

Cognitive Bibliotherapy for Mild Depressive Symptomatology: Randomized Clinical Trial of Efficacy and Mechanisms of Change

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Background: It has been increasingly recognized that subthreshold depression is associated with considerable personal, social and economic costs. However, there is no accepted definition or clear-cut treatment for subthreshold depression. Cognitive bibliotherapy is a promising approach, but further research is necessary in order to assess its clinical efficacy and key mechanisms of change.

Aim: This study aimed to investigate the efficacy of bibliotherapy for subthreshold depression and test whether maladaptive cognitions mediate the effects of bibliotherapy on depressive symptoms.

Method: A total of 96 young adults with subthreshold depression were randomized in one of the following treatment conditions: immediate treatment, delayed treatment, placebo and no treatment. The main outcome was represented by depressive symptoms assessed before, during and immediately after the treatment, as well as at 3-month follow-up. Automatic thoughts, dysfunctional attitudes and irrational beliefs were also assessed throughout the study, and we investigated their involvement as mediators of bibliotherapy effects on depressive symptoms.

Results: The results indicated that cognitive bibliotherapy resulted in statistically and clinically significant changes both in depressive symptoms and cognitions, which were maintained at follow-up. In contrast, placebo was only associated with a temporary decrease in depressive symptoms, without significant cognitive changes. No changes in symptoms or cognitions were found in the delayed treatment and no treatment groups. We also found that automatic thoughts significantly mediated the effect of bibliotherapy on depressive symptoms.

Conclusion: This study provided compelling evidence for the efficacy of cognitive bibliotherapy in subthreshold depression and showed that changes in automatic thoughts mediated the effect of bibliotherapy on depressive symptoms. Copyright © 2012 John Wiley & Sons, Ltd.

Key Practitioner Message:

- Cognitive bibliotherapy is an effective treatment of subthreshold depression.
- Changing automatic thoughts is important, as they mediate the bibliotherapy effect on depressive symptoms.
- Cognitive bibliotherapy is a potential alternative or adjunct to psychotherapy for mildly depressed adults.

Keywords: Cognitive Bibliotherapy, Depression, Automatic Thoughts

DEPRESSION AND SUBTHRESHOLD DEPRESSION

Depression is one of the most prevalent mental disorders. For instance, it is estimated that 9.1% of adults from the USA meet the criteria for current depression (Centers for

Disease Control and Prevention, 2010), and over the course of their lifetime, more than 15% will experience an episode of depression (National Institute for Clinical Excellence, 2009). Depression is viewed as a spectrum of disorders including dysthymia, minor depression, major depression and mixed depressive syndromes (Angst et al., 2003; Judd & Akiskal, 2003; Kendler & Gardner, 1998). These disorders significantly interfere with a person's daily functioning such as the ability to work, sleep, study, eat and enjoy once pleasurable activities (Horwath, Johnson, Klerman, & Weissman, 1992). Not surprisingly, the projections of the World Health Organization (1996) indicate that depression will be the highest-ranked cause of disease burden in developed countries by the year 2020.

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In recent years, there has been a greater recognition of the need to consider depression that is 'subthreshold' (National Institute for Clinical Excellence, 2009). Yet, there is no accepted classification for subthreshold depression in the current diagnostic systems, with the closest being minor depression, which is a research diagnosis in DSM-IV, or dysthymia. The descriptors used in recent international guidelines (National Institute for Clinical Excellence, 2009) generally cite the American Psychiatric Association (2000) and point to several instruments assessing levels of depression, such as the Beck Depression Inventory (BDI) cut-offs: 0–9 (not depressed), 10–16 (subthreshold), 17–29 (mild to moderate) and 30+ (moderate to severe). In the present study, we used these descriptors for assessing subthreshold depression.

Recent research has started to describe the personal and social costs associated with subthreshold depression. It has a substantial impact on quality of life (Cuijpers, De Graaf, & Van Dorsselaer, 2004; Rapaport & Judd, 1998; Rowe & Rapaport, 2006), and it is associated with an increased risk of developing a major depression disorder (Cuijpers & Smit, 2004; Fergusson, Horwood, Ridder, & Beautrais, 2005) and relatively high mortality rate (Cuijpers & Smit, 2002; Cuijpers & Schoevers, 2004). Psychological treatments for subthreshold depression are being actively investigated, and it is hoped that these treatments will help prevent the onset of major depression (Cuijpers, Smit, & van Straten, 2007) by restructuring the mechanisms of change responsible for depression, as most studies are not conclusive regarding the theory of change of most interventions investigated.

