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Assessment of the Effectiveness of an Exposure Technique Intervention in a Case of Amaxophobia

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ABSTRACT

Amaxophobia, or driving phobia, is an anxiety disorder; more specifically a situational phobia (SP). Main symptoms of SP may include an excessive and irrational fear to certain stimuli, to which exposure produces high anxiety levels, as well as the development of avoidance mechanisms or confrontation, at the expense of a high distress. Its prognosis is chronic in the absence of treatment, but empirical evidence reveals a high efficacy of psychological interventions based on exposure techniques. The case of a 47 years old female requesting treatment for an intense driving fear is presented. The assessment was made through an ad hoc self-report of anxiogenic episodes, the Short Form Health Survey (SF-12), the General Health Questionnaire (GHQ-28), the Perceived Stress Scale (PSS-14), the Beck Depression Inventory (BDI) and the State-Trait Anxiety Inventory (STAI). It was conducted a cognitive-behavioral intervention based on imagination and real life exposure techniques, along with breathing and relaxation techniques. After 10 sessions her anxiety levels and her negative affects decreased significantly, allowing her to resume driving and revealing the efficacy of the intervention.
Key words: single-case design, amaxophobia, exposure techniques, outcome assessment, reliable change index.

Novelty and Significance

What is already known about the topic?

- Specific phobias, such as amaxophobia, respond effectively to exposure treatment.
- The assessment of therapeutic outcomes in these cases is based on the achievement of goals -being able to perform the feared activity- which in most cases are based on therapist criteria in single case assessment.
- The effectiveness of interventions is traditionally assessed using statistical procedures based on group comparison, which are not applicable to single case assessment.

What this paper adds?

- A protocol for intervention and evaluation of a single case is presented through the application of the methodology based on Jacobson and Truax's proposal for the calculation of the Reliable Change Index.
- The Reliable Change Index methodology allows an estimation of the clinical significance of the change and whether or not it can be attributed to chance (statistical significance), thus contributing to therapeutic decision making.
- The article shows how contributions with scientific rigour can be made from routine clinical practice, thus encouraging professional psychologists to present their evidence.

Anxiety is an emotion that most drivers experience at some specific moment while driving, not being considered pathological. Some people even drive with certain levels of anxiety. It is when anxiety is so intense and disproportionate that driving is impeded or severely hindered that it becomes a disorder known as amaxophobia (Fernández Castro & Doval, 2011; Sánchez Marín, 2011).

This disorder, whose name has Greek etymology -it is composed of the union of the words amaxo, chariot, and phobos, fear- (Pérez Peláez, 2005), has an average age of onset of 24.5 years (Lipsitz, Barlow, Mannuza, Hofmann, & Fyer, 2002; Bados, 2005) and affects women more frequently than men. The latter can be observed in a study by Fernández Castro and Doval (2011) with a sample of 2,070 driving licence holders

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in which one in four female drivers compared to one in five male drivers reported experiencing high anxiety at the wheel. Regarding the prevalence of the disorder, in the same study, 22% of participants reported a great deal or a fair amount of anxiety while driving, and 4% of these reported that anxiety was at its highest level.

With regard to the classification of amaxophobia, it is located within anxiety disorders as a specific phobia (Belloch, Sandín, & Ramos, 2009). This type of disorder has a series of characteristics that constitute the criteria with which it is diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders (DSM), the main one being an intense, persistent and excessive fear of the presence or anticipation of specific stimuli -in the case of amaxophobia the anxiogenic stimulus is driving-, exposure to which produces an immediate associated response of anxiety (American Psychiatric Association -APA, 2014).

Another highly relevant characteristic is the development of avoidance responses to the anxiogenic stimulus or, failing that, resistance at the cost of a high level of discomfort (APA, 2014). In this regard, it is worth noting the relationship of mutual influence between driving frequency and anxiety at the wheel, and in the study by Fernández Castro and Doval (2011) it can be observed that 18% of those who drive daily suffer from high anxiety, with this figure rising to 35% among those who do not drive or do so very little; thus, anxiety would lead to less driving, which in turn would feed back into anxiety about driving.

It has also been considered important for adults, not for children, to have a subjective awareness of the problem, i.e., to recognise that their fear is excessive and irrational, (APA, 2002), so that the phobia can be distinguished from delusional fears (Bados, 2005). However, Antony and Barlow (2002) found that a significant number of people have little awareness of this fact even though their beliefs do not reach the status of delusions. In the latest update of the DSM, the DSM-5, awareness of the problem is no longer a diagnostic criterion (APA, 2014).

In addition, when diagnosing a specific phobia, the fear, anxiety or avoidance responses must interfere with the person's routine or cause a very intense discomfort. Also, to fulfil the requirement, it is remarkable that the anxiety and avoidance associated with the feared situations cannot be better explained by other mental disorders (APA, 2014).

