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Effect of the EMDR Psychotherapeutic Approach on Emotional Cognitive Processing in Patients with Depression

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The current investigation, framed within the emotional cognitive science field, was conducted with three patients with major depression. They participated in a therapeutic process which involved EMDR (Eye Movement Desensitization and Reprocessing). Data were obtained in the clinical practice through a longitudinal one subject study design, including: emotional valence identification within affective priming experiments; and depressive emotional representation studies, the data of which was analyzed using multi-dimensional scaling. The first ones had the purpose of observing the therapeutic impact over the emotional cognitive bias mechanism regarding depresogenic words related to traumatic experiences; and the second, to analyze modifications on depressive schemata. The results showed that EMDR had a positive effect both on emotional cognitive processing and on long-term memory conceptual organization. In the discussion section, interesting remarks are made on the incorporation of emotional cognitive science tools to the EMDR clinical practice.

Keywords: depression, EMDR, emotion-cognition, affective priming, depressive schemata.

La presente investigación enmarcada en el campo de la ciencia cognitiva de la emoción, se llevó a cabo en tres personas, que fueron diagnosticadas con depresión mayor y que participaron en un proceso terapéutico que involucró la aproximación EMDR (por sus siglas en inglés -Eye Movement Desensitization and Reprocessing-). La recolección de datos se realizó en la práctica clínica mediante el diseño de estudios longitudinales de un solo sujeto, dentro de los cuales se consideraron a la vez estudios de identificación de valencia emocional bajo el paradigma de facilitación afectiva, y de análisis de representación emocional depresiva bajo la técnica de escalamiento multidimensional. Los primeros se realizaron para observar los cambios en el mecanismo de sesgo cognitivo emocional sobre las palabras depresogénicas relacionadas a experiencias traumáticas y los segundos, para analizar cómo se modificaban los esquemas depresogénicos. Los resultados muestran que EMDR impactó tanto el procesamiento cognitivo de la información emocional, como la organización conceptual en memoria a largo plazo. En la sección de la discusión se hacen señalamientos interesantes sobre la integración de las herramientas de la ciencia cognitiva de la emoción a la práctica clínica.

Palabras clave: depresión, EMDR, cognición-emoción, facilitación afectiva y esquemas depresivos.

Over a decade ago, the disability or loss of healthy life factor was included as priority consideration in public health. In this sense, unipolar depression (American Psychiatric Association, 2003) ranked fourth worldwide among disabling diseases for 2000 and, by 2012, it is estimated to occupy the second place, or even number one for developing countries. It has become an important public health problem suffered by approximately 150 million people in the world (Parker, 2002). Therefore, the World Health Organization (WHO) has established in its mental health program that attention to this depressive disorder be of primary concern.

From the cognitive behavioral perspective, therapeutic intervention has proven successful in the treatment of this emotional disorder (Greenberger & Padesky, 1998). The foundation for this is that thinking habits may be influenced to modify emotions and behaviors in order to achieve positive changes in afflicted individuals; however, the role of cognitive mechanisms in this healing process has not yet been clearly determined. In general, the literature on this subject (Dalglish *et al.*, 1997; Power & Dalglish, 1998; Siegle, 1996, 1999, 2001) suggests the engagement of sustained attention to autobiographical events and the individual's memory-related mechanisms. In this sense, Beck (1979; Rush & Beck, 2000) and Bennett-Goleman (2002) argue that people suffering from depression, when evaluating surrounding events, are influenced by emotionally negative long-term memory archetype schemata which affect their perception. Specifically, Mog and Bradley (2000) maintain that the disorder seems to trigger mechanisms related to loss and failure feelings.

Emotional-cognitive models have tried to specify not only how each component of the cognitive architecture influences the process of the disorder, but also their organized interaction to maintain the disorder's symptomatology. Scherer (1984a, 1984b, 1987, 2001) proposed one of the initial models for human emotional information processing, trying to identify what happens to short-term memory, long-term memory and attention and critical thinking processes when an event is being evaluated. He included schemas and propositions regarding long-term memory, resulting from both unconscious (automatic) and conscious (controlled) elaborations. According to this proposal, to experience an emotional cognitive behavior, it is also necessary to have parameters or registers for event evaluation in short-term memory; yet, in the case of depression, these seem to be used differently by attention, long-term memory and critical thinking processes.

