Patient Change Trajectories Over a Year of Psychoanalytic Therapy and Psychoanalysis.

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ABSTRACT

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Univariate and multivariate growth curve analysis were conducted to examine the shape of change of 61 patients receiving either long-term psychodynamic therapy (N=43), or psychoanalysis (N=18). Outcome measures were the Beck Anxiety Inventory (BAI), the Quick Inventory of Depressive Symptomatology (QUIDS), the Social Adjustment Scale (SAS), and the Inventory of Interpersonal Relationship (IIP). Results: when variables are examined separately and jointly using the whole sample, one year of psychoanalytic treatment does not produce significant differences in rates of improvement between patients, indicating that the shape of change over the first year can be generalized to the sample. For QUIDS, BAI, and SAS levels, the shape of change can be described as a slightly downward straight line. For IIP levels, there may be some significant up and downturns suggesting a quadratic trajectory. For clinical course (QUIDS with BAI), the shape of change can be described as a straight, horizontal line, whereas for social adjustment (SAS with IIP), the shape of change is best described as a downward line. For social adjustment (SAS with IIP), the dynamic therapy group has more pronounced rates of improvement than the psychoanalysis group, and higher baseline levels are related to steeper slopes in dynamic therapy whereas for psychoanalysis higher initial levels tend to produce flatter. Clinical and conceptual implication as well as limitations of the study design are discussed.

Table of Contents

List of Tables, Graphs, and Figures……..iii

1. Introduction……..…..……1

2. Literature Review…….…..10

2.1 The Importance of the First year……..……....……10

2.2 Between-Subject Variability in Trajectories of Change..……12

2.3. Growth Curve Model Applications in Psychotherapy Research……15

3. Research Questions……24

4. Method…….…..25

4.1 Participants……..…….....25

4.2 Measures……...…..…….28

4.3 Treatments and Therapists…...……....31

4.4 Procedure……..……...…35

5. Results ……..…….37

5.1 Preliminary and Descriptive Analyses.....40

5.1.1 Missing Data……..…..…….44

5.1.2 Visual Inspection of Individual Trajectories…..……...……..45

5.2 Unconditional Univariate Growth Models…….....48

5.2.1 Unconditional Growth Model for Anxiety……...……48

5.2.2 Unconditional Growth Model for Depression…….....….….55

5.2.3 Unconditional Growth Model for Social Adjustment……...……59

5.2.4 Unconditional Growth Model for Interpersonal Difficulties……62

5.3 Unconditional Multivariate Growth Models……..……..65

5.3.1 Clustering of Variables for Multivariate Growth Models……...….65

5.3.2 Unconditional Multivariate Model for Depression with Anxiety as Time-Varying Covariate…….……69

5.3.3 Unconditional Multivariate Model for Social Adjustment with Interpersonal Problems as Time-Varying Covariate…….……76

5.4 Knownclass Analysis to Detect Differences in Growth Parameters Between Treatments……..……..…….80

5.4.1 Differences Between LTT and PA for Depression Model with Anxiety as Time-Varying Covariate…….……...…….80

5.4.2 Differences Between LTT and PA for Social Adjustment Model with Interpersonal Problems as Time-Varying Covariate……85

6. Discussion……..……89

7. References……..…….....100

List of Tables, Graphs, and Figures

Table 1: Pearson Correlations for Dependent Variables……39

Table 2: Patient Characteristics at Baseline……..43

Table 3: Model fit Statistics for Univariate, Unconditional Tests……..…52

Table 4: Estimated Mean Growth Parameters and Variance Components for Anxiety…54

Table 5: Estimated Mean Growth Parameters and Variance Components for Depression……..57

Table 6: Estimated Mean Growth Parameters and Variance Components for Social Adjustment……61

Table 7: Estimated Mean Growth Parameters and Variance Components for Interpersonal Problems……..……64

Table 8: Estimated Mean Growth Parameters and Variance Components for Depression (QUIDS) with Anxiety (BAI) as time-varying covariate……...73

Table 9: Estimated Mean Growth Parameters and Variance Components for S AS with IIP as time-varying covariate……...……....78

Table 10: Estimated Mean Growth Parameters and Variance Components for Depression and Anxiety by Treatment Class…….……83

Table 11: Estimated Mean Growth Parameters and Variance Components for Social Adjustment and Interpersonal Problems by Treatment Class……88

Figure 1: Visual comparison between trajectories of change in depression……9

Figure 2: Clinical cut-off points at baseline……..26

Figure 3: Individual growth trajectories for patients using the whole sample……...…46

Figure 4: Unconditional growth curve model for anxiety…….49

Figure 5: Estimated and sample means for unconditional growth model for anxiety…..50

Figure 6: Estimated and sample means for unconditional growth model for depression……..58

Figure 7: Unconditional multivariate growth curve model for depression and Anxiety……..74

Figure 8: Estimated and sample means for unconditional growth model for depression with anxiety as time-varying covariate……75

Figure 9: Estimated and sample means for unconditional growth model for social adjustment with interpersonal problems as time-varying covariate……..79

Figure 10: Growth Trajectories by Treatment Class (1)……84

Figure 11: Growth Trajectories by Treatment Class (2)……87

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1. INTRODUCTION

Once upon a time the wife of a rich man was very ill. She called to her bedside her only daughter. (…) Then the prince looked full in her face. It was the maiden with whom he had danced. "Ah, this is the right bride," he cried. Then he took Cinderella on his horse, and rode away.

from Cinderella, by Jacob and Wilhelm Grim, 1812.

Repression acts, therefore, in a highly individual manner.

Sigmund Freud, 1915.

Studying change in psychotherapy is increasingly important in order to better understand why and how patients benefit from psychological treatments. (Barkham, Stiles, & Shapiro, 1993; Kopta, Howard, Lowry, & Beutler, 1994; Stiles et al., 2004). Many studies have looked at change from a treatment outcome perspective. In these studies, pre-and post-treatment data points are compared and –not surpisingly- linear trends emerge as a result. Some studies include post-treatment follow-ups, which allow for non-linear trends to emerge, but still, the within-treatment part of these designs only allows for linear trends to emerge between two data points. To be sure, the question of whether or not a treatment is effective can be answered using only these two data points, but little can be learned about more complex (e.g., non-linear) trajectories of change at the group level (if one is comparing two diffe1rent treatments) or at the individual level (if one wants to learn how patients differentially change in response to treatment) (Willet, 1988).

When researchers look at pretest and posttest average scores for groups, a significant part of the story is lost (Bryk & Weisberg, 1977; Rogosa, Brand, & Zimowski, 1982). Do all patients change in a linear sort of way? If they do, is the rate of change the same for all individuals in a sample? Do all patients change following the same trajectory in response to the treatment? Are individual trajectories influenced by type of treatment? Are they influenced by initial status on some intake covariate? Are they dependent on belonging to a subset within the patient sample (e.g., depressed patients)? It is impossible to address these crucial questions using only two data points. However, when data are collected at several time points, a longitudinal narrative can emerge that is more revealing of the actual change process in psychotherapy, especially in long-term treatments (McNeilly & Howard, 1991). In other words, the question that becomes of interest is not only "*do* patients get to the finish line (e.g., achieve sub-clinical outcome scores)?" but also "*how* do they get there?" This is exemplified by the Cinderella fragment quoted above: it is obvious that the *meat of the matter* is between the two segments that are separated by the ellipsis –without the part represented by the ellipsis the story is meaningless; or at least rather boring, perhaps even trivial.

To illustrate this issue, Figure 1 allows for a visual inspection of a sample growth trajectory using averages for each time point (using month-12 as outcome for the purpose of this illustration) and a plot of observed trajectories for each individual using data from this study's sample (N = 61). This visual comparison between the aggregated trajectories of change in depression scores for patients and observed individual growth trajectories indicates the problem at hand: how to go from aggregated outcome research to honoring individual change? It becomes clear, based on a visual inspection, that the line that

emerges using aggregated data does not fully "do justice" to the complexity of different change trajectories at the individual, disaggregated level.

In psychotherapy research there are at least two general frameworks to tell the story of change in treatment: (1) to focus on the change trajectory of one patient through intensive single case analytic strategies and (2) to aggregate the individual trajectories in a sample and establish one average trajectory that represents change in general. Using equivalent terms, the challenge is to integrate the ideographic (i.e.. the individual) and the nomothetic (i.e., the "normal," or aggregated level) levels of research. Story telling in psychotherapy research can be organized within a continuum that goes from telling a detailed individual story (e.g., case studies, or n =1 designs) to telling a general story about a group of characters (e.g., calculation of group averages, and under correct conditions, making inferences about a population) where the individual has no privileged place. In statistical language, telling an "aggregated" story entails usually running one single regression analysis for the whole sample, that is one single regression of the outcome variable on time (use al n on T). With this design, the researcher obtains one intercept and one slope common to all individuals that describe the movement of the whole sample. In this design, there is, of course, no privileged status of individual trajectories and thus no accounting of individual differences. In other words, the individual is lost in the aggregation of the data into on single regression line, and as a matter of fact, between-subject variability is considered error variance in traditional ANOVA-based strategies (Bryk & Raudenbush, 1987; Laurenceau, Hayes, & Fedman, 2007). On the other extreme of the continuum, the researcher can run a regression for each individual of the outcome variable on time (use n regressions for T data points). The

researcher obtains an intercept and a slope estimate for each individual in the sample, that is, a collection of individual stories and encounters the *melancholic haphazardness of the particular* (Arendt, 1968). This design accounts for individual differences, but does not acknowledge similarities, that is, it does not draw on the idea that a sample is selected to make inferences about a population. The general is left behind in the collection of individual regression lines. In this regard, the challenge related to the study of individual trajectories of change in psychotherapy research is to combine the individual level -the heroic deeds of every single patient that embarks in the his own story of change- with the story of all patients, of all trajectories aggregated into something that can contribute to the formulation of a theory of change. Summarily, the challenge is to formulate a theory of change that takes into account the importance of individual differences and how individuals contribute *qua* individuals to a general trajectory of change given a particular sample.

In statistical analysis, the answer to this problem came from Multilevel Analysis. (Bryk & Raudenbush, 1987; Raudensbush, 1984; Raudenbusk & Bryk, 2002; Snijders & Bosker, 2012). In Multilevel Analysis -also known as Hierarchical Linear Models, mixed-effects models, and random regression models (Tasca & Gallop, 2009)- data are modeled in consideration of two levels, an individual level and a group level. Because data are considered to be nested across levels (e.g., students in classrooms, patient data nested in therapists or clinics, different time points nested within individuals, etc.) the assumption of independence of observation is typically not met, which requires additional statistical considerations. If the nested structure of the data is overlooked and observations are treated as independent even when they are not, then the analysis can

yield incorrect inferences (Dorman, 2008). The statistical mechanism that is introduced to deal with non-independence of observations in nested data structures is mixed-effects modeling. In mixed effects models, a distinction between within-group and between-group is established (or within-subject and between-subjects), and coefficients are set as either random or fixed differentially in these two levels (Snijders & Bosker, 2012).

The extension of this approach to the treatment of longitudinal data is rather straightforward: different time points are considered to be nested within individuals. Thus the two-level structure of the data accounts for random effects at the between-subject level (Level 2) and fixed effects at the level of individual time measurements within-subject (Level 1). The resulting analytic strategy is growth curve analysis, which also draws from Structural Equation Modeling and Confirmatory Factor Analysis (Wolf & Brown, 2013). Using growth curve analysis, the gap between the individual level and the group level can be bridged to a very significant extent. Each individual's story of change is modeled using a person-specific set of growth parameters (e,g., intercepts, slopes, quadratic, cubic, etc.) at the first level, which captures intra-individual, or within-subject change (Laurenceau, et al., 2007). At the same time, these parameters themselves are considered to be random variables at the second level, the level that models between-subject variability. Summarily, Laurenceau et al. (2007) formulates this two-level approach as "capturing inter-individual variability in intra-individual change" (p. 690).

The psychoanalytic literature in itself exemplifies the polarity between the group-level and the inidividual level. On the one hand, research in psychodynamic therapy has increasingly relied on methods of aggregation (most noticeably randomized clinical

trials) to study the effectiveness of treatment over a variety of clinical presentations and diagnoses (Shedler, 2010). On the other hand research in psychoanalysis has typically stressed the plurality of subjective experiences but has primarily addressed this through single case studies. This methodological choice has led to a generalized rejection of any attempt to aggregate individual variances in longitudinal quantitative and empirical models. It is likely that this rejection has resulted from a historical lack of adequate statistical tools available for psychoanalytic researchers that could account for subjective differences. For example, one of the traditional models to analyze longitudinal data has been repeated-measures ANOVA, a method that would be (presumably) rejected by many psychoanalytic researchers because of its reliance on the calculation of means rather than assuming different individual trajectories. By focusing on group means the subjective differences that are so valuable in the psychoanalytic endeavor are lost –there is no account of individual differences. This is, of course, inconsistent with the principles of psychoanalysis where subjective experience is paramount. In a way, it can be said that psychoanalysis has systematically rejected any theorizing that excludes the subjective experience of the individual in therapy. To be fair, psychoanalysis is presumably not in principle against theorizing on the basis of aggregating the individual into averages, but remains opposed to the elimination of the privileged place of individual differences.

Thus, it is only natural that the psychoanalytic and psychodynamic perspective on patient change may be furthered through the use of Multilevel Analysis and in particular, growth curve analysis. This program of research allows to empirically test some of the basic tenants of psychoanalytic theory and practice: all patients are different (e.g., in terms of psychoanalytic diagnosis, unconscious formations, and transference dynamics);

they do not necessarily progress in a linear sort of way (e.g., they are subject to negative therapeutic reactions and resistance) and even if they do, the rate if change is not necessarily the same for every patient. It is also a program that is attuned to more contemporary methods of studying treatment effectiveness. Additionally, analysts would certainly agree with the assumption that the effects of treatments are nested within individuals, which are in turn nested within their therapists –if nothing else, the concept of transference and counter-transference accounts for this nesting structure at least theoretically.

Growth curve analysis is particularly suited to illuminate the process of patient change in any psychotherapy, but it also preserves certain traditional analytic principles as they relate to the privileged place of the individual patient in therapy. Thus, using growth curve analysis, the primary aim of this study was to examine how patients change over their first year of analytic treatment, ranging from twice-weekly, face-to-face analytic therapy to four to five-times-a-week psychoanalysis on the couch. Initially, the analysis is based on the whole sample, with no distinction of treatment - patients are considered to be treated in a continuum of analytic treatments where the main difference is frequency of sessions, but other differences are assumed to be random. Using multivariate growth curve analysis, trajectories of change were investigated using pre-treatment, 3-month, 6-month, and 12-month follow-ups for the whole sample. The goal was to examine the emergence of longitudinal change trajectories for patients who are receiving psychoanalytic therapy and psychoanalysis, explore the individual differences in growth trajectories and if such differences were to emerge, look into the influence of baseline covariates that may account for some of the between-subjects variability.

Dimensions of growth included in the models (i.e., dependent variables) were levels of depression, anxiety, social adjustment, and interpersonal functioning. Growth parameters for dependent variables were studies both at the univariate level (i.e., different analysis for each dependent variable) and at the multivariate level (models include more than one dependent variable) to assess the relationship between dependent variables in growth trajectories. Finally, using a simple mixtures approach (KNOWNCLASS) the parameters of growth of patients in psychoanalytic therapy were compared to the growth parameters of patients that are in four to five times a week psychoanalysis using the couch.

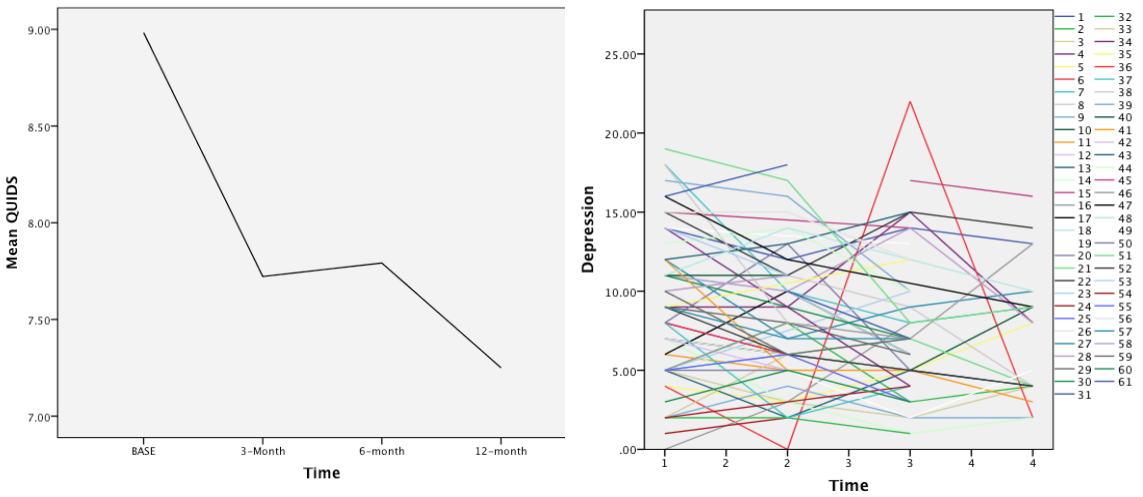

Figure 1: Visual comparison between a trajectory of change in depression using averages of the sample for each time point versus a plot of individual trajectories for depression.

2. LITERATURE REVIEW

Psychotherapy process research can summarily be divided into two main related classes: (1) the study of mediators and moderators of patient change, and (2) the study of the *shape* of change, that is, of individual trajectories of growth (Laurenceau et al., 2007). These two classes address the question of *how* patients change in psychotherapy--that is, what happens between pre-treatment and post-treatment scores (i.e., the ellipsis in the Cinderella epigraph; the whole complex non-linear narrative of *Finnegan's Wake* contained between two seemingly equivalent initial and final sentences). Perhaps, the ideal process research would include frequent repeated assessments throughout the treatment of outcome variables (e.g., depression, anxiety, interpersonal functioning) as well as hypothesized mediators (e.g., object relations, therapeutic alliances, and use of depressive cognitions). However, this study's aim and design were intended to explore the *shape* of change over the first year of psychoanalysis and psychoanalytic therapy.