EVIDENCE-BASED TREATMENTS FOR MAJOR AND SUBTHRESHOLD DEPRESSION

Evidence-based treatments for major depression are available and extensively used (National Institute for Clinical Excellence, 2009; Abbass, Sheldon, Gyra, & Kalpin, 2008; Cuijpers, van Straten, van Oppen, & Andersson, 2008; Cuijpers, van Straten, Warmerdam, & Andersson, 2008; David, Szentagotai, Lupu, & Cosman, 2008; Ekers, Richards, & Gilbody, 2008; Leichsenring, Rabung, & Leibling, 2004; Leichsenring & Rabung, 2008). In the case of subthreshold depression or mild to moderate depression, treatment is not as clear cut. Several 'low-intensity' psychological interventions with potential benefit in the treatment of subthreshold depression have recently been suggested (National Institute for Clinical Excellence, 2009), such as guided self-help based on the principles of Cognitive-Behavioral Therapy (CBT). Self-help approaches may be particularly suitable for subsyndromal disorders (e.g., subthreshold depression) because they provide ready access to noninvasive and inexpensive treatment and avoid the potential stigma of specialist referral (Cuijpers, 1997;

Bower, Richards, & Lovell, 2001; Williams, 2001). Psychological treatments are therefore increasingly being provided in written format (i.e., bibliotherapy). Bibliotherapy refers to self-managed interventions that are based on validated and specific written materials and are generally facilitated by a healthcare professional. Most often, this facilitation is limited to introducing, monitoring and reviewing the outcome of treatment (National Institute for Clinical Excellence, 2009).

Bibliotherapy has been increasingly used in depression (Cuijpers, 1998; Starker, 1988, 1988; Ackerson, Scogin, McKendree-Smith, & Lyman, 1998; Floyd, Scogin, McKendree-Smith, Floyd, & Rokke, 2004; Floyd et al., 2006). Most forms of bibliotherapy are based on principles from CBT (Gregory, Canning, Lee, & Wise, 2004), and they are designed to provide patients with means for restructuring key cognitive processes that contribute to depression. As recently reviewed (Anderson, Lewis, Araya, Elgie, Harrison, Proudfoot, & Williams, 2005; Cuijpers et al., 2007; Gellatly et al., 2007; Richardson, Richards, & Barkham, 2008), several bibliotherapy interventions in depression have been evaluated in randomized clinical trials: *Coping with depression* (Lewinsohn, Antonucci, Breckenridge, & Teri, 1984); *Managing anxiety and depression* (Holdsworth & Paxton, 1999); *Feeling good—The new mood therapy* (Burns, 1999); and *What should I do? A handy guide to managing depression and anxiety* (Kennedy & Lovell, 2002; Mead et al., 2005).

There is a growing literature indicating that psychological treatments for subthreshold depression are effective (Clarke, Hornbrook, Lynch, Polen, Gale, Beardslee, & Seeley, 2001; Lynch, Tamburrino, & Nagel, 1997; Mossey, Knott, Higgins, & Talerico, 1996; Willemse, Smit, Cuijpers, & Tiemens, 2004). A recent meta-analysis (Cuijpers et al., 2007), which included randomized controlled studies that investigated the effects of psychological treatments (i.e., mostly CBT), indicated a moderate effect size on short term and small effect size at 1-year follow-up.

This randomized controlled study contributes to the literature by investigating the efficacy of CBT-based bibliotherapy in subthreshold depression and identifying cognitive mechanisms of change for this intervention.

OBJECTIVES

Our first objective was to investigate the overall treatment efficacy of CBT-based bibliotherapy in subthreshold depression. We hypothesized that bibliotherapy would significantly decrease depressive symptoms compared with delayed treatment, placebo and no treatment. The very limited literature on predictors of psychotherapy effectiveness (e.g., Lambert, 1992; Lambert, 2003) suggests that there are a number of non-specific effects of psychological interventions that could account for improvement in

psychotherapy, such as working alliance, patient characteristics, placebo or natural remission (Bertisch et al., 2009; Schoevers et al., 2003; Schoevers, Deeg, van Tilburg, & Beekman, 2005; Stek et al., 2006). These non-specific effects were controlled by including a placebo condition and a no treatment condition. The latter condition shows the natural course of depressive symptoms. We specifically hypothesized that whereas bibliotherapy will result in decreases of both depressive symptoms and maladaptive cognitions, placebo will only be associated with a temporary decrease in symptoms. We expected no significant change in depressive symptoms or maladaptive cognitions in the delayed and no treatment conditions.

We also wanted to investigate the effects of bibliotherapy on cognitive factors that may contribute to depression: negative automatic thoughts, dysfunctional attitudes and irrational beliefs. We hypothesized that bibliotherapy would decrease maladaptive cognitions and that these cognitive changes would mediate the effects of bibliotherapy on depressive symptoms.

METHOD

Design

Participants were allocated equally between one of the four parallel arms corresponding to treatment conditions: (1) immediate treatment (bibliotherapy); (2) delayed treatment (wait list); (3) placebo; and (4) no treatment. The main outcome was represented by depressive symptoms. Automatic thoughts, dysfunctional attitudes and irrational beliefs were also assessed and hypothesized to have mediating effects.

