

Treating Cognitive Symptoms of Generalized Anxiety Disorder Using EMDR Therapy With Bilateral Alternating Tactile Stimulation

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This article reports preliminary evidence for the effectiveness of eye movement desensitization and reprocessing psychotherapy (EMDR) therapy, applying bilateral alternating tactile stimulation in treating cognitive symptoms in patients with generalized anxiety disorder (GAD). A single-case experimental design was used in seven clinical cases. The Penn State Worry Questionnaire, Intolerance of Uncertainty, Cognitive Avoidance Questionnaire, and Negative Problem Orientation Questionnaire were administered at five points during pretreatment (which established the baseline phase serving as each participant's control), at three points during the treatment phase, at the end of it, and at the 3- and 6-month follow-ups. Each participant received 16 treatment sessions. Visual, statistical, and clinical significance analyses were conducted. The cognitive symptoms treated were: excessive worry, intolerance of uncertainty, cognitive avoidance, and negative orientation to problems. All four cognitive symptoms subsided, with large effect sizes in all cases, between pre- and posttreatment, which can be observed in the visual and statistical analysis of each case. Pre- and post-cognitions are specified in each case. According to the clinical significance analysis, all participants evidenced a change towards an improvement. Finally, evidence is given in favor of the usefulness of EMDR therapy for the treatment of cognitive symptoms in participants diagnosed with GAD. However, these results must be considered cautiously when generalizing data.

Keywords: eye movement desensitization and reprocessing (EMDR) therapy; bilateral alternating tactile stimulation; single-case experimental design; generalized anxiety disorder; effectiveness

Eye movement desensitization and reprocessing (EMDR) therapy is an integrative psychotherapy developed by Shapiro from 1987 onwards for the treatment of traumatic memories, facilitating the remission of the symptom patterns of a wide range of disorders, especially posttraumatic stress disorder (PTSD; De Jongh et al., 2019; Pagani et al., 2012). The effectiveness of EMDR therapy for the treatment of PTSD has been recognized by a consensus of experts, including the American Psychiatric Association, the American Psychological Association, and the International Society for Traumatic Stress Studies, among others.

Although there has been expert consensus recognizing the effectiveness of EMDR therapy for the treatment of PTSD (De Jongh et al., 2019), further research

is needed for other disorders. In clinical practice, therapists occasionally find anxiety symptoms for which they report an improvement after EMDR therapy. However, such improvement has not been thoroughly studied yet. Two recently published meta-analyses point to the efficacy of EMDR therapy in reducing symptoms of anxiety, panic, phobia, and behavioral and somatic symptoms. However, they argue for the need for more research to explore the long-term efficacy of EMDR therapy in anxiety disorders (Cuijpers et al., 2020; Yunitri et al., 2020).

Shapiro's (2001) adaptive information processing (AIP) model suggests there is an information processing system that, when working properly, assimilates and integrates new experiences into existing memory networks, which form the basis of perception,

attitudes, and behavior and guide the person in the future. According to this model, if a distressing incident is inadequately processed it is then stored in state-specific form, disconnected from other memory networks that hold adaptive information. Internal and external stimuli can trigger the original perceptions, causing inappropriate emotional, cognitive, and behavioral reactions and overt symptoms.

The AIP model views presenting symptoms, such as generalized anxiety, as occurring when inadequately processed and stored memories are activated. This conceptualization is essential to EMDR treatment, whose mechanisms of action involve the assimilation of adaptive information (stored in different memory networks) into the network holding the isolated disturbing event. Successful treatment means that the memory is no longer isolated, but appropriately integrated into the larger memory network. In this way, symptoms are reduced or eliminated, and the person's overall function improves (Shapiro, 2016; Solomon & Shapiro, 2014).

Generalized Anxiety Disorder

In the last decades, there has been a substantial increase in the number of scientific research studies on anxiety disorders and, especially, on generalized anxiety disorder (GAD) (Dugas et al., 2010). According to *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5)*, GAD is characterized by the presence of excessive anxiety and worry (apprehensive expectation) occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance). GAD often starts before the age of 25. The incidence rate is twice as high in women than men; annual GAD prevalence is 0.9% in adolescents and 2.9% in adults of the general population. Lifetime morbid risk is 9.0% in the United States, and it reaches between 0.4% and 3.6% in other countries (American Psychiatric Association, 2013). Data provided by the Pan American Health Organization reveal that GAD has a lifetime prevalence of 2.9% in Latin America and the Caribbean, making it one of the most common disorders affecting adults in that area, together with major depression, dysthymia, and substance abuse (Kertz et al., 2013). This disorder tends to be chronic; it has low remission rates and moderate recurrence rates (Clark & Beck, 2012). GAD remission rates are approximately 83%, but the symptoms recurred in 41% of the recovered patients within 7 years (Ansell et al., 2011).

Cognitive Symptoms of GAD

In 1998, Dugas et al. introduced a cognitive model to explain GAD's main symptoms (Dugas et al., 1998). This Intolerance of Uncertainty Model has proven to be clinically useful (Behar et al., 2011). It identifies four basic cognitive processes: (a) intolerance of uncertainty, (b) dysfunctional beliefs about the usefulness of worrying, (c) poor orientation to problem-solving, and (d) cognitive avoidance.

The Etiology of GAD

Researchers agree that factors influencing the appearance of GAD include a genetic predisposition to anxiety disorders, a character increasingly vulnerable to anxiety, and the interaction between environmental factors and upbringing. Among others, the following factors are considered possible causes: overprotective parents and/or parents who worried in excess, parent-child role reversal, the combination of overprotection and lack of warmth, parents who dismiss their children's emotions, children who grow with feelings of shame and/or who cannot be sure that their parents will be emotionally available when they need them, insecure attachment, and the perception of the world as a threatening place (Robichaud et al., 2019). Such experiences play a prominent role in the development of the disorder, preventing the processing of distress and causing excessive worry, the main symptom of GAD. Thus, it seems logical to draw a parallel between the factors influencing the etiology of GAD and the AIP model proposed by Shapiro (Newman et al., 2016).

Treatment of GAD

Various approaches have been developed in the last decades for the treatment of GAD, with the main focus placed on excessive worry and overactivation. The most researched treatments for GAD are cognitive behavioral therapy and applied relaxation, both recommended by the National Institute for Health and Care Excellence (2011). Among the most recognized theoretical models for the treatment of GAD, we find:

1. The Avoidance Model, developed by Borkovec and collaborators from 1994 onward, views worry as a cognitive avoidance response to possible future threats. The first avoidant function presents worry as a cognitive attempt to prevent bad events from happening and/or prepare for them, the second

avoidant function explains that worry mutes the reaction to fear-inducing images. There is a negative reinforcement in both types and the fear-related stimuli are not properly processed, causing worry to persist. The key components of the model are, among others, cognitive avoidance, positive beliefs about worry, and inefficient problem solution/processing of problems. Cognitive behavioral interventions include relaxation techniques; gradual stimulus control; self-control desensitization; and self-monitoring of external situations (Newman & Llera, 2011; Patrick, 2016).