2.1 The Importance of the first year

The focus in the present study on trajectories of change during the first year of treatment is primarily the result of real-life limitations to the study, which started in the Spring of 2011 and was discontinued on May, 2013 by the Columbia Center for Psychoanalytic Training and Research due to constraints of time. Thus, the available sample only includes follow-ups for the first twelve months of treatment (18-month follow ups are available for a very small subset of patients, and thus were not included in this study). Fortunately, the focus on the initial stages of treatment has empirical value in itself, and is worth exploring. Several research papers have stressed the predictive value

of early patterns of symptom change in long-term outcome across a variety of treatments (Crits-Christoph et al., 2001; Gunlicks-Stossel & Mufson, 2011; Lewis, Simons, & Kim, 2012; Papakostas et al., 2007). Early response to treatment appears to be a more robust predictor for treatment outcome than any pretreatment covariate (Crits-Cristoph et al., 2007; Tang & DeRubeis, 1999). Additionally, early patterns of symptom change also predict patient drop-out (Tang & DeRubeis, 1999) and thus the available literature justifies the focus on initial change in different treatment modalities.

From a dose-effect perspective, a classic study by Howard, Kopta, Krause and Orlinsky (1986) aggregated several psychotherapy databases in order to conduct a pooled meta-analysis that looked at the relationship between number of sessions and clinical improvement across a variety of outcome measures. According to the results of this frequently-cited study, about 75% of patients benefited from less than 30 sessions of psychotherapy, which establishes an optimal dose-effect relationship of psychotherapy in under one year assuming a once-weekly framework. In the case of the sample of patients recruited for this study, where session frequency was set at a minimum of two sessions per week, it can be expected that a large majority of patients will have achieve significant improvement within the 12 months where outcomes were measured.

2.2 Between-Subject Variability in Trajectories of Change

The idea that patients' trajectories in treatment are widely diverging (i.e., not always linear and not necessarily equal for all patients) seems to have been anticipated by Freud (1923):

> There are certain people who behave in a quite peculiar fashion during the work of analysis. When one speaks hopefully to them or expresses satisfaction with the progress of the treatment, they show signs of discontent and their condition invariably becomes worse. One begins by regarding this as defiance and as an attempt to prove their superiority to the physician, but later one comes to take a deeper and juster view. One becomes convinced, not only that such people cannot endure any praise or appreciation, but that they react inversely to the progress of the treatment. Every partial solution that ought to result, and in other people does result, in an improvement or a temporary suspension of symptoms produces in them for the time being an exacerbation of their illness; they get worse during the treatment instead of getting better. They exhibit what is known as a 'negative therapeutic reaction.'(p. 49)

To be sure, Freud goes on to provide many theoretical explanations for this phenomenon (e.g., death drive, unconscious guilt, aggression, masochism, repetition compulsion, etc.), but descriptively what seems important is his observation that some patients do not follow a linear trend of improvement. They do not seem to just get better as they progress in the treatment. In fact, according to Freud's observation, patients appear to follow a quadratic trend: they start at a particular point, then get worse, and finally get better again.

Theoretically related but phenomenologically different, more contemporary analytic authors have also addressed the issue of the therapeutic stalemate (Maguire, 1990), providing a myriad of theoretical explanations. For example, Bion (1958) describes the concept of *arrogance* as a situation in analysis where everything seems to be known in the analytic situation and no progress takes place. Similarly, Fenichel (1945) explains the therapeutic stalemate as a difficulty progressing from defense transferences to transference neurosis. Regardless of the theoretical merits and clinical relevance of these explanations they describe yet another possible progression in therapy: patients get better at the beginning, and then nothing seems to happen. This trajectory of a treatment plateau can be captured as a logarithmic function. If the stalemate is handled correctly by the clinician, the patient can improve and the treatment can be successful. It is also conceivable that some patients may show gains in treatment, and then because of the negative therapeutic reaction they get worse and then get better by the end of treatment. This would fit an s-shaped cubic trend, but then again, some patients seem to get worse again right at the end of treatment, an issue that has occupied negative outcome researchers for some time (Strupp & Haddley, 1977).

Within all these specific theoretical considerations, the picture that seems to emerge is that trajectories of change in psychotherapy can vary significantly across patients. They can be linear, quadratic, logarithmic, or cubic and they may present differential rates of growth within these particular trajectory patterns. This variability captured in the analytical literature suggests a need to look at these *individual* trajectories closely. Does change occur gradually and smoothly throughout a treatment? Does most of the change occur at the beginning or at the end of therapy? Do things get much worse

before they get better? In fact, it is impossible to come up with meaningful models of therapeutic process without considering a longitudinal dimension. Psychotherapy *requires* time; it is a process-in-time.

In the context of scientific research in psychotherapy the dialectic between studying the individual case (the ideographic approach) and studying normative aspects of groups of individuals (the nomothetic approach) taking time into consideration, has been only partially settled by statistical growth models, but the study of individual cases is still, more often than not, relegated to the humanities (Tschacher & Ramseyer, 2009). The proliferation of psychoanalytic case studies that are *only* published in analytic journals is only one effect of this tension, even when intensive single case analysis is used (Kächele & Thomä, 1993) or other sophisticated qualitative methods of analysis are carefully developed (for example in Bucci, 1985). Only in the last decade or so, have statistical designs allowed researchers to aggregate individual longitudinal case data using quantitative tools (Laurenceau, Hayes, & Feldman, 2007). The idea that researchers can model individual change over time is rather revolutionary. It is also liberating as the natural consequence of a fact well known to most clinicians: every patient is different and changes differently in treatment.

The concept of *random effects* (Tasca & Gallop, 2009) in statistical analysis seems extremely appropriate to frame the study of what Freud had anticipated in the early twenties: all patients are different in their starting point for therapy (i.e., the intercept) and how they change throughout the process (i.e., the slope). Another tentative translation of Freud's anticipation of different individual trajectories into statistical language is the idea of multilevel modeling (Tasca & Gallop, 2009). What Freud indicated in his 1915

paper on repression is that the impact of therapy on patients is *nested* within individuals in a manner similar to what is assumed in hierarchical or multilevel models, among other reasons because "[r]epression acts, therefore in a highly individual manner" (Freud, 1915a, p. 150). These analytic tools allow proceeding from Freud's initial, theory and single-case based assertions to empirical hypothesis testing, and thus the question of between-subject variability as well as of the "shape of change" (i.e., linear, quadratic, or cubic) can be settled in a scientific fashion. Is it really true that typically patients have different rates of improvement? Is accurate that linear change is not the most common shape of trajectories? Mixed effects modeling allows to address these questions empirically.

2.3 Growth Curve Model Applications in Psychotherapy Research

Following Freud's contention, many authors have noted that individual patients' change across treatments can vary significantly and that exploring the plurality of change trajectories is of clinical relevance (e.g., Barkham et al., 1993; Krause, Howard & Lutz, 1998). As noted earlier, interest in exploring the shape of change in psychotherapy has increased (Barkham et al., 1993; Kopta et al., 1994; Stiles et al., 2004) and there are very interesting findings that have been produced by this literature. For example, Stultz, Leach, Lucock, Lutz, and Barkham (2007) investigated trajectories of change in a sample of 192 outpatients receiving non-manualized therapy for at least 7 sessions. The study modeled symptom intensity ratings of at least three sessions up to the sixth session, and the authors explored the data using a piecewise approach (i.e., dividing segments of the growth curve). Using a general mixture modeling (GMM) strategy, the authors identified

five client groups that had similar progress in the early stages of the treatment: (1) Patients that improve early in the treatment, (2) patients that have low impairment, (3) patients with high impairment, (4) patients who make continuous progress, and (5) patients who make discontinuous progress. Among other clinically relevant findings, Stultz et al. (2007) demonstrated that patients in the early improvement group show clear improvement at termination, indicating that perhaps this group of patient does not need long term therapy. Conversely, highly impaired patients did not progress significantly in the earlier faces of treatment, indicating that patients in this group do need more long-term therapy, even when outcome levels are lower when compared to early improved patients. Finally, Stultz et al. (2007) found that patients that follow a discontinuous pattern of growth in the beginning of the treatments improve the most at discharge, providing empirical support to the idea that patients that show ups and downs in the initial phases of treatment are, in fact, using therapy well, and have a good prognosis. The relatively big sample size allowed Stultz et al. to find different classes of trajectories (e.g. unobserved heterogeneity) that grouped patients in the above mentioned categories, however, no significant between-subject differences are reported by Stultz et al. This indicates that patient data can be aggregated into general classes, and between-individual differences in slopes are not necessarily a stable finding in growth curve research applied to psychotherapy process.

In another study, Svartberg, Seltzer, Choi, and Stiles (2001) explored trajectories of change in a sample of 21 patients that were randomized to either anxiety-provoking dynamic therapy or nondirective therapy. Repeated measures of the Automatic Thoughts Questionnaire were administered and the resulting data was explored using a latent

growth modeling (LGM) strategy. Both treatment conditions were 20 sessions long and were manualized and delivered by experienced clinicians who were supervised to improve adherence to treatment manuals. Following a piecewise analysis, Svartberg et al. (2001) divided change trajectories into four time periods: (1) before therapy, (2) during the first half of therapy, (3) during the second half of therapy, and (4) during a two-year follow up. Results indicated that in both groups, patients improved significantly after the pre-therapy time segment as well as during the second half of the treatment. Results also showed that trajectories of change were different for patients coming from particular sub-populations, so that patients with major depression did not change immediately after pre-treatment interviews as opposed to anxious patients who displayed a marked and rapid rate of change after pre-treatment procedures. Thus, in this case it seems that anxious patients may require less therapy than depressed patients. This result is also consistent with the literature on differential responsiveness to psychotherapy across different diagnostic groups (e.g., Howard, Kopta, Krause & Orlinsky, 1986). Because of the randomized design, Svartberg et al. had a powerful enough design to argue that treatment-specific differences in trajectories within specified time periods. This study is also interesting because of the sue of multiple longitudinal assessment points that allow for the division of trajectories into a piecewise model. However, similar to Stultz et al. (2007), Svartberg et al. did not report significant between-subject variability and rather based their analysis on aggregated trajectories in the setting of both treatment conditions.

In another study, also focusing on dynamic therapy, Svartberg, Seltzer, and Stiles (2010) studied the shape of change in the construct "Self-Concept" during twenty sessions and over a two-year post-treatment follow-up. Using a small sample of thirteen

patients, who were mainly diagnosed with anxiety disorders, they discovered that patients in general showed a consistent and steady improvement rate in self-concept but they also found that there was significant between-subject variability in improvement rates. This study also found that between-subject variability in slope could be explained partially by initial symptom improvement, where rates of improvement were faster for patients that showed a more rapid initial improvement of symptoms. This type of study complements Stultz et al. (2007) and Svartberg et al. (2001) in that it focuses on between-subject variability –and explanations for it- and not on aggregated, general trajectories that inform about sample or group-level data.

Therapeutic alliance, given its pivotal role in the psychotherapeutic process (Wampold, 2001) has also been studied using a growth curve model approach. This line of research seems quite important for ate least two reasons. First, monitoring longitudinal change in alliance ratings can have important clinical consequences from the perspective of reducing drop-out and attrition rates in treatment. Related, positive alliance ratings are powerful predictors for psychotherapy outcome, but there is no reason to assume that alliance ratings are constant throughout treatments, and thus collecting repeated measures to explore differences and trajectories of alliance ratings can contribute to the understanding of the complex ways in which alliance explains outcome variability. Weiss, Kivity, and Huppert (2013) studied the change trajectory of alliance ratings in patients undergoing cognitive behavioral therapy psychotherapy for panic disorder. Using a small sample of nineteen patients they collected pre- and post-session alliance ratings, they discovered three different trajectory patterns: (1) a saw-tooth pattern characterized by within-session improvement in alliance followed by between-session decline, (2) a

sudden-gains pattern, and (3) a late-stabilization pattern. It could be contended that the sample size used in this study was rather small to find stable mixtures (i.e., classes of trajectories in the data), but using HLM, the authors did provide an Inter-Class Correlation (ICC) calculation that justified the use of a hierarchical treatment of nested data, which ultimately means that there were significant between subject differences at the individual level.

Growth trajectories have been also studied in specific treatment for specific clinical populations. Obeid et al. (2013) looked at growth trajectories of maintenance variables for refractory eating disorders in a sample of 275 adolescents with a variety of psychological disorders. The authors found that a cubic slope (S-shaped pattern) fitted the data better than a linear or a quadratic slope specification. They also found that there was significant between-subject variability for cubic slope random effect (i.e., between-patient variance in cubic slopes), which was somewhat reduced by the introduction of refractory status as a baseline covariate, although there continued to be significant unaccounted between-subject variability in slopes after the introduction of this covariate in the model.

Monsen, Monsen, Svartberg, and Havik (2002) studied the rate of change in interpersonal problems, depression-anxiety, and pain intensity in a sample of 19 chronic pain patients using a piecewise growth modeling a approach (i.e., different segments of the complete trajectory are modeled). Patients were treated with a specific focus on affective experience and interpersonal problems and the authors only reported results for Level 1 analysis, that is for individual trajectories across time-points for the three different outcome variables, and thus no results pertaining between-subject variability

were reported. However the authors found that at the individual patient level, interpersonal problems decreased linearly across the three treatment segments, whereas pain intensity and depression-anxiety only decreased during the second segment.

In a study designed to demonstrate the use of time-series panel analysis (TSPA) as an alternative to GMM, Tschacher and Ramsayer (2009) modeled empirical trajectories of 202 patients, looking at patient well-being and patient's motivation for therapy as the dependent variables. Results indicated that well-being and motivation were linked reciprocally: therapy motivation appeared to improve well-being and conversely, high well-being diminished therapy motivation. This finding carries important clinical consequences: therapists need to be attuned to a patient's level of well being and use this variable to plan terminations before therapy motivation drops and the likelihood of drop-out increases.

GMM analysis has been used for a variety of treatment modalities, including the development of new online treatments. In a recent study, Sunderland, Wong, Hilvert-Bruce, and Andrews (2012) modeled the trajectories of change for 302 patients receiving internet cognitive behavioral therapy for depression and 361 receiving the same internet treatment for generalized anxiety disorder. The authors modeled psychological distress as the outcome variable using a GMM analysis. They found that in both conditions patients improved following a quadratic curve. Using GMM they also identified two sub-populations with distinct growth trajectories: high responders and low responders, where the later group tended to have higher levels of symptom severity and distress at baseline.

All these studies have immediate clinical relevance. They map empirical growth trajectories that can illuminate the way treatment is conducted. LGM, GMM as well as

TSPA analytic strategies have been used to explore the shape of change in a varied range of treatments, diagnoses populations, and age groups. Growth curve modeling approaches can, in fact be applied to a variety of longitudinal datasets. Comparatively fewer studies have looked at change trajectories for psychodynamic therapy, and no studies have focused on growth trajectories for patients in psychoanalysis. If modeling growth patterns has proven to be fruitful for other treatment modalities in that results are easily translated into clinical indications, this sort of study may similarly help analytically-oriented clinicians and psychoanalysts. However, the question of whether or not different treatments produce different treatment-specific trajectories of change remains largely unexplored. There have been no studies published that aggregate findings of treatment trajectories that have been produced using growth curve modeling. In part, the problem is that model specification in growth-curve analysis differs widely across data sets (for example the specification of random vs. fixed effects, the specification of the slope coefficient, etc.). Additional difficulties are related to the fact that growth curve analysis is often used in observational studies, where treatments are delivered naturalistically and no comparisons are available so that with no adherence being measured it becomes difficult to compare consolidate findings into treatment-specific trajectories. Finally, different studies measure different covariates to explain between-subject variability in case such variability is significant as specified in the random parts of the model, The introduction of specific covariates makes studies quite unique and again, comparability becomes difficult.

However, a summary inspection of many published studies that have looked at change trajectories in psychotherapy produces one consistent –although perhaps non

surprising- finding. There is significant variability in the ways that patients progress through psychotherapeutic treatments. This is, of course not surprising if one considers that growth curve analysis is a technique that has become relevant precisely to the extent that it allows to model growth at the individual level and detect between-subject variability. Theoretically, if one would introduce a more complex nesting structure where longitudinal trajectories are not only nested within patients but patients are also nested within therapists, variability becomes more complex and one would even need to argue that there could be a therapist-specific "shape" of change. In summary, the issue of whether or not there are treatment-specific change trajectories is perhaps displaced by the fact that growth curve analysis is capitalizing on the fact that there are, ultimately, only individual-specific growth trajectories that can be, to some extent, explained through the introduction of Level 2 covariates (i.e. variables that may explain why there is differences in improvement rates between patients), but there may always be other covariates that are not measured that may account for the same variability, and thus results may be to some extent specific to designs. Currently, the state of the art regarding the application of hierarchical models to longitudinal data in psychotherapy research seems to be progressively making the case for a plurality of trajectories of change that likely require flexibility at the clinical level and parsimony in the interpretation of study results at the theoretical level. However, between-subject variability is not a consistent finding in the growth model literature applied to psychotherapy research. When significant differences between patient's rates of improvement are found, researchers typically use covariates to explain this differences, but when not such differences are found or reported, researchers typically focus on the aggregated level either to describe shapes of change in general or

to specify differential patterns using mixtures. t is also likely that the variability between patient rates of improvement that sometimes found in psychotherapy growth model data may be a function of whether or not treatments are conceptualized as short or long term and at which point in the treatment data are collected. If one study looks at complete courses of treatment, it is more likely that heterogeneity in improvement rates will be find than if data are collected at the beginning, middle or end phases of a treatment, especially in the case of long-term treatments such as psychoanalysis where change is hypothesized to occur throughout a more extended time lag.

3. RESEARCH QUESTIONS

This exploratory study will use growth curve analysis to answer the following questions about the shape of change for patients over a year of psychoanalysis and psychoanalytic therapy:

(1) What do change trajectories look like visually when they are plotted for each patient in the sample?

(2) Are there differences between patients in baseline levels and in improvement rates (i.e., intercepts and slopes) when dependent variables are analyzed separately?

(3) Are there differences between patients in baseline levels and in improvement rates (i.e., intercepts and slopes) when dependent variables are analyzed together?

(4) If there are significant differences between patients in baseline status and improvement rates, are there specific variables that can account for such differences?

(5) Are there differences in baseline status, improvement rates and relationships between variables throughout treatment course between both treatment conditions (psychoanalysis vs. short term dynamic therapy)?