Ethical approval for the study was obtained from the Babes Bolyai University Research Ethics Committee in 2009; the study ran from January 2010 until June 2010. Once participants were informed about their participation to the study, storage of data and use of anonymous results in publications, signed consent was obtained. Contact details from the research assistant and the principal investigator were also provided.

Considering that previous studies (Cuijpers, 1997; Cuijpers et al., 2007; Gregory et al., 2004), which investigated the efficacy of bibliotherapy, suggested moderate to large effect sizes, we anticipated a similar effect size in our study. Power calculations (Cohen, 1988) for the study indicated that 18 to 42 subjects per group would allow us to detect a medium to large effect size with power above the traditional 0.80 level and alpha 0.05. Therefore, the recruitment of 96 patients in this study provided sufficient statistical power to address the major research questions, even after considering study attrition (an anticipated rate of 10% of the patients) (Jacobson, Dobson, Truax, Addis, Koerner, Gollan, & Prince, 1996).

Participants

Participants were all first year psychology students. Eligibility criteria were (1) scoring between 10 and 16 on BDI and (2) not being in psychotherapy or on psychotropic medication. Students who were not eligible for this study (they had scores higher than 16) were referred to other ongoing studies investigating and treating depression.

The initial sample consisted of 96 participants. Table 1 indicates participants' main characteristics.

Univariate analyses of variance (ANOVAs) showed no significant differences between treatment groups regarding any of the demographic variables (e.g., age and sex).

Treatment Conditions

Bibliotherapy

Participants in the bibliotherapy condition received an adapted version of *Feeling good* (Burns, 1980). The book has a theoretical foundation derived from Beck's (1970) cognitive theory of depression; its efficacy for mildly and moderately depressed adults has been investigated in previous clinical trials (Ackerson et al., 1998; Floyd et al., 2004; Jamison & Scogin, 1995; Scogin, Jamison, & Gochneaur, 1989). *Feeling good* has a sixth-grade reading level and was previously rated as highly interesting (Scogin et al., 1989). Examples of sections in the book are 'Understanding Your Moods: You Feel the Way You Think', 'Ways of Defeating Guilt' and 'Ways to Overcome Procrastination'. Bibliotherapy was designed as a 1-month treatment during which 5-minute weekly telephone calls were made to participants in order to discuss potential questions about the reading material or other practical concerns about the study.

Delayed Treatment

Participants in the delayed bibliotherapy group were placed on a waiting list for 1 month.

Placebo

Participants in the placebo group received a book similar to the bibliotherapy material in terms of aspect and structure. The reading material included practical advice about how to be more organized at home or at the

Table 1. Participants' main characteristics

Condition	Sex		Age (mean and standard deviation)
	Females (n)	Males (n)	
Bibliotherapy	22	2	22.42 (2.68)
Delayed treatment	21	3	21.91 (1.84)
Placebo	21	3	23.08 (2.14)
No treatment	20	4	24.73 (2.05)

workplace. Five-minute weekly telephone calls were also made to this group of participants in order to discuss potential questions about the reading material or the study. When all assessments were completed, they were offered the bibliotherapy material. With this group, we intended to investigate the role of non-specific effects of psychological interventions, specifically to observe whether and to what extent participants felt less depressed by receiving a psychological intervention with no 'active' ingredients.

No Treatment

Patients in this group were told that they could not be included in the current study, but that they might be contacted for other studies. They were invited to complete all measures, at all assessment times. When all assessments were completed, they were offered the bibliotherapy material. Our objective with this group was to investigate the likely course of depressive symptoms when no treatment was implemented, expected or simulated.

Measures

Outcome Measure

All patients were evaluated at pre-treatment, mid-treatment, post-treatment and 3-month follow-up. To assess depressive symptoms, patients were examined using BDI-II (Beck, Rush, Shaw, & Emery, 1979; Beck, Steer, & Brown, 1996). BDI-II is one of the most widely used measures of depression symptoms, and it includes 21 items referring to various psychological and physical symptoms (e.g., feeling sad, guilty, hopeless and being agitated).

Cognitive Mechanisms

The Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980), the Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978) and the General Attitudes and Beliefs Scale (GABS; Lindner, Kirkby, Wertheim, & Birch, 1999) were used to assess cognitive mechanisms relevant to depression at pre-treatment, mid-treatment, post-treatment and 3-month follow-up. ATQ is a 30-item self-report measure used to assess depression-related cognitions, with good convergent validity, internal consistency and test-retest reliability (David, 2007; Harrell & Ryon, 1983). ATQ has also been shown to be sensitive to change in depression level (Eaves & Rush, 1984). DAS is a 40-item self-report instrument that measures attitudes that, according to the cognitive theory of depression, contribute to vulnerability for depression. Adequate internal consistency and test-retest reliability for DAS have been previously reported (David, 2007; Hammen & Krantz, 1985). GABS is a 26-item self-report instrument that measures irrational cognitive processes (e.g., demandingness, awfulizing, global evaluation and low frustration tolerance) related to six content areas: achievement, approval, comfort, justice, self and

others. Adequate psychometric properties have been reported in the literature (David, 2007; DiGiuseppe, Leaf, Exner, & Robin, 1988).

