Received: 25 January 2022 | Revised: 16 March 2023 | Accepted: 29 April 2023

DOI: 10.1002/cpp.2864

RESEARCH ARTICLE

WILEY

Growth curves of common factors in psychotherapy: Multilevel growth modelling and outcome analysis

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Abstract

Objective: A large body of literature discusses change mechanisms underlying psychotherapy with an emphasis on common factors. The present study examined how different comprehensive common factors change over the course of therapy and whether this change was associated with clinical outcome at discharge.

Method: Three hundred forty-eight adults (mean age = 32.1, *SD* = 10.6; 64% female) attended a standardized 14-week day-clinic psychotherapy program. They provided longitudinal data on common factors based on weekly assessments. Additionally, pre- and post-assessment questionnaires on clinical outcome were completed. Using multilevel modelling, we predicted common factors by time (week in therapy). Multiple linear regression models tested the association between changes in common factors and clinical outcome.

Results: The common factor 'Therapeutic Alliance' was best fitted by linear growth models, whereas models for the common factors 'Coping', 'Cognitive Integration' and 'Affective Processing' indicated logarithmic changes over time. 'Coping', that is change in patients' ability to cope with their individual problems, was most closely linked with outcome.

Conclusions: The present study provides evidence for the changeability of common factors over the course of therapy as well as their specific contributions to psychotherapeutic progress.

KEYWORDS
common factors, day-clinic, multilevel modelling, process–outcome research, psychotherapy

1 | INTRODUCTION

Solid evidence speaks for the general effectiveness of psychotherapy (Barkham & Lambert, 2021). Accordingly, the focus of psychotherapy research has shifted towards process questions: How does psychotherapy work? The common factor perspective claims that the underlying change mechanisms of psychotherapy lie in core therapeutic factors shared by psychotherapy approaches (bona fide psychotherapies). This perspective contrasts with the idea of evidence-based therapies anchored in the medical model, whose proponents rather argue that specific therapeutic ingredients are remedial for disorder-related symptoms (see Wampold & Imel, 2015).

The Taxonomy Project by Tschacher et al. (2014) aimed to shed light on the 'common versus specific debate' by striving for a more precise conceptualization of common factors. The associations of therapeutic techniques and common factors were examined and a summarizing classification—taxonomy—was derived. Psychotherapy experts rated the degree of associations between a representative set of specific techniques and a list of common factors retrieved by a comprehensive literature review (Pfammatter & Tschacher, 2012). Factor analysis of these associations revealed a four-dimensional structure providing 'classes' of common factors: Coping, Relationship and Motivation building, Cognitive processing and Emotional processing (Pfammatter & Tschacher, 2016).

The Taxonomy Project indicated that the numerous common factors discussed in the literature can be clustered according to factors–techniques patterns. As these four classes of common factors were derived from expert ratings, a validation of the four-factor conceptualization using therapy process data was needed. Meier and colleagues analysed 502 psychotherapy inpatients and outpatients who assessed 26 common factors as single-item variables on a weekly base throughout their therapies. Exploratory and subsequent confirmatory factor analysis again revealed four factors: Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing, which were referred to as 'global common factors' in Meier et al. (2021). This finding is essentially congruent with the four classes previously established by the Taxonomy Project. Therefore, both studies demonstrated that the large number of process variables can be consistently subsumed by four higher order, comprehensive common factors.

'Coping' summarizes the following variables: self-efficacy expectation, assimilation of problematic experiences, corrective experience, mastery experiences, desensitization, positive outcome expectations, behaviour regulation, emotion regulation, mentalization and resource activation (Meier et al., 2021). Several variables associated with Coping, such as problem activation and resource activation, have been linked to clinical outcome (Gassmann & Grawe, 2006). Further, a meta-analysis of Constantino et al. (2018) comprising 81 studies and 12,722 patients showed that treatment outcome was positively associated with patients' outcome expectations at baseline/early treatment revealing a significant small to medium effect. Vîslă et al. (2018) investigated outcome expectations of 143 depressed adults receiving cognitive-behavioural therapy over 14 sessions. Outcome expectations demonstrated linear but not quadratic or cubic change over time with differences among patients and therapists.

'Therapeutic Alliance' merges empathy, positive regard, therapeutic relationship, goal consensus and collaboration into one common factor (Meier et al., 2021). Therapeutic Alliance encompasses the concept of the 'working alliance' (Bordin, 1979). The working alliance, also called therapeutic relationship or alliance, is the most intensively studied common factor (Norcross & Wampold, 2011). A large body of evidence supports the effect of therapeutic alliance on clinical outcome, revealing moderate effect sizes (Flückiger et al., 2018; Horvath et al., 2011; Martin et al., 2000). In addition, variables contributing to the comprehensive common factor Therapeutic Alliance were associated with psychotherapy outcome, such as empathy (Elliott et al., 2018), positive regard (Farber & Doolin, 2011) or goal consensus (Norcross & Wampold, 2011). Early alliance development appeared particularly meaningful to predict subsequent treatment process and outcome (e.g. Zilcha-Mano & Errázuriz, 2017). Kramer et al. (2009) investigated alliance patterns in short-term dynamic psychotherapy finding linear growth and significant associations of linear slopes with outcome. However, other studies found nonlinear alliance changes over the course of therapy (e.g. Horvath & Luborsky, 1993; Maxwell et al., 2018). Adding to pre-post change patterns, research has increasingly focused on session-by-session changes (e.g. Wucherpfennig et al., 2017). A meta-analysis of session-by-session effects in the early treatment phase found a reciprocal relationship between symptoms and alliance (Flückiger et al., 2020).

The comprehensive common factor 'Cognitive Integration' condenses six variables: insight, explanation model, new self-narrative, problem actualization, self-reflexion and cognitive restructuring (Meier et al., 2021). Several studies focused on the therapeutic impact of variables contributing to Cognitive Integration. For example, a meta-analysis showed moderate associations between therapy outcome and insight (Jennissen et al., 2018).

'Affective Processing' encompasses emotion-related factors affective experiencing, mindfulness and catharsis (Meier et al., 2021). Factors related to Affective Processing were studied far less. A meta-analysis of therapist and patient emotional expression revealed medium to large effect sizes for affect expression associated with the therapeutic relationship and outcome (Peluso & Freund, 2018). A study of 107 psychotherapy patients supported linear over quadratic change in emotional experience, yet this linear growth was not associated with therapy outcome (Fisher et al., 2019).

Common factor models imply multiple variables to address the question of what works in psychotherapy. The majority of studies,

Key Practitioner Message

- The present study proposes that the common factors 'Coping', 'Therapeutic Alliance', 'Cognitive Integration' and 'Affective Processing' are important psychotherapeutic process variables, which are significantly related to the treatment outcome of a standardized day-clinic psychotherapy program.
- The growth curves of these common factors over the course of treatment provide novel insights into how psychotherapy works, as the present study indicates different growth patterns and substantial heterogeneity among patients.
- Continuous monitoring of the therapeutic process should include common factor ratings to guide psychotherapeutic strategies based on patients' needs, aims and preconditions including resources.

however, investigated single common factors only. Therefore, empirical research is still unbalanced (Cuijpers et al., 2019). Studies rarely examine the dynamics of common factors over the course of psychotherapy and the association between these dynamics and therapy outcome. Modelling psychotherapy processes must account for nonlinear change and discontinuous patterns (Hayes et al., 2007), and linear processes may rather be considered the exception than the rule (Tschacher & Haken, 2019).