4. METHOD

4.1 Participants

Participants in the study were adult patients receiving services at the Columbia Center for Psychoanalytic Training and Research (CCPTR). Patients at CCPTR receive either long-term psychodynamic psychotherapy (twice-a-week, face-to-face) (LTT) or psychoanalysis (4 or 5 times-a-week, on the couch)(PA). The sample for this study was taken from an ongoing naturalistic research project* - the Psychodynamic Psychotherapy and Psychoanalysis Database Project (PPPDP) - and includes 43 patients in the Long Term Therapy Clinic (LTT) and 18 patients on the Analytic Clinic (PA). Patients are continuously being referred to either clinic, and all the consenting patients that were referred and admitted for the research project were included in this study. Patients are screened for their adequacy for LTT or PA and those with a history of psychosis, active suicidality, and severe substance abuse are routinely referred out of both clinics. As a result, the sample is one of adult patients who are suited for either LTT or PA.

The sample used for this study consisted of 61 adult patients, of whom 26 were male and 35 were female. The mean age of participants was 31.54 years (SD = 8.37), and aged ranged from 18 to 62 years old. Of all patients included in this study, 41 (67.2%) were Caucasian, 5 (8.2%) were African American, 6 (9.8%) were Asian, 6 (9.8%) were Hispanic, and 2 (3.3%) were Middle Eastern. Of the whole sample, 57% of patients presented with mild to severe anxiety at baseline, 65% had mild to severe levels of depression, 42% presented with interpersonal problems above the psychiatric population mean, and 90% endorsed difficulties in social adjustment above the community sample

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* Psychodynamic Psychotherapy and Psychoanalysis Database Project, IRB # 6419R (previously #5343).

* The null hypothesis is that the model fits the data, thus a non-significant result fails to

mean. Figure 2 presents a more detailed breakup of baseline symptom levels for the whole sample.

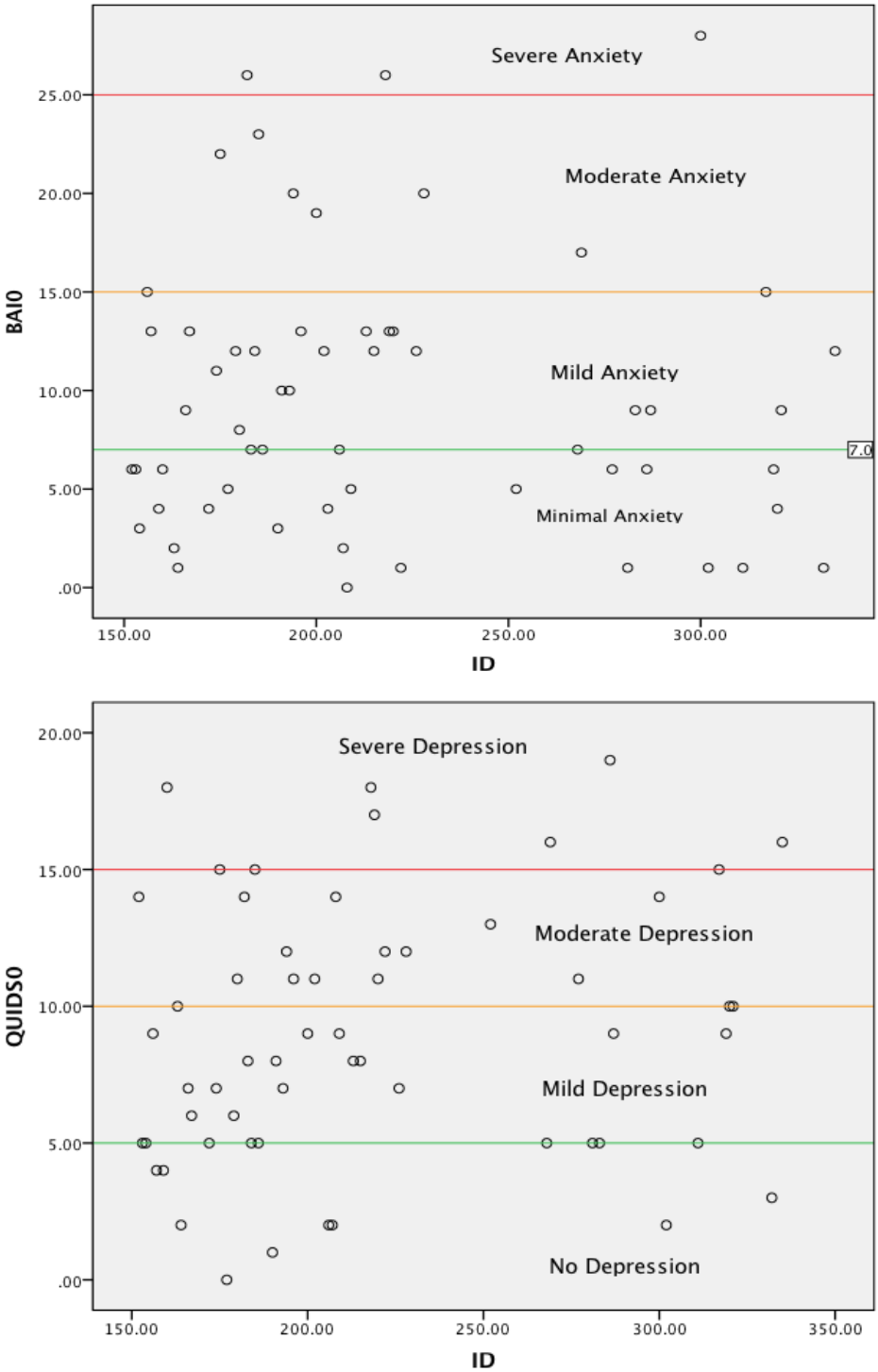

Figure 2: Clinical cut-off points at baseline. This figure presents initial levels for Anxiety (BAI) and Depression (QUIDS0) for patients using complete sample (N=61).

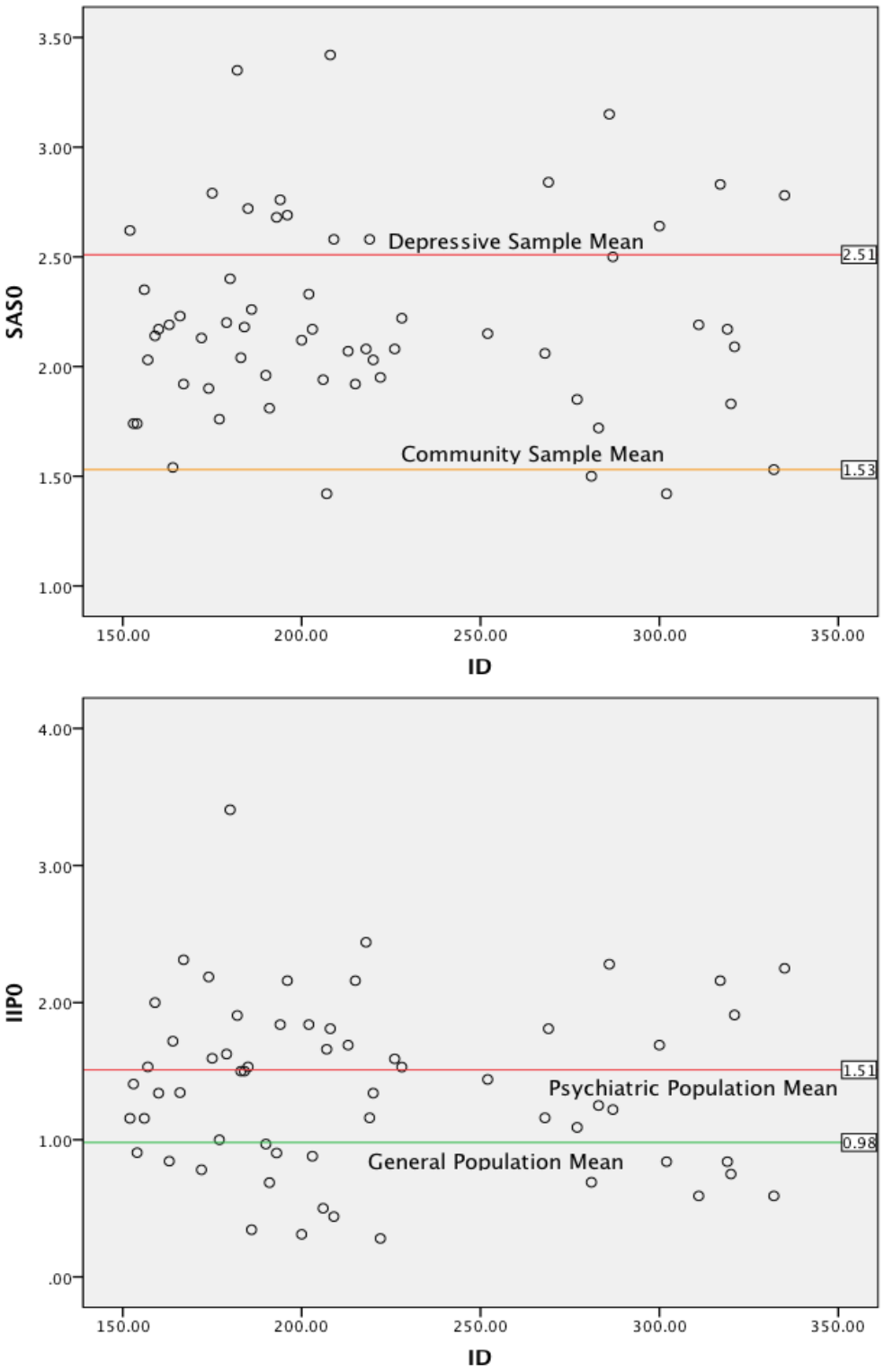

Figure 2 (cont.): Clinical cut-off points at baseline. This figure presents initial levels for Social Adjustment (SAS0) and Interpersonal Problems (IIP0) for patients using complete sample (N=61).

4.2 Measures

Schedule for Nonadaptive and Adaptive Personality (SNAP). The SNAP is a self-report measure developed by Clark (1993) to measure trait dimensions that are related to personality pathology. It contains 375 true/false items and scores can be obtained in 34 different scales including trait scales (12), temperament scales (3), validity scales (6), and diagnostic scales (13). Except for diagnostic scales that map on descriptive criteria similar to the DSM-IV, the SNAP is a measure of dimensional components of personality pathology. The SNAP has produced good internal consistency with a median Cronbach's α of .81 as well as good test-retest correlation after one week of $r=.81$, and after two months of $r=.79$ (Clark, 1993; Harlan & Clark, 1999). Convergent validity for the SNAP has been investigated and reported for trait and temperament scales both in the original manual as well as in subsequent studies. Clark, Livesley, Schroder, and Irish (1996) reported high and significant correlation across temperament as well as trait scales against the Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ) (Livesley, 1990). High convergence between both personality assessment tools was also found by Pryor, Miller, and Gaughan (2009) on a sample of patients diagnosed with psychopathy. The predictive and convergent validity for the diagnostic scales has been investigated and reported by Melley, Oltmanns, and Turkheimer (2002).

Inventory of Personality Organization. The IPO is a 155-item self-report measure developed by Kernberg and Clarkin (1995) that aims to assess the three most relevant personality dimensions proposed by Kernberg (1996) in his model of personality pathology. The main dimensions are Identity Diffusion, Primitive Defenses, Aggression, Moral Values, and Reality Testing. Berghuis, Kamphuis, Boedjin and Verheul (2009)

reported psychometric properties for the Dutch version of the IPO including a high Cronbach's alpha for test-retest reliability across scales (Identity Diffusion: *r*=.86; Primitive Defenses: *r*=.82; Reality Testing: *r*=.85; Aggression: *r*=.80; Moral Values: *r*=.75). Additionally, using a principal component analysis with varimax rotation on a clinical sample of 371 patients, a four-factor structure was produced that was theoretically acceptable according to the authors. Convergent validity was assessed both against the SCl-90 and the Personality Severity Index with a median *r* = .73. Correlations were higher with the Personality Severity Index indicating that the IPO has a lower convergent validity with the SCl-90 which is an Axis I measure.

Beck Anxiety Inventory (BAI). The BAI is a widely used self-report questionnaire that assesses anxiety levels (Beck, Epstien, Brow, & Steer, 1988; Beck & Steer, 1990). It contains 21 items measuring the severity of psychiatric anxiety symptomatology on a 0-3 scale. According to Beck et al., (1988) internal consistency of the BAI is high, with a reported Cronbach's α of .92. In the same study, the BAI produced a test-retest reliability correlation of *r*= .75 after one week. Additionally, the BAI was tested against the revised Hamilton Anxiety Rating Scale for concurrent validity, producing a moderate correlation of *r*= .51. Divergent validity was tested against the revised Hamilton Depression Rating Scale with a correlation of *r* =.25. The BAI is a widely used and widely accepted measure of anxiety.

Social Adjustment Scale (SAS-SR). The SAS-SR is a widely used 54-item paper-and-pencil self report scale of social adjustment (Gameroff, Wickramaratne, & Weissman, 2012). It is used with individuals 17 and older and was derived from the Social Adjustment Scale interview developed by Weissman and Bothwell (1976). The

SAS-SR has versions in 17 languages and can be answered by patients with a fourth grade reading level. Patients are asked to reflect on the past two weeks and the items explore six different areas: (1) work, (2) social and leisure activities, (3) relationships with extended family, (4) role as marital partner, (5) parental role, and (6) role within family unit. A high internal consistency was produced by the SAS-SR with a mean Cronbach's $\alpha = .74$. Adequate test-retest correlations were also achieved with a correlation of $r = .80$ (Edwards, Yarvis, Mueller, Zingale, & Wagman, 1978; Weissman & Bothwell, 1976; Weissman, Prusoff, Thompson, Harding, & Myers, 1978;). Gameroff et al. (2012) produced reliable convergent validity indicators against self-report and rater-assessed measures of psychopathology including the SCL-90, the Global Assessment Scale (GAS) and the Short Form 36 Health Survey (SF-36).

Inventory of Interpersonal Relationships Short Version (IIP-32). Based on the Inventory of Interpersonal Relationships (IIP), originally developed by Horowitz, Rosenberg, Baer, Ureño and Villaseñor (1988) as a 127-item self-report inventory, the IIP-32 (Barkham, Hardy, & Startup, 1996) is a shorter version that describes types of interpersonal difficulties that patients experience as well as the degree of distress that these difficulties produce. Patients answer 32 items and rate the level of distress that each problem causes on a scale ranging from 0 (not at all distressing) to 4 (extremely distressing). According to Horowitz et al. (1988), Cronbach's α for the different scales range from .82 to .94 indicating appropriate levels of internal consistency. Test-retest correlation coefficients were calculated over a 10-week waiting period with a total correlation of $r = .98$. Concurrent validity was tested against the Scales L, A, and D showing significant positive correlations for at least one subscale of the IIP (e.g., Scale L

& Sociable, $r = .73$, Scale A & Assertive, $r = .64$). Convergent validity was assessed against the SCL-90 where of 54 correlations only 3 were significant, indicating that both measures seem to address different areas of difficulties. The IIP-32 was highly correlated with the original IIP for mean item scores with $r = .94$. Test-retest reliability scores were calculated for the IIP-32 with a correlation of $r = .96$ (Barkham et al. 1996; Hughes & Barkham, 2005)

Quick Inventory of Depressive Symptomatology (QIDS-SR). The QIDS (Rush et al. 2003) is a 16-item inventory designed to asses the severity of symptoms necessary to diagnose a patient with a major depressive episode according to the DSM-IV. Patients are asked to report on the last 7 days prior to the assessment. Psychometric properties of the QIDS were assessed by Rush et al. (2003) on a sample of 681 adult outpatients suffering from chronic, non-psychotic Major Depressive Disorder per DSM-IV criteria. Internal consistency for the self-rated version of the QIDS (QIDS-SR) was high with a Cronbach's α of .86. In addition, concurrent validity was tested against the HAM-D--a commonly used instrument for depression–- and both instruments were highly correlated with a Person's product-moment correlation of .86.

4.3 Treatment and Therapists

Patients in the study were referred for either LTT therapy or PA. Since adherence was not measured in the PPPDP, the most parsimonious assumption regarding treatment delivery for patient's in the sample was that patients receive psychoanalytic therapy on a continuum that includes supportive as well as expressive interventions (Cabaniss, Cherry, Douglas, & Schwartz, 2011). Thus, the only reliable difference between twice-weekly

face-to-face psychodynamic psychotherapy and four to five times-a-week psychoanalysis using the couch was session frequency and use of the couch. All other theorized differences between both treatments could not be empirically measured in this study and are considered varying at random in the supportive-expressive continuum. On the other hand, the question about differential treatment indication at the CCPTR as been empirically investigated by Caligor et al. (2009) using a sample of 100 consecutive patients who received a comprehensive baseline battery of assessments. Fixity patients were accepted for psychoanalysis and fifty patients were rejected, but interestingly enough, accepted patients did not differ significantly from non-accepted patients in a variety of measures of psychopathology and psychological functioning. The authors remarked on the "striking similarity between patients accepted and rejected for psychoanalytic treatment" (p. 1).

Even though there are no empirical difference in patients admitted to psychoanalysis and psychodynamic therapy both treatments differ theoretically on their focus, strategies, and technique. Cabaniss et al. (2011) have produced a training manual that indicates that first and foremost, psychodynamic therapy is based on a framework that assumes that "unconscious metal activity affects our conscious thoughts, feelings, and behavior "(p. 2). To this extent, a minimal definition of psychodynamic psychotherapy is a treatment based on this framework. Additionally, psychodynamic therapy uses a variety of techniques that are applied to reach the following goals:

(1) Making the unconscious conscious. Thoughts and feelings that are not in the patient's awareness can still affect and motivate behavior, and can lead to maladaptive thinking styles, relationship patterns and behaviors. Thus

bringing this material into awareness is theorized to be a crucial pathway of therapeutic action in psychodynamic therapy.

(2) Supporting weakened ego function. Theoretically, the *ego* is considered to organize the main psychological functions that are responsible for adaptation to reality demands and a weakened ego can produce significant impairments in a patient's ability to adjust to his or her reality and demands. Thus psychodynamic therapy focuses on strengthening basic ego functions such as reality testing, the capacity to withstand anxiety, the capacity to deploy higher-level defense mechanisms, the capacity of impulse control, etc.

