Patterns of Symptomology over Time

and their Relation to Outcome

by

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ABSTRACT

The purpose of this study was to examine the association between characteristics of the symptomatology change curve (i.e., initial symptomatology, rate of change, curvature) and final treatment outcome. The sample consisted of community clients (N = 492) seen by 204 student therapists at a training clinic. A multilevel approach to account for therapist effects was followed. Linear, quadratic, and cubic trajectories of anxiety and depression symptomatology, as assessed by the Shorter Psychotherapy and Counseling Evaluation (sPaCE; Halstead, Leach, & Rust, 2007), were estimated. The multilevel quadratic trajectory best fit the data and depicted a descending curve (partial "U"-shaped). The quadratic growth parameters (intercept, slope, quadratic) were then used as predictors of both symptom change and reliable improvement in general symptomatology (pre- to post-treatment), as assessed by the Outcome Questionnaire-45.2 (OQ-45.2; Lambert, Hansen, Umpress, Lunen, Okiishi et al., 1996). The quadratic growth parameters of depression and anxiety showed predictive power for both symptom change and reliable improvement in general symptomatology. Patterns for two different successful outcomes (1-change in general symptomatology and 2-reliable improvement) were identified. For symptom change, successful outcomes followed a pattern of *low* initial levels of depression and anxiety, *high* initial rates of change (slope), and *high* (flattening after initial drop) curvature, and the pattern applied to both within- and between-therapist levels. For reliable improvement at within-therapist level, successful outcomes followed a pattern of *high* initial rate of change (slope) and *high* curvature. For reliable improvement at between-therapist level, successful outcomes were associated

with a pattern of *low* initial levels of depression and anxiety. Implications for clinical practice are discussed.

DEDICATION

To my beloved family,
my esteemed professors,
and my clients who daily inspire my research.

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CHAPTER I

Introduction

Studying treatment outcome and predicting the efficacy of psychotherapy treatments were major foci of psychotherapy research (see e.g., Castonguay, 2013; Gomes-Schwartz, 1978; Sandell, 1988). Over time, this approach evolved, and the focus transitioned from the study of *outcome* to the study of the *process* of therapy. Process research helps us understand not only *if* symptoms change but *how* they change during the course of the treatment (Kazdin, 2007, 2008; Pachankis & Goldfried, 2007).

While there have been a good number of examinations of the process of therapy over time with respect to the behavior of the clients, such as emotional reactivity, negative affect, or attachment, to name a few (see e.g., Scharf & Bartholomew, 1994; Staebler, Gebhard, Barnett, & Renneberg, 2009; Windsor & Anstey, 2010), there have been relatively few examining *trajectories of symptomology* (shape of the change curve) and its relation to *final treatment outcome* (e.g., levels of symptom change between pre- and post-treatment). This association is important, as it can help clinicians elucidate what *patterns* are related to successful treatment—the latter being an ultimate goal in psychotherapy. Patterns depict 'when' (timing) and 'how much' change (magnitude) is happening (Owen, Adelson, Budge, Wampold, Kopta, Minami, et al., 2015), so clinicians can modify the therapeutic approach and obtain better results with clients (Hayes, Laurenceau, Feldman, Strauss, & Cardaciotto, 2007; Kopta, Lueger, Saunders, & Howard, 1999; Laurenceau, Hayes, & Feldman, 2007; Pachankis & Goldfried, 2007).

Despite the importance of identifying patterns of successful outcomes in psychotherapy, current research has not provided clear information about trajectories associated with good outcome. Diverse shapes of trajectories have been found, and *individual* characteristics of the trajectory (e.g., early change) have been associated with final treatment outcome (e.g., Lutz et al., 2014; Stulz, Lutz, Leach, Lucock, & Barkham, 2007) rather than *all* features of the change curve (e.g., initial level of symptoms, rate of change, and variability in rate of change). Moreover, statistical dependency of data (data of subjects of the same group being more similar compared to data of subjects from other groups) has been disregarded, as therapist effects on outcomes have not been taken into account, casting doubts on inferences. These aspects have not facilitated the identification of clear patterns of successful treatment, and thus represent an important area of research.

The Shape of Symptomatology Change

The general goal of process research is to describe the mechanisms that foster change and reduction in psychological symptoms (Pachankis & Goldfried, 2007). Laurenceau and colleagues (2007) assert that through process research we can address three important questions to uncover those mechanisms: "what is the shape of change?", "for whom and under what conditions does change occur?", and "why is change occurring?" (p. 684). The purpose of this study was to address the first question (the shape of change) and to find associations with successful and unsuccessful treatment.

Why the shape matters? Examining the *shape* of symptomatology change is one way to discern how clients change (Hayes et al., 2007; Laurenceau et al.,

2007; Pachankis & Goldfried, 2007). By examining the shape, we can answer several questions including: (1) whether or not change occurs at a steady rate (i.e., how fast or slow change is), (2) when the 'bulk' of change occurs (at the beginning, middle, or end of the treatment), (3) what is an optimal number of sessions, and (4) how does the shape vary across individuals (see e.g., Laurenceau et al., 2007). These aspects will be explained next.

Understanding the rate of change over time. The rate of change (also called 'slope') describes how fast or slow symptoms improve (or deteriorate). Although experts agree that change is not constant (see e.g., Balbi & Nardone, 2015; Carroll, 2003; Hayes et al., 2007), there are still several questions to examine. Some of them include: "is fast change always desirable?", "when does the 'fastest' change occur?", or "what rate of change is related to final outcome?"

***Identifying when most change takes place*.** Literature suggests that most change takes place early (first sessions) in the treatment (Grilo et al., 2001; Ilardi et al., 1994; Penava et al., 1998). Experts have associated early change to final outcome (e.g., Lutz et al., 2014; Stulz et al., 2007), yet, there is still no agreement about what '*early response'* is (Haas, Hill, Lambert, & Morrell, 2002). In addition, '*sudden gains*' as defined by a remarkable reduction in symptoms from one session to another one (Tang & DeRubeis, 1999; Tang, Luborsky, & Andrusyna, 2002) represent another phenomenon related to significant change, and it has been associated with long-term outcomes (Tang & DeRubeis, 1999). Examining the shape of the curve helps determine whether or not early /sudden gains are occurring, *when*

they occur, and if they are related to successful treatment as defined by a reduction in symptoms.

Determining an optimal number of sessions. A frequent question in psychotherapy is, "How much is enough?" (Kopta, 2003; p. 728) or *how many session*s are needed to obtain meaningful change. Howard and colleagues (1986) introduced the "dose-effect" association in psychotherapy (*dose* = number of sessions; *effect* = percentage of clients improved) and found that "the more psychotherapy, the greater the probability of improvement, with diminishing returns [obtained] at higher doses" (Kopta et al., 1994; p. 1009). Multiple "dose-effect" studies have been carried out to determine how much is enough (see e.g., Barkham et al., 2006; Dekker et al., 2005; Kadera, Lambert, & Andrews 1996; Lutz, Lowry, Kopta, Einstein, & Howard, 2001). The shape of the change curve (time versus symptomatology level) is intrinsically associated with the dose-effect curve (number of sessions versus percent improved), as both involve a deceleration of symptoms over time.

Understanding variability across individuals. Responses to treatment can widely vary across clients as they don't follow the same trajectory. Examining individual trajectories has helped identify distinctive subtypes or classes (e.g., rapid or early responders, non-responders, late responders, or gradual responders) and classify individuals (see e.g., Owen, Adelson, Budge, Wampold, Kopta, et al., 2015; Taylor & McLean, 1993; Thibodeau et al., 2014). The examination of different shapes allows for an understanding of how people vary from the average trajectory and how individual trajectories that share similarities are aggregated in subgroups

(see e.g., Owen, Drinane, Idigo, & Valentine, 2015; Taylor & McLean, 1993; Thibodeau et al., 2014).

Types of Symptomatology Trajectories. Singer and Willett (2003) describe longitudinal change as an increase or decrease of an outcome over time. In psychotherapy, outcomes are typically measured by levels of psychological distress (also called symptomatology). *General* psychological distress can be defined as "a state of emotional suffering" characterized by psychological, behavioral, or physical human responses (Drapeau, Marchand, & Beaulieu-Prévost, 2011, p.105). *Specific* psychological distress (e.g., depression) is related to the "presence or absence of specific symptoms," mostly associated with DSM classifications (Bogat, von Eye, & Bergman, p. 799). As such, high symptomatology corresponds to higher levels of distress or psychopathology, and a reduction of symptomatology at any point in time is considered therapeutic improvement (Brodsky, 1980).

In psychotherapy, it is expected that trajectories of psychological distress depict a 'downward' path over time, showing symptom improvement. These trajectories are typically called "decay" or "decline curves" rather than "growth curves" (Barkham, Stiles, & Shapiro, 1993). Individual change trajectories depict within-person change over time—outcome measure versus time (Singer & Willett, 2003). An average change trajectory, conversely, is an aggregated trajectory across all clients, which shows "everyone's changes" in one single curve. It can be derived from the "curve of the averages" or the "average of the curves" (p. 225). Average trajectories might differ from individual trajectories, but estimating them brings important benefits such as enabling group-level analyses (Singer & Willett, 2003).

The shape of average change trajectories in psychotherapy has been examined in past studies, and multiple shapes have been identified including linear and non-linear trajectories (quadratic or cubic). *Linear trajectories* (depicting constant rate of change over time) are infrequent in psychotherapy research, but a few studies have identified linear trends at subgroup or sample level (e.g., Nishith, Resick, & Griffin, 2002; Thompson, Thompson, Gallagher-Thompson, & Alto, 1995).

Researchers have found more support for curvilinear trajectories, in specific, for *quadratic* trajectories (e.g., Clapp et al., 2013; Forand & DeRubeis, 2013; Wright, Hallquist, Swartz, Frank, & Cyranowski, 2014). A *quadratic* trajectory involves "*change* in the rate of change" (Heck, Thomas, & Tabata, 2014; p. 187) or symptoms that improve fast and then slow. In a quadratic curve, the improvement or worsening of symptoms accelerates or decelerates, and thus, shows a variation in the steepness of the curve at different points of time. Further, a few studies (e.g., Vermote et al., 2009) found *cubic* trajectories of symptomatology change. These trajectories have an "S-shape" and present two points of inflection (bends) on the curve (Newsom, 2015), representing 'slow-fast-slow' improvement. In sum, although the shape of symptoms change has been examined, multiple shapes have been identified, exemplifying the complexity of the study of symptomatology change.

Statement of the Problem

Although there have been studies of the symptomatology change trajectory, most studies have focused only on the 'shape' of the trajectory (symptom levels vs

time), but not on the association with final outcome (e.g., Cannon, Warren, Nelson, & Burlingame, 2010; Rasmus, Buckley, & Starkey, 2007; Sunderland, Wong, Hilvert-Bruce, & Andrews, 2014). Also, multiple shapes (linear, quadratic, cubic) have been found, making it hard to associate trajectories with outcome.

A few studies examined some associations between trajectories and outcome, especially for the trajectory of early change (see e.g., Lutz, Stulz, & Köck, 2009; Stulz, Lutz, Leach, Lucock, & Barkham, 2007), but no clear patterns for the entire trajectory that ecompasses all the characteristics of the curve (e.g., initial symptomatology, rate of change, change in the rate of change) have been found. It should be noticed that the studies found associations between trajectory and outcome based on subgroups (latent classes) extracted from the overall sample of subjects. While there are some advantages to studying subgroups, subgroups lose the power of aggregated data and inferences about outcome can be done only at subgroup level.

Lack of accounting for therapist effects in the analysis was an additional issue with these designs. Clients are nested with therapists, affecting the independence of data, which represents an issue when predicting outcome. Addressing therapist effects and the multilevel structure of psychotherapy data (clients nested within therapist) is essential to avoid overstating precision and potentially biased results (Falkenström et al., 2013; Owen, Drinane, Idigo, & Valentine, 2015; Tasca, Illing, Joyce, & Ogrodniczuk, 2009). In sum, there are multiple areas to address (*1*-examine all attributes of the curve, *2*- use aggregated data rather than subgroups, *3*-consider therapist effects) in order to understand how the trajectory predicts final outcome and the patterns for successful treatment.

Purpose of the Study

Given the importance of studying trajectories of symptomatology change and the lack of clear results in the identification of patterns of successful treatment, my purpose with this research was to study the shape of symptomatology change and to find associations with successful and unsuccessful treatment. I also aimed to address aspects disregarded in past research (e.g., patterns derived from aggregated data, therapist effects). As such, I intended to answer the following questions: (1) is there a general pattern for treatment?, and (2) how do characteristics of this pattern predict successful treatment? Next, I will review the literature and will present comprehensive information and detailed hypotheses about these patterns and how they predict outcome.

CHAPTER II

Review of the Literature

Patterns of Change and Symptomatology Types

Outcome and symptomatology can be assessed with instruments measuring general symptomatology (general levels of distress) or specific symptomatology (e.g., mood disorders including anxiety and depression, substance use, personality disorders). Two of the most common presenting problems in psychotherapy are *depression* and *anxiety*. The prevalence of depression in the U.S. population compared to other psychological problems is significant. Approximately 4% to 10% of adults suffer from depression and up to 17% experience depression in their lifespan, with 7% reporting a major episode in the past two months (Center for Disease Control, 2013; Kessler, 1994; Regier et al., 1993). The prevalence of anxiety in a lifetime is approximately 15% (Center for Disease Control, 2013) with some subgroups (e.g., women) showing higher prevalence. Further, depression and anxiety show substantial comorbidity (Hecht, Von Zerssen, Krieg, Pössl, & Wittchen, 1989), and diagnosing is frequently complex, given the overlap of symptoms. To better understand different trajectories, experts have studied patterns of change for general and specific symptomatology, including the most common presenting problems (depression and anxiety).