The goal of the present study was twofold: The first goal was to model the growth curves of Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing, which comprehensively integrate the vast number of psychotherapy process variables labelled as common factors in the literature. Secondly, we aimed to investigate the associations of these growth curves over the course of psychotherapeutic treatment with psychotherapy outcome. Although we generally hypothesized that these four common factors will increase during therapy and that such an increment would be positively associated with clinical outcome at discharge, the present study is exploratory since the current literature regarding common factors does not yet allow for the formulation of empirically founded specific hypotheses.

2 | METHOD

2.1 | Patients

We included all patients admitted to the psychotherapy day-clinic at the University Hospital of Psychiatry and Psychotherapy in Bern, Switzerland, between June 2013 and December 2018, on the basis of written informed consent. The ethics committee of the Canton Bern approved the study (# 2015-00122). The study was an extension of routine quality evaluation regarding the process and outcome of day-clinic treatment. The inclusion criteria of the psychotherapy day-clinic were eligibility for psychotherapy and sufficient German language skills; the exclusion criteria were current substance misuse, acute suicidality and acute psychosis. For the present analysis, we included all patients that entered in the study until September 2019 and thus would complete the standardized program by the end of 2019. Thus, therapy was not compromised by the COVID-19 pandemic starting in early 2020. A sample of 365 datasets was available. Individuals with repeated admissions were not included again, resulting in a final sample of 348 patients. Table 1 provides the demographic characteristics, clinical characteristics and clinical outcomes of these patients.

2.2 | Setting

Patients received daily treatment on 5 days a week for 14 consecutive weeks. Outside the therapy program, patients lived at home to maintain their routine life regarding family relationships and living environment while receiving professional psychotherapeutic treatment. The multimodal psychotherapy program emphasized cognitive behaviour therapy, supplemented by schema-oriented and emotion-focused psychotherapy (Greenberg, 2004; Young et al., 2003). The therapy program focused on patients' understanding of their problems, motivation for change, coping skills, emotion regulation, individual resources and social relations. Patients were supported to develop an adaptive explanatory model to gain control and self-efficacy, enabling and reinforcing positive experiences. The psychotherapy program was designed as milieu therapy, providing a structured social environment with individual and group therapies. Psychotherapists conducted individual psychotherapy sessions twice a week during the initial 3 weeks, then once a week until the termination of therapy. Each patient received adapted therapeutic support from a care team consisting of nurses, social workers and physicians. For the present study, treatments were conducted as usual. Patients were not randomly assigned to therapists ($N = 17$) but were allocated based on availability and workload. Four therapists treated 3–9 patients, four therapists treated 10–19 clients, five therapists treated 20–29 patients and three therapists treated 30–60 patients.

2.3 | Procedure and measures

At baseline, diagnosis was established using the Mini-International Neuropsychiatric Interview (MINI; Sheehan et al., 1998), a short structured interview designed to assess DSM-IV disorders. The MINI contains screening questions followed by items on specific symptomatology. Inter-rater reliability is similar to the Structured Clinical Interview for DSM-IV (SCID-IV) with kappas ranging from 0.89 to 1.0 (Sheehan et al., 1998).

Patients rated activation of common factors at the end of each week within the therapy program. The German rating instrument used is called 'Wochenerfahrungsbogen' (i.e., week experience questionnaire), abbreviated as WEB. The WEB measures four comprehensive common factors Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing. Items corresponding to the common factor *Therapeutic Alliance* were separately rated for psychotherapists, psychiatrists, nurses, social workers and further therapists, as the program offered access also to music therapy, creative therapy or occupational therapy. The alliance measure accounted for different therapeutic relationships in the treatment setting by averaging the individual ratings across the various professions. Thus, a summarized rating of Therapeutic Alliance was used for the present analysis. The common factor scores are based on the factor structure of 24 WEB items referring to common factor aspects, such as mindfulness ('In this week, I was aware of bodily perceptions, feelings and thoughts in the here and now'). A preliminary English description of the items and their assignment to the four comprehensive common factors can be found in the supplemental material (Supplement Table 1). Items are rated on seven-point rating scales ranging from 1 (not at all) to 7 (very much). The factor structure of the WEB was previously established by exploratory and subsequent confirmatory factor analysis with factors demonstrating acceptable

TABLE 1 Demographics, clinical characteristics and clinical outcomes ($N = 348$).

	Before treatment	Pre-assessment	Post-assessment
Gender			
Female	218		
Male	124		
Mean age (*SD*)	32.10 (10.59)		
Relationship status			
In relationship	153		
Highest level of education			
No graduation	2		
Elementary school	36		
Secondary school	37		
Apprenticeship	169		
College level	67		
University	31		
Diagnoses (MINI)	296		
Non-standardized diagnostic evaluation[a]	32		
Depression	241		
Bipolar affective disorder	17		
Dysthymia	16		
Panic disorder and/or agoraphobia	35		
Social phobia	34		
Obsessive–compulsive disorder	18		
Post-traumatic stress disorder	50		
Bulimia nervosa	10		
Personality disorder	11		
Comorbidity in % of total			
Single diagnosis	45.69		
Two diagnosis	31.90		
Three or more diagnoses	12.64		
Patients not meeting diagnostic criteria (% of total)	6 (1.72)		
General psychopathology (ISR)		1.51 (0.61)	1.17 (0.62)
Depressive psychopathology (BDI-II[b])		1.33 (0.54)	0.99 (0.61)
Satisfaction in quality of life (BeLP-KF)		2.62 (1.14)	3.57 (1.09)
Satisfaction in mental health (BeLP-KF)		2.02 (0.93)	3.13 (1.25)
Incongruence in avoidance goals (K-INK)		3.01 (0.72)	2.62 (0.75)
Incongruence in approach goals (K-INK)		2.58 (0.68)	3.03 (0.75)
Interaction deficits (SASKO)		2.32 (0.55)	2.13 (0.57)
Information deficits (SASKO)		2.37 (0.57)	2.21 (0.59)
Loneliness (SASKO)		2.24 (0.81)	2.05 (0.82)

Note: Due to missing data, numbers may not add up to the sample size.
Abbreviations: BDI-II, Beck Depression Inventory; BeLP-KF, Berlin Life Quality Profile; ISR, ICD-10 Symptom Rating; K-INK, Incongruence Questionnaire; MINI, Mini-International Neuropsychiatric Interview.
[a]Multiple diagnoses are allowed.
[b]Scores represent BDI-II items' mean values.

to excellent internal consistency of Cronbach's α between .74 and .95 (Meier et al., 2021). This was replicated in the present sample with Cronbach's α ranging between .76 and .94.