(3) Reactivating development. Psychoanalysts have theorized that stalled development trajectories are often responsible for the consolidation of rigid, repetitive and maladaptive patterns of though and behavior (Cabaniss, et al., 2011). In psychodynamic therapy, development is reactivated and new growth can take place in the context of a intense relationship to the therapist that recreates the conditions that have led to the stagnation in development.

In order to allow for the development of these mechanism of therapeutic action a specific set of techniques are used in psychodynamic therapy, including (1) focusing on the affect, (2) free association and focusing on resistances, (3) transference and countertransference interpretation, and (4) interpretation of unconscious conflicts and defense.

The extent to which psychodynamic psychotherapy differed from psychoanalysis proper in respect of goals and technique was not assessed in this study. Theoretically

(e.g., Cabaniss, 2011; Caligor, Kernberg & Clarkin, 2007) psychoanalysis relies more heavily on systematic interpretations of the transference, but this feature is also dependent on the particular orientation of the psychoanalyst. Presumably, psychoanalysis and psychodynamic therapy rest upon similar principles with random variations that are dependent on style, theoretical orientation, available material, orientation of the supervisor, etc. As stated above, for the purpose of this study, the only reliable differences between treatments that could be ascertained were session frequency (twice-weekly for psychodynamic therapy and four- to five-times a week psychoanalysis) and use of the couch (face-to-face in psychodynamic therapy and on the couch in psychoanalysis).

Therapists delivering psychodynamic therapy were psychiatry residents training at the New York State Psychiatric Institute, Columbia University Department of Psychiatry. Residents are in their second, third, and fourth year and receive one hour of weekly individual supervision for every two hours of patient care. Therapists providing psychoanalysis are analytic candidates at the CCPTR and typically are psychiatrists or licensed psychologists. Candidates typically start seeing analytic cases in the middle of their first year of psychoanalytic training and have to be a personal analysis for at least six months prior to starting a case. They receive weekly individual supervisions, undergo training analyses, and routinely present clinical material in a variety of instances included in the curriculum at CCPTR. Thus, the sample of patients used for this study is a sample that receives treatment by therapists that are still training, with more novice therapists delivering psychodynamic therapy and more experienced therapists delivering

psychoanalysis, which certainly has a bearing tin the comparison of both groups and can be considered a limitation of the study. Both groups of therapists receive intense supervision and treatment adherence is not measured as part of the outcome study at the CCPTR but certainly considered in the context of resident and candidate training. The study did not include demographic information about therapists.

4.4 Procedure

The PPPDP is an observational study and thus, patients are not randomly assigned to treatment conditions. Rather, assignment to either psychoanalysis (PA) or long term dynamic psychotherapy (LTT) is conducted using clinical indication criteria which are not formalized beyond standard clinical practice at the CCPTR.

Patients are recruited to the PPPDP through threes sources:

1) Patients applying to the CCPTR from the outside first submit an application, which among other things, explains that intake procedures include research and clinical evaluations. This application is triaged by the director of the clinic to screen for inappropriate patients (heavy substance abuse, psychosis, current suicidal ideation, etc.). Applicants that are not excluded are invited to schedule a first intake interview at the CCPTR. At this point patients are presented with the option of participating in the PPPDP. Participation in the research project has no bearing on admission into the clinic and is not a requirement for treatment.
2) Patients who are converted from a CCPTR candidate's private practice into psychoanalysis. These patients are asked to sign a consent form, which has an addendum where patients are asked to agree (or not) to being contacted by the

clinic to be invited to participate in the research project. Research staff contacts patients that agree and the research project is described to them. If patients are willing to participate, a consent form is mailed and returned signed. This subset of patients likely had a "round of treatment" before starting analytic therapy in the context of this study, which certainly constitutes a confounding factor in the interpretation of results as discussed in the last section of this paper.

3) Patients enter the LTT program by being referred to the director of the program. After a phone triage, applicants who seem appropriate for treatment are invited to the CCPTR to receive a structured evaluation. When patients attend this evaluation they are also invited to participate in the study.

Before starting psychodynamic therapy or psychoanalysis at the CCPTR, all patients who agree to participate in the study completed a wide range of assessment instruments including the SNAP, SAS, QIDS, BAI, IIP, the IPO, the SCID-I, and the Childhood Trauma Questionnaire (CTQ). Patients with an indication for either form of treatment offered at the CCPTR are assessed by the intake team and referred for treatment with trainees. Trainees are either licensed psychologists or psychiatric residents who are in training at the Center. All therapists are supervised individually by senior faculty and training analysts from the CCPTR. Patients fill out mailed follow-up battery after 3 months, 6 months, and 12 months. Follow-up assessments consist on the SAS, BAI, QIDS, and the IIP. At the 12-month follow-up the SNAP is also administered again.

5. RESULTS

To explore patient trajectories of change over the course of the first year of either LTT therapy or PA, a multivariate and univartiate growth curve analysis (Bryk & Raudenbush, 1987; Muthen & Curran, 1997) was used to answer research questions one through six. Research question number six required an additional statistical treatment and included a KNOWNCLASS analysis that can be considered part of a mixture-modeling approach. Although following the indication of Snijders and Bosker (2012) the data were initially analyzed using a univariate approach (i.e., independent analyses for each dependent variable), the study privileged a multivariate approach as the core data-analytic strategy (dependent variables are analyzed jointly in a model). A multivariate approach has some advantages over an individual analysis of each dependent measure for the following reasons outlined in Snijders and Bosker (2012):

1) Multivariate analysis allows for a more articulated interpretation of the results that tales into account the relationship between growth parameters for multiple dependent variables. Furthermore, analyzing the data jointly allows for an exploration of correlations between outcome variables at the two levels of the hierarchical model, within-individual and between-individuals.
2) A multivariate analysis allows for smaller standard errors when assessing specific effects for dependent variables, and thus there is a gain in power, which becomes particularly relevant in samples as small as the same used in the present study. Furthermore, when the dependent variables that go into the multivariate analysis are strongly correlated and data are incomplete (e.g., the average number of measurements per individual is less than the number of dependent variables in the

analysis), the gain in power can be considerable. This is particularly relevant for this study where all dependent variables are significantly correlated as shown in Table 1 and there is missing data in particular at the 12-month follow-up because the study was discontinued.

Table 1
Pearson Correlations for Dependent Variables (N=61)

	BAI	QUIDS	IIP	SAS
BAI	1	.57**	.48**	.56**
QUIDS	.57**	1	.55**	.72**
IIP	.48**	.55**	1	.58**
SAS	.56**	.72**	.58**	1

** p < .01 level (2-tailed).
Note: BAI: Beck Anxiety Inventory; QUIDS: Quick Inventory of Depression; IIP: Inventory of Interpersonal Problems; SAS: Social Adjustment Scale.

An additional issue of consideration has to do with research question number 4, specifically, the introduction of additional baseline covariates to explain the potential emergence of between-subject variability in rates of improvement. To a very important degree, question number four justifies the use of hierarchical analysis, since between-subject variability is a marker for a nested data structure. However, none of the analyses carried out produced a significant between-subject variance component. This means that on average, rates of improvements do not differ statistically between patients, and thus there is no statistical justification to introduce additional covariates. In other words, there is no between-subject variability that needs to be explained based on results of this study. A growth curve modeling approach is still, however justified because of the non-independence of observations in this longitudinal design as well as given the unbalanced nature of data collection (e.g., not all patients are assessed exactly at the same time), both of which are requirements for standard repeated-measures ANOVA but not for longitudinal HLM.

5.1 Preliminary and Descriptive Analyses

After producing general descriptive statistics for the sample which are summarized in Table 2, univariate and multivariate tests of normality and kurtosis were conducted on all variables included in the statistical analysis following the procedure outlined by DeCarlo (1997), in order to make sure that parametric assumptions were met. All tests of univariate and multivariate skew and kurtosis were non-significant, indicating that observed variables were normally distributed and there were no heavy tails.

After conditions of univariate and multivariate normality were satisfied, an initial comparison of means for a dependent sample was conducted to assess general symptom change for the two treatment groups. Across treatment groups patients in the sample improved significantly in terms of symptoms as indicated by a series of paired *t-tests* that compared baseline against 12-month follow-up for each outcome measure. Patients that received a year of twice-weekly, face-to-face psychoanalytic psychotherapy improved on levels of depression measured by the QUIDS ($t[16] = 2.556$, $p = .021$; $d = .635$, moderate), and social adjustment, measured by the SAS ($t[16] = 2.968$ $p = .009$; $d = .752$, moderate to large). There was no significant improvement for anxiety scores measured by the BAI or for interpersonal difficulties measured by the IIP in this group. For the group of patients that received one year of psychoanalysis, four to five times-weekly, using the couch, significant improvement was found only for interpersonal difficulties measured by the IIP ($t[5] = 2.66$, $p = .045$, $d = 1.15$, large). Even though these results are tangential for the purpose of this study and are only shown to illustrate general trends in the sample, caution needs to be exercised in the interpretation of differences between groups. First, even though no significant differences existed in baseline variables between both treatment groups, (independent-sample *t-tests* were conducted on baseline variables including depression, anxiety, interpersonal difficulties, social adjustment, total IPO score and age; all were non significant) patients were not randomly assigned to treatment conditions which means that both samples could differ on covariates that were not measured such as income, SAS, education level, etc. Additionally it needs to be stressed that since several data points were missing at the 12-month follow-up, the paired-sample *t-test* was conducted with a significant rate of mortality (cases with baseline assessment

and not 12-month assessment). No imputations procedures were developed since this analysis is only meant to serve a descriptive purpose. At any rate these results needs to be considered with caution because of the loss of statistical power due to increasing mortality at later waves of data collection.

Table 2
Patient Characteristics at Baseline (N=61)

Mean (SD)	All pts.	Pychoanalytic Therapy	Psychoanalysis	Test		
	N=61	N=43	N=18	t (χ2 where noted)	*df*	*p*
Gender	35 female (57%)	24 female (56%)	11 female (61%)	χ2 =.15	1	0.70
Age in years	31.54 (8.37)	31.55 (9.28)	31.53 (5.73)	0.83	16	0.42
Mood Disorder Current	21 (34%)	14 (33%)	7 (39%)	χ2 = .23	1	0.64
Lifetime	19 (31%)	13 (30%)	6 (33%)	χ2 = .06	1	0.81
Anxiety Disorder Current	14 (23%)	11 (26%)	3 (17%)	χ2 = .57	1	0.45
Lifetime	5 (8%)	2 (5%)	3 (17%)	χ2 = 2.43	1	0.12
Symptom Measures						
Beck Anxiety Inventory (BAI)	9.61 (6.91)	10.24 (6.86)	8.06 (7.00)	-3.05	15	0.96
Quick Inventory for Depression (QUIDS)	8.98 (4.79)	8.63 (4.67)	9.82 (5.11)	-1.50	15	0.15
Social Adjustment Scale (SAS)	2.21 (.45)	2.22 (.42)	2.19 (.52)	-0.39	15	0.70
Interpersonal Problems Scale (IIP)	1.39 (.63)	1.41 (.65)	1.33 (.59)	0.75	15	0.46
Inventory of Personality Organization (IPO)						
Identity Diffusion (ID)	53.28 (13.7)	53.7 (14.26)	52.28 (12.58)	0.01	17	0.99
Primitive Defenses (PD)	34.97 (8.63)	34.86 (8.45)	35.22 (9.3)	-0.40	17	0.70
Reality Testing (RT)	31.15 (7.07)	31.07 (7.14)	31.33 (7.1)	-0.92	17	0.37
Aggression (AG)	24.84 (4.94)	24.77 (4.74)	25 (5.54)	-0.49	17	0.63
Moral Values (MV)	22.26 (6.49)	21.88 (6.44)	23.17 (6.71)	-0.89	17	0.39

Note. Sample means for BAI and QUIDS fall within the mild range. Sample mean for SAS fall above community sample cut-off, but below depressed sample mean. Sample mean for IIP falls above general population mean but bellow psychiatric population mean

5.1.1 Missing Data

Hierarchical Linear Models and thus growth curve analysis generally rely on maximum likelihood (ML) procedures to estimate parameters in the model, which is a procedure known to produce stable estimation of parameters when data are missing under the assumption that the data are missing completely at random (MCAR) or missing at random (MAR)(McKnight & McKnight, 2013; Snijders & Bosker, 2012). Because the PPPDP follow-up project was unexpectedly discontinued in the Spring of 2013, missing values were concentrated in the twelve-month wave for all four dependent measures. The reason for data to be missing is thus theoretically external from an influence of dependent variables (e.g., more depressed patients fail to complete assessment packages) and may be theoretically considered missing at random in relationship to cases (MAR).

To test whether or not missing values in the data set could be considered missing at random, first a dummy variable was created indicating if data were missing at the twelfth time point for each dependent variable (e.g., BAI12_missing, QUIDS12_missing, etc.), where 1 indicated that the value is missing at time point twelve and 0 that it is not. A series of binary logistic regressions were conducted to assess if initial levels for dependent variables and level of the variables at time collection six (before data went missing) predicted the dummy variable for missingness. This analysis yielded no significant results for *b* coefficients (BAI0, QUIDS0, SAS0, IIP0, BAI6, QUIDS6, SAS6, IIP6) using the Wald statistic, and thus it can be concluded that levels of depression, anxiety, social adjustment, and interpersonal problems at baseline and at the six-month time point had no predictive value for data-missngness at time twelve. To further evaluate the assumption of randomness of missing data, Little's MCAR test was performed to

assess missingness and since the test failed to reject the null hypothesis (that data are missing completely at random) (*Chi-square*[63] = 70.16, p = .25) it was decided that the structure of missing values was compatible with a maximum-likelihood procedure, and no imputation procedures were implemented in the study.

5.1.2 Visual Inspection of Individual Trajectories

In order to answer research question one pertaining a visual description of the change trajectories, Figure 2 depicts individually observed growth curves that were plotted for each dependent variable. It is readily observable by looking at individual plots across dependent variables that there is variability across staring points, but no clear "visual slope." Patients seem to move along the first year of analytic treatments with ups and downs but with no clearly distinguishable slope. It is however also clear from this initial visual inspection of plotted observations that there still is variability in slopes, which is exemplified by certain trajectories that are more abrupt, and clearly not linear. It cannot be ascertained by means of a visual inspection if this variability is statistically significant.

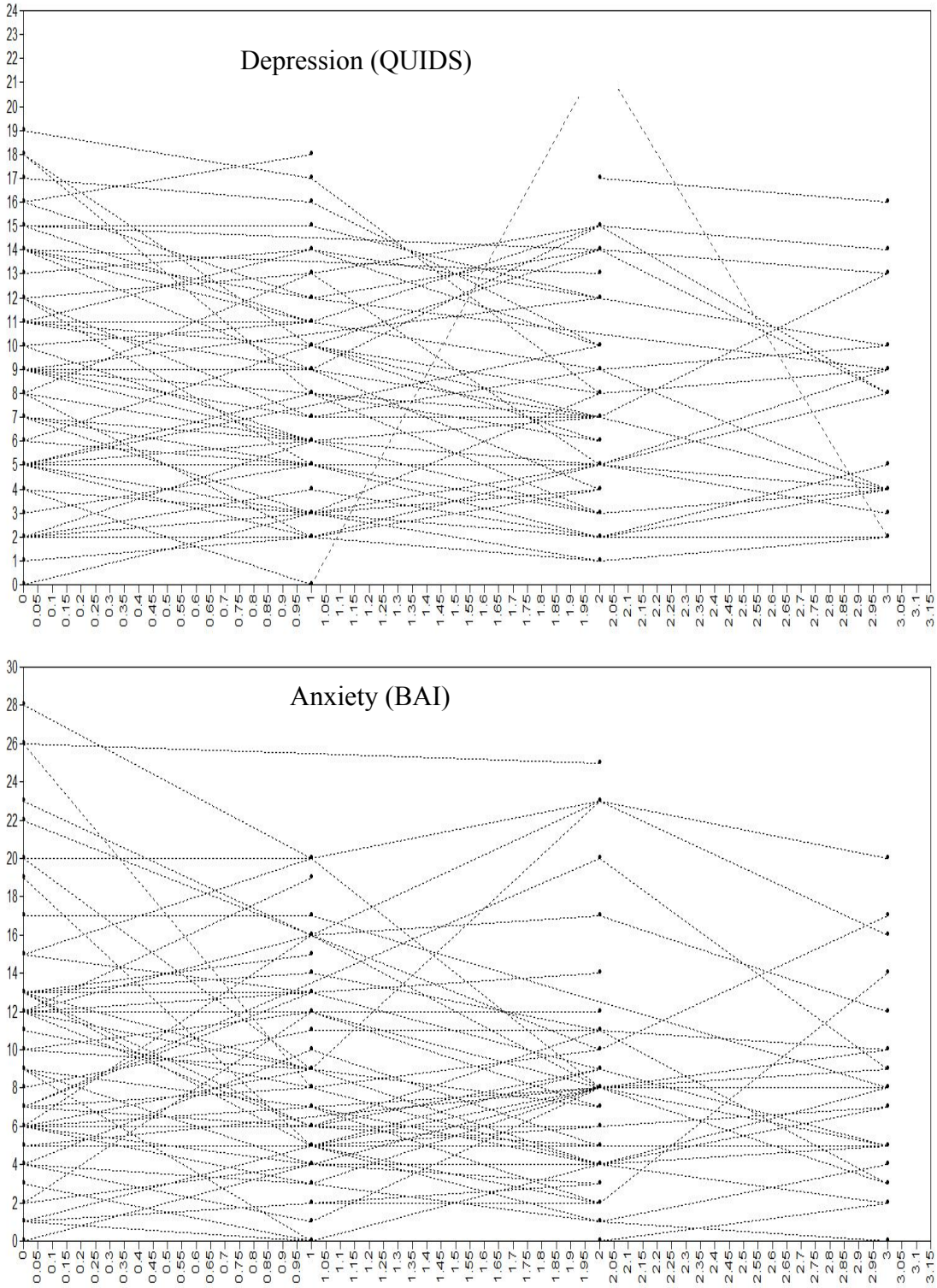

Figure 3. Individual growth trajectories for patients using the whole sample (*n*=61). This figure shows individual plots calculated from the raw data.

