

Group Cognitive Behavioural Therapy for Depression Outcomes Predicted by Willingness to Engage in Homework, Compliance with Homework, and Cognitive Restructuring Skill Acquisition

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Abstract. There is a need to understand the mechanism through which homework contributes to clinically meaningful change in therapy. Theoretically meaningful factors such as willingness to complete therapeutic assignments and cognitive skill acquisition have not been carefully studied in prior research. Depressed outpatients ($N=46$) received cognitive behavioural group therapy for a 10-week period and were assigned relevant homework activities. Patient self-report and independent ratings of homework compliance were obtained on a session-by-session basis. Using path analysis, the authors found evidence that willingness to complete homework assignments and mastery of skill in cognitive restructuring helped account for the relationship between homework compliance and reduced symptom severity ($R^2=.40$). However, paths were only significant when patient self-report of homework compliance was used in the model. The present study highlights the problems in assessing homework compliance and in assuming that independent assessment of compliance is more accurate than patient self-report. *Key words:* homework assignments; cognitive therapy; cognitive behavioural therapy; group therapy.

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Encouraging clients to complete therapeutic assignments between sessions is a fairly common practice among psychotherapy practitioners. The application of therapeutic skills and behaviours between sessions has long been recognized as one of the most common clinical strategies (Garfield, 1997; Goldfried, 1980), and it is neither new nor specific to any one theoretical orientation (Kazantzis & L'Abate, 2007; Kazdin & Mascitelli, 1982). Surveys of both published treatment outcome studies (e.g. Mahrer, Nordin, & Miller, 1995; Shelton & Levy, 1981) and practitioners (Kazantzis, Lampropoulos, & Deane, 2005) further underscore the use of homework in psychotherapy

across a range of theoretical orientations. Some therapies routinely incorporate assignments into the treatment process (A. T. Beck, Rush, Shaw, & Emery, 1979), whereas others use homework frequently (Neimeyer & Winter, 2007) or occasionally but without regarding it as a core or defining feature of treatment (Blagys & Hilsenroth, 2002).

In the context of standard cognitive behavioural therapy (CBT; A. T. Beck, Rush, et al., 1979), homework can be defined as any out-of-office activity directed by a therapist and intended to have a therapeutic effect if undertaken during the course of therapy (see also J. Beck, 1995; Kazantzis, Deane,

Ronan, & L'Abate, 2005). Homework assignments provide opportunities for clients to gather new information, master new skills, and generalize those skills to the range of everyday situations in which their problems occur (Persons, Davidson, & Tompkins, 2000). This process of between-session activity is hypothesized to increase self-efficacy and ultimately reduce vulnerability to relapse (Detweiler & Whisman, 1999).

Homework assignments have been the focus of increased investigation during the past two decades. Several studies have shown that homework compliance is positively associated with reduced symptom severity during the course of CBT (Kazantzis, Deane, & Ronan, 2000). Fennell and Teasdale (1987) studied the course of treatment for 34 clients with major depressive disorder, finding that early reduction in symptoms was predicted by homework compliance between Sessions 1 and 3 and was significantly associated with subsequent outcome. Addis and Jacobson (2000) also demonstrated that homework compliance during the first 4 weeks of CBT was associated with both early and end-of-therapy improvement. In addition, Burns and Spangler (2000) applied structural equation modeling to examine the relationship between homework compliance and symptom change. They found support for the assertion that client homework compliance was sequentially linked with improvement in depressive symptoms (Kazantzis, Ronan, & Deane, 2001). Other studies also have linked homework compliance over the entire course of therapy with reduced depression severity at termination (Bryant, Simons, & Thase, 1999; Burns & Nolen-Hoeksema, 1992; Coon & Thompson, 2003; Persons, Burns, & Perloff, 1988), but it is not clear whether compliance with homework in itself predicts long-term maintenance of therapeutic gains (e.g. Startup & Edmonds, 1994). Much of the prior research linking homework and treatment outcome has suffered from low statistical power (Kazantzis, 2000), but the data on compliance–outcome correlations indicate a modest mean effect size when aggregated using meta-analysis ($r = .22$ in Kazantzis et al., 2000).

Studies that have directly contrasted therapy involving homework to therapy without homework or therapy involving a between-session activity control condition (e.g. self-help) have produced mixed findings. For example,

Kornblith, Rehm, O'Hara, and Lamparski (1983) found no evidence that homework improved symptom reduction in a group self-control therapy for 22 women with major depression, perhaps because compliance was low in the homework condition and some clients in the no-homework condition reported engaging in their own therapeutic tasks between sessions. In contrast, Neimeyer and Feixas (1990) conducted a randomized study to evaluate the effect of homework assignments in group CBT for depression. Outpatients with major depressive disorder were randomly assigned to CBT groups that either did ($n = 32$) or did not ($n = 31$) use homework assignments. When pretreatment severity was taken into account, clients involved in the homework groups exhibited significant improvement as measured by the Hamilton Depression Rating Scale (Hamilton, 1960). When aggregated into a meta-analysis, the data on homework's causal effects indicate an overall mean effect size in the medium range ($r = .36$ in Kazantzis et al., 2000). Therefore, there is also evidence to suggest that including homework assignments increases the effects of CBT in reducing symptoms. The major limitation with existing research is that theoretically important factors in the relationship between homework and symptom reduction have not been carefully studied. Prior research examining the contribution of homework compliance to therapy outcome has generally been conducted to assess two questions: either the causal effects of homework vs. no-homework assignments on outcome or the effects of protocols for homework administration on compliance (Beutler et al., 2004; Kazantzis et al. 2000, 2001).

