Published in final edited form as:

J Behav Ther Exp Psychiatry. 2016 March ; 50: 113–119. doi:10.1016/j.jbtep.2015.06.005.

The Therapeutic Alliance and Therapist Adherence as Predictors of Dropout from Cognitive Therapy for Depression when Combined with Antidepressant Medication

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Abstract

BACKGROUND—Previous psychotherapy research has examined the therapeutic alliance and therapist adherence as correlates or predictors of symptom change. While some initial evidence suggests the alliance is associated with risk of dropout in cognitive behavioral treatment for depression, evidence of such relations has been limited to date. We examined the relation of these psychotherapy process variables and dropout in the context of cognitive therapy for depression when provided in combination with pharmacotherapy.

METHODS—Patients were randomized to the CT plus pharmacotherapy condition of a clinical trial for chronic or recurrent depression. Consistent with the spirit of personalized medicine, patients were treated until they met remission and recovery criteria (or reached the maximum allowable time in the study). In a sample of 176 patients, we examined observer-rated alliance and therapist adherence in the first three CT sessions as potential predictors of treatment dropout.

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Conflict of interest: None declared.

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RESULTS—The therapeutic alliance and one facet of therapist adherence (i.e., Behavioral Methods/Homework) predicted reduced odds of dropout. Therapist use of Negotiating/Structuring predicted greater likelihood of dropout, but only when other variables were included in the model.

LIMITATIONS—Process ratings were not available for concurrent pharmacotherapy sessions. A minority of patients did not have session recordings available.

CONCLUSIONS—Results are consistent with the possibility that the therapeutic alliance and therapists' focus on homework and behavioral methods promote treatment retention in combined treatment for depression.

Keywords

alliance; adherence; dropout; cognitive therapy; depression

The therapeutic alliance and therapist adherence are among the most frequently studied psychotherapy process variables. While the relation of process variables to symptom change has been the focus of hundreds of investigations (Horvath, Del Re, Flückiger, & Symonds, 2011; Webb, DeRubeis, & Barber, 2010), in many fewer studies have researchers examined the relation between process variables and treatment dropout. As dropout is an important therapeutic outcome, there is a need to identify its predictors, as well as intervention strategies that reduce the risk of dropout (i.e., Cooper & Conklin, 2015; Swift & Greenberg, 2012; Swift, Greenberg, Whipple, & Kominiak, 2012).

In a meta-analysis of 11 studies across a very wide variety of contexts and treatment populations, Sharf, Primavera and Diener (2011) reported a significant association between the therapeutic alliance and lower risk of dropout. In cognitive-behavioral therapies for depression specifically, there has been limited study of psychotherapy process variables as predictors of dropout. Perhaps the most revealing examination of these relations was Arnow et al.'s (2007) analysis of a large trial involving the Cognitive Behavioral Analysis System of Psychotherapy (CBASP) for chronic depression. In that study, alliance scores assessed during the second week of treatment were associated with lower risk of dropout across both the CBASP alone and the CBASP combined with medication conditions. As the authors noted, the observed relation of alliance and dropout could be due to the direct effect of the alliance on patients' commitment to treatment, or might have been mediated by the promotion of patients' medication adherence and their willingness to tolerate bothersome side effects. Consistent with this latter possibility, relative to patients in the medication alone condition, patients in the combined condition were less likely to cite side effects of medications as a reason for discontinuing treatment (Arnow et al., 2007).

Researchers have examined the alliance more often than therapist adherence; in fact, unlike the alliance, we know of no published studies examining the relation of therapist adherence and dropout in cognitive behavioral treatments for depression. However, a number of studies have examined the relation of therapist adherence and symptom improvement in CT for depression specifically. Four studies have reported that one or more facets of adherence predict subsequent symptom change in CT for depression (DeRubeis & Feeley, 1990; Feeley, DeRubeis & Gelfand, 1999; Strunk, Brotman & DeRubeis, 2010; Strunk, Cooper,

Ryan, DeRubeis, & Hollon, 2012). While the evidence is indirect, these studies provide some reason to suspect that a relation may exist between adherence and dropout. Thus, we evaluate both therapist adherence and the alliance as predictors of dropout.