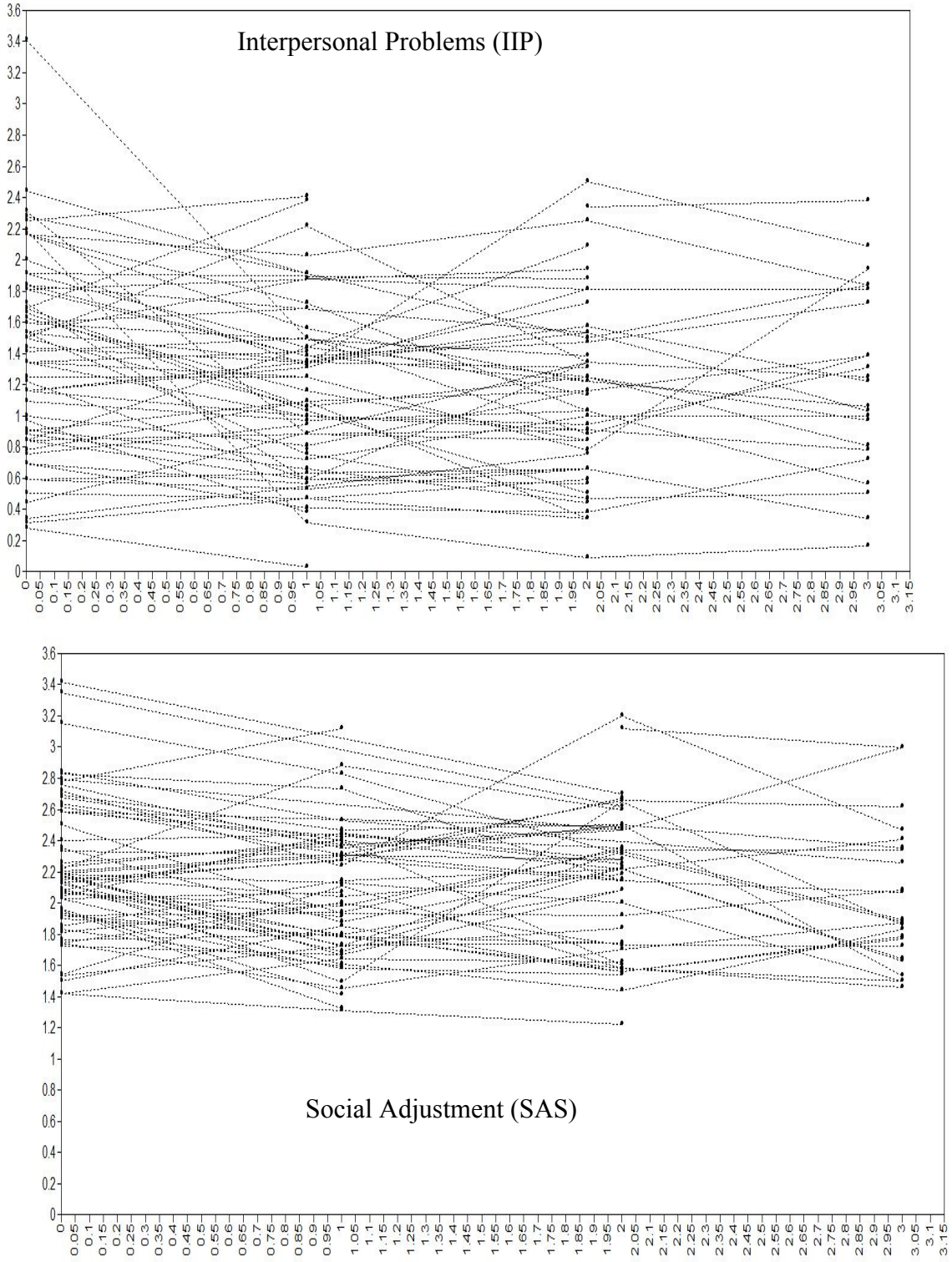

Figure 2 (cont.). Individual growth trajectories for patients using the whole sample (*n*=61).

5.2 Unconditional Univariate Growth Models

In order to answer question (2) regarding the existence of individual differences in growth parameters for each dependent variable modeled separately, a series of univariate growth curve analyses were conducted.

5.2.1 Unconditional Model for Anxiety

The unconditional growth model (a model with no Level 2 predictors) for anxiety for all patients in the sample was specified as the following two level model:

Level 1: $Anxiety_{ij}=\beta_{01}+\beta_{1i}(Time_{ij})+\varepsilon_{ij}$, where Time can take values 0, 3, 6, or 12.

Level 2:

Intercept: $\beta_{01}=\gamma_{00}+\mu_{0i}$

Slope: $\beta_{1i}=\gamma_{01}+\mu_{1i}$

In addition, a quadratic model was added in Level 1 to assess if a more complex model explains additional variance over and above the linear model:

$$Anxiety_{ij}=\beta_{01}+\beta_{1i}(Time_{ij})+ +\beta_{2i}(Time_{ij})^2 +\varepsilon_{ij}$$

Figure 4 shows the path diagram for the unconditional model that includes a quadratic growth parameter. With this unconditional model the question of whether or not here are individual differences in growth parameters (intercepts and slopes) can be addressed for the dependent variable anxiety.

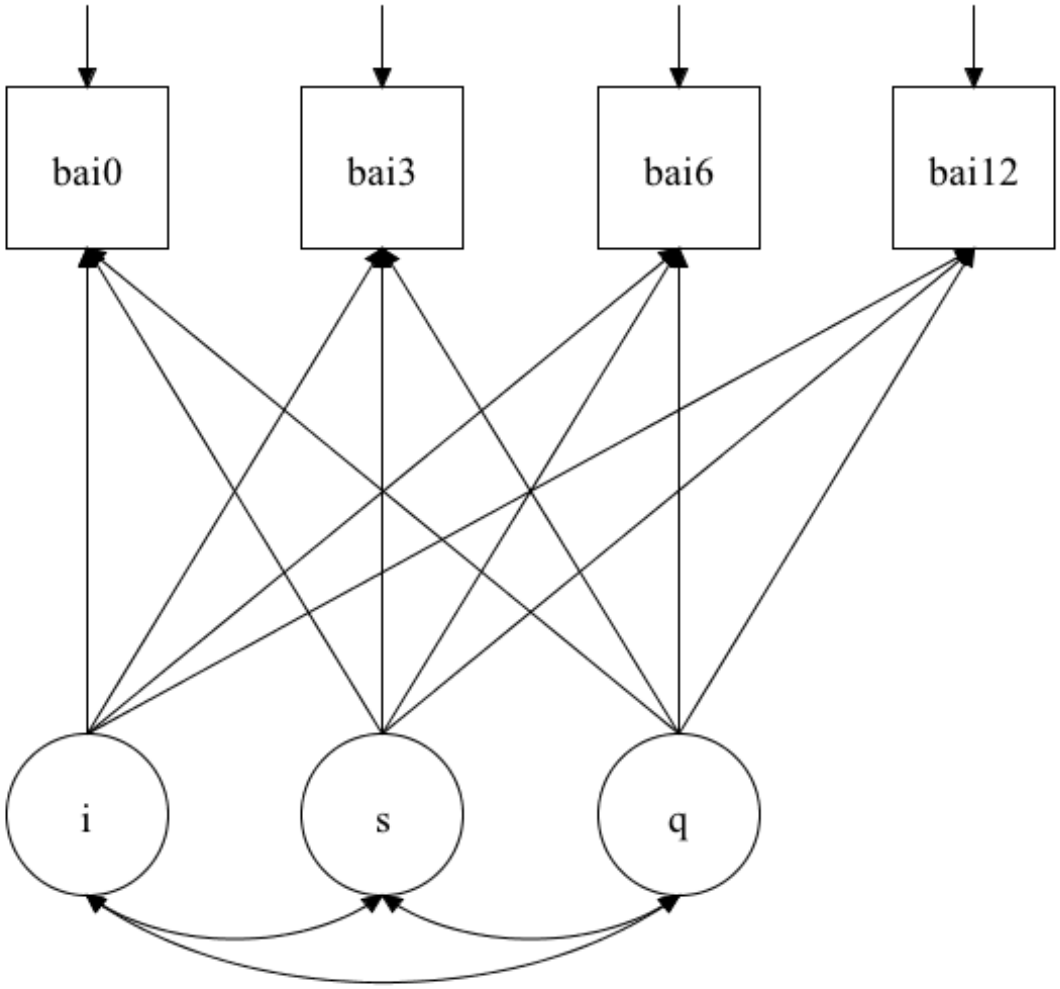

Figure 4. Unconditional growth curve model for anxiety. This figure uses a path analysis diagram to illustrate the growth curve model for Beck Anxiety Inventory (BAI) levels at baseline (bai0), 3-month (bai3), 6-month (bai6), and 12-month (bai12). The diagram also shows the influence of growth parameters on BAI including intercept (i), slope (s), and quadratic parameter (q).

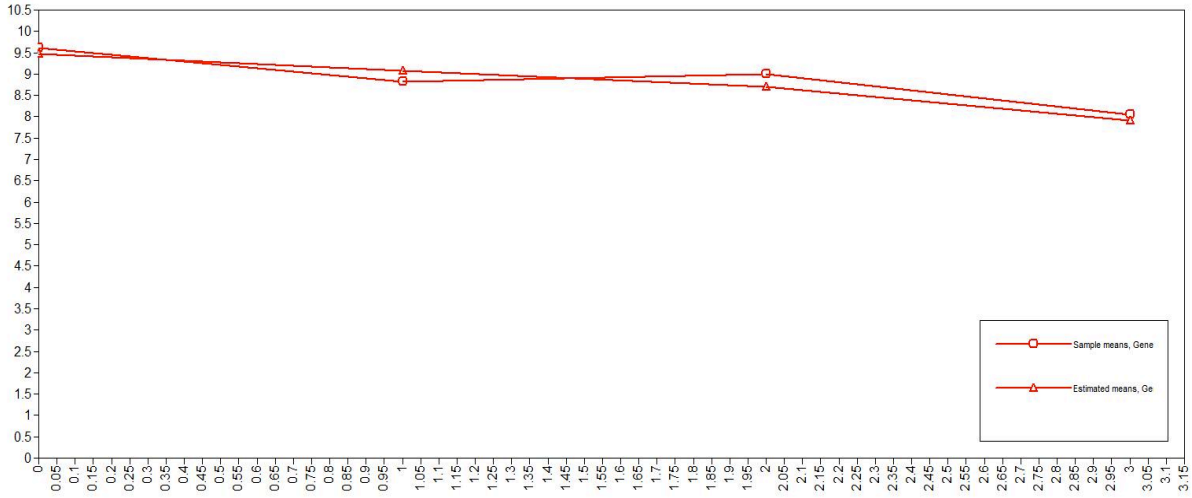

Figure 5. Estimated and sample means for unconditional growth model for anxiety. This figure illustrate model fit by plotting means calculated from the sample against means generated by the model.

The unconditional linear growth model for anxiety yielded appropriate model fit statistics with $\chi^2(5)= 4.89, p= .43^*$. The model that incorporated a quadratic component, also yielded appropriate model fit statistics ($\chi^2(1)=.70, p= .40$), but it generated an additional, albeit small increase in the estimated loglikelihood from -561.67 in the linear model to -559.64 in the quadratic model, thus indicating better overall model fit. Figure 5 shows the plot for estimated and sample means to further illustrate model fit. Further model fit statistics are reported in Table 3 for each dependent variable, including anxiety. A visual inspection of the plotted observed trajectories in Figure 3 is consistent with these results. This model did not produce a significant mean fixed effect for the slope, indicating that between time points there is no significant reduction in anxiety levels. The slope, although non-significant did show a negative trajectory signaling a reduction in anxiety between time points. However, model results yielded no significant differences between patients in intercepts and slopes, and no significant slope (either linear or quadratic). This suggests that there is no significant difference in intercepts between patients and no significant between-subject differences in anxiety-symptom change between time points although a quadratic growth parameter appears to produce a slightly better model fit. Table 4 summarizes these results.

* The null hypothesis is that the model fits the data, thus a non-significant result fails to reject the null hypothesis.

Table 3
Model Fit Statistics for Univariate, Unconditional Tests for Dependent Variables (N=61).

Model	X2	df	p	Loglikelihood	RMSA	90% C.I.	CFI	TLI
Anxiety	4.89	5	0.43	-561.67	0	.00-.18	1	1
Quadratic	0.7	1	0.4	-559.64	0	.00-.32	1	1.03
Depression	5.49	5	0.35	-498.53	0.04	.00-.19	0.99	0.99
Quadratic	0.42	1	0.52	-501.06	0	.00-.29	1	1.05
Social Adjustment	5.35	5	0.37	-69.83	0.03	.00-.18	0.99	0.99
Quadratic	3.79	1	0.05	-69.06	0.21	0.00-0.46	0.96	0.76
Interpersonal Problems	10.7	5	0.06	-125	0.14	.00-.25	0.92	0.91
Quadratic	1.84	1	0.18	-120.57	0.05	.00-.21	0.99	0.99

a Null hypothesis is that model fits data.

When the sample of patient is combined (over both types of treatment) and the change trajectory of patients is examined for anxiety levels, the analysis indicated that patients have similar levels of anxiety when they start treatment at the CCPTR and there is no significant rate of improvement for anxiety levels in the first year of combined psychoanalytic treatment (ranging from psychodynamic therapy to psychoanalysis proper). The analysis also indicates that this pattern of no improvement rate for patient does not significantly vary between subjects, that is, most patients presented the same non-significant slope for anxiety. These results suggest that the shape of change of anxiety levels over a year of psychoanalytic treatment for most patients in the sample is best characterized as a flat line, although the sign of the slope indicates a non-significant tendency toward reduction in anxiety, taking into account that most patients in the sample had low levels of anxiety at baseline, and thus no significant improvement was necessarily expected. The fact that a quadratic model fits data a little better, suggests that perhaps up- or down-turns in anxiety levels can happen over a year of treatment, but they are not consistent enough to be captured by a significant quadratic slope.

Table 4
Estimated Mean Growth Parameters and Variance Components for Anxiety (N=61).[a]

Fixed effect	Coefficient	SE	*t*
Mean baseline status	9.35	0.82	**11.34****
Mean linear growth rate	-0.12	0.22	-0.53
Mean quadratic growth rate	0	0.02	0.01
Random effect	Variance component		χ^2
Baseline status	13.76	13.84	0.32
Linear growth rate	-0.12	1.9	0.52
Quadratic growth rate	0.00	0.01	0.53

[a] For best fitting model.
** $p<0.001$

5.2.2 Unconditional Model for Depression

The same unconditional model was fitted this time using the dependent variable depression to model both linear as well as quadratic growth. The unconditional linear growth model for depression yielded appropriate model fit statistics with $\chi^2(5)=5.485$), $p= .3596$. Figure 6 shows the plot for estimated and sample means to further illustrate model fit. A quadratic growth model, which also fitted the data appropriately ($\chi^2(1)=.419$, $p= .5172$) did not generate an increase in the loglikelihood. Further model fit statistics are reported in Table 3 and Figure 6 further illustrates model fit by plotting estimated versus sample means. The quadratic growth model also yielded a small but significant fixed effect for the linear slope, indicating that there is significant reduction in depression scores between time points with a corresponding significant ratio test ($t(60)=.335/.148= 2.26, p = .023$). The estimate for the mean slope was -.335, and thus the slope for the unconditional univariate model can be interpreted as a .335 reduction in depression for every unit increase in time, that is, depression decreases by .335 between each data collection point. This model also indicated significant between-subject variability in intercepts, but not slopes. This may mean that even though patients start at different baseline depression levels, across time points, their growth trajectory is not significantly different and can be described as linear. Table 5 summarizes these results.

In summary, when the sample of patient is combined regardless of treatment and the change trajectory of patients are examined for ratings of depression, the analysis indicated that there were no significant differences in baseline levels of depression for patients receiving a year of psychoanalytic treatments. However, there was a significant

rate of improvement in depression levels over a year of treatment. One year of psychoanalytic treatment produces a reduction in depression symptoms between each time point (3 months, 6 months, and 12 months). There were no significant differences in this rate of improvement between patients in the sample, which suggests that the shape of change of depression levels for most patients in the sample can be described as a downward straight line (the quadratic component was not significant).

Table 5
Estimated Mean Growth Parameters and Variance Components for Depression (N=61).

Fixed effect	Coefficient	SE	t
Mean baseline status	9.06	0.63	14.39**
Mean linear growth rate	-0.34	0.15	-2.27*
Mean quadratic growth rate	0.02	0.01	0.18

Random effect	Variance component	SD	X2
Baseline status	25.1	8.71	2.88
Linear growth rate	0.48	0.84	0.57
Quadratic growth rate	-0.001	0	-0.29

*p<.05; ** p<.001

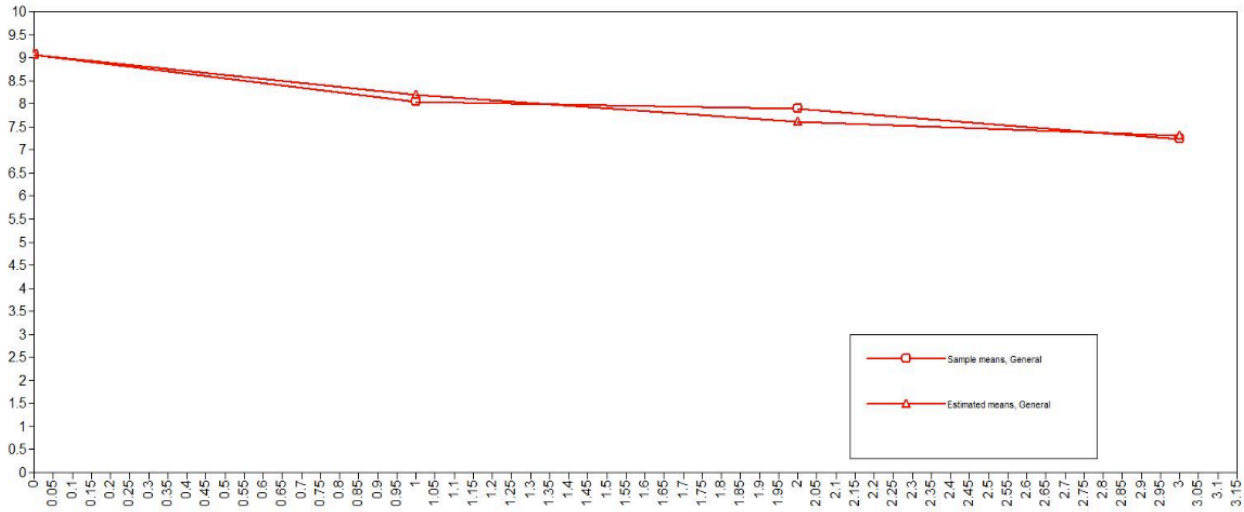

Figure 6. Estimated and sample means for unconditional growth model for depression. This figure illustrate model fit by plotting means calculated from the sample against means generated by the model.

