grootenhuis, and Last (2009) showed that a combination of trauma-focused CBT and EMDR decreased stress reactions in a 16-year-old girl with acute stress disorder following spinal cord injury. These improvements remained stable, and she reported no more distressing flashbacks, memories, or difficulties sleeping. It may be that intermixing the EMDR and CBT protocols may have had additional positive effects compared to each treatment given individually, but further research is needed to determine this.

Oras et al. (2004) found that incorporating the EMDR protocol into a psychodynamic approach by using talking therapy with adolescents and play therapy with those younger than 13 years old significantly reduced symptoms of depression and PTSD, particularly reexperiencing symptoms, among 13 refugee children aged between 8 and 16 years. All the children met *DSM-IV* criteria for a PTSD diagnosis following a range of Type I and Type II traumas, such as rape, assault, torture, imprisonment, and witnessing relatives being assaulted or killed, as well as the ongoing Type II trauma of war. Children received between 5 and 25 psychotherapeutic sessions and between one and six EMDR sessions. No follow-up was conducted in this case series.

Tufnell (2005) showed that, in four preadolescents, one of whom had suffered a recent Type I traumatic bereavement, with other complex difficulties as well as PTSD, using between just two and four sessions of EMDR as part of a multimodal treatment package can resolve PTSD symptoms and maintain this improvement at a 6-month follow-up. It was therefore concluded that EMDR is suitable for use with children and adolescents with comorbid mental health problems when used in conjunction with other treatments.

Should EMDR Be the Treatment of Choice for Children With PTSD?

EMDR has solid research support for the treatment of Type I traumas. It may be more efficient than CBT (de Roos et al., 2011; Jaberghaderi et al., 2004), and its application results in significant remission of symptoms with results maintained at long-term follow-up. It has only preliminary evidence for the treatment of Type II traumas, however, with just one study showing its effectiveness with sexually abused girls (Jaberghaderi et al., 2004). The results are promising, but more research is needed to assess EMDR's effects with children who have suffered repeated interpersonal traumas, and clinicians also need to be aware that in some cases, it may be beneficial to provide EMDR as part of a multimodal treatment package.

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Adaptive Information Processing and a Systemic Biopsychosocial Model

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Shapiro's (2001) adaptive information processing (AIP) model portrays an innate healing system hypothesized to be composed of neurophysiological mechanisms of action causally related to the resolution of disturbing life experiences. The author expands the model to include psychosocial mechanisms and suggests that a model of a biopsychosocial system can best depict causal properties related to positive outcomes of eye movement desensitization and reprocessing (EMDR). Teleofunctionalist and evolutionary perspectives are applied: the first, to explain the inclusion of the psychological and social features highlighted in the updated model; the second, to support the hypothesis that AIP is a goal of the human attachment system. It is posited that bonding, following a disturbing life experience, facilitates the access of information related to previous states, thus allowing an update of self/world models. These interactions are analogous to psychotherapeutic encounters, with multiple levels of information processing at subpersonal, personal, and interpersonal levels. Analysis of the causal properties of personal and interpersonal levels supports a broader understanding of AIP's scope in conceptualizing psychopathology and informing treatment applications and research.

Keywords: EMDR; adaptive information processing; biopsychosocial; teleofunctionalism; internal working models

Originally conceived to describe well-documented treatment effects of eye movement desensitization and reprocessing (EMDR) in the treatment of post-traumatic stress disorder (PTSD), Shapiro's (2001) adaptive information processing (AIP) model has been described as a "working hypothesis" intended to start the model building process (p. 30). The model is based on "neurophysiological" structures comprising an "innate healing system" (Shapiro, 2001, p. 30). Imbalances in the system are considered to be caused by traumatic memories and contribute to symptoms of psychopathology (Shapiro, 2001). Processed memory networks are seen as the basis for health (Shapiro, 2001, p. 32).

This article recommends enhancing the model by including imbalances in personal and interpersonal processes as additional effects of disturbing life experiences and viewing their restoration as additional signs of well-being. Imbalances are conceptualized as problems in personal and interpersonal communication and representation. This emphasis views the biopsychosocial context as a source of both trauma and healing. Consequently, the enhancement of communication and representation on all levels is presented as causally involved in AIP at the subpersonal level and therefore critical to effective EMDR.

Information Processing Models and Systems

A communication theory perspective on memory and psychopathology was speculated by the American mathematician Norbert Wiener (1948). The founder of "cybernetics," Wiener considered the role that information plays in both machines and natural systems. He noted that psychopathology was likely caused by the functional impairments resulting from structural problems in the nervous system. He conjectured that the challenge for the treatment of psychopathology would be to surmount the fact that unlike with machines, memory in humans becomes permanent throughout the "systems" life and therefore the system cannot be "reset." He observed that clinical applications of a model focused on memory and psychopathology at the time of his writing included frontal lobotomies (to remove the memory physically) and

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electroshock therapy (to jar the circuits into new patterns of firing). Such linear interventions seem to belie the model they were built on. Cybernetics brought to light the causal properties related to information processing and feedback mechanisms that do not rely on forces alone to determine the course of the system.

Central to the discourse of information processing models is defining the system and determining its boundaries. The author's experience in the clinical application of EMDR and systemic family therapy is the basis and main inspiration for broadening the boundaries to include psychological and social components.

The biopsychosocial AIP model is conceptualized as a "nearly decomposable system" (Simon, as cited in Juarrero, 1999) which means that each level maintains a distinct separation from the next while all are connected via feedback loops. It can also be considered a "hierarchical dynamic system" where top levels constrain the lower (Juarrero). These attributes of complex systems contribute to the proposed causal relationship between higher (personal and interpersonal) and lower (subpersonal) levels.

The physical flow of information between component parts makes the biopsychosocial AIP system an "informational system" (Juarrero, 1999). Seen from this perspective, the pathogenic nature of disturbing life experiences lies in their capacity to disrupt communication and representation at any level. Information flowing within and between levels makes the system "vulnerable to noise and sensitive to context" (Juarrero, p. 114). The open and relatively unequivocal exchange of information between and within levels of biopsychosocial AIP enhances the accumulation of past states of adaptive actions that have lead to mutually beneficial outcomes for person and environment. System complexity is seen as enhanced behavioral flexibility.

The author suggests that there is ample evidence in the literature on EMDR, trauma, philosophy of mind, and attachment to build a model of such a system. In EMDR, the AIP system is thought to allow for links to neural networks that promote life-preserving responses to stress that become integrated into an adaptive emotional and cognitive schema (Shapiro, 2001). The incorporation of adaptively processed memories into a positive schema of the self/world is thought to be an outcome of effective EMDR in addition to the amelioration of PTSD symptoms (Shapiro, 2001). Thus, the survival value of using social engagement to deal with stress (Porges, as cited in Ogden, Minton, & Pain, 2006) amplifies the salience of having sophisticated resources for social cognition in coping responses to disturbing life experiences.

A biopsychosocial AIP model provides explanatory strength to EMDR case conceptualization and treatment planning by including the social context of the client, the therapist, and the therapy. The location of the information processing system within and without the client assists in conceptualizing relevant relational aspects of psychotherapy as well as the social environment within which treatment takes place. Such a model may be able to systematically account for many of the various factors thought to be involved in successful psychotherapy as described by Norcross (2007). As with the behavior of all complex natural systems, treatment response is understood in retrospect (Juarrero, 1999) with a caution against definitive prediction, instead favoring probabilistic assertions prone to change as this multilevel complex informational system organizes and reorganizes (Juarrero). Each client's story provides the necessary context for treatment planning while chance "natural occurrences" may also play a critical role in treatment outcome. Expanding the scope of the AIP system emphasizes the critical role that the availability of adaptive information within the system at large plays in the efficacy of EMDR treatment.

Internal Working Models of Self

Empirical evidence for a biopsychosocial AIP system is found in the role that memory appears to play in behavioral integration and social cognition. The construction of internal working models of self (IWMs; Bowlby, 1969) organized to control behavior involves autobiographical memory and personal and social information processing. For humans, the internalization of our social history involves the brain, the mind, and the relationships (Panksepp, 1998; Siegel, 1999). The development of autobiographical memory systems gave humans the capacity to retrieve past states and bring them forward in time. The resulting "autonoetic consciousness" (Tulving, 2000) or "extended consciousness" (Damasio, 1999) allows us to experience ourselves in time. We can direct attention to past, present, and anticipated future states and mentally simulate possible selves and possible worlds as well as possible relationships between them (Metzinger, 2003). Of particular importance to AIP is the internalization of examples of communicating with caregivers and constructing adaptive stories of how to deal with stressful situations encountered across all behavioral systems.