The underlying mechanism by which homework produces its effects remains unclear. This is important because practitioners report that homework noncompliance is commonplace in clinical practice (Helbig & Fehm, 2004). Moreover, there are only limited data to guide the integration of CBT homework in order to maximize patient compliance and learning (Detweiler-Bedell & Whisman, 2005). If psychotherapy research is to guide the use of homework in practice, both theoretical mechanisms of change in CBT and the underlying theoretical foundations that explain a patient's decision to engage in homework warrant research attention. A

further limitation of the existing data is that they focus almost exclusively on individual therapy.

Although the relationship between behavioural and cognitive change in CBT has been the focus of debate (e.g. Cooper & Fairburn, 1993; Salkovskis, 1991), these change processes have rarely been considered in prior research. Studies in depression suggest that improvement is preceded by cognitive change (Tang & DeRubeis, 1999; Tang, Luborsky, & Andrusyna, 2002). Multiple processes are likely to account for the benefits that patients experience in this therapeutic approach (Dobson, Backs-Dermott, & Dozois, 2000). Nevertheless, consistent throughout these various theories is the proposition that depression is alleviated when clients learn new cognitive skills through the practice of between-session homework assignments (Lewinsohn & Graf, 1973; Thompson & Gallagher, 1984).

Few studies have sought to measure client cognitive skill acquisition as a determinant of the relationship between homework compliance and recovery from depression (i.e. Neimeyer & Feixas, 1990; Rees, McEvoy, Juniper, Nathan, & Smith, 2003; Westra, Dozois, & Marcus, 2007). Neimeyer and Feixas conducted a randomized controlled trial contrasting two CBT conditions to assess the actual impact of homework assignments. Interestingly, cognitive skill acquisition did not predict reduction in depressive symptoms assessed at termination, but it did predict self-rated maintenance of treatment gains at 6-month follow-up irrespective of treatment condition. More recently, one study failed to find any relationship between cognitive skill acquisition (quality of thought record completion) and change in group CBT for anxiety and depression (i.e. Rees, McEvoy, & Nathan, 2005). Another study showed that acquiring the ability to be exposed to anxiety-provoking situations (defined as "homework quality") more strongly predicted symptom changes than did compliance in CBT for panic disorder (e.g. Schmidt & Woolaway-Bickel, 2000).

One likely reason for inconsistency on homework skill acquisition is the absence of theoretically meaningful determinants of homework compliance in prior studies. Cognitive theories of attitude-behaviour

relations, models of health behaviour, and goal theories all converge on the idea that intention is the key determinant of motivation and behaviour (see Abraham, Sheeran, & Johnston, 1998; Austin & Vancouver, 1996; Conner & Norman, 1996; Maddux, 1999). The theory of reasoned action (Fishbein, 1980), the theory of planned behaviour (Ajzen, 1991), and the model of interpersonal behaviour (Triandis, 1980) each accord intention, or willingness, a key role in predicting health behaviours. Behavioural intention and motivation, willingness, and readiness are explicit components of the transtheoretical model (Prochaska & DiClemente, 1984), which implies that willingness increases at least across the first three stages of change (e.g. Sutton, 1998). In sum, the models discussed inform possible theoretical reasons for homework compliance or lack thereof.

Although many investigators have proposed that motivation or willingness to engage in therapy is an important predictor of homework compliance and symptom change (e.g. Burns & Spangler, 2000; Fennell & Teasdale, 1987), only one study has directly examined willingness in the context of homework compliance and its relationship to therapy efficacy. Specifically, Burns and Nolen-Hoeksema (1991) showed that depressed clients' pretreatment ratings of willingness to try a coping strategy predicted extent of symptom reduction, and compliance with homework assignments added a separate contribution to symptom change in CBT. Although there are a variety of other factors that psychotherapy researchers have sought to examine as predictors of outcome (e.g. treatment acceptability, treatment expectations, symptom severity), the present study prioritized the investigation of theoretically meaningful determinants of CBT outcomes.

Prior studies generally have relied exclusively on either client or therapist ratings as a source of data of homework compliance (Kazantzis, Deane, & Ronan, 2004). However, four studies have found a significant correlation between therapist and client ratings (Burns & Nolen-Hoeksema, 1991, 1992; Holtzworth-Munroe, Jacobson, DeKlyen, & Whisman, 1989), with only one finding low consistency (Kazdin & Mascitelli, 1982). In contrast, three studies compared client ratings with those of an independent monitor and

suggested that clients may exaggerate self-reports of homework compliance (i.e. Hoelscher, Lichstein, & Rosenthal, 1984, 1986; Taylor, Agras, Schneider, & Allen, 1983). Therefore, the present study was designed to gather patient and independent ratings of homework compliance on a session-by-session basis.

Aims and hypotheses of the present study

A primary aim of the present study was to conduct a first examination of cognitive skill acquisition and homework compliance during CBT group therapy for depression. A second aim of the present study was to further examine willingness as a predictor of symptom reduction in CBT. We obtained pretreatment ratings of willingness, self-report and independent ratings of homework compliance at each session, as well as continuous assessment of patient acquisition of cognitive restructuring skills in relation to degree of symptom improvement in group CBT for depression.

We hypothesized that those patients who expressed more willingness to engage in active coping strategies (i.e. homework) before the start of therapy would be more likely to complete homework assignments throughout the course of therapy (Hypothesis 1). We also predicted a positive association between homework compliance and cognitive restructuring skill acquisition (Hypothesis 2). Finally, we hypothesized that initial willingness scores, subsequent homework compliance, and acquisition of cognitive restructuring skills would predict symptom change during treatment (Hypothesis 3).

