TECHNICAL COMMENTARY

Cognitive therapies

NeuRA Discover. Conquer. Cure.
POST-TRAUMATIC STRESS DISORDER LIBRARY

Introduction

Cognitive therapies are based on the theory that an individual's perception of a situation influences his or her emotional response to it. They aim to help people identify distorted thinking and to modify existing beliefs, so that they are better able to cope and change problematic behaviours. Cognitive processing therapy involves psychoeducation, written accounts about the traumatic event, and cognitive restructuring to address beliefs about the event's meaning and its implications. Cognitive restructuring aims to facilitate relearning thoughts and beliefs generated from a traumatic event, to increase awareness of dysfunctional trauma-related thoughts, and to correct or replace those thoughts with more adaptive and rational cognitions.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2010 that report results separately for people with PTSD. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. When multiple copies of review topics were found, only the most recent and comprehensive version was included. We prioritised reviews with pooled data for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews with less than 50% of items checked have been excluded from the library. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate or low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large or if there is a dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found five systematic reviews that met our inclusion criteria[3-7].

- Moderate quality evidence found large improvements in PTSD and depression symptoms after cognitive processing therapy compared to inactive controls, with improvements being maintained for up to 12 months. Females showed greater improvements than males. When compared to active control conditions (mainly exposure therapies), the effect was small post-treatment and was not maintained at follow-up.
- Moderate to high quality evidence found a large improvement in negative trauma-related cognitions following cognitive processing therapy.
- Moderate to low quality evidence found large improvements in PTSD and depression symptoms with cognitive therapy compared to no treatment or usual care, but not compared to exposure therapies.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

Asmundson GJG, Thorisdottir AS, Roden-Foreman JW, Baird SO, Witcraft SM, Stein AT, Smits JAJ, Powers MB

A meta-analytic review of cognitive processing therapy for adults with posttraumatic stress disorder

Cognitive Behaviour Therapy 2019; 48: 1-14

View review abstract online

Comparison	**Effectiveness of cognitive processing therapy vs. non-active (waitlist or psychological placebo) or active (exposure therapies or memory training) control conditions in people with PTSD.**
Summary of evidence	**Moderate quality evidence (large samples, some inconsistency, precise, indirect) found large improvements in PTSD and depression symptoms after cognitive processing therapy compared to inactive controls, with improvements being maintained for up to 12 months. Females showed greater improvements than males. When compared to active control conditions (mainly exposure therapies), the effect was small post-treatment and was not maintained at follow-up.**

PTSD symptoms

Cognitive processing therapy resulted in significant, large improvements in PTSD and depression/anxiety symptoms when compared to nonactive controls post-treatment;

PTSD symptoms: 8 RCTs, N = 841, g = 1.24, 95%CI 0.80 to 1.67, $p < 0.001$, I^2 = 87%

Depression/anxiety symptoms: 8 RCTs, N = 838, g = 1.01, 95%CI 0.72 to 1.29, $p < 0.001$, I^2 = 72%

The improvements in PTSD and depression symptoms were greater in females than in males. Depression, but not PTSD symptom improvements were greater with increased number of sessions.

There were no moderating effects of age, year of publication, total sample size, length of follow-up, and group versus individual treatment delivery.

These effects remained at follow-up (up to 12 months);

PTSD symptoms: 6 RCTs, N = 689, g = 0.90, 95%CI 0.57 to 1.23, $p < 0.001$, I^2 = 72%

Depression/anxiety symptoms: 6 RCTs, N = 689, g = 0.82, 95%CI 0.48 to 1.16, $p < 0.001$, I^2 = 75%

Female sex was the only moderating factor for depression/anxiety (larger effects) at follow-up.

Authors conclude that the average participant treated with cognitive processing therapy improved more than 89% of those in inactive control conditions at post-treatment and 82% at follow-up.