2. The Intolerance of Uncertainty Model (IUM), proposed by Dugas and collaborators from the mid-1990s onward, posits that individuals with GAD experience chronic worry in response to uncertain situations, which they find stressful and upsetting. They experience intolerance of uncertainty, cognitive avoidance, positive beliefs about worry, lack of confidence in their ability to solve problems, and pessimism regarding their efforts to solve problems, or negative problem orientation. Treatment exposes individuals to core fears and tries to increase levels of tolerance and acceptance of uncertainty. Among others, the components of the treatment include study of intolerance of uncertainty, assessment of worry beliefs, self-monitoring, improving problem orientation, and helping patients to reach a positive orientation toward problems (McEvoy & Erceg-Hurn, 2016; Newman & Llera, 2011).
3. The Metacognitive Model, developed by Wells from the mid-1990s onward, stresses that worry is a coping strategy made up of a series of catastrophic thoughts, mostly verbal. Two types of worry are distinguished: type 1 worry or verbal worry, and type 2 worry or meta worry. When people face situations that might cause anxiety, positive beliefs about worry arise. This is known as type 1 worry. During an event of type 1 worry, individuals with GAD begin to worry about their type 1 worry (“worry about worry” or type 2 worry). The Metacognitive Therapy for GAD aims at altering type 2 worry, and it also provides the individual with strategies for coping with worry. Treatment includes case formulation, socialization, discussing the uncontrollability of worry, and positive worry beliefs (McEvoy & Erceg-Hurn, 2016; Patrick, 2016).
4. The Emotion Dysregulation Model, developed by Mennin and collaborators, is based on the emotion theory and the regulation of emotional states.

It states that individuals with GAD: (a) experience emotions that are more intense than those of most other people, (b) do not understand their emotions as most other people, (c) have more negative attitudes towards emotions, and (d) experience maladaptive emotion regulation and management strategies that might lead to emotional states worse than those they were intended to regulate. Treatment includes relaxation exercises, reframing of beliefs, psychoeducation of emotions, training of emotional skills, and experiential exposure (Newman & Llera, 2011; Patrick, 2016).

EMDR Treatment of GAD

There is scarce clinical research about the potential usefulness of EMDR therapy in the treatment of GAD as regards the reduction of its main symptom, excessive worry (Cuijpers, et al, 2020; Yunitri et al., 2020). However, there have been breakthroughs in the last years in this regard. In a Canadian study, Gauvreau and Bouchard (2008) evaluated the potential effectiveness of EMDR for treating GAD. They used a single-case design with multiple baselines across four subjects and evaluated the effectiveness of 15 EMDR therapy sessions. Results indicate that the levels of anxiety and excessive worry decreased to levels below the diagnostic threshold and, in two cases, to the full remissions of the symptoms. All four participants no longer had a GAD diagnosis at posttreatment and at 2-month follow-up. In a similar study carried out in Iran, Farima et al. (2015) studied the effectiveness of EMDR therapy in the reduction of pathological worry in three patients with GAD, using a single-case experimental design. Various questionnaires were used in the baseline, pretreatment, posttreatment, and 1-month follow-up assessments. The results revealed a reduction in pathological worry and cognitive avoidance, together with an improvement in the tolerance of uncertainty in the three patients. One-month follow-up also showed that the decline trend of participants’ worries continued. The study concluded that EMDR therapy is an effective method for the treatment of GAD in women.

Although EMDR therapy received its name after Shapiro’s first experiences with eye movement, other alternating sensory stimulation methods, such as bilateral sound or tactile stimulation, have become widely used. Research shows that up to 50% of trained therapists used bilateral auditory stimulation instead of eye movement (Van den Hout et al., 2011; Van den Hout et al., 2012). However, in most studies carried out

with solid methodology designs, therapists used eye movement; other methods were not used as much as eye movement. There is consensus among researchers about the need to conduct more studies which provide evidence regarding the impact of each type of eye movement (e.g., horizontal vs. vertical) and the effectiveness of both tactile and auditory stimulation (González et al., 2017; Harricharan et al., 2019). In this study, it was the author's decision to use only tactile stimulation in all cases in all sessions in order to gather evidence on its usefulness.

Method

Hypothesis

This study tested the hypothesis that EMDR therapy, providing bilateral alternating tactile stimulation, would produce a clinically significant reduction in cognitive symptomatology in participants diagnosed with GAD and that the improvement in the symptoms would still be observed 3 and 6 months after the last session.

Design

This study used an A-B-A single-case experimental design (Tate et al., 2016) with follow-up after 3 and 6 months, for seven cases (one experimental case and six replications). Phase A1 (baseline) with 5 data points provided observations of the pretreatment behavior pattern. Phase B (treatment) with 3 data points, lasted 16 weeks and applied the standard EMDR therapy protocol. Forty-five-minute-long assessments were conducted between sessions 6 and 7; between sessions 9 and 10; and between sessions 12 and 13. A posttreatment assessment was done between sessions 15 and 16 (termination). Phase A2 (follow-up) included 2 data points with assessments after 3 and 6 months.

Treatment

The EMDR therapy standard protocol was provided in sixteen 90-minute sessions to each case. Sessions 1–3 provided EMDR phases 1 and 2; sessions 3–15 provided phases 3–8; and session 16 was closure. Following advice from other researchers and due to the need for EMDR research studies to evaluate forms of stimulation other than eye movement, it was the author's decision to use only tactile stimulation in this study (González et al., 2017; Harricharan et al., 2019; Van den Hout et al., 2011; Van den Hout et al., 2012). Tactile stimulation was provided by

the therapist tapping with two fingers, alternately on the participant's hands, which were on their knees, palms up.

EMDR's Phase 1 and Phase 2 took place in the first three sessions (Phase 1: clinical history, treatment plan and identification of memories or events that were not elaborated or integrated; Phase 2: preparation for EMDR therapy). The first traumas to be processed, following the steps of the three-pronged protocol (past, present, and future), were those reported in the patient's medical history (Phase 1). Then, GAD cognitive symptoms were processed, following the steps of the three-pronged protocol.

Treatment in all sessions for all cases was administered by the same clinical psychologist (the first author), who had full basic training. To ensure treatment fidelity, sessions were recorded and viewed, with the consent of each participant, by two supervising psychologists (experts in EMDR therapy) who acted as external experts in this research.