Hudlicka (2004), from a direct derivation of Scherer's model, explains the function of emotional cognitive processing based on two great systems. The first evaluates emotional information over very short periods of time; the second amplifies the analysis and includes a conscious or controlled emotional state which considers personal

beliefs and schemata. In this model, the emotional valence evaluation bias mechanism becomes relevant.

In emotional cognitive science, each type of information processing (automatic and controlled) comprised in the cognitive function represents a different theoretical position to explain depression's emotional disorder (Wells, 2009; Williams, Wats, MacLeod & Mathews, 1997). The automatic emotional valence evaluation bias mechanism is explained in terms of recurring processing which causes emotional cognitive vulnerability (Martin, Shrira & Startup, 2004; Martin & Tesser, 1996); and the dysfunctional schemata and stored beliefs are framed within the dysfunctional representation theory (Beck, Rush, Shaw & Emery, 1979; Bower, 1981, 1987). A different perspective will now be explained, based on Shapiro's (1993, 1994, 1995, 2002) Adaptive Information Processing (AIP) model.

Every person has an inherent psychologically adapted system for processing information and usefully and accessibly storing it in memory. A neurologic balance in a well-defined physiological system enables experiences to be attached to positive cognitive and emotional schemas, to be constructively used by the individual in the future. However, if someone experiences a distressing, adverse or traumatic event, his neurophysiologic system loses its balance and he is incapable of optimistically processing new information and connecting it to what is adaptively stored in other memory neuro-networks. The event is then kept in a restricted node in his disturbed state and makes the person manifest negative cognitions, emotions, images and/or feelings (Monson & Friedman, 2006). In general, the AIP model offers a clinical map that explains and makes predictions from a functional neurophysiologic perspective. Therefore, it defines the pathology as information that has been dysfunctionally stored and which may be assimilated appropriately or adaptively when the processing system is functionally activated. It creates, thus, a new territory for psychotherapeutic intervention different from the cognitive behavioral approach (Monson & Friedman, 2006), by using Eye Movement Desensitization and Reprocessing (EMDR), for which there is extensive controlled research (Carlson, Chemtob, Rusnhak, Hedlund & Muraoka, 1998; Feske, 1998; Ironson, Freund, Strauss & Williams, 2002; Marcus, Marquis & Sakai, 1997; Maxfield & Hyer, 2002; Rothbaum, 1997; Shapiro, 1989a, 1989b; Spector & Read, 1999; Van Etten & Taylor, 1998).

EMDR constituted an important contribution to the purpose of this study. In light of the premise which states that there is still yet much to be known about depression in the field of emotional cognitive science, it was considered to investigate how cognitive-emotional mechanisms are affected by means of a different therapeutic approach which could render useful innovative knowledge for clinical practice. Because of the interest of this research

to identify how different levels of information processing could be positively influenced to overcome depression, the following specific questions were proposed:

Question 1. Is it possible to change the automatic processing of the emotional cognitive architecture in patients with depression through EMDR?

Question 2. Can EMDR have a positive effect over long-term memory representation of dysfunctional emotional schemata associated to depression?

For the present investigation, it was assumed that therapeutic EMDR intervention could resolve depression by modifying specific human information processing, where both conscious and unconscious (automatic and controlled) participation sustain this emotional disorder. Therefore, once overcome, the changes manifested in the following hypotheses were expected:

Hypothesis 1. EMDR psychotherapeutic intervention causes changes in negative emotional valence evaluation bias on information contained in the dysfunctional schemata of individuals with depression.

Hypothesis 2. EMDR psychotherapeutic intervention has effect on conceptual organization ratios and the negative information structure relevant to control and disturbance contained in a dysfunctional schema.

Method

Data collection was carried out through clinical practice with longitudinal one-subject study designs (Bishop, Miller, Norman, Buda & Foulke, 1986) which considered two types of cognitive studies, quasi-experimental and descriptive. These were organized in three phases (initial, intermediate and final) in order to evaluate the impact of therapeutic EMDR to overcome the depressive disorder.