In other words, IWMs constrain the attention and behavior of both caregiver and child. The capacity for intrapersonal attunement (Siegel, 2007) of the caregiver and interpersonal attunement with the child is "passed down." The child can then establish the capacity to form an open personal and interpersonal communication channel, relatively free from "noise";

this facilitates the entrainment of adaptive memory useful for the maintenance of the self/world boundary that will be necessary to integrate disturbing life experiences in the future.

The author proposes that these early relationships with caregivers can be understood as "context-sensitive constraints" (Juarrero, 1999) that have causal properties that structure the experiences of the child, thus making some outcomes more likely than others. These outcomes include integration of memory into a healthy IWM or segregation of memory into disintegrated IWMs (Liotti, 2006).

When unconscious IWMs underlie a healthy self-concept, they can be consciously invoked to further shape the more fixed subpersonal patterns of behavior and to promote self-regulation and behavioral coherence. When an IWM supports "mutual feedback" (Juarrero, 1999) between the internal model, somatosensory systems, and other people, intrapersonal and interpersonal attunement is effective, and the individual learns appropriate self-regulation and behavioral integration that is coherent with their social environment.

Possible Mechanisms of Action in EMDR

Based on clinical experience, Shapiro (2001) has attributed neurophysiological mechanisms of action to the AIP model. Most research on EMDR's mechanisms of action has investigated the biological and psychological elements involved in procedural steps (e.g., eye movements) related to the resolution of traumatic memory (Maxfield, 2008). Various related theories have been proposed. These include the role of working memory in memory desensitization (e.g., Maxfield, Melnyk, & Hyman, 2008) and interhemispheric integration enhancing memory recall (e.g., Propper & Christman, 2008). Neurobiological hypotheses have been advanced, for example, Bergmann (2008) hypothesized that alternating bilateral stimulation stimulates and repairs thalamic activity and fosters neurobiological integration.

Mechanisms of Action From Information Processing Perspectives

Information processing models that are seen as relevant to Shapiro's (2001) AIP model include the transfer-appropriate processing model, the cortical reinstatement model, the parallel distributed/connectionistic model, and the thalamocortical-temporal binding model (EMDR International Association, 2009). The transfer-appropriate processing model considers the conditions present at the time of encoding and retrieval relevant to the encoding of memory and that memory performance is enhanced when recollection occurs in the context within which the content was encoded (Tulving, 2000). The cortical reinstatement model suggests that the neurological correlates of episodic memory retrieval differ according to the type of information contained in the recollected episode. The retrieval of a particular type of memory content will "reinstate" the mental state present at the time of encoding (Johnson & Rugg, 2007). The parallel distributed processing (PDP) model describes the representation of information as distributed throughout the brain; memory and knowledge are not stored explicitly but between many "units," and learning can occur with gradual changes in connection strength with experience (Rumelhart & McClelland, 1986). The PDP model stresses that many units process information through sending and receiving excitatory and inhibitory signals in a particular environment that promotes such communication between units (Rumelhart & McClelland). Finally, the thalamocortical-temporal binding model posits that an integrative hippocampal formation process links together various neuronal assemblies established at the time an event was perceived via the 40-Hz gamma band activity of the thalamus (Bergmann, 2008).

To understand how EMDR facilitates AIP, a synthesis of observations related to the interaction of neurobiological and psychological levels of processing provides the clearest picture. AIP seems to facilitate communication in such a way that autobiographical memory can be adaptively represented and integrated. Structures involving basic components of a communication system including a channel, distributed data structures (sources of information), and an optimal environment for the transmission and representation of information seem salient to AIP. The biopsychosocial model suggests such structures exist on personal and interpersonal levels as well and have a causal relationship to each level and ultimately on the resolution of disturbing life experiences in EMDR treatment.

A Historical, Contextual, and Temporal Biopsychosocial AIP System

Dynamical systems theory as applied to complex living systems can help the EMDR clinician and researcher understand how psychological and social processes can be causally related to AIP. To this end, the author has reviewed some relevant concepts to begin the integration of dynamical systems theory with AIP.

Causality

The first concept is that of causality. The exploration of the inanimate physical world has led to productive notions of "what causes things to happen." However,

natural systems seem to operate under different rules. In the inanimate world, it is logical to consider separate entities exerting a force on one another. In that world, the history of the entity is irrelevant to its course.

When considering living systems, context and time must be brought into the scientific exploration of causality (Juarrero, 1999). EMDR clinicians conceptualizing a case in AIP terms are presented with excellent examples of natural systems adapting to their environments over time. To understand why natural living wholes do what they do, we need to consider the initial conditions of a system, what goal it is organized around, and how its history has shaped its course over time.

Clients are living systems embedded in their environments and they exchange information with it. The concept of nonlinear causality posits that a living system is its own cause because it uses its history to determine the set of possible actions at any particular moment in time (Juarrero, 1999). In contrast to force, context-sensitive constraint is understood to be the way that history shapes behavior.

In a closed system where information is not shared between parts, one part "causes" another to do something, and the history of the latter is inconsequential because the system is governed by an overarching physical law (Juarrero, 1999), in which change does not occur; the trajectory of a near equilibrium system is fixed. This type of system moves toward entropy, and its trajectory can be explained by traditional thermodynamic laws. Natural systems, however, are systems that characteristically reside at states far from equilibrium. Such "nonlinear" systems are dynamic and particularly sensitive to the initial conditions present at the time of their formation. Although initial conditions are not causes, or forces acting on the system, they can have substantial effects on the system's trajectory over time (Murphy & Brown, 2007). Clients bring both their genetic and autobiographical history forward in time to shape behavior in a dynamic interaction of their past, present, and potential future states with their environment. The current environment's evocation of memory constrains behavior leading to states of increased or decreased complexity in relationship to the present moment (Juarrero).

Dynamic and Mutualistic

Each individual is an extraordinarily sophisticated system of systems (complex system) that uses self-representation to exploit autobiographical history to its fullest. This complexity can be described as dynamic and mutualistic. A biopsychosocial information processing model describes how communication between the brain, mind, and world allows individuals to manipulate memory to create the experience of a self, world, a self in a world, and the present moment (Metzinger, 2003). This capacity for complex information processing provides the ability to simulate past, present, and anticipated future experiences, making behaviorally relevant information about self and world unconsciously and consciously available (Metzinger, 2003).

EMDR clinicians have witnessed and documented how the adaptive resolution of autobiographical memory relates to overall behavioral integration beyond the alleviation of PTSD symptoms (Shapiro, 2001). The author believes an outcome of effective EMDR treatment is the enhancement of biopsychosocial communication and representation that allows for the simulation of a phenomenal first person perspective and supports optimal behavioral integration within a social context when confronted with a stressor. An informational system's physical operations are organized around the exchange of information between parts and levels (Juarrero, 1999). EMDR therapists have been in a unique position to observe such information exchange at multiple levels and within social groups.

Memory and Moving Around in Time and Space

Consciousness and Behavioral Integration

It is well understood that individuals use memory to make their way through the spatiotemporal world. The author believes that adaptively processed memories seem to enhance functioning in systems related to the sophisticated way humans intentionally move through space and time. Expanded levels of consciousness make intentional movement possible (Metzinger, 2003, p. 60) via autobiographical memory that allows for the experience of self as a historical persona. Dworkin (2005) has described resources necessary for successful EMDR treatment: attunement, mindfulness, and response flexibility. Adaptively processed autobiographical memories are intimately linked to these metacognitive properties. They provide functions necessary to organize behavior in a spatiotemporal phenomenological world. Objects of attentional processing and cognition (which include memory) are always also constituents of behavioral space (Metzinger, 2003).

Autonoetic consciousness or "mental time travel" is a temporal process that organizes experience and differentiates between what has happened, is happening, and may happen. Response flexibility refers to the ability to intentionally delay action. Together these capacities allow for a more sophisticated consideration

of possible adaptive actions. In a neurobiologically integrative climate, memories can be processed similarly to external objects and become part of conscious experience (Damasio, 1999). EMDR may be conceptualized as a type of coregulated mental simulation that involves accessing memory to internalize a variety of adaptive ways we can move in the spaces we occupy.

Establishing Reliable Biopsychosocial Communication

Embedded but Separate: A Need to Make Contact

The individual's capacity to experience self as separate from an environment in which she is deeply embedded promotes behavioral flexibility. This phenomenally experienced boundary between the body and the environment emerges from the communication between the brain, mind, and relationships (Metzinger, 2003; Siegel, 1999). However, not all of this communication and representing is available in everyday conscious experience. In fact, the self and world directly experienced by the individual are themselves representations based on estimations. Individuals are ironically unable to directly experience "our selves" or the "external" world. This places a premium on the nervous system's ability to transmit (communicate) and manipulate (represent) information from sensory and memory systems.

Referred to as "autoepistemic closure" by philosophy of mind philosopher Metzinger (2003), humans are in a predicament he describes as a "structurally anchored deficit in the capacity to gain knowledge about oneself" (p. 32). The process of representing self in the world takes place at the subpersonal level and is not generally available for conscious reflection (Metzinger, 2003). While client and therapist might take such phenomenological experience for granted, it would be impossible to carry out the EMDR protocol without the experience of a personal boundary for the client.

