# Unique and Common Mechanisms of Change across Cognitive and Dynamic Psychotherapies

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## Abstract

The goal of this paper was to examine theoretically important mechanisms of change in psychotherapy outcome across different types of treatment. Specifically, the role of gains in self-understanding, acquisition of compensatory skills, and improvements in views of the self were examined. The University of Pennsylvania Center for Psychotherapy Research database that includes studies conducted from 1995 to 2002 evaluating the efficacy of cognitive and psychodynamic therapies for a variety of disorders was used. Patient samples included major depressive disorder, generalized anxiety disorder, panic disorder, borderline personality disorder, and adolescent anxiety disorders. A common assessment battery of mechanism and outcome measures was given at treatment intake, termination, and 6-month follow-up for all 184 patients. Improvements in self-understanding, compensatory skills, and views of the self were all associated with symptom change across the diverse psychotherapies. Changes in self-understanding and compensatory skills across treatment were predictive of follow-up symptom course. Changes in self-understanding demonstrated specificity of change to dynamic psychotherapy.

The major models of psychotherapy propose specific mechanisms of change responsible for the effects of the treatment packages. Despite these well-articulated models of psychotherapeutic change within the psychotherapeutic treatments widely practiced today, there are few empirical studies demonstrating clearly that the proposed mechanisms actually account for the effects of treatment. Further, there is very little evidence that effective mechanisms of psychotherapeutic change are unique to specific treatment modalities rather than common to diverse psychotherapeutic approaches and techniques aiming to achieve symptom reduction.

As the field moves toward identifying empirically supported treatments for mental disorders, it is important to not only identify specific treatment packages that are effective for specific disorders, but also validate the theoretically relevant mechanisms of change of these efficacious treatments. Although knowledge of which therapeutic packages are most effective in the treatment of specific disorders is important for making decisions about the best treatment choice today, a better understanding of the important mechanisms of therapeutic change provides the best opportunity for further improving the effects of treatments currently available.

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Our goal was to concurrently examine a set of mechanisms proposed as important mechanisms of change within a pooled dataset comprising a range of therapeutic modalities, including cognitive therapies, dynamic psychotherapies, and other supportive control psychotherapies. We were interested in validating the role of each mechanism within specific treatment modalities and, furthermore, in examining whether these mechanisms were unique or common to diverse psychotherapies. We selected three mechanisms of change, including self-understanding of interpersonal patterns to represent the mechanism of change espoused by dynamic models of psychotherapy, compensatory skills (or coping skills) to represent one of the major mechanisms of change described in cognitive models of psychotherapy, and views of the self to represent a mechanism of change common across diverse psychotherapeutic models.

We examined changes in self-understanding of impairing relationship conflicts to represent a mechanism of change central to modern, short-term models of dynamic psychotherapy (Luborsky, 1984; Strupp & Binder, 1984). This construct has been referenced in the theoretical and research literatures as both insight (Luborsky, 1962; Strupp & Binder, 1984) and self-understanding (Connolly et al., 1999; Crits-Christoph, 1984). Most models of brief dynamic psychotherapy share this emphasis on acquiring understanding of the repetitive maladaptive relationship patterns that contribute to symptomatology (Messer & Warren, 1995).

Despite the centrality of changes in self-understanding in theories of change in dynamic models of psychotherapy, relatively little research has validated this important mechanism of change. A review of the research literature (Connolly Gibbons, Crits-Christoph, Barber, & Schamberger, 2007) found that few empirical studies had adequately defined and/or operationalized the construct. However, studies have demonstrated that self-understanding changes significantly more in dynamic psychotherapy compared to other treatment modalities (Connolly et al., 1999) and that change in self-understanding across treatment predicts symptom course (Hoglend, Engelstad, Sorbye, Heyerdahl, & Amlo, 1994; Kivlighan, Multon, & Patton, 2000; Vargas, 1954).

In an analysis of possible mechanisms of change in cognitive therapy, Barber and DeRubeis (1989) reviewed three theoretical possibilities. The accommodation model presumes that cognitive therapy has an effect by changing core beliefs and cognitive processes, although to date, there are only preliminary findings in support of this model. Oei and Sullivan (1999) found that recovered members of a cognitive therapy group for depression experienced fewer depressive thoughts than non-recovered members. Wenzel, Chapman, Newman, Beck, and Brown (2006) determined that patients with borderline personality experienced a reduction in dysfunctional thinking and lower levels of hopelessness after receiving treatment in an open trial of cognitive therapy for borderline personality disorder (BPD). Some support has also been found for cognitive mediation in studies of cognitive therapy for panic disorder (Hofmann et al., 2007) and social phobia (Smits, Rosenfield, McDonald, & Telch, 2006). However in other research, although changes in cognition were found among patients treated with cognitive therapy, they did not predict changes in depressive symptoms (Jarrett, Vittengl, Doyle, & Clark, 2007).

Alternatively, the activation-deactivation model proposes that cognitive therapy leads to a deactivation of depressotypic schemas and the reactivation of previous benign schemas or cognitive processes, rather than changing core beliefs and cognitive processes directly. Although the findings discussed above indicate the role of cognition change in cognitive therapy, studies designed to determine whether cognitive change is specific to CT for depression, compared to other treatments, have produced null or mixed results (Kolko, Brent, Baugher, Bridge, & Birmaher, 2000; Whisman, Miller, Norman, & Keitner, 1991). Thus, to

date, there is little evidence that the changing of cognition or core beliefs or the reactivation of benign schemas are unique mechanisms of change in cognitive therapy.

Barber and DeRubeis (1989, 2001) propose that the central mechanism of therapeutic change in cognitive therapy is instead the acquisition of compensatory or cognitive coping skills to deal with distressing events and thoughts. Compensatory skills that are emphasized in cognitive therapy include the generation of initial explanations and then alternative explanations for negative events and thoughts as well as the creation of concrete problem-solving plans to resolve difficult situations. Wenzel and colleagues (2006) also suggest that cognitive therapy may also teach individuals to more thoughtfully select appropriate behavioral responses and develop problem solving skills. There is some evidence that an increase in these compensatory skills is an important mechanism of change in cognitive therapy. Barber and DeRubeis (2001) found that after 12 weeks of cognitive therapy, patients employed compensatory skills more skillfully. Similarly, Seligman and colleagues (1988) found evidence that changes in explanatory style may be a mechanism of change in cognitive therapy. Relapse prevention has also been shown to be mediated by changes in absolutist, dichotomous thinking styles (Teasdale et al., 2001), suggesting that those patients who learn to shift from automatic modes of processing depressive information to a more controlled mode are less likely to experience subsequent depressive episodes. These findings suggest a potentially critical role for the development of compensatory skills in cognitive therapy for depression, although it has not been determined whether effects are specific to CT.