We investigate these psychotherapy process variables in patients randomized to CT combined with antidepressant medication (ADM) in a clinical trial of outpatients with chronic or recurrent depression (Hollon et al., 2014). In this trial, the provision of treatment was intended to capture the spirit of personalized medicine by allowing for flexibility in treatment duration. Compared to clinical trials that provide a fixed duration treatment for all patients, a design in which patients are treated until achieving an outcome better reflects high quality, personalized care. Accordingly, patients in this trial were treated until they met remission (normalization of symptoms) and recovery criteria (presumed resolution of the underlying episode). In cases where therapeutic outcomes were not achieved, the duration of treatment was capped at a maximum of 42 months of treatment. Relative to most fixed-duration clinical trials, patients in this study were treated for a longer period over which they might have dropped out. In addition, the length of this period was not independent of whether patients experienced remission and recovery.

Even among studies of treatments provided for shorter fixed durations, there is evidence that variability in how dropout is defined substantively influences dropout estimates (Barrett, Chua, Crits-Christoph, Gibbons, Casiano, & Thompson, 2008; Swift & Greenberg, 2012). In the Hollon et al. (2014) trial, dropouts were defined as patients who were randomized to treatment, but then left the study. Patients who were administratively withdrawn (e.g., due to experiencing a manic episode) are considered separately in this paper, as we suspect their outcomes are best regarded as distinct from dropout. Dropout in this study may differ from dropout studied in the context of relatively brief, fixed duration treatments. While studies of dropout in both contexts are informative, dropout in a context such as Hollon and colleagues' trial has the key advantage of reflecting state of the art in high quality personalized medicine.

Our analyses focus on early psychotherapy process ratings for several reasons. First, therapeutic gains tend to occur disproportionately in early sessions of psychotherapy, including CT (Feeley et al., 1999; Sasso, Strunk, Braun, DeRubeis, & Brotman, 2015). This could be due in part to psychotherapy process variables being particularly important early in the course of treatment (DeRubeis & Feeley, 1990). Second, to examine the relation of psychotherapy process variables and risk of dropout, examining later sessions when some or even many patients have dropped out would be difficult due to missing process data for patients who had dropped out.

In keeping with the meta-analytic results reported by Sharf et al. (2011), we hypothesized that observer ratings of the therapeutic alliance would predict reduced odds of dropout. As we are not aware of any previous studies examining therapist adherence to CT as a predictor of dropout risk, we simply hypothesized that adherence ratings would be associated with reduced dropout risk and planned to explore whether these associations were specific to particular facets of therapist adherence.

Method

Participants and Trial Information

Patients—Patients were 176 of 227 patients (78%) in the combined condition of a multi-site, randomized trial of CT combined with ADM versus ADM alone; institutional review boards at all three sites approved the study. All patients received a primary current diagnosis of Major Depressive Disorder per DSM-IV criteria; details of the additional inclusion and exclusion criteria, informed consent procedures and the pharmacotherapy regimen can be found in Hollon et al. (2014). Randomization at each of three sites was stratified by recurrence/chronicity, depression severity, presence of a comorbid personality disorder, sex, and whether patients were married or cohabitating. Across the entire sample of 227 patients treated with CT and ADM, 39 people were classified as dropouts (17%). For this paper, the sample was limited necessarily to those combined treatment patients with a video recording available from at least one of the first three CT sessions; largely due to missing recordings, 51 patients could not be included. Of the 176 patients included in the sample, 58% were women. The average age was 43.3 (SD = 13.2; range of 18 to 80). With regard to race, 85% of patients were Caucasian, 9% were African American, 2% were Asian, 1% were American Indian or Native Alaskan, and 2% self-identified as “other”.

