

**Treatment Strategies  
for Panic Disorder**

Mettaa Institute of CBT  
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**Treatment Strategies  
for Panic Disorder**

- A. Psychoeducation & Cognitive Restructuring
- B. Interceptive Exposure
- C. In vivo exposure & Virtual exposure
- D. Breathing retraining
- E. Relaxation
- F. Acceptance and Mindfulness



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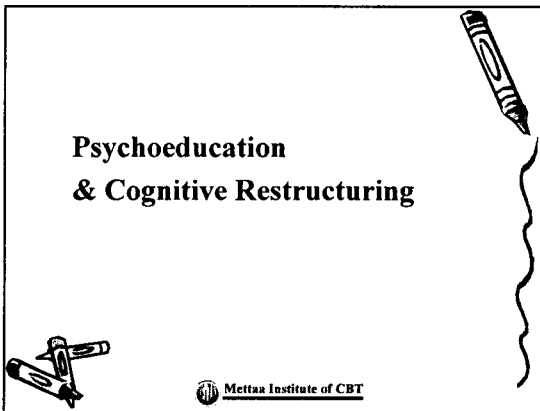
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**Psychoeducation  
& Cognitive Restructuring**



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Arch Gen Psychiatry. 1989 Feb;46(2):157-62.  
**The influence of an illusion of control on panic attacks induced via inhalation of 5.5% carbon dioxide-enriched air.**

Sanderson WC, Rapee RM, Barlow DH.

- Twenty patients with panic disorder inhaled a mixture of 5.5% CO<sub>2</sub>-enriched air for 15 minutes. All patients were instructed that illumination of a light directly in front of them would signal that they could decrease the amount of CO<sub>2</sub> that they were receiving, if desired, by turning a dial attached to their chair. For ten patients, the light was illuminated during the entire administration of CO<sub>2</sub>. For the remaining ten patients, the light was never illuminated. In fact, all patients experienced the full CO<sub>2</sub> mixture, and the dial was ineffective.
- When compared with patients who believed they had control, patients who believed they could not control the CO<sub>2</sub> administration (1) reported a greater number of DSM-III-revised panic attack symptoms, (2) rated the symptoms as more intense, (3) reported greater subjective anxiety, (4) reported a greater number of catastrophic cognitions, (5) reported a greater resemblance of the overall inhalation experience to a naturally occurring panic attack, and (6) were significantly more likely to report panic attacks.



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Behav Res Ther. 1991;29(2):161-6.  
**Treatment of panic attacks using cognitive therapy without exposure or breathing retraining.**

Salkovskis PM, Clark DM, Hackmann A.

- Cognitive treatment of panic attacks is based on the hypothesis that panic results from the catastrophic misinterpretation of bodily sensations, and that changing such misinterpretations will block the occurrence of panic.
- The treatment normally involves an integrated set of cognitive and behavioural techniques.
- In a consecutive series of panic patients, a multiple baseline across subjects design was used to investigate whether a modified form of treatment involving only cognitive procedures could reduce panic attack frequency.
- The results provide preliminary evidence that cognitive procedures directed at changing misinterpretations of bodily sensations can reduce panic attack frequency, and also that cognitive procedures which do not target misinterpretations may not reduce panic.



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Am J Psychiatry. 1999 May;156(5):745-8.  
**Instructional set and physiological response to CO<sub>2</sub> inhalation.**

Welkowitz LA, Papp L, Martinez J, Browne S, Gorman JM.

- **METHOD:** Thirty-seven patients with panic disorder and 16 normal subjects were exposed to CO<sub>2</sub> inhalation under one of three instructional conditions: 1) reassurance (reiterated safety assurances), 2) control dial (patients were instructed on using an operative dial to reduce the concentration of CO<sub>2</sub> in the breathing canopy), and 3) basic instructions (standard information). Perceived breathlessness was measured with the Borg Scale of Respiratory Exertion.
- **RESULTS:** Manipulation of instructional sets did not affect panic rates among patients. The reassurance condition, however, produced a significant reduction in perceived breathlessness.
- **CONCLUSIONS:** CO<sub>2</sub>-induced panic is a robust biological effect that occurs independent of cognitive set changes, such as illusion of control or reassurance of safety.