Finally, we examined change in views of the self as an important mediator of change common to diverse psychotherapies. Conceptions of the self and associated emotions have occupied a central theoretical role in the psychodynamic literature (Sullivan, 1953). In cognitive models of change (Beck, 1967), a negative view of the self is described as part of the negative triad of depression. Though the patient's view of the self has been described as an important aspect of personality, psychopathology, and theories of psychotherapy, little research has addressed the issue of whether improvements in such views of the self are associated with greater benefits from psychotherapy. Research has, however, linked views of the self to psychopathology. For example, Higgins (1987) demonstrated that a discrepancy between how one actually sees oneself compared to his or her ideal self-image is uniquely associated with dejection related emotions (i.e., sadness and hopelessness), whereas a discrepancy between actual self-image and how one ought to be is uniquely associated with agitation related emotions, (i.e., anxiety and tension). Strauman (1989) found that patients with depressive symptoms manifested a greater magnitude of chronic self-discrepancy between actual and ideal self images, whereas patients with social phobia manifested greater self-discrepancies between actual self-image and the image of who one ought to be. In a further study, Strauman et al. (2001) found that three psychotherapy treatments were all associated with decreased self-discrepancy but did not examine whether change in self-discrepancy covaried with symptom course.

We explored these three theory-driven mechanisms of change concurrently across the cognitive and dynamic psychotherapies by first examining whether each mechanism changed significantly across treatment and whether the changes were specific to the models of psychotherapy from which each mechanism was derived. Next, we examined whether change in each mechanism predicted change in symptoms across cognitive, dynamic, and other psychotherapies. To unravel the temporal course of change in mechanism variables and outcome variables, we further examined whether change in the mechanism variables predicted follow-up symptom course, controlling for change in symptoms across the treatment. We hypothesized that self-understanding would change significantly more in the dynamic psychotherapies examined compared to the cognitive therapy conditions, whereas compensatory skills would change significantly more in the cognitive treatments compared to the dynamic psychotherapies. Additionally, we hypothesized that significant changes in self-

concept would occur across both cognitive and dynamic treatments. We hypothesized that the degree of change on each of the three mechanisms examined would predict within treatment symptom course as well as follow-up symptom course across all of the psychotherapies examined. Finally, we hypothesized that each of these mechanisms of change would remain a significant predictor of symptom reduction when controlling for the other mechanisms examined.

## Method

This study used a pooled study database collected at the University of Pennsylvania Center for Psychotherapy Research to examine mechanisms of treatment outcome across a broad patient population. Within the University of Pennsylvania Center for Psychotherapy Research, multiple investigators conducted psychotherapy research studies using a standardized battery of assessments. Because the assessments and methods were common across studies, we aggregated the data to explore mechanisms of outcome in a heterogeneous patient sample across diverse psychotherapies.

### Participants

**Patients**—A total of 411 patients underwent a baseline evaluation at the University of Pennsylvania Center for Psychotherapy Research. Of these patients, 184 were entered into one of five psychotherapy trials described below. Across the pilot studies, 138 patients began treatment, completed the outcome assessment, and completed at least one mechanism measurement at treatment termination. Further details of recruitment procedures and reasons for exclusion are provided in the manuscripts detailing outcomes for each pilot study described below. Diagnoses included generalized anxiety disorder (GAD), adolescent generalized or separation anxiety disorder, panic disorder, major depressive disorder (MDD), and borderline personality disorder (BPD). All patients, or parents/guardians where appropriate, read and signed informed consent documentation, and the study was conducted in compliance with the University of Pennsylvania Institutional Review Board.

**Psychotherapy Studies**—Each of the five trials used in this pooled database examined treatment for a specific psychiatric disorder.

1. *Alliance-Fostering Therapy for MDD*: The first trial included 50 patients with a diagnosis of major depressive disorder treated across three study phases. In Phase I, therapists provided 16 sessions of treatment as usual. During Phase II, therapists provided 16 sessions of psychotherapy while being trained in alliance-fostering psychotherapy. During Phase III, therapists provided 16 sessions of alliance-fostering psychotherapy. Detailed methods and results of this study can be found in Crits-Christoph et al. (2006).

2. *Schema-Focused Cognitive Therapy for Borderline Personality Disorder*: In this study, 34 patients with a primary diagnosis of BPD received 1 year of a version of cognitive therapy tailored to BPD. Full results are described in Brown, Newman, Charlesworth, Crits-Christoph, and Beck (2004).

3. *Relationship Focused Therapy versus Cognitive Therapy for Panic Disorder*: In this study, therapists were trained in either modified relationship focused psychotherapy or cognitive therapy for panic disorder. Thirty-three patients were randomized to 16 sessions of relationship focused therapy, cognitive therapy, or a waitlist condition (Connolly Gibbons, Crits-Christoph, Hearon, & Worley, 2006).

4. *Compensatory Skills Therapy plus Family Therapy for Adolescent Anxiety*: A total of 21 adolescents suffering from GAD or separation anxiety disorder were randomized

to 16 sessions of cognitive therapy or 16–18 sessions of combined cognitive therapy and family therapy.

5. *Supportive-Expressive Therapy versus Supportive Therapy for Generalized Anxiety Disorder*: Forty-six patients participated in this study. Following a training phase, patients were randomized to either 16 sessions of supportive-expressive dynamic psychotherapy or 16 sessions of supportive therapy. Detailed results can be found in Crits-Christoph, Connolly Gibbons, Narducci, Schamberger, and Gallop (2005).

**Therapists—**Thirty therapists were recruited from either the pool of staff therapists at the University of Pennsylvania Center for Psychotherapy Research or from the community. Therapists were recruited for each of the five trials based on their expertise and orientation. Participation in more than one trial was not prohibited in this protocol. Seventy-three percent of the therapists were female and 100% were Caucasian. Twenty-three therapists had PhDs, two had PsyDs., two had MDs., and three had master's degrees. Therapists had between 1 and 27 years of post degree clinical experience and 37% had at least 10 years of clinical experience. All therapists received 1 hour of supervision for every 2 hours of therapy provided during these pilot investigations. Supervisors were all highly experienced doctoral-level clinical psychologists engaged in full- or part-time clinical practice.

### Treatment

The treatment conditions across pilot studies were classified into three categories for the purpose of data analysis for the current article. Supportive-expressive dynamic psychotherapy for GAD, the relationship focused psychotherapy for panic disorder, and the alliance-fostering psychotherapy for MDD were all classified as interpersonal/dynamic. Cognitive therapies included the cognitive therapy for panic disorder, the cognitive therapy for BPD, and cognitive therapy and cognitive therapy plus family therapy treatments in the adolescent GAD/separation anxiety disorder study. Finally, the "other" psychotherapy condition included the treatment as usual provided in the training phase of the alliance-fostering study of MDD and the supportive therapy provided to GAD patients.

All treatments implemented in the cognitive therapy conditions followed manuals specific to the diagnostic group. The cognitive therapy for panic disorder followed the guidelines for focused cognitive therapy for panic disorder (Beck, 1992) and the manual for cognitive therapy of anxiety disorders (Beck & Emery, 1985). The schema focused cognitive therapy for BPD followed the manual by Brown and Newman (1999). The cognitive therapy for adolescent anxiety disorders followed a manual for cognitive behavioral compensatory skills individual treatment (Siqueland & Diamond, 2000).

All treatments in the dynamic psychotherapy condition followed specific treatment manuals. The supportive-expressive therapy for panic disorder was a modification of supportive-expressive dynamic psychotherapy (Luborsky, 1984) which included a brief psycho-educational component. The alliance-fostering psychotherapy for MDD followed the manual provided by P. Crits-Christoph and K. Crits-Christoph (1998), which incorporated elements of the supportive-expressive dynamic psychotherapy model (Luborsky, 1984) with other specific techniques for enhancing the therapeutic alliance. The supportive-expressive psychotherapy for GAD followed the manual for supportive-expressive psychotherapy (Luborsky, 1984) supplemented with a manual specific to GAD (Crits-Christoph, Crits-Christoph, Wolf-Palacio, Fichter, & Rudick, 1995).

