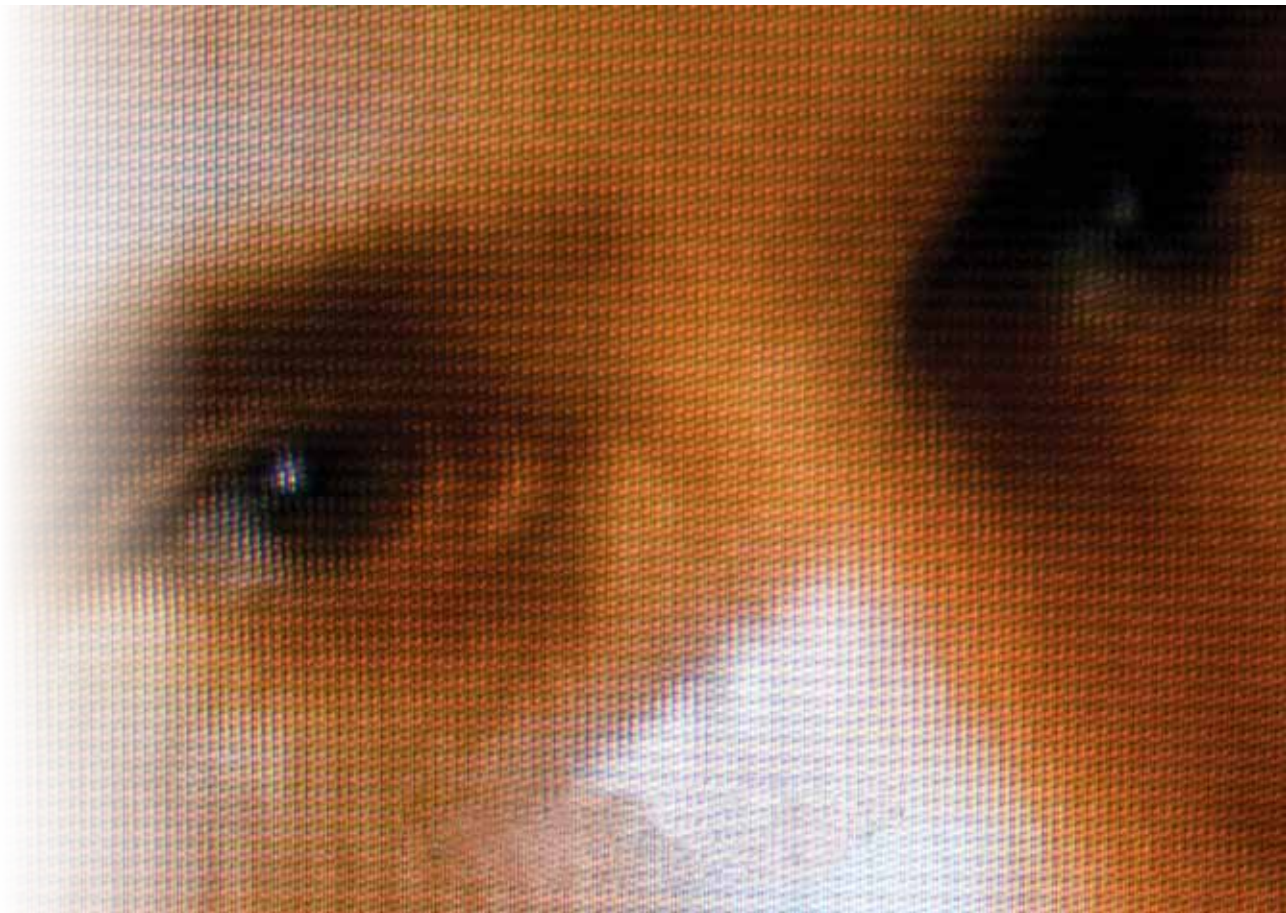
Investigating new process-focused treatments for posttraumatic stress disorder : attentional bias modification and mindfulness-based cognitive therapy

Schoorl, S.M.D.

