Mechanisms of change in CBT: Does homework matter?

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Abstract

This study investigated the impact of homework compliance and accuracy on clinical outcome for 72 patient's completing group CBT for anxiety and depression. Homework tasks were differentially associated with symptom relief for anxious and depressed patients, with benefits being more delayed for depressed patients. The findings are discussed in terms of the importance of therapists examining quality as well as quantity of homework tasks.

Introduction

The assignment of homework tasks in psychotherapy has a long history (Dunlop, 1936). It is considered an important component of many psychotherapeutic approaches, having been endorsed by cognitive, dynamic, systemic, solution-focused and family therapies (Kazantzis & Lampropoulos, 2002).

Kazantzis, Deane & Ronan (2000) conducted a meta-analysis of 27 experimental and correlational studies completed over a twenty-year period, and demonstrated that psychotherapy involving homework assignments yielded a better treatment outcome than psychotherapy without homework. Schmidt & Woolaway-Bickel (2000) extended previous research, showing that *quantity* of homework is associated with improved outcomes, by also including a measure of the *quality*. They conducted a study of 48 patients receiving group treatment for panic disorder over 12 weeks. Using a series of multiple regression analyses, these authors found that quality was a better predictor of outcome than quantity. Specifically, their results indicate that the quality of particular exercises completed (eg. interoceptive exposure) is significantly associated with related outcome variables (eg. reduction in fear of bodily sensations) However, the authors note that their findings lack generalisability to other disorders and thus their findings need to be replicated with other clinical problems.

There is a substantial amount of literature supporting the efficacy of Cognitive Behavioral Therapy (CBT) for a number of clinical problems (e.g. Barlow, Esler, & Vitali, 1998). A core component of CBT is cognitive therapy. Hollon, DeRubeis & Seligman (1992) argue that cognitive therapy works best when it is approached from a skills-training perspective. Teaching the client how to test the validity of his or her beliefs in various situations is a key objective of the approach. Logically, in order to achieve this outcome the client is encouraged to practice outside of the therapy session. Homework is therefore considered a crucial step in the therapeutic process. However, few studies have directly tested the connection between successful completion of homework and outcome in cognitive therapy.

One such study by Neimeyer & Feixas (1990) explored the effects of homework on depressive symptoms following 10 sessions of group CBT for 63 people. Results suggested that those in the homework condition showed significantly reduced clinician-rated symptomatology over the course of treatment compared to the control group. An important variable measured in this study was skill acquisition. In particular, participants showing greater skill in using the thought records by the end of treatment showed clear superiority in maintenance of gains in self-rated depression at follow-up. Thus, it seems that positive outcome in psychotherapy is to some extent determined by the quality of the homework completed.

Moreover, Kazantzis et al. (2000) found some evidence that the influence of homework on therapy outcome was larger for depressed individuals than for anxious individuals. However, the authors recommended that future research examine the usefulness of homework for different patient groups due to methodological limitations of existing evidence. For instance, research has relied heavily on retrospective homework compliance ratings, which are subject to biases by both patients and clinicians. Kazantzis et al. argued that future studies should measure homework compliance at regular intervals in order to overcome this bias in reporting.

The aim of the present study was to examine the effect of homework quality (accuracy) and quantity (compliance) on psychotherapy outcome for a sample of anxious and depressed individuals. This study will

utilise prospective reporting of homework completion and will compare the effects of homework completion between anxious and depressed individuals. Specifically, it is hypothesised that quality ratings will be a better predictor of psychotherapy outcome than compliance ratings and that completion of specific types of homework will be associated with a reduction in related symptomatology (eg. completion of thought records will be associated with less anxiogenic and/or depressogenic cognitions).

Method

Participants

The sample consisted of 72 patients meeting the following criteria: (a) primary Axis I diagnosis of an anxiety disorder or major depression DSM-IV (APA, 1994); (b) no evidence of current or past schizophrenia, bipolar or organic mental disorder; (c) no current self-harm or serious suicidal intent; (d) provided pre-treatment and post-treatment data; (e) attended at least 3 treatment sessions. The average age of participants was 35.3 years (*SD* = 10.2), 41 were female, and 49 were taking psychotropic medication. A Senior Clinical Psychologist administered the MINI to all patients at an initial assessment session prior to commencement of treatment. Of the 72 participants, 25 had a primary diagnosis of anxiety, and 47 had a primary diagnosis of depression. Participants attended a mean of 10.1 treatment sessions (*SD* = 1.6).