5.2.3 Unconditional Model for Social Adjustment

The same unconditional model was fitted this time using the dependent variable social adjustment. Linear model fit was appropriate with $\chi^2(5)=5.349$, $p= .3748$, and for growth trajectories in social adjustment the quadratic growth model did not provide a superior model fit. Further model fit statistics are reported in Table 3. The unconditional linear growth model yielded a small but significant estimated mean slope of -.018, indicating an improvement in social adjustment across time points ($t(60)=.018/.006=3$, $p=.002$.). This estimated mean slope can be interpreted as a reduction of .018 points in social adjustment between each time point (for the SAS-SR higher score signal more impairment). The model also indicated significant between-subject variance in intercepts, but not in slopes, showing a similar trend to depression, where even though patients have different baseline levels of social adjustment impairment, they progress in a similar linear trajectory across time points. Table 6 summarizes these results.

In summary, when the sample of patient is combined over both types of treatment and the change trajectory of patients is examined for ratings of social adjustment, the analysis indicated that patients have significantly different starting points regarding their level of social adjustment. This is consistent with the descriptive analysis of the data that shows a higher percentage of patients that have clinical difficulties in social adjustment. In other words, the patients that were screened and accepted for psychoanalytic treatment in the sample appear report higher levels of distress in social adjustment than in symptom-related measures of distress (i.e. anxiety and depression). Patients start at

different levels and they also improve significantly over a year of psychoanalytic (combined) treatment. The shape of change for levels of social adjustment over a year can be best characterized as a straight, slightly downward line. Since there were no significant between-subject differences, it can be hypothesized that most patients have the same inclination of their improvement rate, that is, for the most part they show a continuous but slight improvement in social adjustment that may include up- and down-turns beyond the linear trend.

Table 6
Estimated Mean Growth Parameters and Variance Components for Social Adjustment (N=61)

Fixed effect	Coefficient	SE	*t*
Mean baseline status	2.21	0.06	**38.74****
Mean linear growth rate	-0.02	0.01	**-3.10***

Random effect	Variance component	SD	X^2
Baseline status	0.16	0.04	**4.14****
Linear growth rate	0	0	0.78

**p<.05; ** p*<.001

5.2.4 Unconditional Model for Interpersonal Difficulties

Finally, a univariate, unconditional model was fitted for the dependent variable interpersonal problems, and a quadratic component was tested as well. The linear growth model yielded appropriate model fit statistics with $\chi^2(5)=10.697$, $p= .0577$, although it can be seen that the test statistic was marginally significant. Further model fit statistics are reported in Table 3. In the case of interpersonal problems, the quadratic model not only produced an increase in the loglikelihood from -124.998 to -121.986 but it also yielded more robust model fit statistics with $\chi^2(4)=4.673$, $p= .3226$. The mean linear fixed effect was significant with a test ratio of $t(60)=-.067/.023=-2.913$, $p=.003$. Precisely, the interpersonal problems score decreases .067 points between each time point. The quadratic effect was also significant with a test ratio of $z=.004/.002=2$, $p=.008$. Based on a visual inspection of the individual trajectory plots for interpersonal problem, the significant quadratic fixed effect seems to describe, beyond what is predicted by the linear effect, an upturn of the trajectories after the three-month follow up. There was significant between subject variability in baseline levels of interpersonal problems, but no significant differences in slope trajectories between patients. Patients start at different baseline points for interpersonal problems, but they also grow following a similar, quadratic trajectory. Table 7 summarizes these results.

In summary, when the sample of patient is combined and the change trajectory of patients is examined for ratings of interpersonal problems, the analysis indicated that

patients start at different baseline levels, which is similar to the case of social adjustment, and provides additional support for the idea that psychoanalytic treatments at the CCPTR are typically indicated (attract) a population of patients with more significant problems in social adjustment and interpersonal problems, or at least with more initial variability in these areas. The analysis also suggested that there is a significant improvement rate in levels of interpersonal problems between time points (baseline, 3 months, 6 months and 12 months). Even though the shape of change can be characterized as a slightly downward line there seem to be enough relatively pronounced up- and down- turns to consolidate a significant quadratic growth parameter, indicating that a straight line may not be the best way to understand how patients change trajectories look like over a year of psychoanalytic treatment. The analysis indicated that there were no significant differences between patients regarding the rate of improvement (linear or quadratic).

Table 7
Estimated Mean Growth Parameters and Variance Components for Interpersonal Problems (N=61).

Fixed effect	Coefficient	SE	*t*
Mean baseline status	1.36	0.08	**16.20****
Mean linear growth rate	-0.07	0.02	**-2.95***
Mean quadratic growth factor	0	0.00	**2.64***

Random effect	Variance component	SD	X^2
Baseline status	0.23	0.06	**4.23****
Quadratic growth rate	0	0	1.38
Linear growth rate[a]	0	0	999

**p<.05; ** p*<.001

[a] Variance component for linear slope held constant.

5.3 Unconditional Multivariate Growth Models

In order to answer questions (3), and (4) regarding individual differences in growth parameters, this time using a multivariate analysis two multivariate growth curve analyses were conducted using a clustering of variables that is detailed below.

5.3.1 Clustering of Variables for Construction of Multivariate Growth Models

In order to increase stability of the models as well as to generate results conducive to a reasonable, multivariate interpretation, it was decided to cluster the four dependent variables (anxiety, depression, social adjustment, and interpersonal problems) into two groups: Clinical Course (depression and anxiety) and Social Adjustment (social adjustment and interpersonal problems). The reason behind this decision was based on 1) theoretical considerations, on 2) considerations to improve model stability, and on 3) a consideration of parsimony to be able to draw reasonable, and ordered conclusions from the multivariate analysis.

1) Theoretical considerations: The position of psychoanalysis *vis-à-vis* the view of treatment as a cure of acute symptoms has always been controversial and has developed over the years. Freud articulated the main points of this controversy. First, he warned therapists who were training in psychoanalysis to refrain from over-focusing on the symptom, an attitude that he termed *furor sanandi* (Freud, 1915b). Additionally, he distinguished between the symptom and the illness, and pronounced psychoanalysis as a treatment that focuses primarily on the

underlying illness (i.e., unconscious conflicts) rather than on the overt manifestation of the illness (Freud, 1916). This position, initially maintained by Freud, has developed since then but can still be considered quite prominent, and presumably is one of the reasons that psychoanalytic researchers have rejected research programs based on symptom-focused outcome. To a great extent, the curing of symptoms is, in the context of analytic therapies, secondary to the understanding and working-through of unconscious conflicts. In fact, the primary focus of psychoanalysis and psychodynamic psychotherapy on social adjustment and interpersonal problems can be readily inferred from the description of psychoanalytic treatment presented by the CCPTR. In response to the educational question *What is psychoanalysis?* the website states:

> Psychoanalysis is a form of talk therapy that has been practiced widely in the United States and internationally for many decades. The ideas behind psychoanalysis, which at one time were considered revolutionary, are now well accepted and include the following:
>
> • There are aspects of our minds that function beneath our level of awareness and that shape the kind of relationships we make, the way we function at work, and the way we feel about ourselves.
>
> • We can get hints about these unconscious thoughts and expectations by carefully examining the choices we make, our dreams, the spontaneous thoughts that flicker through our minds, and the feelings that come up as we interact with the people we care about.
>
> • Many of these unconscious thoughts and expectations can be traced to our childhoods. Although they may have developed as the best solutions we could find to challenges we faced at home and in our world of peers, they may hinder us as adults unless we understand them as fully as possible.
> (http://www.psychoanalysis.columbia.edu/patients/what-psychoanalysis)

This specificity separates psychoanalytic therapy from other psychological treatments. For example the website of the Association for Behavioral and Cognitive Therapies

provides the following answer to the questions "*What is Cognitive Behavior Therapy (CBT)?:*

> Cognitive Behavioral Therapy (CBT) is the term used for a group of psychological treatments that are based on scientific evidence. These treatments have been proven to be effective in treating many psychological disorders.
> Some people have an inaccurate view of what psychological therapy is, perhaps because of the old-fashioned treatments shown on TV or in the movies. For example, on TV, psychotherapy may seem to involve dream interpretation or complex discussions of one's past childhood experiences. This type of psychotherapy is outdated. In fact, very few psychotherapists (e.g., psychologists, social workers, or psychiatrists) use this type of treatment.
> Cognitive and behavioral therapies usually are short-term treatments (i.e., often between 6-20 sessions) that focus on teaching clients specific skills. CBT is different from many other therapy approaches by focusing on the ways that a person's cognitions (i.e., thoughts), emotions, and behaviors are connected and affect one another. Because emotions, thoughts, and behaviors are all linked, CBT approaches allow for therapists to intervene at different points in the cycle.
> (http://www.abct.org/Public/?m=mPublic&fa=WhatIsCBTpublic)

Even though the actual way in which therapists practice psychotherapy may not reflect these theorized principle-driven demarcations, the decision to cluster differentially depression and anxiety symptoms and social adjustment and interpersonal problems was thought to maximize the probability of finding interesting differences in growth parameters in the multivariate model that replicate a conceptualization of the aim of analytic psychotherapies. It was predicted that psychoanalysis and psychoanalytic therapy would produce, over a year, more significant changes in the social adjustment/interpersonal problems cluster. Additionally, as Figure 3 indicates, the sample of patients used for this study was more characterized by difficulties in social adjustment and interpersonal problems (where a large majority of subjects was above community

sample means) than on depression/anxiety symptoms (most patient had either mild or moderate depression and anxiety). Finally, the clustering of anxiety and depression together is consistent with the general co-morbidity and psychiatric disorder course literature that seems to suggest overwhelmingly that anxiety and depression are co-morbid in their clinical presentations (e.g., Breier et al. 1985; Fawcett & Kravitz, 1983; Pini, et al., 1997).

It is important to recognize that the assertion that psychoanalysis is better indicated for social/interpersonal problems than for acute symptomatic distress does not necessarily extend to psychodynamic psychotherapy. Dynamic therapy – conceptualized and manualized differently across studies- has consistently shown reliable effectiveness to treat acute symptom distress (i.e. depression and anxiety) in many studies (for example, Bateman & Fonagy, 1999; Blatt, 1992; Bush et al., 2007; Clarkin, Levy, Lenzenweger, & Kernberg, 2004; Drissen et al., 2007; Leichsenring, Biskup, Kreische, & Staats, 2005; Shedler, 2010). Thus, the decision to group variables into clinical course and social/interpersonal adjustment is theoretically based as far as psychoanalysis proper is concerned but also artificial vis-à-vis empirical studies (including several randomized controlled trails) conducted using some manualized from of psychodynamic psychotherapy for Axis I disorders.

2) Model stability considerations: A multivariate approach that uses four outcome measures with a model specification that frees most parameters (as is the case with an unconditional multivariate model) results in a model that estimates 56 parameters. Estimating this many parameters with such a small sample (N=61)

likely results in a very unstable estimation of parameters and ultimately in a miss-specified and under-fitted model.

3) Finally, fitting a model that includes all dependent variables in a parallel process LGM (Wolf & Brown, 2013), even if this model were to be admissible, yields extremely complicated results and interpretation into a coherent narrative is almost impossible. Thus, clustering dependent variables into pairs that make theoretical sense (and also starting from the fact that all dependent variables are correlated significantly as shown in Table 1) allows for a more coherent, and theoretically relevant interpretation of the results.

Following the clustering procedure outlined above, two different unconditional multivariate models were conducted: Model 1 fitted a linear growth trajectory for depression scores for the four assessment points using anxiety score as a time-varying covariate. Using a multivariate liner growth model with a time-varying covariate instead of a multivariate model with a parallel process LGM requires less parameters to be estimated and with small sample-sizes likely produces a more stable model (Wolf & Brown, 2013). Model 2 fitted a linear growth curve trajectory for social adjustment scores with interpersonal problems as a time varying covariate.

5.3.2 Unconditional Multivariate Model for Depression with Anxiety as Time-Varying Covariate

The unconditional growth model for depression using anxiety as a time-varying covariate for all patients in the sample was specified as the following two level model (Figure 7):

Level 1: $Depression_{ij}=\beta_{01}+\beta_{1i}(Time_{ij})+\beta_{2i}(Anxiety)+\varepsilon_{ij}$, where Time can take values 0, 3, 6, or 12.

Level 2:

Intercept: $\beta_{01}=\gamma_{00}+\mu_{0i}$

Slope: $\beta_{1i}=\gamma_{01}+\mu_{1i}$

Slope: $\beta_{2i}=\gamma_{20}$

This unconditional, multivariate growth model for depression with anxiety as time-varying covariate yielded good model fit with $\chi^2(9)=12.789$, $p= .1724$. Figure 8 further illustrates appropriate model fit by combining both estimated and sample means at different time points for the combined, multivariate model of depression and anxiety. Anxiety scores significantly predicted depression scores across the first three time points, pointing to the strong co-morbid relationship between depression and anxiety that is well documented in the literature. The linear relationship between depression and anxiety was lost at the twelfth time point, but this is likely due to the significant increase in missing values at the twelfth-month data collection wave. The model also yielded a significant relationship between the slope and the intercept in the model ($r=-.69$, $p=.018$). This negative relationship seems to indicate that when patients have higher baseline scores in depression, the slope becomes less pronounced--that is the higher the baseline level for depression, the slower the improvement rate between each time point when the influence

of anxiety at each time point is considered in the model. Of note is that the unconditional model for depression did not produce a significant correlation between the intercept and slope. This may be a result of the added power in analysis when variables are combined in one model, but also it may indicate that the relationship between depression baseline score and growth in depression level is influenced by the relationship between both variables, that is, the extent to which anxiety predicts levels of depression at each time point. Also, when taking into account the relationship between anxiety and depression at each time point of the growth trajectory of depression scores, the model yielded no significant fixed effect for the mean slope, although the direction of the slope remained negative. This signals a decrease in depression scores across time-points when the relationship between depression and anxiety is modeled in time. This result is interesting, because when looking at the univariate unconditional model for depression, there was a significant improvement in depression scores. This significant slope is lost when anxiety is introduced in the model as a time-varying covariate, and this is unlikely to be a result of power since as noted above, the multivariate model typically result sin a gain of statistical power to detect slopes variances. Finally, the model indicated that there were significant between-subject differences in baseline scores for depression and no significant between-subject differences in slopes. Because one objective of this study was to understand between-subject variability in slopes, there was no justification to introduce level 2 predictors since there was no significant between-subject variance to be explained by additional covariates. Table 8 summarizes these results.

In summary, when patients in the sample are combined over treatment types (psychodynamic therapy and psychoanalysis) and the trajectory of change in depression

is explored in its relationship to anxiety levels at each time point, the first interesting result is that a significant difference in baseline status emerges which was not available in the univariate model for depression. This may be a result of added power of the multivariate approach, but also to the idea that anxiety and depression co-vary in patients who receive a year of psychoanalytic treatment. This is consistent with epidemiological and co-morbidity data. Patients appear less homogeneous in the sample when depression and anxiety are allowed to co-vary and a more complex and clinically interesting picture emerges at baseline. Even though there is no significant rate of improvement for levels of depressions in the sample of patients, there is a significant relationship between how patients start therapy and the rate of improvement. About 60% of the variability in rates of improvement in depression can be accounted for by baseline status. This means that when depression and anxiety are allowed to "change together" across time points, how patients start does matter in terms of their future improvement in therapy. Specifically, the higher patients start in regards to baseline depression, the smaller the rates of improvement between assessment points. The relationship between depression and anxiety is likely maintained throughout the first year of therapy and levels of anxiety consistently work as predictors for levels of depression across time points.

Table 8
Estimated Mean Growth Parameters and Variance Components for Depression (QUIDS) with Anxiety (BAI) as time-varying covariate (N=61).

Fixed effect	Coefficient	SE	*t*
Mean baseline status	6.56	1.02	**6.41****
Mean linear growth rate	-1.97	2.31	-0.85
Regression of QUIDS on BAI			
QUIDS0 ON BAI0	0.26	0.09	**2.87****
QUIDS 3 ON BAI3	0.23	0.07	**3.41***
QUIDS6 ON BAI6	0.28	0.12	**2.64***
QUIDS12 ON BAI12	0.39	0.27	1.44
Covariance between intercept and slope	-0.69	0.23	**-2.99***

Random effect	Variance component	SD	X^2
Baseline status	13.6	3.22	**4.23**
Linear growth rate	5.09	3.34	1.53

*$p<.05$; ** $p<.001$

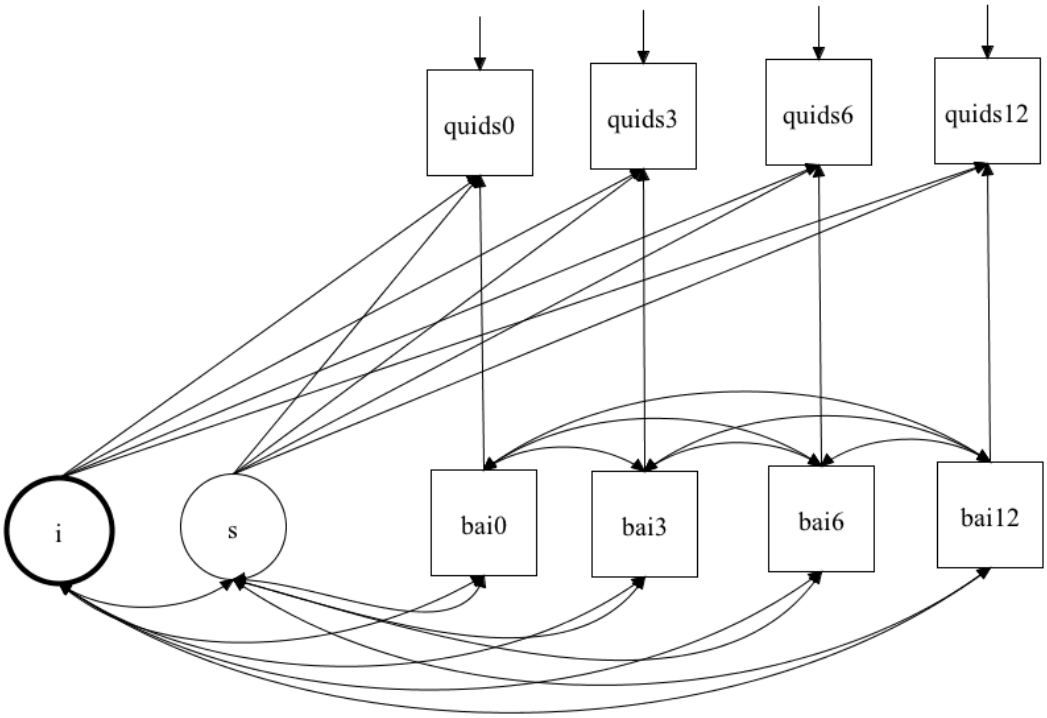

Figure 7. Unconditional multivariate growth curve model for depression and anxiety. This figure uses a path analysis diagram to illustrate the joint growth curve model for depression (QUIDS) and anxiety as a time-varying covariate. In addition to standard influence of intercept (i) and slope (s) on depression at each time point (quids0, quids3, quids6, and quids12), this model also produces regression coefficients for BAI predicting QUIDS scores at each time point.