The treatment provided in the supportive psychotherapy condition also followed a specific treatment manual (Borkovec & Costello, 1993; Borkovec & Matthews, 1988) that was focused

on creating an empathic, nonjudgemental, and accepting therapeutic environment. Therapeutic techniques were designed to focus the patient's attention on emotions.

## Outcome Measures

All outcome measures were part of a core battery of measures completed by patients in all pilot studies at treatment intake, termination, and follow-up 6 months after termination. For all studies, the termination was at 4 months, with the exception of the BPD study, for which the termination assessment was at 1 year, regardless of whether or not the patient dropped out of therapy earlier. We attempted to complete assessments on all patients assigned to treatment regardless of whether they completed the treatment.

**Hamilton Anxiety Rating Scale(HAMA; Hamilton, 1959)**—The HAMA is a 14-item inventory which assesses the severity of typical anxiety symptoms. It was administered using a structured interview guide (Bruss, Gruenberg, Goldstein, & Barber, 1994). Using the structured interview guide, Bruss et al. reported good internal consistency for the total score (Cronbach's $\alpha$ = 79–.83) and good interjudge reliability for the test-retest assessments ($\rho_I$ = . 96 for the total score). In the current study at baseline ($N$ = 138), an internal consistency reliability (Cronbach's $\alpha$) of 0.73 was obtained.

**Hamilton Depression Rating Scale(HAMD; Hamilton, 1960)**—The HAMD is a widely-used inventory for evaluating the severity of common symptoms of depression. The 24-item version of the HAMD was completed by applying the structured interview guide to enhance reliability (Williams, 1988). Using the structured interview guide, Williams reported good interjudge reliability for a test-retest assessment of the 17-item score ($\rho_I$ = .81). In the current study at baseline ($N$ = 138), an internal consistency reliability (Cronbach's $\alpha$) of 0.70 was obtained.

**Beck Anxiety Inventory(BAI; Beck, Epstein, Brown, & Steer, 1988)**—The BAI is a 21-item self-report scale that surveys typical features of anxiety. Beck et al. (1988) demonstrated good internal consistency (Cronbach's $\alpha$ = .92), test-retest reliability (.75), and good discrimination of anxiety disorders from non anxiety disorders. In the current study at baseline ($N$ = 138), an internal consistency reliability (Cronbach's $\alpha$) of 0.91 was obtained.

**Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988)**—This self-report measure is a 21-item questionnaire that surveys common symptoms of depression on a 4-point scale focusing on cognitions. Beck, Steer, et al. (1988) demonstrated good internal consistency (mean Cronbach's $\alpha$ = .86 across several seven studies of psychiatric patients) as well as adequate construct validity with clinical ratings of depression (mean correlation between psychiatric patients =.72). In the current study at baseline ($N$ = 138), an internal consistency reliability (Cronbach's $\alpha$) of 0.92 was obtained.

**Quality of Life Inventory (QOLI; Frisch, 1992)**—The QOLI is a 16-item self-report measure which assesses overall life satisfaction. Items include satisfactions with work, love, friendships, money, health, neighborhood, creativity, learning, goals and values, helping, play, children, self-esteem, relatives, home, recreation, and community. Subjects rate the importance of each item on a 3-point scale and then rate how satisfied they are with the item on a scale that ranges from −3 to 3. The product of the importance and satisfaction ratings is computed for each item rated important or extremely important, and then a composite score across items for each subject is obtained. In the current study at baseline ($N$ = 138), an internal consistency reliability (Cronbach's $\alpha$) of 0.84 for the product of the importance and satisfaction ratings was obtained.

## Measures of Mechanism of Change

All measures of mechanism of change were also part of a core battery of measures completed by all patients included in the pilot studies at treatment intake, termination (4 months for most studies or 1-year for the BPD study), and follow-up (6 months after termination).

**Self-Understanding of Interpersonal Patterns Scale-Revised (SUIP-R)—**The original Self-Understanding of Interpersonal Patterns Scale (SUIP; Connolly et al., 1999) is a 19-item self-report inventory designed to capture patients' levels of self-understanding of their own unique impairing relationship conflicts. Each item represented an interpersonal pattern that an individual might experience in his/her relationships. Patients rated a 4-point self-understanding scale, ranging from mere recognition of a pattern in a single relationship experience to a deeper understanding of the historical origins of the pattern, only for the interpersonal patterns that represented their unique relationship experiences. The self-understanding score represented a patient's average level of self-understanding on his/her unique relationship patterns. The original SUIP demonstrated good internal consistency (Cronbach's $\alpha$ = .79 to .88), 1 month test-retest reliability ($r$ = .76), and good discriminant and convergent validity (Connolly et al., 1999). Additionally, the SUIP showed adequate construct validity by demonstrating significantly greater change across a dynamic psychotherapy for generalized anxiety disorder than across medication treatment despite similar symptom reduction in both treatment groups (Connolly et al., 1999). However, change in the SUIP did not significantly covary with change in symptoms across treatment.

A new version of this measure, the SUIP-R, was designed for the present investigation to address some of the limitations of the original measure. First, the number of items was expanded to 28 to better represent the breadth of relationship patterns that patients might experience. Further, the self-understanding scale was expanded to a 6-point scale that went beyond historical understanding of a pattern to higher levels of self-understanding, such as recognition of one's own role in a pattern and the ability to recognize patterns and consider alternatives when they are experienced. In a sample of 282 patients who completed this measure at the baseline of a psychotherapy study, including the patients in the current sample, the internal consistency was good (Cronbach's $\alpha$ = .92). In addition, results from a non-patient sample of 29 individuals demonstrated good internal consistency (Cronbach's $\alpha$ = .94). The SUIP-R also demonstrated good discriminant validity in the current sample, correlating less than .10 at baseline with measures of symptoms (BAI, BDI, HAMA, HAMD), interpersonal distress (Inventory of Interpersonal Problems [IIP]; Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988), and quality of life (QOLI).

**SELVES Questionnaire—**The SELVES Questionnaire (Higgins, 1987; Strauman, 1989; Strauman et al., 2001) is designed to assess an individual's view of oneself compared to one's ideal self-image and compared to the image that represents how they believe they ought to be. Patients were asked at each assessment point to provide six adjectives to describe themselves: as they actually are (actual/own), as others see them (actual/other), as they would ideally like to be (ideal/own), as others would ideally like them to be (ideal/other), as they ought to be (ought/own), and as others think they ought to be (ought/other). Two independent trained judges then compared each of the actual/own adjectives to each of the ideal/own, ideal/other, ought/own, ought/other ratings for each patient. For each comparison, the rater decided whether the adjectives were a match (synonyms based on *Roget's Thesaurus*; 1988, Expanded Edition), a mismatch (antonyms based on *Roget's Thesaurus*), or a nonmatch. Two final scores were calculated representing each patient's discrepancy between who they actually are and who they would ideally like to be (actual/ideal) and the discrepancy between who they actually are and who they ought to be (actual/ought). For the current sample of 123 patients rated at baseline,

the interjudge reliability for both the actual/ideal ($ICC$(2,2) = .85) and actual/ought ($ICC$(2,2) = .85) self-discrepancy scores was good.

