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RESEARCH ARTICLE

A person-centered, transdiagnostic schema and mode profile approach to predict outcome in time-limited schema group therapy

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Abstract

Objective This study employs a person-centered transdiagnostic approach to examine how schema and mode profiles predict symptom severity reduction in schema group therapy for patients with personality disorders and enduring clinical syndromes.

Method We analyzed symptom reduction in 248 patients across three formats of manualized, time-limited schema group therapy. Latent profile analysis and mixed multilevel modeling were used to determine the extent to which schema/mode classes predict symptom reduction, and whether the inclusion of individual schemas and modes enhances these predictions. **Results** No significant differences in treatment outcomes were found across the group modalities. A three latent profile solution for schemas and modes showed external validity with clinical variables and demonstrated that declines in symptom severity varied by schema and mode class, even after adjusting for baseline symptom severity. Adding the Vulnerability to Harm schema and Vulnerable Child mode to the model increased the explained variance.

Conclusion Patients with more severe personality problems show more substantial symptom reduction. Both schema and mode profiles significantly contribute to predicting post-treatment symptom levels. Understanding these profiles may help therapists tailor interventions more effectively, consistent with Young's theoretical model.

Trial registration: [ISRCTN.org identifier: ISRCTN17262253](https://www.isrctn.com/identifiers/ISRCTN17262253).

Keywords: schema group therapy; personality disorders; prediction; latent profile analysis; schemas; modes

Clinical or methodological significance of this article: This study is one of the first using Latent Profile Analyses to detect personality profiles in schema therapy. It underscores the significance of adopting a person-centered, transdiagnostic, profile-oriented approach to schemas and modes in the treatment of patients through time-limited schema group therapy.

Introduction

Schema therapy (ST) has been found to be effective in the treatment of personality disorders (PDs), even though effect sizes vary from high to low (Arntz et al., 2022; Bakos et al., 2015; Bamelis et al., 2014; Cristea et al., 2017; Giesen-Bloo et al., 2006; Hilden et al.,

2021; Taylor et al., 2017), and not all patients improve (Bakos et al., 2015; Berk & Parker, 2009; van Vreeswijk et al., 2014; van Vreeswijk et al., 2020). It is of great importance to increase our understanding of which specific patients could benefit from ST. So far, research of predictors of

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treatment outcome in PDs, in general, has mainly focused on demographic, clinical and interactional variables and treatment modalities (Aafjes-van Doorn & Barber, 2018; Kramer et al., 2020; Mander et al., 2015; Yakin et al., 2020). The achieved body of evidence is however still sparse and sometimes even incongruent, especially regarding the predictive value of individual schemas and modes (the traditional variable-centered method) (Howard & Hoffman, 2018). The current study thus aims to provide insight into aspects that might predict treatment outcome at a person-centered transdiagnostic schema and mode level.

Schema Therapy

ST (Young et al., 2003) was developed to help treat pervasive, long-term psychological difficulties, such as PD, unresponsive to traditional cognitive therapy. It draws heavily on interpersonal, psychodynamic, attachment, and gestalt theory and techniques (van Vreeswijk et al., 2012). The central concepts of ST consist of early maladaptive schemas (EMS), coping styles, and schema modes (modes). EMS results from unmet needs, attachment pathology, and traumatic events in childhood and represent the (core) negative beliefs regarding oneself, others, and the world. EMS are assumed to be largely trait-like, which is confirmed by empirical evidence (Taylor et al., 2017). So they form the core of personality pathology (Bach et al., 2016), with its severity represented by the pervasiveness and severity of the EMS. When an EMS is triggered, a coping mechanism originating from innate fight-freeze-flight responses is adopted, displayed by overcompensation, surrender or avoidance-based behavior. These responses provide short term relief of the perceived stressor, but in doing so, they reinforce not only themselves, but also the EMS.

The combination of the activation of EMS with a coping mechanism, results in the display of a mode (van Wijk-Herbrink et al., 2018). Modes are more temporary emotional-cognitive-behavioral states of an individual and they are linked to the overt psychopathological symptoms experienced by the individual, and thereby represent personality functioning (Bach & Bernstein, 2019). Modes can be grouped into four main categories: (a) Child modes reflect the primary response to unmet emotional needs in childhood. The central Child modes are the Vulnerable, the Angry and the Impulsive Child. Being in these modes puts one back into the overwhelmed feeling one had in childhood. (b) Dysfunctional parent modes represent the internalized representations of punitive, critical, or demanding responses

(or complete lack thereof) from the child's caregivers. (c) Maladaptive coping modes were developed to deal with extreme stress situations in childhood. They consist of avoidance, detachment, surrender, and overcompensation. Lastly (d) Healthy modes consist of the Happy Child and the Healthy Adult. The Happy Child mode represents feeling of joy, playfulness and feeling safe to explore. The Healthy Adult promotes a realistic view of the world, others and the self in context and helps individuals in meeting their needs. Notably, it is theorized that EMS are particularly manifested in the Vulnerable Child mode (Bach et al., 2018), thus this mode is seen as the core focus for treatment.