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Behav Res Ther. 1999 Jun;37(6):559-74.  
**An experimental investigation of the role of safety-seeking behaviours in the maintenance of panic disorder with agoraphobia.**

Salkovskis PM, Clark DM, Hackmann A, Wells A, Gelder MG.

- This study evaluates the hypothesis that safety-seeking behaviours play an important role in maintaining anxiety because they prevent patients from benefiting from disconfirmatory experience.
- Patients suffering from panic disorder with agoraphobia carried out a behaviour test, closely followed by an experimental session, which included a brief (15 min) period of exposure during which participants either stopped or maintained within-situation safety-seeking behaviours.
- When the behaviour test was repeated within two days, patients who had stopped their safety-seeking behaviours during the experimental session showed a significantly greater decrease in catastrophic beliefs and anxiety than those who had maintained safety-seeking behaviour.
- This difference was also reflected in questionnaires measuring clinical anxiety. These results are consistent with the cognitive hypothesis.



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J Behav Ther Exp Psychiatry. 2005 Aug 25:  
**Efficacy of internet therapy for panic disorder.**  
Klein B, Richards JC, Austin DW.

- Fifty-five people with panic disorder (PD)
- 1) internet-based cognitive behavioural panic treatment (CBT) (with email contact), 2) therapist-assisted CBT manual or information-only control (both with telephone contact).
- Both CBT treatments were more effective in reducing PD symptomatology, panic-related cognition, negative affect, and number of GP visits and improving physical health ratings.
- **Internet treatment was more effective than CBT manual** in reducing clinician-rated agoraphobia and number of GP visits at post-assessment.
- At follow-up, these effects were maintained for both CBT groups, with internet CBT better at improving physical health ratings and reducing GP visits.
- **This study provides support for the efficacy of internet-based CBT.**



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Behav Res Ther. 2005 Aug 4  
**A pilot study of two-day cognitive-behavioral therapy for panic disorder.**

Deacon B, Abramowitz J.

- The treatment involved 9h of therapist contact over two consecutive days and was developed for the purpose of delivering CBT for PD to a largely rural patient population that must travel long distances to find a treatment provider.
- Ten patients who elected to participate in brief, intensive CBT instead of weekly CBT were recruited from routine clinical practice in a hospital-based anxiety disorders clinic.
- Assessments conducted at pre-treatment and 1-month follow-up revealed large, clinically significant reductions in PD symptoms, anxiety sensitivity, body vigilance, and anxiety and depressive symptoms.
- Most patients (60%) were panic-free after treatment and evidenced normative levels of symptomatology at follow-up.
- The present study suggests that brief, intensive treatment may be an effective means of delivering CBT for PD.



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## Interceptive Exposure



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Am J Psychiatry. 1987 Jun;144(6):788-91.  
**Reduction of CO<sub>2</sub>-induced anxiety in patients with panic attacks after repeated CO<sub>2</sub> exposure.**

van den Hout MA, van der Molen GM, Griez E, Lousberg H, Nansen A.

- The authors compared the subjective reaction of 13 panic patients and eight control subjects to a 35% CO<sub>2</sub> challenge, a treatment known to produce physical symptoms comparable to those of natural or lactate-induced panic, and to placebo treatment (inhalation of air).
- They found that patients had higher placebo scores than control subjects, patients tended to get highly anxious on CO<sub>2</sub> and control subjects did not, and CO<sub>2</sub>-induced subjective anxiety in patients decreased as the number of CO<sub>2</sub>-induced exposures to interoceptive anxiety symptoms increased.
- The data support a behavioral account of the effects of anxiogenics.



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Br J Clin Psychol. 1997 Feb;36 ( Pt 1):85-99.  
**Interceptive exposure versus breathing retraining within cognitive-behavioural therapy for panic disorder with agoraphobia.**

Craske MG, Rowe M, Lewin M, Noriega-Dimitri R.