It should be noted that different types of specific phobia can be distinguished, amaxophobia belongs to the situational type. In this type of phobia, the fear is provoked by specific situations such as public transport, lifts, flying in an aeroplane or driving (Bados, 2005).

The anxiety experienced with a phobia has both cognitive and physiological components. Cognitively, people with phobic manifestations often fear possible harm, losing control, making a fool of themselves, getting dizzy, fainting or having a panic attack, as well as the consequences of these actions (Bados, 2005). In the specific case of amaxophobia, those affected fear getting into an accident, getting hurt, getting stuck in a traffic jam, running someone over, becoming the object of anger and/or criticism from other road users, having a panic attack or heart attack, and fainting (Antony & Barlow, 1997; Bados, 2005).

In relation to physiological aspects, the anxiogenic stimulus produces activation of the autonomic nervous system, although which of its components is activated depends on the emotion experienced. Fear leads to activation of the sympathetic system; specific signs are tachycardia and palpitations, increased blood pressure, accelerated breathing, sweating and decreased gastrointestinal function. As for disgust, it is associated with the

activation of the parasympathetic system, which can lead to cardiovascular deceleration, decreased skin temperature, dry mouth, nausea, stomach discomfort and a feeling of dizziness (Bados, 2005).

The prognosis of specific phobias in untreated adults is chronic, with low spontaneous remission rates of around 20% of those affected (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Wittchen, Nelson, & Lachner, 1998). However, there are different applicable interventions with evidence of efficacy that make specific phobia one of the most treatable mental disorders (Wolitzky-Taylor, Horowitz, Powers, & Telch, 2010).

Intervention can be either psychological and/or pharmacological, although it is recommended to use pharmacology as a complement to psychological treatment (Capafons, 2001) or as an alternative when there is no response to the first approach (Baldwin *et alia*, 2005; Haydu, Fornazari, Borloti, & Haydu, 2014).

Regarding psychological interventions, the one that has been studied in greater depth and has emerged as the treatment of choice for this disorder is exposure therapy (Barlow, Raffa, & Cohen, 2002; Richard & Lauterbach, 2007; Wolitzky-Taylor *et alia*, 2010; Sánchez Meca, Rosa Alcázar, Marín Martínez, & Gómez Conesa, 2010). Therefore, most psychological interventions for specific phobias include exposure techniques to anxiogenic stimuli and show satisfactory levels of efficacy. Behavioural theories argue that exposure to such stimuli without producing the feared consequences leads to the extinction of the behaviour -in this case, the phobic reaction- (Capafons, 2001).

There are different modalities of exposure. One of them is live exposure, which involves patients having direct contact with the feared stimulus; another modality is imaginal exposure, which involves having the patient imagine a confrontation with the stimulus. Furthermore, with the development of new technologies, computer-mediated exposure techniques have emerged, such as virtual reality or computer-assisted indirect exposure (Wolitzky-Taylor *et alia*, 2010; Haydu *et alia*, 2014).

When choosing one over the other, it is important to bear in mind that the closer the exposure is to the real stimulus, the better results, so the live modality is considered the most powerful. However, the use of imagery exposure is sometimes preferable, as a) it can be difficult to manipulate certain phobic stimuli, and b) some patients are resistant to exposure to the real stimulus (Richard & Lauterbach, 2007). In any case, in clinical settings, live exposure is often preceded by imaginal exposure or training in techniques that reinforce the patient's commitment to real exposure (Capafons, 2001).

While exposure constitutes the main intervention, there are additional techniques used for the treatment of this disorder, such as breathing and relaxation techniques, which induce an antagonistic response to anxiety. According to Capafons (2001), their inclusion generates greater adherence to treatment when the anxiety response is very high, since they facilitate habituation to the stimulus. Moreover, by reducing such anxiety, these techniques are particularly useful in those cases in which the anxiety response must be controlled, as it is the case of amaxophobia -very intense anxiety could result in driving errors that endanger the health of road users.

One of the simplest and most effective techniques for activation control is breath control, in which the person is trained to maximise their lung capacity in order to facilitate the supply of oxygen necessary for the proper functioning of the body. Another widely used technique is progressive relaxation, which was originally developed by Jacobson and is based on the tension and distension of certain muscle groups, which makes it possible to identify when muscles are tense and initiate actions to relax them

(Labrador, 2008). After progressive relaxation, the best known and most widely used relaxation technique is autogenic relaxation, which consists of a series of phrases that aim to suggest bodily sensations -e.g. warmth, weight, coolness- (Méndez, Olivares, & Quiles, 1998).