Subpersonal Communication and Representation

Communication in the brain involves an exchange between particular structures of the brain and an external or internal stimulus. Gallistel and King (2009) developed the following model to explain this process. To make contact with an external stimulus, there is an interaction with sensory receptors that provide information about what is happening outside of the brain. Acting as an extremely complex subpersonal processing center, the brain relies on extracting meaning from a wide variety of signals. This process of extracting meaning from information is called representation. In order for communication to take place at this level, a neurobiological channel is needed to carry the "spikes," which are transmuted external signals produced by sensory receptors. A "spike train" comprises the subpersonal channel and includes neurons, which facilitates the transmission of information and allows the brain to extract information from these signals. Information removed may be used to inform present behavior or contained for later use to influence future actions. Such a channel provides the necessary organizational structure a system needs to effectively communicate, and therefore, represent.

Personal and Interpersonal Communication and Representation in AIP

When phenomenal experience is possible, client and therapist are in a position to reflect on representations of memory networks containing related to the presenting complaints. The author believes that intrapersonal attunement (Siegel, 2007) is the communication channel operating at the personal and interpersonal levels through which this process occurs. It has the function of ensuring the relatively unequivocal transmission of information rising up from the subpersonal level. Through introspection, the client can become attuned to his or her biopsychosocial state and the pair's capacity to guide their attention maximizes information extraction relevant to representing dysfunctional networks as directed in the EMDR protocol.

Trauma and Noise Reduction

There is a vulnerability to noise within any complex system. Noise is anything that interferes with information-carrying signals reaching their intended receiver (Gallistel & King, 2009; Juarrero, 1999; Shannon, 1948). Based on the current EMDR literature and information theory, trauma may be conceptualized from an informational theoretic perspective as noise that disrupts communication at all levels of AIP. The manner in which trauma disrupts communication between episodic and semantic memory systems in rapid eye movement (REM) stages of sleep would be a subpersonal example of "trauma as noise." The loss of communication between body and mind in somatoform dissociation (Nijenhuis, 2004) would be an example on the personal level, and keeping secrets about abuse in a family would be an example on the interpersonal level. In these examples, trauma becomes defined more by the lack of resources for attunement and communication rather than by the nature of the stimuli as emphasized by Freud and Reik (Reik, 1945).

The assumption that AIP at higher levels of functioning is causally related to the subpersonal level leads to two propositions of this article. One is that the reduction of noise and relatively unequivocal communication between elements of the system at all levels is critical to adaptive processing. The second proposition is that structures related to interpersonal and personal information processing are component parts of the AIP system to the extent to which they reduce noise and allow for reflection on mental content relevant to the subpersonal memory networks being targeted. This makes the biopsychosocial AIP system an integrated set of multilayered structural isomorphies built on the subpersonal level of processing and organized around communication and representation.

The Subjectivity of Information Processing

Shannon's (1948) information theory suggests that the extent to which a receiver has narrowed down a broad range of possible values for a stimulus is the extent to which the receiver has had an "informative experience" (Gallistel & King, 2009, p. 6). This situation highlights the subjective nature of information. The availability of possible states of self and world in autobiographical memory allows one to distinguish between potentially infinite amounts of online sensory input. This makes the accumulation of memory important not only for constructing adaptive mental models that promote attunement but also for fine-tuned perception of differentiated states of self and world.

A dynamic model of self that allows for an ever expanding IWM will therefore increase a client's capacity for accurate simulations of reality. Likewise, an expansive and expanding IWM of the clinician is also valuable. From an information theoretical perspective, the clinician's prior knowledge of the client's biopsychosocial state increases the probability that client's messages will be information-bearing messages. A clinician will be unable to assist the client in distinguishing the meaning of his or her various state to his or her biopsychosocial situation if the clinician has no prior awareness that a given possible state of the world might exist.

Social Attunement

Because of the presumed causal properties of social states, the author expanded the concepts of intrapersonal and interpersonal attunement (Siegel, 2007) to include social states. Each client exists at any given historical moment within a particular social context that shapes his or her phenomenal experience. The social state of the client is a condition that is causally related to AIP by promoting or thwarting attunement. At the interpersonal level, social attunement is critical to positive outcomes in psychotherapy. For instance, clinical experience with EMDR suggests that the clinician's awareness of the particular clinical issues facing the client (e.g., age, family history, sexism, racism) is critical to successful EMDR treatment (Shapiro, 2001).

The author believes that when biopsychosocial attunement is attained, the "state of co-regulation" (Dworkin, 2005) maintained is the physical realization of a channel of interpersonal communication. This allows the representation of information and construction of representations of the self and world that assist the therapist in directing attention to relevant aspects of the biopsychosocial experience of the client that allow for the targeting of salient subpersonal networks of memory.

Representational Structures That Structure the AIP System

Mental Models and States of Mind as Context Sensitive Constraints

Shapiro (2006) describes the AIP system as an "innate healing system forged over millions of years" (p. 5). As implied previously along with biological structures, temporal, and social structures are among the evolutionary tools humans have obtained to maximize the adaptive behavioral responses to self/world situations. "Mental states possess causal properties, which, in a certain group of personas or under the selective pressure of a particular biological environment, can be more or less adequate" (Metzinger, 2003, p. 26).

The existence of any biological tool implies a functional relationship between the tool and the system/organism using it (Metzinger, 2003). States of mind and their corresponding self-models have been optimized through their causal relationship to neurobiological structures over time. The presence of sophisticated and complex mental content found in representational systems seems to be the most plausible explanation for the capacity of social cognition that allows us to pay attention to the concepts, behaviors, and mental models of others (Metzinger, 2003). The author believes that mental states that facilitate AIP are those that allow an individual to reflect on his or her self/world models making himself or herself, his or her concepts, and his or her behaviors the object of his or her own attention and the attention of a trusted other. In this way, these become context-sensitive constraints related to AIP.

Reliable biopsychosocial communication establishes a context within which mental models in need of further updating can be identified via corresponding states of mind reflected on in a trusting relationship. This ability to represent self to enhance self-organization emerges in the context of relationship. This inherency of the social in the personal is logical for an organism that thrives in attuned interpersonal relationships and it is emphasized in the model of AIP.

Safety, Responsibility, and Choices: Meaning Structures of a Biopsychosocial AIP System

The "engine" of a biopsychosocial AIP system is those structures that promote the relatively unequivocal transmission of messages on both the sending and receiving end. The author believes that the EMDR tradition has identified a triad of phenomenal content found in IWMs that aids in structuring the biopsychosocial AIP system. Positive cognitions related to safety, responsibility, and choice have long been documented in the EMDR literature (Shapiro, 2001) as emergent phenomenal content indicative of the presence of adaptively processed autobiographical memory. In their negative form, they indicate the presence of unprocessed memory. For example, the negative cognitions associated with targeted memories in EMDR have been distilled down to "I'm not safe," "I'm to blame," and/or "I'm helpless." It is postulated that the inability to incorporate an experience into a healthy self-concept seems to be related processes associated with threat to life, experiencing toxic shame, and/or feeling trapped. All of these experiences make the individual vulnerable to affect dysregulation and distortions of time, place, and person.

Fear, shame, and rage are innate stimulus bound affective responses to such situations (Panksepp, 1998). Extreme levels of these emotions can inhibit information processing in the moment on the subpersonal, personal, and interpersonal levels (e.g., the role of shame in dissociative responses). Examples from psychotherapy of how a lack of safety, undue responsibility, and/or lack of choice affect communication, and therefore, adaptive representations of experience that facilitate information processing have been described by Dworkin (2005). Fear, shame, and helplessness can emerge as a result of intersubjective interactions during psychotherapy and can stifle AIP. When the EMDR therapist pays attention to these emotional states in the client and facilitates a return to a state of "co-regulation," AIP can resume. Dworkin has suggested that repairing the rupture of such states is imperative to successful EMDR treatment.

The author supports Dworkin's (2005) assertion and hypothesizes that when such a rupture is interpersonally processed in a session as described in the "relational interweave" (p. 39) intervention, the biopsychosocial AIP system itself is strengthened. In other words, the actual relationship and the updated IWMs structure the bio-psychosocial AIP system and are thought to be causally related to the adaptive resolution of the target memory network. When therapist and client create a context within which it is acceptable to feel safe and focus on the target experience/memory, acceptable to own the experience/memory, and acceptable to use the experience/memory for current and future simulations, AIP is strengthened.