- Thirty-eight individuals with panic disorder and agoraphobia were randomly assigned to (a) cognitive restructuring, interoceptive exposure (i.e. repeated exposure to feared bodily sensations) and in vivo exposure to agoraphobic situations; or (b) cognitive restructuring, breathing retraining and in vivo exposure to agoraphobic situations.
- Assessments were conducted at pre-treatment, post-treatment and six months later.
- The treatments were equally effective on many measures.
- However, treatment that included interoceptive exposure was more effective at post-treatment in terms of panic frequency, overall severity and functioning, and more effective at six-month follow-up in terms of panic frequency, phobic fears and general anxiety and functioning. Follow-up results were limited due to attrition.



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J Anxiety Disord. 1997 Sep-Oct;11(5):541-56.  
**How does interoceptive exposure for panic disorder work?**  
An uncontrolled case study.  
Beck JG, Shipherd JC, Zebb BJ.

- To examine the influence of interoceptive exposure (IE) when used alone in the treatment of Panic Disorder (PD), 17 PD patients were presented with six IE sessions, using 35% CO<sub>2</sub> as the exposure medium.
- The data indicate that IE alone is effective in reducing panic, panic-related fears, and general anxiety.
- However, the positive effects of IE do not appear to extend to agoraphobia, related fears, or depressed mood.
- Two distinct within-session patterns of fear response to IE were noted, **one indicating habituation and the other indicating a lack of fear reduction.**
- Although both patterns were associated with reductions in panic and anxiety following IE, **the Habitators appeared to have a more positive outcome, which occurred more rapidly.**
- These data suggest that IE may operate via two different pathways.



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Br J Psychiatry. 2001 Apr;178:331-6.  
**Self-exposure therapy for panic disorder with agoraphobia: randomised controlled study of external v. interoceptive self-exposure.**  
Ito LM, de Araujo LA, Tess VL, de Barros-Neto TP, Asbahr FR, Marks I.

- **METHOD:** Eighty out-patients were randomised to a control group or to one of three forms of **self-exposure treatment (external, interoceptive, or combined)**. Each treatment included seven sessions over 10 weeks and daily self-exposure homework. Assessments were at pre- and post-treatment and up to 1 year post-entry. Assessors remained blind during treatment.
- **RESULTS:** The three self-exposure groups improved significantly and similarly at post-treatment and up to 1-year followup, and significantly more than did the control subjects. Rates of improvement on main outcome measures averaged 60% at post-treatment and 77% at follow-up.
- **CONCLUSIONS:** The three methods of self-exposure were equally effective in reducing panic and agoraphobic symptoms in the short- and long-term.



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Behav Res Ther. 2002 Mar;40(3):325-41. Related Articles, Links  
**Cognitive therapy versus interoceptive exposure as treatment of panic disorder without agoraphobia.**  
Amtz A.

- Cognitive therapy (CT) and interoceptive exposure (IE) as treatments of panic disorder without agoraphobia were compared in a sample of 69 patients, randomly allocated to condition. There were no significant differences between treatments as to reductions in panic frequency, daily anxiety levels and a composite questionnaire score, at posttest after the 12-session treatment, and at both follow-ups (4 weeks, 6 months).
- In both conditions, high percentages of patients were panic free at post and follow-up tests (range 75-92%).
- Although the reduction in idiosyncratic beliefs about the catastrophic nature of bodily sensations was equally strong in both conditions, post-treatment beliefs correlated strongly with symptoms at post and follow-up tests in the CT condition, but not in the IE condition.
- **Reduction of beliefs may be essential in CT, but not in IE.** This suggests that the two treatments utilize different change mechanisms.



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Behav Res Ther. 2006 Jan;44(1):85-98.  
**Responses to symptom induction exercises in panic disorder.**  
Antony MM, Ledley DR, Liss A, Swinson RP.

- This study describes responses of individuals with PD and non-clinical controls to 13 standard symptom induction exercises (interoceptive exposure) and 3 control exercises.
- Generally, individuals with PD responded more strongly to symptom induction exercises than did controls.
- The exercises producing the most fear included spinning, hyperventilation, breathing through a straw, and using a tongue depressor.



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## In vivo exposure & Virtual exposure



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Behav Res Ther. 2004 Oct;42(10):1105-27.  
**Cognitive behavior therapy vs exposure in vivo in the treatment of panic disorder with agoraphobia (corrected from agrophobia).**  
Ost LG, Thulin U, Ramnero J.