The quasi-experimental studies, called emotional valence identification, within affective priming experiments (Fazio, Sanbonmatsu, Powell & Kardes, 1986; Musch & Klauer, 2003), were performed to observe changes in the emotional cognitive bias mechanism for negative autobiographical words. On the other hand, the descriptive studies, called of emotional representation, through analysis of the multi-dimensional scaling technique, were used to identify changes in the depressive schema.

Subjects

From a possible sample of fifteen candidates, only the three individuals diagnosed with classified major unipolar depression were selected. The diagnosis was clinically determined through a guided interview with the clinical history inventory from Shapiro's (2005) manual, and psychometrically with the *Beck Depression Inventory, second edition* (Beck, Steer & Brown, 1996). This instrument was considered because it was developed

precisely to evaluate symptoms corresponding to world criteria for major depression disorder diagnosis; this coding system is listed in the DMS-IV (APA, 1994). The evaluation was conducted by a doctor in psychology, certified as an EMDR psychotherapist, with a thirteen-year experience in clinical practice, once the patients agreed to participate in this research by signing a letter of consent.

Of the maximum score of 63 that may be reached through the answers to the *Beck Depression Inventory* items, the cutting points suggested by its authors to subclassify the diagnosis were also considered: minimum depression, 0 – 13 points; mild depression, 14 - 19 points; moderate depression, 20 – 28 points; severe depression, 29 – 63 points. The characteristics of the participants are as follows:

- *Patient 1.* 21 year old student, School of Medicine, 8th semester, single, medium-low socioeconomic level; only child of divorced parents from the age of 3, with moderate depression (26 points), single episode without medication, reflected by significant social and school deterioration. She reported allergic asthmatic bronchitis.
- *Patient 2.* 25 year old student, School of Dentistry, 9th semester, single, medium-low socioeconomic level; ninth in a family of ten children, with mild depression (13 points), single episode without medication, reflected by significant social and school deterioration. She reported no other health problem.
- *Patient 3.* 31 year old architect, electric installation auditor, single, medium-low socioeconomic level; oldest of two, divorced parents from the age of 3, with mild depression (19 points), single episode without medication, reflected by significant social and work deterioration. He reported no other health problem.

It is noteworthy that the size of the sample was considered adequate because the purpose of this research was not to generalize the results. The purpose was to observe, through the use of cognitive techniques, the impact of EMDR on patients with depression regardless of their different emotional architectures; additionally, to identify and disclose the individual ways in which each patient could modify his/her emotional cognitive participation at the procedural and representational levels.

Therapeutic Intervention

Instruments and materials. For the therapeutic intervention, the following instruments and materials were used: the Beck Depression Inventory, second edition (Beck, Steer & Brown, 1996); the clinical history inventory (Shapiro, 2004, 2005); Shapiro's (2005) clinical manual

as a guide for the accurate application of the EMDR standard procedure methodology; formats for the register patients took home between sessions; letters of consent signed by the patients, 120-minute 8 mm videotapes for therapy session recording; video recording camera; tripod; and rating scales for treatment fidelity from the EMDR Institute (www.emdr.com; www.emdria.org).

Procedure. The research was conducted with the therapeutic EMDR approach, the function of which was to help each participant reprocess negative experiential events that contributed to their emotional disorder, and which were identified in their verbal report on their most distressing autobiographical events. This type of intervention was adopted as a methodology, because it involves, more than only eye movement and other bilateral stimuli, a standardized procedure in eight phases (Shapiro, 2005), which were carried out as described below:

- Phase 1 – Clinical history and treatment plan. Together with the administration of the Beck Depression Inventory, the clinical history was collected, which included the ten most dramatic or distressing events in the life of the participant. The therapy was programmed to be carried out during 90-minute sessions, twice a week. The total number of sessions dedicated to each individual depended on the time each required to reprocess each one of the traumatic events; hence, patient 1 required 11 sessions; patient 2, 11 sessions; and patient 3, 15 sessions.
- Phase 2 – Patient preparation. The patient was explained the why and the how of the methodology; expectations regarding the outcome of the treatment were defined; and the “safe place” was established, this being a personal shelter within the patient’s imagination, where feelings of comfort, balance and peacefulness could be evoked. This safe place was created by the patient himself while being guided, with the purpose of enabling a restful break during the therapy session; having a support element to reduce distress, when enough session time was unavailable to end reprocessing; and for dealing with distress which could arise between sessions.