**Ways of Responding Questionnaire (WOR; Barber & DeRubeis, 1992)—**The WOR was developed to evaluate the compensatory skills model of cognitive therapy, which postulates that patients improve because they acquire new skills in psychotherapy that they use to curtail the effects of their negative thoughts. The measure originally consisted of eight different stressful scenarios presented to patients along with an initial depressotypic automatic thought. Patients were asked to state their feelings, thoughts and possible reactions to the given scenario. Each response was then rated by independent judges for the presence of a list of possible positive and negative compensatory skills. For the current project, six scenarios were presented to patients and subsequently scored by a set of trained independent judges. The WOR positive scale represents the frequency of the kinds of responses that would be encouraged by cognitive therapists, whereas the WOR negative scale represents the frequency of depressotypic responses. The WOR total score implemented in the current project consists of the WOR positive score minus the WOR negative score. In the current sample of 144 subjects who completed the WOR at treatment baseline, the interjudge reliability was good ($ICC$(2,2) = .88) and the internal consistency across the 6 scenarios was good (Cronbach's $\alpha$ = .75).

### Procedures

Patients were recruited for each study through departmental referrals and newspaper advertisements. Upon first contacting the clinic, patients underwent a structured telephone interview. Those who did not appear to meet any of the exclusion criteria were scheduled for an initial evaluation. The initial evaluation consisted of a diagnostic interview using the Structured Clinical Interview for Axis I DSM-IV disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997) and Axis II disorders (SCID-II; First, Spitzer, Gibbon, Williams, & Benjamin, 1994) as well as the measures listed above. The BAI and BDI were collected at every treatment session and also at the major assessment points (intake, termination, 6-month follow-up). The HAMA and HAMD were administered at intake, termination, and 6-month follow-up. The HAMA and HAMD interviews, as well as the diagnostic assessments, were conducted by trained interviewers who were unaware of the type of treatment the patient had received.

### Data Analysis Plan

Four mechanism measures were examined (SUIP-R, WOR, actual/ideal self-discrepancy scale, actual/ought self-discrepancy scale) in relation to five measures of outcome (HAMD, BDI, HAMA, BAI, QOLI). Treatment and study were included as covariates in all predictive analyses presented below. Treatment was a three-level categorical variable (dynamic psychotherapy, cognitive therapy, other therapies). Study had five categories. All analyses were conducted on a modified intent-to-treat sample, (i.e., the sample included all patients who had an assessment at the respective time point evaluated, regardless of the number of treatment sessions attended). Sample sizes vary per analysis based on variations in missing data across the different assessment measures.

In preparation for the primary predictive analyses, we first evaluated whether any of the demographic variables predicted change in outcome. We conducted six multiple regressions predicting each symptom measure at termination from the six demographic variables, controlling for the symptom level at intake, the treatment group, and the study. Each demographic variable was included as a dichotomous variable: education was coded as a college degree or post-baccalaureate education versus less than college; marital status included married or cohabitating versus not; race was coded as white versus minority; employment included full-time employment versus not employed full-time; age was based on a median split including subjects greater than 35 versus those less than or equal to 35; and gender included

male versus female. We evaluated the significance of the partial eta for each demographic variable representing the effect size of the relation between the demographic variable and change in symptoms, partialling out variance due to differences between treatments and studies. Significant demographic predictors of any of the mechanism variables were retained as covariates in the analyses of the relation between change in each of the mechanism variables and outcome.

An additional preliminary analysis examined the degree of change of the mechanism variables from intake to termination. Overall change from intake to termination was evaluated with paired $t$ tests. Pre-post effect sizes were calculated with Cohen's $d$ (mean of post scores minus pre scores, divided by the standard deviation of the change scores). Differential change on the mechanism variables across the cognitive and dynamic treatment groups was tested using analyses of covariance (ANCOVA), with termination scores on each mechanism variable as the dependent variable, treatment group (dynamic, cognitive) as the independent variable, and study, baseline scores on the mechanism variable, and any significant demographic predictors as covariates. For analyses of change in the mechanism variables, we included only the dynamic and cognitive therapy conditions to test the theoretically relevant mechanism changes described in our hypotheses.

Since we attempted to assess outcome on all patients whether or not they completed all treatment sessions, a differential dropout from treatment could bias the outcome assessment for pilot studies with greater dropout rates. We used the pattern-mixture approach (Hedeker & Gibbons, 1997) to determine if differential dropout across pilot studies had a substantive influence on the results. We defined treatment completion as attendance at greater than or equal to 75% of sessions (12 sessions for the 16-session interventions and 40 sessions for the year-long treatment). To determine if the treatment effects examined in the analyses described above were dependent on completion status, a two-way interaction of completion status and treatment group was included in our outcome analyses. A significant finding for this two-way interaction would suggest that the treatment group comparison was dependent on completion status; a non-significant finding would indicate that the treatment group comparison was not biased by completion status.

The primary analyses of the mechanism variables in relation to outcome were conducted with a series of multiple regressions. Each regression analysis used residual change (from intake to termination) in the outcome measure as the dependent variable. Predictor variables included residual change (from intake to termination) of the mechanism variable, treatment group (dynamic, cognitive, other), study, and demographic factors (those that were significant in preliminary analyses). Additional analyses examined interactions between both treatment and study and residual change on the mechanism variable in relation to residual change on the outcome variable.

We also evaluated the temporal relation between change in mechanism variables and change in outcome variables by conducting multiple regressions predicting change in outcome variables from termination to 6-month follow-up from change in mechanism variables from intake to termination, controlling for change in the outcome variable from intake to termination, treatment, study, and demographic factors. Additional analyses examined the interactions between treatment and residual change in the mechanism variable, and between study and residual change in the mechanism variable, in these temporal analyses.

Although we examined the interactions between study and each of the mechanisms of change in the prediction of outcome in the analyses, the pooled database did not have high statistical power to detect these interactions. For this reason, we also conducted sensitivity analyses to

examine whether the size of the main effects varied when each study was successively excluded from the analysis.

## Results

### Sample Demographics

Of the 138 patients who began treatment in one of the pilot studies and completed the outcome assessment plus at least one mechanism measurement at treatment termination, the average age was 37.5 (*SD*=13.1), 66% were female, and 83% were Caucasian. Nineteen percent of the sample were high school graduates, whereas 65% had completed college. Thirty-seven percent were married or cohabitating, and 50% were employed full-time.

There was differential dropout across the pilot studies. Of the 138 patients in the current modified intent-to-treat sample, including patients with at least one outcome assessment and one assessment of a mediator variable, 95.5% of patients in the alliance-fostering study of major depressive disorder, 41.2% of patients in the study of cognitive therapy for borderline personality disorder, 92% of patients in the study of panic disorder, 42.9% of patients in the study of cognitive therapy for adolescent anxiety, and 97.4% of patients in the study of generalized anxiety disorder met criteria for treatment completion defined as attendance at seventy-five percent or more of the treatment sessions.