In ST, the status quo seems to be anything, but a one size fits all approach, reflecting the wide variety of diagnoses to which ST is applied. Not only has ST been adapted for specific target groups (e.g., different PDs and clinical syndromes), also the use of specific ST techniques and delivery modes vary widely (Heath & Startup, 2020; van Dijk et al., 2023). No evidence has yet been provided for superiority of one ST format over the other (Ahowan et al., 2020; van Vreeswijk et al., 2012). Therefore, it is relevant to gain more insight into what could be beneficial for which patient. As a first explorative step to reach this end, the identification of predictors of the outcome of ST in general may be helpful. So far only unequivocal support for the predictive value of symptom severity at the start of treatment has been found (van Vreeswijk et al., 2020) and research on prescribing variables for specific ST-formats is absent.

Higher Order Approach

In the study by Bach et al. (2018) the term "higher ordering of schemas into schema domains" describes how individual early maladaptive schemas (EMS) are grouped into broader, related categories. These categories—like "Disconnection & Rejection," "Impaired Autonomy & Performance," "Excessive Responsibility & Standards," and "Impaired Limits"—are clusters of schemas believed to stem from similar developmental deficiencies, specifically unmet emotional needs in childhood. This organization reveals how specific cognitive and emotional patterns are interconnected, rather than isolated, across these domains.

The study's findings indicate a strong link between these schema domains and the "Vulnerable Child" mode with psychological distress. It suggests that higher manifestations of these schemas and this mode correlate with greater psychological distress. The "Vulnerable Child" mode, marked by emotional

overwhelm and unmet safety needs, captures the emotional state associated with these schemas. Its presence significantly indicates the level of psychological distress, reflecting the enduring emotional impact of past adversities now structured within these higher-order domains. Other studies in various patient populations, applying different formats of ST, provide conflicting results about the influence of demographics, individual and clusters of EMS and modes (e.g., Taylor et al., 2017), but also regarding the influence of overall schema and mode severity. In sum, except for symptom severity at the start of treatment, direct measures have not yet provided stable and generalizable clues to predicting outcome. In other health care domains advances have been made using Latent Profile Analyses (LPA). This aims to uncover hidden groups from observed cross-sectional data such as demographics, questionnaires, and environmental data. For instance, a study among an extraordinary large sample ($N = 44,905$) of mental health care patients with predominantly anxiety and depression showed that latent profiles could be helpful in the choice for intensity and treatment mode (CBT or counseling) and that a specific profile was predictive of a greater risk of deterioration (Saunders et al., 2020).

In ST it has been found through LPA that the presence of antisocial PD and/or comorbidity of other PDs did not affect treatment outcome differentially (Brazao et al., 2019). Research into the effects of other latent profiles, based on schemas and modes, on treatment outcome has, to the authors knowledge, not yet been conducted. If these latent profiles can be found, they could offer several advantages. First, they are detected statistically and are therefore not prone to clinical bias. Furthermore, as they do not rely on the (indicational) scores of specific subscales only, they are less prone to type I and type II errors. Lastly, if latent profiles are found, the dynamics and hierarchical order of and between different scales on different questionnaires could be deduced. This in turn may help clinicians understand the individual interplay between the scores instead of relying on unidimensional interpretation based on the norm scores of single (sub)scales only (Lazarus & Rafaeli, 2023).

Aims and Research Hypotheses

In the present study, the focus is to examine predictors of treatment outcome in terms of reduced symptom severity following time-limited schema group therapy formats. More specifically, this research explored person-centered, transdiagnostic latent classes of schemas and modes as predictors.

Additionally, it investigated whether individual schemas and modes offer extra predictive value beyond what is accounted for by the latent classes.

In an open-label study symptom severity, schemas and modes were assessed before, in the middle and after three formats of outpatient time-limited schema group therapy for patients with longstanding clinical syndromes and/ or personality disorders.

In this study, we aim to examine the predictors of treatment outcomes in terms of reduced symptom severity following time-limited schema group therapy formats. Specifically, our research investigates person-centered, transdiagnostic latent classes of schemas and modes as potential predictors. Additionally, we explore whether individual schemas and modes provide additional predictive value beyond that accounted for by these latent classes. In an open-label study design, we assessed symptom severity, schemas, and modes at three points: before, during, and after participating in one of three formats of outpatient time-limited schema group therapy. This therapy was provided to patients with long-standing clinical syndromes and/or personality disorders.

It is hypothesized that: (a) time-limited ST will be associated with a significant decrease in symptom severity irrespective of schema group treatment format, (b) underlying latent schema and mode profiles can be identified, (c) either latent schema, latent mode profiles or a combination of both are significant predictors of schema group therapy outcome and the addition of separate individual schemas and modes to the profiles does not improve profile based prediction models, except for the Vulnerable Child in analogy to the study of Bach et al. (2018).

Methods

Patients

Adult patients (male and female) with a personality disorder as the primary diagnosis or who suffered from a long-lasting clinical disorder and who had insufficiently benefited from earlier treatments (psychotherapy and/ or psychopharmacological treatments) were referred for outpatient treatment to G-kracht mental health care institute. Exclusion criteria were: a main diagnosis of drug and/ or alcohol abuse, a non-affective psychotic disorder, a bipolar disorder, severe affect problems requiring inpatient treatment, not being able to speak or write Dutch and severe hearing or speech disorders.