- Seventy-three psychiatric outpatients with DSM-IV diagnosis of panic disorder with agoraphobia were assessed with a battery of independent assessor, self-observation, self-report and behavioral measures before and after therapy, and at a 1-yr follow-up.
- They were randomly assigned to **Exposure in vivo** (E; n = 25), **Cognitive Behavior Therapy** (CBT; n = 26), or a **Wait-list control** (WLC; n = 22) and received 12-16 individual therapy sessions, once weekly.
- However, there were no significant differences between E and CBT. The three criteria of clinically significant improvement were achieved by 67% of the E-patients and 79% of the CBT-patients at post-treatment, and 74% and 76%, respectively, at follow-up.
- The conclusion that can be drawn is that **adding cognitive therapy to exposure did not yield significantly better results than for exposure alone.**



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Cyberpsychol Behav. 2004 Oct;7(5):527-35.  
**Clinically significant virtual environments for the treatment of panic disorder and agoraphobia.**

Botella C, Villa H, Garcia-Palacios A, Banos RM, Perpina C, Alcaniz M.

- The aim of this work is the description of virtual environments designed to apply exposure therapy in the treatment of panic disorder and agoraphobia.
- The program allows the simultaneous exposure to two different kinds of stimuli usually avoided by panic disorder and agoraphobia sufferers (external and interoceptive).
- The characteristics of the virtual environments are described, as well as the target behaviors that can be simulated with these virtual environments.



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Cyberpsychol Behav. 2005 Aug;8(4):387-93.  
**Effects of group experiential cognitive therapy for the treatment of panic disorder with agoraphobia.**

Choi YH, Vincelli E, Riva G, Wiederhold BK, Lee JH, Park KH.

- The objective of this study was to test the efficacy of short-term (four sessions) ExCT compared with a traditional 12-session panic control program (PCP) for the treatment of PDA.
- Forty patients diagnosed as having PDA by the diagnostic criteria of DSM-IV were randomly assigned to ExCT and PCP groups of 20 patients each.
- In all ratings, both ExCT and PCP groups showed significant improvement post-treatment compared with pre-treatment scores. There were no significant differences between the two treatment groups in HES and medication discontinuation at post-treatment, but there was a significant difference in medication discontinuation at 6-month follow-up.
- These results suggested that although short-term effectiveness of ExCT might be comparable to the effectiveness of PCP, long-term effectiveness of ExCT might be relatively inferior to the effectiveness of PCP.



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## Breathing retraining



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Clin Psychol Rev. 2005 May;25(3):285-306.  
**Voluntary hyperventilation in the treatment of panic disorder—functions of hyperventilation, their implications for breathing training, and recommendations for standardization.**  
Meuret AE, Ritz T, Wilhelm FH, Roth WT.

- From the theoretical perspective of cognitive-behavior therapy, VH is a way to expose patients with panic disorder to sensations associated with panic and to activate catastrophic cognitions that need restructuring.
- Here we review panic disorder treatment studies using breathing training that have included VH.
- We differentiate the roles of VH in diagnosis, education about symptoms, training of breathing strategies, interoceptive exposure, and outcome measurement—discussing methodological issues specific to these roles and VH test reliability and validity.
- We propose how VH procedures might be standardized in future studies.



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Int J Psychophysiol. 2005 Nov-Dec;58(2-3):190-8.  
**Physiological markers for anxiety: panic disorder and phobias.**  
Roth WT.

- We developed a capnometry feedback assisted breathing training therapy for panic disorder designed to reduce hyperventilation and making breathing regular. Without feedback, conventional therapeutic breathing instructions may actually increase hyperventilation by increasing dyspnea.
- Five weekly therapy sessions accompanied by daily home practice with a capnometer produced marked clinical improvement compared to changes in an untreated group. Improvement was sustained over a 12-month follow-up period.
- The therapist avoided any statements or procedures designed to alter cognitions. Improvement occurred regardless of whether patients initially reported mostly respiratory or non-respiratory symptoms during their attacks.



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## Relaxation



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Behav Res Ther. 1993 May;31(4):383-94.  
**Applied relaxation, exposure in vivo and cognitive methods in the treatment of panic disorder with agoraphobia.**  
Ost LG, Westling BE, Hellstrom K.