Preliminary analyses examining demographic factors revealed that age was significantly predictive of change on the BDI ($\eta = .20$, $p = .029$), HAMD ($\eta = .21$, $p = .016$), and HAMA ($\eta = .27$, $p = .002$). In addition, education significantly predicted change on the BDI ($\eta = .23$, $p = .010$), as did marital status ($\eta = .27$, $p = .003$), gender ($\eta = .20$, $p = .029$), and employment status($\eta = .19$, $p = .042$). Based on these results, we used marital status, education, gender, and employment status as control variables. Although age also significantly predicted change in outcome, it was not included as a covariate in the analyses of change in the mechanism variables because it was highly confounded with the study variable (one study was restricted to adolescents). Instead, the effects of age on change in the mechanism variables were examined in separate analyses.

### Correlations among the Variables at Baseline

At baseline, the SUIP-R was significantly correlated with the WOR ($r(141) = .17$, $p = .041$) but was not correlated with the actual/ideal self-discrepancy ($r(120) = .05$, $p = .567$) or the actual/ought self-discrepancy ($r(120) = .01$, $p = .884$). The WOR was significantly correlated with the actual/ideal self-discrepancy ($r(114) = -.21$, $p = .023$), but was not significantly correlated with the actual/ought self-discrepancy ($r(114) = -.14$, $p = .140$). Actual/ideal and actual/ought self-discrepancies were highly correlated with each other at treatment baseline ($r(121) = .37$, $p < .001$).

Residual change in the SUIP-R was not significantly correlated with change in the WOR ($r(113) = .10$, $p = .273$), change in the actual/ideal self-discrepancy ($r(100) = .13$, $p = .200$), or change in the actual/ought self-discrepancy ($r(100) = .08$, $p = .422$). Residual change on the WOR was not significantly correlated with change in the actual/ideal self-discrepancy ($r(96) = -.07$, $p = .506$) and change in the actual/ought self-discrepancy ($r(100) = -.09$, $p = .400$). Residual change from intake to termination in actual/ideal and actual/ought self-discrepancies were highly correlated ($r(110) = .65$, $p < .001$).

### Changes in Symptoms across Treatments

We conducted multiple regressions to examine whether treatment groups changed differentially across treatments on each of the symptom measures. Each regression predicted

termination symptoms from treatment group, controlling for baseline symptoms, study, and baseline demographics. There were no significant differences across the treatment conditions regarding change on the BDI ($F(2,132) = 1.52$, $p= .222$), BAI ($F(2,132) = 2.48$, $p= .088$), HAMD ($F(2,136) = 2.07$, $p= .131$), HAMA ($F(2,136) = 1.53$, $p= .221$), or QOL ($F(2,130) = 1.13$, $p= .326$).

## Changes in Mechanism Variables from Intake to Termination

*T* tests revealed statistically significant improvement in use of compensatory skills across cognitive and dynamic psychotherapies as measured by the WOR ($t(=83) = 4.29$, $p = .001$, $d = .47$) and a significant decrease in the actual/ideal self-discrepancy as measured by the SELVES Questionnaire ($t(73) = −3.69$, $p = .001$, $d = .43$). There were no significant changes in self-understanding across the sample from treatment intake to termination as measured by the SUIP-R ($t(90) = 1.79$, $p = .077$, $d = .19$) and no significant improvement in the actual/ought self-discrepancy measure across treatment for the sample ($t(73) = −0.08$, $p = .934$, $d = .01$). To further understand the changes in compensatory skills across treatment, we explored changes in the WOR positive subscale, which measures acquisition of positive compensatory skills, and the WOR negative subscale, which represents a decrease in the use of negative behaviors. There was significant change on the WOR negative scale ($t(83)= −5.45$, $p = .001$, $d = .59$) but no significant change overall on the WOR positive scale ($t(83)= 0.79$, $p =.433$, $d = .09$) across the pooled database, indicating that the changes in compensatory skills evident in this sample were driven more by a decrease in negative behaviors than by acquisition of new, more adaptive behaviors.

To examine differential changes in the mechanism variables across the cognitive and dynamic treatment categories, ANCOVAs were conducted, as previously described. The results of the ANCOVAs revealed that only change in self-understanding was specific to dynamic psychotherapy. There was significantly greater improvement in self-understanding in the dynamic psychotherapy group compared to the cognitive therapy group from intake to termination of treatment ($F(1,89) = 4.01$, $p =.049$; see Table 1). There were no significant differences between the cognitive and dynamic treatments in change in compensatory skills or self-discrepancy measures. Since there was differential dropout from treatment across pilot studies, we examined post hoc pattern mixture models to test whether treatment effects were differential across completer status. We repeated each of the ANCOVAs described above including both completer status and the interaction between treatment and completer status in the model. There were no significant interactions between completer status and treatment in the prediction of change on the SUIP ($F(1,89) = 0.89$, $p = .348$), WOR ($F(1,83) = 0.05$, $p = .833$), actual/ideal self-discrepancy ($F(1,73) = 0.03$, $p = .873$), or actual/ought self-discrepancy ($F(1,73) = 0.09$, $p = .766$).

Because age and treatment group were both significantly related to change in self-understanding, and because age and treatment/study were confounded (one study involved adolescents and only cognitive therapy), we examined change in self-understanding across treatment for each study separately. We found that self-understanding improved from intake to termination in the studies of alliance-fostering psychotherapy for MDD and dynamic psychotherapy for generalized anxiety disorder. Self-understanding actually decreased from intake to termination (indicating less insight at post-treatment) in the study of adolescent anxiety. The study on cognitive therapy for BPD showed no overall change in self-understanding across treatment.

The study of panic disorder provided the best opportunity to examine the role of change in self-understanding across treatments without age as a confounding variable. In this study, all patients were adults, and patients were randomly assigned to either cognitive therapy or dynamic therapy. Consistent with the results in the pooled database, patients in dynamic

therapy showed relative improvement in self-understanding ($d = .15$), whereas patients in cognitive therapy showed a small decrease in self-understanding of interpersonal patterns across treatment ($d = -.06$). Taken together, these within-study results suggest that age, although a significant predictor of change in self-understanding and confounded with treatment, is not solely responsible for the differential treatment effects of self-understanding found in the overall pooled study database.

### Relation of Change in Mechanisms to Treatment Symptom Course

Results of the ANCOVA main effects for change in the mechanism variable from intake to termination predicting change in the outcome measure from intake to termination are presented in Table 2. Improvements in self-understanding across treatment were significantly predictive of change in depression, as measured by both the BDI and the HAMD, as well as changes in quality of life. Improvements in compensatory skills across treatment significantly predicted improvements across all five measures of outcome. There were no significant interactions between study or treatment and residual change in self-understanding in the prediction of outcome. There were no significant interactions between study or treatment and residual change in compensatory skills in the prediction of outcome.

Reductions in the degree of actual/ought self-discrepancy were associated with improvements in symptoms of anxiety, as measured by the HAMA, and improvements in quality of life, as measured by the QOLI (see Table 2). There was also a significant interaction between treatment and residual change in the actual/ought self-discrepancy in predicting change on the HAMD across treatment ($F(2,89) = 3.19$, $p = .046$). Pairwise contrasts between the treatment groups showed that there was a significantly greater relationship between change in the actual/ought self-discrepancy and change on the HAMD in the "other" treatment condition compared to the dynamic psychotherapy group ($t(89) = -2.53$, $p = .013$). For the dynamic psychotherapy group, for every point decrease in the actual/ought self-discrepancy there was a .35 point decrease in the HAMD, whereas for the "other" psychotherapy condition, there was a 3.6 point decrease in the HAMD for every point decrease in the actual/ought self-discrepancy.