Participants

Inclusion criteria: Individuals with a principal diagnosis of GAD, with or without comorbid diseases, between 21 and 50 years old. Reasons for exclusion: suicidal ideation, substance abuse, a diagnosis of psychosis or bipolar disorder, hyperthyroidism, being under other psychotherapeutic treatment, having been under psychotherapeutic treatment in the previous 4 months, and/or being under psychopharmacological treatment.

A call was made among mental health professionals for the derivation of participants and 23 individuals with a presumed diagnosis of GAD were derived. A preliminary evaluation was conducted for each and 11 individuals were derived. An external psychiatrist conducted the diagnostic evaluation for these 11 potential participants, and analyzed the inclusion and exclusion criteria to confirm whether they met the study requirements. Seven individuals (five female) were selected this way, so seven single-case study experiments were conducted. In the initial interview, participants were informed about the aims, scope, and implications of the research. Those who freely and voluntarily accepted to participate were given an informed consent form to be read and signed, if they agreed, before the beginning of the treatment. Participants were guaranteed anonymity and data confidentiality, letters were used instead of their names, and only the necessary information about their lives was given.

Measures

Two external evaluators administered screening measures and repeated measures at the first assessment and final assessment points. The screening measures consisted of two GAD specific tests.

The Generalized Anxiety Disorder Anxiety Scale -7 items (GAD-7), in Its Argentinian Adaptation (Rodríguez de Behrends & Brenlla, in press). The GAD-7 is a screening measure to detect GAD. The questionnaire has seven items with four possible answers each. The Argentinian adaptation shows acceptable reliability ($\alpha = .78$), and stability after 5 weeks ($r = .53$; $p = .001$).

Generalized Anxiety Disorder Questionnaire IV (GAD-Q-IV) in Its Argentinian Adaptation (Rodríguez de Behrends & Brenlla, 2015c). The GAD-Q-IV shows acceptable internal consistency ($\alpha = .745$) and test-retest reliability after five weeks ($r = .89$; $p < .001$) (Rodríguez de Behrends & Brenlla, 2015c).

Repeated measures were administered by the psychologist (first author) who provided the treatment. Each phase was assessed through the Penn State Worry Questionnaire (PSWQ), the Intolerance of Uncertainty Scale (IUS), the Cognitive Avoidance Questionnaire (CAQ), and the Negative Problem Orientation Questionnaire (NPOQ). Participants were assessed with the following self-report questionnaires to determine the baseline phase (5 points) and during-treatment phase (3 points). Once finished, measures were made again 3 and 6 months later.

PSWQ in Its Argentinian Adaptation (Rodríguez-Biglieri & Vetere, 2006). The PSWQ is a self-administered questionnaire consisting of 16 items which measures psychological worry. Each item has five options measured on a Likert scale in which 1 means “not at all typical of me” and 5 means “very typical of me.” Studies conducted with the Argentinian population indicate excellent internal consistency ($\alpha = .94$) and very good test-retest correlation ($r = .86$). The cutoff point for patients with GAD is 62 points (Rodríguez-Biglieri & Vetere, 2006).

The IUS (Buhr & Dugas, 2002). The IUS is a scale of 27 items expressing dislike when facing uncertain situations, with 5 options ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). The Argentinian adaptation of the scale was made by Rodríguez de Behrends and Brenlla (2015b), who reported the following reference average values: for women $M = 48.31$, $SD = 14.49$; for men $M = 48.47$, $SD = 17.68$. The results of the study with the Argentinian

population showed excellent consistency ($\alpha = .93$) and a test-retest stability of $r = 0.47$ after 5 weeks.

The CAQ (Sexton & Dugas, 2009). The CAQ is a 25-item self-administered questionnaire, with 5 options ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me.) The results with the Argentinian population show satisfactory internal consistency ($\alpha = .94$) and test-retest stability after 5 weeks ($r = 0.78$; $p < .001$). The values are: for women $M = 47.13$, $SD = 16.58$; for men $M = 47.18$, $SD = 17.37$ (Rodríguez de Behrends et al., 2014).

The NPOQ (Robichaud & Dugas, 2005) in Its Argentinian Adaptation (Rodríguez de Behrends & Brenlla, 2015a). The NPOQ is a 12-item questionnaire on a 5-option Likert-type scale-1 (not at all characteristic of me), 5 (extremely characteristic of me)—which evaluates negative orientation to problems. The Argentinian adaptation showed excellent internal consistency ($\alpha = .91$) and a .62 test-retest stability after 5 weeks. The mean and deviation values for women are $M = 21.87$, $SD = 8.00$; and for men $M = 19.87$, $SD = 7.25$ (Rodríguez de Behrends & Brenlla, 2015a).

Data Analysis

The data analysis was conducted through: (a) a visual analysis of the GAD measures (obtained through PSWQ, IUS, CAQ, and NPOQ) graphed using the conservative dual-criterion (CDC) method (Swoboda, Kratochwill & Levin, 2010), which analyzes the mean and trend lines: that is, the direction that the successive series of data shows (Manolov & Moeyaert, 2016); (b) a statistical analysis using Nonoverlap of All Pairs (NAP), an index of data overlap between phases in single-case research (Parker & Vannest, 2009) of the same questionnaires analyzed in the visual analysis; and (c) a clinical significance analysis, through the Reliable Change Index (RCI) of Jacobson and Truax (1991), of GAD-7 and GAD-Q-IV.

The visual analysis allows us to observe the magnitude of the change: that is, the process through which, by visually analyzing the data, it is possible to judge the reliable effects of a therapeutic intervention (Manolov & Moeyaert, 2016). It aims at identifying that the presence or absence of change is consistent and systematic: that is, if it is the result of the treatment or of chance. The figures show the scores for PSWQ, IUS, CAQ, and NPOQ between Phase A1 (baseline), Phase B (treatment), and Phase A2 (follow-up). The trend lines (projections) are shown as dashed lines in the figures,

and are calculated with the CDC method (Swoboda et al., 2010). If all the points are below the projected lines, it is concluded that there was a systematic change.