Comprehension

For the assessment of the comprehension and retention of the bibliotherapy material, we used the Cognitive Bibliotherapy Test (adapted after *Feeling good* by Burns, 1980), a 20-item true/false scale, which has been shown to have good validity, being able to ascertain participants' comprehension and retention of the material, and discriminate between those who read the book and those who did not (Scogin, Jamison, Floyd, & Chaplin, 1998).

Procedure

Potential participants were assessed for eligibility through an initial assessment of depressive symptoms by using BDI-II. A meeting was then organized with the participants who met inclusion criteria (e.g., a BDI-II score between 10 and 16) at which time a brief description of the study was provided by the principal investigator. Those who were interested in participating in the study were invited to sign an informed consent form and complete pre-treatment measures.

A randomization plan was generated by an independent researcher in order to randomly allocate participants to one of the four conditions: immediate treatment (bibliotherapy), delayed treatment (wait list), placebo or no treatment. For allocation of the participants, a computer-generated list of random numbers was used. The independent researcher was responsible for allocation concealment by using a secure computer-assisted method. Participants were not aware of the allocated group.

Participants filled in electronic versions of all of the above self-report measures. Participants in the bibliotherapy group were assessed at pre-treatment (Time 1), at mid-treatment (Time 2: 2 weeks after the beginning of the treatment), at post-treatment (Time 3: after 1 month of treatment) and at 3-month follow-up (Time 4). Participants in the placebo, delayed treatment and no treatment groups were assessed at the same Times as participants in the bibliotherapy group.

Participants assigned to the bibliotherapy condition were given the bibliotherapy book along with explicit instructions on how to use the designated sections in the book (i.e., should they decide to do any of the exercises suggested in the book) and were given 1 month to complete the intervention. During this time, weekly telephone calls were made to participants. The telephone calls did not exceed 5 minutes, and no counseling or advice was provided. During these phone calls, the researcher answered any questions participants had concerning the study or the reading material; participants were asked about the number

of pages they read and the number of exercises they completed. Those who completed their book in less than 1 month were encouraged to review the material until a post-treatment assessment could be arranged.

Participants in the placebo condition were also telephoned weekly during their 1-month intervention; during telephone calls, which did not exceed 5 minutes, the researcher answered any questions the participants had concerning the study or the reading material.

Participants in the delayed bibliotherapy group were placed on a waiting list for a month. After the waiting period, they received the bibliotherapy intervention.

Data Analysis and Statistics

Statistical analyses were conducted using the intent-to-treat principle: the analysis included all randomized patients in the treatment group to which they were assigned, regardless of their protocol adherence and/or subsequent withdrawal from treatment or assessments. The last available score on each outcome measure served as termination score for dropouts.

Post-treatment BDI-II scores served as the primary measure of the treatment outcome (i.e., depressive symptoms). ANOVAs were performed to compare the efficacy of the treatment. Repeated measures ANOVAs were used to investigate the course of depressive symptoms. Follow-up analyses were conducted to determine if treatment gains were maintained 3 months after the treatment. In order to investigate mechanisms of change, mediation analyses and repeated measures ANOVA were used to determine whether the intervention effects can be accounted for by the hypothesized mechanisms of change, the course of these mechanisms while in treatment and whether gains are maintained at 3 months follow-up. Treatment status was 'dummy' coded as an independent variable (see Treadwell & Kendall, 1996). An alpha level of 0.05 was used for all statistical tests.

Procedures suggested by Baron and Kenny (1986) were used to examine whether maladaptive cognitions mediated the effects of bibliotherapy on depressive symptoms. Analyses require that potential mediators (i.e., automatic thoughts, dysfunctional attitudes and irrational beliefs) are correlated with both the dependent (i.e., depressive symptoms) and the independent variables (treatment condition), then that three regression analyses be completed for each of the mediators investigated. First, the proposed mediator is regressed onto the independent variable. Second, the dependent variable is regressed onto the independent variable. Finally, the dependent variable is regressed onto both the proposed mediator and the independent variable. Mediation is suggested if the independent variable affects the mediator in the hypothesized direction in the first equation, if the independent variable affects the dependent

variable in the appropriate direction in the second equation, if the supposed mediator affects the dependent variable in the third equation and if the effect of the independent variable in the third equation is zero or less than in the second.

RESULTS

Attrition

The flow diagram below illustrates the progress through the phases of the trial (Figure 1).

Three hundred and thirty five students responded to various announcements regarding the study and were invited to complete an online BDI-II assessment. One hundred four eligible students were invited via e-mail to participate in the research. A total of 96 individuals entered the study.