Other techniques that could provide valuable support are cognitive techniques, which focus on changing thought patterns, emphasising the difference between rational and irrational thoughts and between possible and probable. They would aim to enable patients to face exposure with reduced anticipatory anxiety and adaptive attributions of their motor and physiological reactions. This category would include techniques aimed to increasing the patient's information about their disorder, such as information therapy, bibliotherapy and psychoeducation (Capafons, 2001).

The aim of the present study is to present a case of amaxophobia and its intervention through the application of cognitive-behavioural techniques, mainly exposure, although accompanied by breathing and relaxation techniques, as well as cognitive techniques when necessary. This is a subject that has been little studied scientifically, as there are very few case studies on the intervention of this disorder.

METHOD

Identification of the patient and reason for consultation

The patient, who came to the clinic of her own free will, is a 47-year-old single woman with no children. She has a higher level of education and is professionally engaged in secondary education. There are no previous or simultaneous psychological or psychiatric treatments.

She reports fear of driving as the reason for her consultation, as it affects her daily life and avoids driving, with the complications that this may entail. She has driven a car occasionally, experiencing intense discomfort. She foresees that driving is going to become necessary in the short term in order to carry out her work and family duties correctly or more easily, so she has decided to face the problem.

History of the problem

One of the patient's earliest memories of driving, which she directly relates to the genesis of her problem, occurred during her childhood and it is closely related to her mother, who at that time suffered from a serious hormonal illness that caused her physical and psychological imbalances. This coincided with her father's decision to obtain his driving licence; the patient recalls with vividness and emotional impact how every time he was about to leave the house before going to the driving school, her mother shouted at him in a highly emotional state, telling him not to go because, if so, he would kill himself.

It was also during her childhood when she travelled to Italy and discovered that in that country vehicles are not in the habit of giving way to pedestrians, so during her stay there she was afraid to cross the road because of the risk of being run over. Back in Spain, she continued to experience anxiety at busy pedestrian crossings, although she now reports that she has it under control.

It is also remarkable that she comes from a family of taxi drivers, as many of its members are dedicated to this profession.

As for her driving history, she obtained her driving licence at the age of 22

without having experienced any significant difficulties in doing so. Afterwards, she did not buy any vehicle nor drove regularly ever again. Currently, she hardly ever drives, if so, it is in a very irregular way since there are years when she has driven several times, and others when she has not driven at all. She only drives if she is accompanied.

Regarding her history as a co-driver, she reports experiencing some anxiety even if the driver is cautious. On two occasions she has travelled with reckless drivers who have caused her great fear, but this has not prevented her from travelling as a co-driver again.

There have been two previous attempts to solve the problem, both of which occurred eight years ago: the first time she tried to drive with her father, while the second time she was accompanied by a friend, but none of the situations got her the desired results.

Assessment

Self-recording of anxiogenic episodes. *Ad hoc* instrument in which the patient had to write down each episode of anxiety in any stimulating situation associated with driving occurred between sessions. The record consisted of describing the situation and setting of the event, the spontaneous cognitions, the physical symptoms experienced (tension in the arms, abdominal tension, tachycardia, etc.) and the intensity of the perceived feeling of discomfort/anxiety. In the latter case, a Visual Analogue Scale (VAS) was used with ratings from zero (minimum expression of activation or disturbance) to ten (maximum expression of anxiety or discomfort).

Health Questionnaire, version 2 (SF-12; Ware, Kosinski, Turner-Bowker, & Gandek, 2002; Spanish version by Vilagut, Valderas, Ferre, Garin, López García E, & Alonso, 2008, -based on that of Alonso, Prieto, & Antó 1995). It provides a self-perceived assessment of the degree of well-being and functional capacity of people over 14 years of age. It is a reduced version of the SF-36 with 12 items in a 3- or 5-point Likert-type response format. From the scores on these items, which are grouped into eight dimensions ('Physical Function', 'Role Limitations due to Physical Problem', 'Pain', 'General Health', 'Vitality', 'Social Function', 'Role Limitations due to Emotional Problem', and 'Mental Health') the summary components Physical and Mental are obtained. The test has an adequate reliability for both the physical and mental components, (α= .89 and α= .86, respectively, Ware *et alia,* 2002). It was administered prior to the intervention.

Goldberg General Health Questionnaire (GHQ-28; Goldberg & Hillier, 1979; Spanish version by Lobo, Pérez Echevarría, & Artal, 1986). Its aim is to assess the overall health of the individual according to both the person's capacity to continue performing daily tasks and the appearance of psychological discomfort. It consists of 28 items divided into four subscales: 'somatic symptoms', 'anxiety and insomnia', 'social dysfunction' and 'severe depression'. The response format is a 4-point Likert-type scale. In its total Health Index a score above five would indicate the presence of a probable psychiatric case. According to Pérez Moreno, Lozano Rojas, and Rojas Tejada (2010) in relation to internal consistency, in somatic symptoms this was α= .83 in somatic symptoms, α= .86 in anxiety and insomnia, α=.86 in social dysfunction and α= .83 in depression. It was administered prior to the intervention.

