

Best Evidence Summaries of Topics in Mental Healthcare

BEST *in* **MH** *clinical question-answering service*

Question

“In adults with depression and/or anxiety, how effective is Cognitive Bias Modification, compared to Cognitive Behavioural Therapy, in improving mood ratings?”

Clarification of question using PICO structure

Patients: Adults with depression and/or anxiety

Intervention: Cognitive Bias Modification

Comparator: Cognitive Behavioural Therapy

Outcome: Improving Mood Ratings

Clinical and research implications

No definite clinical implications can be made from the available evidence. There is almost no evidence that directly compare Cognitive Bias Modification (CBM) with Cognitive Behavioural Therapy (CBT). Only one RCT included in this BEST summary compared these two interventions, and in this study, the CBT intervention was computerised. It is apparent that more studies are needed to evaluate these types of interventions.

What does the evidence say?

Number of included studies/reviews (number of participants)

One systematic review (SR) (Hallion and Rusco 2011), and three randomised controlled trials (RCTs) (Beard et al. 2011; Bowler et al. 2012; Williams et al. 2013) met the inclusion criteria for this BEST summary.

Main Findings

The aim of the SR was to evaluate the effectiveness of CBM on anxiety and depression (Hallion and Rusco 2011). In this SR, 45 studies (43 of which appear to be RCTs) published up to 2010 were included. The control groups evaluated in the included studies received either the opposite training relative to the treatment group (e.g. negative biases were reinforced) or a “no contingency” sham training (e.g., negative and positive biases were reinforced with equal frequency). The authors of this SR reported that CBM had a small positive effect on anxiety and depression symptoms ($g = 0.13$, 95% CI 0.05 to 0.21, $p < 0.001$), however, they also reported that publication bias was detected. When anxiety and depression were examined separately, CBM significantly reduced anxiety but not depression.

One RCT compared the combination of CBM for attention (CBM-A) and interpretation (CBM-I) – a treatment called Attention and Interpretation Modification (AIM) – with placebo in participants with Social Anxiety Disorder (SAD) (Beard et al. 2011). The authors reported that after 4 weeks, participants who received AIM had significantly reduced self-reported symptoms of social anxiety (Liebowitz Social Anxiety Scale) ($p=0.006$). These gains were also evident on a behavioural measure (performance on an impromptu speech) ($p=0.003$).

The second RCT compared CBM-I and computerised cognitive behavioural therapy (cCBT) with a control condition, and also with each other, in participants experiencing social anxiety (Bowler et al. 2012). The authors reported that after 2 weeks, CBM-I and cCBT were efficacious at reducing social anxiety (as assessed by the FNE and the SPIN), trait anxiety (as assessed by the STAI), and depression (as assessed by the BDI-II), relative to the no-intervention comparison condition, but that there was no significant difference between the two intervention groups.

The third RCT aimed to evaluate the independent effects of a CBM-I, as well as the combined effects of 7 days of CBM-I followed by 10 weeks of an internet based CBT programme (iCBT) in patients diagnosed with a major depressive episode (Williams et al. 2013). The authors reported that after CBM-I, and also after the combined intervention, there were significant reductions in depression (BDI-II and PHQ-9) and distress (K10) scores compared with a wait-list control (WLC) group. In addition, disability (WHODAS-II), anxiety (STAI-T), and repetitive negative thinking (RTQ10) scores were significantly lower in the combined intervention group relative to the WLC group.

Authors Conclusions

The authors of the SR concluded that prior to correcting for potential publication bias, CBM was found to have a small, positive effect on anxiety and depression symptoms (Hallion and Rusco 2011).

The RCT by Beard et al. (2011) concluded that a combined CBM treatment produced medium-to-large effects on social anxiety.

The authors of the second RCT (Bowler et al. 2012) concluded that CBM-I and cCBT were both efficacious in a high socially anxious population, and that there was no clear superiority of either active intervention over the other to reduce symptoms of anxiety and depression. The authors of this study also concluded that these two approaches could be used as alternative or complementary interventions to reduce anxiety.

Williams et al. (2013) concluded that the combined intervention of CBM-I and iCBT was effective in reducing depressive symptoms, distress, disability, anxiety, and rumination in patients diagnosed with a major depressive episode.

Reliability of conclusions/Strength of evidence

The SR was well conducted and although a quality assessment was conducted by the review authors, it is not clear if the included studies were of good quality. Although the authors reported a significant difference between the intervention and control group, it is unclear whether or not this small effect size may be clinically significant.

The RCT by Beard et al. (2011) was well-conducted but it had a relatively small sample size (n=32) with only 12 participants in the control group. There was not enough methodological information reported in the RCTs by Bowler et al. (2012) and Williams et al. (2013) to assess risk of bias in these studies.