Reductions in the degree of actual/ideal self-discrepancy were significantly associated with improvements in symptoms of anxiety as measured by the BAI and improvements in quality of life (see Table 2). There were no significant interactions between treatment and change in the actual/ideal self-discrepancy in relation to outcome. There were no significant interactions between study and change in the actual/ideal self-discrepancy in relation to outcome.

### Relation of Change in Mechanisms to Follow-up Symptom Course

Improvements in self-understanding across treatment were significantly predictive of improvement in symptoms of anxiety (BAI) from termination to follow-up, controlling for change on these symptom measures from intake to termination (see Table 3). Similarly, improvements in compensatory skills were significantly associated with improvements in symptoms of anxiety (BAI) from termination to follow-up. There were no significant interactions between treatment or study and residual change in self-understanding or compensatory skills in the prediction of change in the outcome measures from termination to follow-up.

There were no significant main effects for changes in actual/ought or actual/ideal self-discrepancies from intake to termination predicting change in outcome from termination to follow-up (see Table 3). There were, however, significant interactions between treatment and residual change in the actual/ideal self-discrepancy from intake to termination in predicting change on the BDI and QOLI from termination to follow-up (all $p$ values < .05). In analyses of change on the BDI from termination to follow-up, pairwise contrasts revealed that the

dynamic psychotherapy condition was significantly different from the "other" psychotherapy condition ($p = .006$). Increases in the actual/ideal self-discrepancy from intake to termination were associated with relative increases in symptoms from termination to follow-up for the dynamic psychotherapy group (and to a lesser extent in the cognitive therapy group) but were associated with improvements in symptoms from termination to follow-up for the "other" psychotherapy condition. Similarly, pairwise contrasts revealed that the dynamic psychotherapy condition was significantly ($p = .013$) different from the "other" psychotherapy condition regarding the relation of change in actual/ideal self-discrepancy and change in QOLI across follow-up. Increases in the actual/ideal self-discrepancy from intake to termination were associated with improvements in QOLI from termination to follow-up for the "other" psychotherapies condition but little change in QOLI in the dynamic psychotherapy condition. In the "other" psychotherapy condition, there was a 1.02 point increase in QOLI for every point increase in the actual/ideal self-discrepancy, but only a 0.10 point increase in the dynamic psychotherapy condition.

There was also a significant interaction between study and the actual/ideal self-discrepancy in the relation to change on the QOLI from termination to follow-up. Pairwise comparisons showed that the study of alliance-fostering psychotherapy for depression was significantly different from the studies of borderline personality disorder, panic disorder, and adolescent anxiety ($p = .026$, $p = .031$, and $p = .003$, respectively). In the study of alliance-fostering psychotherapy for depression, changes in the actual/ideal self-discrepancy across treatment were not predictive of changes in QOLI from termination to follow-up. However, in the other studies, increases in the actual/ideal self-discrepancy from intake to termination were associated with increases in quality of life from termination to follow-up.

## Unique Contribution of Mechanism Variables in Relation to Outcome

Because changes in self-understanding, compensatory skills, and self-concept were all significantly related to changes in outcome measures, we conducted multiple regressions to examine the unique contribution of each of these mechanism variables controlling for the other mechanism variables. For each regression, the outcome measure at termination was the dependent variable. Predictor variables included intake levels of the outcome variable, residual change from intake to termination on each of the mechanism variables, treatment, study, marital status, education, gender, and age. As change from intake to termination in actual/ideal and actual/ought self-discrepancies were highly correlated ($r(110) = .65$, $p < .001$), we included only change in actual/ideal self-discrepancy to represent change in self-concept, as this variable was most sensitive to change across treatment.

Once change in compensatory skills and change in self-concept, as measured by the actual/ideal self-discrepancy, were controlled, change in self-understanding from intake to termination was not significantly related to change on any of the outcome measures (all $p$'s > .100). However, change on the WOR remained significantly related to change on the BDI ($F(1,88) = 6.70$, $p = .012$) and QOLI ($F(1,87) = 7.50$, $p = .016$) once change on the SUIP-R and change in actual/ideal self-discrepancy were controlled. Change in actual/ideal self-discrepancy remained significantly related to change on the BAI ($F(1,88) = 4.75$, $p = .033$), HAMA ($F(1,89) = 5.12$, $p = .027$), and QOLI ($F(1,87) = 7.49$, $p = .003$), once change on the other mechanism variables was controlled.

Both the SUIP-R and the WOR individually predicted residual change on the HAMD across treatment, yet none of the mechanism variables significantly predicted change on the HAMD when controlling for the other predictors (all $p$s > .108). Thus, we conducted further analyses to sort out the extent to which the overlap among the mechanism variables, or the unique variance of each, was related to outcome. When the SUIP-R was the only predictor in the model, the eta was .24 for prediction of change on the HAMD, but the eta dropped to only .07

when change in the WOR was included in the model, .19 when change in the actual/ideal self-discrepancy was included in the model, and .15 when both the WOR and actual/ideal self-discrepancy were included. When the WOR was the only predictor in the model, the eta was .33 for the prediction of change on the HAMD and dropped somewhat when the SUIP-R ($\eta$ = .21), actual/ideal self-discrepancy ($\eta$ = .21), and both the SUIP-R and actual/ideal self-discrepancy ($\eta$ = .19) were included in the prediction model. To further quantify the unique contribution of the three predictors above, we derived semi-part correlation coefficients for each predictor with the HAMD. Semi-part correlation coefficients portray the unique predictive effect for each predictor, whereas semi-partial correlation coefficients portray the incremental predictive effect of each predictor (Hair, Anderson, Tatham, & Black, 1995). Semi-part correlation coefficients were .12, −.11, and −.14 for actual/ideal discrepancy, SUIP-R, and WOR, respectively.

### Sensitivity Analysis

Sensitivity analyses examining the relation of change in mechanism variables from intake to termination in relation to change in outcome from intake to termination revealed that the results presented in Table 2 were largely maintained (in terms of effect sizes) when any one of the individual studies was successively dropped from the analysis. For change in the SUIP-R in relation to change in outcome measures, the eta values (successively dropping one study at a time) ranged from .17 to .33 (BDI), .19 to .26 (HAMD), .16 to .24 (IIP), and .10 to .26 (QOLI). For change on the WOR in relation to change on the outcome measures, the eta values ranged from .12 to .29 (BDI), .15 to .32 (BAI), .19 to .40 (HAMD), .30 to .44 (HAMA), and .15 to .31 (QOLI). For the relation of actual/ideal self-discrepancy to the outcome measures, etas ranged from .19 to .25 (BAI), .16 to .23 (HAMA), and .29 to .33 (QOLI). For prediction of residual change on the QOL from the actual/ought self-discrepancy, etas ranged from .25 to .36.