Study Implementation—Treatment was provided in a manner intended to capture the spirit of personalized medicine by allowing for flexibility in treatment duration according to clinical need, with the aim of having all patients achieve recovery (see Hollon et al., 2014). Patients progressed through an acute phase and a continuation phase. In the acute phase, patients were treated until they met remission criteria (i.e., 4 consecutive weeks of minimal symptoms). Following acute treatment, patients remained in the continuation phase until they met recovery criteria (i.e., 26 consecutive weeks without relapse). During the continuation phase, patients who relapsed needed to again achieve remission criteria before being eligible to achieve recovery criteria. There were maximum periods allowed for achieving remission (18 months) and recovery (36 months), after which patients who did not meet criteria were removed from the study and referred for other treatment (see Hollon et al. for additional details). If patients met the symptomatic criteria at the end of a phase, they were followed to determine if they would ultimately meet the duration criteria. Thus, patients could be treated for up to 19 months for remission, and up to 42 months for recovery.

Remission and recovery were defined on the basis of scores from the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) and Longitudinal Interval Follow-up Evaluation (LIFE; Keller et al., 1987) combined with duration criteria. Specifically, remission was defined as scores of eight or lower on the HRSD, and scores of two or lower for four consecutive weeks on the LIFE. After 12 months, patients could achieve partial remission until their 19th month in the study, with partial remission defined as HRSD scores of 12 or lower, and LIFE scores of three or lower for four weeks. Recovery was defined as the absence of relapse for a period of 26 weeks, where relapse was defined as two consecutive weeks of HRSD scores of 16 or more or LIFE scores of five or more. As reported by Hollon

et al. (2014), intraclass correlation coefficients for the HRSD and LIFE were .96 and .80, respectively.

Therapists—Three therapists provided CT at the University of Pennsylvania (two female), six therapists at Rush Medical Center (three female), and five therapists at Vanderbilt University (four female). One male therapist at Rush was a psychiatrist and one female therapist at Vanderbilt was a psychiatric nurse practitioner; all others were doctoral-level psychologists. The therapists met for 90 minutes weekly at each site to review cases, with on-site supervision provided by Robert J. DeRubeis, Paula R. Young, and Steven D. Hollon at each site, respectively. Protocol called for patients to receive 50-minute sessions of CT biweekly for the first 2 weeks, at least weekly through the remainder of the acute treatment phase, and at least monthly during the continuation phase.

Measures

Depressive Symptoms—At each session, depressive symptoms were assessed with the Beck Depression Inventory-II (BDI-II; Beck, Steer & Brown, 1996), a widely-used and well validated self-report measure.

Therapist Adherence—Adherence was evaluated using three subscales identified through a factor analysis (see Strunk et al., 2012) of the adherence items from the Cognitive Behavioral subscale of the Collaborative Study Psychotherapy Rating Scale (CSPRS; Hollon et al., 1988). The subscales were: a ten-item Cognitive Methods scale reflecting the identification and evaluation of automatic thoughts; a seven-item Negotiating/Structuring scale assessing therapists' management of session structure and collaboration with patients; and a five-item Behavioral Methods/Homework scale assessing the use of behavioral strategies and homework. The Behavioral Methods/Homework scale consists of three items that address behavioral strategies and two items that concern the use of homework. As described by Strunk et al., the homework items assess all types of homework and were not limited to behavioral assignments.

Alliance—The therapeutic alliance was assessed using the 12-item observer-rated version of the Working Alliance Inventory (WAI; Horvath & Greenberg, 1989; Tracey & Kokotovic, 1989). The WAI was designed to assess the quality of the affective, or bond, aspects of the therapeutic relationship, in addition to the agreement between therapist and patient on overall treatment goals and on the steps to achieve therapeutic goals. We utilized the total score as our measure of the alliance.

Antidepressant Medication (ADM)—Specific details on the pharmacotherapy protocol are presented in Hollon et al. (2014). Pharmacotherapists followed a principle-based algorithm involving up to four different classes of medication along with augmenting or adjunctive agents commonly used in clinical practice. In an effort to assess individual differences in treatment with ADM, we constructed an ADM dosing covariate based on ratings from expert psychiatrists familiar with the medications in the trial (for details on this covariate, see Strunk et al., 2012). Average and maximum therapeutic doses were identified for each of 22 primary antidepressant medications used during the study, and were scaled as

“5” and “10” respectively. All other values were interpolated along this scale, with values higher than the routine maximum dose for any single medication scored as a “10”. Patients on multiple ADMs concurrently had the scores on these variables summed. Values were multiplied by duration (in days) between acute phase pharmacotherapy sessions, and then averaged across the duration of each patient’s participation in the acute phase. The mean value of this covariate was 7.13 (SD = 2.92), with a range of 0 to 15.7.