Method

Participants

Participants were 46 depressed individuals receiving CBT group treatment for depression enrolled in a randomized trial comparing CBT and mutual support interventions (Bright, Baker, & Neimeyer, 1999). The current research was nested within a broader study of CBT and mutual support therapy groups for depression, which examined the roles of therapist training and client coping styles in

therapist outcome. Results of this larger project are reported elsewhere (Baker & Neimeyer, 2003; Bright et al., 1999). The analyses of willingness to engage in homework, homework compliance, and cognitive skill acquisition in the prediction of CBT symptom change are original to this study.

Participants were recruited from the Memphis, Tennessee community through media advertisements and were included if they (a) were older than 18 years, (b) had attained at least an eighth-grade education, (c) were able to complete the pretreatment assessment questionnaires, (d) received a diagnosis of major depression, dysthymia, or depression not otherwise specified using the Structured Clinical Interview for *DSM-III-R* (SCID; Spitzer, Williams, Gibbon, & First, 1990), and (e) scored 10 or higher on the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1967). Individuals were excluded if they exhibited organic or substance abuse disorders, represented active and uncontrollable suicidal impulses or plans assessed on the Scale for Suicide Ideation (A. T. Beck, Kovacs, & Weissman, 1979), or were already involved in treatment comprising either psychotropic medication or psychotherapy.

The SCID was administered at intake for the purpose of screening participants into the study. The SCID is considered to be a valid and reliable assessment instrument; interrater agreement on diagnoses of major depressive disorder is reported as $\kappa = .72$ (Riskind, Beck, Berchick, Brown, & Steer, 1987). To assess the interrater reliability of the SCID (non-patient [NP] edition) ratings performed by the three interviewing clinicians (none of whom was involved in the treatment phase of the study), a fourth clinician served as an observer on 10% of patient interviews. The proportion of agreement on the SCID-NP after chance agreement was removed was $\kappa = 1.00, .71,$ and 1.00 for the three clinicians. Further details on recruitment and screening can be found in Bright et al. (1999).

Participants were, on average, 47 years old (range = 26–72 years). Sixteen (35%) were men and 30 (65%) were women. Forty-three (93%) participants were Caucasian, two (4%) were African American, and one (2%) represented other cultural groups. Participants exhibited moderate to severe Beck

Depression Inventory (BDI; A. T. Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) scores at intake ($M=22.3$, $SD=8.47$). Twenty-one (46%) participants reported problems with severe depression lasting for the past 5 years or more. Twenty-four (52%) had received previous treatment for depression, and 10 (22%) had received psychotherapy for other problems. The remaining 12 (26%) reported no previous involvement in psychotherapy.

Eleven clients (24%) terminated treatment before completing seven sessions, the criterion adopted for minimal satisfactory completion of the therapy program. Although women had a higher percentage of attrition (40.0%) than men (18.8%), this difference was not significant, $\chi^2(1, N=46)=2.14, p>.05$.

Therapists

Because one aspect of the Bright et al. (1999) study concerned therapists' differing levels of training, eight professional and six paraprofessional therapists were recruited for the study; each therapist team had responsibility for one group in the CBT condition. Professional and paraprofessional therapists were recruited to participate as group leaders forming male/female cotherapy teams differing in their level of professional training. Professional therapists were defined as those who had received postbaccalaureate formal clinical training in professional programs of psychology, whereas those who had not received this training were considered paraprofessionals (Durlak, 1979). Clinical and counseling psychology doctoral students with a minimum 1 year of training were recruited as professional therapists. The typical professional therapist was in the fourth year of doctoral training, had previously led one outpatient therapy group, and had never participated in a therapy group as a client. Nonprofessional therapists were recruited from a community-based self-help organization (Memphis Depressive and Manic Depressive Association) as well as from a list of volunteers from the Memphis Mental Health Society who had previously led a mental health support group. Paraprofessionals had typically completed 4 years of undergraduate work in fields other than psychology, had previously led one support group, and had participated in one support group as clients.

Professionally trained therapists had attained at least a master's degree in clinical or counseling psychology and had an average of 4 years clinical training, including supervised practice in psychotherapy. Paraprofessionals had no advanced degrees in psychology or experience providing individual treatment but had led some form of group therapy (e.g. self-help groups) in the community. Analysis of therapist differences was not part of the present study's aims or hypotheses. (See Baker & Neimeyer, 2003, for a report on therapists' training in the broader trial contrasting CBT and mutual support interventions.)

Treatment manual

Group CBT was delivered in a manualized format. The present study adopted Burns's (1989b) *Feeling Good* treatment, which represents a direct extension of the approach developed by A. T. Beck, Rush, et al. (1979). Groups were active and structured and involved the identification and evaluation of distorted thinking and beliefs as core techniques. Sessions were 90 minutes and took place on a weekly basis for 10 weeks. Seven CBT groups were formed across a 16-month period, and each consisted of four to 10 members ($M=6.57$). Groups were held in the Psychological Services Center at The University of Memphis, a community mental health center that also serves as a training clinic for doctoral students in clinical psychology.

Treatment integrity

Therapist training. Therapists were oriented to the project and trained in the CBT treatment manual during a 2-day workshop. The training workshop was conducted by a team of doctoral- and master's-level therapists with extensive experience in conducting therapy groups and teaching graduate-level courses in CBT and included intensive didactic and experiential components.