Unlike the two previous phases which occurred at the beginning of the therapy process, the following were conducted with each of the events identified as distressful. During the fourth, fifth and sixth phases, it was essential to support the patient with bilateral stimulation (visual, tactile and auditory) while reprocessing the distressing information, as well as when working with the positive belief or cognition.

- Phase 3 – Treatment target evaluation. The experience to be reprocessed was determined, as

well as its components in terms of visual image, negative cognition, positive cognition and its degree of credibility on a scale of 1 to 7, emotion and its distress level on a scale of 1 to 10, and body sensation.

- Phase 4 – Desensitization. With attention placed on the experience identified as traumatic, the patient was given freedom to spontaneously evoke information related to that event, and the changes in his/her disturbance were evaluated until its disappearance.
- Phase 5 – Instilling positive cognition. Once the disturbance disappeared, a previously defined positive cognition was instilled, adaptively linked to the original event and considering the patient’s current life circumstances.
- Phase 6 – Body sensation check-up. The individual was asked to mentally examine his body sensations while his/her attention was on the target event and the positive cognition, in order to be able to work with any residual tension.
- Phase 7 – Session closure. After crediting the patient for his/her efforts, necessary instructions were delivered on maintaining his/her emotional balance between sessions and a format was made available so he/she could record whatever would arise during this period.
- Phase 8 – Follow-up or re-evaluation. Treatment effects beyond the session were evaluated. Hence, once reprocessing all that was related to the traumatic event, attention was given to current distress-triggering stimuli and, finally, future scenarios. Thus, the three dimension standard protocol (past, present and future) for this therapeutic approach was accurately followed.

Given that EMDR procedure and standard protocol fidelity is considered fundamental to both clinical practice and research, all sessions were videotaped and later analyzed through fidelity ranking scales from the EMDR Institute, having complied with treatment fidelity standards. Maxfield and Hyer (2002) found, through meta-analysis they performed, that results obtained through this treatment are highly correlated to the degree of procedure fidelity.

Emotional valence identification studies

Variables. In these studies, the independent variable was constituted by congruent pairs of emotional and neutral words. The congruency was given by the relationship between them: positive/positive, negative/negative-autobiographical, negative/negative-non-autobiographical and neutral/neutral. On the other hand, the dependent

Table 1

Groups of negative words related to each participant's traumatic events

Patient 1	Patient 2	Patient 3
Unhappiness-Fear	Slap-Resentment	Mockery-Fear
Crying-Anger	Pool-Guilt	Rejection-Fight
Lovelessness-Loneliness	Sadness-Discouragement	Pig-Worried
Selfishness-Revulsion	Horrible-Insult	Fat-Obsession
Confusion-Lies	Unsuccessful -Suicide	Fool-Slapping
Harassment-Sadness	Shame-Humiliated	Ridicule-Inferiority
Birthday-Bitterness	Submission-Painful	Controlling-Revenge
Resentment-Apathy	Bitterness-Fear	Revenge-Sickness
Sadness-Anguish	Aversion-Deception	Injustice-Stone
Pain-Sorrow	Loneliness-Indifference	Weakness-Distrust
Deceit-Rejection	Irritation-Anger	Anger-Knock
Disagreement-Frustration	Insult-Fear	Obsession-Fat
Dejection-Frustration	Hate-Helplessness	Inequality-Revenge
Anguish-Selfishness	Annoyance-Injury	Controlling-Fool
Lies-Confusion	Death-Uncontrolled	Slapping-Pig

variable was the reaction time; that is, the time required to recognize if the second word of each pair presented was emotional or neutral.