Procedure

Recordings from at least one of the first three sessions were available for 176 patients. Across these patients, recordings of a total of 467 sessions were available, with approximately equal representation of each session (for session 1, $n = 160$; for session 2, $n = 157$; for session 3, $n = 150$) and the majority of patients having all three sessions. Each session was rated by four raters from a pool of 50 advanced undergraduate students, each of whom completed approximately 50 hours of training over a 10-week period. Thus, a total of 1,868 ratings were generated. Raters provided ratings for no more than one session per patient and were blind to each others’ ratings. For each patient, ratings were averaged across sessions before being used in statistical analyses.

Inter-Rater Reliability of Process Scores

To evaluate the inter-rater reliability of process measures, random effects intraclass correlation coefficients (ICCs) were calculated. Estimates of these ICCs for average ratings were corrected for the number of raters (i.e., the harmonic mean of the number of raters, 10.4 rather than 12, due to missing sessions for some patients). ICCs were .85 for the WAI, .85 for Cognitive Methods, .75 for Negotiating/Structuring, and .89 for Behavioral Methods/Homework.

Analytic Strategy

For our primary analyses, we used survival analyses to examine predictors of patient dropout. In conventional survival analyses, censoring is assumed to be independent of time to the event. Because both recovery and administrative removal precluded the occurrence of dropout in this trial (Hollon et al.), these events are competing risks that could bias estimates of the time to dropout unless we model the non-independence of the censoring mechanism. To examine predictors of dropout while also modeling competing risks (i.e., recovery and administrative removal), we used the proportional subdistributional hazard model (Fine & Gray, 1999). This model extends the competing risk model and allows for dependency of failure types. All models were implemented in SAS version 9.3 using the Zhang and Zhang (2011) SAS macro. Fitting of the SAS macro requires a grouping variable be identified. For this grouping variable, we used site. This means that site was included as a covariate in all analyses.

For conceptual clarity, we distinguish between covariates and predictor variables. While these variables are handled in the same way statistically, we use the term covariate to refer to variables we regard as exerting a potentially confounding effect, and predictor for the psychotherapy process variables of interest (i.e., therapeutic alliance and adherence scores). In order to better isolate the effects of our predictors, we planned to enter the following

covariates to account for their possible relationship to dropout: (1) a residual score representing change in depression symptoms, obtained from a regression model in which the BDI-II scores from the first-rated session served as the sole predictor of the BDI-II scores from the last-rated session; (2) the ADM dosing variable; and (3) any demographic variables that differed at a $p < .10$ level between dropouts and non-dropouts. The first covariate was included to account for any symptom change that occurred over those early sessions. For ease of interpretation, all continuous variables (except age) were standardized before being included as predictors in our model variables.

We used the proportional subdistributional hazard model because it allows for modeling dropout along with the competing risks of recovery and administrative removal. However, this approach assumes risk of dropout is independent among patients seen by the same therapist. To evaluate this independence of dropout assumption, we examined a generalized linear mixed model, in which we modeled risk of dropout (using a binomial distribution with the probit link function) and included therapist as a random effect. Using this model, we estimated the ICC for therapist in predicting risk of dropout was .038 (Baecke & Van den Poel, 2012), showing a very small within-therapist correlation. When we extended the model to include all covariates and predictors, the estimate of the variance-covariance matrix for the generalized linear mixed model was not positive definite, with the therapist variance component estimated as 0, further suggesting any therapist differences in risk of dropout were quite small. Therefore, the exclusion of a random therapist effect in the proportional subdistributional hazard model is unlikely to have substantively impacted our results.