Cognitive processing therapy resulted in a significant, small improvement in PTSD symptoms when compared to active controls post-treatment;

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

PTSD symptoms: 4 RCTs, N = 407, *g* = 0.26, 95%CI 0.04 to 0.48, *p* = 0.019, I^2 = 18% *This effect was not significant at follow-up (up to 9 months);* PTSD symptoms: 4 RCTs, N = 407, *g* = 0.17, 95%CI -0.02 to 0.37, *p* = 0.07, I^2 = 0%	
Consistency in results‡	Inconsistent for non-active comparison, consistent for active comparison.
Precision in results§	Precise
Directness of results‖	Indirect; mixed control conditions

Cusack K, Jonas DE, Forneris CA, Wines C, Sonis J, Middleton JC, Feltner C, Brownley KA, Olmsted KR, Greenblatt A, Weil A, Gaynes BN

Psychological treatments for adults with posttraumatic stress disorder: A systematic review and meta-analysis

Clinical Psychology Review 2016; 43: 128-41

View review abstract online

Comparison	**Effectiveness of cognitive therapy vs. waitlist, treatment as usual, or other psychotherapy in adults with PTSD.**
Summary of evidence	**Moderate to low quality evidence (small samples, consistent where reported, some imprecision and indirectness) found large improvements in PTSD and depression symptoms with cognitive therapy compared to no treatment or usual care. There were no differences in symptoms when comparing cognitive and exposure therapies.**

PTSD symptoms

Cognitive therapy resulted in a significant, large effect of greater improvement in PTSD symptoms compared to waitlist condition;

3 RCTs, N = 144, SMD = -1.61, 95%CI -1.99 to -1.23, *p* < 0.05, I^2 = 0%

Cognitive therapy resulted in a significant, large effect of greater improvement in PTSD and depression symptoms and greater loss of PTSD diagnosis compared to waitlist or usual care;

PTSD: 4 RCTs, N = 282, SMD = -1.33, 95%CI -1.99 to -0.67, *p* < 0.05, I^2 not reported

Depression: 3 RCTs, N = 221, SMD = -0.91, 95%CI -1.20 to -0.62, *p* < 0.05, I^2 not reported

Loss of diagnosis: 4 RCTs, N = 221, RD = 0.56, 95%CI 0.32 to 0.79, *p* < 0.05, I^2 not reported

There were no significant differences in PTSD symptoms between cognitive therapy and exposure therapy;

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

2 RCTs, N = 100, WMD = 4.80, 95%CI -4.50 to 14.20, $p > 0.05$, I^2 not reported	
Consistency in results	Consistent where reported
Precision in results	Some imprecision
Directness of results	Direct, apart from waitlist/usual care comparison (mixed control conditions).

Forman-Hoffman V, Middleton JC, Feltner C, Gaynes BN, Weber RP, Bann C, Viswanathan M, Lohr KN, Baker C, Green J

Psychological and Pharmacological Treatments for Adults With Posttraumatic Stress Disorder: A Systematic Review Update

Agency for Healthcare Research and Quality Comparative Effectiveness Reviews (US) Report No.: 18-EHC011-EF: 2018-SR-01

View review abstract online

Comparison	**Effectiveness of cognitive therapies vs. inactive control conditions (waitlist or usual care) for PTSD symptoms in adults with PTSD.**
Summary of evidence	**Moderate quality evidence (medium-sized samples, inconsistent, precise, indirect) found large effects of reduced PTSD symptoms and more loss of PTSD diagnosis following cognitive therapies.**
PTSD symptoms	
Large effects showed reduced PTSD, depression and anxiety symptoms, and more loss of PTSD diagnosis, with cognitive processing therapy (CPT) or cognitive therapy (CT); PTSD symptoms: 5 RCTs, N = 399, SMD = -1.35, 95%CI -1.77 to -0.94, I^2 = 71% Loss of PTSD diagnosis (CPT): 4 RCTs, N = 299, RD = 0.44, 95%CI 0.26 to 0.62, I^2 = 78% Loss of PTSD diagnosis (CT): 4 RCTs, N = 314, RD = 0.55, 95%CI 0.28 to 0.82, I^2 = 78%	
Consistency in results	Inconsistent
Precision in results	Precise
Directness of results	Indirect; mixed control conditions

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

Holliday R, Holder N, Suris A

A Single-Arm Meta-Analysis of Cognitive Processing Therapy in Addressing Trauma-Related Negative Cognitions