Measures

MINI-International Neuropsychiatric Interview-MINI PLUS Version 5.0 (MINI, Sheehan et al., 2001) is a structured diagnostic interview based on both DSM-IV and ICD-10 criteria. Good inter-rater and test-retest reliability has been reported for the MINI (Sheehan et al., 1997).

Beck Depression Inventory Revised (BDI-II Beck & Steer, 1987) & Beck Anxiety Inventory (BAI Beck, Epstein, Brown, & Steer, 1988) are 21-item self-report instruments designed to assess the severity of depression and anxiety in adults. Both have excellent psychometric properties.

Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q, Endicott, Nee, Harrison, & Blumenthal, 1993) is a self-report measure of the degree of enjoyment and satisfaction an individual experiences in various areas of daily functioning. The Q-LES-Q has sound psychometric qualities when compared to similar quality of life measures.

Cognition Checklist(CCL, Beck, Brown, Steer, Eidelson, & Riskind, 1987) *is a 26-item self-report measure designed to assess the frequency of depression and anxiety-related automatic thoughts. The scale is made up of a 14-item depression sub-scale (CCLD) and a 12-item anxiety sub-scale (CCLA) The CCL has excellent reported validity for use with depressed and anxious outpatients (Steer et al., 1994).*

Homework Monitoring Form (HMF)__required participants to record the type and number of planned homework tasks at the end of each session, and to mark off tasks as they were completed. Patients then rated the perceived impact (i.e. usefulness) of each task on a 5-point scale, from (0) definitely did not find the task useful (4) to very useful.

Thought Diary Evaluation Form (TDEF) assessed participants' competence in accurately completing thought records, and consisted of a clear scoring system that divided the thought record into 9 sections. Each section was given a score from 0-2. For example, the antecedent section is scored as 0 (not accurate, only includes beliefs and/or consequences), 1 (somewhat accurate, includes an antecedent but also some inappropriate information), or 2 (accurate, includes only a description of the antecedent).

Procedure

Participants completed 11, 2-hour weekly sessions of group CBT for anxiety and depression over 14 weeks (10 weekly sessions plus one final session one month post treatment). The treatment protocol included: (a) psychoeducation, (b) relaxation, (c) behavioural tasks (pleasant activities, exposure, goals), and (d) thought diaries (Nathan, Rees & Smith, 2001). Homework was assigned at the end of every 2-hour therapy session, and reflected the four components of treatment. Participants were asked to complete HMF's every week and to bring them back to the following session. One completed thought diary was also provided to the therapists mid-treatment, which was used as a measure of compliance and then rated for accuracy, with a maximum score of 15. Treatment integrity was maintained by use of a structured therapist manual. Participants completed the study measures (BDI, BAI, CCL, Q-LES-Q) at pre-treatment (PreT), post-treatment (PostT), and follow-up (FU).

Results

Overview of Analyses

Outcome was evaluated as change scores on the BDI, BAI, CCLT, CCLD, CCLA, and Q-LES-Q. Predictor variables for the homework goal-setting forms were (a)

number of *completed* activities, and (b) the *impact* ratings of each activity over the course of treatment. These indices were calculated for psychoeducation, relaxation, behavioural tasks, and thought diaries.

In addition, thought diary accuracy ratings were independently completed on standardised rating forms by two research psychologists who had not been involved with treatment or data collection. The interrater reliability of accuracy ratings was very high (r = .88), and after discussion consensus was reached on ratings for all diaries. Pearson rs were first calculated between predictor and outcome variables for the whole sample, and then separately for those with primary anxiety and depression.

Descriptive Statistics

Mean scores showed improvements on all outcome variables from pre-treatment to post-treatment, and pre-treatment to follow-up (see Table 1). One-way ANOVAs were significant for all outcome variables (ps < .001), and follow-up paired-sample t-tests indicated that participants significantly improved from pre-treatment to post-treatment and/or follow-up.

Table 1: Mean scores (standard deviations) for outcome variables pre-treatment, post-treatment, and at follow-up.

	Mean Scores (SD)		
Outcome	Pre Treatment	Post Treatment	Follow Up
BDI	[illegible]	[illegible]	[illegible]
BAI	21 (12 [illegible])	16 80 (10 [illegible])	14 48 ([illegible])
CCLT	41 96 (19 01)	[illegible]	[illegible]
CCLD	26 11 (11 40)	19 [illegible] (10 52)	18 56 (12 19)
CCLA	[illegible] (9 48)	[illegible]	11 21 (8 71)
Q-LES-Q	47 30 (15 51)	[illegible]	54 86 (18 73)

[illegible] Significant change from pre-treatment (p [illegible])
[illegible] Significant change from post-treatment (p [illegible])

Table 2 reports the number (and standard deviation) of completed activities over the course of treatment, impact ratings and mean accuracy ratings.