Patterns of change in general symptomatology. Multiple longitudinal patterns (including linear, quadratic, and cubic) have been found using instruments to assesses *general symptomatology*. For instance, Lambert, Hansen, and Finch (2001) examined change trajectories of 11,942 patients with diverse presenting problems (i.e., adjustment disorders, mood disorders, and anxiety) and varying treatment lengths (at least 3

sessions). *General symptomatology* was measured using the Outcome Questionnaire-45.2 (OQ-45.2; Lambert, Hansen, Umpress, Lunen, Okiishi et al., 1996). Lambert and colleagues modeled growth curves using Hierarchical Linear Modeling (HLM) and found 50 subgroups of subjects (bands) based on initial level of symptoms (ranging from 0 to 180). They found that the trends of change trajectories were *mostly linear*. However, it is important to note that the subgroups were similar in terms of level of initial symptomatology and each subgroup represented about 2% of the entire sample. The average change trajectory was not analyzed.

Also, Rasmus, Buckley, and Starkey (2007) examined 33 adult outpatient clients with mood disorders, adjustment issues, and relational problems treated by 19 counselors over the course of approximately 10 sessions. Rasmus and colleagues assessed *general symptomatology* using the Outcome Questionnaire-45.2 (OQ-45.2; Lambert, et al., 1996) at session 1, 4, 7 and 10, and they carried out curve fitting analyses with aggregated (average) data. The research team found that the best fitting curve depicted a negatively accelerated, *quadratic* trajectory of change over time.

In addition, Cannon and colleagues (2010) examined trajectories of change of 2,715 youth patients (mean age of 14) with mood disorders, substance use, and ADHD, among other presenting problems. Outcome and levels of *general symptomatology* were assessed with the Youth- Outcome Questionnaire (Y-OQ-2.01; Burlingame, Wells, & Lambert, 1996; Burlingame, Wells, Lambert, & Cox, 2004). Even though the treatment was 18 weeks, the average number of outcome measures obtained was 5, and average time intervals between assessments ranged from 2.6 to 8.9 weeks. Cannon and colleagues used a Multilevel Model (MLM) approach to model change trajectories with Y-OQ

scores and time as variables (therapists effects were not part of the MLM design). The authors found support for *curvilinear* trajectories with rates of change that became successively slower over the course of the treatment.

Finally, Vermote and colleagues (2009) used a naturalistic design to study symptomatology in a sample of 70 adult inpatient clients with personality disorders and with a length of stay ranging from 1.5 to 13 months. The treatment program encompassed group therapy, individual therapy, non-verbal therapy (music therapy) and psychiatric consultation. A *global score of symptoms* (GSS) was obtained from a battery of instruments which included general symptomatology scales such as the Symptom Checklist (SCL-90; Arrindell & Ettema, 1986), as well as specific instruments like the Beck Depression Inventory (BDI; Bouman, Luteijn, Albersnagel, & Van der Ploeg, 1985). Measures were obtained at intake and 3-month intervals. Using growth curve analysis, the researchers found that the overall trajectory of symptoms followed a *cubic* trend, with little improvement in the beginning, followed by high improvement in the middle and stable improvement at the end.

Pattern of change in depression. Patterns of change in clients with depression have been analyzed, and the majority of the studies found support for curvilinear trajectories. For instance Sunderland, Wong, Bruce, and Andrews (2012) examined the trajectory of symptomatology change in a sample of 663 adult patients with depression and anxiety. Services were provided through 6 internet-based CBT sessions (lessons), and outcome was primarily assessed with the Kessler-10 Psychological Distress Scale (K10; Kessler et al., 2002) before each online lesson. The K10 global measure is based on *anxiety* and *depression* items. Using Growth Mixture Modeling (GMM), the authors

found that a quadratic model provided the best fit, suggesting that the decrease of symptoms follows a *curvilinear* trajectory with the most change happening in the first few sessions.

In addition, Clapp and colleagues (2013) examined the change trajectory of a sample of 1,084 adult psychiatric inpatients with various diagnoses including depression, bipolar, psychotic, and substance use disorders. Outcome focused on depressive symptoms using the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) at admission and then bi-weekly for the duration of the stay (duration was not specified). Clapp and colleagues used Latent Growth Curve (LGC) analysis and found that a *quadratic* model provided a better fit to the data compared to the linear model, and that symptom improvement occurred in the first week of admission.

Using the Beck Depression Inventory-II (BDI-II; Beck, Steer & Brown, 1996) and the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988), Forand and DeRubeis (2013) examined *depression* symptomatology in 180 clients over the course of 16 weeks. The researchers used Hierarchical Linear Modeling (HLM) and found support for a *quadratic* model. They also found that levels of *anxiety* at intake predicted early rapid change in depression symptomatology.

Furthermore, Wright and colleagues (2014) examined the symptoms of 78 adult patients with anxiety and depression treated with a multimodal approach in psychotherapy (e.g., individual therapy, group therapy, medication, and psychoeducation) over the course of 16 sessions. They measured symptomatology using the Hamilton Rating Scale for Depression–Core Symptoms (HRSD-CS; Hamilton, 1960) at each session and found that symptoms depicted a *quadratic* trajectory with most pronounced

declines occurring at the beginning of the treatment, followed by less pronounced decline later on. Taken together, these studies supported that a *quadratic* trajectory of change (symptoms that vary in the rate of change) best describe the progression of symptoms over time.

Patterns of change in anxiety. Longitudinal studies of anxiety have shown diverse patterns of symptom change. For instance, Stanley and colleagues (1996) studied 70 adult patients with panic disorder over the course of 10 sessions. The team used *anxiety* instruments such as the State-Trait Anxiety Measure (STAI; Spielberger, Gorsuch, & Lushene, 1970), and the design included a multivariate analysis (MANOVA). Stanley and colleagues found fast change at different periods of time depending on the intervention type (a greater reductions in the *first half* of the treatment with relaxation training and faster reductions in the *second part* of the treatment with cognitive therapy).

In a review of research, Hayes and colleagues (2007) studied the trajectory of several *anxiety* studies including Heimberg and Becker's (2002), Nishith, Resick, and Griffin's (2002), and Gilboa-Schechtman and Foa's (2001). Hayes found that these trajectories shared *discontinuous* patterns, with a *peak of heightened symptoms* (intended to increase arousal and facilitate change) preceding a decrease of symptomatology. However, the diagnoses were PTSD or specific phobias (social phobia), and the instruments were specific for PTSD, such as the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990), the PTSD Symptom Scale (PSS; Foa, Riggs, Dancu, & Rothbaum, 1993).

Furthermore, Hedman and colleagues (2013) studied a sample of 81 clients with severe health anxiety (hypochondriasis) who received Internet-based CBT over 12 weeks. Outcome was measured with the Health Anxiety Inventory (HAI; Salkovskis, Rimes, Warwick, & Clark, 2002). Using linear and logistic regression, Hedman and colleagues found that higher baseline anxiety (e.g., intake) was associated with lower chances of improvement, and years with severe health anxiety were not significantly associated with outcome.

In sum, longitudinal analyses of *general* symptomatology and anxiety showed diverse patterns. In contrast, most analyses of *depression* (Clapp et al. 2013; Sunderland et al., 2012) suggested that *quadratic* curves best represent the shape of the trajectory in most cases. Results also showed that most change occurred early in the treatment (first few weeks of therapy). Findings were similar for different ages (youth and adults) and treatment formats (inpatient/ outpatient; in person/ online).

Associations Between Trajectory and Final Outcome

The shape of the trajectory in psychotherapy has been broadly examined, and several findings support a quadratic shape, but little has been said about how the trajectory relates to final treatment outcome: how the patterns of successful outcome look like? Considering that one of the main objectives in psychotherapy research is to predict final outcome (Castonguay, 2013; Gomes-Schwartz, 1978; Sandell, 1988) and that there is a current emphasis on associating process to outcome (Greenberg, 2015; Hardy & Llewelyn, 2014), then examining the association between the shape and final treatment outcomes becomes relevant.

Few studies have attempted to examine this association. One of those studies was conducted by Thompson and colleagues (1995). They used a regression line to fit symptom levels to a longitudinal trajectory and calculated levels of non-linearity (shifts in the trajectory). Thompson and colleagues found a positive correlation between overall levels of non-linearity and recovery rate. Although this was one of the first studies that attempted to link shape and outcome, the examination of shapes was done within subgroups (recovered versus non-recovered) rather than examining the whole sample, and the goal was not to predict final outcome based on the shape of the trajectory.

Another study was conducted by Stulz and colleagues (2007), who examined the association between patterns of early change (first 6 weeks of therapy) and final outcome in a sample of 192 teenage and adult clients who had a treatment duration of 7 to 203 sessions provided by 33 therapists. Symptomatology was assessed with the Clinical Outcomes in Routine Evaluation (CORE; Cahill et al., 2006). Using GMM, Stulz and colleagues analyzed subjects who had at least 3 of the first 6 weeks of treatment, and found five distinctive groups or classes of trajectories in those initial 6 weeks (i.e., early improvement, low impairment, high impairment, continues, and discontinues). Improvement at termination (effect size of change during treatment) was assessed within each group by using the reliable change (RC) criterion (e.g., Jacobson & Truax, 1991), which compares the change between two measures and determines if change occurred. The "early improvement" group showed the highest gain (96% reliably improved) compared to other groups such as the "high impairment" group (22% reliably improved).

Similarly, Lutz and colleagues (2009) conducted a GMM analysis of 162 patients with depression during 14 to 23 week. Outcome was measured with the Beck Depression

Inventory (BDI; Beck, Steer, & Brown., 1996) at intake, weeks 4, 8, 12, 16 (termination), and post treatment (months 6, 12, and 18). The research team found three distinctive subgroups or classes of trajectories based on 'early change' (first 8 weeks): (1) Moderate to severe depression with moderate early improvement, (2) Moderate to severe depression with rapid early improvement, and (3) Mild to moderate depression with moderate early improvement. Prediction of final outcome was done by comparing the percentage of patients who "reliably improved" after 16 weeks. Lutz and colleagues found that 100% of group-2 patients (Moderate to severe depression with rapid early improvement) improved after 16 weeks compared to the other groups (69% for group 1 and 34% for group 3). Lutz and colleagues concluded that 'rapid early improvement' was associated with good final outcomes. Lutz et al. acknowledged that higher responsiveness might have been associated to other factors, such as a higher expectation of receiving help.

Later on, Lutz and colleagues (2014) carried out a similar study with 326 patients with panic disorder. They used GMM to model change over the first 4 weeks of treatment, and outcome was measured with the Panic Disorder Severity Scale – Self-Report Version (PDSS-SR; Shear et al., 1997). Lutz and colleagues found four classes of trajectories ('early deterioration,' 'medium symptoms -slow change,' 'high symptoms- no change,' and 'early response'). They found that the 'early response' group had the highest rates of improvement (93%) from intake to termination, and concluded that class membership predicted final outcome. Again, this argument was based on percent of improvement within the subgroup.

In the above studies, the authors concluded that certain patterns of trajectories (i.e., rapid early improvement) were associated with positive final outcomes. These designs, however, did not address several aspects: (1) the trajectory of the entire treatment was not examined but only the first weeks of treatment, (2) the study was done by subgroups, losing the power of aggregated date to make inferences, and (3) therapist effects were not examined, losing the power of aggregated data to make inferences.

Overall, there is limited research about the association between the shape of the change trajectory and final outcome. Some studies (i.e., Thompson, Thompson, Gallagher-Thompson, & Alto, 1995) used correlation to link shapes of trajectories and outcome. Other studies examined the shapes of subgroups and compared percent of improvement across subgroups. Also, these studies focused on the shape of 'early change' rather than the shape of the entire treatment. Moreover, the effect of therapists was not included.

Selecting Outcome Measures

To analyze associations between symptomatology trajectories with final outcome, two different instruments were needed in the present study: one instrument to measure symptoms over time and the other instrument to measure change pre- to post-treatment. Several factors were taken into account to select measures. First, longitudinal research benefits from the use of brief scales that facilitate administration and scoring (Boswell, Kraus, Miller, & Lambert, 2013; Smith, McCarthy, & Anderson, 2000). Second, *depression* showed more clear patterns of change compared to general symptomatology or anxiety, so a measure of depression was appropriate to predict final outcome. Third, this measure should have adequate predictive power in order to predict final outcome.

Fourth, literature shows that depression is significantly correlated with other psychopathologies (Gotlib, 1984; Gotlib, Lewinsohn, & Seeley, 1995; Kaufman & Charney, 2000; Rohde, Lewinsohn, & Seeley, 1991).

The Shorter Psychotherapy and Counseling Evaluation (sPaCE; Halstead, Leach, & Rust, 2007) meets several requirements to measure longitudinal symptomatology. The sPaCE is a brief (19-item) scale with good psychometric properties and convergent validity with the BDI. Also, the sPaCE has good sensitivity to change (Halstead et al., 2007), relevant to longitudinal research and it has incremental predictive power over other brief measures (Jimenez-Arista, Holzapfel, Shanholtz, & Tracey, in press). Importantly, the sPaCE was developed to capture two of the most common presenting problems in therapy (depression and anxiety).

Final outcome (pre- to post-treatment) was measured in this study with the Outcome Questionnaire-45.2 (OQ-45.2; Lambert, Hansen, Umpress, Lunen, Okiishi et al., 1996), one of the most utilized scales of general symptomatology. Good validity (Lambert, et al., 1996; Mueller, Lambert, & Burlingame, 1998; Umphress, Lambert, Smart, Barlow, Clouse, & Hensen, 1997) makes this instrument adequate to measure final treatment outcome. In order to have relevant criterion variables and validate the results, two measures of outcome derived from the OQ-45 were used in this study: (1) change in symptoms and (2) reliable improvement. *Change in symptoms* represents the gain or improvement from intake to termination (including small change and big change). *Reliable improvement* represents substantial and significant reduction in symptoms and is a recommended way to measure change (see e.g., Speer, 1992; Wise, 2004).