Instruments and materials. The stimuli or words considered for emotional valence identification were presented through a computer using the Superlab Pro program. This is a reaction time study generator system, with the capability of automatically recording in milliseconds the answers to the task required.

For each individual, 95 pairs of stimuli (independent variable) were considered; among these were: 30 pairs of negative words, 15 related to their traumatic event and 15 unrelated; 30 pairs of positive words; 30 pairs of neutral words; and 5 pairs randomly associated for task familiarization practice. Except for the 15 specific autobiographical pairs for each patient, those of which are listed in Table 1, the rest were the same for all participants and the words selected were controlled by length and frequency of use in Spanish.

Procedure. The three moments when to administer the studies to each participant were determined as follows: 1) after performing the initial interview, before any therapy intervention; 2) half-way through the treatment; and 3) at conclusion of the therapy process. These moments constituted the three phases considered to analyze the therapy's effect.

During the testing, the participant was sat before a computer, the keyboard of which recorded his/her answers to the experimental task; this included: instructions on how to perform the test; familiarization with the task to avoid practice effects; and the test itself, which developed during each trial or sequence as described below:

- The participant was presented with a dot in the center of the screen, with the purpose of focusing his/her vision to the place where two words would then appear. The dot would disappear when the indicated key was pressed.

- The first word was displayed, remaining 250 ms to be read in silence.
- The screen would go blank for 50 ms.
- The second word was displayed, the participant having to decide if it had an emotional connotation or not, by pressing the indicated key. When the verbal stimulus disappeared, the initial dot reappeared to repeat the sequence.

On conclusion after 5 trials, the task had involved 90 experimental tests which were completed by each individual in approximately 15 minutes.

Depressive emotional representation studies

Variables. From the perspective of a research design, it may be considered that the three phases of the therapy (initial, intermediate and final) constituted an independent variable factor and, the conceptual organization quantitative indexes, the dependent variable; however, in this type of studies, one must be careful to consider it from this perspective only for the purpose of parametric evaluation. No causal attribution should be inferred.

Instruments and materials. Of the pairs of autobiographical stimuli used as independent variables in the previous studies, we chose 15 emotionally negative word pairs related to the most traumatic or distressing events in the life of each of the two participants who were considered for studying depressive information representation. Considering Beck (1979), it was assumed that they were related to the patient's dysfunctional self-memory schema with regards to their future and current world. Given that patient 3 presented rumination, it was considered that his depression was more a product of procedural architecture and, therefore, was not included in these studies for emotional representation analysis.

Procedure. The three moments for administering the studies to each participant were defined, the same as with the emotional valence identification studies.

The words were presented on a computer setup with the KU-Mapper program, which enabled the participants to slide the words on the screen and develop semantic maps. The procedure, conducted individually, was carried out as follows: the participant was seated before a computer, instructions were given on how to perform the task, she was allowed to become familiar with the task to avoid practice effects and, once she reported ready to begin, she was allowed to reorganize the words by freely sliding them across the screen with the use of a mouse, grouping them according to her own criteria. This activity rendered proximity matrixes that were used for subsequent analysis.

Results

The clinical evaluation carried out at the end of the psychotherapeutic intervention confirmed that the objectives stated by the participants as the reason for consultation were achieved. The positive effects reported by them and the results from a new Beck Depression Inventory, where scores patient 1 were reduced from 26 to 0; for patient 2, 13 to 0; and patient 3, 19 to 4, showed the favorable effect of the therapy on their daily life.

In the emotional valence identification studies, data obtained were submitted to an ANOVA (3 x 4) with repeated measurements, where the first factor (EMDR) was constituted by three phases (initial, intermediate and final); and the second factor (second word of each pair presented), by four experimental conditions (neutral words, positive words, negative autobiographical words, and negative non-autobiographical words). Because EMDR's effect is analyzed in different emotional architectures, each participant's data is presented separately.