Perceived Stress Scale (PSS-14; Cohen, Tyrrell, & Smith, 1993; Spanish version adapted by Remor, 2006). It measures the degree to which situations in one's life are perceived as stressful through 14 items that assess whether they consider their life to be unpredictable, uncontrollable or overloaded, during the last month. Its response format is Likert-type frequency. Its internal consistency is α= .81, so it can be said to have adequate reliability. It was administered before and after the intervention.

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Spanish version by Sanz & Vázquez, 1998). Composed of 21 items presenting symptoms of depressive disorders such as sadness, crying, anhedonia, feelings of failure and guilt, pessimism, and suicidal ideation, it provides a measure of the presence and severity of depression. The response format is Likert-type; each item consists of a series of

at least four statements that vary in intensity in which the respondent must select the one that best represents him/her, each one corresponding to a numerical value from '0' to '3'. It has an internal consistency of $\alpha=.83$, thus the reliability is adequate. It was administered before and after the intervention).

State-Trait Anxiety Questionnaire version 2 (SF-12; Spielberger, Gorsuch, & Lushene, 2008). Instrument whose purpose is to assess two independent dimensions of anxiety, trait anxiety (STAI-T) -relatively stable individual's propensity reflecting their tendency to perceive situations as threatening- and state anxiety (STAI-S) -transient emotional state characterised by consciously perceived feelings of attention and apprehension and hyperactivity of the autonomic nervous system. Their reliability indices are $\alpha=.89$ and $\alpha=.87$ respectively, revealing adequate internal consistency. Each of the two subscales has 20 items and a Likert-type response format with an intensity from '0' almost never/ not at all to '3' very much/almost always. It was administered before and after the intervention, as well as during the development of the intervention as a follow-up).

Clinical formulation of the case

The patient's problem behaviour is driving phobia, in which several components can be found. One of them is a cognitive component, where mental over-activity is observed. In her self-talk, she repeats to herself that she is going to hurt someone -with the consequent feeling of guilt- and that she is hindering other road users. In addition, she worries intensely about the different actions to be taken while driving, planning them exhaustively. Another is the physiological component, which refers to tension in the arms and stomach (on two occasions there has been nausea and vomiting not attributed to dizziness), also in the legs, although in a milder form, palpitations, and a feeling of "lump in the throat". Finally, the emotional component includes insecurity and fear, as well as helplessness and frustration at not being able to do something that so many people normally do.

The most frequent behavioural response to anxiety is avoidance, although she has been able to cope on some occasions at the cost of intense discomfort. However, even when she does not face the anxiogenic stimulus, she is very aware of her limitation, which also affects her well-being; this can be reflected in the decrease in the quality of sleep that she has been experiencing in the last two years, reporting waking up at night thinking about her driving problem with high jaw tension, experiencing difficulties falling asleep again.

It is also relevant to mention the tension she has experienced at pedestrian crossings since she was a child; although she claims to have this fear under control, she sometimes activates avoidance mechanisms, making detours to avoid crossing them. Furthermore, by thought association, crossing them leads her to think about her problem with driving, with the consequent discomfort.

Regarding phobia, the type of road that causes her the most anxiety is motorways, dual carriageways, and roundabouts; she attributes this anxiety to the fact that on these types of roads with high traffic density it is necessary to make fast decisions while driving at high speed and keeping her attention on the traffic, as well as noticing the characteristics of the road. Her anxiety is lower on secondary roads and zero in garages -she often parks her car without any negative emotions. Likewise, the type of vehicles with which she feels most anxious about when sharing the road are cars, lorries, and buses, because of their large size. In addition, she also feels uneasy about bicycles because the driver is more unprotected.

On the other hand, at the beginning of the intervention, a battery of instruments was applied in order to assess the patient's state of health, signs and symptoms, constituting

the baseline of the intervention. The score on the GHQ-28 was '7', indicating the presence of a possible psychiatric case or, alternatively, emotional distress with noticeable intensity. Looking at the four dimensions of the instrument, the score was higher in two of them, reflecting greater distress; these dimensions are 'Anxiety-insomnia' and 'Social dysfunction', with a score of '3' in both cases. The dimension 'Somatic symptoms' has a score of '1', below the population mean, and 'Depression' has a score of '0', revealing an absence of negative emotional manifestations.