Predictors of Final Outcome

In order to hypothesize about trajectories of successful treatment, it is necessary to understand the attributes of the trajectory that can predict successful treatment. Trajectories have three main attributes (or latent growth parameters): intercept, slope, and quadratic terms (Singer & Willet, 2003). The intercept depicts the level of initial symptomatology. Each individual trajectory has its own intercept representing the person's initial level of symptoms. The intercept for the average curve represents the average initial level of symptomatology for the sample. Second, the rate of change of symptoms, also identified as the *slope*, can be downward/negative (improving) or upward/positive (deteriorating), and it can be steeper (fast change) or less steep (slow change).Third, the quadratic parameter indicates the variability in the rate of change, also called *curvature*. This quadratic terms depicts if the trajectory looks more similar to an arch (high curvature) when the rate of change is variable (accelerating and decelerating), or more similar to a straight line (low curvature) when the rate of change is more steady, with more positive values delineating a "U"-shaped curve (upward) and more negative values describing an inverted "U"-shaped trajectory (downward). These three characteristics, also called 'latent growth parameters,' represent distinctive aspects of the curve and can depict a pattern for either successful or unsuccessful treatment based on the magnitude and direction of the parameters.

Next, I review what the literature says in regards to these predictors. First, in terms of *initial symptomatology* (intercept), findings show that clients with more severe symptoms at intake (high initial symptomatology) do poorly in therapy. For instance, Thibodeau and colleagues (2015) found that initial symptom severity predicted

"nonresponder" status after 6 months of treatment in a sample of 821 patients with depression evaluated with the Montgomery-Asberg Depression Rating Scale (MDRS). Similarly, Taylor and McLean (1993) identified that clients who were severely depressed at intake and underwent a 10-week treatment tended to have small gains, and they lost those gains after a 3-month follow-up in sample of 155 depression clients assessed by the BDI. Conversely, research shows that individuals with lower initial symptoms are expected to have better results. For example, in a sample of 104 clients with depression as assessed by the BDI, clients with low initial symptomatology responded better to the treatment compared to individuals with higher initial symptoms (Allart-van Dam, Hosman, Hoogduin & Schaap, 2007). Severe symptomatology is often related to cognitive deficits, high substance use, dissociation, poor awareness, or low insight. These factors may slow or impair treatment given that they affect an individual's sense of awareness, motivation, or the ability to adhere to and complete the course of therapy (Bauer et al., 2007; Regier et al., 1990; Sackeim, 1998; Schwartz, 1998). Altogether, findings show that low initial distress (low intercept) is associated with better outcomes, and high severity of symptoms (high intercept) is associated with poor outcomes.

Second, in terms of *initial rate of change* (slope) as a predictor of outcome, studies have repeatedly shown that 'steeper early slopes' are associated with good therapy outcome. For instance, Lewis, Simons, and Kim (2012) contend that rapid early response is essential to overall success, and that targeting readiness to change is recommended to maximize treatment outcome. Lewis and colleagues examined a sample of clients with depression assessed by the BDI and found that the rate of early change predicted treatment outcome, explaining 52% of the variance in response to treatment. In

addition, Haas and colleagues (2002) found that clients who presented early improvement in the first three weeks of treatment had good final outcomes (lower OQ-45 scores) and maintained gains up to two years post-termination (Haas, Hill, Lambert, & Morrell, 2002). Similarly, researchers examining latent classes found that change occurring in the first weeks of therapy was associated with symptom reduction or reliable improvement at termination for problems such as depression, anxiety, and panic disorder (e.g., Lutz, Hofmann, Rubel, Boswell, Shear et al., 2014; Lutz, Stulz, & Köck, 2009; Stulz, Lutz, Leach, Lucock, & Barkham, 2007). Lutz's and Stulz's teams examined groups of trajectories and found that classes with early rapid change (steeper slopes) had better results at the end of the treatment as indicated by change scores or reliable improvement. The researchers argue that factors such as readiness to change, motivation, and expectancy might be related to early improvement. Another aspect associated with a fast initial rate of change is *sudden gains*, as these gains typically occur early in the treatment (Greenfield, Gunthert, & Haaga, 2011). *Sudden gains* (substantial improvement in between two sessions) and *first-sessions gains* (improvement occurring after session one) predicted positive outcome (as conceptualized by higher post-treatment recovery rates) in cognitive therapy for depression (Busch, Kanter, Landes, & Kohlenberg, 2006). Busch and colleagues explained early improvement as change related to non-specific factors mediated by hope, rather than related to specific ingredients. It is important to consider that rapid early rate of change has been also associated with number of sessions (total dose of treatment), as shorter treatments had faster rates of change, and longer treatment had slower rates of change (Baldwin, Berkeljon, Atkins, Olsen, & Nielsen, 2009). In sum, rapid early change (more negative, downward steep slopes) has been associated with

good final outcome. Factors that were conducive to positive early improvement as proposed by the researchers (e.g., readiness to change, motivation, expectancy, and hope) might also be contributing to positive final change.

Lastly, *curvature* depicts if a trajectory is more round (variable change) or more straight (steady change), and it also shows if change accelerates or decelerates. In this regard, psychotherapy research has consistently shown that progress does not occur at a steady rate and therefore, symptom change is not linear (e.g., Clapp et al., 2013; Hayes et al., 2007; Sunderland et al., 2012; Wright et al., 2014), but few studies associating the degree of curvature and final outcome were found. In one of the studies, Thompson and colleagues (1995) studied linearity (steady change) and non-linearity (non-steady change including worsening and improvement shifts) in a sample of clients with depression undergoing 16 to 20 psychotherapy sessions. Although the researchers did not directly examine curvature, they found that the less linear the trajectory, the higher the recovery rates, arguing that unsteady rates of change (less linear) were associated with higher improvement. In another study, no association between curvature and final symptomatology was identified (Rice, Hagler, & Tonigan, 2014). Given the lack of clear findings, our rationale to hypothesize about curvature took into account how the linear term (slope) and the quadratic term (curvature) are mathematically related, and that a decrease in symptoms is desired. First, we expect a curvilinear trajectory of symptom reduction and this implies a quadratic term with a positive sign (partial "U" curvature), given that the initial slope (linear term) should be negative for successful treatment. Second, since we had hypothesized a rapid initial rate of change in the quadratic curve (big initial dip) because substantial drops have typically occurred in the first few sessions

(Grilo, Masheb, & Wilson, 2006; Kopta, Howard, Lowry, & Beutler, 1994; Penava, Otto, Maki, & Pollack, 1998; Rush, Kovacs, Beck, Weissenburger, & Hollon, 1981; Thase, Simons, Cahalane, & McGeary, 1991), a successful non-linear trajectory is possible if, after the big dip, the trajectory bends and symptoms continue to decrease at a slower pace (decelerating), creating a concave form. Thus, the initial drop and symptoms that level off after a certain point imply positive values for the quadratic term with a partial "U"-shaped trajectory (flattening after initial drop). In sum, given the above information, we hypothesize that a pattern of successful treatment will have a *low* intercept (low initial symptomatology), a *steep* downward negative slope (high initial rate of change), and a positive curvature (partial "U"-shaped curve). A comprehensive pattern like this that predicts successful treatment (symptom reduction) has not been examined in previous studies, and further, a key aspect in psychotherapy research, such as the dependency in client-therapist data, has been neglected.

Methodological Recommendations in Process Research

To make process research and the examination of symptomatology change over time effective, experts have provided a series of recommendations including timing of assessments, statistical approaches, and addressing therapist effects. Frequent assessments and measuring time in weeks or sessions is advised (Laurenceau et al., 2007; Pachankis & Goldfried, 2007; Singer & Willett, 2003). It is known that the frequency of measures has an effect on the precision of the results (Cook & Ware, 1983; Laurenceau et al., 2007; Schaie, 1986; Schmidt & Teti, 2005). It is important to consider how fast change in psychotherapy can occur and design accordingly (Laurenceau et al., 2007).

Also, the use of sophisticated methods, emerging methodologies, and state-of the-art approaches is a new direction in process research. These methods include growth mixture modeling (GMM), growth curve modeling, Multilevel Modeling (MLM), and dynamical systems modeling (Laurenceau et al., 2007; Pachankis & Goldfried, 2007; Wright et al., 2014). These approaches allow for exploring different shapes (e.g., quadratic or cubic), examining rates of change over the course of the treatment, and identifying subgroups (Laurenceau et al., 2007; Wright et al., 2014).

Therapist effects (or the proportion of variance in outcome explained by therapist differences) occur as clients obtain different results with different therapists (Falkenström et al., 2013). Findings show that these effects range from 0% to approximately 10%, and the effects are larger for naturalistic or non-randomized clinical trials (non-RCTs) compared to RCTs. For instance**,** Wampold and Brown (2005) found therapist effects of 5% in a naturalistic study with a sample of 6,146 clients and 581 therapists. Later on, Kim, Wampold, and Bolt (2006) examined therapist effects in samples from the National Institute of Mental Health Treatment of Depression Collaborative Research Program, and they obtained an estimated value of 8%, which was superior to the value of treatment effects (0%). Elkin and colleagues (2006) obtained contradictory findings, as they found an effect of 0% in the same sample. Wampold and Bolt (2006) explained that this difference is due to Elkin's inappropriate assumptions leading to increased patient variance. Additionally, in another naturalistic study, Lutz and colleagues (2007) used a three-level growth curve model study and found therapist effects of approximately 8% (of total variance) in a sample of 1,198 patients and 60 therapists using the Compass tracking system (Howard, Moras, Brill, Martinovich, & Lutz, 1996; Lueger et al., 2001; Lyons,

Howard, O'Mahoney, & Lish, 1997). Furthermore, Saxon and Barkham (2012) identified an average therapist effect of 6.6 %, and the effect was larger (10%) for more severe clients in a naturalistic design with 10,786 clients and 199 therapists. Conversely, no therapist effects have been found in several randomized studies (see e.g., Ball et al., 2007; Goldstein et al., 2010).

Therapist effects have been found to be relevant, and experts recommend to control them for in the design (Falkenström, Markowitz, Jonker, Philips, & Holmqvist, 2013). Disregarding the effect of therapists brings potential negative consequences, such as the increase in Type I errors, which might bias the estimation of treatment effects (Falkenström et al., 2013; Owen, Drinane, Idigo, & Valentine, 2015; Tasca, Illing, Joyce, & Ogrodniczuk, 2009). Furthermore, experts advocate for controlling for therapists regardless of the significance level of the effect (Falkenström et al., 2013). Despite these recommendations, therapist effects have not been controlled for in process and outcome research examining the shape of the change trajectory, which might compromise the validity of past results.

Present Study

Examining patterns of symptomatology change (shape of the change trajectory over time) contributes to the understanding of the mechanisms of change in psychotherapy (Laurenceau et al., 2007). Understanding these patterns and identifying the shape of the change trajectory assist clinicians to focus on specific periods of time during the treatment (e.g., early, middle, late treatment), discern why progress is occurring or not, and explore variables associated with symptom change (Laurenceau et al., 2007). This can ultimately help practitioners and scholars design effective

interventions and obtain better results with clients (Pachankis and Goldfried, 2007; Kopta et al., 1999).

Given the importance of identifying factors of successful treatment (significant reduction in symptoms) in order to obtain better results with clients, my goal was to find patterns depicting associations between trajectories of symptomatology change and final outcome. These associations can be studied by focusing on characteristics of the trajectory (latent growth parameters), as they represent identifiable aspects in the course of treatment. Such characteristics encompass: (1) initial level of symptoms, also called *intercept* of the trajectory, (2) rate of change of symptoms, also identified as *slope*, and (3) variability in the rate of change, also called *curvature* of the trajectory. These three distinctive aspects can depict a pattern for either successful (reduction in symptoms) or unsuccessful (lack or reduction or increase in symptoms) treatment. As suggested by the literature that has individually examined characteristics of the trajectory and the associations with successful outcome (see e.g., Lutz et al., 2009, 2014; Stulz et al., 2007; Thompson et al., 1995), I expected *low* initial symptomatology, *high* initial rate of change, and *high* curvature to predict final outcome as defined by a reduction in symptoms.

Given that two of the most common presenting problems in psychotherapy are depression and anxiety, this study focused on examining longitudinal patterns of these two problems. As such, I selected the sPaCE instrument (Halstead, Leach, & Rust, 2007) to assess longitudinal change given that the sPaCE captures depression and anxiety. This instrument is also brief and easy to administer, and it has shown good ability to predict general symptomatology. To measure final outcome, I selected the OQ-45 (Lambert,

Hansen, Umpress, Lunen, Okiishi et al., 1996), a widely used instrument to assess general psychological distress, and selected two criterion variables. I expected the characteristics of the curve (growth parameters) to predict successful treatment as defined as a reduction of symptoms (any level of symptom change) as well as a reduction of symptoms that meets standard cut-offs (e.g., reduction of specific points) representing significant change (reliable change).

I also expected to find support for a *curvilinear trajectory*, as multiple studies have shown that psychotherapy change is not linear (Hayes et al., 2007). Specifically, I expected to obtain a descending *quadratic*, partial "U"-shaped trajectory, as this trajectory has been identified in multiple studies. In particular, the quadratic curve has found support in trajectories of depression and anxiety, which aligns with the measures I obtained with the sPaCE. Further, a quadratic curve had good support for various other diagnoses. To substantiate this trajectory, I also tested a linear and cubic trajectory to identify which one was superior.