The choice of a statistical analysis is based on its credibility in the scientific community. It is used to calculate the effect size, a quantitative index that estimates the statistical significance of a change associated with an intervention (Manolov & Moeyaert, 2016; Vannest & Ninci, 2015). Single-case designs require the use of nonparametric statistics for the analysis of data. The indexes for the estimation of the effect size based in nonoverlap are the most appropriate for A-B-A design with small quantities of data obtained in each phase (Manolov et al., 2016). The choice of a statistical test depends on the kind of data and the amount of measures obtained. The NAP index takes into account all possible overlaps, considering atypical data, and may be used with very short series, with less than 5 measures per phase (Parker et al., 2011). Conventional values to interpret effect size are as follows: small (between 0 and 0.65), medium (between 0.66 and 0.92), and large (at least 0.93) (Ok et al., 2020). Last, the clinical significance analysis allows us to understand the behavioral changes produced as a result of the intervention on the patient's life. It aims at reflecting if a change produced by a treatment is clinically significant and continues over time. In this study, the RCI by Jacobson and Truax (1991) was used: it provides the evidence to consider if a patient has *recovered* (if the score suggests a change above 1.96 in RCI and the cutoff point of the measure); *improved* (if the score suggests a change above the RCI score but not above the cutoff point); *unchanged* (if the score does not exceed the RCI score), and *deteriorated* (if the score is above that of RCI but toward a deterioration) (Jacobson & Truax, 1991).

Results

There was no attrition in the study. The seven cases completed all treatment sessions and all assessment measures. See Table 1 for demographic data.

Case T

Case T was a 24-year-old, single, female administrative employee. The eldest of three children, her parents separated when she was starting secondary school. They had economic difficulties when she was a child and she remembers her classmates at school making fun of her because of their economic problems. Her reasons for consultation lay in her need to control her worries, and her feelings of failure and distress related to her future studies at university. Being able to enter university caused permanent worry and discomfort, which reminded her of the worry caused by the separation of her parents. Her main worries were related to economic issues, health problems (hers and her mother's), and her academic performance. She reported discomfort caused by excessive worry since she was 17. Targets related to her parents' fighting and her classmates' mockery were processed. Her cognitions were "I'm a failure, I can't do it," but they changed toward the end of the treatment to "I can study."

The visual analysis showed that systematic change occurred between baseline and treatment phases on the PSWQ, IUS, and CAQ and between baseline and follow-up phases on all four measures (Figure 1). The NAP (1; $p = .025$; $SD = 6.078$, $CI_{90} = 0.264, 1.736$) analysis shows a significant change between baseline (A1) and follow-up (A2). The effect size was large. The RCI score obtained for GAD-7 was 9.57, and for GAD-Q-IV, 5.12, indicating that Case T improved.

TABLE 1. Demographic Data of Each of the Cases

Case	Age	Sex	Marital Status	Children	Education	GAD Onset
T	24	Female	Single	None	Finished Secondary Studies	Age 17
U	32	Female	In a relationship	None	Finished University Degree	Age 23
V	35	Male	In a relationship	None	Finished University Degree	Age 18
W	38	Female	Married	1 child	Finished Secondary Studies	Age 16
X	33	Male	Married	1 child	Finished Secondary Studies	Age 16
Y	24	Female	Single	None	Unfinished University Degree	Age 18
Z	44	Female	Married	2 children	Finished Secondary Studies	Age 24

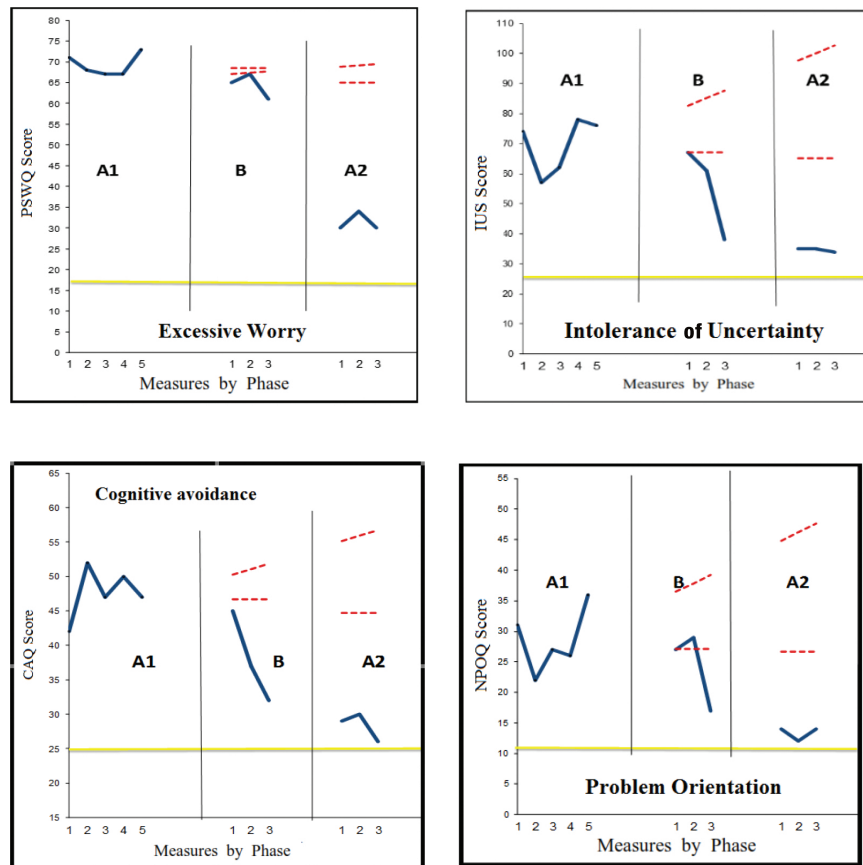


Figure 1. Visual analysis using the conservative dual-criterion (CDC) method—Case T.

Case U

Case U was a 32-year-old woman in a long-term relationship. Originally Colombian, she came to Buenos Aires in 2012 to attend university. Her parents separated when she was young because of domestic violence. She remembered several instances of economic problems and two situations in which her father was violent toward her mother. She reported symptoms of discomfort and excessive worry since age 23 and was currently experiencing distress and worry because of work and economic situations. She felt afraid whenever her employer shouted aggressively at her workmates and her, and she worried that this fear was causing her job performance to deteriorate and that she would lose her employment. The reprocessed targets were related to situations of family violence and her boss’s violence. Her beliefs before treatment were “I am useless, I am meaningless,” but they changed toward the end of the treatment.

The visual analysis concludes that systematic change occurred between baseline (A1) and treatment (B) phases on the PSWQ, IUS, and NPOQ, and between baseline (A1) and follow-up (A2) on all four

measures (Figure 2). The NAP computed between baseline and intervention phases was 1, indicating a significant change between baseline and follow-up ($p = .025$; $SD = 6.708$, $CI_{90\%} = 0.264, 1.736$). The effect size was large. In the clinical significance analysis, the RCI score obtained for GAD-7 was 8.29 and, for GAD-Q-IV, 5.12, indicating Case U improved.