Results

Among the 176 patients included in our analysis, 21 patients were classified as having dropped out (12%). Dropouts occurred between 21 and 724 days, with an average of 272 days to dropout ($SD = 212$). Although we focus on dropout, other possible outcomes included: recovered ($n = 135$), administratively withdrawn or removed from treatment ($n = 3$) and completed treatment without recovering ($n = 17$).

We first compared demographic characteristics on the basis of dropout status. As shown in Table 1, patients who dropped out were significantly younger than non-dropouts, with a mean age of 33.4 ($SD = 10.2$) for dropouts versus 44.7 ($SD = 13.0$) for non-dropouts ($d = .57$, $t(174) = 3.79$, $p < .001$). There was also a non-significant trend for a lower rate of being married or cohabitating among patients who dropped out as compared to non-dropouts (19.1% versus 37.4%; $\chi^2 = 2.7$, $p = .098$). These two variables were the only demographic factors we examined that differed at $p < .10$ between patients who dropped out and those who did not, and thus were the only demographic covariates we retained for subsequent analyses.

Prior to conducting our primary analyses, we examined the correlations among the psychotherapy process predictors. As shown in Table 2, these variables were at most only moderately correlated (r s ranged from $-.09$ to $.31$). Means and standard deviations for psychotherapy process variables are also provided. As the table shows, age was negatively correlated with Cognitive Methods and Negotiating/Structuring and positively correlated

with Behavioral Methods/Homework. The point-biserial correlation with being married or cohabitating shows that those living with a significant other had higher alliances than those not living with a significant other (equivalent to a d of .33).

Table 3 provides results of our primary analyses examining the prediction of dropout from our covariates and predictor variables. Among the covariates, both the medication dosing variable and participant age were significantly predictive of dropout, such that patients who received a higher medication dose, and those who were older, were less likely to drop out. Three of the adherence and alliance predictor variables were significantly related to dropout risk. Higher ratings of the therapeutic alliance and therapist adherence to Behavioral Methods/Homework were predictive of lower risk of dropping out. Unexpectedly, higher ratings of the Negotiating and Structuring adherence subscale were associated with greater risk of dropout.

Although our primary model examined all psychotherapy process ratings simultaneously, to better understand the individual relationships between each of these variables and dropout, we conducted exploratory analyses in which each adherence and alliance predictor was examined in a separate model, retaining all other covariates. Similar to our primary analyses, Cognitive Methods was not a significant predictor (estimate = $-.07$, SE = $.23$, HR = 0.94 , 95% CI = $0.59 - 1.50$, $p = .8$), and both Behavioral Methods/Homework (estimate = $-.67$, SE = $.34$, HR = 0.51 , 95% CI = $0.25 - 1.00$, $p = .048$) and alliance scores (estimate = $-.59$, SE = $.21$, HR = 0.55 , 95% CI = $0.36 - 0.84$, $p = .004$) were significantly predictive of dropout. However, in contrast to the results of our primary model, Negotiating/Structuring did not significantly predict risk of dropout (estimate = $.20$, SE = $.21$, HR = 1.22 , 95% CI = $0.79 - 1.87$, $p = .3$). This finding suggests that some of the other psychotherapy process variables removed variance in the outcome that otherwise served to suppress the relation of Negotiating/Structuring and risk of dropout.¹

Discussion

In a sample of patients with chronic or recurrent depression who participated in treatment that combined CT and ADM, the therapeutic alliance and therapist use of behavioral interventions and homework in early CT therapy sessions predicted lower odds of dropout. Surprisingly, therapist efforts to negotiate and structure sessions were associated with greater odds of dropout. None of the relations between psychotherapy process variables and dropout odds were accounted for by covariates reflecting symptom change over the period during which process variables were assessed or differences in patients' ADM regimens. Similarly, of the demographic factors that differed between dropouts and completers (*viz.*, age, cohabitation status), neither accounted for the observed predictive relations.