It is important to note that this study examined patterns over the course of the treatment and not only "early change," as done in other studies. The examination of the entire treatment provides a more comprehensive picture of symptom change but so far, no study predicting final outcome from the entire change trajectory (intake to termination) has been done. It is also important to measure symptoms in short intervals (e.g., every session) in order to avoid impacting the precision of the analyses (Cook & Ware, 1983; Schaie, 1986; Laurenceau et al., 2007; Schmidt & Teti, 2005). Some previous studies had long intervals (up to 9 weeks) in between measures; however, the interval of this study was one week in between observations (weekly sessions).

From a methodological perspective, past studies of patterns and outcome focused on subgroups (latent classes) and compared outcomes across groups. Issues with past approaches are related to the methodology and the potential consequences on effect size. Classes diffuse the effects as they decrease the variability within subgroups, whereas aggregated data can show stronger or clearer associations (Ostroff, 1993). A better approach to finding patterns is using the power of regression and involving aggregated data rather than subgroups. The design I propose has methodological advantages over previous studies for various reasons: 1) we can quantify the influence of predictors on outcomes, 2) we can identify the direction of that association (direct or inverse), and 3) we can use aggregated data (rather than subgroups or classes) to find clearer associations. An additional methodological advantage is the inclusion of therapist effects on final outcome. Therapist effects have not been controlled for in previous studies, which can increase Type I errors and biased results (Falkenström et al., 2013; Owen, Drinane, Idigo, & Valentine, 2015; Tasca, Illing, Joyce, & Ogrodniczuk, 2009).

Overall, my purpose was determine whether or not the shape of the change trajectory predicts final treatment outcome, controlling for therapist effects, testing a quadratic trajectory, and using the trajectory parameters as predictors. Based on the information presented from the literature, I expect successful treatment to be associated with a pattern of low intercept, steep downward slope, and high curvature. As such, I present the following hypotheses.

Hypotheses

Hi: There will be a pattern of successful outcome (reduction in symptoms) in terms of

general Symptomatology change. The descending partial "U"-shaped quadratic trajectory will present the following associations*:*

H1: Low initial symptomatology (intercept) will be associated with successful outcomes (the lower the initial level of symptoms, the better outcome)

H2: Steep slope (fast change) will predict successful outcome (the steeper the slope, the better outcome)

H3: High curvature will be associated with successful outcomes (the less steady the rate of change, the better outcome)

Hii: There will be a pattern of successful outcome in terms of *reliable improvement.* The descending partial "U"-shaped quadratic trajectory will present the following associations*:*

H4: Low initial symptomatology (intercept) will be associated with *reliable* improvement (the lower the initial level of symptoms, the more reliable the improvement)

H5: Steep slope (fast change) will predict *reliable* improvement (the steeper the slope, the more reliable the improvement)

H6: High curvature will be associated with *reliable* improvement (the less steady the rate of change, the more reliable the improvement).

CHAPTER III

Method

Participants

The sample (N = 492) consisted of community counseling clients who underwent weekly psychotherapy sessions at a university counseling training center in the Southwest. Therapists were 204 graduate level students (83% were master's level and 17% were doctoral level). On average, each clinician provided psychotherapy to approximately 2.4 clients (M = 2.4; SD = 1.51; range = 1 to 14) under the supervision of licensed psychologists. The majority of the therapists (72%) had 2 or more clients. About 9% of these therapists had at least one semester of previous practicum experience, and 5% had prior experience in other work settings. These therapists were 78% female and 22% male, and the mean age was 28.09 (SD = 5.58; range = 22 to 41).

Clients provided weekly information on psychological distress, which was measured by the Shorter Psychotherapy and Counseling Evaluation (sPaCE; Halstead, Leach, & Rust, 2007), as well pre- and post-treatment information of general distress as measured by the Outcome Questionnaire-45.2 (OQ-45.2; Lambert, et al., 1996). The presenting problems included anxiety, depression, interpersonal problems, anger management, family issues, substance abuse, grief, and vocational concerns. The mean score of the sPaCE at session 1 was 22.64 (SD = 13.94; range = 5 to 65; 0 = low, 76 = high). Norms for the sPaCE show that the initial scores of this sample are close to 'general practice' population norms (lower than psychiatric populations). Mean scores of the OQ-45 at session 1 was 73.52 (SD = 23.58; range = 19 to 143; 0 = low, 180= high),

which was within the range of OQ-45 norms for this type of population (Lambert et al., 1996).

This sample was restricted to only individual psychotherapy clients aged at least 18 years of age (M = 31; SD = 12.30; range = 18 to 70). Clients attended weekly counseling sessions (up to 14). The duration of each session was approximately 50 minutes. The inclusion criterion for this study was attending at least 3 sessions in order to model change. Approximately 13% attended 3 sessions, 11% attended 4 sessions, 12% attended 5 sessions, 11% attended 6 sessions, 10% attended 7 sessions, 11% attended 8 sessions, 11% attended 9 sessions, 12% attended 10 sessions, 6% attended 11 sessions, 1% attended 12 sessions, 1% attended 13 sessions, and less than 1% attended 14 sessions.

The distribution of participants based on different characteristics was as follows. Considering gender, 43% were males, 50% were females, 1% were transgender, and 6% did not provide gender information. Based on age, 36% were from 18 to 25, 33% were from 26 to 35, 19% were from 36 to 49, 8% were over 50, and 4% did not report age. Considering ethnicity, 67% were White, 13% were Hispanic, 5% were Asian, 3% were African American, 2% were Native American, 1% were mixed race, and 9% did not provide information about ethnicity.

Measures

OQ-45.2 (Lambert, Hansen, Umpress, Lunen, Okiishi, 1996). The OQ-45.2 is a 45-item Likert scale based on five points (0 = *Never*, 4= *Almost always*). This instrument is typically administered to assess general psychological distress and frequently used in process and outcome research. There is a total score and three subscale scores. The total score indicates the level of general symptomatology (psychological

distress). The subscales indicate specific types of distress such as symptom distress, interpersonal relations, and social roles. Past analyses (Wells, Burlingame, Lambert, Hoag, & Hope, 1996) indicate that the OQ-45 has good psychometric properties such as internal consistency (Cronbach's $\alpha = 0.93$) and three-week test-retest reliability ($r = 0.84$). Concurrent validity with instruments, such as the Symptom Checklist 90, Beck Depression Inventory and Inventory of Interpersonal Problems among others, show values ranging from .55 to .88 (Lambert & Vermeersch, 2008). Various studies showed additional properties such as sensitivity to change (Vermeersch, Lambert, & Burlingame, 2000), concurrent validity (Umphress, Lambert, Smart, Barlow, Clouse, & Hensen, 1997), and construct validity (Bludworth, Tracey, & Glidden-Tracey, 2010; Mueller, Lambert, & Burlingame, 1998). The total score was used at intake and termination to obtain a measure of final outcome.

sPaCE (Halstead, Leach, & Rust, 2007). The sPaCE is a 19-item Likert scale based on five points (0 = *Not at all*, 4 = *Extremely*) and is used as a measure of client depression and anxiety symptomology over time. The sPaCE has shown good internal consistency (Cronbach's $\alpha = .93$ for the total scale and Cronbach's $\alpha = .79$ to .88 for subscales), two-week test-retest reliability ($r = .96$), convergent validity with the BDI ($r = .76$), and sensitivity to change ($t = 7.40$, $p < .0005$) (Halstead et al., 2007). Convergent validity of the Spanish version of the sPaCE with the OQ-45 showed good results (Leiva et al., 2010). In addition, the predictive validity was recently examined and findings showed that the sPaCE has incremental predictive power regarding final outcome (symptomatology as measured by the OQ-45and interpersonal problems as measured by the IIP-32) over and above other comparable brief measures such as the OQ-10.2

(Jimenez-Arista et al., in press). The sPaCE total score was used on each of the 14 weekly longitudinal observations to track symptom change over time.

Procedure

IRB approval for the study was obtained prior to any data collection. Average rate of participation was approximately 58% (58% of clients attending therapy consented to participate in the research). Prior to the first session, clients received an information packet including purpose and description of the study, participant's rights concerning confidentiality and withdrawing from the study, and a consent form. As part of this packet, clients were administered the OQ-45 in order to assess initial levels of distress. For all subsequent weeks, they completed the sPaCE questionnaire every time they attended a counseling session at the beginning of the visit. Finally, they completed the OQ-45 again at the end of the treatment in order to obtain a final measure of distress post-treatment. This was a naturalistic study and no experimental interventions were done. The initial data collected consisted of 699 subjects. However, 207 subjects did not meet the criteria (having attended at least 3 session) and thus, were removed from the final sample (N = 492).

Analysis

Multilevel LCM in SEM. The model design encompassed three main components: (1) a curvilinear trajectory, (2) a multilevel structure to account for therapist effects, and (3) a prediction component. First, a quadratic *latent curve model* (LCM; see e.g., Bollen & Curran, 2006) in Structural Equation Modeling (SEM) was used to model the non-linear trajectory of the observations over time. This approach allowed for testing the first hypothesis (trajectory following a curvilinear pattern of change). LCM is based

on a standard linear regression model and includes an additional powered term (i.e., "time squared" or "quadratic term"—*Q*) to model a curvilinear pattern over time (Cohen, 1978). Time (1 to 14 weeks) was coded subtracting one to the week (*week number* – 1). A quadratic curve is thus represented by latent (non-observed) growth variables: *intercept* (*I*) or level of symptomatology at time 1, linear term (*S*) or *slope* of curve at time 1, and *quadratic* term (*Q*) or curvature of the trajectory. Loadings between latent growth parameters and observations are a function of time: intercept loadings as t^0 (1), slope loadings as *t* (0 to 13), and quadratic loadings as t^2 (0, 1, 4, 9, 16..., 169). For cubic trajectories, loadings would be represented as t^3 (0, 1, 8, 27…, 2197).

Second, the multilevel component was included in order to account for the third level in the hierarchical data structure (therapist) and to examine inter-individual differences (differences between therapists). Controlling for therapist effects is relevant, as omitting this information can lead to biased or inaccurate results (Falkenström et al., 2013; Owen, Drinane, Idigo, & Valentine, 2015; Tasca, Illing, Joyce, & Ogrodniczuk, 2009). A multilevel SEM approach proposed by Muthén (1989, 1994) was used in this design in order to incorporate the information about therapists. This multilevel approach decomposes data in two orthogonal parts (Hox & Maas, 2004): an intra- individual part—"within" — and a group part — "between" — (*within-therapists* and *between therapists* in this design).

Third, a predictive component was added to test the second hypothesis (curvilinear trajectory predicting final outcome). The *predictors* were the latent parameters of the best fitting model. The *criterion* was final outcome. Final outcome was measured by taking into account both the pre- and post-treatment scores of OQ-45, given

that different clients started with different levels of distress. Experts have examined various approaches to assess final outcome in longitudinal research, such as difference-scores and residual change scores (see e.g., Allison, 1990; Cronbach & Furby, 1970; Willet, 1988; Willet, 1997). Difference scores are obtained by subtracting post- from pre-test scores. Residuals scores can be computed by regressing post-test scores on pre-test scores, or by subtracting pre- times the correlation between pre- and post- from post-test Z scores using the following formula: $RG = Z_2 - Z_{2*} r_{12}$ (see e.g., Steketee& Chambless, 1992).

For this study, *residual change scores* were used as a measure to represent final outcome (OQres) for several reasons. First, residual scores were developed to obtain a "measure of individual change that is uncorrelated with initial status" (Willet, 1996, p. 380). And second, residual scores not only account for initial differences across individuals but also for measurement error (Beutler & Hamblin, 1986; Mintz et al., 1979; Steketee & Chambless, 1992). Steketee and Chambless (1992) explain that calculating residual scores involves a procuress of re-scaling "an individual's score relative to typical gains made by others at the same initial level" (p. 394). They argue that residual scores represent an appropriate measure of change, but given that the interpretation of residual change is less intuitive than those of change scores or percent-change scores, the use of residuals scores in research has been limited. In general, lower residuals represent more change and were an indicator of successful outcome in this study (lower levels of final symptomatology after accounting for initial symptomatology). Conversely, higher residuals indicate poor outcome (higher levels of final symptomatology after accounting for initial symptomatology).

To further evaluate the predictive power of the latent growth parameters, *"reliable improvement"* was also used a criterion variable. The Reliable Change Index (RCI; Jacobson & Truax, 1991) determines if individual change is statistically reliable. Using the RCI is a recommended way to measure change (see e.g., Speer, 1992; Wise, 2004). The RCI for the OQ-45 is 14 points (Lambert et al., 1996), a cut-off that helps identify clients who improve. Therefore, I identified subjects who experienced a decrease of 14 points in symptoms, and considered their improvement as reliable change. A binary variable (1, 0) was created to indicate if clients reliably changed from intake to termination (1) or not (0), and this variable (*reliable improvement*) was used as the criterion variable in the predictive component along with residuals. See Figure 1 for final LCM of the hypothesized quadratic trajectory.

The three design components described above (curvilinear, multilevel, and predictive) were included in the design, and the model building process started with simple models. Progressively, more components were added to build more complex models (Rodgers, 2010). This approach is recommended, as issues with convergence are difficult to manage in more elaborate models. First, a linear model, containing only the intercept (*I*) and the slope (*S*) parameters, was developed. Next, the multilevel component ("within" and "between") was added to account for therapist effects. Subsequently, a quadratic term (*Q*) was added to create an LCM depicting curvilinear change. Finally, the distal outcome (*Y*) was added to the model by regressing final outcome (residual scores) from the latent parameters (e.g., *I, S, Q*) at both within and between levels.