## Discussion

Several findings emerged from our analyses of theoretically relevant mechanism variables in this pooled study database. First, as hypothesized, self-understanding changed significantly more in the dynamic psychotherapies that implemented specific techniques to target understanding of interpersonal patterns than in cognitive therapies. In contrast, changes in compensatory skills and self-concept were common across the dynamic and cognitive psychotherapies examined. Second, changes in self-understanding, compensatory skills, and views of the self (specifically improvements in discrepant views of the self) all were significantly related to outcome. Third, analyses of the unfolding of these processes over time revealed that changes in self-understanding and compensatory skills from intake to termination predicted change in outcome from termination to follow-up, even after controlling for change on the outcome measures from intake to termination. This suggests that changes in self-understanding and compensatory skills may be producing subsequent changes in outcome, rather than simply covarying with outcome.

These findings extend the results regarding these mechanisms of change previously reported in the empirical literature. Although multiple investigations of self understanding have previously demonstrated covariation between changes in self-understanding and changes in symptoms (Hoglend et al., 1994; Kivlighan et al., 2000; Vargas, 1954), the only previous investigation to implement the SUIP (Connolly et al., 1999) demonstrated that self-understanding changed more in dynamic psychotherapy than in mediation treatment but found no evidence of covariation with symptoms. The current investigation, which implemented the improved SUIP-R, found specificity of effects to dynamic psychotherapy, confirmed the findings of previous investigations demonstrating the covariation of changes in self-

understanding and changes in symptoms, and demonstrated a temporal relation between changes in self-understanding across treatment in relation to follow-up symptom course.

The current results of the WOR as a mechanism of change in psychotherapy also build on the previous empirical literature. Previous research (Barber & DeRubeis, 2001) reported that changes in compensatory skills, as measured by the WOR, were apparent across cognitive therapy. In addition, the current findings demonstrate that change in compensatory skills is apparent across diverse psychotherapies, that change in compensatory skills (especially decreases in negative compensatory responses or negative thinking) covaries with symptom course, and that changes in compensatory skills predict subsequent symptom course after the end of treatment. These results are consistent with the recent findings presented by Strunk, DeRubeis, Chiu and Alvarez (2007) demonstrating that WOR scores at the end of treatment predicted lower relapse in cognitive therapy for depression. Furthermore, they showed that the extent to which patients exhibit an understanding and use of the material taught in CT was predictive of lower relapse rate over and beyond WOR scores. Together, these results indicate that learning and displaying competencies taught during CT is associated with a decreased likelihood of relapse.

Likewise, our results regarding changes in views of the self further elucidate the findings previously reported in the empirical literature. Strauman et al. (2006) reported that changes in self-discrepancy occurred across both cognitive therapy and a therapy specifically designed to decrease self-discrepancy. Our findings also support change in self-discrepancy across diverse psychotherapies, but further demonstrate that changes in self-discrepancy are associated with symptom course. Our findings do not demonstrate a relation between changes in self-discrepancy and subsequent symptom course. Accordingly, the causal role of self-discrepancy remains to be determined.

Our results suggest that the mechanisms of change examined here may play an important role across diverse psychotherapies. Although self-understanding changes more within treatment models that target interpretation of maladaptive relationship patterns, changes in compensatory skills and conceptions of the self appear to be fostered by diverse psychotherapeutic approaches that implement diverse therapeutic techniques. Additional research is needed to further unravel the role of specific interventions that produce these changes in the mechanism variables. It may be that diverse therapeutic techniques are capable of resulting in changes in compensatory skills and conceptions of the self. Alternatively, it may be the case that the common techniques utilized across diverse psychotherapeutic approaches are responsible for changes in these important mechanisms.

The significant interaction effects (mechanism variable by treatment) found here suggest that changes in the discrepancy between actual and ideal views of the self appear to play a different role in varied treatments. In particular, changes in actual/ideal self-discrepancies and actual/ought self-discrepancies seem to play less of a role in regard to change in symptoms and quality of life in psychodynamic therapy. It may be that there is a greater tolerance for these self-discrepancies in psychodynamic therapy, with such self-discrepancies seen as part of the inevitable struggles of life, whereas such self-discrepancies are directly or indirectly viewed as problematic and in need of change with cognitive and other therapies. Thus, psychodynamic therapists, at least those included in the current sample, may not target these self-discrepancies as domains that especially need to be changed.

When all three mechanism variables were entered simultaneously in regression analyses, the "action" was carried by changes in compensatory skills and views of the self; changes in self-understanding were no longer significant once changes in the other mechanism variables were controlled. These results indicate that changes in compensatory skills and views of the self are

the important mechanisms of change driving symptom course across diverse psychotherapies. Decreases in the use of negative coping skills and improvements in how individuals view themselves appear to be important changes in patient skills that drive symptom course across diverse psychotherapeutic approaches.

The results indicate that self-understanding of interpersonal patterns is not a significant mechanism of therapeutic action, once the effects of changes in compensatory skills and views of the self are controlled. There are several possible interpretations of this finding. It may be that change in self-understanding is only a correlate of change in compensatory skills, and that self-understanding change does not cause better outcomes. However, the follow-up findings suggest that previous change in self-understanding is related to subsequent change in outcome, lending some support to the causal role of change in self-understanding. A second possibility is that the overlap between these mechanism variables is particularly relevant to improving outcome. The performed stepwise regressions indicate that it is specifically the overlap between the SUIP-R and the WOR that is responsible for change across treatment. These results do not necessarily mean that changes in self-understanding are not important to the process of change across therapy. It may be that the mechanism variables have causal relationships among them. For example, change in self-understanding might cause change in compensatory skills, which in turn causes change in outcome. Within such a causal network, the most proximal causal factor will likely have the highest correlation with outcome and carry the action in a multiple regression when all mechanism variables are entered simultaneously. The conceptual overlap between the constructs of self-understanding and compensatory skills appears consistent with this latter explanation. Changes in self-understanding include changes in the patient's wishes towards others, the way the patient perceives the actions of others, and the way the patient responds to others. The response towards others measured by the SUIP-R is conceptually overlapping with the changes in compensatory skills targeted by the WOR, especially since we know that changes in the WOR in this sample were driven by a decrease in negative compensatory skills. These results indicate that changes in the patient's interpersonal responses to others, targeted by both the SUIP-R and the WOR, may be most closely related to symptom course across therapy. It is possible that as patients come to understand their wish and response patterns in relationships, they subsequently decrease their negative compensatory responses, leading to improved symptoms. Future research can attempt to address this by measuring mechanism variables at multiple points in time and exploring the temporal causal connections that eventually lead to improved outcomes.

One limitation of the current results is the reliance on self-report measures, specifically the SUIP-R, which could be biased by its close approximation to the techniques of the dynamic treatments included in the pooled database. It is possible that the dynamically-oriented treatments teach patients to answer the items of the SUIP-R with more self-understanding in the absence of true emotional insight. However, because change in the SUIP-R predicted symptom course across treatment as well as follow-up symptom course, it is likely that the changes in the SUIP-R reported here represent true change in the patient and not just teaching the patient to report better insight on the measure.