Treatment outcome was monitored in terms of psychopathology, satisfaction with quality of life and mental health, patient's attainment of personal goals and social anxiety and social competence deficits.

Assessments were conducted at baseline within 1 week after admission (pre-assessment), 1 week before discharge (post-assessment) and 6 months after discharge (follow-up assessment). The following five outcome questionnaires were applied:

Patients rated psychopathology using the ICD-10 Symptom Rating Scale (ISR German version; Tritt et al., 2008). The ISR comprises 29 items forming six subscales: depressive syndrome, anxiety syndrome, obsessive–compulsive syndrome, somatoform syndrome, eating disorder syndrome and additional items. The ISR evaluates the degree of suffering from these symptoms in the past 2 weeks on a five-point rating scale from 0 (does not apply) to 4 (applies extremely). The ISR total score demonstrated good internal consistency with Cronbach's α of .92 (Fischer et al., 2010). In the present sample, Cronbach's α was .77 (ISR total score).

Depression was assessed using the Beck Depression Inventory, Second Edition (BDI-II German version; Beck et al., 1996; Hautzinger et al., 2006). The severity of depression during the previous two weeks was assessed. The BDI-II consists of 21 items with four-point severity scales ranging from 0 (no symptom) to 3 (severely symptomatic). The BDI-II has shown adequate concurrent validity with clinical depression ratings and good internal consistency (Cronbach's α ≥ .89 across clinical and non-clinical samples) (Hautzinger et al., 2006). We computed a BDI-II total score that demonstrated excellent internal consistency (Cronbach's α = .93).

Quality of life was measured by the Berlin Life Quality Profile 15-item short version ('Berliner Lebensqualitätsprofil—Kurzform', BeLP-KF) (Kaiser et al., 1999). The BeLP-KF items are rated on six-point scales ranging from 'not at all satisfied' to 'completely satisfied'. It demonstrated good internal consistency with Cronbach's α of .88 (Kaiser et al., 1999). For the present study, we used two single items, 'satisfaction with mental health' and 'satisfaction in quality of life'.

To assess the patient's experience regarding his or her achievement of personal goals, the short version of the incongruence questionnaire ('Kurzversion Inkongruenzfragebogen', K-INK; Grosse Holtforth et al., 2004) was administered. The K-INK has two subscales, items 1–14 for 'approach goals' (i.e. the degree to which favourable, positive goals cannot be realized) and items 15–23 for 'avoidance goals' (i.e. the degree to which negative states cannot be avoided). Patients rate items on a five-point Likert scale ranging from 1 (not enough) to 5 (absolutely sufficient) in part I (avoidance goals) and from 1 (totally disagree) to 5 (totally agree) in part II (approach goals). Both subscales have shown good internal consistency with Cronbach's α of .91 for approach goals respectively .89 for avoidance goals in outpatient samples (Grosse Holtforth et al., 2004). Internal consistency was slightly lower in our sample but still good with Cronbach's α of .89 (incongruence in approach goals) and .82 (incongruence in approach goals).

The SASKO ('Fragebogen zu sozialer Angst und Kompetenzdefiziten', Kolbeck & Maß, 2009) measures social anxiety and social competence deficits, comprising 40 items rated on four-point Likert scales from 0 (never) to 3 (most/always). Only the scales of feeling loneliness (four items), deficits in social interaction (10 items) and deficits in information processing (eight items) were considered. With regard to internal consistency, these three scales demonstrated Cronbach's α ranging from .81 to .84 in a clinical sample (Kolbeck, 2008). In the present sample, internal consistency was good with Cronbach's α of .84 (interaction deficits), .87 (information deficits) and .85 (loneliness).

2.4 | Statistical data analysis

2.4.1 | Growth curve analysis

The hierarchical dataset comprised weekly assessments ($N = 3819$) nested within patients ($N = 348$) nested within therapists ($N = 17$). To determine the amount of variance at patient and therapist levels, we estimated unconditional models (null models) for each common factor. The intraclass correlation coefficient (ICC; Supplement Equation 5), defined as the ratio of the between-patient variance to the total variance, was .57 (Coping), .59 (Therapeutic Alliance), .55 (Cognitive Integration) and .58 (Affective Processing) in two-level models. This suggested substantial between-patient variability in common factor scores arguing for a two-level model (random effect: patient). ICCs were also obtained for a three-level modelling (random effect: patient nested within therapist). For three-level models the patient- and therapist-level ICCs were .55 and .02 (Coping), .57 and .01 (Therapeutic Alliance), .54 and .01 (Cognitive Integration) and .58 and .01 (Affective Processing) indicating low between-therapist variance. Likelihood ratio tests likewise showed that the inclusion of the third level was insignificant for each common factor. Accordingly, significant variation existed at the patient but not therapist levels. We therefore used two-level models accounting for repeated assessments within patients.

Models with increasing complexity with regard to (a) the fixed effect of time, (b) the variability in growth parameters and (c) the error structure were examined (for a growth model building approach, see Bliese & Ployhart, 2002). To determine change over time, we started with the most parsimonious model, M1, of a linear relationship between time and common factor ratings, followed by an M2 model with a quadratic function of time and an M3 model with logarithmic time. The time predictor, namely week in therapy, was centered at 0. Model comparison was based on the significance of parameter estimates and confidence intervals of growth parameters to determine the best function of time. To investigate variability in change over time among patients we compared random intercept models with models allowing for random slope variation by log likelihood ratio tests. Finally, we tested whether model fit increased when autocorrelation was assumed using likelihood ratio tests. Residuals were modelled with a first-order autoregressive covariance structure considering that responses closer in time may be more related to each other than responses farther apart. We provide model equations for the final model for each common factor in the supplemental material (Supplement Equations 1–4).

2.4.2 | Clinical outcome prediction

The second goal of the study was to investigate the prediction of psychotherapy outcome by change in common factors. We used

TABLE 2 Descriptive results of common factor scores.