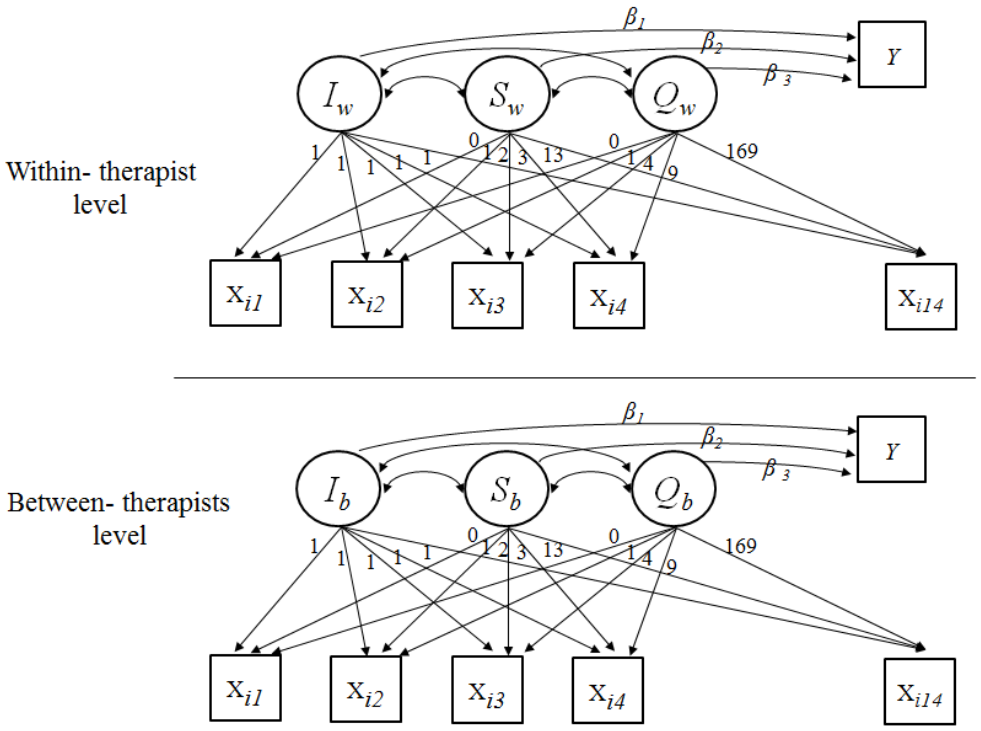

Fig. 1. Multilevel Latent Curve Model (multilevel LCM) of 14 longitudinal observations (X_i) over time depicting quadratic latent parameters (I = intercept, S = slope, Q = quadratic) predicting final outcome (Y) as conceptualized by symptom change (residuals) or reliable change at both within- and between-therapist levels.

Model fit was examined at overall model level (Chi-Square Test of Model Fit), as well as with multiple fit indices (see e.g., Hu & Bentler, 2000; Kline, 2005). Fit indices included, the chi-square test of exact fit, the root mean square error of approximation (RMSEA < .08), the standardized root mean square residual (SRMR < .08), the comparative fit index (CFI > .90), and the Tucker-Lewis index (TLI > .90). According to recommendations, CFI and TLI have to be corrected in order to obtain informative indices when RMSEA values are particularly small (Kenny, 2015; Kenny, Kaniskan, & McCoach, 2015). Prediction of final outcome was subsequently assessed by examining the effect size and significance of the R^2 values and regression coefficients.

Data characteristics. Patterns of missing data were examined prior to the analyses. The proportion of missing data was approximately 47% over 14 longitudinal observations, with higher proportions of missingness occurring in the last 5 points in time. The average number of longitudinal measures collected for each client was 7 (M = 6.8; SD = 2.63; range = 3 to 14). A Little's MCAR test was carried out (Little, 1988), and results showed that data were *not* missing completely at random, χ^2 (108) = 226,029,725. 27, $p < .001$. This makes sense considering that the proportion of missing data was particularly high for late observations of sPaCE (t = 10 to t = 14). It is important to note that other mechanisms of missing data could have been present (e.g., missing at random—MAR or not missing at random—NMAR) but they were not examined. Nevertheless, experts contend that using full information maximum likelihood (FIML) estimation is appropriate to address missing data under "ignorable data conditions" like MCAR or MAR (Enders & Bandalos, 2001; p. 430), so FIML was used in this study. FIML allows for the examination of all data in longitudinal studies (as if all subjects were measured at each point in time) while dealing with selection bias during the sampling process (MacArdle & Grimm, 2014).

Normality of the data was examined with the Shapiro-Wilk test (Shapiro & Wilk, 1965). The univariate examinations of each variable showed that the data did not approximate a normal distribution (except for sPaCE scores at t = 12, 13, and 14 which had high levels of missing data). We therefore used *robust maximum likelihood* as the estimation method. All analyses were conducted in the statistical software Mplus v.7.2 (Muthén & Muthén, 2014).

CHAPTER IV

Results

Descriptive Statistics and Initial Data Screening

Descriptive statistics including means, standard deviations, and correlations among longitudinal scores of sPaCE, and pre- and post-OQ45 are included in Table 1. Given that data are not independent (clients are nested within therapists), these figures should be examined with caution. Measures of sPaCE were strongly correlated with other sPaCE observations at different times as expected ($.70 < r < .97$). They also showed moderate to high correlations with scores of OQ-45 at intake ($.40 < r < .82$) and termination ($.59 < r < .86$). Comparing pre- OQ-45 scores ($M = 73.52$; $SD = 23.58$) with post-OQ-45 scores ($M = 63.79$; $SD = 26.53$), there was a decrease in symptomatology at the end of the treatment. Similarly, initial sPaCE scores (session = 1; $M = 22.64$; $SD = 13.94$) compared to later scores (session = 10; $M = 19.01$; $SD = 14.48$) showed symptomatology decrease.

As clients were nested within therapists, the variability of the data within and between groups of therapists was examined. The longitudinal data, as measured by sPaCE, was part of a three-level structure: level 1 (longitudinal observations), level 2 (client), and level 3 (therapist). Final outcome as measured by OQ-45 was part of a two-level structure (clients and therapists). The intraclass correlation (ICC), which describes the distribution of variance across levels, was calculated to examine the nested structure. The ICC of the longitudinal data as measured by sPaCE was approximately 13% (ICC = .134), meaning that 13% of the variability in the longitudinal data was explained by differences between therapists. The ICC of the final outcome variable as measured by

OQ-45 (residuals) was less than 1% (.003). In sum, the substantial ICC of the longitudinal data supports the model design representing a three- level structure: *level 1*- observations over time, *level 2*- clients, and *level 3*- therapists.

Given the high proportion of missing data at the end to the treatment, models at time 11 to 14 presented identification issues and did not converge (probably due to low variance). The following analyses were carried out using 10 longitudinal observations, which represent over 70% of the treatment duration.

Table 1

Correlations and Descriptive Statistics among Observed Variables (N= 492)

Measure	*N*	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
sPaCE_1	492	22.64	13.94	1																
sPaCE_2	492	21.23	14.52	.80**	1															
sPaCE_3	491	20.71	14.58	.80**	.82**	1														
sPaCE_4	428	20.61	15.27	.78**	.80**	.86**	1													
sPaCE_5	374	19.64	14.89	.77**	.79**	.83**	.85**	1												
sPaCE_6	315	19.02	14.7	.75**	.80**	.79**	.85**	.88**	1											
sPaCE_7	258	19.93	14.92	.74**	.75**	.74**	.84**	.84**	.85**	1										
sPaCE_8	209	19.7	14.57	.72**	.70**	.71**	.78**	.80**	.82**	.86**	1									
sPaCE_9	154	19.48	14.43	.76**	.78**	.77**	.87**	.83**	.84**	.86**	.85**	1								
sPaCE_1	97	19.01	14.48	.77**	.79**	.83**	.86**	.88**	.87**	.88**	.88**	.91**	1							
sPaCE_1	41	19.07	12.6	.78**	.72**	.79**	.83**	.85**	.88**	.87**	.89**	.84**	.87**	1						
sPaCE_1	12	23.75	17.52	.91**	.85**	.86**	.76**	.88**	.85**	.79**	.78**	.83**	.97**	.93**	1					
sPaCE_1	4	29.5	19.84	0.91	0.75	0.89	0.86	0.82	.99**	0.92	0.82	0.94	0.95	.97*	.97*	1				
sPaCE_1	1	22	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†			
pre_OQ4	473	73.52	23.58	.69**	.61**	.60**	.58**	.56**	.61**	.57**	.57**	.57**	.57**	.40*	.82**	0.54	†	1		
post_OQ	312	63.79	26.53	.66**	.66**	.66**	.72**	.71**	.74**	.75**	.74**	.75**	.81**	.82**	.86**	0.84	†	.59**	1	
OQ45res	302	-0.01	0.48	.29**	.36**	.37**	.45**	.44**	.45**	.50**	.48**	.45**	.58**	.71**	.77**	0.93	†	-0.05	.78**	1

**p < .05, **p < .01, † = N/A*

Multilevel Latent Curve Modeling (Multilevel LCM)

A linear model was developed first as a baseline. This model included two latent growth parameters (intercept—*I* and slope—S). *Between*- and *within*- therapist components were included in order to account for the multilevel structure. Model fit of the multilevel linear model was examined through the Chi-Square Test of Model fit and individual fit indices, which showed a moderate fit (χ^2 (92) = 176.619, $p < .001$; RMSEA

= .043; $SRMR_{within}$ = .024; $SRMR_{between}$ = .006; CFI = .711; TLI = .695). See model fit statistics in Table 2.

Table 2. Model Fit Statistics

Model	*M*	*var*	χ^2	*df*	RMSEA	$SRMR_{within}$	$SRMR_{between}$	CFI	TLI
1. Linear Model			176.619**	92	0.043	0.024	0.06	0.711	0.695
Intercept within	22.276**	141.278**							
Slope within	-0.511**	1.013**							
Intercept between	22.276**	30.467*							
Slope between	-0.511**	0.032							
2. Quadratic Model			134.989**	85	0.035	0.020	0.038	0.829	0.805
Intercept within	22.690**	132.072**							
Slope within	-0.872**	2.713*							
Quadratic within	0.046*	0.007							
Intercept between	22.690**	31.919**							
Slope between	-0.872**	1.475*							
Quadratic between	0.046*	0.017							
3. Cubic Model			69.357	76	0.000	0.016	0.033	1.000	1.000
Intercept within	22.943**	132.835**							
Slope within	-1.368**	18.643**							
Quadratic within	0.211*	1.314**							
Cubic within	-0.013	0.007							
Intercept between	22.943**	32.636**							
Slope between	-1.368**	0.941							
Quadratic between	0.211*	0.041							
Cubic between	-0.013	0.000							

Note: RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index(CI): 90% Confidence Interval for RMSEA. *$p < .05$, **$p < .01$

Next, a quadratic term (*Q*) was added to the baseline (multilevel linear) model in order to build a curvilinear *quadratic* trajectory of change. This included the three latent growth parameters (intercept—*I*, slope—S, and quadratic term—*Q*) at within and between levels. The overall model fit and fit indices showed that the quadratic model fit the data well (χ^2 (85) = 134.989, $p < .001$; RMSEA = .035; $SRMR_{within}$ = .02; $SRMR_{between}$ = .038; CFI = .829; TLI = .805).

Given that some studies identified cubic patterns (e.g., Vermote et al., 2009), a cubic model was tested. Mean scores of this sample showed a drop in symptoms by

session six (M = 19.02), followed by an increase in symptoms in session seven (M = 19.93), potentially suggesting a cubic trend. A cubic model was thus estimated by adding a cubic term (C) to the quadratic model. Even though individual fit indices for the cubic model showed acceptable values in terms of cut off criteria, both the cubic term and the test of model fit were not significant (χ^2 (76) = 69.357, p = .69; RMSEA = .000; $SRMR_{within}$ = .016; $SRMR_{between}$ = .033; CFI = 1.000; TLI = 1.000).

Given that the cubic model was not significant, the linear and the quadratic models were compared. The Chi-Square values of the *linear* model (χ^2 (92) = 176.619, p < .001) and the *quadratic* model (χ^2 (85) = 134.989, p < .001) were examined. Results of the Likelihood Ratio Chi-Squared difference test showed that the quadratic growth curve was significantly better than the linear curve (χ^2 (7) = 41.63, p < .001). Also, lower values of RMSEA and SRMR and higher values of CFI and TLI supported the superiority of the quadratic model. Moreover, the coefficient of the *quadratic term* was significant (t = 2.270, p = .023), justifying the quadratic term in order to represent the growth curve (see Fig. 2 for estimated mean quadratic trajectory of data).

A visual inspection of the average *quadratic* trajectory showed additional characteristics. The trajectory showed steeper slopes in the first 4 to 5 sessions and then, symptoms leveled off. This was confirmed by obtaining tangents (values of the slopes at individual points in time such as t = 1, 2, 3, etc.), calculated with the derivative of the quadratic equation. Values of theses slopes showed less steep tangents starting around time 5.