One of the treatment options for patients, besides individual treatment, was following one or more time-limited Schema group treatments (SGT) sequentially with or without additional

psychopharmacological treatment. Several forms of time-limited SGT were available (see below) and through shared decision making with the patient a particular treatment was chosen. Of the 248 participants in this study, 43 patients (17.34%) followed Day-Schema Therapy (d-SGT), 47 patients (18.95%) Schema Cognitive Behavioral Therapy (SCBT-g) and 158 patients (63.70%) Schema Experiential Therapy (SEPT-g). The demographic and clinical information is described in Table 1.

Design

This study is a naturalistic investigation employing a within-subject, pre-post design, initiated on January 1, 2007, and concluded on January 1, 2022. Patient files and Routine Outcome Monitoring (ROM) data from 248 patients who underwent time-limited Schema Group Therapy (SGT) and provided written consent for the use of their patient file data in research were analyzed. An independent research assistant collected and anonymized the data. The measurements were administered at baseline (T1), halfway through treatment (T2), and post-treatment (T3).

The trial was registered with the trial register ISRCTN under ISRCTN17262253. Additional approval from a Medical Ethical Committee was not required according to the Helsinki agreement and Dutch regulations. This is because the ROM data, a standard part of patients' therapy, were utilized for research purposes without imposing any extra burden or requiring additional data provision by the patients. The Journal Article Reporting Standards (JARS) (Appelbaum et al., 2018) are adhered to in this study. Anonymized data and the code behind the analysis are available by contacting the first author of this article.

Treatment Conditions and Therapists

The three outpatient group-based formats were: a schema day group (d-SGT) (van Vreeswijk & Op 't Veld, 2013), a schema cognitive behavioral group (SCBT-g) (Broersen & van Vreeswijk, 2017) and a schema experiential group (SEPT-g) (Broersen & van Vreeswijk, 2018). Each format unified by their adherence to the schema therapy model proposed by Young et al. (2003) and Yalom and Leszcz (2005). These formats are not only anchored in the foundational principles of Young's schema therapy—a framework that integrates elements of cognitive, behavioral, psychodynamic, and attachment theories to understand and treat maladaptive schemas and modes—but also incorporate Yalom's group

therapy model. This emphasizes therapeutic factors like group cohesion, catharsis, and existential factors. The integration of these two models in the therapy formats offers a unique approach, blending Young's schema therapy individual techniques (Young et al., 2003) with Yalom's insights into the dynamics and therapeutic potential of group settings (Yalom & Leszcz, 2005). Thus far, no scientific evidence suggests that one format of schema therapy is superior to another; however, clinicians often favor the flexibility of adopting a person-centered approach and providing various formats. Additionally, there is a preference for concentrating on a specific cluster of techniques during 90-minute sessions of time-limited schema group therapy, rather than integrating all schema therapy techniques as was done in our time-limited schema day treatment.

All three groups consisted of about 14–20 weekly group-sessions. The protocols are described in more detail in Supplemental 1.

Measures

DSM-IV classification. Assessment took place prior to start of treatment. Psychological problems, physical problems, current medication if applicable, prior treatments and life history were assessed in an intake interview by a psychologist. Patient files of prior treatments were assessed if applicable. Assessment through this information and clinical interviews yielded one or more clinical DSM-classifications for most patients. If the clinician and/or the patient wanted more certainty, the Mini-International Psychiatric Interview-Plus (MINI-Plus) and/ or SCID-II was conducted as well.

BSI. The total score of the Brief Symptom Inventory (BSI) (de Beurs, 2004) measuring general psychological distress, was used as the primary outcome. The BSI has 53 items and nine subscales (physical problems, cognitive problems, interpersonal sensitivity, depressive mood, general anxiety, hostility, phobic anxiety, paranoid thoughts and psychoticism). The Dutch version has shown to have good psychometric values (Cronbach's alpha ranging between .71 and .85) (de Beurs & Zitman, 2006).

Schemas were measured using the Young Schema Questionnaire-L2 (Rijkeboer, 2005; Young & Brown, 1994). It has 205 items that assesses 16 dysfunctional schemas: Abandonment/ Instability, Mistrust/Abuse, Emotional Deprivation, Defectiveness/ Shame Social Isolation and Social Alienation (schema domain I: Disconnection and Rejection); Vulnerability to Harm or Illness, Dependence/ Incompetence, Enmeshment/ Undeveloped Self

Table 1. Sociodemographic and clinical data of patients following time-limited schema group therapy at baseline.