Clinical researchers have called for increased attention to dropout as an important and distinct clinical outcome (Swift & Greenberg, 2012). Although many studies have examined relations between psychotherapy process variables and outcome, few studies have

¹As we were curious which of the psychotherapy process variables drove this suppression effect, we examined Negotiating/Structuring with each of the other process variables included as an additional predictor. Only when Behavioral Methods/Homework scores were included did Negotiating/Structuring become predictive of greater dropout risk.

investigated such process variables as predictors of dropout. Our results support prior research showing a relationship between early alliance and dropout across a variety of treatment settings (Sharf et al., 2011) and in a cognitive behavioral therapy for depression more specifically (Arnow et al., 2007). These findings are also consistent with the possibility that the alliance may serve to ameliorate risk of dropout (Swift et al., 2012). If the alliance-dropout relation we identified reflects a causal relationship, one might wonder what the causal sequence is that begins with early alliance assessments and leads to relatively distal instances of dropout. We suspect that the alliance-dropout relation reflects more than the positive impact of the alliance in early sessions. Early alliance may also serve as an indicator of alliance quality across the total course of treatment. Thus, an early alliance-dropout relation could reflect the causal effect of early alliance on dropout as well as, to some degree, the subsequent levels of the alliance that have a more proximal impact on dropout. As DeRubeis and colleagues noted (DeRubeis, Brotman & Gibbons, 2005), measures of the alliance may reflect any of three determining factors: the therapist, the patient, and the match of specific therapists and patients (i.e., therapist-by-patient interactions). Based on the analyses we presented, we can at least be confident that the alliance-dropout relation is not a simple function of any of the covariates we considered.

To our knowledge, this is the first study of therapist adherence-dropout relations in cognitive therapy for depression. In the absence of research on this question, one might look to studies examining the relation of adherence and symptom change in CT. However, treatment differences in dropout rates do not invariably parallel treatment differences in outcome. For example, in a recent trial of face-to-face versus phone CT, there were no differences in acute outcomes despite a significant difference in dropout rates (Mohr et al., 2012). Psychotherapy process variables that are most important to promoting outcome do not need to be the same as those that promote treatment retention. Although two of the process variables that predicted dropout in this study were the same as those identified in an investigation of early session-to-session symptom change in this sample, these outcome variables are conceptually and empirically distinct (Strunk et al., 2012). Furthermore, our analytic method modeled the risks associated with recovery and dropout separately.

We consider our findings for adherence in the context of the existing literature on dropout. Unlike the alliance, where items reflect both therapist and patient contributions, adherence items assess therapist behaviors explicitly. With regard to our finding of a relation between Behavioral Methods/Homework and lower dropout risk, this relation is consistent with some expert cognitive behavioral therapists' suggestions that behavioral techniques (along with between-session use of therapeutic strategies) may be particularly important early in therapy (Whisman, 2003). We suspect that demonstrating the utility of these therapeutic procedures early on helps to instill hope, confidence and promote engagement with subsequent treatment strategies, all of which may help to maintain patients' commitment to treatment.

Unexpectedly, our primary analyses also revealed that Negotiating/Structuring was predictive of *greater* risk of dropout. This might lead one to wonder whether patients found therapists' efforts to negotiate and structure sessions disagreeable and were therefore more likely to discontinue treatment as a result. Given this unexpected finding, we conducted exploratory analyses to understand the relation better. These analyses showed that the

relation of Negotiating/Structuring and dropout was only evident when accounting for other process measures (specifically Behavioral Methods/Homework). If this reflects a true causal effect of Negotiating/Structuring, then presumably the variance it accounted for only became reliable when removing other variance in dropout risk.

As is true for any non-experimental finding, unmeasured third variables could have contributed to the observed relation. For Negotiating/Structuring, one might be concerned that a patient characteristic that contributes to difficulty in structuring sessions could be at work. For example, perhaps patients who exhibited greater interpersonal difficulty elicited more explicit efforts on the part of therapists to engage in a process of negotiating therapeutic topics and structuring sessions. If so, higher Negotiating/Structuring scores may have predicted dropout only because of their relation to characteristics of patients that place them at higher risk of dropout (for a discussion, see Strunk, Brotman, DeRubeis & Hollon, 2010). This is a possibility that could be evaluated further in future research.