Therapist adherence. Therapist adherence to each treatment was monitored using the Therapy Compliance Checklist by trained raters, a scale developed for the present study based on the Cognitive Therapy Scale (Young, Beck, & Budenz, 1983). This adherence measure was used to rate therapy audiotapes to maintain the prescribed

components (i.e. “red-line” minimum criteria) and distinctiveness of the CBT condition (see Dobson & Singer, 2005; Flannery-Schroeder, 2005; Gresham, 2005; Perepletchikova & Kazdin, 2005; Shaw et al., 1999). All sessions were audiotaped and reviewed in a group monitoring session held weekly for therapists. If deviation occurred, corrective action was taken in supervision to ensure that future sessions maintained their integrity. There was a high level of adherence in CBT groups, with no differences between professionals and paraprofessionals (see Bright et al., 1999), thereby attesting to the distinctiveness of the CBT condition in the present study.

Willingness Scale

The Self-Help Inventory (SHI; Burns, 1991) is a self-report instrument designed to discover what strategies clients use when feeling depressed, which yields reliable and factorially valid data (Burns & Nolen-Hoeksema, 1991). The SHI contains 11 items identified as self-help/coping methods (e.g. “Try to think of pleasant things in my past, present, and future”; “Pinpoint some problems in my life and develop a strategy for dealing with them”). Respondents rate each item three times, resulting in three separate scores for this measure (i.e. frequency, helpfulness, and willingness). However, for the present study, only the scores resulting from the Willingness subscale immediately before the first therapy session were used. Patients selected from three options (*definitely not, maybe, definitely*) the one that best described whether they would try self-help coping methods suggested by the therapist during therapy. This measure was administered once, immediately before the first therapy session. Burns and Nolen-Hoeksema found that the Willingness scale was positively correlated with improvement during the first 12 weeks of treatment and made additive and unique contributions to clinical improvement.

Homework compliance

Homework compliance was evaluated on a weekly basis by patients and independent raters. Written homework assignments were collected at the outset of each session, and patients were asked to indicate which assignments they completed that week. Raters recorded patient compliance with each

homework assignment separately, using a designation of complete or not complete, and provided detailed and personalized feedback to participants immediately after each session. (Guidelines for the feedback to patients are available from Robert Neimeyer.) Additionally, because self-reports of homework compliance are sometimes exaggerated (see review in Kazantzis et al., 2004), a further method was used to verify clients’ self-reported compliance with reading assignments. Specific pages of the reading assignments (i.e. Burns, 1989a) were lightly glued together before distribution of handbooks to patients to mark one fourth, one half, and three fourths of the total assignment for each week. Compliance with reading was verified by checking to see whether pages had been opened, allowing for verification of whether these sections had, at a minimum, been browsed by patients. Composite compliance scores equal to the percentage of compliance per session and total percentage across treatment were calculated for patient and independent data sources.

Cognitive skill acquisition

Patients completed daily mood logs (Burns, 1989a), a variant on Beck’s dysfunctional thought record, on a weekly basis from Sessions 3 through 10. Daily mood logs were scored based on the system developed by Neimeyer and Feixas (1990). The scoring system was designed to evaluate participants’ responses in each of the five columns (situation, emotion, automatic/dysfunctional thoughts, rational response, outcome). Each column is rated as 0 (*entirely irrelevant or missing response*), 1 (*marginally relevant or incomplete response*), or 2 (*relevant and appropriate response*). Total scores ranged from 0 to 10; higher scores reflected greater skill in cognitive restructuring. Composite scores equal to the average skill acquisition across treatment were calculated based on data from independent raters. There was good interrater agreement between the two independent raters (Kendall’s $\tau = .81$ based on 20% of the thought records).

Depression severity

Hopkins Symptoms Checklist-58 (HSCL-58; Derogatis, Lipman, Rickels, Uhlenhuth, &

Covi, 1974). This is a 58-item self-report instrument designed to assess outpatient symptomatology, with test-retest coefficients ranging from .75 to .85 (Lipman, Covi, & Shapiro, 1979). Patients rate distress on the 58 symptom items using a 4-point scale; higher scores reflect greater distress. In the present study, internal reliability for the pretreatment HSCL-58 was excellent ($\alpha=.95$).

BDI (A. T. Beck et al., 1961). This is a well-known 21-item self-report questionnaire designed to assess depression severity. Each item is rated on a 4-point scale. Total scores are obtained by summing the item scores; scores of 17 or higher indicate significant depression (Burns, 1980). In the present study, internal reliability for the pretreatment BDI was good ($\alpha=.97$).

HRSD (Hamilton, 1960, 1967). The Rehm and O'Hara (1985) revised version of the HRSD was administered by an independent clinician at pretreatment as part of the initial screening phase and at posttreatment. Scores can range from 0 to 52, with 30 representing the cutoff for severe illness. Interrater reliability was good for the clinicians using the HRSD in the present study (Kendall's $\tau=.89$, .67, and .79).

Results

Preliminary analyses

Patient homework compliance ratings were correlated with the more objective measures (i.e. written assignments and pages opened in reading material) to assess whether patients were accurately representing their outside-session work. Patient and independent reports were highly correlated, $r(35)=.87$, $p<.001$, but given the inconsistent findings in prior research (cf. Kazantzis et al., 2004), data sources were kept separate in the analyses to explore differences in relationships with theoretically meaningful process variables (i.e. willingness, cognitive skill acquisition). In addition, compliance rates were compared between active and passive assignments (e.g. thought records vs. readings), were highly related, $r(35)=.81$, $p<.05$, and were not analyzed separately.