What do guidelines say?

NICE Guidelines for social anxiety disorder (CG159) discuss the use of cognitive bias modification in the following way;

“Cognitive bias modification is a computerised intervention that aims to reduce attention towards threatening stimuli. The most common programs use modified dot-probe tasks in which participants see numerous (sometimes hundreds of) presentations of written or facial stimuli and are asked to make quick decisions based on what has been seen. For example, some tasks present written stimuli with two possible interpretations, one threatening and one benign; participants select one and receive positive reinforcement when they bias towards neutral stimuli. These interventions require limited therapist input and, until recently, these programs were used only to study psychological processes.” (pp. 103)

“A number of interventions, including cognitive bias modification, exposure (which was efficacious as a stand-alone intervention but has been adapted into more recent and efficacious interventions) and social skills training, contained components of efficacious psychological interventions for social anxiety disorder. The GDG concluded that people with social anxiety disorder should be offered an

integrated programme of treatment rather than separate components that, in the main, have not demonstrated clinical efficacy as stand-alone interventions. For example, exposure alone, although clinically efficacious, was found not to be cost effective.” (pp. 187)

Date question received: 15/01/2014

Date searches conducted: 16/01/2014

Date answer completed: 03/02/2014

References

Guidelines

National Institute for Health and Care Excellence (2013) Social Anxiety Disorder. The NICE Guideline on recognition, assessment and treatment. CG159 London: National Institute for Health and Care Excellence

<http://www.nice.org.uk/nicemedia/live/14168/63846/63846.pdf>

SRs

Hallion, L.S. and Ruscio, A.M. (2011) A Meta-Analysis of the Effect of Cognitive Bias Modification on Anxiety and Depression. *Psychological Bulletin* 137 (6) pp.940-958

RCTs

Beard, C., Weisberg, R.B. and Amir, N. (2011) Combined Cognitive Bias Modification Treatment for Social Anxiety Disorder: A Pilot Trial. *Depression and Anxiety* 28 pp.981-988.

Bowler, J.O., Mackintosh, B., Dunn, B.D., Mathews, A., Dalgleish, T. and Hoppitt, L. (2012) A Comparison of Cognitive Bias Modification for Interpretation and Computerized Cognitive Behaviour Therapy: Effects on Anxiety, Depression, Attentional Control, and Interpretive Bias. *Journal of Consulting and Clinical Psychology* 80 (6) pp.1021-1033.

Results

Systematic Reviews

Author (year)	Search Date	Inclusion criteria	Number of included studies	Summary of results	Risk of bias
Hallion and Ruscio (2011)	10/2010	<p>P: 2,591 participants, psychologically healthy adults, adults selected on the basis of an anxiety or mood disorder diagnosis.</p> <p>I: Cognitive bias modification (CBM); in which a cognitive bias (e.g. attention to threat) was modified.</p> <p>C: 'No contingency' sham training (e.g. negative and positive biases were reinforced with equal frequency) or opposite training relative to the treatment group (negative biases were reinforced).</p> <p>O: Changes in anxiety and depression.</p> <p>S: Controlled trials</p>	45 (it appears that 43 studies were RCTs)	<p>The authors reported that CBM had a small effect on anxiety and depression ($g = 0.13$, 95% CI 0.05 to 0.21, $p < 0.001$), and that this effect was only reliable when symptoms were assessed after participants experienced a stressor (e.g. a threatening video or upcoming exam) ($g = 0.23$, 95% CI 0.11, 0.34, $p < 0.001$). When anxiety and depression were examined separately, CBM significantly modified anxiety ($g = 0.13$, 95% CI 0.05 to 0.22) but not depression ($g = 0.06$, 95% CI -0.05 to 0.18). There was a non-significant trend toward a larger effect for studies including multiple training sessions.</p> <p>This SR also evaluated other variables and moderators, but these data and complex analyses have not been extracted.</p>	Low