4

Attentional bias modification in veterans with posttraumatic stress disorder: a case series with a personalized treatment version

M. Schoorl, P. Putman, T.M. Mooren, S. Van Der Werff & W. Van Der Does (2013). *Journal of Traumatic Stress*, under revision



Abstract

Beneficial effects of Attentional Bias Modification (ABM) have been claimed in a number of anxiety disorders, but the results are variable. A recent trial in patients with posttraumatic stress disorder (PTSD) showed no therapeutic effects. The use of personally relevant stimuli in patients might increase the efficacy of ABM. In an A-B case series design, we explored whether individualized ABM led to changes in attentional bias and to symptom reduction in six war veterans with PTSD. No therapeutic effects were observed. Inter- and intra-individual attentional bias scores varied widely and did not respond to ABM as hypothesized. This study provides no evidence that individualized ABM is an effective treatment for PTSD.

Introduction

Attentional bias (AB) for threatening information is a characteristic of anxiety disorders, including PTSD (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & IJzendoorn, 2007). Attentional Bias Modification (ABM) is a novel, computerized treatment that aims to treat anxiety disorders by changing AB. ABM involves eight to ten 15-minute sessions in which participants are trained to direct their attention away from the threatening stimuli that automatically attract their attention.

Two meta-analyses have concluded that ABM positively affects anxiety (Hakamata et al., 2010; Hallion & Meron Ruscio, 2011). Reviewing twelve randomized controlled trials (RCTs), an effect size of .61 (medium) was calculated for ABM as compared to a control training (Hakamata et al., 2010). Three of these RCTs were clinical trials, demonstrating therapeutic effects of ABM in patients with generalized anxiety disorder (GAD) (Amir, Beard, Burns, & Bomyea, 2009a) and social anxiety disorder (SAD) (Amir et al., 2009b; Schmidt, Richey, Buckner, & Timpano, 2009). The number of patients in each RCT was limited however and a recent clinical trial on the effect of ABM on PTSD had disappointing results (Schoorl, Putman, & Van Der Does, 2013). This trial was by far the largest RCT to date (n = 102) and revealed that ABM and control treatment reduced PTSD symptoms with effect sizes of 0.66 and 0.46 respectively, comparable to or lower than the effect sizes of pill-placebos in pharmacotherapy trials in PTSD (e.g., Davidson et al., 2001). Moreover, ABM did not affect AB.

The lack of effect might be explained by the use of pictorial stimuli, since verbal stimuli are thought to generate better results (Hakamata et al., 2010). Furthermore, our stimuli might not have been personally relevant enough. ABM may be more effective when the stimuli are tailored to patients' idiosyncratic experiences (MacLeod, Koster, & Fox, 2009).

At a conference presentation, Amir (2010) presented preliminary positive results of two studies in war veterans with PTSD, in which individualized ABM was used as an augmentation to regular treatment. We decided to investigate such a version of ABM in a case series design and measure the effect on both symptoms and AB. In only two RCTs (a change in) AB was measured (Amir et al., 2009a, Schoorl et al., 2013). Establishing mediation of symptom change by a change in AB is however crucial to attribute therapeutic impact to ABM. Therefore, our goal was to investigate the effects of individualized ABM on both AB and PTSD symptoms.

Methods

Participants

Participants were six war veterans administered in a clinic for PTSD treatment. Inclusion criteria were PTSD symptoms, measured by the Clinician Administered

PTSD scale (CAPS, Blake et al., 1990). Inclusion criterion was a CAPS score ≥ 45. Exclusion criteria were lifetime psychotic disorder, alcohol or drug abuse or dependence.

Measures

The Mini-International Neuropsychiatric Interview Plus (MINI Plus, Sheehan et al., 1998) was used to assess the presence of psychiatric disorders at baseline. PTSD symptoms were assessed with the CAPS.
AB was measured with a version of the Dot-probe Test (DPT; Amir et al., 2009a). Each trial starts with a fixation cross in the center of a computer screen for 500ms. Next, two words (one neutral and one trauma-related) appear for 500ms, above and below the fixation location. Then, a target ('E' or 'F') is shown in the location of either word. In half of the trials the target appears in the location of the trauma-related word, and in the other half in the location of the neutral word. Patients are instructed to discriminate the target as fast as possible by pressing a response key. The trials consisted of different, fully counterbalanced combinations of target type, position and location of the trauma-related word, presented in a random order. AB score is calculated by subtracting the mean reaction time (RT) in congruent trials from the mean RT in incongruent trials.
To collect idiographic relevant words, participants were interviewed about their traumatic experiences. A verbatim report of this audiotaped interview was made. The interviewer selected two sets of 20 meaningful words for test and training for each participant individually.