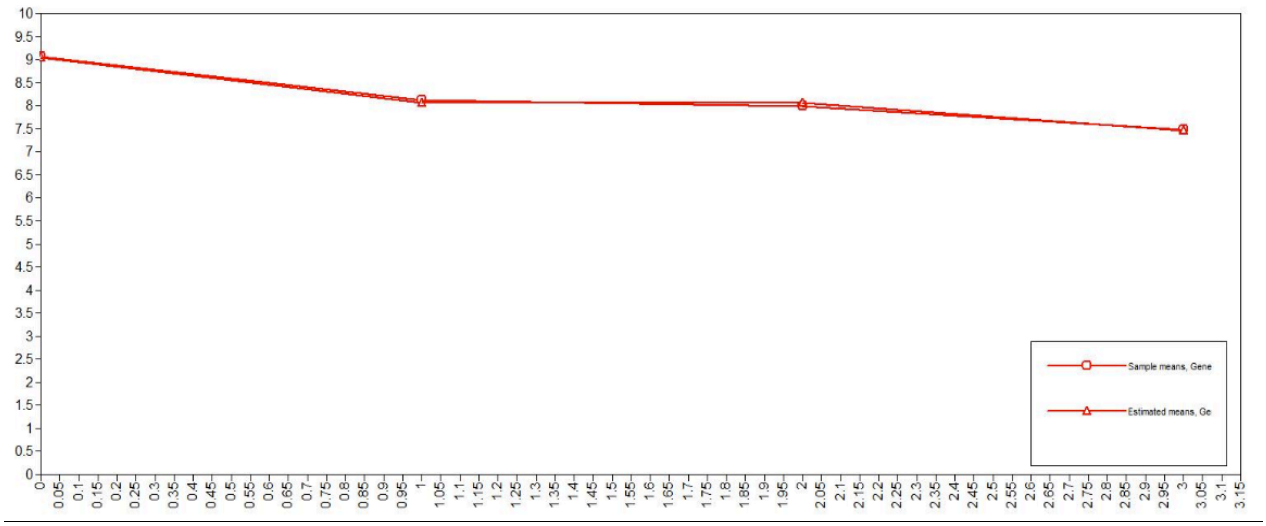

Figure 8. Estimated and sample means for unconditional growth model for depression with anxiety as time-varying covariate. This figure illustrates model fit by plotting means calculated from the sample against means generated by the model.

5.3.3 Unconditional Multivariate Model for Social Adjustment with Interpersonal Problems as Time-Varying Covariate

A similar model was fitted to explore the growth trajectory of social adjustment when interpersonal problems were introduced as a time-varying covariate. The model yielded appropriate model fit statistics with $\chi^2(9)=15.589$, $p= .0761$ Figure 9 illustrates model fit by plotting both estimated and sample means for trajectories of SAS scores in a multivariate model with interpersonal difficulties. Scores on both variables –social adjustment and interpersonal problems were correlated across all time point except for baseline assessment. A linear relationship between both variables is identified by the model only from the third month onwards, and it continues to hold until the twelve-month assessment. For the cluster social adjustment/interpersonal problems there was a marginally significant linear relationship between intercept and slope with a test ratio of z=-0.012/0.006= -2, p= 0.057. This may suggest that when patients have higher baseline scores in social adjustment, the slope becomes less pronounced--that is, the higher the baseline level for social adjustment, the slower the improvement rate between each time point when the influence of interpersonal problems at each time point is considered in the model. A significant fixed effect for mean slope was found with a test ratio of z= -.095/.032=2.97, p=.003. When the relationship between social adjustment and interpersonal problems is modeled across time points, there is a reduction of .095 points in social adjustment between each time point. This suggests that when interpersonal problems are modeled as a time-varying covariate for social adjustment, the slope becomes somewhat steeper compared to the unconditional model for social adjustment which yielded an estimate for the fixed mean slope effect of -.018. The analysis also

yielded significant between-subject variability for baseline assessments of depression, but not for slope. Table 9 summarizes these results. Because the one of the main objectives of this study was to understand between-subject variability in slopes, there was no justification to introduce level 2 predictors since there was no significant between-subject variance to be explained by the introduction of additional Level 2 covariates.

In summary, when patients receiving psychodynamic therapy or psychoanalysis are combined, and the level of social adjustment is explored across time points in its relationship to interpersonal problems, there is significant variability in where patients start treatment. The shape of change for patients in regard to social adjustment over a year of psychoanalytic (combined) treatment can best be described as a downward straight line and the inclination (rate) of this line does not seem to be very different between patients. In other words, most patients in the sample improve regardless of where they start and they rate of improvement (a slightly downward line) is similar for all. Additional findings of this combined model (social adjustment and interpersonal problems) are related to the extent to which interpersonal problems predict social adjustment across the first year of psychoanalytic treatment (combined). Of note is that interpersonal problems only predicts social adjustment from the three month time point on, which suggests that in the combined sample the relationship between both constructs may be actually developed in the treatment; that is, as a part of the treatment, patients learn to relate their problems in social adjustment to interpersonal difficulties and thus, both variables become linearly related. This consistent with a basic principle of psychodynamic therapy and psychoanalysis: that repetition of maladaptive patterns is an important mechanism of therapeutic action.

Table 9
Estimated Mean Growth Parameters and Variance Components for SAS with IIP as time-varying covariate.

Fixed effect	Coefficient	SE	*t*
Mean baseline status	2.05	0.14	**15.01****
Mean linear growth rate	-0.10	0.03	**-2.96***
Regression of SAS on IIP			
SAS0 ON IIP0	0.12	0.09	1.31
SAS3 ON IIP3	0.28	0.08	**3.38***
SAS6 ON IIP6	0.59	0.12	**4.78****
SAS12 ON IIP12	0.91	0.27	**3.40***
Covariance between intercept and slope	-0.01	0.01	-1.91

Random effect	Variance component	SD	X^2
Baseline status	0.12	0.04	**3.18***
Linear growth rate	0	0.00	1.46

*$p<.05$; ** $p<.001$

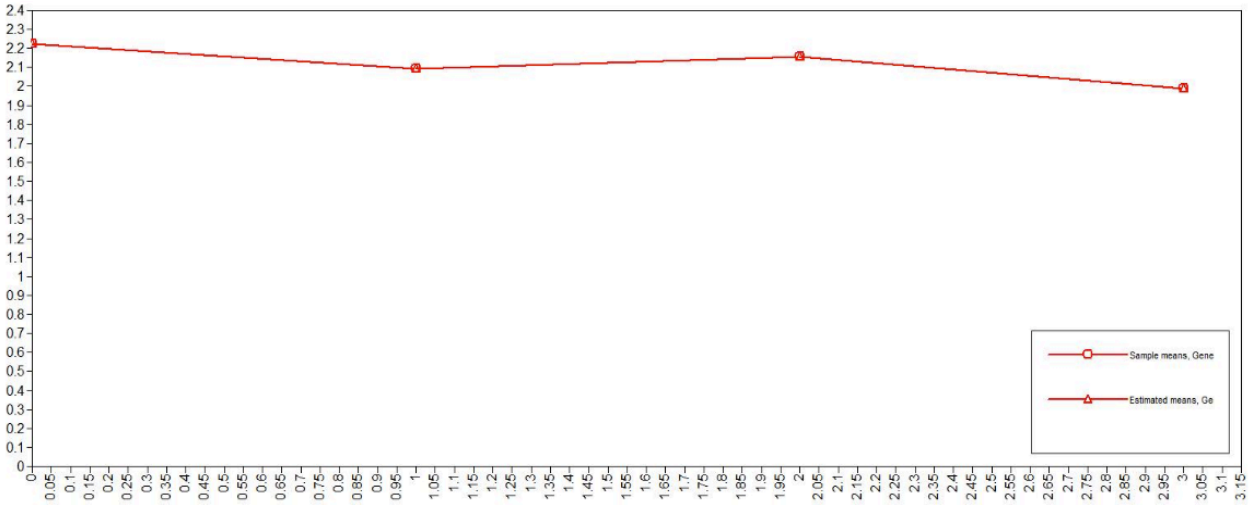

Figure 9. Estimated and sample means for unconditional growth model for social adjustment with interpersonal problems as time-varying covariate. This figure illustrates model fit by plotting means calculated from the sample against means generated by the model.

5.4 Knownclass Analysis to Detect Differences in Growth Parameters Between Treatments

For most analyses the sample was treated as a single heterogeneous sample of patients receiving analytic treatment in a continuum from twice-weekly, face-to-face long-term psychoanalytic psychotherapy, to four to five times a week psychoanalysis using the couch. The main reason behind this joint analytic strategy was to maximize power by augmenting sample size. Additionally there was no indication that patients would substantially differ across treatments within a year as proven by preliminary analyses as well as comparisons in baseline characteristics. However, in order to answer research questions (5) and (6), a "known-class" mixtures analysis was conducted to establish potential differences in growth parameters between both treatments, assumed to differ reliably in regards to frequency and use of the couch. Additionally, treatment differences in the linear relationship between variables in combined models (depression/anxiety and social adjustment/interpersonal problems) were assessed. to answer research question (6).

5.4.1 Differences Between LTT and PA for Depression Model with Anxiety as Time-Varying Covariate

When the relationship between depression and anxiety is modeled jointly with anxiety as a time-varying covariate, there was no significant fixed effect for the mean slope in either treatment group although both coefficients pointed to a negative relationship. This suggests that neither treatment produce a significant decrease in depressive symptoms measured by the QUIDS between time points when the influence of

anxiety was incorporated in the model. However, for patients in both groups there was a significant covariance between baseline status and improvement in therapy (i.e., between intercept and slope), signaling that there is a relationship between initial levels and growth between time points even though the linear growth parameter was not significant. There were interesting differences in regression coefficients for BAI scores as predictors of QUIDS scores at each time point (these regressions are specified in the time-varying part of the model). For patients in the LTT group, BAI significantly predicted QUIDS scores at corresponding time points indicating a strong relationship between both variables across time points with the exception of the twelve-month assessment where the regression coefficient was not significant. However, as indicated above, this could be an artifact of the increase in missing data at the last data collection point. The extent to which BAI scores predicted QUIDS scores across corresponding time points was more erratic in patients in the psychoanalysis group. BAI scores predicted QUIDS scores at baseline and at the three-month data wave. For the sixth month wave, the regression coefficient was non significant. For the twelfth data wave, the relationship was significant again. It is difficult to establish a pattern, but perhaps psychoanalytic treatment produces a "disaggregation" of symptoms that is facilitated by the depth and complexity of the work. Conversely, psychoanalytic therapy is presumably more "symptom oriented" and capitalizes on the "aggregation" of symptoms to produce an improvement in clinical course, although this improvement was not observed in the analysis. Alternatively, psychoanalytic treatment may be more "anxiety provoking" to the extent that anxiety may, at times loose its association to depression and operate rather as iatrogenic anxiety.

For both groups there was significant between-patient variation in baseline, but not in slopes. Table 10 summarizes these results.

Table 10
Estimated Mean Growth Parameters and Variance Components for Depression (QUIDS) and Anxiety (BAI) by Treatment Class (N=61).

Long Term Psychodynamic Therapy (LTT) (N=43)

Fixed effect	Coefficient	SE	*t*
Mean baseline status	6.18	1.37	**4.52****
Mean linear growth rate	-.24	0.24	-.99
Regression of QUIDS on BAI			
QUIDS0 ON BAI0	0.24	0.12	**2.01***
QUIDS 3 ON BAI3	0.20	0.09	**2.31***
QUIDS6 ON BAI6	0.30	0.11	**2.86***
QUIDS12 ON BAI12	0.41	0.24	1.67
Covariance between intercept and slope	-.58	0.25	-2.355

Random effect	Variance component	SD	X^2
Baseline status	12.35	2.79	**4.42****
Linear growth rate	0.05	0.03	1.76***

Psychoanalysis (PA) (N=18)

Fixed effect	Coefficient	SE	*t*
Mean baseline status	7.39	1.29	**5.71****
Mean linear growth rate	-.13	0.18	-.74
Regression of QUIDS on BAI			
QUIDS0 ON BAI0	0.36	0.10	**3.74****
QUIDS 3 ON BAI3	0.35	0.08	**4.30****
QUIDS6 ON BAI6	0.17	0.11	1.58
QUIDS12 ON BAI12	0.39	0.19	**1.99***
Covariance between intercept and slope	-.58	0.25	**-2.36***

Random effect	Variance component	SD	X^2
Baseline status	12.35	2.79	**4.42****
Linear growth rate	0.05	0.03	1.76

*$p<.05$; ** $p<.001$

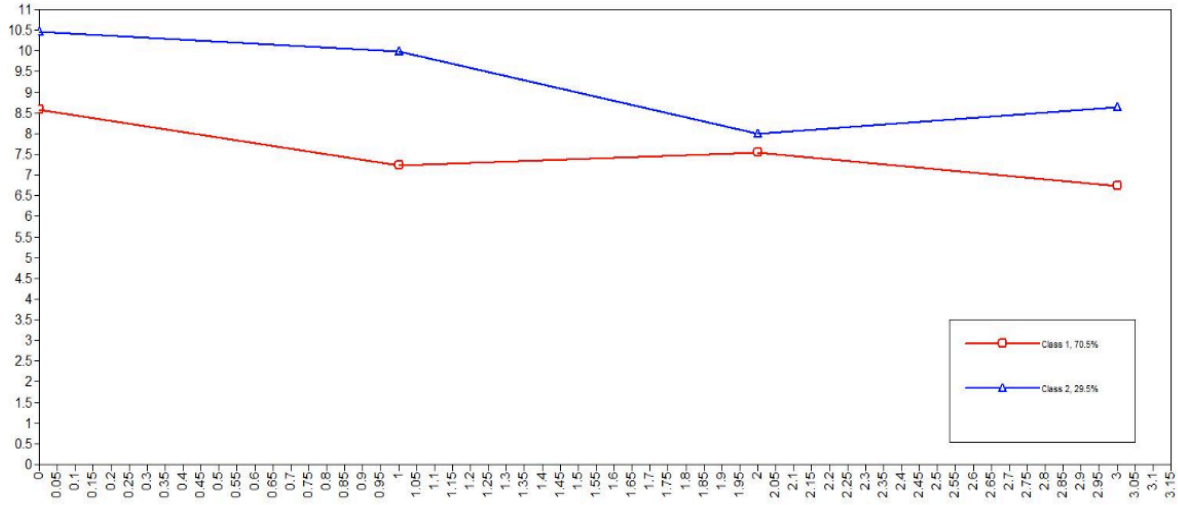

Figure 10. Growth Trajectories by Treatment Class (1). This figure shows estimated means for multivariate model of depression (QUIDS) with anxiety (BAI) as time-varying covariate specified by treatment class. Class 1= Long Term Dynamic, Class 2= Psychoanalysis.

5.4.2 Differences Between LTT and PA for Social Adjustment with Interpersonal Problems as Time-Varying Covariate

When the relationship between social adjustment (SAS) and interpersonal problems (IIP) was modeled jointly with interpersonal problems as a time-varying covariate, there was a significant fixed effect for the mean slope in the LTT group (z=-3.9, p = .001) but this effect was only marginally significant in the PA group (z=-2.724, p=.053). This suggests that patients in psychodynamic therapy had a more pronounced rate of improvement than patients in psychoanalysis when the relationship to interpersonal problems was taken into account in the model at each time point. Both groups had a significant relationship between baseline status and improvement rate, indicating that where patients start initially in terms of social adjustment has a bearing in the speed of the improvement when interpersonal problems are used as a predictor for each time point. However, the direction if this relationship was different between treatments so that for the LTT group the rate of improvement increases when baseline levels are higher, and for the PA group the rate of improvement decreases when initial levels of social adjustment and interpersonal problems are higher. The extent to which IIP scores predicted SAS scores at corresponding time points varied between both treatment groups. For patients in the psychodynamic therapy group, the regression coefficient of SAS on IIP was only significant at the six-month assessment (although as mentioned above the non-significance at time twelve needs to be interpreted with caution). Conversely, the regression coefficients of SAS on IIP were significant across time points for patients in the PA group, with the exception of the last time point which was

marginally significant, presumably because of missing values t the last time point. This difference suggests that patients in psychoanalysis tend to "aggregate" social adjustment and interpersonal problems more consistently than patients in the psychodynamic group. This may confirm the theoretical distinction of psychoanalysis as a treatment that relies more on systematic interpersonal work as a mechanism for improvement. It is likely that psychoanalytic treatment capitalized on the relationship between social adjustment and interpersonal problems in a more systematic and in-depth way than patients in psychodynamic therapy. In other words, patients in psychoanalysis are systematically thinking about interpersonal problems as an engine for social adjustment difficulties in general. Table 12 summarized these results.