RCTs

Author (year)	Inclusion criteria	Number of participants	Summary of results	Risk of bias
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<p>Beard et al. (2011)</p>	<p>P: American adults ages 18-79. With social anxiety disorder according to DSM-IV. Eligible if score 30 or above on the Liebowitz Social Anxiety Scale (LSAR-SR). I: Attention and Interpretation Modification computerised programme, which focussed on targeting attention biases and interpretation biases (twice weekly sessions with no therapist contact for four weeks). C: Placebo control. Received the same psycho-education and rational as the intervention condition but the computerised tasks were differed and did not include cognitive bias modification material. O: Anxiety: self reported LSAR-SR, behavioural assessment of social anxiety,</p>	<p>N=32 (n=20 intervention, n=12 control).</p>	<p>After 4 weeks, participants who received AIM had significantly reduced self-reported (Liebowitz Social Anxiety Scale) symptoms of social anxiety compared with participants who received placebo (p=0.006). These gains were also evident on a behavioural measure (performance on an impromptu speech) (p=0.003).</p>	<p>Well-conducted trial, but very small sample size</p>
<p>Bowler et al. (2012)</p>	<p>P: Caucasian adults, mean age 22.7 years with high school anxiety. I: Cognitive bias modification for interpretation involving scenarios related to issues that might concern socially anxious individuals such as making a phone call (4 sessions). C: Computerised cognitive behavioural therapy (cCBT). Contained information and CBT modules of social anxiety featuring 'exposure practice', 'modifying your thinking', 'attention practice' and 'social</p>	<p>N=63 (n=21 CSM-I, n =21 cCBT, n=21 no intervention).</p>	<p>After 2 weeks, both CBM-I and cCBT groups reported significantly reduced levels of social anxiety compared to control (CBM-I vs. control: Fear of Negative Evaluation Scale (FNE): p=0.02, Social Phobia Inventory (SPIN): p=0.007; cCBT vs. control: FINE: p=0.01, SPIN: p=0.001), but there was no difference between treatment groups (CBM-I vs. cCBT: FINE and SPIN: p=ns). Similar results were observed for trait anxiety (STAI) (CBM-I vs. control: p=0.02, cCBT vs. control: p=0.001, CBM-I vs. cCBT: p=ns) and depression (BDI-II) (CBM-I vs. control: p=0.04, cCBT vs. control: p=0.01, CBM-I vs. cCBT: p=ns) and attentional control (CBM-I vs. control: p=0.007, cCBT vs. control: p=0.02, CBM-I vs. cCBT: p=ns).</p>	<p>Unclear</p>

	skills training' or no intervention O: Self report measures of anxiety (FNE, SPIN and Spielberger State-Trait Anxiety Inventory), depression (BDI-II), attentional control (ACS) and threat-related interpretive bias (ASSIQ).		Outcomes other than anxiety and depression were reported in the paper, but have not been data extracted.	
Williams et al. (2013)	P: Male and female adults with a major depressive episode, recruited from the research arm of the Clinical Research Unit for Anxiety and Depression (CRUfAD) in Sydney, Australia, assessed for eligibility with (MINI). I: A brief, 7 day internet delivered CBM-I intervention followed by a 10 week internet based CBT (iCBT) programme delivered remotely. C: Waiting list control O: Primary outcomes; change in depression severity and distress (BDI-II, PHQ-9, K10, AST-D, SST). Secondary outcomes; disability, (WHO-DAS-II) anxiety (STAI-T) and repetitive negative thinking (RTQ10).	N=69 (n=38 intervention, n=31 control)	After CBM-I, and also after the combined (CBM-I and iCBT) intervention, there were significant reductions in depression (BDI-II and PHQ-9) and distress (K10) scores compared with a wait-list control group sizes (Cohen's d ranged from 0.62–2.40). Significant reductions were also observed following the combined intervention on secondary measures associated with depression: disability (WHODAS-II), anxiety (STAI-T), and repetitive negative thinking (RTQ10) (Cohen's d ranged from 1.51–2.23). Twenty-seven percent of patients evidenced clinically significant change following CBM-I, and this proportion increased to 65% following the combined intervention.	Unclear

Risk of Bias: SRs

Author (year)	Risk of Bias				
	Inclusion criteria	Searches	Review Process	Quality assessment	Synthesis
Hallion and Ruscio (2011)					

RCTs

Study	RISK OF BIAS					
	Random allocation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective Reporting
Beard et al. (2011)						
Bowler et al. (2012)						
Williams et al. (2013)						

 Low Risk

 High Risk

 Unclear Risk

Search Details

Source	Search Strategy	Number of hits	Relevant evidence identified
<i>SRs and Guidelines</i>			
NICE	cognitive bias modification	106	
DARE	(CBM) IN DARE 121 Delete 2 (cognit* adj4 (bias* OR vaccine*)) IN DARE 1 Delete 3 (attention* adj4 retrain*) IN DARE 0 Delete 4 (anxi*) IN DARE 1145 Delete 5 (depress*) IN DARE 1925 Delete 6 MeSH DESCRIPTOR Anxiety Disorders EXPLODE ALL TREES 404 Delete 7 MeSH DESCRIPTOR Anxiety EXPLODE ALL TREES 222 Delete 8 MeSH DESCRIPTOR Depression EXPLODE ALL TREES 482 Delete 9 MeSH DESCRIPTOR Depressive Disorder EXPLODE ALL TREES 872 Delete 10 MeSH DESCRIPTOR Depressive Disorder, Major EXPLODE ALL TREES 273 Delete 11 #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 2963 Delete 12 #1 OR #2 OR #3 122 Delete 13 #11 AND #12 2	2	
<i>Primary studies</i>			
CENTRAL	#1 "cognitive bias modification":ti,ab,kw (Word variations have been searched) 21 #2 MeSH descriptor: [Cognitive Therapy] explode all	11	