Two persons discontinued before commencing treatment in the delayed treatment condition, three during the placebo intervention and four from the no treatment group, whereas three dropped out during bibliotherapy. A total of 12 participants dropped out of the study before the post-treatment assessment. There were no significant differences between the number of dropouts in the active treatment group and the other conditions.

Missing Data

The analysis of missing data showed that the proportion of missing values did not differ among treatment groups. Also, the results of the sensitivity analysis (i.e., the extent of the impact of the missing data) were consistent across treatment conditions.

Treatment Outcome

Table 2 summarizes the outcomes of the randomized clinical trial, by condition and by assessment time. We compared all conditions on initial levels of depressive symptoms to establish if there were any significant differences between conditions before treatment. There were no significant differences between the BDI-II scores before the waiting period and the pre-treatment assessment for the delayed treatment group; also, no significant differences between groups at the pre-treatment assessment of depressive symptoms (Time 1) were identified. Thus, participants in all four groups had comparable levels of depression prior to entering the trial.

An initial ANOVA was conducted to evaluate overall treatment efficacy. The independent variable in this analysis was treatment group (bibliotherapy versus placebo versus delayed treatment versus no treatment). The dependent variable was the BDI at post-treatment. Analyses yielded

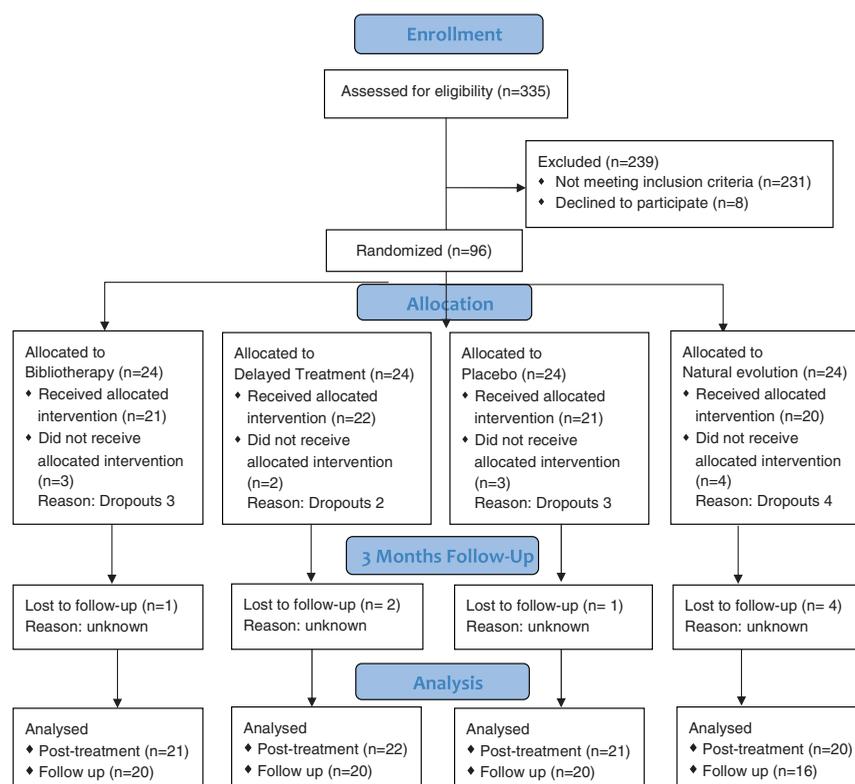


Figure 1. Flow diagram of the progress through the phases of the trial

Table 2. Means and standard deviations for depressive symptoms, at all times, by group

Variable	Time			
	1	2	3	4
Bibliotherapy ($n = 24$) ^a				
BDI				
M	11.7	6.8	7.7	7.2
SD	2.2	5.0	4.8	4.9
Delayed treatment ($n = 24$) ^b				
BDI				
M	12.7	9.2	12.0	6.7
SD	2.3	9.0	7.9	5.2
Placebo ($n = 24$) ^c				
BDI				
M	11.7	9.9	7.1	10.2
SD	1.6	6.1	5.3	4.8
No treatment ($n = 24$) ^d				
BDI				
M	11.3	11.1	11.0	9.2
SD	1.9	8.1	6.1	5.4

BDI = Beck Depression Inventory.

a, b, c and d: Time 1 = pre-treatment, Time 2 = mid-treatment, Time 3 = post-treatment and Time 4 = follow-up.

significant differences between groups: $F[3, 92] = 3.43$, $p < 0.05$. *Post-hoc* analyses (Tukey HSD) indicated that the bibliotherapy group significantly differed from the delayed treatment group and the no treatment group on the BDI but did not differ significantly from the placebo group.

Repeated measures ANOVA (for the three assessment times) indicates a significant decrease in depressive symptoms ($F[2, 21] = 8.21$, $p < 0.05$, $\eta^2 = 0.44$) for the bibliotherapy group. The delayed treatment group and the no treatment group do not differ significantly from Time 1 to Time 2 and, respectively, Time 3. Yet, there was a decrease in depressive symptoms for the placebo group ($F[2, 21] = 8.21$, $\eta^2 = 0.42$).