Baseline characteristics	d-SGT ^a N = 43	SCBT-g ^b N = 47	SEPT-g ^c N = 158
	M or n (SD or %)	M or n (SD or %)	M or n (SD or %)
Gender (m/f)	13/30 (30.2/69.8)	19/27 (41.3/58.7)	57/ 101 (36.1/63.9)
Age	38.90 (10.50)	36.35 (11.87)	36.26 (10.99)
Psychopharmacology (yes/no)	10/ 31 (24.4/75.6)	13/34 (27.7/72.3)	51/ 101 (33.6/66.4)
Drop out (yes/ no)	5/ 38 (11.6/88.4)	2/ 45 (4.3/95.7)	21/137 (13.3/86.7)
Number of diagnoses	2.98 (1.37)	3.74 (1.47)	2.85 (1.25)
Comorbidity clinical syndrome and personality (yes/no)	35/ 8 (81.4/18.6)	40/ 7 (85.1/14.9)	136/22 (86.1/13.9)
<i>Main PD^d DSM-classification</i>			
No PD	5 (11.6)	10 (21.3)	28 (17.7)
Schizoid PD	1 (2.3)	0 (0)	0 (0)
Otherwise specified PD	14 (32.6)	13 (27.7)	52 (32.9)
Narcistic PD	1 (2.3)	2 (4.3)	4 (2.5)
Borderline PD	8 (18.6)	10 (21.3)	17 (10.8)
Avoidant PD	6 (14.0)	10 (21.3)	34 (21.5)
Dependent PD	3 (7.0)	1 (2.1)	2 (1.2)
Obsessive compulsive PD	5 (11.6)	1 (2.1)	20 (12.7)

Note. ^a d-SGT = Schema day group. ^b SCBT-g = Schema CBT group. ^c SEPT-g = Schema experiential group. ^d PD = Personality disorder.

and Failure (schema domain II: Impaired Autonomy and Performance); Entitlement/ Grandiosity and Insufficient Self-control/Self-discipline (schema domain III: Impaired Limits); Subjugation and Self-sacrifice/ Approval Seeking/Recognition Seeking (schema domain IV: Other Directedness); and Emotional Inhibition and Unrelenting Standards/Hypercriticalness (schema domain V: Over-vigilance and Inhibition). The Dutch version of the YSQ-L2 has proven to be reliable (Cronbach's alpha ranging between .76 and .95) and valid (Rijkeboer & van den Bergh, 2006).

Modes were measured using the Schema Mode Inventory-I (SMI-I) (Young et al., 2007). It is a 118-item self-report questionnaire that assesses 14 modes: Vulnerable child, Angry child, Enraged child, Impulsive child and Undisciplined child (Child modes domain), Compliant surrenderer, Detached protector, Detached self-soother, Self-aggrandizer and Bully/Attack mode (Coping modes domain), Punitive parent and Demanding parent (Parents mode domain), Happy child and Healthy adult (Healthy modes domain). The Dutch version of the SMI-I is reliable (Cronbach's alpha ranging between .79-.96) and valid (Lobbestael et al., 2010).

Data Analysis

Differences between treatment conditions at pre-treatment in socioeconomic status, total BSI-scores, schema and mode domains were analyzed using *T*-tests and Chi-square tests. These analyses were also performed between patients who dropped out and those who completed treatment.

Assessing the magnitude of treatment effects on total BSI scores, schema domains, and mode domains, we computed within-subjects Cohen's *d* (Cohen, 1988) as the measure of effect size. This was conducted for each treatment condition across pre-treatment, mid-treatment, and end-of-treatment phases to provide a standardized measure of change. Effect sizes were calculated by considering the differences in means divided by the pooled standard deviation, allowing for an interpretation of the practical significance of treatment outcomes. Confidence intervals for each effect size were also calculated to assess the reliability of these estimates.

Latent profile analyses (LPAs) were conducted in Mplus version 8 (Muthen & Muthen, 1998-2017). Maximum likelihood estimation with robust standard errors (MLR) were used to fit latent profile models from one up to five latent profiles to the data. To determine the optimal number of profiles based on the schema and schema mode subscales, we used the Bayesian Information Criterion (BIC) and bootstrap likelihood ratio test (BLRT) as indicators of the correct number of latent profile (Nylund et al., 2007). A smaller BIC indicates a better model fit. The BLRT is used to determine whether a *k* profile model fits the data significantly better compared to a *k-1* profile model. In addition to the BIC and BLRT, we used the Lo-Mendell-Rubin test as an indicator for the correct number of profiles and inspected and compared the average latent profile probabilities for the most likely latent profile membership by latent profile (posterior classification probabilities) for competing models. Posterior classification probabilities with higher diagonal values would indicate greater certainty of

assignment to the right profile. Because model selection is not always straightforward, we followed recommendations of other researchers to also include profile size (profiles with <1% of total sample or <25 individuals should not be considered meaningful) (Lubke & Neale, 2006). As suggested by Weller et al. (2020), we additionally report the Entropy as a statistic that indicates how accurately the model defines the classes, but do not rely on the value to determine the number of profiles. There is no agreed cutoff criterion for entropy, but higher entropy values indicate a more accurate model, contributing to our comprehensive assessment of model quality, both in statistical and clinical terms.

In line with recent methodologies and recognizing the importance of clinical relevance in our model selection process, we ensured that each identified profile was not only statistically significant but also clinically meaningful. This consideration was crucial in determining the appropriateness of each model, as we aimed for profiles that could be directly applicable in clinical settings.