On the SF-12 the evaluations offered by the participant revealed a very conserved state in the dimensions of 'Physical health', 'Role limitations due to physical problems' and 'Pain', where the scores are 100 -that is, the maximum expression of quality of life or satisfaction with her health. She also scored high for 'Social function', whose score is 75 and it is very close to the average for the general population. However, the scores are below the population mean in the dimensions 'General health' (60), 'Vitality' (50), 'Mental health' (50) and 'Role limitations due to emotional problems' (62.5), which can be said to be impaired.

As for the BDI, the score obtained was 10, which despite being above the population mean (5.9) indicates an absence of clinically relevant emotional disturbance. The PSS score was 24, below the population mean (26.6). Something similar happened with the STAI; the STAI-T subscale score was 24, which places it at the 50th percentile, and the STAI-S subscale score was 23, corresponding to the 55th percentile, being in both cases slightly lower than the population mean (24.99 and 23.3 respectively). Thus, at baseline, both anxiety and perceived stress had a lower intensity than what would be expected in the general population.

Treatment

Driving can be a risky situation if it is practised without adequate driving skills. These skills include sensory-perceptual, cognitive (such as knowledge of traffic rules) and motor skills (such as vehicle handling), but also emotional skills. Thus, given that a state of emotional stress while driving can have undesirable consequences on the individual's behaviour and, consequently, on his or her health and that of other road users, there is a need to promote the development of this type of driving coping skills to minimise possible risks at the wheel.

To this end, based on the literature, cognitive-behavioural techniques were used; specifically, breathing and relaxation techniques, psychoeducation about the disorder and the possible situations derived from the intervention, and imaginative exposure, followed by live exposure.

The intervention was carried out in 10 sessions of 60 minutes each. The first nine sessions took place on a weekly basis, while the final follow-up session took place two months later; thus, the time extension of the whole intervention was four months (see Table 1).

With regard to the content of the sessions, 4 phases can be distinguished:

Phase 1: Assessment (sessions 1 and 2).
- Session 1: welcome, framing, obtaining the patient's informed consent to be recorded, and evaluation. A homework assignment is given, consisting in the elaboration of a self-recording of anxiogenic episodes (see Assessment strategies) to be kept throughout the intervention.
- Session 2: evaluation and training in the visual-analogue scale for the assessment of anxiety intensity.

Table 1. Intervention planning and assessment of the case of amaxophobia throughout the sessions

Phases	Session	Intervention	Assessment	Time (weeks)
Assessment	S1	Reception, setting, obtaining informed consent. Start of anamnesis and functional analysis.	Instructions on the completion of standardised scales (STAI-E and -R, BDI, EEP, GHQ28, SF12). Homework to be done in the inter-session period.	Base Line
	S2	Completion of the anamnesis. Training in the use of the Visual-Analogical Scale (VAS) for the assessment of anxiety intensity.	VAS Utilisation Tests. Baseline VAS physical stress (VAS-F) and cognitive stress (VAS-C) recording.	1
Training in therapeutic competencies	S3	Relaxation and Breathing Techniques Training (RBT). Programming of relaxation training in the inter-session period.	At the beginning of the session: administration of the STAI-R, STAI-E and VAS-F and -C. Assessment of self-reporting At the end of the session: administration of the STAI-E and VAS-F and -C.	2
	S4	TBR Test. Training in the acquisition and assessment of physiological, behavioural, and cognitive stimuli and responses.	Equal Evaluation Session 3	3
Intervention through exposure	S5	Application Exposure Techniques (through a driving simulator). Guided Imagination Training.	Equal Evaluation Session 3	4
	S6 a S8	Application Exposure techniques (through guided imagery).	Equal Evaluation Session 3	5- 6-7
	S8b	Live exhibition. Starts driving school classes. Three sessions, two on consecutive days and the third two days after the second.	Equal Evaluation Session 3	7
Follow-up	S9	Evaluation of the Live Exhibition experience. Instructions for further rehearsals.	Equal Evaluation Session 3	8
	S10	Assessment of experience and evaluation of progress. Therapeutic discharge.	Final assessment: administration of the BDI, EEP, STAI and VAS scales.	16

Phase 2: Assessment (sessions 3 and 4). From this phase onwards, all sessions follow a similar structure. They begin with a weekly review of the homework done - evaluating the experiences and possible problems encountered in the development of the task. Then the specific techniques programmed for each session are applied. Finally, the session closes with an evaluation of the possible problems and adverse situations that may arise until the next session, the management of cognitions that have arisen and the programming of the week's homework.
- Session 3: training in breathing and relaxation techniques -differential relaxation, autogenic relaxation and directed imagination- and the STAI questionnaire is administered for the second time in the intervention. The patient is given a CD with instructions on how to do the breathing and relaxation exercises twice a day as a homework assignment.
- Session 4: training in breathing and relaxation to consolidate the lessons learned during the previous week, and training in guided imagery.
Phase 3: Application of exposure techniques (sessions 5-8). After the assessment of the week, the evaluation of anxiety in the present moment -by means of the STAI-S and the assessment through a VAS of physical and cognitive tension- and the previous week -by means of the STAI-T- is carried out. The exposure practices were initially based on the use of a simulator. The patient's physical stress during the first training session was of such a magnitude that it damaged the fixations of the device to its mechanical location, making it impossible to use this resource again. As a consequence, the exposure sessions were readapted to a traditional format of imaginative work. During each session, two to three trials were carried out, for each of which the anxiety experienced was assessed and forms of control were considered. Before closing the session, the assessment of anxiety in the present moment -STAI-S and EVA of physical and cognitive tensions- was repeated. At the end of session 8, it was recommended to begin with the live exposure, which would be done by driving practice at a local