Journal of Aggression, Maltreatment and Trauma 2018; 27: 1145-53

View review abstract online

Comparison	**Effectiveness of cognitive processing therapy for negative cognitions pre-post treatment in people with PTSD.**
Summary of evidence	**Moderate to high quality evidence (large sample, inconsistent, precise, direct) found a large improvement in negative trauma-related cognitions following cognitive processing therapy.**
Negative, trauma-related cognitions about the self, the world, and other people	
A large effect showed improved negative cognitions with cognitive processing therapy; 9 RCTs, N = 583, g = 1.10, 95%CI 0.83 to 1.37, $p < 0.001$, I^2 = 69%	
Consistency in results	Inconsistent
Precision in results	Precise
Directness of results	Direct

Sadeghi R, Mokhber N, Mahmoudi LZ, Asgharipour N, Seyfi H

A systematic review and meta-analysis on controlled treatment trials of metacognitive therapy for anxiety disorders

Journal of Research in Medical Sciences 2015; 20: 901-9

View review abstract online

Comparison	**Effectiveness of metacognitive therapy for PTSD symptoms in adults with PTSD.**
Summary of evidence	**Low quality evidence (very small sample, consistent, imprecise, direct) found a large improvement in PTSD symptoms following metacognitive training.**
PTSD symptoms	
A large effect of improved PTSD symptoms following metacognitive therapy;	

2 studies, N = 50, SMD = 1.10, 95%CI 0.50 to 1.69, $p < 0.00001$, $I^2 = 0\%$	
Consistency in results	Consistent
Precision in results	Imprecise
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, *g* = Hedges' g, standardised mean difference, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, RD = risk difference, SMD = standardised mean difference, *p* = statistical probability of obtaining that result, vs. = versus, WMD = weighted mean difference

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small[8].

---

† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) that allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect[8].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[9]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship

between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula[8];

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed[10].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

References

1. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMAGroup (2009): Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *British Medical Journal* 151: 264-9.
2. GRADEWorkingGroup (2004): Grading quality of evidence and strength of recommendations. *British Medical Journal* 328: 1490.
3. Asmundson GJG, Thorisdottir AS, Roden-Foreman JW, Baird SO, Witcraft SM, Stein AT*, et al.* (2019): A meta-analytic review of cognitive processing therapy for adults with posttraumatic stress disorder. *Cognitive Behaviour Therapy* 48: 1-14.
4. Cusack K, Jonas DE, Forneris CA, Wines C, Sonis J, Middleton JC*, et al.* (2016): Psychological treatments for adults with posttraumatic stress disorder: A systematic review and meta-analysis. *Clinical Psychology Review* 43: 128-41.
5. Holliday R, Holder N, Suris A (2018): A Single-Arm Meta-Analysis of Cognitive Processing Therapy in Addressing Trauma-Related Negative Cognitions. *Journal of Aggression, Maltreatment and Trauma* 27: 1145-53.
6. Forman-Hoffman V, Middleton JC, Feltner C, Gaynes BN, Weber RP, Bann C*, et al.* (2018): Psychological and Pharmacological Treatments for Adults With Posttraumatic Stress Disorder: A Systematic Review Update. *Agency for Healthcare Research and Quality Comparative Effectiveness Reviews (US)* Report No.: 18-EHC011-EF: 2018-SR-01.
7. Sadeghi R, Mokhber N, Mahmoudi LZ, Asgharipour N, Seyfi H (2015): A systematic review and meta-analysis on controlled treatment trials of metacognitive therapy for anxiety disorders. *Journal of Research in Medical Sciences* 20: 901-9.
8. CochraneCollaboration (2008): Cochrane Handbook for Systematic Reviews of Interventions. Accessed 24/06/2011.
9. Rosenthal JA (1996): Qualitative Descriptors of Strength of Association and Effect Size. *Journal of Social Service Research* 21: 37-59.
10. GRADEpro (2008): [Computer program]. Jan Brozek, Andrew Oxman, Holger Schünemann. *Version 32 for Windows*