"Optimal" Internal Working Models and a Healthy Self-Concept

Self-directed attunement and introspection depend on the individual's ability to direct his own attention. This capacity is called attentional agency (Juarrero, 1999; Metzinger, 2009). IWMs containing a robust set of prior probabilities suggesting that the individual is safe, can own experiences, and has more choice will support the regulation of fear, shame, and rage allowing for attentional agency and ongoing communication and representation of what is happening. The author hypothesizes that "optimal internal working models of self and world" promote a feeling of safety by allowing the individual to own the disturbing experience and to problem solve how to represent and remedy it, in a manner that benefits self and environment. In other words, this process is accomplished in part through the maintenance of a self/world boundary. The specific self-conceptual triad related to safety, responsibility, and choices would be considered linguistic representations of such models hypothesized to be prevalent among individuals with a secure/autonomous attachment status.

Goals of the Biopsychosocial AIP System

The use of both fixed action patterns and learned behaviors is prevalent among more complex species (Murphy & Brown, 2007). Behavioral flexibility is maximized via optimal IWMs. Bowlby's (1969) "environment of evolutionary adaptedness" describes the emergence of innate "stimulus bound" unreflective behaviors shaped by evolution that prepare an organism for life in a specific setting. There are also characteristic behavioral responses genetically encoded within the central nervous system of humans and other mammals related to the absence of certain environmental stimuli that are salient to survival (Bowlby, 1969; Panksepp, 1998). The author believes that an attuned

interpersonal relationship is the environment to which an infant's fixed patterns of attachment behavior are designed to anticipate and respond. Furthermore, the guarantee that the infant will consistently seek and find attunement is hypothesized to be found in the capacity to develop IWMs that selectively entrain attention and memories that maximize attunement. Thereby ensuring attentional agency and adaptive behavioral integration will occur via the construction of accurate representations of self and world.

How a Biopsychosocial AIP System Is Organized and Maintained

The author hypothesizes that the presence of attunement in the environment acts as the initial condition that an AIP system organizes around. Furthermore, IWMs can be seen as data structures containing information useful to depict what dynamic systems theorists call attractors. An attractor is an abstract shape that delineates the state space over time within which any given system resides (Juarrero, 1999, p. 152; Murphy & Brown, 2007, pp. 75–76). They represent the multitude of context-sensitive constraints that endure and influence the probability that a system will behave with predictable patterns (Juarrero). An attractor also represents the space a system will return to if perturbed outside of its typical pattern of behavior. For instance, the conceptualization of human behavior as resulting from a system's predictable trajectory through state space has been used by Putnam (1997) to describe dissociative disorders.

The author believes that IWMs act as attractors that shape an individual's trajectory toward the development of an AIP system. In addition, the establishment of a biopsychosocial AIP system may be the apex of the attachment system in a secure autonomous individual. He has found the conceptualization of IWMs as data structures containing information useful in describing salient attractors of a biopsychosocial AIP system as a useful diagnostic tool in determining the overall tendency for an individual to respond with attunement in any given stressful situation. By extension, the assessment of the capacity for intrapersonal and interpersonal attunement has also been useful in the author's clinical work to assess the robustness of the biopsychosocial AIP system itself.

Discussion

A phylogenetic perspective of AIP suggests that emergent properties of a complex natural system that uses its history to promote behavioral flexibility are causally related to adaptive processing of autobiographical memory. The author presents the theoretical perspective of a biopsychosocial AIP system to capture the way that personal and interpersonal processes (mental and social states) may be causally related to the adaptive resolution of disturbing life experience. In particular, advances in the understanding of complex natural systems and their capacity for subjectivity and intentional actions have offered important insights that can be integrated with the existing neurophysiological model of AIP.

In addition, current trends in EMDR have focused on relational aspects of AIP (Dworkin, 2005; Dworkin & Errebo, 2010) as clinicians and researchers adapt the protocol to treat more complex psychiatric conditions. These adaptations have often led to the integration of EMDR and attachment theory. This article has moved the discussion from the clinical integration of EMDR and attachment theory to the theoretical integration of the two. Focusing merely on traumatic memory in a linear fashion as if it were a "germ" that "causes like a force," betrays the deeper understandings of how disturbing life experiences and the state of a biopsychosocial AIP system relate to one another in determining the trajectory of psychopathology where memory is concerned.

What happens when an infant develops in an environment where attunement is not prevalent or possible? Informational closure (Juarrero, 1999) describes the tenacity with which a system maintains its integrity despite exchanges with the environment. The author suggests that a systemic understanding of AIP is necessary to avoid clinical errors and frustration in the therapeutic alliance when an individual does not have the capacity for attentional agency required to process disturbing experiences with EMDR. The biopsychosocial AIP model offers methodological insights derived from considering the dynamics of such a system. Space limitations of this article and its focus on theory require a follow-up paper to adequately address these insights.

One insight is the value of the model in identifying the extent to which a client is embedded in an AIP system. If adaptively processed memories function within a system to bring information forward in time, to optimize the simulation and actualization of behaviors that maximize the fit among an individual and his or her environment, then the use of such adaptive memories ought to be inferred from coherent behavioral functioning. Likewise, the absence of adaptive processing ought to be inferred from disorganized behavioral repertoires. It would also be sound to consider that the more AIP "like" a system is, the "more

conscious" the individual will be and the more he or she will behave more "intentionally."

The biopsychosocial AIP model can enhance treatment planning in the following ways: The client's maladaptive attractors can be described and identified by the range of negative cognitions and affects associated with recent triggers and past touchstone memories. These representations of IWMs can be plotted on a chart with a corresponding differential list of associated reflexive behaviors targeted for change. Such an exploration will yield the generic elements of situations likely to move the system into the closed state. Because behaviors of complex natural systems are multiply realizable, this approach to treatment planning can assist in making sense of how the array of maladaptive behaviors in the client profile are organized around specific self/world interactions. A list of adaptive self-representations and reflective actions tailored to specific client situations can also be identified early in treatment to highlight where skill building needs to take place as updates to IWMs are made.

Finally, the author believes that a biopsychosocial model supports the long-held adage of Francine Shapiro, (2009) that EMDR begins when the client walks in the door. Beginning with step one in the protocol, the pair construct macro representations of memory networks by maintaining biopsychosocial attunement and recording information related to areas of inhibition to growth. These representations, whether verbal or written, guide the pair's attention. The use of the EMDR self-report scales and body scans also constrain the personal and subpersonal levels of the client. In fact, the personal and subpersonal experiences of the therapist become constrained as well, and if there is minimal noise interfering with the therapist's intrapersonal attunement, the dyad will maintain a state of coregulation necessary for AIP. The author hypothesizes that these are examples of how interpersonal AIP is an emergent property of the biopsychosocial AIP system.

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■ CLINICAL Q&A ■

EMDR Target Time Line

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This Clinical Q&A section responds to a question about organizing a client's historical information into a targeting sequence within a treatment plan that is consistent with Shapiro's (2001) three-pronged protocol. The procedures for identifying and prioritizing treatment eye movement desensitization and reprocessing (EMDR) targets are reviewed in the context of Shapiro's theoretical model, and various time line models are summarized. The author then presents her *EMDR Target Time Line*, which provides a practical simple visual tool for documenting past, present, and future aspects of the presenting problem. It allows the therapist to note if disturbing past experiences present around a core theme, such as negative cognitions, physical symptoms, or situations/persons/circumstances. Three clinical cases are used to illustrate the form's application with various types of treatment targets.

Keywords: eye movement desensitization and reprocessing (EMDR); treatment target; time line; core theme; adaptive information processing; clinical application

Question: How can I organize my client's historical information into a targeting sequence consistent with a treatment plan?

ANSWER:

Target tracking is a critical component of comprehensive treatment with eye movement desensitization and reprocessing (EMDR). Effective target tracking rests on the foundation of relevant targets organized in a way that reframes the presenting issue within the context of the client's history. I have developed the *EMDR Target Time Line*, which is a structured and systematic tool to conceptualize this task and provide a visual illustration of how the presenting issue is related to the client's significant life experiences (see Figure 1). It allows the therapist to note if disturbing past experiences present around a core theme, such as negative cognitions, physical symptoms, or situations/persons/circumstances. The EMDR Target Time Line organizes the identified dominant symptom with the related life events and illustrates how the past is recreated in the present. In this way, the EMDR Target Time Line adheres to EMDR's three-pronged approach, connecting past incidents, present triggers, and future concerns or templates. It allows the clinician to monitor progress and remain focused on the client's goals, providing efficient and more effective treatment.