- Forty-five psychiatric outpatients with DSM-III-R diagnosis of panic disorder with agoraphobia were assessed with a battery of self-report, behavioral and cognitive measures before and after therapy, and at a 1 yr follow-up.
- They were randomly assigned to either Applied Relaxation (AR; n = 15), Exposure in vivo (E; n = 15) or Cognitive Treatment (CT; n = 15) and received 12 individual therapy sessions, once weekly.
- All patients also had self-exposure instructions. The three treatments yielded significant improvements that were maintained at follow-up.
- One criterion of clinically significant improvement was fulfilled by 87% of the AR-, 80% of the E- and 60% of the CT-patients at the end of treatment, and 85, 79 and 67%, respectively, at follow-up. Between-group differences were observed on two measures only, both showing better results for AR than for CT.
- The conclusion that can be drawn is that the three treatments, focused on different anxiety components, are about equally effective, and the results are maintained 1 yr after the end of treatment.



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J Behav Ther Exp Psychiatry. 2003 Jun;34(2):129-40.  
**Treatment of panic disorder via the Internet: a randomized trial of CBT vs. applied relaxation.**  
Carlbring P, Ekselius L, Andersson G.

- A randomized trial was conducted of two different self-help programs for panic disorder (PD) on the Internet. After confirming the PD-diagnosis with an in-person structured clinical interview for DSM-IV (SCID) interview 22 participants were randomized to either applied relaxation (AR) or a multimodal treatment package based on cognitive behavioral therapy (CBT).
- Overall, the results suggest that Internet-administered self-help plus minimal therapist contact via e-mail has a significant medium to large effect (Cohen's  $d=0.71$  for AR and  $d=0.42$  for CBT).
- The results from this study generally provide evidence to support the continued use and development of Internet-distributed self-help programs.



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## Acceptance and Mindfulness



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*The Cochrane Database of Systematic Reviews 2006 Issue 1*  
**Meditation therapy for anxiety disorders**  
Krisanaprakornkit T, Krisanaprakornkit W, Piyavhatkul N,  
Laopaiboon M

- Although meditation therapy is widely used in many anxiety-related conditions there is still a lack of studies in anxiety disorder patients.
- **The small number of studies included in this review do not permit any conclusions to be drawn on the effectiveness of meditation therapy for anxiety disorders.**
- Transcendental meditation is comparable with other kinds of relaxation therapies in reducing anxiety, and Kundalini Yoga did not show significant effectiveness in treating obsessive-compulsive disorders compared with Relaxation/Meditation.
- **Drop out rates appear to be high, and adverse effects of meditation have not been reported.**
- More trials are needed.



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**Cognitive-behavioral therapy and the treatment of panic disorder: efficacy and strategies.**

**Otto MW, Deveney C.**  
J Clin Psychiatry. 2005;66 Suppl 4:28-32

- In this article, we review the efficacy and applications of cognitive-behavioral therapy (CBT) for panic disorder.
- Research supports CBT as an effective first-line treatment of panic disorder that offers relatively quick onset of action and long-term maintenance of treatment benefits.
- These characteristics, plus the acceptability, tolerability, and cost-efficacy of CBT, make it an especially attractive treatment option for panic disorder.
- We review these findings as well as some newer developments in the field including research on emotional acceptance, the importance of context in extinction learning, and the use of CBT in combination with pharmacotherapy.



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J. Behavior Therapy & Experimental Psychiatry 34(3)  
**The effects of acceptance versus control contexts on avoidance of panic-related symptoms.**  
Eifert and Heffner (2003)

- Sixty high anxiety sensitive females were exposed to two 10-min periods of 10% carbon dioxide enriched air, an anxiogenic stimulus.
- Before each inhalation period, participants underwent a training procedure aimed at encouraging them either to *mindfully observe (acceptance context)* or to *control symptoms via diaphragmatic breathing (control context)*. A third group was given no particular training or instructions.
- Compared to control context and no instruction participants, **acceptance context participants were less avoidant behaviorally and reported less intense fear and cognitive symptoms and fewer catastrophic thoughts during the CO<sub>2</sub> inhalations.**



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