The association between latent schema and mode profiles was analyzed using a Chi-square test. And construct validity of latent schema and mode profiles was explored using ANOVA and chi-square tests.

Predictors of treatment outcome were analyzed using linear mixed-effects models (LMM) in R-package lme4 (v1.125) (Bates et al., 2015). LMM random effects models were examined (assessment time points: pre, mid, and end-of-treatment). Lme4 can handle missing data when it is Missing at Random (MAR) or Missing Completely at Random (MCAR). No significant differences were found between patients with incomplete data, drop-outs and completers with complete data suggesting that the data were MAR.

As a null-model, we estimated a random intercept and random slope for the effect of time across individuals, with assessment time points per individual specified at level 1 nested within individuals at level 2. Time was entered as a numerical variable such that one unit of time corresponds to half of the received treatment. As an exception, to address “hypothesis a”, an alternative random effects structure was tested against the null-model that included therapy group numbers (1–33) at level 3. To test for the effect of treatment format (d-SGT, SCBT-g, and SEPT-g), dummy variables for d-SGT and SCBT-g were included as fixed factors (to either the null-model or the three-level model). A series of steps were taken to address “hypothesis c”, for which we detail the corresponding models in Supplemental 2.

First, we examined the fixed effects and the cross-level interaction effects with time of either the

derived latent schema or mode classes. Both schema class and mode class (at baseline, i.e., as level 2 factors) were included as a combination of two dummy variables (class 2 and class 3 with class 1 as the reference category). After selecting two parsimonious models with schema or mode class predictors, it was analyzed whether the model improved by the addition of fixed and cross-level interaction effects of (mean centered) individual schemas or modes, including the Vulnerable child mode. Finally, combinations of schema and mode profiles were explored. All LMM analyses included all available data points.

Against overfitting, power analysis was performed by means of simulations, using the R-package simr (Green & MacLeod, 2015). Each power analysis was performed on a stable (non-singular and converging) model, focusing on the statistical significance of the model parameter with respect to the last added cross-level interaction effect or fixed effect involving a schema or mode profile. In each simulation, an effect-size of .20 was assumed, that is, the observed parameter estimate was replaced with 0.20 before calculating the level of power. Only models which exceeded well over 80% of power were accepted. Models were selected after comparisons for which we refitted the models with Maximum Likelihood (ML) estimation on the same data and inspected the Bayesian Information Criterion (BIC) and ANOVA results (i.e., of Chi-squared tests on the difference of the log-likelihood between two nested models). Nested models were compared by looking into the statistical significance ($\alpha = .05$). Non-nested models were selected by the lower level of BIC. From the selected models the Restricted Maximum Likelihood (REML) output is presented.

For LCA *Mplus* version 8 for Mac (Muthen & Muthen, 1998–2017) was used. For the remaining analyses, the statistical software package RStudio (v2022.02.0) (RStudio-Team, 2022) for Mac was used.

Results

Demographic and clinical variables are described in Table 1 and in Supplemental 3, Table 2. Treatment effects, including specific analyses on effect sizes for each treatment condition, are presented in the supplemental material. Please see Supplemental 4 for a detailed overview of means, standard deviations, paired sample *t*-tests, effect sizes, and 95% confidence intervals at each treatment phase. Patients from the three treatment conditions only differed significantly on number of diagnosis ($F(2, 245) = 8.47$, $p < 0.001$), but not on any other demographic or

clinical variable (Table 1). Nor were differences found on the self-reported variables: psychological distress, schemas and modes (Table 2). Furthermore, no differences between groups were found in dropout rates ($p > .1$). Those that did drop out, did not differ on any variable from the completers ($p > .1$).

Number of Latent Profiles

LPA was used as a measurement model to identify unique latent classes of schemas and modes at baseline. BIC, LMR, BLRT and entropy for the latent profile models containing two to five profiles are presented (Supplemental 5, Table 4a). The BIC value is lowest for the 5-profile-solution and the BLRT is significant up to the 5-profile solution.

However, the posterior classification probabilities for schema profiles were highest in the 2 and 3-profile solution (both $\geq .97$) and for mode profiles for the 2-profile solution ($\geq .95$), while the LMR test favored a three-class solution for schemas and a one-class solution for schema modes. Moreover, only the 2- and 3-profile solutions resulted in profiles with a size of at least 25 persons. In addition, when visually inspecting the 4-profile and 5-profile solutions, it could be concluded that no “new” qualitatively distinguished clinically meaningful profile emerged compared to resp. a 3- and 4-profile solution (Supplemental 5, Table 4b).

Although the BIC and BLRT supported a five-profile solution, we opted for a three-profile solution for schemas and modes. This choice was driven by the three-profile solution providing sufficiently powered, meaningful predictions. Moreover, solutions with additional profiles did not yield qualitatively distinct profiles, thereby limiting their predictive utility.

Figure 1a,b depict the standardized latent class profiles for the schemas and modes, respectively, in the three-class solution at baseline.