Case V

Case V was a 35-year-old man, married for 2 years, with no children. He was the eldest of five children. Originally Uruguayan, he moved to Buenos Aires in his adolescence, a few months after his youngest sibling died in a car accident. He had a master’s degree in finance and had worked at a bank for 8 years. He sought treatment for his permanent anxiety, irritability, and continual thinking of problems. He said he had experienced distress since he was 18 years old, with the smallest physical pain triggering a fear of getting ill and dying. This related to memories of his brother’s accident and the days at the hospital before he died. The cognition at the beginning of the treatment was

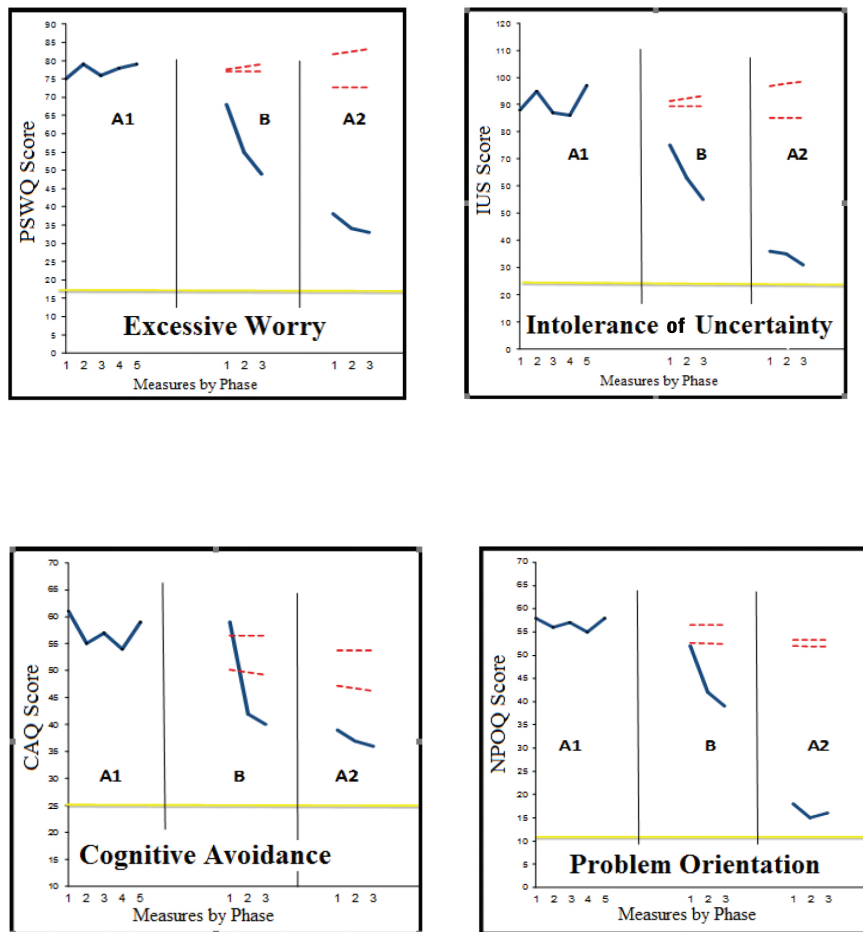


Figure 2. Visual analysis using the conservative dual-criterion method—Case U.

“I cannot take care of my life,” and, toward the end, “I can take care of myself.” Targets related to his brother’s death and subsequent family situations were reprocessed.

The visual analysis between baseline (A1) and treatment (B) phases and between baseline (A1) and follow-up (A2) showed that systematic change occurred on all four measures (Figure 3). The statistical analysis resulted in a NAP value is 1 (1; $p = .025$; $SD = 6.078$, $CI_{90\%} = 0.264, 1.736$) indicating a large effect size in all the variables studied. Regarding the analysis of clinical significance, the RCI score obtained for GAD-7 is 10.21, and, for GAD-Q-IV, 4.33, which showed that case V recovered.

Case W

Case W was a 38-year-old married woman with a 2-year-old daughter. She was the eldest of three children. She had GAD symptoms since she was 16. She had asthma attacks as a child, beginning at age 6. During these attacks, she experienced the feeling of

suffocation and a belief she would die, complicated by feelings of guilt because her parents said she caused the attacks. At the time of treatment, W worried excessively if her husband was more than 10 minutes late, thinking something serious might have happened to him. She remembered when she was a child that her father had a serious accident and she had seen him covered in blood. She reported she worried “a lot and about everything, ever since she was a child.” Her main worries were of something bad happening to her husband, of being unable to look after her daughter, and of suffering from a serious disease and economic issues. Her cognitions before treatment were “I will die if something happens to my husband,” “I cannot stand uncertainty,” and “I cannot live without someone to look after me,” and, toward the end of the treatment, they changed to “I can deal with difficult situations” and “I can tolerate uncertainty.”

Through the visual analysis, since the 6 points in phase B and phase A2 are below the mean and trend lines, we conclude that there was a systematic change

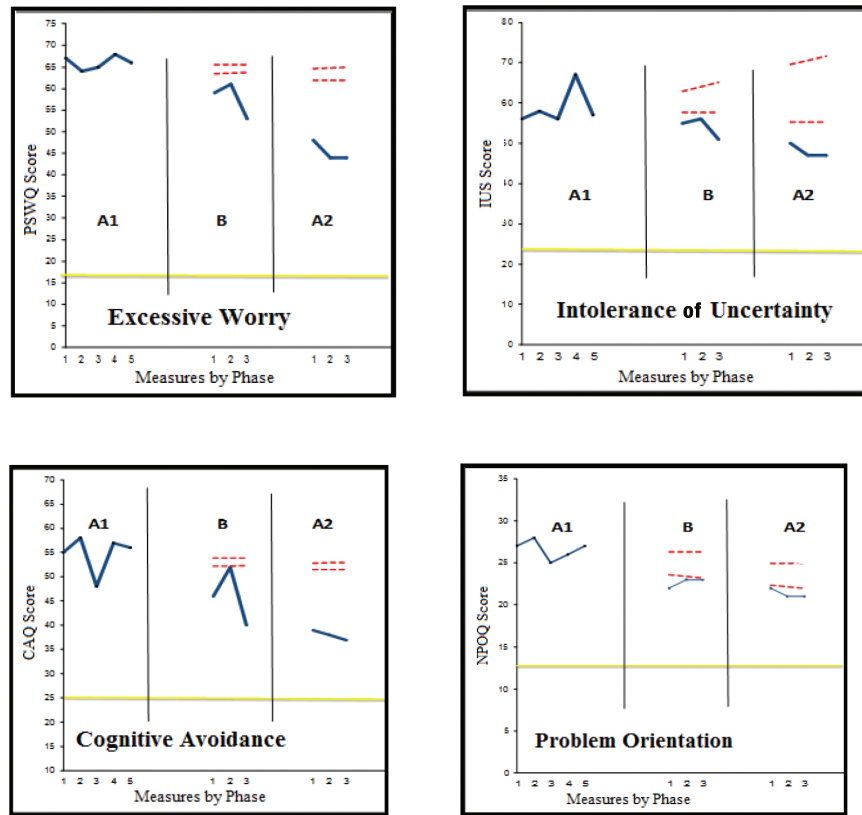


Figure 3. Visual analysis using the conservative dual-criterion method—Case V.