As we consider our findings in the context of the broader literature, our results are distinct insofar as patients in the parent trial were provided with treatment until they achieved an outcome (i.e., dropped out, recovered, or failed to recover) rather than for a fixed duration. This approach reflects the field's recent shift toward personalized medicine. On average, patients were exposed to much longer treatments than has been the case in most previous depression trials (e.g., Arnow et al., 2007). Because the relations we report tended to be relatively distal, one might have expected that we would be at a disadvantage for finding the relations of interest. Even in this context, two predictors achieved statistical significance and were robust to models including key covariates. Whether our results would differ from those that would be obtained in fixed duration, shorter-term outcome studies is an empirical question that remains to be addressed. Nevertheless, we believe our results are likely to reflect the clinical realities of high quality treatment tailored to individual patient needs. To complement this study, studies in which internal validity is a chief priority would be useful. For example, a pilot study suggested that one can experimentally manipulate the alliance by using specific alliance fostering procedures (Crits-Christoph et al., 2006). Evidence from both experimental psychopathology and treatment outcome research converging on factors that support retention in an intervention would allow for the greatest confidence in our understanding of the mechanisms that promote patients' ongoing participation.

Patients in this study were also receiving concurrent pharmacotherapy based on a principle-based treatment algorithm (Hollon et al., 2014). If Behavioral Methods/Homework and the alliance are robust predictors of treatment retention in CT regardless of context, we would expect our results to replicate whether CT is provided alone or in combination with ADM. That is, future studies of CT alone would also find that Behavioral Methods/Homework and the alliance predict dropout. However, we note that process variables predictive of *symptom change* have been found to differ in CT alone vs. CT combined with ADM (see Strunk et al., 2012, online supplement). Thus, an alternate possibility for the prediction of dropout is that process variables that predict symptom change, with or without concurrent ADM, will also tend to predict treatment retention. Future research examining predictors of dropout in CT alone is needed to evaluate these possibilities. However, with a recent estimate suggesting that about a third of depressed outpatients who are participating in psychotherapy are

concurrently receiving pharmacotherapy (Marcus & Olfson, 2010), understanding psychotherapy process-dropout relations in a combined treatment context is important.

We acknowledge several limitations to our findings. First, despite our efforts to acquire session recordings for all patients, in some cases no recordings were available. This was due to a number of factors, including missing tapes, damaged recordings, and patients discontinuing CT prior to session 1. The end result was that our sample underrepresented the total number of dropouts in the clinical trial (12% in our sample vs. 17% in the combined condition of the overall trial). We were unable to identify any therapist or patient variables associated with availability of recordings. Thus, while we cannot rule out the presence of a systematic bias in recording availability, we suspect the poor representation of dropouts primarily resulted in reduced statistical power.

Second, as with all non-experimental studies, causal relations cannot be firmly established. However, investigators can rule out alternatives to the presumed causal relations by attending to the temporal precedence of their predictors to any outcomes predicted, and by considering plausible third variables (Feeley et al., 1999). In the study of dropout, psychotherapy process variables inherently occur prior to treatment termination. We also examined a number of third variables, including early symptom change, ADM regimen, and demographic characteristics. Thus, while unidentified third variables cannot be ruled out, none of the covariates we examined explained the process-dropout relations we identified. Variables characterizing pharmacotherapy sessions are one set of third variables that we think are particularly worth of future study (see Strunk, Stewart, et al., 2010).

Third, our analyses focus on predicting dropout by examining variables characterizing early CT sessions. Although our decision to focus on these sessions was a deliberate one, we also recognize that excluding later sessions limits our ability to detect how psychotherapy process relates to risk of dropout across the course of CT. Finally, our analyses did not consider patients' stated reasons for dropout. While these reasons are worth considering when they can be obtained, they should not assumed to be veridical, in that patients may not know or wish to share their true reasons for dropping out.

Conclusions

In summary, we found that early therapist use of Behavioral Methods/Homework, and high quality therapeutic alliance, predicted lower odds of dropout in CT combined with ADM delivered in a fashion consistent with the principles of personalized medicine. An unexpected negative association between therapist Negotiating/Structuring efforts and higher dropout was also evident, but only when controlling for the positive impact of another facet of adherence. These predictive relations were not accounted for by early symptom change, ADM regimen, or demographic variables. If future research corroborates our findings, clinical researchers might begin to examine strategies for manipulating these variables to examine their potential causal impact on dropout.