		Coping		Therapeutic Alliance		Cognitive Integration		Affective Processing		Intercorrelation					
Week	*N*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Coping, Therapeutic Alliance	Coping, Cognitive Integration	Coping, Affective Processing	Therapeutic Alliance, Cognitive Integration	Therapeutic Alliance, Affective Processing	Cognitive Integration, Affective Processing
1	344	0.45	0.16	0.74	0.15	0.49	0.16	0.58	0.15	.36	.61	.81	.46	.41	.75
2	336	0.51	0.16	0.77	0.14	0.57	0.15	0.64	0.14	.34	.57	.81	.45	.42	.78
3	327	0.53	0.16	0.78	0.15	0.6	0.15	0.65	0.16	.37	.62	.83	.49	.47	.79
4	319	0.53	0.16	0.78	0.15	0.61	0.14	0.67	0.15	.36	.58	.78	.44	.43	.77
5	309	0.55	0.17	0.78	0.15	0.62	0.15	0.67	0.16	.40	.67	.82	.47	.49	.82
6	295	0.55	0.17	0.78	0.15	0.62	0.16	0.67	0.17	.47	.71	.84	.54	.54	.85
7	286	0.55	0.17	0.79	0.14	0.62	0.16	0.67	0.15	.36	.65	.83	.35	.36	.79
8	279	0.56	0.18	0.79	0.15	0.62	0.17	0.68	0.16	.42	.69	.85	.48	.41	.82
9	264	0.58	0.17	0.8	0.13	0.63	0.15	0.68	0.15	.37	.68	.81	.47	.46	.81
10	258	0.59	0.18	0.8	0.13	0.64	0.17	0.7	0.16	.45	.70	.85	.47	.47	.81
11	237	0.59	0.17	0.81	0.14	0.64	0.16	0.7	0.16	.46	.69	.86	.51	.52	.82
12	223	0.6	0.17	0.81	0.14	0.66	0.17	0.71	0.16	.56	.69	.84	.55	.58	.81
13	192	0.63	0.18	0.83	0.14	0.66	0.17	0.73	0.15	.54	.74	.88	.55	.59	.85
14	142	0.67	0.15	0.86	0.12	0.7	0.15	0.75	0.14	.55	.68	.84	.59	.59	.83
15	7	0.76	0.12	0.92	0.08	0.78	0.13	0.81	0.14	.42	.79	.95	.58	.55	.94
16	1	0.56		0.89		0.56		0.64							

individual slope coefficients of the initial growth curve analysis. For example, for common factors with linear or logarithmic growth, only one predictor was obtained. In the case of quadratic change in common factors, we included two predictors (the linear and quadratic terms). The selection of dependent variables among outcome measures was based on effect sizes to minimize Type I error. Effect sizes were computed by standardized differences between pre-assessment and post-assessment scores using pre-assessment values for standardization. We included pre-assessments of the corresponding measures and mean levels of each common factor as covariates. ICCs for null models with post-assessment as dependent variable and therapist as random effect were close to 0 (.00003 to .03). We compared multilevel null models to linear regression models using likelihood ratio tests to investigate whether the between-therapist variance significantly differed from zero (Bliese, 2013). Models allowing for random intercepts did not significantly better fit the data. As the data did not indicate therapist differences among clinical outcomes, we used multiple linear regression analysis to predict clinical outcome choosing the simplest but appropriate modelling approach.

The following model fit criteria were provided for growth analysis and clinical outcome prediction: The Akaike information criterion (AIC), the marginal R^2 accounting for the variance of fixed effects only, the conditional R^2, which considers both fixed and random effects, and log-likelihood values for model comparison by likelihood ratio tests. Models were analysed by the software R (R Core Team, 2020) using the 'nlme' package with 'optim' optimizer (Pinheiro et al., 2020).

3 | RESULTS

3.1 | Descriptive statistics

Of the 348 patients included, 346 completed pre-treatment assessment and 256 post-treatment assessment questionnaires. Over the course of therapy, 344 patients filled out the WEB on a weekly basis ($M = 11.10$, $SD = 3.86$). Overall, 3819 ratings of the common factors Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing were available (see Table 2).

3.2 | Growth curve analysis

Results of the growth curve analysis predicting Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing are presented in Table 3.

With regard to the first common factor Coping, a null model (M0) including only random effects served as the basis for comparisons. First, we compared parameter estimates in models with linear, quadratic, and logarithmic functions of time (M1–M3) to determine growth trends. The significance of the linear term ('week linear') in M1 indicated a steady increase in Coping over the course of therapy. This effect remained stable in the quadratic model (M2). The quadratic term ('week quadratic') however did not reach significance in M2. The predictor in M3 testing a logarithmic growth curve ('week log') was highly significant. Fixed effects and model fit criteria favoured M3. We tested for individual differences in logarithmic change (random slopes) and whether Coping scores were related between observations (autocorrelated error structure) based on M3. Models with the same fixed effects were compared by likelihood ratio tests. M3 assuming random intercepts only was outperformed by M3.b [random slope model, $\Delta\chi^2$ (2) = 349.41, $p < .0001$], which in turn was inferior to M3.c (autocorrelation and random slope) with $\Delta\chi^2$ (1) = 170.41 ($p < .0001$). Overall, parameter estimates and likelihood ratio tests favoured the logarithmic model with random intercepts and random slopes allowing for autocorrelated errors (M3.c). The data thus proposed logarithmic growth of Coping throughout therapy courses.

To examine changes in Therapeutic Alliance over therapy, models were again consecutively estimated. Whereas predictors were significant in M1 and M3, the nonlinear model (M2) revealed non-significant linear and quadratic parameter estimates. Fixed effects as well as model fit criteria favoured linear increase in Therapeutic Alliance (M1). M1.b (random slope model) showed better fit than M1 [$\Delta\chi^2$ (2) = 151.36, $p < .0001$] and so did M1.c compared to M1.b [$\Delta\chi^2$ (1) = 70.20, $p < .0001$]. Thus, M1.c was the final model showing that steady growth represented the data best.

Analysis of Cognitive Integration revealed significant predictors in linear (M1), quadratic (M2) and logarithmic models (M3). Significant predictors across models suggested linearly increase in M1, an inverted U-shaped curve in M2 and logarithmic growth in M3. Comparison of parameter estimates for fixed effects and model fit criteria supported M3 over M1 and M2. Based on pairwise comparisons, we determined which model appropriately captured individual variability among patients as well as the error structure. Likelihood ratio testing of M3 and M3.b suggested that the model with random intercepts and random slopes had a significantly better fit [$\Delta\chi^2$ (2) = 218.81, $p < .0001$]. M3.c assuming autocorrelated errors as well as random slopes outperformed M3.b [$\Delta\chi^2$ (1) = 60.82, $p < .0001$]. Results thus supported M3.c proposing the logarithmic change of Cognitive Integration over time as the final model.

Concerning Affective Processing, fixed effects in models with linear, quadratic or logarithmic functions of time were significant in M1, M2 and M3. Parameter estimates and model fit criteria pointed towards M3 indicating logarithmic change. M3 assuming random intercepts showed a lower fit compared to M3.b [random slope, $\Delta\chi^2$ (2) = 339.85, $p < .0001$], which in turn was outperformed by M3.c (autocorrelation and random slope) with $\Delta\chi^2$ (1) = 107.44 ($p < .0001$). Parameter estimates and model fits suggested M3.c as the final model proposing a logarithmic increase in Affective Processing.

Overall, the superiority of the final models was supported by lower AIC values, higher conditional/marginal R^2 and higher log-likelihood values compared to the respective null models. Figure 1 depicts growth curves for Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing according to linear and logarithmic fits.

TABLE 3 Multilevel modelling of week and week quadratic as predictors of Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing.