A second preliminary analysis was conducted to determine the need for a composite score of change. Correlations between the patient ratings of improvement (BDI and

HSCL-58) and the HRSD were used to determine whether different measures were assessing the same phenomenon of change. If all correlations among measures had been high (i.e. $r>.80$), then a composite change score would have been created. However, only BDI and HSCL-58 scores reached this criterion, $r(35)=.81$, $p<.001$, whereas other correlations between the BDI and HRSD and between the HRSD and HSCL-58 were well below this cutoff, $r(35)=.48$ and $.54$, respectively, $p<.001$ for each. Therefore, all three measures were retained as individual assessments of depression severity and no composite scores were calculated. Table 1 presents the means and standard deviations of all depression measures at pretreatment and posttreatment.

To ensure that observed changes from pretreatment to posttreatment were not due to unreliability in assessment, a reliable change index (RCI; Jacobson & Truax, 1991; Ogles, Lambert, & Masters, 1996) was calculated for each measure for each patient using the standard error of measurement obtained in the normative sample for instruments (A. T. Beck, Steer, & Garbin, 1988; Derogatis et al., 1974; Grundy, Lambert, & Grundy, 1996). The RCI should not be interpreted as an index of clinically significant change, but it was adopted for the dependent variables in the present study to identify changes that could not be attributed to unreliability of the BDI, HSCL-58, and HRSD (see Beutler & Moleiro, 2001; Hsu, 1989; Jacobson & Truax, 1991; Sheldrick, Kendall, & Heimberg, 2001).

Willingness and homework compliance

Before the start of the first therapy session, participants were asked to estimate the amount of time (in hours) they would be willing to spend on relevant activities performed between group sessions. It was expected that those patients who expressed more willingness to engage in active coping strategies (i.e. homework) before beginning therapy would be more likely to complete homework assignments throughout the course of therapy (Hypothesis 1). However, the data showed no bivariate relationships between willingness and patient self-report of homework compliance, $r(35)=.19$, $p>.05$, or independent ratings of homework compliance, $r(35)=.16$, $p>.05$.

Table 1. Means and standard deviations for symptom severity

Measure	Pretreatment (<i>N</i> =46)		Posttreatment (<i>N</i> =35)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
BDI	22.30	8.35	11.23	9.82
HRSD	17.57	4.36	7.14	5.36
HSCL-58	123.02	24.46	98.17	24.52

Note. *BDI*=Beck Depression Inventory; *HRSD*=Hamilton Rating Scale for Depression; *HSCL-58*=Hopkins Symptom Checklist-58.

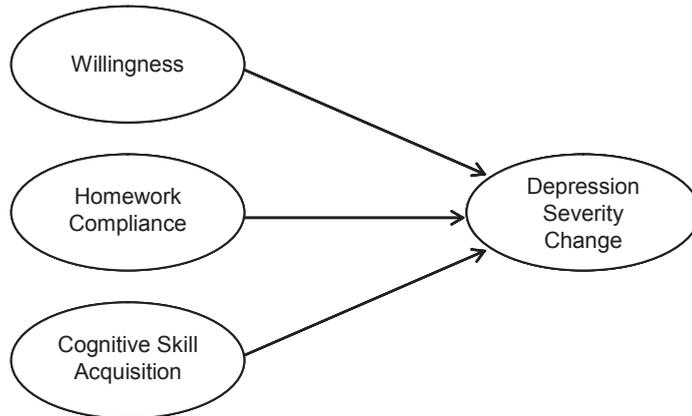
Homework compliance and cognitive skill acquisition

We also expected there would be a positive association between homework compliance and cognitive restructuring skill acquisition (Hypothesis 2). However, no bivariate relationships were found between cognitive skill acquisition and patient compliance ratings, $r(35)=.28$, $p>.05$ or independent ratings, $r(35)=.24$, $p>.05$.

Prediction of symptom change

We also hypothesized that initial willingness scores, subsequent homework compliance, and acquisition of cognitive restructuring skills would predict symptom change during treatment (Hypothesis 3). Because willingness, quantity of compliance, and skill acquisition are theoretically meaningful determinants of cognitive change and symptom reduction in CBT, it is possible that they make independent contributions to outcomes or, alternatively, may not be correlated yet interact to predict outcome. Thus, the independent and combined effects of willingness, quantity of compliance, and skill acquisition were tested in the present study. Figure 1 shows the series of path analyses calculated to test the hypothesized independent relations among these variables (Model 1). We tested a second model involving a combined homework process (i.e. willingness, patient homework compliance ratings, cognitive skill acquisition) and the three symptom change variables (Model 2). A composite interaction score was formed

Model 1



Model 2



Figure 1. Two theoretical models of the relationships linking willingness, homework compliance, cognitive skill acquisition, and change in depression severity. Model 2 shows a relationship with a combined homework process (i.e. composite score=Willingness \times Patient Homework Compliance Ratings \times Cognitive Skill Acquisition).

by multiplying Willingness \times Patient Homework Compliance Ratings \times Cognitive Skill Acquisition. Separate path analyses for patient self-report and independent homework compliance data were carried out.