(Figure 4). The statistical analysis shows that NAP (1; $p = .025$; $SD = 6.078$, $CI_{90\%} = 0.264, 1.736$) values present a large effect size in all the variables studied. Regarding the analysis of clinical significance, the RCI score obtained for GAD-7 is 10.21, and, for GAD-Q-IV, 4.33, which indicates that Case W has recovered.

Case X

Case X was a 33-year-old man, married for 6 years, with a 4-year-old son. He worked independently with his father and brother. He was the oldest of three siblings. His parents never got on well and they finally separated when he was 17 years old. He mentioned traumatic events: when he was 6, the illness and death of his maternal grandfather, who adopted the role of a father and helped them economically. When he was 12, they moved from an apartment to a house, and he started fearing being robbed. When he was 16, three robbers attacked him as he was going into the house, entered with him, and took as much as they could. From then on, he started fearing death. His reason for consultation was worry about his work situation and fear of diseases which might prevent him from

working, causing his son to go through economic difficulties as he did when he was a child. His current trigger was an economic difficulty in his field of work, which reminded him of a childhood time when his father lost his job.

These three traumatic memories were reprocessed. His cognitions were “I am useless,” “I am not bright enough to study,” and “I am not a whole person because I did not study.” At the end of his treatment his beliefs changed to “I am able to study” and he started a course at university. The visual analysis for the scores obtained through the PSWQ, IUS, CAQ, and NPOQ in Figure 5 shows that there are 3 points in the treatment phase and there are 3 points in the follow-up, with none above the two lines. We conclude that there is systematic change.

The statistical analysis of the data shows a large effect size in all relationships studied ($NAP = 1$; $p = .025$; $SD = 6.078$, $CI_{90\%} = 0.264, 1.736$), between all the phases of all analyzed variables. The analysis of the clinical significance shows an RCI score of 13.39 for GAD-7, which indicates that the patient has recovered. The RCI score obtained indicates an improvement in the symptomatology.

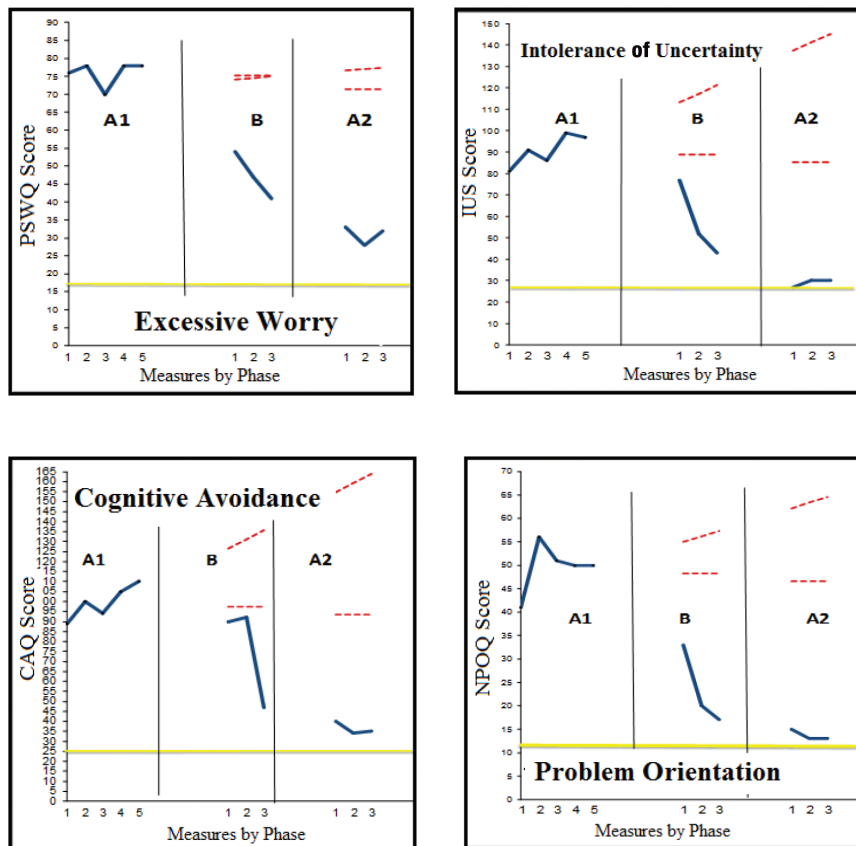


Figure 4. Visual analysis using the conservative dual-criterion method—Case W.

Case Y

Case Y was a 24-year-old, fifth-year female medical student. She was the youngest of three children and lived with her parents and siblings. During Y's childhood her mother overprotected her older brother, who took drugs, and her parents often argued because her mother did not set any limits for him. Her mother paid less attention to her sister and her and Y recalled having problems with school homework and receiving no help. Her mother scolded her if she did not get high marks, grounded her to force her to study, and told her she would grow up be stupid if she did not study. She started worrying at around 18. Y sought treatment because she could not stop worrying. She worried about not being able to live off her profession and not obtaining high marks at school, which would limit her choices for her medical residency. Reprocessed targets were related to episodes of violence with her brother and school situations. Her negative cognition at the beginning of treatment was "I am stupid," and, at the end of it, "I am intelligent enough to get good marks." The visual analysis concludes that systematic change occurred between phases in all the variables studied (Figure 6). The NAP

computed between baseline and intervention phases was 1, which shows a significant change between baseline (A1) and follow-up (A2), ($p = .025$; $SD = 6.708$, $CI_{90\%} = 0.264, 1.736$). The analysis of clinical significance shows an RCI score of 6.38 for GAD-7 and 4.33 for GAD-Q-IV, which indicates an improvement in symptomatology.

Case Z

Case Z was a 44-year-old housewife, married with two daughters, 10 and 11 years old. Her fears were related to two childhood events: a fire in her house and the death of her grandfather, who lived with her, as a consequence of the distress caused by the fire.