Coping ($N = 3819$)						
	M1			M2		
Predictors	*Estimates (CI)*	*t-statistic*	*p-value*	*Estimates (CI)*	*t-statistic*	*p-value*
Intercept	0.48 (0.47–0.50)	63.31	**<.001**	0.48 (0.46–0.50)	59.22	**<.001**
Week linear	0.01 (0.01–0.01)	24.82	**<.001**	0.01 (0.01–0.02)	8.45	**<.001**
Week quadratic				−0.00 (−0.00–0.00)	−1.32	.19
Week log						
Random effects						
Random intercept variance 1| patient	.02			.02		
Random slope variance week linear| patient						
Random slope variance week log| patient						
Patients	344			344		
Marginal R^2/conditional R^2	0.07/0.62			0.07/0.62		
AIC	−5300.21			−5283.83		
Log-likelihood	2654.11			2646.91		

TABLE 3 (Continued)

Coping ($N = 3819$)						
	M3			M3.c		
Predictors	*Estimates (CI)*	*t-statistic*	*p-value*	*Estimates (CI)*	*t-statistic*	*p-value*
Intercept	0.45 (0.44–0.47)	55.67	**<.001**	0.45 (0.43–0.47)	53.04	**<.001**
Week linear						
Week quadratic						
Week log	0.06 (0.05–0.06)	24.99	**<.001**	0.06 (0.05–0.07)	15.33	**<.001**
Random effects						
Random intercept variance 1| patient	.02			.02		
Random slope variance week linear| patient						
Random slope variance week log| patient				.00		
Patients	344			344		
Marginal R^2/conditional R^2	0.07/0.62			0.07/0.65		
AIC	−5310.90			−5824.723		
Log-likelihood	2659.45			2919.36		

TABLE 3 (Continued)

Therapeutic Alliance ($N = 3819$)												
	M1			**M2**			**M3**			**M1.c**		
Predictors	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***
Week linear	0.00 (0.00–0.01)	11.55	**<.001**	0.00 (−0.00–0.01)	1.63	.10				0.01 (0.00–0.01)	7.95	**<.001**
Week quadratic				0.00 (−0.00–0.00)	1.79	.07						
Week log							0.02 (0.02–0.03)	11.14	**<.001**			
Random effects												
Random intercept variance 1| patient	.01			.01			.01			.02		
Random slope variance week linear| patient										.00		
Random slope variance week log| patient												
Patients	344			344			344			344		
Marginal R^2/conditional R^2	0.02/0.59			0.02/0.59			0.02/0.59			0.02/0.61		
AIC	−6078.10			−6062.98			−6072.26			−6293.638		
Log-likelihood	3043.05			3036.49			3040.13			3153.82		
Cognitive integration ($N = 3819$)												
	M1			**M2**			**M3**			**M3.c**		
Predictors	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***
Intercept	0.55 (0.54–0.57)	77.08	**<.001**	0.53 (0.52–0.55)	70.14	**<.001**	0.52 (0.50–0.53)	67.91	**<.001**	0.51 (0.50–0.53)	62.26	**<.001**
Week linear	0.01 (0.01–0.01)	21.09	**<.001**	0.02 (0.02–0.02)	12.46	**<.001**						
Week quadratic				−0.00 (−0.00 to−0.00)	−6.60	**<.001**						
Week log							0.05 (0.05–0.06)	24.00	**<.001**	0.06 (0.05–0.07)	15.12	**<.001**
Random effects												
Random intercept variance 1| patient	.01			.01			.01			.02		
Random slope variance week linear| patient												
Random slope variance week log| patient										.00		
Patients	344			344			344			344		
Marginal R^2/conditional R^2	0.05/0.59			0.06/0.60			0.07/0.61			0.07/0.65		
AIC	−5485.46			−5510.56			−5603.56			−6044.86		
Log-likelihood	2746.73			2760.28			2805.781			3029.43		

(Continues)

TABLE 3 (Continued)

Affective processing (N = 3819)	M1			M2			M3			M3c		
Predictors	**Estimates (CI)**	**t-statistic**	**p-value**	**Estimates (CI)**	**t-statistic**	**p-value**	**Estimates (CI)**	**t-statistic**	**p-value**	**Estimates (CI)**	**t-statistic**	**p-value**
Intercept	0.62 (0.61–0.64)	86.79	**<.001**	0.61 (0.60–0.63)	80.93	**<.001**	0.60 (0.58–0.61)	78.55	**<.001**	0.59 (0.58–0.61)	75.72	**<.001**
Week linear	0.01 (0.01–0.01)	17.95	**<.001**	0.01 (0.01–0.01)	7.76	**<.001**						
Week quadratic				−0.00 (−0.00 to −0.00)	−2.66	**.01**						
Week log							0.04 (0.04–0.05)	19.13	**<.001**	0.04 (0.04–0.05)	12.61	**<.001**
Random effects												
Random intercept variance 1| patient	.01			.01			.01			.02		
Random slope variance week linear| patient												
Random slope variance week log| patient										.00		
Patients	344			344			344			344		
Marginal R^2/conditional R^2	0.04/0.61			0.04/0.61			0.04/0.61			0.04/0.65		
AIC	−5779.21			−5768.04			−5822.27			−6095.90		
Log-likelihood	2893.602			2889.02			2915.14			3054.95		

Abbreviations: AIC, Akaike information criterion; CI, 95% confidence interval; M1, random intercept (linear) growth model; M2, random intercept (quadratic) growth model; M3, random intercept (logarithmic) growth model; M1.c: random slope (linear) growth model with autocorrelated error structure; M3.c, random slope (logarithmic) growth model with autocorrelated error structure.

3.3 | Process–outcome analysis

Effect sizes of outcome measures were −.56 (general psychopathology), −.63 (depressive psychopathology), .83 (satisfaction in quality of life), 1.19 (satisfaction with mental health), −.54 (incongruence in avoidance goals), .66 (incongruence in approach goals), −.35 (interaction deficits), −.28 (information processing deficits) and −.23 (loneliness). Outcome measures indicating substantial improvement from pre to post-assessment (effect size > .5) were selected to investigate the effect of common factors. For each outcome measure, we performed multiple linear regression analysis to examine whether post-assessments can be predicted by changes in common factors, controlling for pre-assessment values of clinical outcome and mean values of common factors over the course of therapy (Table 4).

To examine associations between the four common factors and general psychopathology, a full model with change indexes of Coping, Therapeutic Alliance, Cognitive Integration and Affective Processing as predictors was computed. We included mean levels of each common factor over the therapy course as covariates ('therapy mean score') to test whether the growth rate in the respective common factor predicted clinical outcome beyond its mean. This procedure indicates whether the specific dynamics of a common factor predicts outcome above and beyond the mean level of the outcome variables. The pre-assessment of general psychopathology was significantly linked to post-assessment ratings. For Coping, the therapy mean score as well as change score reached significance indicating a negative association with general psychopathology. The model for depression revealed three significant common factor variables: Change in Therapeutic Alliance, Change in Coping and Coping (therapy mean score). In addition, pre-assessment levels of depression were associated with depression at the end of therapy. Negative parameter estimates indicated a decrease in depression. Change in Coping and Therapeutic Alliance negatively predicted the dependent variable. Growth rates in Coping were associated with lower ratings of general psychopathology, and growth rates in Coping as well as Therapeutic Alliance were linked to lower self-rated depression at discharge.