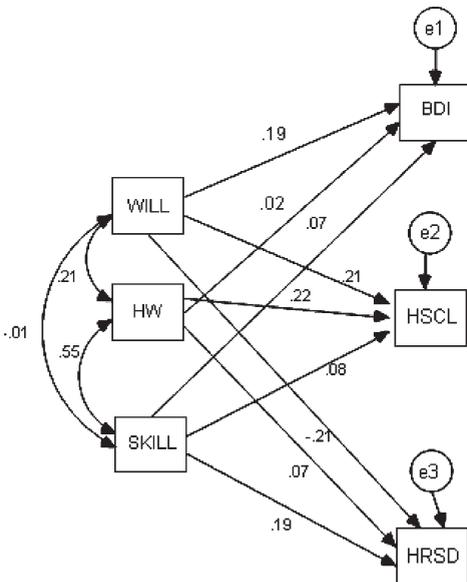
Path analyses of the hypothesized relationships between the various components were conducted using Amos 4.01 (Arbuckle, 1999). The paths for the three predictor variables and the three symptom change variables are presented in Figures 2 and 3. Table 2 presents the multiple correlation squared values for each model tested. The amount of variance explained in Model 1 was 27% when independent rater homework compliance data were used and increased to 29% with the use of patient-reported data. In Model 2, the combined homework process score (willingness, homework compliance ratings, and cognitive skill acquisition) predicted change in BDI scores ($\beta=.37, p<.05$) and HSCL-58 score ($\beta=.39, p<.05$) with the use of patient-reported homework compliance. Because no relationships in Model 2 reached statistical significance with independent rater data, the use of patient-reported homework compliance data in Model 2 was considered best because

the amount of variance to be explained was the greatest ($R^2=.40$).

Ancillary analysis

Because the present study was the first to investigate whether willingness, homework compliance, and cognitive skill acquisition predicted group CBT outcomes, an ancillary analysis was conducted to explore whether compliance with different types of homework assignments predicted outcome. We also examined the role of early treatment compliance as an ancillary analysis, using the combined homework process (Model 2) involving pretreatment willingness, patient homework compliance ratings (Sessions 0–3), and cognitive skill acquisition (Sessions 4–10) and the three symptom change variables. We decided to select cognitive skills acquired from Sessions 4 to posttreatment to address the temporal precedence of these variables. However, the model was not statistically tenable in the present sample. Specifically, the model accounted for only 2% of the variance in outcome, and none of the paths achieved statistical significance; all $ps > .05$.

Model 1. Patient Homework Compliance Data



Model 1. Independent Homework Compliance

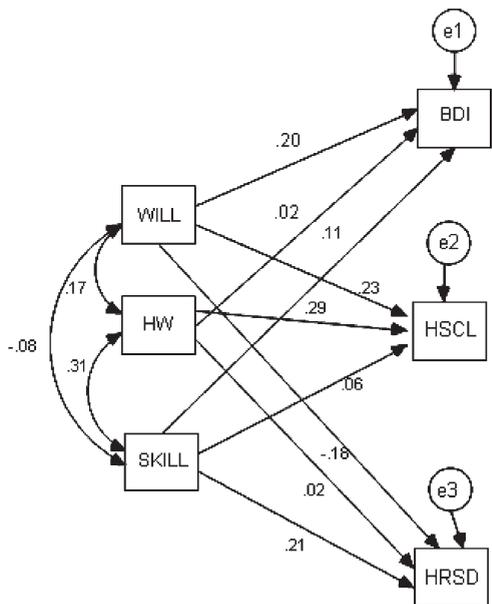
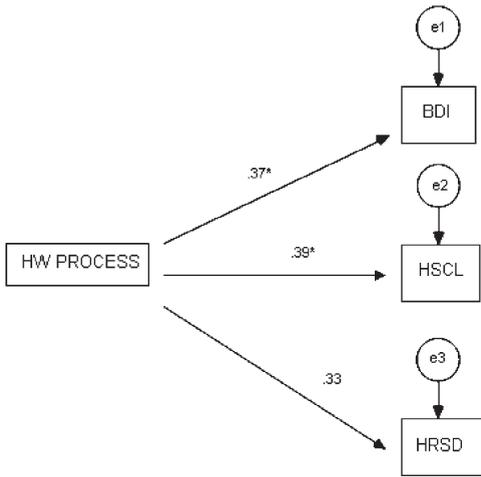


Figure 2. Path analyses for Model 1. The relationships linking willingness (WILL), homework compliance (HW), cognitive skill acquisition (SKILL), and change in depression severity on BDI, HSCL-58 (HSCL), and HRSD for patient and independent homework compliance ratings.

Model 2. Patient Homework Compliance Data



Model 2. Independent Homework Compliance

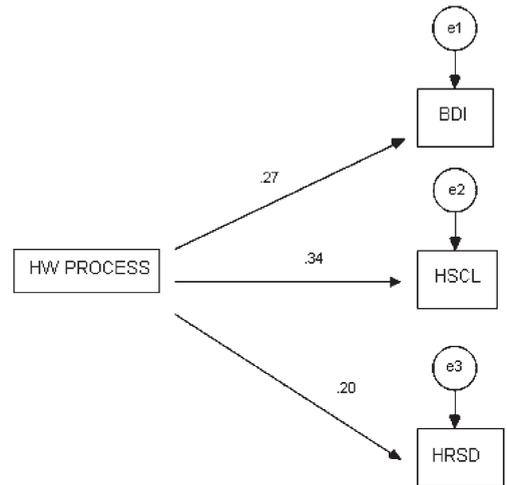


Figure 3. Path analyses for Model 2. The relationships linking the combined homework process score (Willingness × Homework Compliance Ratings × Cognitive Skill Acquisition) and change in depression severity on BDI, HSCL-58 (HSCL), and HRSD for patient and independent homework compliance ratings.

Four independent-samples *t* tests were conducted to examine change in depression severity among clients who were compliant with behavioural homework (i.e. groups defined on the basis of completion of the activity schedule at Session 10 or not) and cognitive homework (i.e. groups defined on the basis of consistent completion of thought record across Sessions 3 through 10 or not) with patient and independent observer compliance data. Using patient data, these data showed that those consistently compliant with cognitive homework experienced greater symptom reduction as measured by the HCL-58, $t(27)=3.107, p<.05$. No other tests reached statistical significance ($ps>.05$).