Treatment

Each of the eight ABM sessions consisted of 100 trials. Of these, 80% were neutral/trauma-related, and 20% neutral/neutral pairs. In ABM, the target always appeared in the location of the neutral word. In the control condition, the target appeared in the location of the neutral word in 50% of the trials, similar to AB assessment.

Design and procedure

A single-case series using an A-B design (Barlow & Hersen, 1984) with a 2-week follow up was implemented. Individual baselines and control treatment acted as control variables.
The study was approved by the local review board. Therapists informed their patients about the research and patients received an information letter. Patients were informed about the study, but they were unaware of the timing of the control treatment. If patients decided to participate, the first assessment (inclusion, Time 1) was planned. Written informed consent was obtained.

A one week baseline-period took place (baseline, Time 2), followed by one week control treatment (Time 3). Subsequently, all patients received ABM for two weeks (Time 4) with a one week follow-up (Time 5).
All assessments and interviews were done by an independent, well-trained experienced psychologist, supervised by the first author, a licensed clinical psychologist.

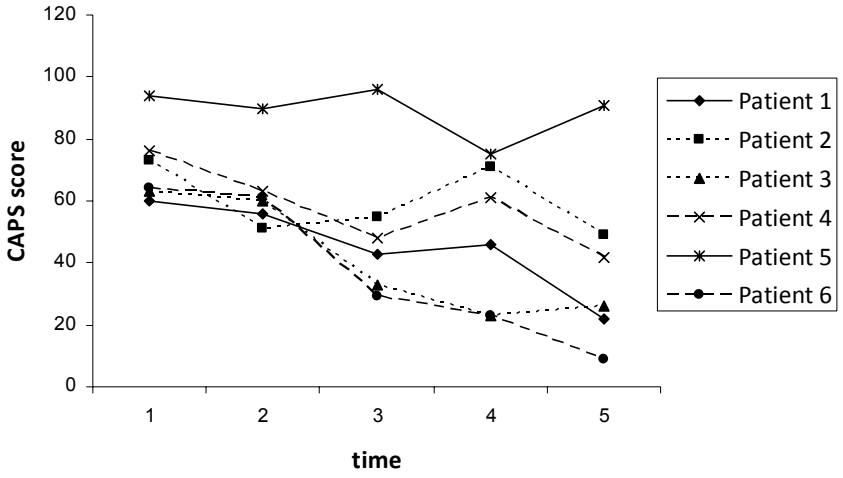
Data reduction and analyses

The DPT data from Time 1 of one patient were lost due to technical problems. One patient did not show up for follow-up and we were unable to contact him.
First, all DPT trials with erroneous responses and trials with RTs < 300 ms were removed (5 % of the data). In the following step, all trials with RTs below or above an individual threshold set at the mean +/- three standard deviations were removed as outliers (2 % of the data; Putman, Hermans, & Van Honk, 2006; Ratcliff, 1993).