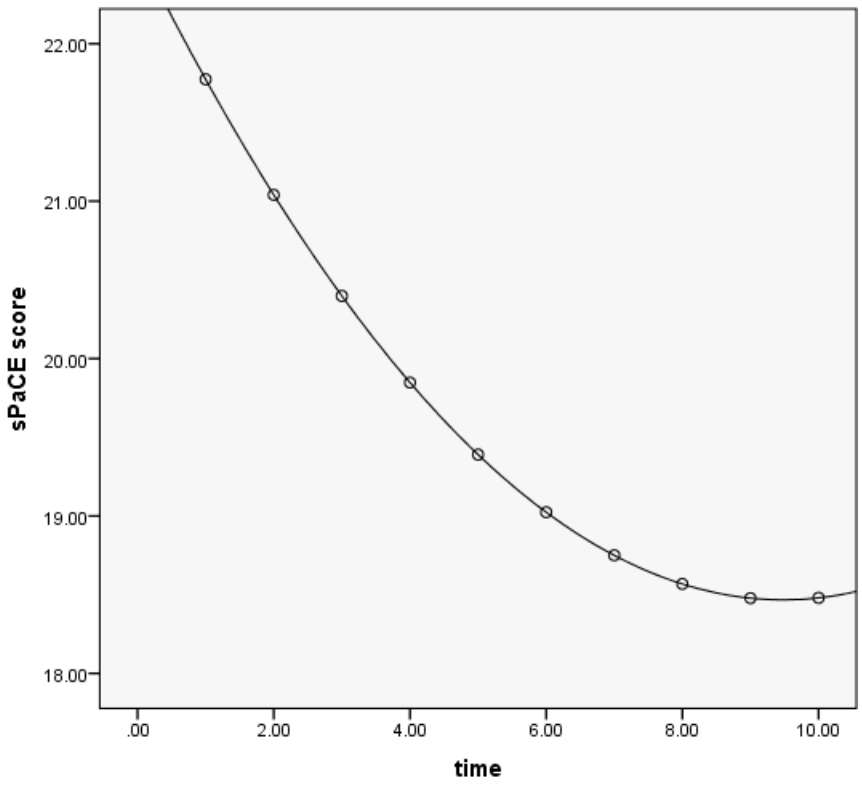

Fig. 2. Estimated mean symptomatology change trajectory as measured by sPaCE

To further identity differences in individual sPaCE *quadratic* trajectories within clusters of clients of a given therapist and across therapists, the means, variances, and correlations of the latent parameters (IW, SW, QW, IB, SB, and QB) were examined (see Table 2 and Table 3). The overall mean intercept (M = 22.690; SD = 13.94; $p < .001$; range = 5 to 65; 0 = low; 76 = high) indicated that on average, clients started with a moderate level of distress of 22.690 at session one (intake). The negative mean slope at session one (M = -0.872, $p < .001$) indicates a decreasing rate of change (decreasing symptomatology). The mean quadratic term describes a small level of curvature (M = 0.046, p = 0.023). The tree growth parameters depict a descending quadratic curve (partial "U"-shaped) with small curvature. The time-1 variance of the intercepts and

slopes at both within-therapist (IW, SW) and between-therapists level (IB, SB) were significant. This indicates that individual initial symptomatology differ from the mean initial symptomatology. This variance was particularly high at within-therapist level (var = 140.339, $p < .001$) suggesting that clients of the same therapist widely vary in terms of initial symptomatology. Correlation values indicate that there were associations among latent growth parameters. Some correlations were particularly high, such as between SW and QW, and SB and QB.

Table 3. Correlations among quadratic latent growth parameters at both within- and between therapist levels

Parameter	*1*	*2*	*3*	*4*	*5*	*6*
1. Intercept within -IW	1.00					
2. Slope within -SW	0.34	1.00				
3. Quadratic within- QW	-0.69	-0.92	1.00			
4. Intercept between- IB	0.48	0.10	-0.29	1.00		
5. Slope between- SB	-0.03	0.20	-0.12	-0.46	1.00	
6. Quadratic between- QB	-0.02	-0.21	0.15	0.37	-0.99	1.00

In sum, results showed support for a quadratic trajectory. The three pieces of information (the model fit indices, the Likelihood Ratio Chi-Squared difference test, and the significance of the quadratic term) supported a downward *quadratic growth curve model* with clients nested within therapists. This provided the foundation to test the hypotheses.

Next, the *predictive* component was added to the quadratic model. Predictors were the latent growth parameters (intercept—*I*, slope—*S*, and quadratic—*Q*), and they were added at both within- (IW, SW, QW) and between-therapist (IB, SB, QB) levels. Criterion variables were the residuals of post-OQ45 regressed on pre-OQ45 (OQRes) as well as the RCI. Prediction was tested at both within- and between-therapist levels.

A correlation assessment of the predictors showed moderate to high multicollinearity among the latent growth parameters at both within-therapist level (IW, SW, QW; $.34 < | r | < .92$) and between-therapist level (IB, SB, QB; $.12 < | r | < .99$). Multicollinearity between SW and QW ($r = -.92$) and QB and SB ($r = -.99$) were particularly high. Also, the high variance inflation factor (VIF) scores for these latent growth variables supported the presence of high multicollinearity. High predictor collinearity makes the interpretation regression coefficients challenging and may lead to imprecise estimations (see e.g., Hutcheson & Sofroniou, 1999).

The quadratic model with all predictors at within- (IW, SW, QW) and between-therapist (IB, SB, QB) did not converge even after predictors were centered, most probably due to the high multicollinearity among predictors. To solve this issue, predictors (latent growth parameters) were included individually and multiple models were estimated (see Table 4 for regression results).

I estimated models 1 to 3 to test hypotheses with *residuals* (change in symptoms) as the criterion variable (*lower* residuals indicate *successful* outcome and *higher* residuals indicate *poor* outcome). Models marked as "a" examined within-therapist effects and models marked as "b" examined between-therapist effects. Models 1a and 1b tested hypothesis 1 (high initial symptomatology will be associated with poor outcomes). Models 2a and 2b tested hypothesis 2 (steeper slopes will predict good outcomes). Model 3a and 3b tested hypothesis 3 (high curvature will be associated with good outcomes).

Table 4. Regression Results. Predicting Final Outcome by Sets of Predictors (N = 492)

Model parameters by criterion variable	R^2_{within}	$R^2_{between}$	B (SEB)	β
Residual Models				
1a. Quadratic residuals -IW	.16**			
IW			0.016 (0.003)**	0.404**
1b. Quadratic residuals -IB		.96**		
IB			0.028 (.008)**	0.981**
2a. Quadratic residuals -SW	.38**			
SW			0.194 (0.36)**	0.615**
2b. Quadratic residuals -SB		†		
SB			0.864 (.027)**	1.080**
3a. Quadratic residuals- QW	.28*			
QW			-2.732 (.612)**	-0.529**
3b. Quadratic residuals- QB		†		
QB			-5.967 (.111)**	-1.04**
RCI models				
4a. Quadratic RCI -IW	.01			
IW			-0.004 (.003)	-0.098
4b. Quadratic RCI -IB		.83		
IB			-.021 (.011)*	-0.91
5a. Quadratic RCI- SW	.12*			
SW			-0.112 (0.023)**	-0.35**
5b. Quadratic RCI- SB		.01		
SB			.006 (.197)	0.091
6a. Quadratic RCI- QW	.06			
QW			1.729 (0.481)**	0.24
6b. Quadratic RCI- QB		.04		
QB			.120 (3.172)	0.208

Note: IW = intercept within; SW= slope within; QW= quadratic within;
IB = intercept between; SB= slope between; QB= quadratic between;
RCI= Reliable Change Index; *p < .05, **p < .01, † = undefined

For the hypotheses with *reliable improvement* as criterion, I estimated models 4 to 6. Models marked as "a" examined within-therapist effects and models marked as "b" examined between-therapist effects. Model 4a and 4b tested hypothesis 4 (low initial symptomatology will be associated with reliable improvement from intake to

termination). Models 5a and 5b tested hypothesis 5 (steeper slopes will predict reliable improvement from intake to termination). Models 6a and 6b tested hypothesis 6 (high curvature will be associated with reliable improvement from intake to termination).

Results using individual predictors at *within-therapist level* showed significant R^2 values and coefficients. Results using individual predictors at *between-therapist level* showed high or undefined R^2 values. However, coefficients *were significant*. The high R^2 values are potentially due to the low intraclass correlation of level-2 variables, such as OQ-45 residuals ($ICC_{residuals}$ = .003). This ICC for residuals suggests that level-2 variables within therapists appear to be no more similar than the values from different therapists. However, experts warn that low ICC values do not always justify *not using* multilevel designs (Nezlek, 2008). Little between-group variability within a measure does not mean the relation between this measure (e.g., residuals) and other measures (e.g., latent growth parameters) is the same across clusters (Nezlek, 2008). Moreover, the ICC of the level-1longitudinal observations (sPaCE) was substantial (ICC_{sPaCE} = .134), and thus the multilevel approach was justified. Furthermore, Muthén (2014) argues that when the sampling distribution or R^2 is not close to a normal distribution, it might affect R^2 values, and focusing on the coefficients is advised. Considering all these factors, the analysis of the results will focus on coefficients (see Table 4 for regression results).

The results showed confirming results for the hypotheses. Findings using *residuals* as criterion are as follows. Models 1a and 1b, which contained the intercept (initial symptomatology) as predictor, showed that *higher initial symptomatology was associated with poor outcomes* at within- and between-therapist levels, supporting hypothesis 1. Models 2a and 2b tested the initial slope as predictor. Results showed that

more positive (upward) slopes are associated with *poor* outcome and *more negative (downward)* slopes are associated with *good* outcome at within- and between-therapist levels. This finding supported hypothesis 2. Models 3a and 3b tested the level of curvature as a predictor of final outcome. Results showed that *higher curvature was associated with better outcomes* at within- and between-therapist levels. This finding supported hypothesis 3. In sum, models 1 to 3 suggested that the growth parameters accounted for up to 38% of the variance in final outcome (symptom change in general distress) as assessed by the OQ-45.2. They showed that *low* initial symptomatology, *steep downward* slopes, and *high* curvature were associated with *better* outcomes. In contrast, *high* initial symptomatology, *flatter or upward* slopes and *low* curvature were associated with *poor* outcomes.

Results using *reliable improvement* as criterion are as follows. Models 4a and 4b tested hypothesis 4 (high initial symptomatology will be associated with reliable improvement). Results showed an *inverse* association between *initial symptomatology and reliable improvement* at between-therapist level only (the higher the initial symptomatology, the lower the reliable improvement). Hypothesis 4 was supported at between-therapist level. Models 5a and 5b tested hypothesis 5 and included the initial slope as predictor. The negative coefficient showed an inverse association between the slope and reliable improvement: more negative (*downward)* slopes are associated with *reliable improvement* at within-therapist level. These results supported hypothesis 5. Models 6a and 6b tested the level of curvature as a predictor of final outcome. Results showed that a *high curvature was associated with better outcomes* at within-therapist level. This finding supported hypothesis 6 at within-therapist level. In sum, results of

models 4 to 6 suggested that the growth parameters accounted for up to 12% of the variance in *reliable improvement* from intake to termination. For *reliable improvement* at *within*-therapist level, successful outcomes followed a pattern of *high* initial rate of change (slope) and *high* curvature. For *reliable improvement* at *between*-therapist level, successful outcomes were associated with a pattern of *low* initial levels of depression and anxiety.

There are four main conclusions based on the results. First, a descending quadratic curve (partial "U"-shaped) best described symptomatology change in depression and anxiety. Second, there are multilevel patterns of change associating characteristics of the curve and outcome. Third, the pattern for successful outcome in terms of *symptom change* (lower levels of symptomatology) at both within- and between-therapist levels is: *low* initial symptomatology, steep downward initial slopes (high initial rates of change), and *high* curvature. Finally, the pattern for *reliable* improvement had differences at within- and between therapist levels. At within-therapist level, the pattern was steep downward initial slopes (high initial rates of change) and *high* curvature. At between-therapist level, the pattern was *low* initial symptomatology. Next, I will discuss these findings providing interpretations and highlighting conclusions. I also present implications for practice, limitation of this study, as well as future recommendations.

CHAPTER V

Discussion

Patterns of change can contribute to the understanding of the mechanisms that make psychotherapy work. This can be done by pinpointing key times during the treatment when substantial change is occurring or not, and determining if the way symptoms evolve (e.g., levels of symptomatology at different times, rate of change) is related to final treatment outcome. Past studies primarily focused on patterns by subgroups (latent classes) associated to final outcome. Characteristics of the change curve (e.g., initial symptomatology, rate of change, variability in the rate of change) and the association with outcome have been examined separately rather than as a whole. In addition, data dependency and therapist effects due to the *multilevel* nature of psychotherapy data have been disregarded.

These aspects were addressed in the present study using a multilevel latent change curve analysis. The sPaCE (Halstead et al., 2007), a measure that captures two of the most common presenting problems in therapy, depression and anxiety, was used to measure longitudinal symptomatology. The OQ-45.2 (Lambert, et al., 1996) was used to assess final outcome (pre- to post- treatment gain) in general symptomatology. After finding support for a quadratic trajectory of change, major findings of this study are the identification of patterns of change associated with good and poor outcomes. The *shape of the mean trajectory* found in this study will be briefly addressed first. Then findings related to patterns of change with outcome will be discussed subsequently.

Shape of the Average Curve

First off, a multilevel model approach was followed to address the lack of *independence in the data* (clients nested within therapists). As argued by other researchers, controlling for therapist differences and addressing the lack of data independence in the design is crucial and recommended regardless of the level of the effect (Falkenström et al., 2013). In this study, results showed a substantial proportion of variance in the longitudinal data (13%) explained by differences in therapists.

Three multilevel trajectories were estimated: linear, quadratic, and cubic. The results provided support for a quadratic trajectory. Even though there was a drop in symptoms by session six (M = 19.02), followed by an increase in symptoms in session seven (M = 19.93), this single drop in session six did not support a cubic trajectory. The quadratic trajectory was significant and superior compared to the linear and cubic trajectories. Accordingly, this mean trajectory of depression and anxiety symptomatology depicts a descending quadratic curve (partial "U"-shaped). There is an important decrease in symptoms in the first 4 to 5 sessions followed by symptoms that level off and the trajectory presents a low curvature over time.