Reaction times rendered by ANOVA's interaction analysis for patient 1 (Figure 1), showed emotional information processing interference for the different experimental conditions in the initial phase, but for the intermediate and final phases, EMDR's effect was evident in her way of codifying negative valences. She implemented a cognitive filter and eliminated them. This is represented in the graphic with a value of 0, for not collecting data under that condition, because the patient was mistaken in all her answers. Furthermore, she also

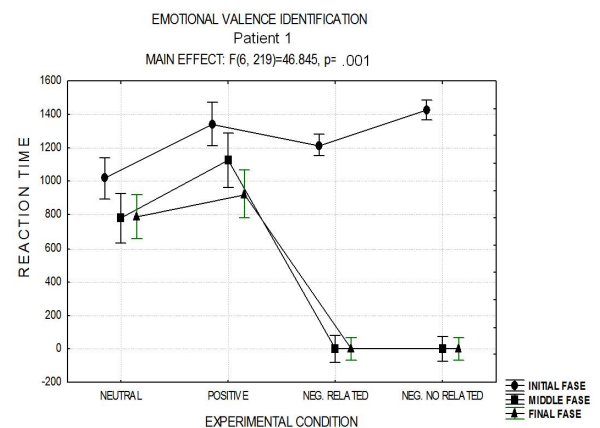


Figure 1. This shows EMDR's strong effect on negative autobiographical and non-autobiographical words. The patient applied a cognitive filter to these words, eliminating them by mistaking all her answers. 0 does not mean the reaction time was equal to 0 ms, but that data was not collected because the patient's answers were all mistaken. Changes in recognition patterns of positive and neutral information are also illustrated.

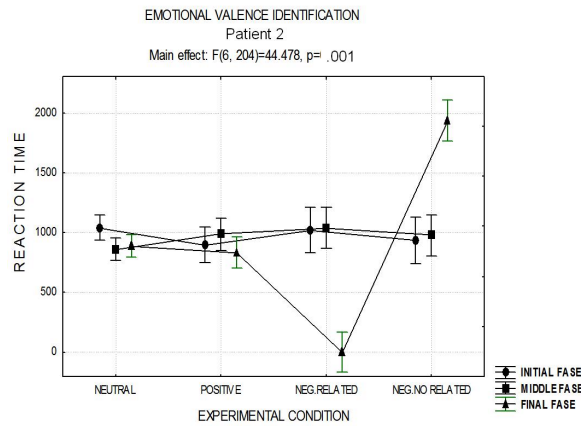


Figure 2. The data show how EMDR caused a cognitive filter only toward negative autobiographical information in this patient.

showed a tendency to more easily recognize the positive and neutral information.

For patient 2 (Figure 2), reaction times during the initial phase showed an easiness to recognize positive words, and negative stimuli were processed faster than neutral. As with the previous patient, during the final phase, after EMDR, she also eliminated the recognition of negative autobiographical words and increased her ability to recognize positive and neutral information. Regarding negative non-biographical stimuli, it required further analysis.

Patient 3 manifested rumination, and this suggested a great use of cognitive resources on negative information in general. This was evident through the high reaction times rendered during the initial phase (Figure 3). As may be seen, the EMDR effect was significant, because the delays in recognizing negative information show that, during the final phase, rumination was eliminated. This participant, as both previous patients, also increased his ability to recognize positive and neutral information.

Considering human information processing criteria, it was considered that, because of patient 3's rumination, his depression was a product of a procedural architecture more than a dysfunction in long-term memory representation. Therefore, he was not included in the second part of this research and, for the emotional representation studies, described below, only patients 1 and 2 participated.

For these studies, we used the multi-varied multidimensional scaling (MDS) analysis technique to analyze the effect of EMDR in the dysfunctional schema dynamics and to observe the evolution of depressive emotional representation in long-term memory for both participants. In both cases, by means of a Kruskal analysis,