Results

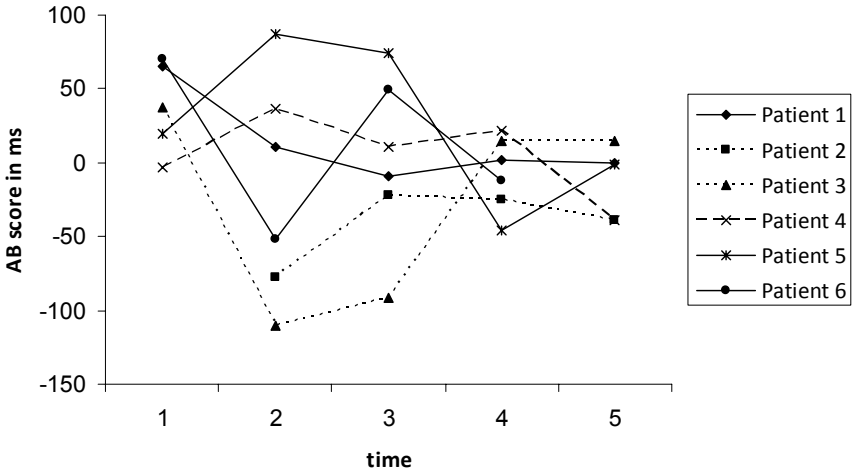
Average age of the six male participants was 39.3 years (*SD* = 8.2, range 27-49 years). According to the MINI Plus, two patients were diagnosed with current major depressive disorder, one with dysthymic disorder, one with panic disorder and two with GAD. Mean AB score was 3.7 ms (*SD* = 3.1ms). For the results on the CAPS, see figure 1. Positive effects were expected after the intervention or at follow-up (Time 4 or 5).
We used the Jacobson & Truax (1991) formula to compute criteria for clinically meaningful improvement. For the CAPS, we used norms of both a functional and a dysfunctional population (Resick, Nishith, Weaver, Astin, & Feuer, 2002); a clinically significant cut-off point of 56.5 was set.
According to this cut-off point, five patients showed recovery at follow-up. However, none of the patients were improved after ABM. Furthermore, in two patients (patient 2 and 4) PTSD symptoms increased during ABM although this effect disappeared at follow-up.
AB scores (see figure 2) varied widely, to the extent that the intra-individual change was larger than the inter-individual change during baseline. Moreover, at Time 1 all patients demonstrated AB towards threat at Time 1, but at Time 2 three patients showed attentional avoidance. Two patients demonstrated the expected attentional modification after ABM, but one of these patients showed a similar decline during baseline. In three other patients, AB did not change and one patient demonstrated less avoidance after ABM. In one patient (patient 5) a decline in symptoms, although not clinically meaningful, coincided with a shift in AB at time 4 compared to time 3, but both changes were lost at follow-up.

Figure 1. Posttraumatic stress symptoms



Note: CAPS score = Clinician Administered PTSD scale total score

Figure 2. Attentional bias



Note: AB score in ms = Attentional bias score in milliseconds

In conclusion, although five patients showed meaningful clinical improvement, this can not be related to ABM. Moreover, the individual AB scores vary largely, and changes in AB do not coincide with symptom change.

Discussion

Contrary to our expectations, we found no evidence that ABM was effective in reducing AB or PTSD symptoms.

Our results fit the outcomes of recent RCTs on the effect of ABM in anxiety disorders (Boetcher, Berger & Renneberg, 2012; Carlbring et al., 2012; Neubauer et al., 2012; Schoorl et al., 2013), in which no therapeutic effect of ABM was demonstrated. When compared to the earlier positive results (Amir et al., 2009b; Schmidt et al., 2009), it is hard to explain the large differences in outcomes. An often heard argument is that null findings are due to the absence of AB at baseline; when an individual does not demonstrate attentional vigilance at the start of treatment, ABM (training avoidance) can not lead to beneficial effects. However, the absence of AB has not been crucial in producing positive results before (e.g., Amir et al, 2009a; Hazen, Vasey, & Schmidt, 2008). Moreover, a post-hoc analysis in a subgroup with PTSD patients demonstrating AB at baseline also showed no effect of ABM (Schoorl et al., 2013).

A noticeable feature of this study is the use of idiographic stimuli. Although carefully selected, this was of course a subjective procedure for which formal validation was not possible. Furthermore, the generalizability of the results is limited by the small amount of patients treated. However, since the present results are almost unequivocal, and confirm the outcomes of an earlier large RCT (Schoorl et al., 2013), reconsidering ABM as an effective treatment for PTSD seems inevitable.

References

Amir, N. (2010). Cognitive Bias Modification for PTSD: Preliminary Efficacy in Active Duty Marines. In C. Beard, *Cognitive Bias Modification in Anxiety: Targeting Multiple Disorders, Biases, and Settings*. Symposium conducted at the meeting of the World Congress of Behavioral and Cognitive Therapies. Boston, MA.

Amir, N., Beard, C., Burns, M., & Bomyea, J. (2009a). Attention modification program in individuals with generalized anxiety disorder. *Journal of Abnormal Psychology 118,* 28-33.

Amir, N., Beard, C., Taylor, C.T., Klumpp, H., Elias, J., Burns, M., & Chen, X. (2009b). Attention training in individuals with generalized social phobia: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 77,* 961-973.

Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M.J, &., Van IJzendoorn, M.H. (2007). Threat-related attentional bias in anxious and nonanxious individuals: A meta-analytic study. *Psychological Bulletin, 133(1),* 1-24.

Barlow, D.H., & Hersen, M. (1984). *Single case experimental designs: Strategies for studying behaviour change (2nd ed.)*. New York, Pergamon Press.

Blake, D.D., Weathers, F.W., Nagy, L.N., Kaloupek, D.G., Klauminzer, G., Charney, D.S., & Keane, T.M. (1990). *Clinician Administered PTSD Scale (CAPS)*. National Center for Posttraumatic Stress Disorder, Behavioral Science Division-Boston.

Boettcher, J., Berger, T., & Renneberg, B. (2012). Internet-based attention training for social anxiety: a randomized controlled trial. *Cognitive Therapy and Research 36*, 522-536. doi: 10.1007/ s10608 -011-9374-y.

Carlbring, P., Löfqvist, M., Sehlin, H., Amir, N., Rousseau, A., Hofmann, S., & Andersson, G. (2012). Internet-delivered attention bias modification training in individuals with social anxiety disorder – a double blind randomized controlled trial. *BMC Psychiatry, 12*, 66.

Cisler, J.M., & Koster, E.H.W. (2010). Mechanisms of attentional biases towards threat in anxiety disorders: An integrative review. *Clinical Psychology Review, 30*, 203-216.

Davidson, J.R., Rothbaum, B.O., van der Kolk, B.A., Sikes, C.R., & Farfel, G.M. (2001). Multi-center, double-blind comparison of sertraline and placebo in the treatment of posttraumatic stress disorder. *Archives of General Psychiatry, 58*, 485-492.

Hakamata, Y., Lissek, S., Bar-Haim, Y., Britton, J.C., Fox, N.A., Leibenluft, E., Ernst, M., & Pine, D.S. (2010). Attention bias modification treatment: A meta-analysis toward the establishment of novel treatment for anxiety. *Biological Psychiatry, 68*, 982-990.

Hallion, L.S., & Meron Ruscio, A. (2011). A meta-analysis of the effect of cognitivebias modification on anxiety and depression. *Psychological Bulletin, 137(6)*, 940-958.

Hazen, R.A., Vasey, M.W., & Schmidt, N.B. (2008). Attentional retraining: A randomized clinical trial for pathological worry. *Journal of Psychiatric Research, 43*, 627-633.

Jacobson, N.S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology 59,* 12-19. doi: 10.1037/0022-006X.59.1.12

MacLeod, C., Koster, E.H.W., & Fox, E. (2009). Whither cognitive bias modification Research? Commentary on the special section articles. *Journal of Abnormal Psychology, 118(1),* 89-99.

Neubauer, K., Von Auer, M., Murray, E., Petermann, F., Helbig-Lang, S., & Gerlach, A.L. (2012). Internet-delivered attention modification training as a treatment for social phobia: A randomized controlled trial. *Behaviour Research and Therapy*, in press. doi: 10.1016/j.brat.2012.10.006.

Putman, P., Hermans, E., & Van Honk, J. (2006). Anxiety meets fear in perception of dynamic expressive gaze. *Emotion, 6(1),* 94-102.

Ratcliff, R. (1993). Methods for dealing with reaction times. *Psychological Bulletin, 114(3),* 510-532.

Resick, R., Nishith, P., Weaver, T.L., Astin, M.C., & Feuer, C.A. (2002). A comparison of cognitive-processing therapy with prolonged exposure and an awaiting condition for the treatment of

chronic posttraumatic stress disorder in female rape victims. *Journal of Consulting and Clinical Psychology, 70,* 867-879.

Schmidt, N.B., Richey, J.A., Buckner, J.D., & Timpano, K.R. (2009). Attention training for generalized social anxiety disorder. *Journal of Abnormal Psychology, 118,* 5-14.

Schoorl, M., Putman, P., & Van Der Does, W. (2013). Attentional Bias Modificationin posttraumatic stress disorder: A randomized controlled trial. *Psychotherapy & Psychosomatics, 82,* 99-105.

Sheehan, D.V., Lecrubier, Y., Sheehan, K.H., Janays, J., Weiller, E., Hergueta, T., Baker, R., & Dunbar, G.C. (1998). The MINI International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry, 59,* 22-33.