For satisfaction with quality of life and mental health, higher ratings of this clinical outcome variable at pre-assessment were associated with higher ratings at post-assessment. Change in Coping over the course of therapy predicted patients' satisfaction with quality of life. With respect to covariates, Coping (therapy mean score) and Cognitive Integration (therapy mean score) were associated with the dependent variable. The significant positive parameter estimate of Change in Coping showed that the growth rate in this common factor was associated with higher satisfaction in quality of life after therapy. For satisfaction with mental health, Change in Coping and therapy mean score of Coping positively predicted outcome at the end of therapy. Thus, patient growth rates in Coping were linked to improved mental health satisfaction rated by patients.

Next, we investigated the incongruence in avoidance goals. Change in Coping and Change in Therapeutic Alliance predicted avoidance goals significantly negatively. Cognitive Integration (therapy mean scores) was the only significant covariate. Thus, patients who

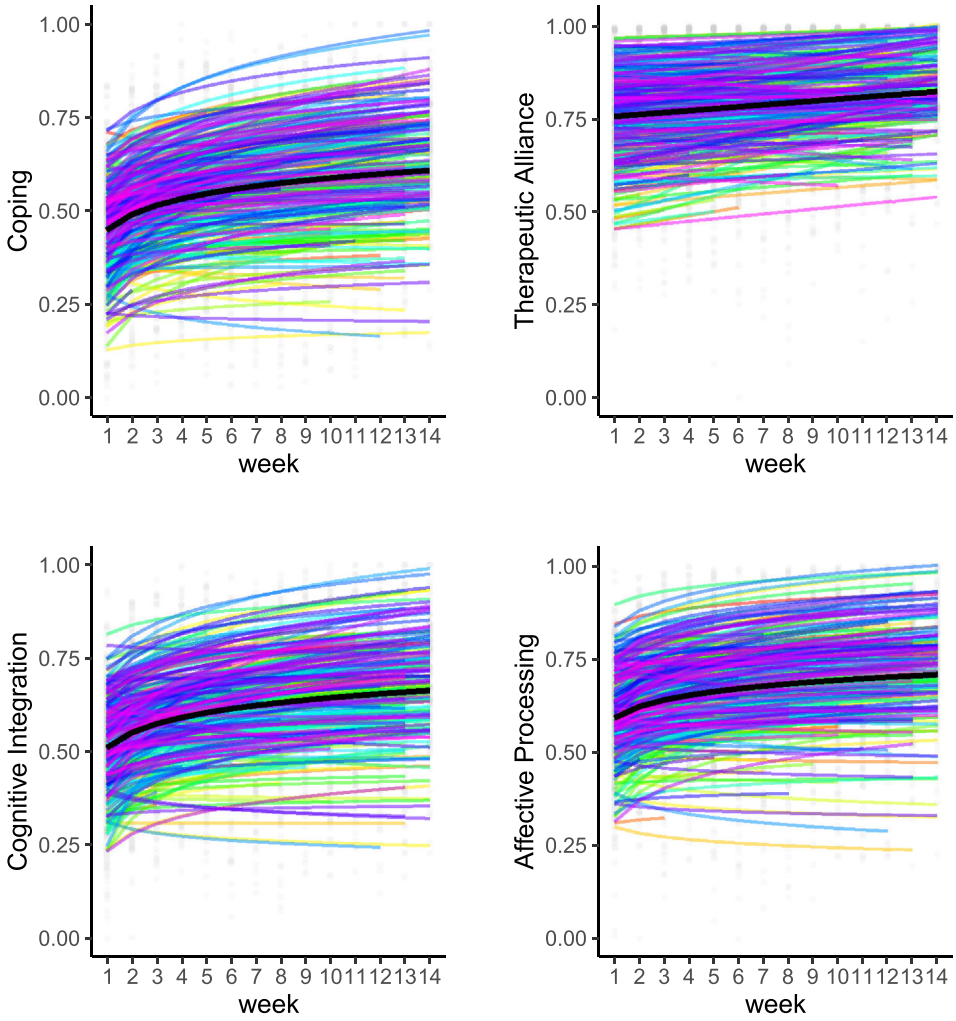

FIGURE 1 Individual patients' growth curves of common factors over the course of therapy (weekly assessments). The curves are drawn based on the respective linear and logarithmic parameters. Black bold lines: mean growth curves of all patients.

perceived themselves as being increasingly able to cope with mental problems over the course of therapy as well as patients who improved faster in forming working alliances showed significantly less incongruence concerning negative states they aimed to avoid after therapy.

The R^2 refers to the proportion of total variance of the dependent variable explained by predictor variables. Across all models, R^2 scores ranged from 41% to 62%. The adjusted R^2, which accounts for the number of predictors, revealed slightly lower values (39%–61%). The variance inflation factor, VIF, indicating collinearity was acceptable (VIF < 10) with low to moderate correlations among predictors.

4 | DISCUSSION

The present study rested on the monitoring of the therapy process in 348 patients attending a standardized 14-week psychotherapy program. Our first goal was to explore the growth of four comprehensive common factors during this program. Logarithmic models fitted Coping, Affective Processing and Cognitive Integration best. Logarithmic change curves indicated that growth in these common factors started fast and was followed by slower but still continuing increases over the course of therapy. The rate of growth was comparable for Coping and Cognitive Integration. The growth rate for Affective Processing was slightly lower; however, ratings for Affective Processing were higher than Coping and Cognitive Integration at the beginning of therapy, as indicated by the intercept. The nonlinear growth of Coping and Affective Processing contrasts previous findings, in which variables linked to Coping such as outcome expectation (Vîslă et al., 2018) and self-efficacy (Brown et al., 2014) demonstrated linear increases over time. Emotional experience, which is associated with Affective Processing, showed linear growth in previous research (Fisher et al., 2019). However, these studies did not include logarithmic growth but compared linear to quadratic trends only. To our knowledge, the growth curve of common factors related to Cognitive Integration was not investigated so far. The logarithmic increase in Cognitive Integration is linked to the notion of an expectation pathway in the contextual model (Wampold & Imel, 2015). Patients were apparently enabled to develop an adaptive explanatory model for their problems during the therapy. In Therapeutic Alliance, a linear growth pattern was identified which is consistent with previous findings on alliance development over time (for a review, see Stiles & Goldsmith, 2010). Nevertheless, substantial evidence also points towards nonlinear dynamics in alliance such as

TABLE 4 Multiple linear regression modelling of change in common factors as predictors of clinical outcome.