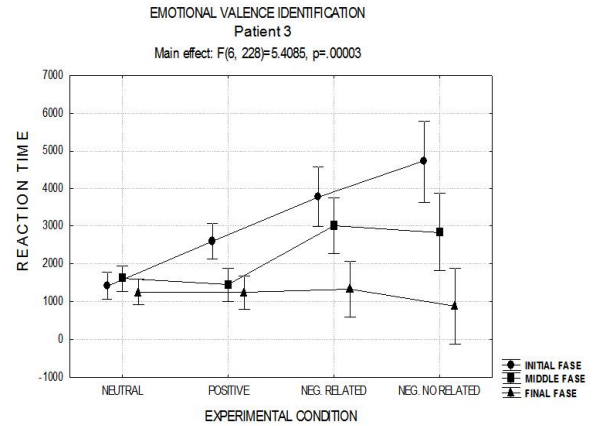


Figure 3. This illustrates the cognitive resources that patient 3 invested in negative information recognition in the three phases and, by decreasing reaction times, the disappearance of rumination may be observed.

the stress index converged to an acceptable solution in two dimensions: for patient 1, it began at 20.88 and decreased its values to below 1, oscillating around .30; for patient 2, it began at 23.33 and converged to values oscillating around .32. This rendered three mappings per individual (initial, intermediate and final), which evidenced the changes in their schemata dynamics. Initial and final phases may be seen in Figure 4, for patient 1, and in Figure 5, for patient 2, with the two dimensions considered as will be explained below.

Because MDS is a method that allows qualitative data analysis framed within knowledge representation theories (Friendly, 1979), in order to interpret the participants' emotional representations and the dimensions around which they organized the negative information, the theory of despair (Abramson, Metalsky & Alloy, 1989) was considered. This theory proposes that individuals with depression, besides reporting high levels of stress due to a feeling of despair for the inability to solve their problem, they manifest a loss of control over the events related to their depressive situation. Therefore, the representational analysis was conducted in terms of locus of control and disturbance. MDS enabled the definition of these subjacent dimensions and the interpretation of the space mappings obtained, which evidence the changes. This is also illustrated in Figure 4, where it may be interpreted that fear, though still distressful, has ceased to be an external locus and became controlled by the patient.

Discussion and Conclusion

From the EMDR perspective, it was expected that negative images, beliefs, emotions and sensations

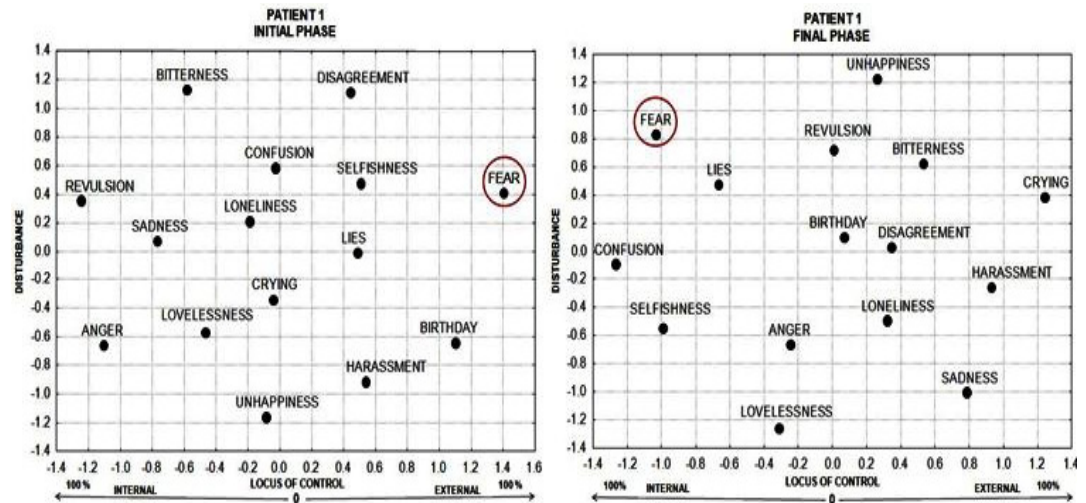


Figure 4. Initial and final phases of patient 1's depressive emotional representation, showing her changes regarding fear, the latter having changed from external locus to self-controlled (internal locus).