Table 2: Cumulative number of completed tasks, impact ratings, and mean thought diary accuracy ratings.

Treatment Component	Number/Impact Rating (SD)
Psychoeducation	
Completed	7 05 (5 13)
Impact	11 03 (6 41)
Relaxation	
Completed	17 33 (11 97)
Impact	11 78 (7 21)
Behavioural Tasks	
Completed	34 25 (26 84)
Impact	39 01 (33 13)
Thought Diaries	
Completed	5 07 (3 91)
Impact	9 04 (6 68)
Mean Accuracy Rating	10 64 (2 77)

Correlational Analyses

Statistically significant bivariate correlations between each treatment component and the outcome variables are reported in Tables 3 to 5 for all patients, anxious patients and depressed patients, respectively.

Table 3: Significant correlations for all participants between treatment components and symptom change.

Treatment Task	Outcome	PreT-PostT	PreT-FU
Psychoeducation			
Completed	CCLT	- 26*	-
Impact	BDI	-	34*
Relaxation			
Completed	BAI	-	30*
Impact	BAI	-	- 39**
Behavioural Task			
Impact	BAI	26	-
	Q-LES-Q	[illegible]	-
Thought Diary			
Completed	BAI	34**	45**
Impact	BDI	-	38*
	BAI	-	40*
	Q-LES-Q	- 33*	- 42*
Accuracy Rating	BAI	42**	48**
	CCLT	-	48**
	CCLA	31*	47**

Note: A negative correlation for the Q-LES-Q suggests the task was associated with an improvement in quality of life. A positive correlation with all other measures indicates the task was associated with symptom improvement.
* p = .05 * p < .05 ** p < .01

Table 4: Significant correlations between treatment components and symptom change for participants with primary anxiety.

Treatment Task	Outcome	PreT-PostT	PreT-FU
Psychoeducation			
Completed	CCLT	- 55**	-
	CCLD	- 48*	-
	CCLA	- 56**	-
Relaxation			
Impact	BAI	-	50*
Thought Diary			
Impact	Q-LES-Q	- 49*	-
Accuracy Rating	BAI	70**	-
	CCLT	66*	-
	CCLD	56*	-
	CCLA	72**	-

Note * p = .05. * p < .05 ** p < .01

Table 5: Significant correlations between treatment components and symptom change for participants with primary depression

Treatment Task	Outcome	Pre-Post	*Pre-FU*
Psychoeducation			
Completed	BDI	-	41*
Impact	BDI	-	47*
Behavioural Task			
Impact	CCLT	34*	-
	CCLA	34*	-
Thought Diary			
Completed	BAI	-	48*
Accuracy Rating	CCLT	-	48*
	CCLA	-	45*

Note * p < .05

Psychoeducation: More psychoeducation was associated with larger *increases* CCLT from PreT to PostT. Higher impact ratings were associated with larger reductions in BDI from PreT to FU. *Primary Anxiety*: More psychoeducation was associated with larger *increases* CCL scores from PreT to PostT. *Primary Depression*: More psychoeducation and higher impact ratings were associated with larger reductions BDI from PreT to FU.

Relaxation: More relaxation was associated with larger reductions in BAI scores from PreT to FU, whereas higher impact ratings were associated with larger increases in BAI. *Primary Anxiety*: Higher impact ratings were associated with larger reductions in BAI from PreT to FU. *Primary Depression*: No significant associations.

Behavioural Tasks: Higher impact ratings were associated with larger improvements in BAI and Q-LES-Q from PreT to PostT. *Primary Anxiety:* No significant associations. *Primary Depression*: Higher impact ratings were associated with larger reductions in CCLT and CCLA.

Thought Diaries: Completing more thought diaries was associated with larger reductions on BAI from PreT to PostT and FU. Higher impact ratings were associated with larger improvements on BDI and BAI from PreT to FU, and Q-LES-Q from PreT to PostT and FU. *Primary Anxiety*: Higher impact ratings were associated with larger increases in Q-LES-Q from PreT to PostT. *Primary Depression*: Completing more thought diaries was associated with larger reductions in BAI from PreT to FU.

Compliance with Thought Diaries: Submission of a thought diary mid-treatment was used as an objective index of compliance with this component of treatment. To explore if compliance was associated with better treatment outcome, participants who submitted a thought diary (n = 44) were compared to those who did not (n = 28) on the outcome variables. Independent samples t-tests showed that those who submitted a diary had significantly larger improvements from PreT to FU on CCLT and CCLD (all $ps < .05$).