Interpretation of the Classes

On the schemas (Figure 1a) the profiles were dubbed self-reported level of Personality Problem Severity (PPS). Profile 1 presents the lowest PPS and profile 3 presents the highest PPS. Whereas profiles 1 and 2 present a more or less flat line, profile 3 has small spikes on the schemas Defectiveness/ shame, Mistrust/abuse, Emotional Inhibition, and Subjugation.

On the modes (Figure 1b) the profiles were dubbed self-presentation of type of Personality Profile (PP). Profile 1 presents the Self-Serving Bias PP, Profile 2 presents the Internalizing PP and profile 3 presents the Externalizing PP. All three profiles look very distinct. Patients in profile 1 show a

profile with a spike on Happy Child and Healthy Adult mode and score low on the Vulnerable Child and Punitive Parent modes. Patients in profile 2 are distinguishable by high scores on the Vulnerable Child modus and relatively low scores on the Enraged Child, Happy Child, Healthy Adult modes. Patients in profile 2 and the other profiles scored similarly with respect to the Compliant Surrender, Detached Protector and the Punitive Parent and Demanding Parent modes. Patients in profile 3 are characterized by low scores on Happy Child and Healthy Adult modes and high scores for the maladaptive modes. Profile 3, in particular, showed a spike for Enraged Child and the Bully and Attack mode.

Association Between Latent Schema and Mode Classes

A Chi-square test for independence indicated a significant association between latent schema (severity) and latent mode profiles (type), $\chi^2 (4, n = 248) = 130.71, p < .001$. As depicted in Figure 2 most patients included in the Low PPS were included in the Self-Serving Bias PP. Patients in profile 2 of PPS were mostly found in the Internalizing PP. Patients in profile 3 of PPS were mostly found in the externalizing PP.

Construct Validity of Latent Classes

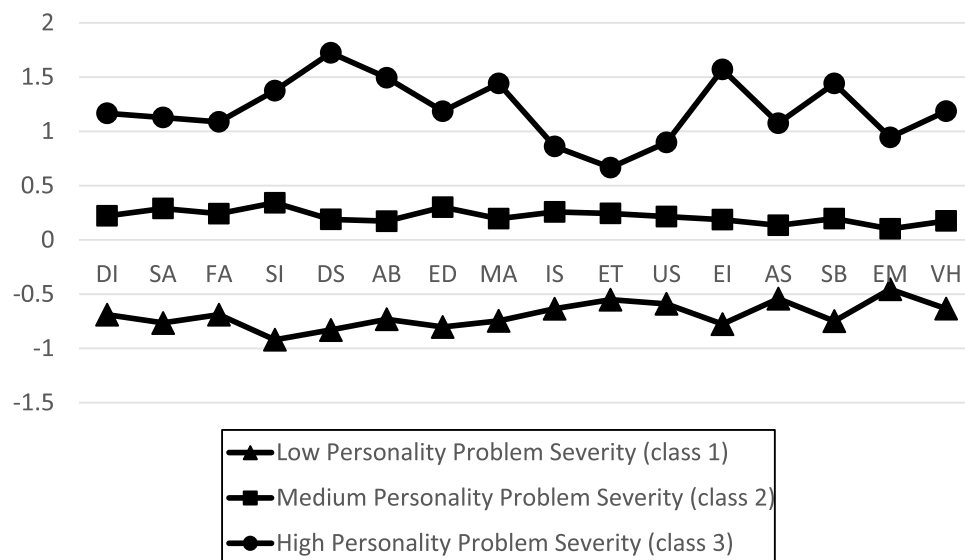
Exploring the construct validity of the latent profiles was done by examining their association with socio-demographic, clinical, and psychometric variables (see Table 5).

Table 5 shows that patients in the Low PPS class and in the Self-Serving Bias PP class, compared to the other profiles, report less psychological distress on the BSI ($p < .001$). For the latent schema profiles, patients in the Low PPS class had a significant lower number of DSM-diagnoses, less comorbidity and fewer had a personality disorder as main diagnosis ($p < .05$) as compared to both other classes. Whereas for the latent mode profiles, a smaller proportion in the Self-Serving Bias class had a diagnosis of cluster B or C ($p < .05$) as compared to the higher classes.

Predicting Outcome in Symptom Severity

The outcomes of the subsequent models are given in Supplemental 7, Table 6a–c. A negative correlation between the random intercept and random slope in our null-model (-0.71), revealed that those patients starting with a low BSI-total-score at T1 improved the most. The fixed effect of time in this model indicated that the mean symptom severity change for the

(a)



(b)