The analyses for the bibliotherapy group were conducted to determine if treatment gains were maintained at 3-month follow-up. The results indicated that there were no significant differences between Time 3 and Time 4 assessments in terms of depressive symptoms, suggesting that treatment gains were maintained. We also conducted analyses to determine the course of depressive symptoms for the no treatment group; inspection of the means indicated a decrease of BDI-II scores, particularly at 3-month follow-up, but differences are not significant. When investigating

the evolution of the depressive symptoms for the placebo group at 3-month follow-up (compared with the assessment immediately following intervention), a significant increase was yielded: $t[23]=2.45$, $p < 0.05$, Cohen's $d=1.16$, which suggests gains were not maintained at follow-up.

Mechanisms of Change

After determining that the intervention was efficient in terms of the outcome, we investigated the influence of the intervention on the hypothesized mechanisms of change. The final question to be answered was whether the intervention effects could be accounted for by the hypothesized mechanisms of change.

Means and standard deviations for each of the hypothesized mechanisms of change by condition and by assessment time are shown in Table 3. We compared all conditions on initial levels of cognitions to determine if there were any significant differences between conditions before treatment. Analyses revealed no significant differences between groups at the Time 1 assessment on any of the measures.

Analyses of variance were conducted to evaluate the connection between participation in a treatment condition and changes in hypothesized mechanisms of change at post-treatment. The independent variable in this analysis was the treatment group (bibliotherapy versus placebo versus delayed treatment versus no treatment). The dependent variables were ATQ, GABS and DAS. Results of the ANOVA indicated that the groups differed significantly for all measures: on ATQ, $F[3, 92]=2.45$, $p < 0.05$; GABS, $F[3, 92]=3.57$, $p < 0.05$; and DAS, $F[3, 92]=4.30$, $p < 0.05$.

Post-hoc analyses indicated significant differences between the bibliotherapy and delayed treatment means on ATQ: MD=9.66, $p < 0.05$, Cohen's $d=0.93$; GABS: MD=12.2, $p < 0.05$, Cohen's $d=0.70$; and DAS: MD=20.33, $p < 0.05$, Cohen's $d=0.73$. No differences were identified between the delayed treatment and placebo or natural evolution groups on any of the mechanisms measures.

Repeated measures ANOVA indicated a significant decrease from Time 1 to Time 2 and Time 3 in automatic negative thoughts ($F[2, 21]=7.20$, $p < 0.05$, $\eta^2=0.27$), general attitudes and beliefs ($F[2, 21]=24.28$, $p < 0.05$, $\eta^2=0.61$) as well as dysfunctional attitudes ($F[2, 21]=9.93$, $p < 0.05$, $\eta^2=0.58$) for the bibliotherapy group. In contrast, the placebo group, the delayed treatment group and the no treatment group did not differ significantly in terms of any of the cognitions assessed throughout the intervention.

Analyses were conducted to determine if treatment gains at the cognitive level were maintained at 3-month follow-up. The results indicated that there were no significant differences between Time 3 and Time 4 assessments for any of the cognitive mechanisms identified, suggesting that treatment gains were maintained.

Table 3. Means and standard deviations for hypothesized mechanisms of change, at all times, by group

Variable	Time			
	1	2	3	4
Bibliotherapy ($n=24$) ^a				
ATQ				
M	31.5	22.4	24.4	23.6
SD	6.6	11.7	4.3	5.1
GABS				
M	60.0	57.0	49.2	48.2
SD	11.4	12.8	12.8	11.6
DAS				
M	117.6	112.5	99.4	101.8
SD	19.6	22.4	24.0	23.4
Delayed treatment ($n=24$) ^b				
ATQ				
M	35.1	29.1	33.4	22.4
SD	8.8	16.9	11.8	4.9
GABS				
M	62.9	59.15	58.8	52.4
SD	11.1	11.75	11.5	12.2
DAS				
M	116.1	117.84	117.1	106.4
SD	23.5	28.8	24.7	19.8
Placebo ($n=24$) ^c				
ATQ				
M	33.6	30.7	30.4	29.7
SD	7.6	13.5	9.6	6.8
GABS				
M	60.5	58.7	55.5	57.2
SD	8.9	10.7	10.5	9.7
DAS				
M	125.9	126.8	122.8	124.6
SD	27.6	21.8	27.0	24.5
No treatment ($n=24$) ^d				
ATQ				
M	33.9	33.1	31.6	29.6
SD	13.4	14.4	14.5	9.6
GABS				
M	64.1	62.5	59.5	61.4
SD	12.0	12.6	13.5	12.2
DAS				
M	132.0	129.2	130.3	132.4
SD	23.1	26.8	29.7	22.8

ATQ=Automatic Thoughts Questionnaire; GABS=General Attitudes and Beliefs Scale; DAS=Dysfunctional Attitude Scale.

a, b, c, d: Time 1 = pre-treatment, Time 2 = mid-treatment, Time 3 = post-treatment and Time 4 = follow-up.