Table 2. Path model multiple correlation squared values

Model	Model R^2
Model 1	
Patient homework compliance	.29
Independent homework compliance	.27
Model 2	
Patient homework compliance	.40
Therapist homework compliance	.21

Discussion

The present study examined the relations among three homework variables (willingness, compliance, and skill acquisition) and their contribution to the prediction of treatment outcome in group CBT for depression. Results of the study add support and detail to a growing body of research in suggesting that the combination of clients' willingness to undertake between-session assignments and effective completion of assigned homework are associated with positive outcome in CBT for depression. Strengths of the study include the assessment of distinct theoretically meaningful homework variables and the use of different perspectives in the assessment of compliance in the context of a randomized controlled trial. The high correlation between client and observer compliance ratings suggests that the use of client self-report can be reliable in the context of CBT for depression. Prior concerns about the accuracy of patient self-report have been observed in the context of anxiety treatment (see Kazantzis et al., 2004).

The data did not support our hypotheses that willingness to engage in homework was associated with homework compliance or that

compliance was associated with cognitive skill acquisition. Although we used measures of willingness and cognitive skill acquisition applied in prior research, these methods have not been subject to comprehensive psychometric evaluation. However, the present data suggest that the combination of patient willingness to engage in self-help activities, subsequent homework compliance, and cognitive skill acquisition together predicted symptom change in group CBT for depression.

The finding that willingness, homework compliance, and skill acquisition produce combined effects in the prediction of outcome was consistent with theorized mechanisms of change in Beck's system of psychotherapy (A. T. Beck, Rush, et al., 1979). There was a clear theoretical rationale for forming a composite score for the prediction of outcome in the present study. Willingness is a component of various cognitive theories (e.g. Prochaska & DiClemente, 1984) that suggest that patient willingness to engage in a health behaviour (homework) is a key determinant in predicting engagement (homework compliance). Beckian cognitive theory does not emphasize solely compliance but rather learning or degree of skill acquisition from homework tasks as crucial for determining reduction in negative thoughts, symptom distress, and impaired functioning. Cognitive restructuring skills, such as those learned on thought records, are theorized to be essential among the array of skills that determine patient improvement. The present data support the assertion that patients' pretreatment willingness, homework compliance, and skill acquisition depend on each other in producing reduction in symptom severity.

The finding that willingness, homework compliance, and skill acquisition produce combined effects in the prediction of outcome was also consistent with theorized determinants of homework compliance. In a review of the behavioural and cognitive theoretical foundations for patient engagement in homework, Kazantzis and L'Abate (2005) concluded that patients are likely to have a range of beliefs about homework (e.g. costs, benefits, difficulty, match with therapy goals), and these beliefs are ideally taken into account with the patient's degree of engagement (i.e. quantity of homework completion and degree of skill acquisition). That is, the mechanism

underpinning patient engagement with homework requires consideration of beliefs and behaviour. It is concluded that the interaction of willingness, homework compliance, and cognitive skill acquisition in the present study was likely to have better represented the process taking place in CBT and, therefore, was more sensitive to effects in a relatively small sample.

The finding that willingness, homework compliance, and skill acquisition produce combined effects in the prediction of outcome was also consistent with prior research. Published studies show a positive association between homework compliance and symptom reduction in CBT (Kazantzis et al., 2000) and have implicated cognitive skill acquisition (homework quality) in that relationship (Schmidt & Woolaway-Bickel, 2000).

The theorized mediation effects for cognitive skill acquisition could not be explicitly tested within the present path analysis because of the size of the sample. However, the present findings were not consistent with the existence of such mediating effects (see Holmbeck, 1997; Frazier, Tix, & Barron, 2004). That is, there was no direct relationship between homework compliance (the predictor) and symptom change (the criterion), which could be accounted for by a mediator. Furthermore, there was no relationship between homework compliance and skill acquisition (i.e. between the predictor and potential mediator) or between skill acquisition and treatment outcome (i.e. the potential mediator and the criterion variable). Thus, the potential mediating effects of cognitive skill acquisition in the homework compliance–outcome relationship require further examination in larger samples of CBT for depression.

Integration of the present study with prior research

The present study evaluated the relationship with overall homework compliance during the course of CBT group therapy. A study by Startup and Edmonds (1994) reported that, although homework compliance after two sessions related to outcome, later compliance did not. Other studies also raise the possibility that early homework compliance may be important (e.g. Fennell & Teasdale, 1987), and research illustrates that some depressed patients may show a rapid response in early

sessions (Tang, DeRubeis, Beberman & Pham, 2005). Thus, early homework compliance warrants examination in future research on CBT processes in depression.

The present study was focused exclusively on clients' acquisition of cognitive skills. It is possible the study would have obtained significant results among compliance, skill acquisition, and symptom change if acquisition of behavioural skills was also assessed. Despite the conceptual difficulties in the operationalization of what is referred to as "behavioural" and "cognitive" components of CBT given that the one usually involves the other, significant evidence suggests that behavioural activation is an important component in the treatment of depression (Dimidjian et al., 2006; Jacobson et al., 1996). Future research studies could extend the present results by incorporating an assessment of behavioural skill acquisition.