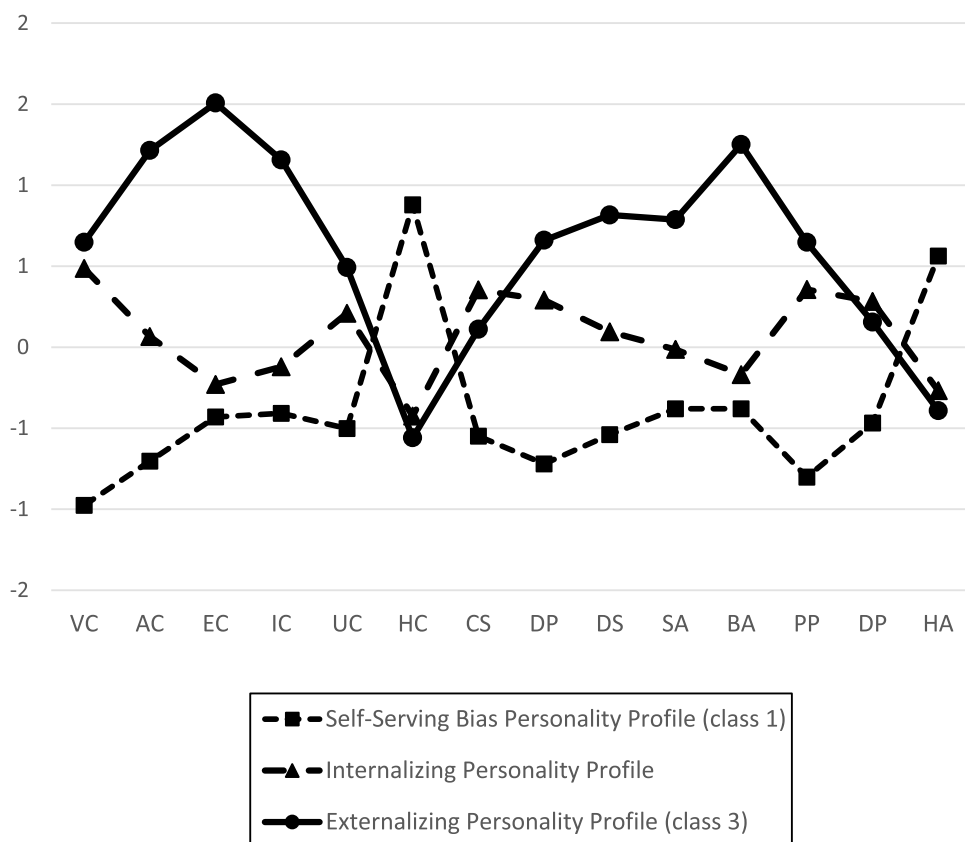


Figure 1. (a) Latent schema classes at T1. Note. The following abbreviations are used: DI = Dependence/Incompetence, SA = Social Alienation, FA = Failure, SI = Social Isolation, DS = Defectiveness/ Shame, AB = Abandonment/ Instability, ED = Emotional Deprivation, MA = Mistrust/Abuse, IS = Insufficient Self-control/Self-discipline, ET = Entitlement/ Grandiosity, US = Unrelenting Standards/Hypercriticalness, EI = Emotional Inhibition, AS = Self-sacrifice/ Approval Seeking/Recognition Seeking, SB = Subjugation, EM = Enmeshment/ Undeveloped Self and VH = Vulnerability to Harm or Illness. (b) Latent mode classes at T1. Note. The following abbreviations are used: VC = Vulnerable Child, AC = Angry Child, EC = Enraged Child, IC = Impulsive Child, UC = Undisciplined Child, HC = Happy Child, CS = Compliant Surrenderer, DP = Detached Protector, DS = Detached Self-soother, SA = Self-aggrandizer, BA = Bully/Attack mode, PP = Punitive parent, DM = Demanding Parent and HA = Healthy Adult.

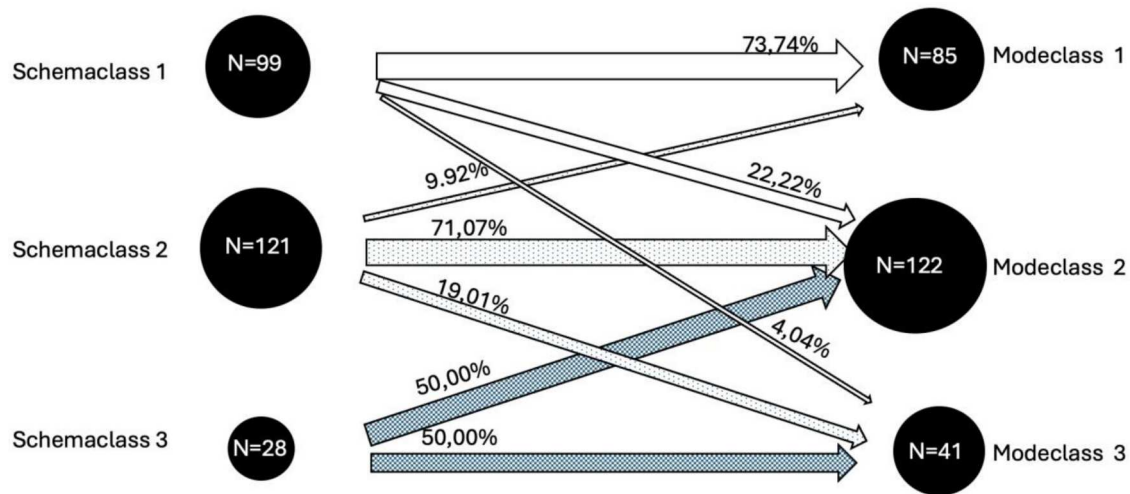


Figure 2. Transitional probabilities between schema classes and mode classes.