	<p>trees 4359</p> <p>#3 MeSH descriptor: [Cognitive Dissonance] explode all trees 52</p> <p>#4 MeSH descriptor: [Depression] explode all trees 4873</p> <p>#5 MeSH descriptor: [Depressive Disorder] explode all trees 7019</p> <p>#6 MeSH descriptor: [Anxiety Disorders] explode all trees 4551</p> <p>#7Enter terms for searc anxiety19766</p> <p>#8Enter terms for searc depression30329</p> <p>#9Enter terms for searc#1 or #373</p> <p>#10Enter terms for searc#2 and #920</p> <p>#11Enter terms for searc#4 or #5 or #6 or #7 or #844834</p> <p>#12Enter terms for searc#10 and #11 12</p> <p>Central only 11</p>		
PsycINFO	<ol style="list-style-type: none"> 1. PsycINFO; ANXIETY/ OR ANXIETY DISORDERS/; 54674 results. 2. PsycINFO; anxiety.ti,ab; 129279 results. 3. PsycINFO; "DEPRESSION (EMOTION)"/ OR exp MAJOR DEPRESSION/; 109835 results. 4. PsycINFO; "depressive disorder*".ti,ab; 19230 results. 	19	

	<p>5. PsycINFO; 1 OR 2 OR 3 OR 4; 227356 results.</p> <p>6. PsycINFO; "cognitive bias modification".ti,ab; 71 results.</p> <p>7. PsycINFO; COGNITIVE BIAS/; 1613 results.</p> <p>8. PsycINFO; 6 OR 7; 1628 results.</p> <p>9. PsycINFO; CBT.ti,ab; 7215 results.</p> <p>10. PsycINFO; "cognitive behav*".ti,ab; 26725 results.</p> <p>11. PsycINFO; COGNITIVE BEHAVIOR THERAPY/; 10592 results.</p> <p>12. PsycINFO; 9 OR 10 OR 11; 28280 results.</p> <p>13. PsycINFO; 5 AND 8 AND 12; 19 results.</p>		
Embase	<p>14. EMBASE; ANXIETY/ OR ANXIETY DISORDERS/; 148512 results.</p> <p>15. EMBASE; anxiety.ti,ab; 145075 results.</p> <p>16. EMBASE; "DEPRESSION (EMOTION)"/ OR exp MAJOR DEPRESSION/; 35588 results.</p> <p>17. EMBASE; "depressive disorder*".ti,ab; 27504 results.</p> <p>18. EMBASE; 14 OR 15 OR 16 OR 17; 234957 results.</p> <p>19. EMBASE; "cognitive bias modification".ti,ab; 65 results.</p> <p>20. EMBASE; COGNITIVE BIAS/; 23 results.</p> <p>21. EMBASE; 19 OR 20; 87 results.</p> <p>22. EMBASE; CBT.ti,ab; 7200 results.</p> <p>23. EMBASE; "cognitive behav*".ti,ab; 21130 results.</p> <p>24. EMBASE; COGNITIVE BEHAVIOR THERAPY/; 32816 results.</p> <p>25. EMBASE; 22 OR 23 OR 24; 41751 results.</p> <p>26. EMBASE; 18 AND 21 AND 25; 27 results.</p>	27	
Medline	<p>27. MEDLINE; ANXIETY/ OR ANXIETY DISORDERS/;</p>	33	

	<p>71477 results.</p> <p>28. MEDLINE; anxiety.ti,ab; 105517 results.</p> <p>29. MEDLINE; "DEPRESSION (EMOTION)"/ OR exp MAJOR DEPRESSION/; 72151 results.</p> <p>30. MEDLINE; "depressive disorder*".ti,ab; 19662 results.</p> <p>31. MEDLINE; 27 OR 28 OR 29 OR 30; 197175 results.</p> <p>32. MEDLINE; "cognitive bias modification".ti,ab; 60 results.</p> <p>33. MEDLINE; COGNITIVE BIAS/; 0 results.</p> <p>34. MEDLINE; 32 OR 33; 60 results.</p> <p>35. MEDLINE; CBT.ti,ab; 4699 results.</p> <p>36. MEDLINE; "cognitive behav*".ti,ab; 14316 results.</p> <p>37. MEDLINE; COGNITIVE BEHAVIOR THERAPY/; 14686 results.</p> <p>38. MEDLINE; 35 OR 36 OR 37; 22748 results.</p> <p>39. MEDLINE; 31 AND 34 AND 38; 33 results.</p>		
Summary	NA	NA	

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