Mediation Analyses

Our data met requirements for mediation when using a treatment condition as the independent variable, automatic thoughts as the mediator and depressive symptoms as the dependent variable (correlation coefficients are presented in Table 4).

As predicted, depressive symptoms were significantly related to automatic thoughts ($r=0.68$, $p < 0.01$) and

Table 4. Correlation coefficients for all variables at Time 3

	BDI	ATQ	DAS	GABS	Treatment
BDI	–				
ATQ	0.68**	–			
DAS	0.39**	0.54**	–		
GABS	0.43**	0.55**	0.59**	–	
Treatment	–0.38*	–0.51**	–0.40*	–0.48**	–

BDI = Beck Depression Inventory; ATQ = Automatic Thoughts Questionnaire; GABS = General Attitudes and Beliefs Scale; DAS = Dysfunctional Attitude Scale.

*Correlation is significant at 0.05 level.

**Correlation is significant at 0.01 level.

treatment condition ($r = -0.38$, $p < 0.05$). When depressive symptoms on both treatment condition and automatic thoughts were regressed, the standardized coefficient for treatment was reduced from 0.38 ($p < 0.05$) in the second equation to 0.03 ($p > 0.05$) in the third equation, whereas the standardized coefficient for the automatic thoughts in the third equation was 0.84, $p < 0.05$. Sobel test confirmed the significant mediation: $z = 5.33$, $p < 0.05$; thus, the role of automatic thoughts in mediating the impact of cognitive bibliotherapy on depressive symptoms was supported by these findings. In the case of dysfunctional attitudes and irrational beliefs, the mediation models were not supported.

Comprehension, Adherence and Compliance

Compliance with the bibliotherapy programme was assessed weekly by asking participants how much of the book they had read (i.e., number of pages). Participants reported having read 100% of the book by the end of the 1-month treatment. Adherence with the bibliotherapy programme was assessed during the weekly telephone call, by asking participants how many of the exercises suggested in the book they had completed at that point (i.e., number of exercises). By post-treatment, participants reported doing an average of 65% of the exercises. At post-treatment, we also measured comprehension by using the Cognitive Bibliotherapy Test. We examined adherence, participation and comprehension as possible predictors of treatment outcome. Regression analyses revealed no significant results.

Clinical Significance

The clinical significance of the bibliotherapy intervention was evaluated using a method suggested by Jacobson, Follette, and Revenstorf (1984) and developed by Jacobson and Truax (1991). Two criteria were used. First, we examined whether participants' BDI-II scores at post-treatment were one standard deviation below the mean of a dysfunctional population; we established our sample's pre-treatment scores as the dysfunctional values. We then calculated the reliable change

index as the authors indicated. Participants whose scores were outside the range of the dysfunctional population and who indicated changes according to the reliable change index were considered to have clinically improved. Using these criteria, we found that 35% of the subjects who completed the study (when assessed at post-treatment) clinically improved—61% in the bibliotherapy group, 19% in the wait list group, 42% in the placebo group and 18% in the no treatment group. We also measured the extent to which clinically significant improvements were maintained at follow-up; 38% of the participants assessed 3 months after treatment were still outside the range of the dysfunctional population; more specifically, 64% in the bibliotherapy group, 56% in the wait list group (after having gone through bibliotherapy themselves), 22% in the placebo group and 12% in the natural evolution group.

DISCUSSION

As hypothesized, we found that bibliotherapy resulted in both statistically and clinically significant changes in depressive symptoms and maladaptive cognitions, whereas placebo was only associated with a temporary decrease in symptoms without any changes at the cognitive level. Bibliotherapy was also found to be superior to the delayed treatment and no treatment conditions both in terms of symptoms and cognitions. In addition, we tested the mediation of cognitions and found evidence that automatic thoughts mediated the effect of bibliotherapy on depressive symptoms. Therefore, these results support the view that cognitive bibliotherapy is effective for subthreshold depression and that cognitions are the likely mechanism of change.

The present findings are in line with previous studies indicating a moderate effect of other psychological treatments (e.g., CBT) on subthreshold depression. Our study focused on CBT-based bibliotherapy and found it to be an efficient treatment for subthreshold depression (Cuijpers, 1997; Cuijpers et al., 2007; Gregory et al., 2004; Jamison & Scogin, 1995; Scogin, Hamblin, & Beutler, 1987; Scogin et al., 1989). The present results support Beck's (1970) cognitive theory of depression and extend previous research (Ackerson et al., 1998; Treadwell & Kendall, 1996) that found cognitive mechanisms such as automatic thoughts as mediating change in depressive symptoms.