The reason for consultation was constant fear of something bad happening to a loved one and of getting ill and dying, even though she is healthy. These worries started when she was around 24. She felt distressed when her daughters became ill with a minor case of flu. She also worried when her husband was late, even by 15 minutes. She has had these fears for about 5 or 6 years, but she remembered

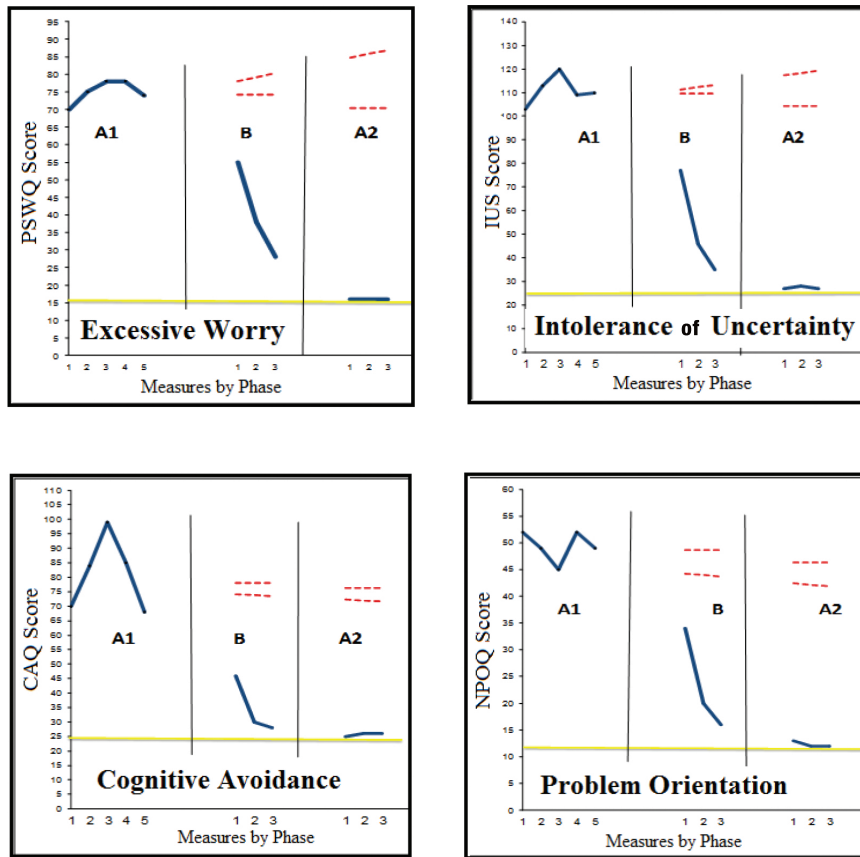


Figure 5. Visual analysis using the conservative dual-criterion method—Case X.

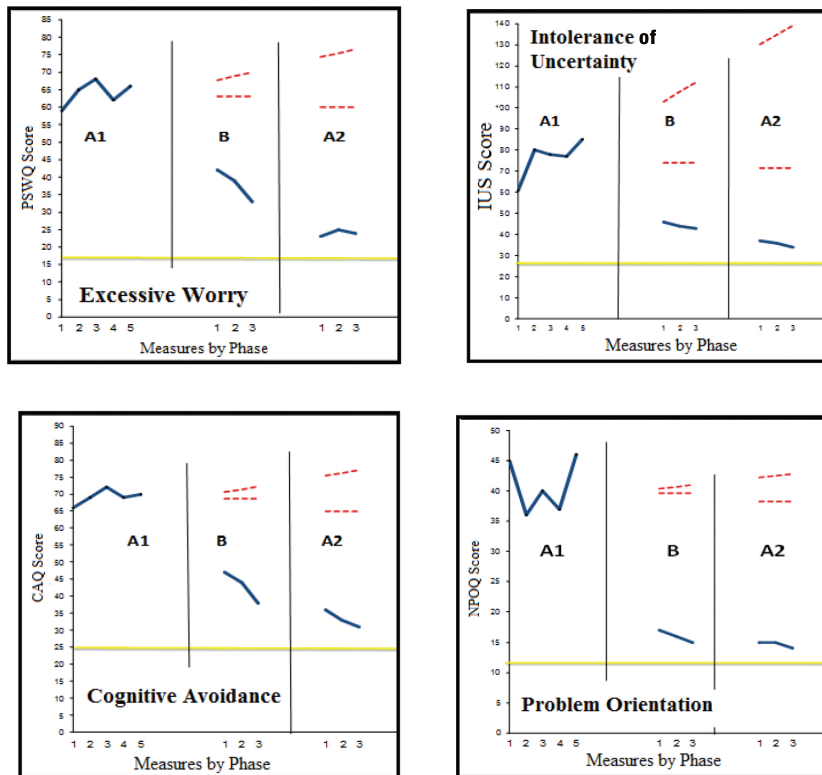


Figure 6. Visual analysis using the conservative dual-criterion method—Case Y.

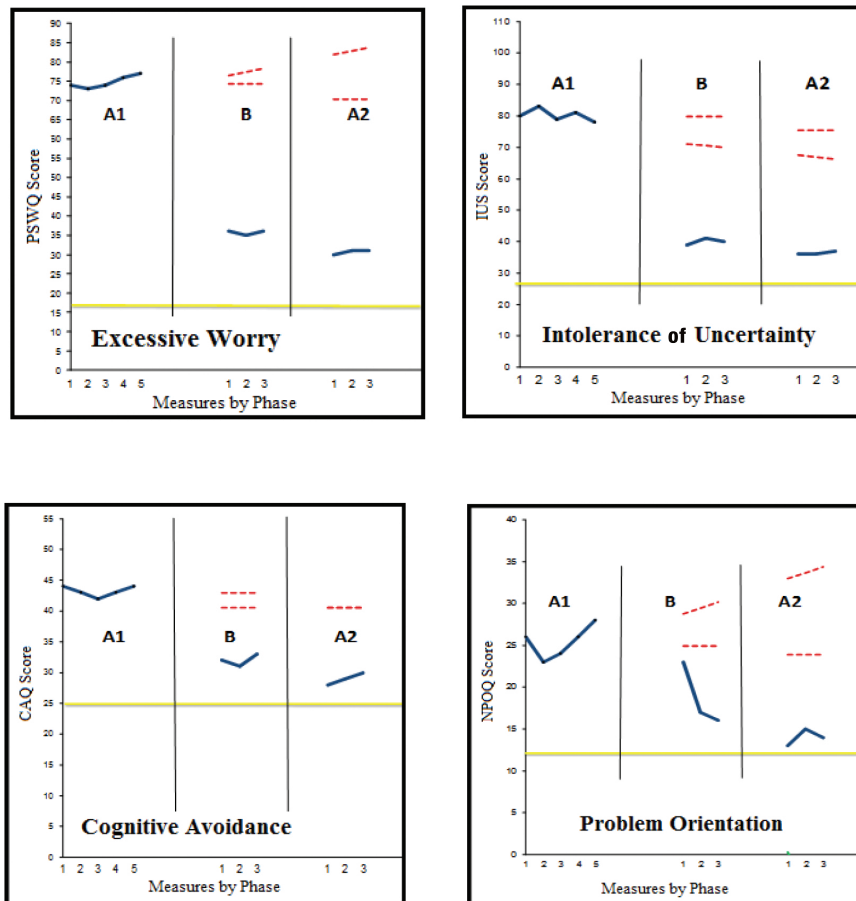


Figure 7. Visual analysis using the conservative dual-criterion method—Case Z.

worrying about everything in her adolescence. Her negative belief before reprocessing was “I cannot control anything that happens to me.” At the end of the treatment it had changed to “I can control much of what happens to me.”