	General psychopathology (ISR)			Depressive psychopathology (BDI-II)			Satisfaction in quality of life(BeLP-KF)
Predictors	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***
Intercept	0.86 (0.43–1.28)	3.96	**<.001**	1.12 (0.64–1.60)	4.56	**<.001**	1.11 (0.24–1.99)
Pre-assessment	0.69 (0.61–0.78)	16.00	**<.001**	0.54 (0.44–0.65)	10.23	**<.001**	0.28 (0.18–0.39)
Change in Therapeutic Alliance	−6.07 (−16.64–4.49)	−1.13	.26	−12.41 (−23.70 to −1.11)	−2.16	**.03**	21.39 (−1.92–44.70)
Change in Coping	−4.46 (−6.92 to −2.00)	−3.57	**<.001**	−5.21 (−7.86 to −2.56)	−3.87	**<.001**	8.07 (2.61–13.52)
Change in Cognitive Integration	1.59 (−1.09–4.27)	1.17	.24	2.00 (−0.85–4.86)	1.38	.17	2.66 (−3.35–8.66)
Change in Affective Processing	−0.34 (−2.78–2.11)	−0.27	.79	−1.02 (−3.63–1.58)	−0.77	.44	−1.91 (−7.34–3.51)
Therapeutic Alliance (therapy mean score)	−0.23 (−0.79–0.33)	−0.81	.42	−0.00 (−0.60–0.60)	−0.01	.10	1.09 (−0.16–2.34)
Coping (therapy mean score)	−1.08 (−1.88 to −0.29)	−2.68	**.01**	−1.86 (−2.73 to −0.99)	−4.22	**<.001**	4.02 (2.26–5.78)
Cognitive Integration (therapy mean score)	0.02 (−1.11–1.15)	0.03	.97	1.07 (−0.15–2.28)	1.73	.09	−2.58 (−5.02 to −0.14)
Affective Processing (therapy mean score)	0.43 (−0.42–1.28)	0.99	.32	−0.21 (−1.12–0.71)	−0.44	.66	−0.77 (−2.64–1.10)
Patients	255			255			252
R^2/adjusted R^2	0.62/0.61			0.55/0.53			0.41/0.39
AIC	253.38			288.38			647.48
Log-likelihood	−115.69			−133.19			−312.74

Abbreviations: AIC, Akaike information criterion; BDI-II, Beck Depression Inventory; BeLP-KF, Berlin Life Quality Profile; CI, 95% confidence interval; ISR, ICD-10 Symptom Rating; K-INK, Incongruence Questionnaire.

TABLE 4 (Continued)

	Satisfaction in quality of life(BeLP-KF)		Satisfaction in mental health (BeLP-KF)			Incongruence in avoidance goals (K-INK)		
Predictors	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***	***Estimates (CI)***	***t-statistic***	***p-value***
Intercept	2.51	**.01**	−0.22 (−1.15–0.70)	−0.48	.63	2.44 (1.71–3.17)	6.57	**<.001**
Pre-assessment	5.52	**<.001**	0.41 (0.28–0.54)	6.12	**<.001**	0.47 (0.36–0.57)	8.49	**<.001**
Change in Therapeutic Alliance	1.81	.07	5.39 (−19.26–30.05)	0.43	.67	−18.79 (−34.13 to −3.46)	−2.41	**.02**
Change in Coping	2.91	**.004**	12.48 (6.73–18.23)	4.27	**<.001**	−5.97 (−9.60 to −2.34)	−3.24	**.001**
Change in Cognitive Integration	0.87	.38	−4.16 (−10.37–2.06)	−1.32	.19	1.43 (−2.48–5.33)	0.72	.47
Change in Affective Processing	−0.69	.49	3.57 (−2.15–9.30)	1.23	.22	0.36 (−3.18–3.89)	0.20	.84
Therapeutic Alliance (therapy mean score)	1.72	.09	0.72 (−0.58–2.03)	1.09	.28	−0.79 (−1.63–0.05)	−1.86	.06
Coping (therapy mean score)	4.50	**<.001**	4.60 (2.69–6.52)	4.73	**<.001**	−2.17 (−3.35 to −0.98)	−3.60	**<.001**
Cognitive Integration (therapy mean score)	−2.08	**.04**	−2.48 (−5.10–0.15)	−1.86	.06	1.72 (0.07–3.37)	2.05	**.04**
Affective Processing (therapy mean score)	−0.81	.42	0.29 (−1.69–2.26)	0.29	.78	−0.08 (−1.32–1.16)	−0.13	.90
Patients	252		253			253		
R^2/adjusted R^2	0.41/0.39		0.50/0.48			0.45/0.43		
AIC	647.48		678.02			439.64		
Log-likelihood	−312.74		−328.01			−208.82		

Abbreviations: AIC, Akaike information criterion; BDI-II, Beck Depression Inventory; BeLP-KF, Berlin Life Quality Profile; CI, 95% confidence interval; ISR, ICD-10 Symptom Rating; K-INK, Incongruence Questionnaire.

rupture-repair processes in early treatment (Zilcha-Mano & Errázuriz, 2017) and over the course of therapy (Stiles & Goldsmith, 2010; Strauss et al., 2006). The present definition of Therapeutic Alliance, however, was not restricted to a single patient–therapist relationship. Rather, patients rated Therapeutic Alliance in terms of their relationships with psychotherapists, nurses, various group therapists and social workers, which depicted a realistic image of the therapeutic relationships in a standardized therapy program. Results showed no significant differences between psychotherapists. This contradicts previous findings on therapist effects where 5%–8% of the outcome variance can be explained by therapist variables (Kim et al., 2006; Norcross & Lambert, 2018). Thus, the steady time trend of Therapeutic Alliance with multiple professionals and the lack of between-therapist variance might be due to compensations of dyadic rupture–repair processes. In the present sample, we found a large between-patient variance indicating that the changes in common factors varied considerably among patients.

The second goal was to examine process–outcome associations between the common factors and clinical outcomes. Five outcome measures indicated medium to large effects: general psychopathology, depressive psychopathology, satisfaction in quality of life, satisfaction with mental health and incongruence in avoidance goals. This was however not the case regarding incongruence of approach goals, feeling of loneliness, deficits in social interaction and deficits in information processing. Although improvement in clinical outcomes related to social anxiety and interaction deficits was found, the effects remained small. This might be due to less than 10% of the sample actually meeting the criteria of social phobia. With regard to incongruence, patients in our study showed decreased incongruence in avoidance goals, yet their incongruence regarding the rapprochement of positively valued goals rather increased. Hence, the day-clinic psychotherapy program failed to help patients in achieving positively valued goals such as attaining intimate relationships, autonomy, status or sense of meaning. Nevertheless, the therapy supported the patients in avoiding negatively valued goals like not being respected, humiliation or dependence. According to Grawe (2007), mismatches of personal goals with experiences are associated with the experience of incongruence, which in turn is linked with psychological strain. Thus, decreasing incongruence represents a fundamental goal of successful psychotherapy (Grawe, 2007). For instance, Berking et al. (2003) found lowered ratings of incongruence (approaching positively and avoiding negatively valued goals) in inpatients after cognitive behavioural therapy. The patient sample seems to have been primarily concerned with avoiding frustration and not getting hurt, rather than pursuing positive goals. Further, as the day-clinic psychotherapy program is designed for 5 days a week, patients have limited capacities to aim for positive goals in their routine life outside the therapy.