Target Selection and the Adaptive Information Processing Model

The structure of EMDR is grounded in Shapiro's (2001) adaptive information processing (AIP) model, which states that most pathologies have their roots in earlier life experiences that are triggered in the present, setting in motion a continuation of maladaptive patterns. The model views each person as having the innate capacity for health and well-being. It assumes that traumatic or disturbing life events can impair the individual's processing system, preventing the integration of these experiences, so that the memories become dysfunctionally stored in the brain. The memories appear to be frozen in time, along with the

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EMDR Target Time Line

Client Name:

Dominant Targeting Cluster:

Negative Cognition:
Responsibility/Safety/Control
Symptom/Body Sensation:
Situation/Person/Circumstances:

Age _____

Incident

Age _____

Incident

Age _____

Incident

Age _____

Incident

Current Triggers:

_____

_____

_____

Future Triggers and Templates:

_____

_____

FIGURE 1. EMDR Target Time Line.

thoughts, images, cognitions, emotions, and body sensations that were experienced at the time of the original events. When present-day experiences occur that are similar to these incidents, adaptive responses are not accessible. Instead, aspect(s) of these dysfunctionally stored memories are triggered, causing a maladaptive reaction. Over time, these maladaptive reactions can cause a wide array of difficulties from problematic thoughts and behaviors to psychological disturbances.

As part of an overall psychotherapeutic approach, EMDR provides a framework for reprocessing these disturbing memories in a way that can restore health and wholeness. Effective EMDR treatment begins with gathering of client history, the first phase of the eight-phase EMDR protocol.

The Significance of Targets

In an EMDR session, the material that the client is asked to focus on is referred to as a *target*. A target can be a specific memory, an experience, a disturbing image, a person (real or imagined), or an event or circumstance that is past, current, or projected into the future. Targets can also include an aspect of experience, such as a thought or a body sensation (Shapiro, 2001).

In EMDR, each target is understood to be connected to a memory network, which represents an associated system of information created when incidents containing related perceptions, cognitions, emotions, and body sensations are stored and linked to one another. Shapiro (2001) states that dysfunctional memory networks tend to be organized around the original incident. Subsequent life experiences that share similar affect, or cognitions, or situations "are stored as information linking into a network organized around the node of the earlier touchstone experience" (Shapiro, 2001, p. 45). For example, a victim of childhood trauma may have a negative self-referential belief such as "I'm powerless" that is carried into adulthood. Likewise, this same adult may experience physical feelings of anxiety, shortness of breath, and clammy hands whenever he feels out of control in a situation.

The Benefit of Target Tracking

Initial targets can be identified in EMDR's phase 1, history taking and treatment planning. In addition, new targets often emerge during phases 4–6, desensitization, installation of positive cognition, and body scan. Often, these new targets are associated memories that are earlier memories in the client's life that were not reported by the client during history taking.

A structured framework of target tracking is a critical component of comprehensive EMDR treatment. Tracking targets in a systematic way allows the clinician to monitor progress and remain focused on the client's goals.

Tracking targets can be a daunting task. Even cases that initially present with a single issue can quickly become complicated with the emergence of new targets and the uncovering of progressions (Morrow, 2008). Consequently, in order to be most effective, a system for target tracking needs to be simple enough to address straightforward cases, and flexible enough to accommodate the unexpected twists and turns of more complex cases. In addition, this system needs to provide a way to keep tracks of targets as they arise, both during processing and between sessions. Finally, as clients can present with multiple issues, targets need to be tracked in a way that organizes this material for more comprehensive treatment.

Examples of Different Time Line Models

Various approaches have been developed to facilitate this process. These include Hofmann's (2009) Positive and Negative Memories Map, Kiessling's (2009) Targeting Sequence Plan, Kitchur's (2005) Strategic Developmental Model, and de Jongh, ten Broeke, and Meijer's (2010) Two Method Approach. These strategies have been applied to both simple and complex presentations.

Hofmann's (2009) time line script provides salient questions to ask the client relative to positive/negative memories, current triggers, and future concerns; his or her answers are organized into a "Positive and Negative Memories Map." This map creates a visual presentation of the client's chronology that assists both clinician and client in seeing the organizing themes of the client's life experience. Hofmann provides additional forms that can be used on an ongoing basis to track important memories and resources, as well as a place to monitor the processing of disturbing memories.

Similarly, Kiessling's (2009) Intake Questionnaire organizes information into a Targeting Sequence Plan. He views disturbing incidents as clustering "around a common denominator, such as a belief, emotion, body sensation, issue, symptom, person" (Kiessling, 2009, p. 12) and recommends developing two different types of targeting sequences. The first focuses on a specific negative belief, which was evident in several life events. The second focuses on symptom clusters in which the dominant presenting issue, across incidents, is an emotion, body sensation, perception, person, or place, and in which the negative and positive cognitions may vary from incident to incident. Because simple cases present with a singular focus, the Targeting Sequence Plan can be straightforward. However, even in working

with comprehensive cases, Kiessling notes that the Targeting Sequence Plan still remains a vital part of the treatment process as each issue is identified and a past and present targeting plan constructed.

De Jongh et al. (2010) developed the Two Method Approach. The first method is used for treating Axis I disorders and simple post-traumatic stress disorder (PTSD) and applies a simple time line. They have found that the time line is most useful when working with cases where the causal event and symptoms can be simply and chronologically arranged. Targeting in EMDR is conducted following the temporal sequence. In more complex cases, where there may be multiple events and numerous possible targets, de Jongh et al. recommend the second method. In this approach, the therapist identifies the core dysfunctional belief and the life experiences that contributed to the development of that cognitive theme. In this approach to EMDR treatment, the life experiences are targeted in the order of relevance to the cognitive theme and not in chronological order.

Kitchur's (2005) Strategic Developmental Model provides a strategy to address developmental deficits that are believed to underlie the client's presenting symptoms. The primary clinical task is to identify and treat chronologically all events in the client's life that have been identified as impeding developmental progress, thus allowing for more efficient resolution of other targets and presenting issues. The client's history is taken using a genogram mapping format. Related questions assist the client in becoming aware of family patterns that have been carried into adult relationships. In this way, developmentally interruptive experiences can be identified, which then become targets for processing (Kitchur, 2005).

In gathering client history, the aforementioned experts all recommend a visual representation of the client's history and related targets to assist the clinician in organizing information vital to case conceptualization and to help the client understand how unresolved issues in the past present as problematic situations in the present. This facilitates client education and engagement in treatment.

The EMDR Target Time Line

I developed the EMDR Target Time Line to clearly illustrate the chronological sequence of the client's traumatic history related to the targeted theme. This tool can be used to visually present the target information collected with any of the aforementioned strategies. For example, it parallels Hofmann's (2009) model by noting triggers and future concerns in list form and keeping track of memories that have been processed while noting new ones as they arise. There are similarities as well to de Jongh et al.'s (2010) first method where the PTSD causal event and related symptoms are chronologically arranged and their second method where the core dysfunctional belief and life experiences that contributed to the development of this cognitive theme are identified. My approach also has much in common with Kiessling's (2009) strategy, as both are grounded in Shapiro's (2001, 2011) AIP model, viewing disturbing past experiences that share a similar theme (e.g., belief, emotion, body sensation, person) as being stored in the same or closely connected memory network/s. Accordingly, the EMDR Target Time Line uses a three-pronged approach to identify all past-present-future aspects of this core theme. Whereas Kiessling's Targeting Sequence Plan simply creates a list of events, my EMDR Target Time Line lists all related events chronologically on a time line and provides space to document the treatment process. This facilitates the inclusion of feeder memories as they arise, as well as providing a clearer map to facilitate target organization and client engagement.

Constructing a Time Line Using the Three-Pronged Approach

The primary reason for developing a time line is to provide a visual illustration of how disturbing life situations tend to cluster around core themes and are manifested throughout the life span, clearly identified in past events, current triggers, and future triggers and templates.

Identifying the Core Theme

In EMDR (Shapiro, 1995, 2001, 2011), present issues are conceptualized as related to past unprocessed events, which are understood to be stored in memory networks organized around a core theme such as a negative belief (e.g., "I can't trust anyone"), an emotion (e.g., fear), a situation (e.g., rejection), or a person (e.g., an authority figure). Often, the theme can be identified as it emerges in the client's story. To further clarify the negative cognition, it can be helpful to ask, "What do you believe your struggle (i.e., the presenting issue) says about you?" To further clarify a symptom theme, it can be helpful to ask, "Is there a common factor in these different situations?"

Identifying Past Events

Some clients are easily able to identify important related past events. When clients have difficulty identifying a related past experience, the floatback technique (Browning, 1999) can be used to identify the touchstone event and any other related significant incidents. The negative cognition, current emotions, and body sensations can all be used as the bridge to earlier experiences.

Identifying Current Triggers

Current triggers consist of present day situations in which the client notices reactivity with a dominant symptom or negative cognitions similar to the touchstone event. Often, these triggers are found in the client's presenting issues and complaints that prompted the seeking of treatment. These triggers consist of situations, stimuli, or events that are disturbing or troublesome in the present.

Identifying Future Triggers and Templates

Future triggers are anticipated future situations that prompt concern or anxiety. Again, these targets can take the form of situations, events, stimuli around a dominant symptom, or negative cognition. Another way to gather information for future templates is to ask the client what he or she would like to be able to do or experience once adverse symptoms are alleviated or the desired positive cognitions are integrated. Future templates can then be created that reflect these goals.