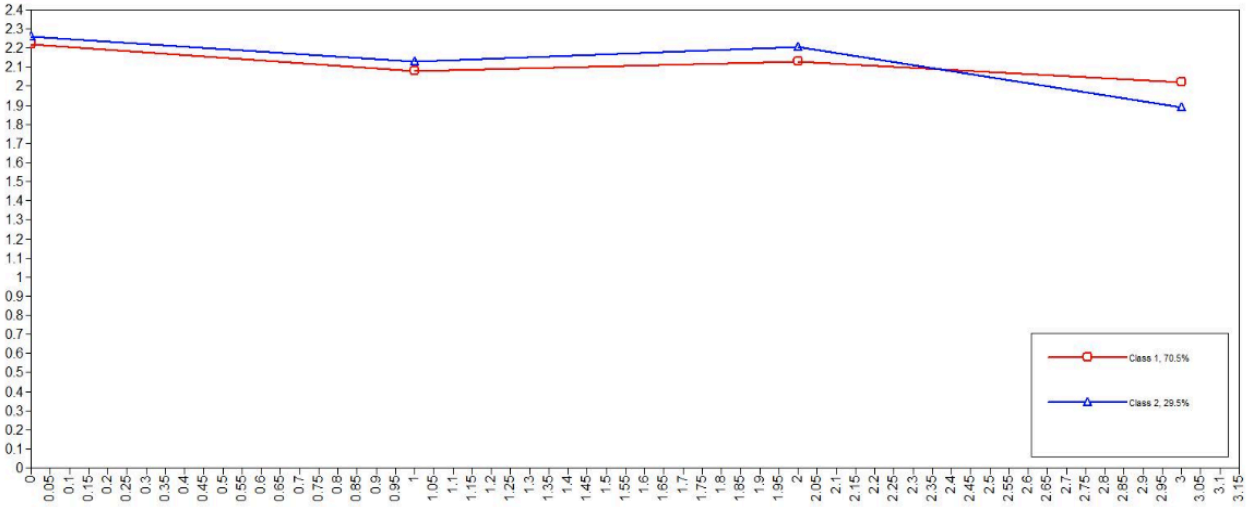

Figure 11. Growth Trajectories by Treatment Class (2). This figure shows estimated means for multivariate model of social adjustment with interpersonal problems as time-varying covariate specified by treatment class. Class 1= Long Term Dynamic, Class 2= Psychoanalysis.

Table 11
Estimated Mean Growth Parameters and Variance Components for Social Adjustment (SAS) and Interpersonal Problems (IIP) by Treatment Class (N=61).

Long Term Psychodynamic Therapy (LTT) (N=43)				
Fixed effect		Coefficient	SE	*t*
Mean baseline status		2.45	0.23	**10.85****
Mean linear growth rate		-3.90	1.18	**-3.30****
Regression of SAS on IIP				
SAS0 ON IIP0		-.166	0.16	-1.03
SAS3 ON IIP3		0.41	0.14	**2.88***
SAS6 ON IIP6		0.66	0.21	**3.16***
SAS12 ON IIP12		-.73	1.49	-.49
Covariance between intercept and slope		1.87	0.30	**-2.30***
Random effect	Variance component		SD	X^2
Baseline status		0.22	0.08	**2.68***
Linear growth rate		2.56	1.41	1.81***

Psychoanalysis (PA) (N=18)				
Fixed effect		Coefficient	SE	*t*
Mean baseline status		1.93	0.31	**6.27****
Mean linear growth rate		-2.72	1.41	-1.94***
Regression of SAS on IIP				
SAS0 ON IIP0		0.24	0.22	1.10
SAS3 ON IIP3		0.59	0.18	**3.22***
SAS6 ON IIP6		0.62	0.20	**3.06***
SAS12 ON IIP12		-.98	1.43	-.68
Covariance between intercept and slope		-.69	0.30	**-2.30***
Random effect	Variance component		SD	X^2
Baseline status		0.22	0.08	**2.68***
Linear growth rate		2.56	1.41	1.81

*$p<.05$; ** $p<.001$

6. DISCUSSION

Psychoanalytic psychotherapies are effective treatments that have been studied on a variety of patients with different clinical presentations, but little is known about the specific "shapes of change" that may best characterize patient trajectories in analytic treatments. Results from the present study suggest that when anxiety, depression, social adjustment, and interpersonal problems are studied separately and jointly, one year of psychoanalytic therapy –hypothetically functioning variably within a continuum ranging from supportive to expressive interventions- does not produce significant differences in rates of improvement between patients. In this regard, it is likely that since the analytic treatments explored in this study are hypothesized to be long-term treatments, looking at the first year does not produce significant differentiation between patients in rates of improvement.

The absence of significant between-subject variability is certainly a striking result. Typically, growth curve model studies do show variability in rates of improvement between patients, which in turn allow for the introduction of additional explanatory variables and maximizes the utility of a multilevel data-analytic strategy. In this regard, this study only investigates aggregated trajectories, and little is learned about what is happening at an individual level. A growth curve model approach is still a superior analytic strategy to standard repeated-measures ANOVA because of the inherent violation to the assumption of non-independent observations in longitudinal data sets as well as due to the unbalanced data-structure (e.g., patients do not complete follow-ups at the same time and data is missing from some collection points). However, results did not

allow for the deployment of the full range of analytic opportunities theoretically contained in mixed effect modeling.

It remains unclear why this study failed to find a statistically significant differentiation between patients' rates of improvement. It is possible that because treatments in this study are hypothesized to be long-term treatments, one year of therapy (either dynamic or psychoanalysis) does not allow for sufficient differentiation between patients. More targeted, short-term treatments may produce more marked rates of improvement as well as allow for significant between-subject variability, but only if randomization is used to control for treatment effects. Even if differences would emerge between patient using a longer tam frame, without either randomization or some matching strategy, it would not be possible to ascertain if change is related to treatment. In terms of a pure shape of change approach, a longer time frame could allow for differentiation between subjects, but again, this differentiation can not be related to a treatment effect without improving comparability and thus it would only by a reflection of the effect of time on outcome. An alternative explanation is that because patients' initial scores were, on average, concentrated around mild to moderate levels, the rates of improvement were not pronounced enough to allow for a between-subject differentiation. The model was strong enough to detect mild slopes, and certainly, from a clinical perspective, mild to moderate levels of symptomatic burden or social/interpersonal problems can be expected to improve to subclinical levels, but likely a restriction on the "space of improvement" may curtail the extent to which a multiplicity of improvement rates and trajectories can be observed.

Before any theoretical and clinical implications of this study can be specified and discussed, there are several limitations to this study (as well as correction strategies) that need to be taken into account to interpret results. First, when analyzing relatively small sample sizes power can be an issue. Even though the sample size used for this study is comparable to sizes used in the growth curve model literature applied to psychotherapy, steps were taken to maximize the ability to find significant differences in the data. First, for most of the analyses, data was examined using the whole sample and second, a multivariate approach was used in addition to the univariate approach, which results in a significant gain in power. In addition, within available models for multivariate analysis, the model that requires the least estimation of parameters (time-varying covariate model) was used, thus increasing stability of models in the face of a relatively small sample size. However, even with the precautions noted above, larger sample sizes tend to produce more stable models and improve the chances of finding meaningful differences in the data, and thus sample size may have been a limitation of this study.

An additional limitation has to do with the time frame used for this study. Even though the psychotherapy literature supports the importance of the first year, this may not be a viable assumption when looking at treatments that are intended to produce effects in the long term. Particularly in the case of psychoanalysis, it is likely that a richer and more complex shape of change could emerge if a longer time lag is examined and even more if the whole treatment plus follow ups are studied. Thus, for treatments that are hypothesized to work in the long-term it is possible that the first year does not have quite the predictive power and generalizability potential that it has in treatments that are short-term.

In addition, the results of the differential analysis of treatment classes (LTT vs. PA) need to be interpreted with caution. First, even though both treatments are comparable from the point of view of measured covariates, because there was no randomized treatment assignment, patients may differ across a variety of aspects that were not measured and thus remain uncontrolled. Second, adherence to treatment was not formally measured, so that it cannot be ascertained with any viable degree of accuracy, in what specific ways both treatments differ except, of course, in frequency and use of the couch, which constitute the only reliable differences between both treatments.

Finally, it is likely that some patients that are in the analysis group had, prior to starting on-the-couch, five-times-weekly psychoanalysis, a round of psychodynamic therapy. These are conversion cases and the do not start from a "true baseline" *vis-à-vis* patients in the psychodynamic therapy group and thus, there are likely carryover effects that were not measured in this study and remain thus uncontrolled. For these patients, the study did no, strictly speaking, look at the "first year" of therapy, but only at the first year of their conversion status. These carryover effects may easily account for the smaller slopes in the PA when looking at social/interpersonal problems since most of the change may have already happened in the LTT segment of the treatment trajectory. Finally, as noted before, therapists delivering psychoanalysis (e.g., psychiatrists and licensed psychologists) were significantly more experienced then therapists delivering long-term psychodynamic therapy (e.g., residents), further affecting the extent to which both groups can be accurately compared and the study did not differentiate (e.g. control for) the confounding effects of patients taking psychiatric medication in addition to receiving psychotherapy. All these factors can be assumed to produce a fair amount of "noise" that

not only contaminates the ability to make statistical, theoretical and clinical inferences based on obtained results, but may also compromise the very extent to which a "signal" can be found against the background of confounding effects.

However, even considering the "noise" related to all these limiting factors, the study was able to produce interesting findings that carry both theoretical as well as clinical implications.. First, and this time looking at variables independently, the shape of change over a year of analytic treatment seems to be best described as a straight, downward line when it comes to levels of depression, anxiety and social adjustment. This indicates that on average patients exhibit a slight rate of improvement for anxiety, depression and social adjustment over a year of analytic therapy. For interpersonal problems however, the trajectory of change of patients may contain significant up and downturns that suggest a more complex story than a straight, downward line. It was not possible within the design constraints of this study to specify at which point within the first year of therapy these alterations of a linear trajectory may occur, since more than four time points are needed to model piecewise improvement trajectories. Nevertheless, this suggests that even though there are no significant differences in improvement rates between patients (linear or quadratic) there may be differential shapes of change for different outcome measures, where anxiety, depression, and social adjustment are best described as a straight downward line whereas interpersonal problems may be characterized by a quadratic trajectory with potentially significant up or down-turns within the first year of analytic therapy. Clinically, therapists delivering psychodynamic therapy and psychoanalysis should expect up and downturns in levels of interpersonal problems, but understand that "interpersonal turmoil" is likely co-occurring with more

linear rates if improvement in depression and social adjustment. In terms of theoretical mechanisms, this general result is consistent with the hypothesized mechanism of change of analytic therapies, where patterns of maladaptive interpersonal problems are rapidly operationalized as etiological mechanisms underlying symptomatic burden and addressed technically in the context of transference and counter-transference interventions. This result is also consistent with the fact that most patients in the sample presented with more significant problems (as well as more variability at baseline) in the areas of social adjustment and interpersonal problems than in symptom-specific areas of anxiety and depression. In other words, one year of analytic therapy produces "more action" in social and interpersonal difficulties for patients that presented, on average, mild to moderate levels of baseline anxiety and depression, but on average scored above community and clinical samples on baseline levels of social adjustment and interpersonal problems.

A differential analysis between clinical course (depression and anxiety) and social/interpersonal problems (social adjustment and interpersonal problems) was hypothesized, to produce a more meaningful illumination of the shape of change in analytic treatments. The shape of change for clinical course over a year of analytic therapy is characterized by slow, and non-significant rates of improvement. There was however a negative correlation between baseline level and improvement rate, suggesting that for clinical course, the rate of improvement decreases as symptom severity increases at baseline. With a larger sample, a division of the sample into quartiles that group patients with different levels of symptomatic burden (i.e., minimal, mild, moderate, and severe) could further illuminate this covariance, by indicating different rates of improvement associated with specific ranges depression and anxiety.

In the case of the study, a general decision was made to minimize statistical analysis that relied on dividing up a sample that was quite small. However, this significant covariance carries some immediate clinical implications. Treatments as delivered in this study may not be the best indication when acute symptomatic distress plays a prominent role in the clinical picture of a given patient. In general, empirical evidence for psychodynamic treatment points to the idea that specific analytic treatment protocols (either principle-based on manualized) can be effective to combat acute symptomatic distress, but findings of this study suggest that a more "liberal," less focused type of analytic treatment may not be indicated for acute patients. In this regards, and based on results of this study, psychodynamic clinicians are encouraged to adhere to empirically supported dynamic treatments when there are concerns about acute symptomatic distress in patients presenting for therapy.

When looking at social/interpersonal course, this study did find that the shape of change is best characterized as a slight but significant downward line. Thus, a year of analytic treatment as delivered in this study, produces a steady rate of improvement that is seen early in the treatment, presumably even before changes are observed in clinical course. A closer look at the relationship between variables in the multivariate analysis may provide some further illumination of the process of change in analytic treatment that appears to differentially affect clinical course and social/interpersonal difficulties. As expected from epidemiological literature, when looking at clinical course anxiety and depression are strongly related at baseline and continue to be related across the first year of therapy. The relationship between social adjustment and interpersonal problems is however different. Results from this study show that social adjustment and interpersonal

problems only become linearly related after therapy starts. Again, this finding can be related to the "interpersonal vocation" of analytic therapy. It is likely that the first year of analytic therapy capitalizes on the systematic –although perhaps iatrogenic in the sense that it is produced by the treatment- connection between social adjustment difficulties and maladaptive patterns of interpersonal difficulties. It can be hypothesized that this artifact involves two logical steps. First, maladaptive, recurrent, and rigid interpersonal problems are identified and related etiologically to social adjustment difficulties (e.g. in work, family, friendships, etc.) and secondly, interpersonal problems are related operationally to the therapeutic relationship *via* transference and countertransference. Thus, although the shape of change for social/interpersonal problems over a year of analytic therapy can be best described a s straight downward line for most patients in the sample, analytic interventions may actually influence the particular way in which both, social adjustment and interpersonal problems, are related within the structure of this straight line. Based on these results, it is plausible that the first year of psychoanalytic treatment produces two correlated processes: (1) social adjustment is related operationally to interpersonal difficulties which are deployed in the transference, and (2) initial change is generated in social adjustment/interpersonal difficulties which may be eventually followed by symptomatic relief.

In the face of no significant differences between patients in long-term psychodynamic therapy (LTT) and in psychoanalysis (PA) in any of the measured covariates, the whole sample of patients was used for most analyses with no differentiation by treatment class. However, even considering the particular constraints related to the lack of random treatment assignment, the question of whether or not there

were differences in shapes of change between both treatment classes was explored. When it comes to clinical course (depression/anxiety) for both treatments -LTT and PA-, the shape of change can be best described as straight, flat line, indicating that the rate of improvement approximates zero within the first year of treatment. However, for patients in psychoanalysis, the rate of change may be dependent from initial level of depression and anxiety as indicated by the significant correlation between intercept (baseline) and slope (improvement rate), which suggests that the when patients have higher baseline levels of anxiety and depression, their improvement rates are lower. This finding continues to support the idea that psychoanalytic treatments, and in particular psychoanalysis are not necessarily indicated as first line treatments for the rapid improvement of patients suffering with severe depression or severe anxiety. Because this study only looked at the first year of treatment, it is not possible to say whether or not rates of improvement may become more dramatic and differenced further into the treatment (i.e. significant downturns or upturns), but these results do support the idea that if a faster rate of change in clinical course is required (e.g., for patients with severe depression and/or suicidality), psychoanalysis, as delivered in this study may not be the treatment of choice.

On the other hand, when looking at social/interpersonal problems, the shape of change for both treatments -long term psychodynamic therapy and psychoanalysis- can be best described as a straight downward line that is somewhat more inclined in the LTT group than in the PA group. This suggests that both treatments are related to robust linear shapes of change, but that long-term psychodynamic therapy produces a more pronounced rate of improvement. Similarly to the case of clinical course, patients in

psychoanalysis appear less likely to show significant improvement rates when baseline levels are higher within the first year. In other words, for the psychoanalysis group, the higher initial levels are in social adjustment and interpersonal problems, the more the shape of change will approximate a straight flat line (e.g. no slope) when looking at the first year of treatment. Conversely, the rate of improvement in the long-term psychodynamic therapy group, becomes more pronounced when baseline levels of social adjustment and interpersonal problems are higher. These findings suggest that if treatment indication criteria calls for significant improvement in social/interpersonal problems within one year, both treatments LTT and PA are likely indicated, with LTT, but not PA allowing for sharper rates of improvement within the first year when baseline levels are higher.

In addition to clinical and theoretical implications, this study has some implications for future longitudinal research on analytic treatments. First, as is the standard, when possible a randomization protocol should be preferred to control for "noise" that significantly difficult the interpretation of results as well as the ability to find a "signal." Randomizing to conditions is likely the best approach to improve internal validity of designs, but there are other alternative strategies that –given a large sample- can be used to increase comparability between treatments. This is the case of case-control matching strategies that have been used for observational data. Compression between long term psychodynamic therapy and psychoanalysis (as well as to other treatments) can only really be achieved through these methods. In this regard, the present study indicates some potential differences that should be further examined with more appropriate research designs.

In particular for analytic treatments that are hypothesized to be effective in the long term a longer time period should be used in future studies. Ideally, a growth modeling study would encompass the delivery of a complete treatment to a larger sample of patients randomized to different treatments (or matched for improved comparability in observational studies). A bigger sample size would likely include a larger range of clinical presentations and would also allow for more differentiation between subject and thus it would permit to take full advantage of the analytical power of multilevel designs, and in particular of growth curve modeling.

Finally, future growth curve research in psychoanalysis should include a through reflection of outcome measures to be used to capture change. First and foremost, this study showed that different instruments produce different shapes of change (e.g. ,IIP quadratic, QUIDS linear). Thus, future studies should use a variety of assessment tools that cover the different aspects of change that are hypothesized to be affected by treatment. In addition, instruments need to be sensitive enough to capture change (in particular when more frequent time points are introduced in the design) and instruments that capture hypothesized mediators and moderators of change should also be used in order to understand the underlying mechanisms that explain trajectories of change.

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