With respect to clinical outcome showing medium to large effects, general and depressive psychopathology, satisfaction in quality of life and mental health and incongruence of avoidance goals, the common factor Coping played a predominant role. Coping-related predictors were significant across models in the direction of clinical improvement, for example decreased depression and increased satisfaction after the therapy. The average level of Coping over the course of therapy was not linked to therapy success alone, but rather the increase in Coping. Thus, patients who improved faster in considering themselves capable of overcoming problems and difficulties reported greater psychotherapeutic benefits. Enhanced Coping is an active therapeutic ingredient in patients suffering from depression, anxiety, eating disorders or schizophrenia (for an overview, see Crits-Christoph et al., 2013).

The common factor Therapeutic Alliance was associated with clinical outcome in two out of five models. The rate of growth in Therapeutic Alliance predicted depression and incongruence in avoidance goals controlling for the individual mean level of Therapeutic Alliance over the course of therapy. Accordingly, patients who established helpful professional relationships faster demonstrated less depressive psychopathology and less incongruence in avoiding negatively valued goals at the end of therapy. This finding is in line with the three-phase model of the psychotherapy outcome (Howard et al., 1993). The model postulates a sequence of therapeutic progress that begins with an improvement in subjectively experienced well-being, followed by a reduction of symptoms and, finally, by an improvement in social functioning. Lambert and Ogles (2004) assigned different classes of common factors to these phases. They distinguished between (1) supportive common factors such as the therapeutic relationship, (2) learning common factors such as the assimilation of problematic experiences, cognitive learning or gaining insight and (3) action-oriented common factors such as problem confrontation, mastery experience or regulation of behaviour. These three groups of common factors correspond to the typical sequence of change in psychotherapy: 'The developmental nature of this sequence presumes that the supportive functions precede changes in beliefs and attitudes, which precede the therapist's attempts to encourage patient action' (Lambert & Ogles, 2004, p. 173). Furthermore, our present findings are congruent with earlier studies that demonstrated the role of alliance in the improvement of BDI-assessed depression (e.g. Barber et al., 2000). Therapeutic Alliance was not associated with general psychopathology although previous studies have found alliance linked to general psychopathology (Flückiger et al., 2018; Horvath et al., 2011). Several reasons may account for this: Patients rated Therapeutic Alliance continuously high right at the beginning of therapy, which may have limited individual growth curves due to ceiling effects. Studies proposed indirect, mediating effects of alliance on outcome expectation (Abouguendia et al., 2004; Constantino et al., 2020). Thus, the strong Coping–outcome association in our study, for example for general psychopathology, might have evolved through the therapeutic relationship.

Patients improving in Affective Processing did not show significantly better outcomes at the end of therapy. Recent findings indicated that the therapeutic impact of common factors related to affective processing might depend on patients' pre-treatment emotion regulation strategies (Brintziger et al., 2021) and therapists' empathy (Watson et al., 2020). In line with the present findings, Fisher et al. (2019) did not find an association between linear growth of patients' emotional experience and clinical outcome. Cognitive Integration

ratings were associated with higher depression ratings and lower satisfaction with mental health at the end of therapy. Given that change in Cognitive Integration was not a significant predictor, between-patient differences rather than intra-individual change within therapy seem to be associated with lower outcomes. Patient characteristics linked to stable, high ratings of Cognitive Integration over the course of the therapy might have accounted for lower satisfaction with mental health and higher depression after therapy (e.g. number of treatment attempts).

The findings on Affective Processing and Cognitive Integration challenge the presumed generally positive impact of these common factors on clinical outcome in psychotherapy patients. Nevertheless, all common factors increased substantially over the course of therapy. Whereas Coping and Therapeutic Alliance clearly predicted clinical outcome, the function of Affective Processing and Cognitive Integration as mechanisms of change needs further investigation.

4.1 | Strengths and limitations

A strength of the current study is its large and continuously monitored sample of patients in psychiatric routine care providing broad information on therapy progress and outcome. The use of multilevel models allowed for dealing with the complex hierarchical structure of the dataset. The models accounted for within-patient and between-patient effects and integrated well-established clinical outcome measures. Thus, the naturalistic design benefitted from high external validity as it closely represents the reality of psychotherapy in the context of a standardized day-clinic program. The present study revealed temporal relationships between four comprehensive common factors and clinical outcome, thereby providing initial support for their possibly causal therapeutic impact. Yet, these findings should be interpreted in the light of several study limitations. First, the current design lacked experimental manipulation and a control condition. Accordingly, its capability to generate evidence on cause and effect was limited, as alternative explanations may have accounted for the relationship. Second, we analysed clinical outcome measures only pre- and post-therapy. Weekly assessments of outcome measures and adding a therapist-rated instrument would have allowed a closer look at the effects of common factors on session outcome.

4.2 | Implications and future research

Shifting the perspective from single common factors to the effects of multiple and comprehensive common factors may substantially deepen the understanding of psychotherapeutic processes. The ongoing debate in psychotherapy research is based on additive models of therapeutic techniques, common factors, and extra-therapeutic factors. Yet, we are far from having disentangled the interaction of these variables. Our findings demonstrate that comprehensive common factors, therapeutic alliance, affective processing, cognitive integration and coping, follow unique trajectories in the course of psychotherapy. Furthermore, an intensifying therapeutic alliance and increasing perceived coping capability generally contribute to psychotherapeutic benefits. In a previous study, Brintziger et al. (2021) found that patients' pretreatment characteristics regarding the processing of their emotions interacted with the benefit of activating common factors related to affective processing such as mindfulness: 'The perceived activation of mindfulness had a positive impact on depression reduction only in patients with pretreatment deficits in cognitive representation and communication of emotions. In patients who did not show such deficits, the perceived activation of this common factor during treatment was negatively correlated with outcome' (Brintziger et al., 2021, p. 472). Thus, it seems that the activation of so-called common factors is not commonly beneficial in psychotherapy. Rather, in the sense of personalized psychotherapy, the realization of active therapeutic factors must match the patient's deficits and resources to initiate improvement. Our empirical evidence implies time-, problem-, context- and patient-specific process differences rendering psychotherapy a complex dynamic system. Therefore, we recommend that practitioners should monitor and adapt according to the individual growth curves and the course of therapeutic progress to personalize psychotherapy. Future studies should further investigate the dynamic interplay and synergistic effects of common factors, therapeutic techniques and patient characteristics.

ACKNOWLEDGEMENTS

Open access funding provided by Universitat Bern.

CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interest.

DATA AVAILABILITY STATEMENT

The dataset contains information on patients, which cannot be fully anonymized. Accordingly, data may not be shared according to privacy and ethical concerns.

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SUPPORTING INFORMATION

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How to cite this article: Meier, D., Tschacher, W., Frommer, A., Moggi, F., & Pfammatter, M. (2023). Growth curves of common factors in psychotherapy: Multilevel growth modelling and outcome analysis. *Clinical Psychology & Psychotherapy*, 1–16. https://doi.org/10.1002/cpp.2864