driving school. During the eighth-ninth intersessional period, three driving lessons were held, the first two on consecutive days, and the third one two days afterwards
Phase 4: Follow-up (sessions 9 and 10).
- Session 9: exploration and assessment of the development of the first live exposure session.
- Session 10: follow-up of the development of the live exposure, application of the STAI, PSS and BDI instruments, and therapeutic discharge.

Therapist-related factors

All sessions were conducted with the presence of two therapists. One of them, a male clinical specialist with extensive professional experience, who guided the sessions; the other, a female student doing her internship associated with the Master's Degree in General Health Psychology, who acted as observer and co-therapist.

It is also worth mentioning that all the sessions were recorded in audio and video format with the patient's informed consent, so that subsequent viewing would facilitate the analysis of relevant information.

Data Analysis

A single case design with repeated inter-session assessment was used. For this purpose, the STAI-S, STAI-T tests and a visual analogue scale from 1 to 10 were applied to assess physical and cognitive stress, and their evolution was monitored by means of a graphic record and the interpretation of the scores obtained using the standards offered by the rating scales.

The Reliability Change Index (RCI) methodology was used to evaluate clinical outcomes between pre-treatment and post-treatment measurements. This methodology consists of a series of statistical procedures to determine whether an individual's score on a psychometric test has changed with respect to a previous assessment with the same instrument. This technique, originally described by Jacobson and Truax (1991), was designed to determine significant therapeutic changes, which are defined as "when the client moves from the dysfunctional to the functional range during the course of therapy" in patients who have experienced a disorder or a clinical intervention and to be able to apply them in decision-making. On the other hand, they define a clinically significant change as one that, apart from achieving a functional score, is statistically significant in magnitude. Thus, 'No change' would be defined when neither the criterion of clinical nor statistical magnitude of change is met; 'Non-Significant Change', when a clinical cut-off point is exceeded but there is no statistical significance; 'Significant Change', when a statistically significant result occurs but does not exceed the cut-off point; and 'Clinically Significant Change', when in addition to producing a statistically significant result, the cut-off point towards functionality is exceeded.

For the application of the RCI, standardised instruments with a standardised scoring system and the establishment of cut-off points that delimit functional and dysfunctional areas are necessary. In the present study, the Spanish normative data of the STAI-S and STAI-T, PSS and BDI scales were used, and it was essential to know their Cronbach's alpha, mean and standard deviation, as well as their pre-treatment and post-treatment scores.

Jacobson and Truax (1991), as well as other later authors (Iraurgi, 2010), determined that the most effective way to know the reliability and significance of the change in an individual score is to express the magnitude of the effect achieved, which is achieved

by relating the magnitude of the change -that is, the difference between the post-test and the pre-test- with respect to a measurement estimation error that comes from the precision of the instrument used and the variability of scores within the normative group. This estimate constitutes the RCI and the necessary calculations are as follows:

Step 1. Calculation of the Standard Error of the mean (*SE*): $SE = Sx(1-r_{xx})1/2$, or $SE = Sx \sqrt{(1-r_{xx})}$.
Step 2. Calculation of the Standard Error of the difference (*SEdif*): $SEdif = (2SE^2)^{1/2}$, or $SEdif = SE \sqrt{2}$.
Step 3. Calculation of the *RCI* score: $RCI = (x_2 - x_1)/SEdif$.

where *Sx* is the Standard Deviation of the test scores in the normative group, r_{xx} is the test-retest reliability coefficient, x_2 is the post-test score and x_1 is the pre-test score. The resulting *RCI* is expressed using standardised *z*-scores, with values ≤ -1.96 or ≥ 1.96 being considered statistically significant with a probability of less than 5% ($p \leq .05$).