There is some evidence to suggest that homework assignments are more beneficial for patients who present with more severe clinical presentations. Two studies have shown that pretreatment depression severity influences homework compliance effects (Neimeyer & Feixas, 1990; Persons et al., 1988; but see Burns & Spangler, 2000, for an exception). Similarly, Fennell and Teasdale (1987) observed that demoralization was associated with a more rapid response to CBT of depression, which in turn was linked to early homework compliance (see also Addis & Jacobson, 2000; DeRubeis & Feeley, 1990). Unfortunately, the size of the present sample precluded a test of moderated effects. As a suggestion for future research, researchers could test the hypothesized effects of pretreatment severity, extent of dysfunctional cognition, and functioning using the methods for moderator research outlined in Holmbeck (1997).

Although the data on the correlation of homework compliance fairly consistently show a positive relationship with symptom change, a study of group CBT for anxiety and depression failed to replicate that finding (Rees et al., 2005). There is also emerging evidence to suggest that the role of the therapist, or therapist competence, in the integration of homework in a given session for a given client may predict compliance and symptom change (Bryant et al., 1999). In the

present study, the group therapy format adopted may be a further factor implicated in the present results. Some CBT groups may develop a norm of homework compliance, whereas others may impede compliance. Furthermore, it can be difficult for therapists to individualize homework assignments or review each patient's homework assignments and discuss individual barriers to homework compliance in a group context. Taking into account the practitioner surveys that identify difficulties in the use of homework in clinical practice (Fehm & Fehm-Wolfsdorf, 2001), further examination of therapist factors and the interaction between clients and therapists discussing homework assignments is also warranted.

Limitations of the present study

Several limitations to the present study should be acknowledged. First, the sample size was not as large as we would have preferred. Although the combined homework process score (Willingness \times Homework Compliance Ratings \times Cognitive Skill Acquisition) significantly predicted change in BDI and HSCL-58 scores and explained 40% of the variance, low correlations such as those observed in the present study often imply insufficient power to evaluate path models. However, it is worth noting that the sample size in the present study was similar to other research attempting to examine the role of homework compliance in CBT (e.g. Rees et al., 2005; review in Kazantzis, 2000). We can speculate that willingness, homework compliance, and cognitive skill acquisition in Model 1 would have accounted for a greater degree of variance in symptom changes and produced relationships that reached statistical significance.

Second, the present study recruited participation via media advertisements from the Memphis area. Patients were required to meet *Diagnostic and Statistical Manual of Mental Disorders (DSM)* diagnostic criteria for major depression, dysthymia, or depression not otherwise specified, received treatment on a (reduced) fee-for-service basis, and were excluded if they met criteria for bipolar disorder, alcoholism, drug abuse/dependence, schizophrenia, and organic disorders, or if they were experiencing current suicidal potential or in need of other immediate treatment. It is still possible that relying on

patient self-referral, or those who completed seven group sessions, introduced some bias and compromised the external validity of the data.

Third, the present study did not examine other theoretically meaningful determinants of homework compliance and symptom change in CBT. We did not measure change in surface or deeper level cognition (Barber & DeRubeis, 2001; Peterson et al., 2004; Teasdale et al., 2001) or extent of pleasure or self-rated mastery associated with engagement with homework. In addition, patients' self-efficacy is likely to have influenced their engagement with homework tasks (Conner & Norman, 1996). Patient beliefs are based on prior experience of engaging in a task, observation of other people's experiences, receiving encouragement and feedback from others, and experiencing emotional triggers that cue the activity. These beliefs are likely to fluctuate on a week-by-week basis with the change in homework assignments. In other words, a number of cognitive factors mediate the behavioural contingencies and explain the process of learning through homework completion. The results of the present study support the weekly assessment of theoretically meaningful determinants of homework as part of the assessment of homework compliance (see Kazantzis, Deane, et al., 2005; Yovel & Safren, 2007).

A fourth limitation was the inherently dependent nature of group therapy data. The present study was designed to be a first investigation of theoretically meaningful determinants of outcome in CBT, but readers are reminded of the data dependency issue so that they can adjust their own interpretations and future research.

Previous research also suggests that therapist competence is implicated in the correlational and causal effects of homework compliance in CBT (Bryant et al., 1999; Startup & Edmonds, 1994). However, the present study did not measure therapist competence in the administration of homework assignments. Because prior studies show that practitioners report a range of attitudes toward the impact of homework on therapy process (i.e. Kazantzis, Lampropoulos, & Deane, 2005), it is possible that the interaction between clients and therapists is important in understanding the link between homework

compliance and symptom change in CBT (Lambert, Harmon, & Slade, 2007). Thus, as with prior studies attempting to map the paths between homework and symptom change (Burns & Spangler, 2000; Kazantzis et al., 2001), additional theoretically meaningful factors may have been operating.

Finally, the present data were gathered in the context of a study that used *DSM* (third edition, revised [American Psychiatric Association, 1987] criteria for depression diagnosis and the original version of the BDI. As with the 1971 revision (BDI-IA), the original BDI only addresses six of the nine *DSM* criteria for depression. Consequently, future research on the effects of homework compliance within individual or group CBT for depression would benefit from using the revised version (BDI-II; A. T. Beck, Steer, Ball, & Ranieri, 1996).

Summary

The present study provided beginning empirical support for the proposition that client willingness to engage in homework assignments, actual completion of these between-session tasks, and the acquisition of skills in analyzing emotionally troubling situations and restructuring them cognitively predicts improvement in cognitive therapy of depression. In the present data, it was the combined effect of willingness, compliance, and skill acquisition, and not the separate homework process variables, that predicted outcome in this study. That is, the data suggested that these factors depend on each other in producing reduction in symptom severity. We argued that the sum (combination) of these variables was likely to have better represented the process theorized to take place in CBT, and the theoretically meaningful model was more sensitive to effects in a relatively small sample. Further specification of the relationships among these and other potentially relevant processes that could shape outcome awaits future research.

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