Mean quadratic trajectories with similar early decrease of symptoms have been found in single-level studies in depression and anxiety. For instance, Ilardi and Craighead (1994) identified substantial reduction of symptoms by session 4, followed by symptoms that leveled off in a sample of clients with depression. Similarly, Kopta et al. (1994) found that clients with acute distress symptoms (anxiety, depression, somatization, and compulsive behavior) showed significant improvement (50%) by session 5. A similar pattern of early improvement (by session 4 or 5) has been identified in the change

trajectories of other presenting problems besides depression, such as panic disorder (Penava et al., 1998) and bulimia (Grilo et al., 2001).

In sum, the examination of different trajectories showed that the mean trajectory depicts a descending quadratic curve (partial "U"-shaped) with an important decrease in symptoms in the first 4 to 5 sessions followed by symptoms that level off, and the trajectory shows low overall curvature. It is important to note that this is the shape of the *average trajectory*, encompassing clients with successful and unsuccessful outcomes. Factors that predict successful outcomes will be discussed next.

Predicting Final Outcome

A multilevel quadratic trajectory of change was modeled and the characteristics of the curve (initial symptomatology, rate of change, and curvature) as represented by the growth parameters (*I, S, Q*) were used as predictors at within- and between-therapist levels. First, I expected initial symptomatology (initial sPaCE scores) to predict final outcome (low initial symptomatology to be associated with higher change in symptoms) and this argument was supported. Clients with higher initial depression and anxiety distress as measured by the sPaCE had less successful outcomes in terms of general symptomatology at termination as measured by the OQ-45.2. This finding is consistent with the literature. Past research has shown that low initial depression symptomatology is associated with positive outcomes (Allart-van Dam, Hosman, Hoogduin & Schaap, 2007). Conversely, clients with high symptom severity are frequently non-responders (see e.g., Taylor & McLean, 1993; Thibodeau et al,, 2014) or have poor outcomes (Herzog, Hartman, Sandholz, & Stammer, 1991), and only a portion of them recover with follow-up or post-treatment (Durham, Higgins, Chambers, Swan, & Dow, 2012). I also

expected the same effect with *reliable improvement* as criterion, hypothesizing that high depression and anxiety symptomatology as measured by the sPaCE would be associated with higher reliable improvement in general symptomatology. For reliable improvement, this was supported at between-therapist level. In sum, low initial symptomatology is related to *change in symptoms* at both within- and between therapist levels, and to *reliable improvement* at between-therapist level.

Second, fast initial change (steep downward initial slopes) predicted successful outcome. *Fast change* at session 1 in depression and anxiety was associated with *higher* reduction of general symptoms at termination. Fast initial change also predicted reliable improvement at between-therapist level. This is consistent with past studies that found associations between early decrease of symptoms and final symptom change or reliable improvement at termination (e.g., Haas et al., 2002; Lutz et al., 2009, 2014; Renaud et al., 1998; Stulz et al., 2007).

Fast early change may be related to several factors. For instance, Wright and colleagues (2014) argue that clients may seek services when *distress is very high*, responding fast to either specific interventions or common factors. The power of *common factors* early in the treatment might exert an important influence in early change, as researches have tested how early change can occur before introducing specific techniques (Ilardi & Craighead, 1994). Boswell and colleagues (2012) explain rapid improvement as an effect of readiness to change, which moderates initial levels of symptomatology and change. In addition, the "*flight into health*" or important *realizations* occurring at the beginning of the treatment of phenomenon might be related as well (Lambert, 2007; 2015). Further, a *placebo* effect experienced early in therapy might be related as well (see

e.g., Hubble, Duncan, Miller & Wampold, 2010). Experts have studied the power of placebos in psychotherapy (expectations, hope, remoralization, or the therapeutic relationship), and they have found that psychological placebos can be as effective as treatment (Wampold et al., 2015). Nevertheless, experts ultimately contend that the active factors *linking early response to outcome* are still unknown (Lambert, 2015). It is also important to highlight that distinguishing realistic from unrealistic or 'feigned' *fast improvement* is a relevant topic, especially in some problems such as suicidality, as clients may deny symptoms to avoid treatment or to leave treatment prematurely (Sholevar, 2008; Simon & Gutheil, 2009). In sum, results concerning initial rate of change (slope) indicated that change that is *fast* in the beginning (steep downward initial slopes) favors *symptom change* at both within- and between-therapist levels. Also, change that is fast in the beginning favors *reliable improvement* at within-therapist level only.

Third, high levels of curvature predicted successful outcomes: the more curvature (less linearity), the higher change clients showed at termination. Similarly, the less curvature, the less change in symptoms was present (this association applies only at within-therapist level when predicting *reliable improvement*). Results confirmed that curvature is more conducive to good outcome and it can be explained as follows. Multiple findings have consistently suggested that change is not linear (see e.g., Hayes et al., 2007). Lutz and colleagues (2009), for instance, found a specific pattern in a subgroup (an 'early improvement' latent class) with higher curvature compared to others subgroups with less curvature (more linear). This subgroup was associated with *better*

outcomes, as these clients showed the *highest reliable improvement.* The other patterns showed more linear trajectories and attained less reliable improvement.

In addition, high curvature might be associated with more major or "sudden" between-session improvement shifts and with a lack of worsening shifts at individual level (details that cannot be seen in the mean trajectory). For instance, successful subgroups presented high frequency of major improvement shifts (Lutz et al., 2009). Levels of "non-linearity" and "discontinuity" had been associated with recovery in other studies. Thompson and colleagues (1995) found a positive correlation between overall levels of non-linearity and recovery rate. They explained that clients with the greatest improvement had "unsteady rates of depression reduction" (p. 334). Furthermore, a level of homeostasis occurring later in the treatment and showing symptoms that level off might also be creating a curvature. This may also be related to the dose-effect relation, which indicates that the effect of therapy increases more slowly as therapy progresses (see e.g., Barkham et al., 2006; Dekker et al., 2005; Kadera, Lambert, & Andrews 1996; Kopta, 2003; Lutz, Lowry, Kopta, Einstein, & Howard, 2001). Finally, patterns found in previous studies about depression depict curvilinear quadratic change ("change in the rate of change") with early rapid response and symptoms that level off, and these patterns were associated with improvement (e.g., Grilo et al., 2006; Penava et al., 1998). The *early response rate* and *substantial decrease* in symptoms implies higher curvature. All in all, these studies suggest that high curvature is related to successful outcomes and give support to the results obtained in the present study.

For reliable improvement, findings did not apply at both levels (within- and between-therapist). Nevertheless, the direction of the association (direct/inverse) was

consistent with that of the residuals. At within-therapist level, steeper slope and high curvature were significant predictors. This means that for a given therapist, clients that change rapidly in the beginning will have better results than clients of the same therapist that change slowly in the beginning. Similarly, for a given therapist, clients with a higher curvature will have better results than clients of the same therapist with less curvature. At between-therapist level, only low initial symptomatology was a significant predictor. Thus, a therapist that on average his or her clients started with less severe initial symptoms, will have better results than other therapists with more severe symptoms on average. Reliable improvement was a dichotomous variable (yes/no) and a more 'strict' criterion compared to "change in symptoms" (residuals). Nevertheless, findings obtained for residuals (change in symptoms) in this study still have utility, as the idea of significant (reliable) change may be a subjective concept, and minor change might be meaningful depending on the individual or situation.

As an additional finding, these results also support the power of the sPaCE (as a measure that captures depression and anxiety) to predict change in general symptomatology. It is known that depression correlates with other psychopathologies, including substance use, non-affective disorders, disruptive behavior disorders, bipolar disorder, eating disorders, or general distress (see e.g., Gotlib, 1984; Gotlib, Lewinsohn, & Seeley, 1995; Kaufman & Charney, 2000; Rohde, Lewinsohn, & Seeley, 1991). In this study, the sPaCE showed the ability to predict change in general symptom distress as measured by the OQ-45.2. This supports previous studies about the predictive power of the sPaCE. For instance, the incremental validity of the sPaCE in terms of explanatory power compared to other measures was supported in a multilevel (bilevel) design

(Jimenez-Arista et al., in press). The sPaCE explained up to 12% of the variance in outcome measures of general symptomatology (OQ-45.2; Lambert et al., 1996) and up to 7% of the variance in interpersonal distress (IIP-32; Horowitz, Alden, Wiggins, & Pincus, 2000).

In sum, work done in the past examined *some* of the characteristics of the curve (initial level of symptoms, rate of change, curvature) *separately* and mainly by *subgroups* (latent classes). Multilevel approaches had not been followed. In this multilevel study, *all* of the three aspects were included to find patterns of change for successful and unsuccessful outcomes. First, I obtained a *mean* change curve: a descending quadratic, "U"-shaped trajectory with early improvement (first 4 to 5 session). In contrast to other studies based on subgroups, I used the aggregated information of the entire sample (rather than subgroups) to predict outcome and found patterns for successful and successful treatment. The quadratic growth curve of depression and anxiety had predictive power for both final outcome and *reliable* improvement in general symptomatology. Patterns for successful outcomes included *low* initial levels of depression and anxiety, *steep downward* slopes at session one, and *high* curvature. Finally, patterns for poor outcomes included *high* initial levels of depression and anxiety, *flat* or *steep* upward slopes at session one, and *low* curvature.

Implications for Practice

As mentioned, studying the shape of the symptomatology curve is relevant in order to understand the rate of change over time, identify when most change takes place, determine an optimal number of sessions, and analyze how individual trajectories differ from average trajectories. This can ultimately help us have better outcomes with clients.

The findings from this study shed light on various practical aspects. First, clinicians can expect that progress for the average client is *not steady*. This is consistent with past findings (see e.g., Cannon et al., 2010; Hayes et al., 2007; Rasmus et al., 2007). Second, a pattern for successful outcomes was found. Clinicians can expect that clients who follow this pattern (*low* initial levels of depression and anxiety, *steep downward* slopes at session one, and *high* curvature) can potentially have significant reduction in symptoms. Likewise, if clients are deviating from this trajectory, clinicians can suspect poor final outcomes. This is an opportunity for clinicians to change their therapeutic approach in the middle of the treatment and attempt to obtain better responses. Owen and colleagues (2015) advise, "[w]hen clients are not progressing as expected, therapists are encouraged to address alliance issues, change their approach to treatment, or address other external factors that might be negatively affecting treatment" (p. 817).

Third, clinicians can be cognizant when, on average, more change occurs. The average curve found in this study showed early response and supported past research (see e.g., Grilo et al., 2001; Ilardi et al., 1994; Penava et al., 1998) indicating that *faster* change happened in the first 4 to 5 sessions. Clinicians typically expect to have longer treatments or less desirable outcomes with late-responders (Roth & Fonagy, 2015), and treatment has been adjusted to provide additional support at follow-up for those clients (Haan et al., 1997). However, fast change in the *first session* for high risk client (e.g., suicidal behaviors) might not be conducive to good outcomes, as it can represent unrealistic change related to phenomena such as "flight into health," overcompensation, psychological placebo, feigning to terminate treatment, or change that lacks sufficient preparation.

Fourth, it is expected that not all clients will follow the same pattern conducive to successful outcomes. Responsiveness from clients varies widely and clients present different types of patterns. However, adequate and timely response from therapists is needed when clients show poor response trends. Stiles (2013) contends that, "appropriately responsive therapists adapt their interventions to these variations" (p. 38). *Therapist responsiveness*, as part of clinical competence, involves using constant information of clients' progress to pursue positive outcomes (Stiles, 2009). The importance of progress monitoring comes into play here (see e.g., Boswell et al., 2013; Lambert & Vermeersch, 2008). Clinicians can better respond and adjust interventions if they have clearer information about outcomes during the course of the treatment.

Limitations and Future Directions

The generalizability of these findings depends on several factors, such as the amount of data obtained as well as the characteristics of the sample. Concerning the data collection, there were considerable missing data similar to most longitudinal research. Data were particularly missing at the end of the treatment, and the average number of observations collected for each client was about 5. This number represents the measures that were *obtained* and not necessarily treatment *attendance* (clients might have attended more sessions without completing the questionnaires). Missing data were appropriately handled with recommended techniques, but it is possible that analyzing the 14 sessions instead of 10 would have yielded different results, as it is known that the frequency of measures impacts the 'precision' of the analyses (Cook & Ware, 1983; Schaie, 1986; Laurenceau et al., 2007; Schmidt & Teti, 2005). In addition, the high multicollinearity among predictors led to estimating separate models with single predictors, given that

multi-predictor models did not converge. Nevertheless, regression results and coefficients using residuals and reliable change as criterion variables were consistent with each other, providing reassurance about the results obtained.

In terms of the sample, no participants were excluded as long as they attended at least three sessions. However, clients who were willing to participate might have had different characteristics than the ones who decided not to be part of the study. For instance, it is unknown if the level of initial symptomatology affected clients' willingness to participate. As this was a naturalistic study, a variety of client presenting problems and therapist theoretical orientations were involved. Further, this sample included community clients; therefore, features of other populations (e.g., residential programs, psychiatric outpatient facilities) might not have been captured. The presenting problems in psychiatric populations are typically more severe and might require longer treatments and more time to show initial response, affecting the shape of the mean curve and the patterns of change for successful and unsuccessful treatment.

One additional factor to consider is the ethnic mix of this research. Minorities were underrepresented in this study, as seen in the differences between the ethnic composition and percentages in the general populating (U.S. Census Bureau, 2010) for the following groups: Hispanics (*13%* in this study versus *17%* in the general population), African Americans (*3%* versus *12%*), Asians (*3%* versus *6%*), and Native Americans (*1%* versus *2%*). Nevertheless, ethnic minorities continue to be underrepresented in mental health services (Holden et al., 2014; Leong & Zalibatseva, 2011; Miranda, 1996), so this sample might be similar to community clinical populations.