Together, these results indicated that following treatment, bibliotherapy was superior to placebo (in terms of cognitions) and to delayed treatment and no treatment (in terms of both symptoms and cognitions). Reading a book that does not have 'active ingredients' (e.g., the one used in the placebo group) may contribute to the reduction of depressive symptoms on short term. However, these reductions will not be maintained on the long term because the cognitive mechanisms (e.g., automatic thoughts) responsible for depression are not restructured. Follow-up

assessment results clearly indicated that whereas bibliotherapy effects were generally long-lasting (i.e., the significant improvements achieved during treatment were maintained both in terms of symptoms and mechanisms), the placebo group lost the gains temporarily achieved by reading the placebo book and returned to the level of depression symptoms from baseline. These results bring additional support to the idea that various factors (such as reading a book) may contribute to clients feeling better (i.e., temporarily, in terms of symptoms); getting better would be changing the exact mechanisms (e.g., cognitions such as the belief the one is worthless) that lead them to emotional distress (Barber & Derubeis, 1989; David & Szentagotai, 2006; Neenan & Dryden, 2006; Szentagotai, David, Lupu, & Cosman, 2008). Considering that empirical data investigating this hypothesis are scarce, our results are particularly important.

The present study is not without its limitations. In light of the small sample size, all findings should be interpreted with caution. With the use of power calculations (Cohen, 1988) and guidelines for interpreting effect sizes (Cohen, 1977), a sample of 24 participants per group provides enough power to detect medium to large effects but not small effects; therefore, our conclusions regarding differences between conditions are only suggestive from this perspective and are in need of additional empirical evidence. Another limitation that may be informative is that participants reported doing an average of 65% of the exercises proposed in the bibliotherapy book. As homework assignments are an important component in CBT, this attrition rate may partially explain our results (e.g., effect size). This study also has limitations common to other treatment studies: due to convenience, we recruited first year psychology students; their knowledge about psychology, psychotherapy and depression were assumed to be negligible, but it is very likely that psychology students willing to volunteer for a research study are different to some extent from mildly depressed adults from the community. Consequently, the results of this study may not apply to all depressed adults.

In spite of these limitations, we did find clear indications that cognitive bibliotherapy was effective in the treatment of subthreshold depression. In addition to previous results, we brought an important contribution to the bibliotherapy literature by describing the effects on cognitive factors involved in depression: most participants undergoing treatment were able to reduce their depressive symptoms as well as change their dysfunctional attitudes, irrational beliefs and automatic thoughts (which were also found to mediate treatment's effect); these gains were maintained 3 months following treatment.

To our knowledge, this is the first study investigating the efficacy and mechanisms of change of a CBT-based intervention for subthreshold depression, designed according to recommendations laid out by a number of authors (Kazdin, 2007; Johansson & Høglend, 2007; Kazdin & Nock,

2003; Kraemer, Wilson, Fairburn, & Agras, 2002; Murphy, Cooper, Hollon, & Fairburn, 2009). The general view of these researchers is that, in addition to the minimal requirements for demonstrating mediation, there are a number of ways to bring further evidence for mechanisms of change: (1) the decision to perform a mediation analysis needs to be taken *a priori*; (2) hypotheses need to be derived from an empirically supported theory and focused on the likely mechanisms of action of the treatment under study; (3) the treatment, the putative mediators and the outcome need to be operationalized, and a suitable assessment protocol devised; (4) mediators need to be investigated in the context of trials that include a control condition, as this can help to rule out the possibility that what appears to mediate change is simply a placebo effect or a naturally occurring change rather than the specific effect of the treatment under consideration; and (5) change in the mediator needs to be shown to have occurred prior to change in the outcome of interest. This study has taken into account all the above recommendations and hence brings an important contribution to recent theoretical and empirical literature on subthreshold depression by having thoroughly investigated the cognitive processes through which clinical changes associated with bibliotherapy occurred.

The implications of this study are important not only with regard to clinical efficacy but also to effectiveness. Cognitive bibliotherapy programmes are potential alternatives or adjuncts to psychotherapy for mildly depressed adults. Bibliotherapy is a viable psychological intervention, particularly for patients who are unlikely to use more traditional psychological treatments; self-help approaches may allow patients ready access to help that they would otherwise have limited access to (Williams, 2001). Thus, when efficacy, cost and convenience are considered, bibliotherapy seems a very attractive alternative.

Future studies might try to replicate the present results on larger samples and complement them by investigating more extensively mechanisms of change and therapeutic packages. It is important that future research also concentrates on developing clear criteria for subthreshold depression, as the definitions still vary considerably. Additionally, comparisons with alternative therapies would be especially interesting as the number of randomized clinical trials examining psychological interventions for subthreshold depression is still rather limited.

In conclusion, this study showed that cognitive bibliotherapy was effective in the treatment of subthreshold depression and that changes in automatic thoughts mediated its effects on depressive symptoms.

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