In the visual analysis through the CDC method, all measurements of all the variables evaluated in all phases by the four questionnaires are below the mean and trend lines, indicating a systematic change in all cases (Figure 7). The statistical analysis of the data through NAP (1) shows a large effect size in the relationships between the phases in all studied variables. The *p* values are statistically significant: .025 in all cases (*SD* = 6.708, *CI*_{90%} = 0.264, 1.736). The RCI score obtained for GAD-7 is 9.57, and, for GAD-Q-IV, 4.73, which shows an improvement in GAD symptomatology.

All-Case-Analysis Summary

A summary of the visual analysis of the data provided by the CDC method shows a systematic change between Phases A1-B and A1-A2 on all measures for

five of the seven participants (i.e., V, W, X, Y, Z). All cases show systematic change between phases A1 baseline and A2 follow-up. Regarding the statistical analysis, in all cases there was a large effect size in change indicators provided by the calculation of NAP between baseline (A1) and follow-up (A2) for all measures. As regards the clinical significance analysis, obtained through both GAD screening techniques used in this research—GAD-7 and GAD-Q-IV, the RCI scores of all participants showed a change toward an improvement. In Cases W and X there was a recovery indicator for GAD-7. The reports of the psychiatric analysis indicate an improvement in all the cases at the end of the treatment.

Discussion

The results of this study provide support for the hypothesis that EMDR therapy, providing bilateral alternating tactile stimulation, would produce a clinically significant reduction in cognitive symptomatology in participants diagnosed with GAD and that the improvement would be maintained at follow-up.

The following analyses were conducted: (a) magnitude of the change, through visual analysis; (b) effect size, through statistical analysis; and (c) clinical significance, through clinical significance analysis.

- The visual analysis of Figures 1–7 showed a systematic change in the mean and trend values between the baseline phase and follow-up phase for all participants, on the questionnaires evaluating the cognitive processes of GAD, according to Dugas’s model (Robichaud et al., 2019).
- A large effect size was observed for all participants between baseline and follow-up in the four variables studied.
- The clinical significance analysis shows that all participants evidenced clinical improvement on the GAD-Q-IV and GAD-7, with two participants (W, X) showing “recovery” on the GAD-7.

These results of this study in Argentina are consistent with two earlier studies which showed that EMDR therapy appeared to be effective for the treatment of GAD: one in Canada (Gauvreau & Bouchard, 2008) and the other in Iran (Farima et al., 2015). The empirical strength of this study lies in the use of an evidence-based design, with a strict application of the protocol (Manolov & Moeyaert, 2016; Tate et al., 2016). An external independent researcher evaluated compliance with the model. However, more studies about the usefulness of EMDR therapy are necessary to fully understand the mechanisms of action. For example, the process through which cognitive symptoms improved after applying the conventional EMDR protocol is still unclear.

This study was based on the explanatory model of GAD proposed by Dugas and collaborators (1998). After analyzing the literature, Dugas’s model was chosen, since it provides a clear explanation of the cognitive process of the disorder (Newman & Llera, 2011; Robichaud et al., 2019). The four basic cognitive processes identified by this model were specifically measured with related inventories: (a) intolerance of uncertainty (b) dysfunctional beliefs about the usefulness of worrying, (c) poor orientation to problem-solving, and (d) cognitive avoidance. During A1, the baseline phase, participants showed high levels of symptoms on all measures, indicating that their cognitive symptoms aligned with those of Dugas’s model. After treatment, the scores diminished with large effect sizes, showing the effects of treatment on these cognitive symptoms. See Figures 1–7.

During EMDR therapy, participants articulate negative (NC) and positive cognitions (PC) related to the targeted traumatic events. These are considered to fall into three categories: responsibility, safety, and control. For the seven participants, these generally fell into the categories of responsibility (e.g., “I’m useless) and control (e.g., “I can’t tolerate it”) with related changes during therapy.

This study used only tactile stimulation. An analysis of the EMDR literature clearly showed that tactile and auditory stimulations have not been studied deeply enough (Bergmann, 2010). Laboratory research which examined the effects of various types of stimulation on working memory processes found an advantage for eye movements over tones (Van den Hout et al., 2011; Van den Hout et al., 2012). However, the use of tactile and auditory stimulations has not been adequately investigated in clinical studies. The current study provides preliminary evidence suggesting that bilateral alternating tactile stimulation was effective in the EMDR treatment of GAD. More studies analyzing its possible benefits and applying strict experimental designs are required.

Limitations

It is important to mention that, apart from its cognitive component, GAD has emotional, physiological, and behavioral components (Newman & Llera, 2011), which were not measured in this research and constitute one of the limitations of this study. Another limitation of this study is the number of replications made: seven cases. Although the methodology is appropriate for the purpose of the study and there is no agreement among different study groups as to the minimum number of replications (Kratochwill et al., 2010; Swoboda et al., 2010), and even though this study was conducted following a strict procedure, the small number of replications might challenge the generalization of the results. Another limitation lies in the phases of the design (A-B-A). Some authors stress the importance of conducting research studies with at least four phases (e.g., ABAB design) and with at least five measures in each phase (Kratochwill et al., 2010; Tate et al., 2016)

The follow-up timing, that is, 3 and 6 months after the end of the treatment, is another limitation of this study. This being a chronic disorder with an early age of onset, the total remission rate is low (Ansell et al., 2011; Clark & Beck, 2012) and, due to the high rate of relapse, longer periods are required for the follow-up (Cuijpers et al. 2020; Yunitri et al., 2020).

Conclusion

To conclude, the results obtained by this study show empirical evidence which supports the hypothesis about the efficacy of EMDR therapy for the treatment of GAD cognitive symptoms, and they open up new doors for the treatment of such disorder.

Disclosure

This being a study conducted with a Spanish-speaking population, it was necessary to use evaluation instruments in Spanish; hence the presence of bibliography in said language.

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Disclosure. The author has no relevant financial interest or affiliations with any commercial interests related to the subjects discussed within this article.

Acknowledgment. I would like to thank doctor Rumen Manolov for his supervision and suggestions for the data analysis.

Funding. The author received no specific grant or financial support for the research, authorship, and/or publication of this article.

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