There are also multiple limitations associated with the use of a pooled database. Although the pooled database using a standard core battery provided a unique opportunity to examine important psychotherapeutic variables in a large diverse sample, this diversity can also provide difficulty interpreting and generalizing results. The biggest problem with the use of the pooled dataset is that treatment groups were confounded with study and diagnosis. It is possible that the differences that emerged between treatments are a function of study or diagnosis. Because of the relatively limited within-study sample sizes and the corresponding limitations on statistical power for testing interactions, the pooled study database was not ideal for understanding specific mechanisms of action in specific treatments of specific diagnostic

groups. It may be that some of the mechanisms examined here are more important for particular disorders than others. It is also possible that the results presented here were influenced by only a small number of studies. In addition, the differential dropout across pilot studies might have influenced the results. However, differential attrition does not necessarily mean that dropping out is related to outcome. When the missing data process depends on the value of the outcome variable, then the missing data are said to be informative (Rubin, 1976). To assess if the missing data are informative, one common approach is to implement pattern-mixture models. As described by Hedeker and Gibbons (1997), this approach allows us to assess whether important estimates (i.e., treatment effects) are dependent on missing data patterns, (i.e., informative). We examined pattern-mixture models for each analysis of differential treatment effects and found that the treatment effects were not differential across patterns of attrition. Further research would be needed to evaluate these important change mechanisms within specific treatments for specific disorders.

We also did not formally examine these mechanism variables as mediators of outcome as described by Baron and Kenny (1986) because we did not have an outcome difference between the "other" control psychotherapies and dynamic and cognitive therapies (this is a requirement of the Baron and Kenny approach). Both Baron and Kenny (1986) and Kraemer and colleagues (Kraemer, Stice, Kazdin, & Kupfer, 2001; Kraemer, Wilson, Fairburn, & Agras, 2002) support the importance of evaluating mediation within the context of well-done clinical trials where the mediator is demonstrated as a predictor of outcome in the active treatment compared to a control condition. Kraemer et al. (2001, 2002) further emphasize the importance of demonstrating the temporal relation of change in the mediator to change in outcome in order to support the causal relation. A formal evaluation of statistical mediation would be necessary to demonstrate that change in the mechanisms examined here caused change in outcomes. We were able to examine the temporal relation of change in the mechanism variables and change in the outcome measures by predicting change in outcome variables across the follow-up period from change in the mechanism variables across treatment, controlling for change in the outcome variables across treatment. Our results suggest that changes in self-understanding and compensatory skills across treatment are driving the improvements across the follow-up period rather than simply an epiphenomenon of symptom change.

Although the limitations associated with pooling multiple pilot studies that targeted different treatments for different disorders limit the interpretation of the findings, the diversity of the pooled dataset can also be viewed as a strength of this project. The error variance associated with pooling across diverse samples actually makes it more difficult to demonstrate the statistical relation between constructs. However, our analyses demonstrate consistently, across multiple domains of outcome, that the three mechanism variables play an important role in the process of change in dynamic, cognitive, and other supportive psychotherapies. Larger within-treatment sample sizes, however, are likely to be needed to tease apart small differences in how these mechanism variables might operate in different psychotherapies.

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**Table 1**

Change in Mechanism Variables from Intake to Termination by Treatment Type

| Mechanism | Dynamic | | Cognitive Behavioral | | Change in Mechanism Across Treatments | Treatment Effect |
|---|---|---|---|---|---|---|
| | Intake | Termination | Intake | Termination | t | F |
| | M(SD) | M(SD) | M(SD) | M(SD) | | |
| SUIP-R | 2.99(1.41) | 3.65(1.67) | 2.76(1.22) | 2.61(1.43) | 1.79 | 4.01* |
| WOR | 0.34(1.59) | 1.12(1.37) | −0.58(1.93) | 0.17(1.73) | 4.29*** | 2.01 |
| Actual/Ought | 0.06(1.17) | −0.05(1.16) | −0.07(0.68) | 0.17(1.40) | −0.08 | 0.45 |
| Actual/Ideal | 0.84(1.19) | −0.03(1.37) | 1.15(1.68) | 0.66(2.15) | −3.69*** | 1.13 |

*Note.* SUIP-R = Self-understanding of Interpersonal Patterns Scale - Revised; WOR = Ways of Responding Total Score; Actual/ought = Selves Questionnaire actual/ought self-discrepancy; Actual/ideal = Selves Questionnaire actual/ideal self-discrepancy. Results are given controlling for Treatment, Study, Marital Status, Education, Employment Status, and Gender. Sample sizes ranged from 73 to 91 across analyses due to missing data.

*
$p \le .05$,

***
$p \le .001$.

## Table 2

Change in Outcome Measures from Intake to Termination in relation to Change in Mechanism Variables from Intake to Termination

|  | Mechanism Variable *Partial Eta* | | | |
| Outcome | SUIP-R | WOR | Actual/Ought | Actual/Ideal |
| --- | --- | --- | --- | --- |
| BDI | −0.29[**] | −0.23[*] | 0.14 | 0.12 |
| BAI | −0.13 | −0.25[**] | 0.18 | 0.23[*] |
| HAMD | −0.24[**] | −0.33[**] | 0.13 | 0.07 |
| HAMA | −0.15 | −0.33[***] | 0.21[*] | 0.18 |
| QOL | 0.20[*] | 0.29[**] | −0.29[**] | −0.31[**] |

*Note*. SUIP-R = Self-understanding of Interpersonal Patterns Scale - Revised; WOR = Ways of Responding Total Score; Actual/ought = Selves Questionnaire actual/ought self-discrepancy; Actual/ideal = Selves Questionnaire actual/ideal self-discrepancy. Results are given controlling for Treatment, Study, Marital Status, Education, Gender, Employment Status, and Age. Sample sizes ranged from 124 to 126 for analyses of the SUIP-R, 115–117 for analyses of the WOR, and from 102 to 108 for analyses of the SELVES Questionnaire due to missing data.

[*] $p \leq .05$,

[**] $p \leq .01$,

[***] $p \leq .001$.

**Table 3**

Change in Mechanism Variables from Intake to Termination in relation to Change in Outcome Measures from Termination to 6 Month Follow-up

| Outcome | Mechanism Variable *Partial Eta* | | | |
|---------|--------|--------|--------------|--------------|
|         | **SUIP-R** | **WOR** | **Actual/Ought** | **Actual/Ideal** |
| BDI     | −0.23 | −0.20 | 0.09  | 0.09  |
| BAI     | −0.33[*] | −0.42[*] | 0.12  | 0.16  |
| HAMD    | −0.11 | −0.03 | 0.03  | 0.25  |
| HAMA    | −0.19 | −0.14 | 0.04  | 0.00  |
| QOL     | 0.16  | 0.05  | −0.11 | −0.10 |

*Note*. SUIP-R = Self-understanding of Interpersonal Patterns Scale - Revised; WOR = Ways of Responding Total Score; Actual/ought = Selves Questionnaire actual/ought self-discrepancy; Actual/ideal = Selves Questionnaire actual/ideal self-discrepancy. Results are given controlling for Change in Outcome Variable from Intake to Termination, Treatment, Study, Marital Status, Education, Gender, Employment Status, and Age. Sample sizes ranged from 72 to 86 for analyses of the SUIP-R, 71 to 82 for analyses of the WOR, and from 63 to 72 for analyses of the SELVES Questionnaire due to missing data.

[*]
$p \leq .05$,

[**]
$p \leq .01$,

[***]
$p \leq .001$.