Acknowledgments

We are grateful to our colleagues for contributing to this research. Robert J. DeRubeis, PhD, Jan Fawcett, MD, and Steven D. Hollon, PhD, were the principal investigators and Jay D. Amsterdam, MD, John Zajecka, MD, and Richard C. Shelton, MD, were the co-principal investigators. Drs DeRubeis and Hollon oversaw the implementation of CT at Penn and Vanderbilt respectively and Paula R. Young, PhD, did the same at Rush. Dr. Fawcett oversaw the implementation of pharmacotherapy across the study and Drs Amsterdam, Zajecka, and Shelton supervised the implementation of pharmacotherapy at the respective sites. For more information about those involved in the trial, please see Hollon et al. (2014)

Role of funding source: This study was supported by grants MH60713 and MH01697 (K02) (Dr Hollon), MH60998 (Dr DeRubeis), and MH060768 (Jan Fawcett, MD and John Zajecka, MD) from the National Institute of Mental Health. Wyeth Pharmaceuticals provided venlafaxine, and Pfizer Inc provided sertraline for the trial. The funding sources had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

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Highlights

- Examined psychotherapy process variables in combined treatment for depression
- Higher adherence to behavioral methods/homework predicted lower dropout risk
- Higher therapeutic alliance also predicted lower dropout risk

Table 1

Patient Characteristics by Dropout Status.

	Dropouts M (SD) or %	Non-dropouts M (SD) or %
Intake HRSD	20.5 (4.8)	21.7 (4.4)
Number of Prior Episodes	4.2 (3.5)	5.2 (5.8)
Axis II Comorbid Diagnosis (%)	52	44
Female (%)	67	56
Age *	33.5 (10.4)	44.7 (13.0)
Non-White (%)	14	16
Married or Cohabiting (%) [†]	19	37

Note. Significance tests reflect whether dropouts and non-dropouts differ in percentage or mean value. For dropouts, $n = 21$. For non-dropouts, $n = 155$. HRSD = Hamilton Rating for Depression Scale.

*
 $p < .05$.

[†]
 $p < .10$.

Table 2

Means, Standard Deviations, and Correlations for Process Ratings, with Demographic Covariates.

Variable	1.	2.	3.	4.	5.	6.
1. Cognitive Methods	--					
2. Negotiating/Structuring	.31*	--				
3. Behavioral Methods/Homework	-.09	.05	--			
4. Therapeutic Alliance	.29*	.29*	.16*	--		
5. Age	-.23*	-.15*	.27*	-.08	--	
6. Married or Cohabiting	-.01	.06	.07	.16*	.19*	--
Mean	1.19	2.89	1.40	49.09	43.32	--
SD	0.52	0.41	0.61	5.33	13.16	--

Note. Means reflect average variable scores prior to standardization. Relations with cohabitation status reflect point-biserial correlations.

* $p < .05$.

Table 3

Predictors of Risk of Dropout.

Predictors and Covariates	Estimate	SE	Hazard Ratio	95% CI
Focal Predictors				
Cognitive Methods	.07	.27	1.07	0.62, 1.85
Negotiating/Structuring *	.58	.24	1.79	1.11, 2.88
Behavioral Methods/Homework *	-.84	.42	0.43	0.19, 0.99
Alliance (Total) *	-.61	.28	0.54	0.34, 0.94
Covariates				
Residualized BDI-II Change	.28	.22	1.32	0.47, 3.76
Medication Covariate *	-.21	.08	0.81	0.69, 0.95
Age **	-.06	.02	0.94	0.90, 0.99
Married or Cohabiting	-.64	.53	0.53	0.18, 1.52

Note. All covariates and predictors were entered simultaneously in the model described in our Analytic Strategy section. Predictors (except age) were standardized for ease of interpretation. For all models, $n = 176$.

* $p < .05$,

** $p < .01$.