Accuracy Ratings of Thought Diaries: Overall, more accurate thought diaries were associated with greater improvement on BAI and CCLA from PreT to PostT, and on BAI, CCLT, and CCLA from PreT to FU. *Primary Anxiety*: Associated with larger reductions in BAI, CCLT, CCLD, and CCLA from PreT to PostT. *Primary Depression*: Associated with larger improvement in CCLT and CCLA from PreT to FU.

Conclusions

The hypotheses that psychotherapy outcome would be significantly associated with the quantity and quality of homework, and that specific homework tasks would be directly associated with related outcomes, were supported. For instance, compliance and accuracy with thought diaries, a technique for challenging dysfunctional cognitions, was consistently associated with a reduction in anxiogenic and depressogenic cognitions. In contrast to earlier studies, compliance with treatment was generally associated with earlier treatment gains for anxious than depressed patients.

Psychoeducation was associated with outcomes for both anxious and depressed patients, although the relationships were quite different for these groups. Specifically, psychoeducation was associated with amelioration of depression symptoms for depressed patients. However, psychoeducation was associated with *increased* CCL scores for anxious patients between pre- and post-treatment. Although this appears to suggest that psychoeducation results in worsening symptoms, it was strongly and significantly associated with larger *improvements* on the CCLT (r = .63), CCLD (r = .58), and CCLA (r = .71) between post-treatment and follow-up. This suggests that the benefits of psychoeducation might be more delayed for anxious patients, such that more psychoeducation during treatment holds them in better stead when treatment ends and group support ceases.

Self-rated impact of relaxation was associated with larger reductions in anxiety symptoms in patients with primary anxiety. In contrast, self-rated impact of behavioural tasks was associated with less anxiogenic cognitions in depressed patients. This effect on anxiety symptoms in patients with primary depression might reflect the high proportion of individuals with comorbid anxiety in this group (n = 18).

Thought diaries were important correlates of outcome for both anxious and depressed patients. First, compliance with submitting a thought diary was associated with less dysfunctional cognitions. Second, for anxious patients, the impact of thought diaries was associated with an increase in quality of life, whereas the number of completed thought diaries was associated with fewer anxiety symptoms in the depressed group. Third, the accuracy ratings of the thought diaries appeared to be particularly important for anxious and depressed patients. For anxious patients, the accuracy of thought diaries was strongly associated with improvements in symptoms of both anxiety and depression over the course of treatment. In contrast, accuracy ratings were associated with improvements in anxiogenic cognitions at follow-up, rather than at post-treatment like the anxious patients. It might be that the behavioural tasks provide faster symptom relief for depressed patients than for anxious patients, who enjoy more relief from cognitive components of treatment, at least in the short term.

In sum, symptom relief over the course of treatment for anxious patients was associated with completing more psychoeducation and more accurate thought diaries, with relaxation being most strongly associated with symptom relief in the longer term. For depressed patients, behavioural tasks appear to have the fastest effect on symptoms, with longer term gains being associated with psychoeducation and the completion of accurate thought diaries.

This study had several limitations that mean the conclusions must remain tentative. First, reliance on self-reported homework tasks may have introduced biases into the data (e.g. social desirability, forgetting, etc.). However, unlike previous research, data was collected weekly to limit forgetting. Second, this study was correlational, and thus no causal conclusions can be made. Unmeasured factors may have influenced patients' symptom relief and engagement in treatment, although prospective data collection strengthened the argument that homework completion temporally preceded and influenced symptom reduction. Third, the modest sample size and resultant limit in power meant that multivariate analyses, which would have provided greater protection against Type I error and measures of independent and shared variance between treatment components, would have been too stringent. Finally, this sample consisted of patients who provided homework and post-treatment data and therefore might have been more motivated than the general psychiatric population. However, the possibility that these patients were particularly motivated to engage in treatment does not limit the importance of the finding that symptom relief was associated with engagement in the treatment components of interest.

Notwithstanding these limitations, several recommendations can be made on the basis of this study. First, clinicians should monitor compliance *and* accuracy of homework tasks completed by their patients. Second, it is important that therapists schedule homework for all of the active therapeutic ingredients reported in this study, as each appeared to have an influence on different symptoms. Third, each of the treatment components may play a different role in facilitating improvement for anxious and depressed patients. Future research should be directed towards developing our understanding of the mechanisms of action of each treatment component for a broader range of patient groups.

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