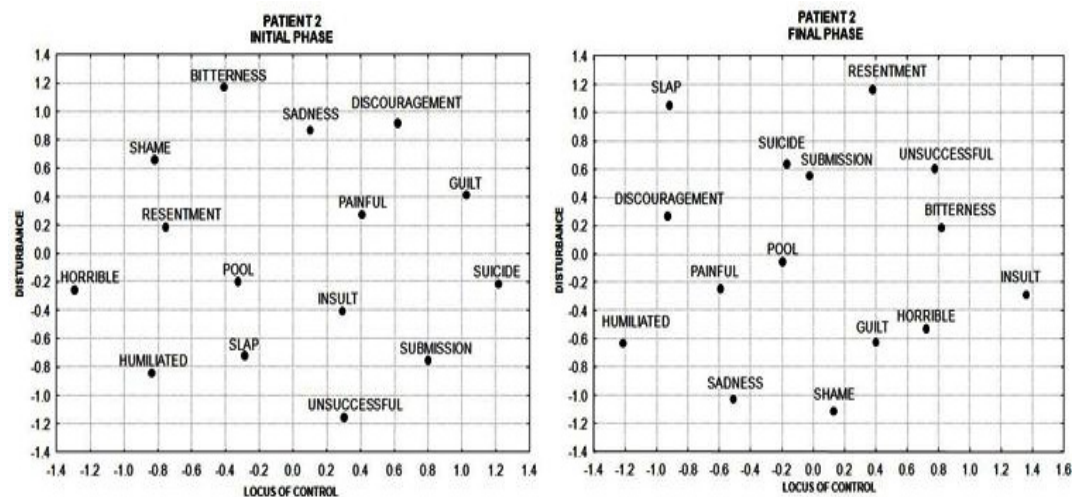


Figure 5. Initial and final phases in patient 2's depressive emotional representation.

associated to the memory of the patients' traumatic events would cease to be distressful and become associated to more functional information. The recovering process evaluation, conducted through three measurement units considered EMDR's own standard procedure, was able to prove that such was the case and the subjects recovered from depression.

These results were also reflected by the findings in the studies on emotional valence identification and depressive emotional representation. Differential modifications present in the cognitive-emotional

participation of the subjects, manifested at the processing and representational levels, confirmed the positive effect of the EMDR psychotherapy. Specifically, it may be point out that EMDR did cause changes in the emotional bias mechanisms, reflected by the patients' reaction times during their evaluation of negative information emotional valence; also confirmed was the positive effect of psychotherapeutic intervention on the emotional representation organization and the negative information structure, regarding the control and disturbance dimensions.

By incorporating experimental cognitive theories to EMDR's effect analysis, to the cognitive processing of emotional information in patients with depression, it was interesting to be able to evaluate the changes achieved through indicators different from the traditional inventories and those proper to the psychotherapeutic approach. On the other hand, it was also an opportunity for emotional cognitive science by being able to specify the structure and organization of depressive schemata (a great interest to this field of knowledge) beyond the mere affirmation of their existence. Given the changes quickly observed over an average of 12 sessions, EMDR provided that field the possibility to conduct single-subject longitudinal design studies which were required for follow-up on each patient's particular individual processing procedures. It is noteworthy that this is in line with Shapiro's proposal (2004) for the inclusion of such research designs that enable wider exploration of the different effects with EMDR differential treatments. In this sense, a relevant implication of the observations performed during this investigation was that, independent from the emotional architecture manifested by the participants, significant changes took place in their information processing, therefore, overcoming depression.

The single-subject longitudinal design studies involving both EMDR and the quasi-experimental and descriptive studies aforementioned constituted a relevant methodological implication to this research, joining two different fields of knowledge. Methodologies and experimental techniques from the field of emotional cognitive science were introduced to EMDR clinical practice. This opened a window of opportunity to continue generating innovative knowledge, such as that of the positive effect that the EMDR psychotherapeutic approach proved to have in these patients diagnosed with depression. Therefore, we must emphasize the importance of incorporating knowledge of the Sciences, so that the different fields, disciplines or approaches may be enriched by this knowledge and render benefits for the community.

Bear in mind that the data in this article are specific to the cognitive architectures of the individuals tested in this study; they should not be generalized. What may be generalized is the way of measuring, with the experimental techniques imported from emotional cognitive science, EMDR's individual effect at the procedural and representational levels in patients with depression.

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