Results

Figure 1 shows the set of assessments that the participant obtained in the two subscales of the STAI throughout the intervention and that served as a follow-up of
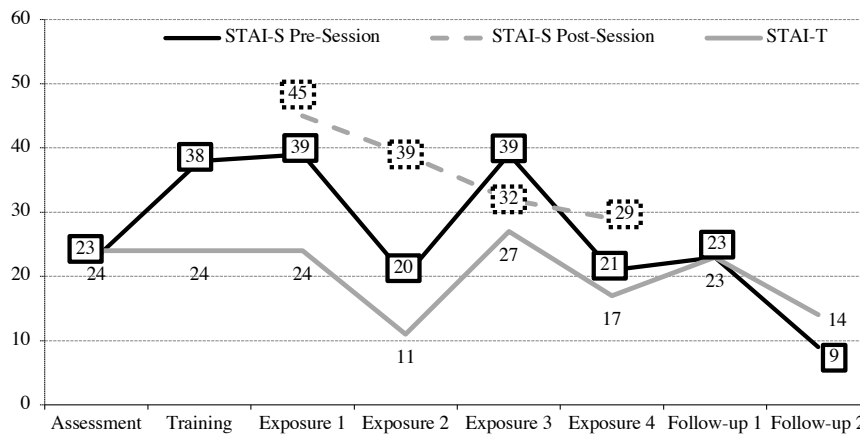
Figure 1. Sequence of STAI-S (pre- and post-session) and STAI-T scores over the course of the treatment.

her evolution.

Comparing the scores between state and trait anxiety, it can be seen that during all the sessions the former is above the latter (except in the evaluation and follow-up session 1, which are on a par or very slightly below); that is, at the time of action during the sessions, anxiety is activated to a greater extent than it has been activated during the interconsultation periods. If we look at trait anxiety, the highest score (27) occurs in the intersession period between exposures 2 and 3, which would correspond to the 60th percentile, so that at no time has it been in a situation that could be noticeably alarming.

With regard to state anxiety, as mentioned in the section 'Clinical formulation of the case', it can be seen that in the evaluation phase, state anxiety would be within the normal range. However, in the training and exposure phases there is a notable increase that at certain times reaches values above what could be considered risky (i.e. above 37, which would correspond to the 85th percentile); both in the training phase and in the

pre-exposure 1 and 3 and post-exposure 1, 2 and 3 times, the scores are above that level.

In the post-exposure assessments, activation always increased with respect to pre-exposure (except in exposure session 3). However, there is a decreasing trend, as the post-exposure scores are gradually lower, reaching in the 4th exposure a score still above the baseline but markedly lower than in the 1st exposure. Thus, as the exposure sessions are carried out, the participant offers a reaction of increasingly lower intensity, reflecting a self-regulation of anxiety.

The results obtained in exposure session 2 are noteworthy; while in the first session there was a very high pre-exposure state anxiety, among the highest (39), in the second session there was a very marked decrease (20), the score being even lower than that of the baseline. However, after exposure there is a significant increase in anxiety, at the level of the pre-exposure measure and lower than the post-exposure of the previous session.

On the physical and cognitive stress assessments by means of visual analogue scales that were carried out during the exposure phase and the follow-up, the results are shown in Figure 2. There is an absence of a characteristic pattern, with different phases of activation, although as the exposure sessions progress there seems to be a
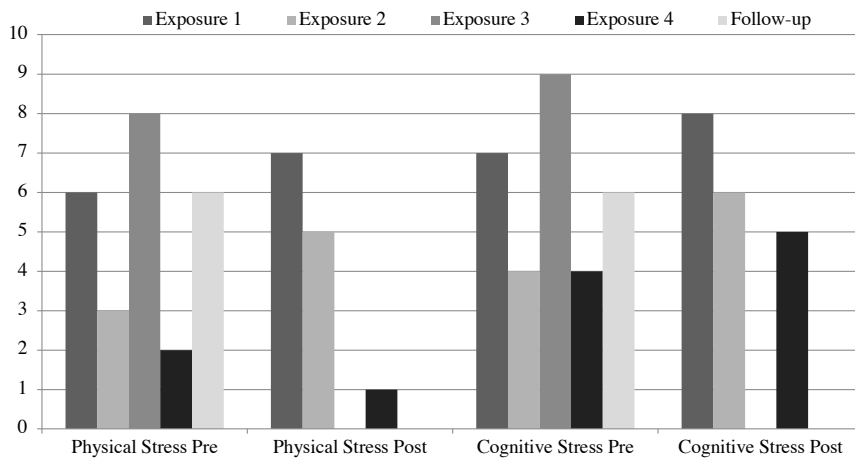
Figure 1. Sequence physical and cognitive stress perception scores (pre- and post-session) throughout the treatment.

greater control of physical activation and slightly also of cognitive activation.