Constructing the Time Line

A time line can be constructed once a thorough history is taken. The information gathered is utilized, highlighting the most disturbing past experience, currents triggers, and future triggers and templates.

Each time line page focuses on the core theme of the memory network: negative cognitions, (responsibility, safety, control), symptom/body sensation, or situation/person/circumstance. Past events are listed in chronological order, with the age noted where indicated on the time line, and cue words that relate to each corresponding incident listed under the age (Lombardo & Morrow, 2009). These incidents are listed on the time line in a way that leaves space between each one to accommodate the emergence of any other disturbing memories that can occur during processing or recollections that can happen between sessions. If the client indicates that one incident in particular is the "worst," this can be noted with an asterisk. As each event is processed, it is helpful to make a check or notation to indicate that the processing for that incident is complete.

Current triggers, future triggers, and future templates are recorded in a list fashion. These are recorded not only during history taking but also on an ongoing basis, as the client provides feedback on experiences between sessions. The client's experiences of triggers and future goals can evolve and change as the work progresses. Old data, once inaccessible, now becomes accessible as reprocessing occurs.

Identifying the Memory Network to be Targeted

Each time line corresponds to only one organizing theme: negative cognitions, symptoms/body sensations, or situation/person/circumstances.

Targeting a Memory Network Organized Around a Negative Cognition

When negative cognitions are the core theme, all related past, present, and future incidents are identified, using Shapiro's (2001) categories of responsibility, safety, and control. Sometimes a time line may be developed for each category, for example, one would have a time line for each of the cognitive themes: "I'm powerless" and "I'm in danger." When an incident relates to both themes, it is logged onto the time line page for each cognitive theme.

When there is more than one cognitive theme, the choice of whether to begin with a responsibility, safety, or a control-themed time line is a clinical decision that needs to be consistent with the client's presenting issues and goals. The therapist and client should reach an agreement on the order of reprocessing. Client education on the AIP model helps to facilitate this decision-making process. Often, by processing the cognitive theme of responsibility first, safety and control issues are addressed as well. However, this is not always the case, and if an incident appears in more than one time line, it is important that the clinician check all aspects of negative cognitions to see whether there is any residual disturbance that needs to be processed.

Targeting a Memory Network Organized Around a Person, Situation, or Circumstance

When a client is unable to identify a primary negative cognition, consider using a person, situation, or circumstance as the core theme. In this case, a time line would be constructed where past incidents, current triggers, and future concerns/templates would have the same person, situation, or circumstances as the touchstone memory. Negative and positive cognitions may vary for each incident (Kiessling, 2009).

Targeting a Memory Network Organized Around a Symptoms or Body Sensation

Similarly, when a dominant belief is not present, a symptom or body sensation can also become the core theme around which the time line is constructed. In constructing the time line, each incident where the symptom occurred would be noted, beginning with the earliest experiences, and continuing with present

day situations and future concerns. Again, varying positive and negative cognitions may need to be noted for each incident (Kiessling, 2009).

Case Illustration: Negative Cognition(s)

Brian, a 50-year-old married engineer, sought psychotherapy because of symptoms of anxiety and feelings of inadequacy. These manifested primarily in a strained relationship with a blustery and highly critical employer. The client's response to his employer's rebukes was to remain passive and silent, despite his exemplary job performance.

Conceptualizing the case from an AIP perspective and utilizing the floatback technique based on a recent interaction with his employer, Brian realized that his dilemma was rooted in his childhood relationship with an emotionally abusive father. The first memory that emerged was at age 5 when his father forced him to stand on the front porch wearing a diaper, after he had wet his bed. The next and worst incident was at age 9 when his father forced him to eat dinner on the floor next to the dog's bowl because he had interrupted and disagreed with him during a discussion at dinner. The next memory, at age 10, was that of the client returning home from school to find that his father had ransacked his bedroom because he had forgotten to make his bed that morning. The next incident, at age 12, followed a church choir performance when the choir director admonished Brian in front of the entire group for what the director considered to be an inadequate solo performance. The next significant incident took place when he was a freshman in college and was benched throughout the entire basketball season because of what he described as his subpar performance. The most recent incident occurred 6 months prior when the client received critical feedback from his employer during his biannual performance review. As a result of these experiences, Brandon's self-referential beliefs focused around responsibility with negative cognitions that included, "I am stupid," "I did something wrong."

Utilizing the three-pronged approach, an EMDR Target Time Line was developed for Brian (see Figure 2).

Case Illustration: Symptom/Body Sensation

Michelle, a 40-year-old married homemaker, sought treatment to address a phobia relative to flying. These symptoms first appeared 2 years ago when she was flying cross country to attend her mother's funeral. At that time, she experienced a panic attack during flight turbulence. Since then, she had flown on one other occasion 6 months ago. At that time, she reported symptoms of severe anxiety for days leading up to the flight, including sleeplessness and obsessive thinking. She indicated that although the flight was uneventful, she experienced symptoms of anxiety throughout. Michelle's initiation of treatment was prompted by a plan to fly to an out-of-state conference in the near future.

Client history appeared to be largely unremarkable. She stated that she has been happily married for over 20 years and enjoyed being a full-time homemaker and mother to three children. Similarly, her childhood showed no evidence of trauma or unresolved conflicts in significant relationships.

The client was educated relative to the AIP model, and a floatback was performed using the visceral feeling of anxiety that the client experienced during her flight 2 years ago. The first memory that emerged was that of her father leaving for war-time duty in Vietnam when the client was 4 years old; negative cognition, "I'm a disappointment." The next incident was at age 25, of moving out of state and away from her family, and her sadness that her parents were unable to be with her on the day of the move; negative cognition, "I'm not important." The next incident occurred at age 34, when the client received a positive breast biopsy report while she was driving in her car; negative cognition, "I'm not in control." The worst incident was the cross country flight 2 years ago; negative cognition, "I'm not safe." (Note: the varying negative cognitions are noted in parentheses along with the incident).

Utilizing the three-pronged approach, an EMDR Target Time Line was developed for Michelle (see Figure 3).

Case Illustration: Situation/Person/ Circumstances

Joseph, a 30-year-old married salesman, sought treatment because of symptoms of severe anxiety. Client initially stated that he became aware of these symptoms 2 years ago, shortly after the birth of his only child. Joseph had sought cognitive behavioral therapy 6 months prior, but found that the reframing self-talk and deep breathing he learned offered limited relief.

After a thorough history was taken, it became clear that these physical symptoms occurred whenever Joseph experienced financial concerns. This issue became evident with the birth of his child as he and his wife had decided that she would stay at home, leaving him the sole breadwinner. Joseph realized that there was an irrational aspect to his worry as he was very successful in sales, consistently earning top awards.