The contribution of this study was the understanding of patterns of change and how they predict therapy outcome: low initial symptomatology, fast initial rate of change and high curvature favors successful outcomes. To expand this understanding, further research might focus on explaining *what* makes clients present early responses and what makes the symptoms level off. Additional studies to examine factors (from the client or the therapist side) are still needed. Continuing to take therapists effects into account is relevant to avoid overstating precision and potentially biased results, and to obtain more comprehensive findings.

Another area of opportunity in the study of patterns of change is the examination of "sudden gains" which have been explored in single level analyses (see e.g., Tag & DeRubeis, 1999; Tang et al., 2002). Examining if sudden gains are related to some of the findings of this study (high curvature) by using a multilevel model and determining if gains are ultimately related to final treatment would be a further step.

Finally, this study followed a macro-analytic approach, examining *session to session* information. New trends in psychotherapy process include the use of *within-session* "microanalytic approaches," focusing on moment-to-moment behavior and examining the interrelation of variables at a given moment (see e.g., Busch et al., 2010; Greenberg, 2015). This approach can help researchers and practitioners first, understanding specific behavior within the session and context (Greenberg, 2015) and second, provide adequate and contingent responses (Kohlenberg & Tsai, 1991). As such, patterns of change can be studied from a microanalytic perspective, attempting to understand what lead to early change in each one of the first five sessions. The context and complexity of human behavior must be taken into account. Psychotherapy is a

"reciprocal process" with non-predictable inputs that constantly change during the interaction of the participants (Hubble et al., 2010; p. 34). To conclude, there are still many process research areas to explore. As psychotherapy research continues to evolve in focus and methodologies, the main question, 'how therapy works,' continues to offer a myriad of possibilities in the attainment of knowledge for the application in practice.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

ASU Knowledge Enterprise Development

APPROVAL: MODIFICATION

Cynthia Glidden-Tracey
CLS - Counseling and Counseling Psychology
480/965-2420
Cynthia.Glidden-Tracey@asu.edu

Dear Cynthia Glidden-Tracey:

On 4/14/2015 the ASU IRB reviewed the following protocol:

Type of Review:	Modification
Title:	Process Study of Counseling Using the OQ-45
Investigator:	Cynthia Glidden-Tracey
IRB ID:	0709002124
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• 2015 Counselor Letter_of_Consent rev 16February2015.pdf, Category: Consent Form; • 2015 Client Letter of Consent rev 16February2015.pdf, Category: Consent Form; • 2014 Counselor Letter_of_Consent rev 082014.pdf, Category: Consent Form; • 2014 Client Letter of Consent rev 082914.pdf, Category: Consent Form;

The IRB approved the modification.

When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc:

APPENDIX B

DATA COLLECTED 2006- 2014

APPENDIX C

SAMPLE MPLUS SYNTAX

```
TITLE: Regress Residuals on Intercept-Between
DATA: FILE IS MasterSPACE.dat;
VARIABLE: NAMES ARE Client ther_id SP1 sp2 SP3 SP4
    SP5 SP6 SP7 SP8 SP9 SP10 resids RC;
USEVARIABLES = sp1-sp10 resids;
missing = .;
CLUSTER = ther_ID;


ANALYSIS:
ESTIMATOR = mlr;
COVERAGE = 0;
H1ITERATIONS = 1000000;
TYPE = TWOLEVEL;
MITERATIONS = 10000;

MODEL:
%WITHIN%
     iw sw qw| sp1@0 sp2@1 sp3@2 sp4@3 sp5@4 sp6@5 sp7@6 sp8@7 sp9@8
    sp10@9;
     iw sw WITH qw;

%BETWEEN%
   ib sb qb| sp1@0 sp2@1 sp3@2 sp4@3 sp5@4 sp6@5 sp7@6 sp8@7 sp9@8
   sp10@9;
  ib sb WITH qb;
  resids ON ib;
```

APPENDIX D

INFORMED CONSENT

CONSENT FORM for CTC Clients
Examination of the counseling process

The purposes of this form are to provide you (as a prospective research study participant) information that may affect your decision as to whether or not to participate in this research and to record the consent of those who agree to be involved in the study. Participation is voluntary and will not affect the counseling services you receive as a client at the CTC.

RESEARCHERS

Professors Cynthia Glidden-Tracey, Terence Tracey, and Lisa Spanierman are a research team in the College of Letters and Sciences at Arizona State University and are inviting your participation in a research study.

STUDY PURPOSE

The purpose of the research is to clarify symptom and counseling process variables that will be used to track client progress over the course of counseling.

DESCRIPTION OF RESEARCH STUDY

If you decide to participate, then you will join a study in which we examine the changes in your concerns over the course of counseling. ***Your participation will involve filling out a symptom checklist like the one you have just completed prior to each of the counseling sessions. You will also be asked to complete a short questionnaire about your experience in counseling.*** In order to complete the questionnaires each week, you will be asked to arrive 5-10 minutes before each session. In addition, if you agree to participate please arrive 15 minutes early before your next session to complete a brief packet of 3 questionnaires, which we ask participants to complete at the beginning and the end of the semester. If you say YES, then your participation will last until the end of your counseling at the Counselor Training Center (CTC). Approximately 50-60 clients will be participating in this study this semester at the CTC.

RISKS

There are no known risks from taking part in this study, but in any research, there is some possibility that you may be subject to risks that have not yet been identified.

BENEFITS

Although there may be no direct benefits to you, the possible benefits of your participation in the research are that we may learn more about the questionnaires we use as well as how they provide information over the course of counseling.

CONFIDENTIALITY

All information obtained in this study is strictly confidential. The results of this research study may be used in reports, presentations, and publications, but the researchers will not identify you. In order to maintain confidentiality of your records, Professor Glidden-Tracey will ensure that all data will be number coded and that the list associating your name with the code number will be locked in a secure cabinet and destroyed at the conclusion of the study. Only the research team will have access to those code numbers.

WITHDRAWAL PRIVILEGE

Participation in this study is completely voluntary. It is ok for you to say no. Even if you say yes now, you are free to say no later, and withdraw from the study at any time. Your decision will not affect your receipt of services from the CTC. Nor will it affect your relationship with Arizona State University or otherwise cause a loss of benefits to which you might otherwise be entitled. Withdrawal from the study will mean that you will not be requested to complete any more forms but that the forms you completed to date can still be used in data analysis. If you wish your information previously completed to be deleted, please inform the research team.

COSTS AND PAYMENTS

There is no payment for your participation in the study.

VOLUNTARY CONSENT

Any questions you have concerning the research study or your participation in the study, before or after your consent, will be answered by members of the research team (Professor Cynthia Glidden-Tracey, 480-965-5067, Professor Terence Tracey, 480-965-6159, or Professor Lisa Spanierman, 480-727-2605, all at 446 Payne Hall).

If you have questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk; you can contact the Chair of the Human Subjects Institutional

Review Board, through the ASU Research Compliance Office, at 480-965-6788.

This form explains the nature, demands, benefits and any risk of the project. By signing this form you agree knowingly to assume any risks involved. Remember, your participation is voluntary. You may choose not to participate or to withdraw your consent and discontinue participation at any time without penalty or loss of benefit. In signing this consent form, you are not waiving any legal claims, rights, or remedies. A copy of this consent form will be given upon request.

Typing your name below indicates that you consent to participate in the above study.

_____ _____ _____

Subject's Signature Printed Name Date

INVESTIGATOR'S STATEMENT

"I certify that I have explained to the above individual the nature and purpose, the potential

benefits and possible risks associated with participation in this research study, have answered

any questions that have been raised, and have witnessed the above signature. These elements of Informed Consent conform to the Assurance given by Arizona State University to the Office for Human Research Protections to protect the rights of human subjects. I have provided (offered) the subject/participant a copy of this signed consent document."

Signature of Investigator_____

Date_____

APPENDIX E

DEMOGRAPHIC FORM

Please select the best response

Sex
□ Female
□ Male

Family Size *(including yourself)*
□ 1
□ 2
□ 3
□ 4 or more

Age
□ 0-18
□ 19-25
□ 26-35
□ 36-49
□ 50+

Family Income
□ $0 - $9,999
□ $10,000- $19,999
□ $20,000- $29,999
□ $30,000- $39,999
□ $40,000 +

Ethnicity
□ White
□ Black
□ American Indian
□ Hispanic
□ Asian/ Pacific Islander
□ Others

Client Type
□ Student Part-time
□ Student Full-time
□ Staff/Faculty Part-time
□ Staff/Faculty Full-time
□ Community member

Marital Status
□ Single
□ Married
□ Divorced
□ Widowed
□ Living w/Significant Other

Disability
□ Not Disabled
□ Physically Disabled
□ Developmentally Disabled

APPENDIX F

SHORTER PSYCHOTHERAPY AND COUNSELLING EVALUATION (SPACE)

Shorter Psychotherapy and Counselling Evaluation (sPaCE)

This questionnaire is about problems or difficulties that people may have. It is concerned with how you have felt in the last two weeks, including today.

The statements below refer to problems or difficulties that may have distressed you over the last two weeks. Please read each statement carefully. **Circle** the number to the right that best indicates how much you have been bothered or distressed. For example, if ''Finding it an effort to remember things'' has distressed you ''Quite a bit'', circle 3.

During the last two weeks, how much were you distressed by:

	0	1	2	3	4
	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Finding it an effort to remember things	0	1	2	3	4
2. Thoughts about killing myself	0	1	2	3	4
3. Feeling anxious or nervous	0	1	2	3	4
4. Feeling hopeless	0	1	2	3	4
5. Having to avoid things because they frighten me	0	1	2	3	4
6. Not being able to get going	0	1	2	3	4
7. Finding it hard to concentrate	0	1	2	3	4
8. Wanting to harm myself	0	1	2	3	4
9. Panicky feelings	0	1	2	3	4
10. Feeling worthless	0	1	2	3	4
11. Feeling afraid to go out	0	1	2	3	4
12. Feeling tired most of the time	0	1	2	3	4
13. Feeling confused	0	1	2	3	4
14. Impulses to cut or mutilate myself	0	1	2	3	4
15. Feeling tense	0	1	2	3	4
16. Feeling life is pointless	0	1	2	3	4
17. Feeling anxious in crowds	0	1	2	3	4
18. Having no energy	0	1	2	3	4
19. Having difficulty making decisions	0	1	2	3	4

APPENDIX G

OUTCOME QUESTIONNAIRE (OQ-45.2)

Outcome Questionnaire (OQ-45.2)

Instructions: Looking back over the last week, including today, help us understand how you have been feeling. Read each item carefully and mark the box under the category which best describes your current situation. For this questionnaire, work is defined as employment, school, housework, volunteer work, and so forth. Please do not make any marks in the shaded areas.

	Never	Rarely	Sometimes	Frequently	Almost Always
1. I get along well with others.	4	3	2	1	0
2. I tire quickly.	0	1	2	3	4
3. I feel no interest in things.	0	1	2	3	4
4. I feel stressed at work/school.	0	1	2	3	4
5. I blame myself for things.	0	1	2	3	4
6. I feel irritated.	0	1	2	3	4
7. I feel unhappy in my marriage/significant relationship.	0	1	2	3	4
8. I have thoughts of ending my life.	0	1	2	3	4
9. I feel weak.	0	1	2	3	4
10. I feel fearful.	0	1	2	3	4
11. After having a drink, I need a drink the next morning to get going. (If you do not drink mark "never")	0	1	2	3	4
12. I find my work/school satisfying.	4	3	2	1	0
13. I am a happy person.	4	3	2	1	0
14. I work/study too much.	0	1	2	3	4
15. I feel worthless.	0	1	2	3	4
16. I am concerned about family troubles.	0	1	2	3	4
17. I have an unfulfilling sex life.	0	1	2	3	4
18. I feel lonely.	0	1	2	3	4
19. I have frequent arguments.	0	1	2	3	4
20. I feel loved and wanted.	4	3	2	1	0
21. I enjoy my spare time.	4	3	2	1	0
22. I have difficulty concentrating.	0	1	2	3	4
23. I feel hopeless about the future.	0	1	2	3	4
24. I like myself.	4	3	2	1	0
25. Disturbing thoughts come into my mind that I can't get rid of.	0	1	2	3	4
26. I feel annoyed by people who criticize my drinking (or drug use). (If not applicable mark "never")	0	1	2	3	4
27. I have an upset stomach.	0	1	2	3	4
28. I am not working/studying as well as I used to.	0	1	2	3	4
29. My heart pounds too much.	0	1	2	3	4
30. I have trouble getting along with friends and close acquaintances.	0	1	2	3	4
31. I am satisfied with my life.	4	3	2	1	0
32. I have trouble at work/school because of drinking or drug use. (If not applicable, mark "never")	0	1	2	3	4
33. I feel that something bad is going to happen.	0	1	2	3	4
34. I have sore muscles.	0	1	2	3	4
35. I feel afraid of open spaces or driving or being on buses, subways and so forth.	0	1	2	3	4
36. I feel nervous.	0	1	2	3	4
37. I feel my love relationships are full and complete.	4	3	2	1	0
38. I feel that I am not doing well at work/school.	0	1	2	3	4
39. I have too many disagreements at work/school.	0	1	2	3	4
40. I feel something is wrong with my mind.	0	1	2	3	4
41. I have trouble falling asleep or staying asleep.	0	1	2	3	4
42. I feel blue.	0	1	2	3	4
43. I am satisfied with my relationships with others.	4	3	2	1	0
44. I feel angry enough at work/school to do something I may regret.	0	1	2	3	4
45. I have headaches.	0	1	2	3	4