In exposure 1, physical and cognitive tension both pre- and post-exposure is above a score of 6, reflecting moderate-high activation. However, in exposure 2, something similar to what happened with the STAI-S occurs, since the pre-measurement of both types of stress is notably lower than in the previous session, although in this case the post-measurement does not increase too much. In exposure 3, stress levels increase to the highest point, but in exposure 4, a greater control at a cognitive and physical level can be seen due to its low score, in addition to the fact that in the latter there is a decrease in the post score with respect to the pre score. In the follow-up phase, as there was no exposure, the response was assessed only once; there was again an increase in the perception of physical and cognitive tension, with a score of 6, similar to that of exposure 1.

Finally, the assessment of therapeutic change using the *RCI* methodology is presented. Table 2 shows the data necessary for the calculation of this score for each

Table 2. Assessment of therapeutic change after the intervention using the Reliable Change Index (RCI) methodology

	STAI-S	STAI-T	PSS	BDI
Crombach's Alpha	.87	.89	.81	.83
M	23.30	24.99	26.60	5.90
SD	11.93	10.05	8.10	5.40
Pre-Treatment Score	23	24	24	10
Post-Treatment Score	9	14	1	1
Change (Post-Pre)	-14	-10	-5	-9
RCI	-2.30	-2.12	-1	-2.86
p associated with the RCI	.010	.017	.158	.002

Notes: STAI-S: State Anxiety; STAI-T. Trait Anxiety; PSS: Perceived Stress; BDI: Depression

instrument together with the *RCI* score and the p-value associated with it. In all tests the change score was negative, as the pre-treatment score was higher than the post-treatment score. Thus, it can be said that after the intervention there has been a reduction of signs and symptoms which would indicate a therapeutic shift towards success. However, the *RCI* reveals that it was only significant for the STAI-S, STAI-T and the BDI, being in all three cases lower than -1.96 with $p < .05$. For the STAI-S the *RCI* is associated with a p-value of .010, i.e. the change of 14 units on the scale is statistically significant and is considered to be due to the intervention. The same is true for the STAI-R and the BDI, where the *RCI*s are associated with a $p = .017$ and $p = .002$, respectively. Another issue is the PSS, since despite the 5-point reduction its *RCI* is -1.00 with an associated $p = .158$ and thus its change is non-significant and not attributable to the intervention.

Subsequently, in the follow-up sessions, it was found that the patient had been exposed to live driving for sufficient time to allow her to perform the activity, keeping her anxiety levels under control, without resorting to the avoidance mechanism.

DISCUSSION

The results of the initial assessment seemed to indicate that, despite the discomfort that the phobia of vehicles generated in the patient, her levels of anxiety, stress and depression were not beyond the normal range. However, the results of the GHQ-28 did reveal emotional distress with notable intensity, especially in the dimensions Anxiety-insomnia and Social dysfunction, as well as those of the SF-12 in the areas of General health, Vitality, Mental health and Role limitations due to emotional problems; in this regard, it should be noted that the low scores in Vitality and Mental health have a direct impact on that of Role limitations due to emotional problems, as they affect the performance of this role. It is when the relaxation and breathing training phase begins that there is a notable increase in anxiety until it reaches dysfunctional levels, highlighting the high scores obtained during the exposure phase and especially after the sessions.

The drastic decrease in state anxiety prior to exposure 2, which reaches lower values than those of the baseline and the population mean, could be explained due to the expectations generated after the first exposure session. That is to say, after the tasks were performed adequately, the participant could have generated confidence with a corresponding decrease in state anxiety, so that when it is assessed at the beginning of the second exposure session, really low or controlled scores are obtained. However, the confrontation with the anxiogenic situation could have triggered an important activation that is reflected in the remarkable increase in the post-exposure score.

The patient's anxiety after the exposure sessions follows a decreasing trend, reflecting her improved ability to regulate her arousal and a sign that it is appropriate to proceed with the live exposure. The fact that the patient was able to face a situation of driving a vehicle on the roads without experiencing discomfort, uncontrolled anxiety

or avoidance, was a sign of recovery from the problem.

On the other hand, there are two noteworthy facts in relation to the origin of the problem; on the one hand, the patient comes from a family of taxi drivers and, on the other hand, that her mother feared that her father would drive even when he was ill. At the time of planning the intervention, it was decided not to address these issues in response to the patient's specific request, but they could have been the subject of psychological work.

As for any difficulties that may have arisen during the intervention, it is noteworthy that the virtual reality machine used in the fifth session (S5-1st exposure) broke down during the course of the intervention. For this reason, the virtual reality exposure could not be applied again, and from then on it was necessary to stick to the imaginary exposure.

To sum up, it can be concluded that the presented intervention is effective for the treatment of amaxophobia, as it is shown in the RCI results, with a significant decrease in the levels of anxiety and negative affect. In any case, the fact that the patient was able to drive again without experiencing non-maladaptive levels of anxiety, is the most important criterion to assess the effectiveness of the process.

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