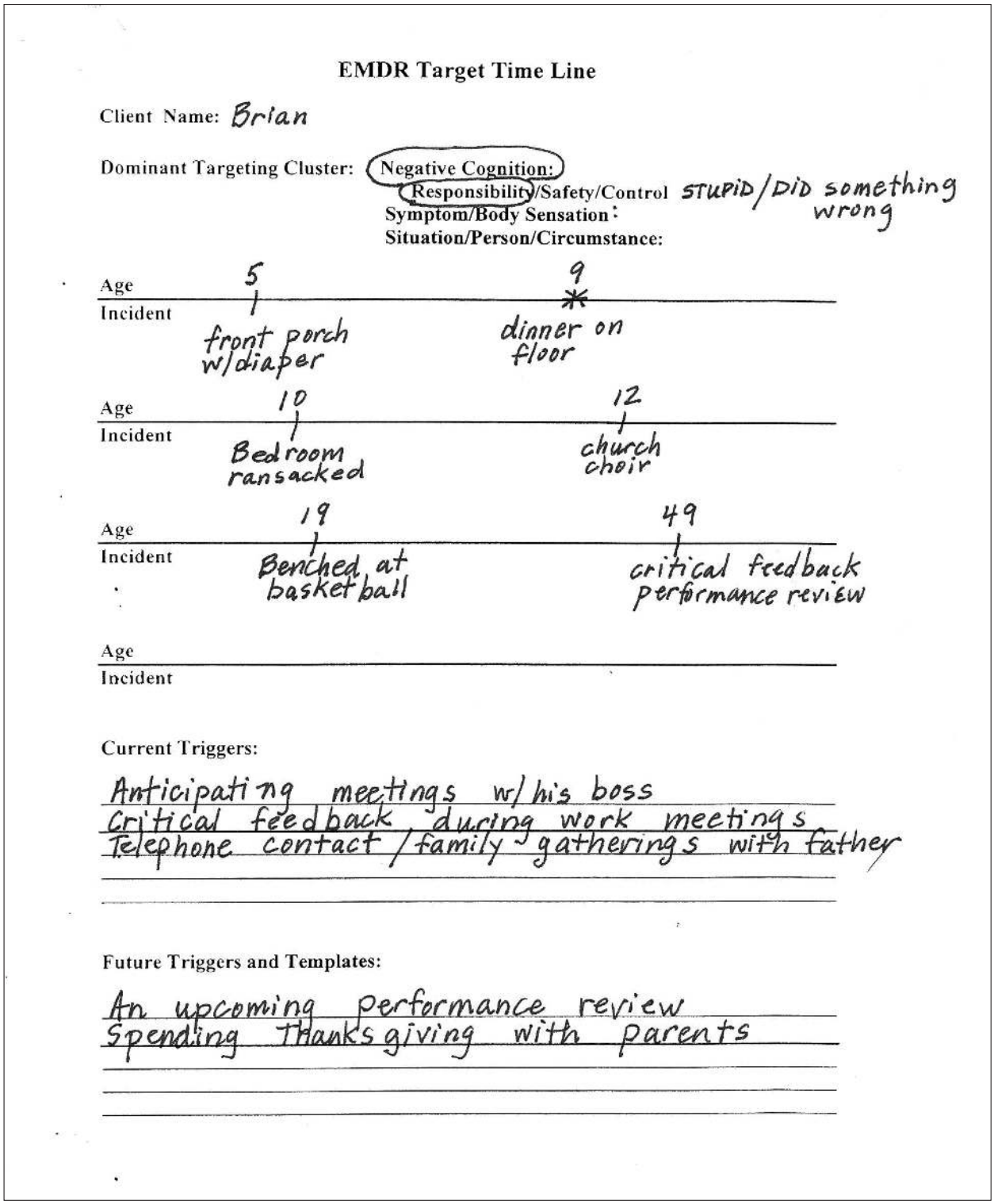
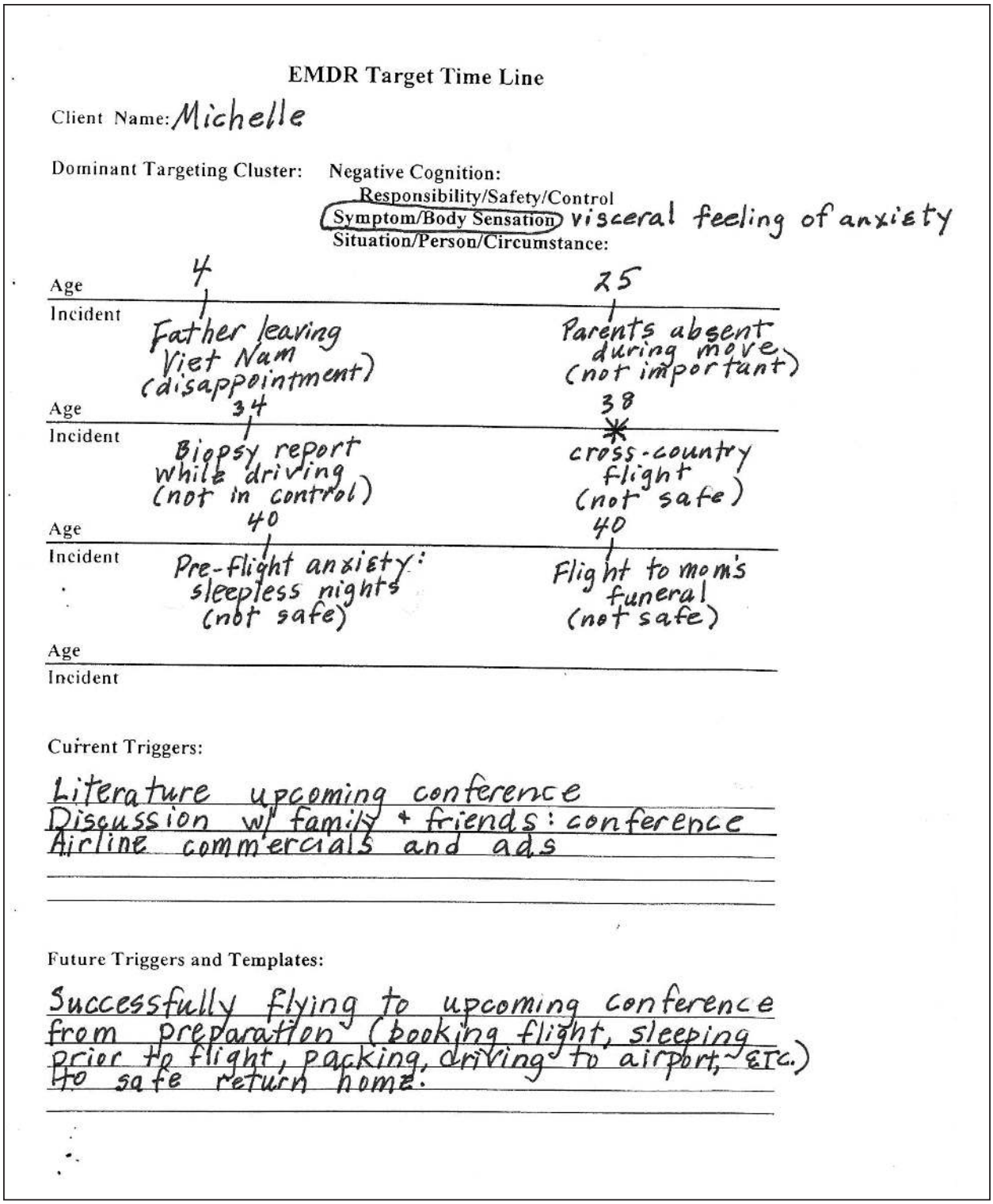


FIGURE 2. Target time line for Brian.

Exploration into family of origin issues revealed that the client's father had physically and financially abandoned the household when Joseph was 10 years old. He was left to be "man of the house," caring for his two younger siblings while his mother worked long hours to support the family. Joseph revealed that he often felt alone and overwhelmed throughout his childhood, but these feelings became more acute when he was faced with the prospect of having to pay for his own college education. After educating the client in the AIP model, he understood that these same feelings of overwhelm and anxiety he experienced



EMDR Target Time Line

Client Name: Michelle

Dominant Targeting Cluster: Negative Cognition:
Responsibility/Safety/Control
(Symptom/Body Sensation) visceral feeling of anxiety
Situation/Person/Circumstance:

Age	4	25
Incident	Father leaving Viet Nam (disappointment)	Parents absent during move (not important)
Age	34	38
Incident	Biopsy report while driving (not in control)	* cross-country flight (not safe)
Age	40	40
Incident	Pre-flight anxiety: sleepless nights (not safe)	Flight to mom's funeral (not safe)
Age		
Incident		

Current Triggers:

Literature upcoming conference
Discussion w/ family + friends: conference
Airline commercials and ads

Future Triggers and Templates:

Successfully flying to upcoming conference from preparation (booking flight, sleeping prior to flight, packing, driving to airport, etc.) to safe return home.

FIGURE 3. Target time line for Michelle.

then were triggered by the financial responsibility of his current circumstances. Joseph also realized, however, that there was no dominant negative cognition that accompanied his anxiety; he was able to identify with the theme of control ("I can't handle it") as a child; responsibility ("I'm not worthy") when he was struggling to pay his own way through college; responsibility ("I can't measure up") after the birth of his own child, which he identified as the worst incident; and safety ("I don't trust myself") relating to the most recent incidents of job performance. As a result, a decision was made to target the cluster of experiences

surrounding financial issues. (Note: the varying negative cognitions are noted in parentheses along with the incident).

Utilizing the three-pronged approach, an EMDR Target Time Line was developed for Joseph. (see Figure 4).

The Value of the EMDR Target Time Line Approach

A time line provides a visual presentation of the salient events in a client's life experience and illustrates how the past is recreated in the present. In this regard, it can

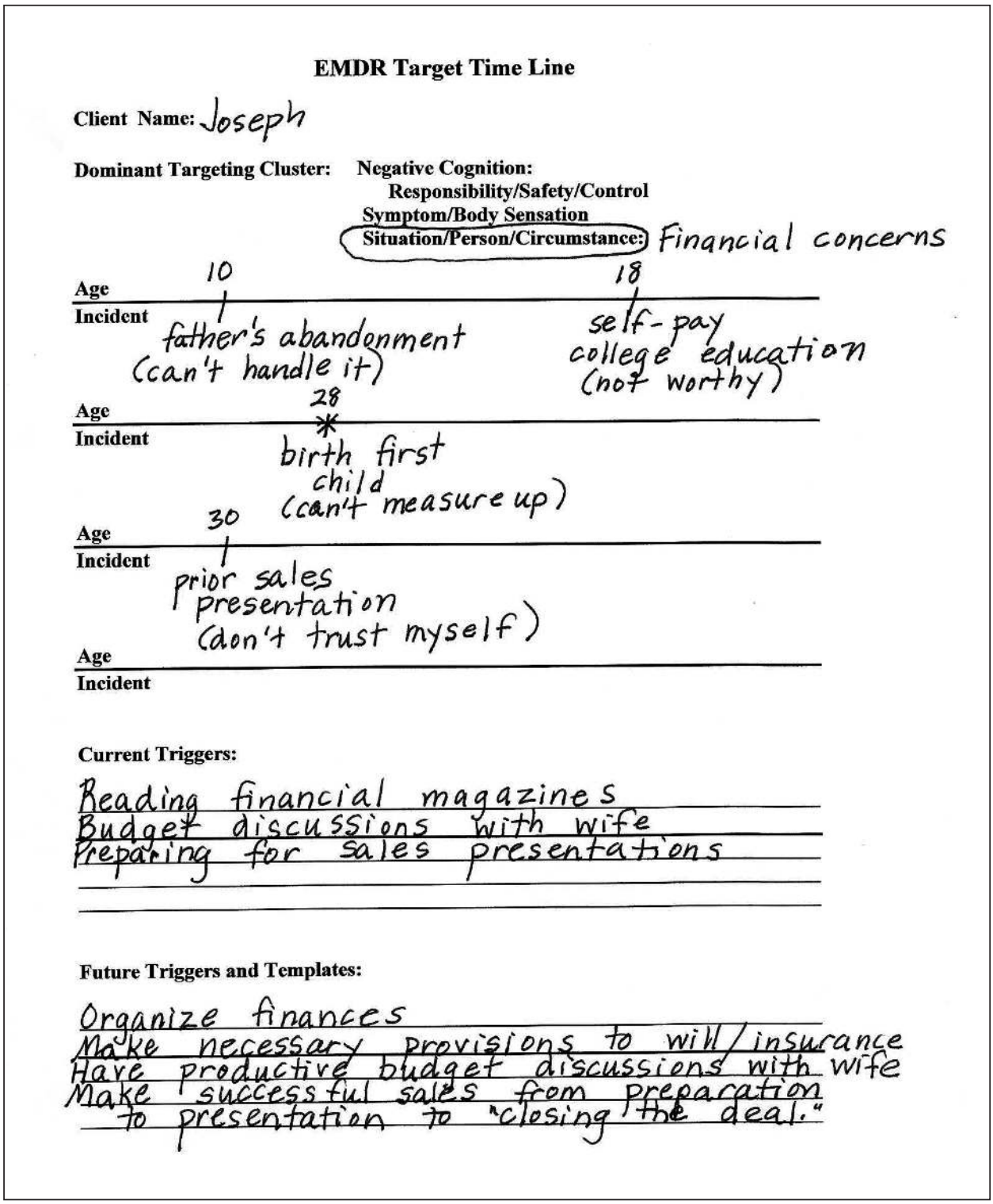


FIGURE 4. Target time line for Joseph.

provide a structured framework that maintains a global view of the client's progress and goals. The EMDR Target Time Line serves as a map, for both the clinician and client, of where the client has been, and by lighting up the positive networks, of where the client wants to go.

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■ OBITUARY ■

David Servan-Schreiber (1961–2011)

Udi Oren
President, EMDR Europe Association

In June 2007, Dr. David Servan-Schreiber, psychiatrist, researcher, EMDR (eye movement desensitization and reprocessing) trainer, and one of the best speakers I have ever met, was giving the keynote address to the 900 participants at the EMDR Europe Association annual meeting that took place in the School of Medicine of the University of Paris. He was talking about his new understanding regarding cancer research that would later become part of his best-selling book *Anticancer*.

The point I remember most clearly was a slide showing a graph of the length of survival after being diagnosed with cancer. It was the classic upside down U shape of most statistical distributions, with some people dying very early on, many surviving a few months and a few surviving for longer periods of time. So what's new? Well, David was pointing to the fact that some people continued living against all odds. Since some people succeeded in doing this, the question in his mind was how did they do it? How does one continue living in the face of the biggest challenge? How does one use all the knowledge that has been gathered by science and by human wisdom to win the battle? The statement I remember him stressing on the podium was clear: *The median is NOT the message!*

"The median is not the message" is the sentence that, in my view, was the essence of David's life. When one looks at what he accomplished during his—all too short—life, one can see a constant struggle to go beyond what has been understood and achieved before his time.

After completing medical school, David began an outstanding career as a researcher. His broad research interests included everything from artificial intelligence and medical management to anxiety disorders and psychopharmacology. The more than 100 articles he published as a researcher brought him prizes from the National Institute of Mental Health, the American College of Neuropsychopharmacology, and the Pennsylvania Psychiatrist Society, among others. His thesis was published in *Science* in 1990, when he was 29 years old.

I believe that a major conceptual shift took place in his mind when he decided to join the Center for Complementary Medicine at Shadyside Hospital in Pennsylvania, where he later became Medical Director. This is the place where David's interests in psychiatry, internal medicine and complementary-based medicine came together, which led to much of his later groundbreaking work. In all his books, David wrote about both the power and the limitations of conventional western medicine. His "going beyond the median" meant looking beyond the material he studied in the known world of medicine, and the outcome of that quest can be seen in his best-selling book *The Instinct to Heal: Curing Stress, Anxiety and Depression,* which has been translated in to 29 languages and sold over 1.3 million copies. In that book, he made a clear statement about the need to act in ways that most physicians do not recommend to their clients, when they are dealing with the dangerous impact of depression and anxiety on their health and lives.

The Instinct to Heal contained two chapters about a form of psychotherapy called EMDR, which became one of the centers of David's life. After he heard a lecture by Francine Shapiro, the originator of EMDR, he took an EMDR training and started using it in his practice. David was very impressed by the impact of this new form of psychotherapy on the psychological and physical health of his clients. Based on many research

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studies, David believed that traumatic helplessness affects health via inhibition of the immune system (among other mechanisms). In *The Instinct to Heal*, he stressed the importance of treating, via EMDR, difficult life events that continued to have on going negative impact on people's minds and bodies. He became the president of the French EMDR Association, the first French EMDR Trainer, and one of the leaders of the EMDR Europe Association.

Behind David's back, we all called him "The Prince." He was a good-looking guy with a beautiful smile, who always had an aristocratic air about him—even when he just got off his bike. He was a very well mannered man of the world who came from a famous French family; in a very real sense, he was a prince.

But all that did not get in the way of his being a hard working and ambitious man. While he had a great mind, he also had a very large heart. He was one of the founders of the U.S. branch of the Doctors Without Borders organization and personally went to Bosnia, Iraq, Tajikistan, Guatemala, and India. This type of volunteer work in war-torn and devastated regions is not for the faint hearted. In all his work, David combined mind and heart, research and humanism, organization and passion.

David battled with cancer several times in his life, starting at the age of 31. *Anticancer,* his second best-selling book (a *New York Times* best-seller that has sold over 1 million copies and been translated into 35 languages), was the outcome of his decision to provide the world with the information needed to prevent and treat cancer. This effort became the center of his work during the last years of his life, which changed the lives of many people around the world. He himself did everything he suggested to the readers of his book: ate healthy, exercised daily, practiced meditation, and took Omega 3 supplements—but he never reduce the intensity of his work until illness forced him to do so.

After he found out about his last cancer relapse a year ago, David begun writing his third and final book *Not the Last Goodbye: On Life, Death, Healing & Cancer,* which was published two months before his death. In it, he tells the story of his relapse and says that despite the fact that he is about to die, the message of *Anticancer* is still valid. When he was diagnosed with cancer for the first time in 1993, he was given three more years to live—at most. The fact that David lived another 18 years is a testimony to his understanding that "The median is NOT the message!"

David left behind a loving extended family of his wife, Gwenaëlle, and his children Sacha (from his first marriage), Charlie, and Anna, who were in his words "his best success." He also left behind him a large (and very sad) community of friends, colleagues, and fellow travelers in the journey—for whom his loss goes beyond words. His memory, his courage, his wisdom, his love, and his smile will be with us forever.

On a personal note: After his 2007 speech, I wrote and sent David the following poem:

He does not get it

Sitting on the floor, exhausted,
Sitting on the floor, floored,
Little energy, teary eyes,
People around, the usual,
Being his usual nice guy,
His usual giving of himself,
But there was little left.

The show was beyond belief,
How does he do it?
In the midst of a scientific talk,
The magic touch,
That leaves not even one eye dry,
In the audience or on the stage.

And when it is all over I come up to him,
Pushing the little old lady aside (politely)
And I kiss the guy,
And I look him in the eye,
At his tired, tearful eyes,
At his face that looks beaten from inside, depleted,
And I say (twice) "I love you."

And his eyes say, baffled, I do not get it.
Is this a joke? Because I am not in the mood.
Moi? Me? How come? Look at me?
Can't you see what's inside? Love me?
He does not get that
It was because, not despite.

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