patient throughout (the first or second) half of their treatment was on average -0.13 ($SE = 0.02$, $CI = -0.18$ to -0.09 , $p < 0.001$). Subsequently, it was analyzed if treatment group (as a random factor) or treatment formats (as fixed factors) were associated with outcome in symptom severity as measured with the BSI-total-score at T1, T2, T3. The three-level level model, which nested individuals and individuals' assessment times under treatment groups, did not improve model fit beyond the null model, $\chi^2(1) = .74$, $p = .95$. The addition of fixed effects for treatment format attributed symptom reduction over time to individuals in the SEPT-g format, followed by 64% of the patients, relative to individuals in d-SGT (17%), $B = -0.14$, $SE = 0.06$, 95% $CI [-0.25, -0.02]$, $p = .02$ (see Supplemental 7, Table 6a). However, this did not enhance the model fit compared to the null model, $\chi^2(1) = 7.75$, $p = .10$.

Next it was analyzed if—and how—the prediction of symptom reduction (the null model) could be improved by including the fixed effects of latent schema profiles, and explored if optimal schema-based prediction requires any further additions of particular schemas. The best model with latent schema profiles only outperformed the null-model and included the fixed effects of schema class 2 and 3, as well as the cross-level interaction effect of class 3 with time (Supplemental 7, Table 6a: $AIC = 982.81$, $BIC = 1023.019$, $\chi^2 = 148.29$, $p < .001$). The intercept, time, latent schema profiles, and cross-level interaction effect were all significantly related to symptom severity (all p 's $< .001$) and 33.3% of the variance in treatment outcome was explained by fixed factors. The estimates showed that: (1) patients with higher psychological distress at the beginning had higher psychological distress at the end, (2) patients in schema class 2 or 3—at the beginning of therapy—had higher psychological

distress at the end than those in schema class 1, and (3) patients in schema class 3 reduced their symptoms relatively more than patients in schema class 1 or 2. Exploration indicated the lowest BIC (989.69) and a further improvement of predictive performance ($\chi^2 = 57.12$, $p < .001$) by adding a fixed effect $B = 0.38$, $SE = 0.05$, 95% $CI [0.28-0.49]$, $p < .001$ and a cross-level interaction effect with time of the Vulnerability to Harm schema $B = -0.08$, $SE = 0.03$, 95% $CI [-0.14$ to $-0.03]$, $p = .002$.

The predictive value of mode profiles and individual modes (subsequently) were examined via the same method as for the schema's. As can be seen in Supplemental 7, Table 6b, the best model based on mode classes outperformed the null-model ($\chi^2 = 127.01$, $p < .001$). The estimates in this model indicated higher BSI total scores for patients in mode class 2 $B = 0.71$, $SE = 0.07$, 95% $CI [0.58-0.84]$, $p < .001$ and in mode class 3 $B = 1.22$, $SE = 0.13$, 95% $CI [0.97-1.48]$, $p < .001$ relative to those in mode class 1. Furthermore, symptoms reduced relatively more over time in patients in mode class 3 $B = -0.18$, $SE = 0.06$, 95% $CI [-0.30$ to $-0.06]$, $p = 0.003$). In this model, 27.9% of the variance in treatment outcome was explained by the fixed factors.

After exploring the inclusions of the individual modes, it was found that adding a fixed effect for the Vulnerable child mode further improved the model-based prediction of symptoms ($\chi^2 = 69.92$, $p < .001$). No other additions of fixed effects or interactions with time of individuals modes resulted in a better fit.

Next, the model with predictors regarding both schemas and modes were estimated. A model that combined the parameters of the optimal schema class and mode class predictions was stable (Supplemental 7, Table 6c: $AIC = 965.14$, $BIC = 1018.75$), adequately powered (with respect to the

cross-level interaction effects), had superior fit to the schema class ($\chi^2 = 34.26, p < .001$) and mode class models ($\chi^2 = 55.55, p < .001$). The intercept, time, schema classes 2 and 3, mode classes 2 and 3, and the interactions of schema class 3 and mode class 3 with time all had a statistically significant relationship with psychological distress (all p 's $< .05$). The fixed factors in this model explained 37.2% of the variance in treatment outcome.

Explorative Analyses

A final, explorative, LMM combined the fixed and cross-level interaction effects on symptoms involving times of assessment, latent classes, as well as individual schemas and modes. This model enabled to describe the predictive contribution of all parameters of interest whilst controlling for the others. A stable model was obtained in which the fixed effects of mode class 2, and the

interaction between time and mode class 3, were not statistically significantly associated with psychological distress level. The total amount of explained variance by the fixed factors in this model was 43.4%. As illustrated in Figure 3, this final model indicates that—when other parameters at assumed at a constant level—BSI symptom reduction over time during treatment was higher in patients with higher baseline scores of (1) psychological distress, (2) Personality Problem Severity profile 3 and (3) Vulnerability to Harm schema. Moreover, patients with latent schema profile 2 or 3, latent mode profile 3, or higher Vulnerable Child mode showed higher average levels of psychological distress at baseline.

Discussion

This study presents the use of latent profile analysis (LPA) of schemas and modes as a potential person-

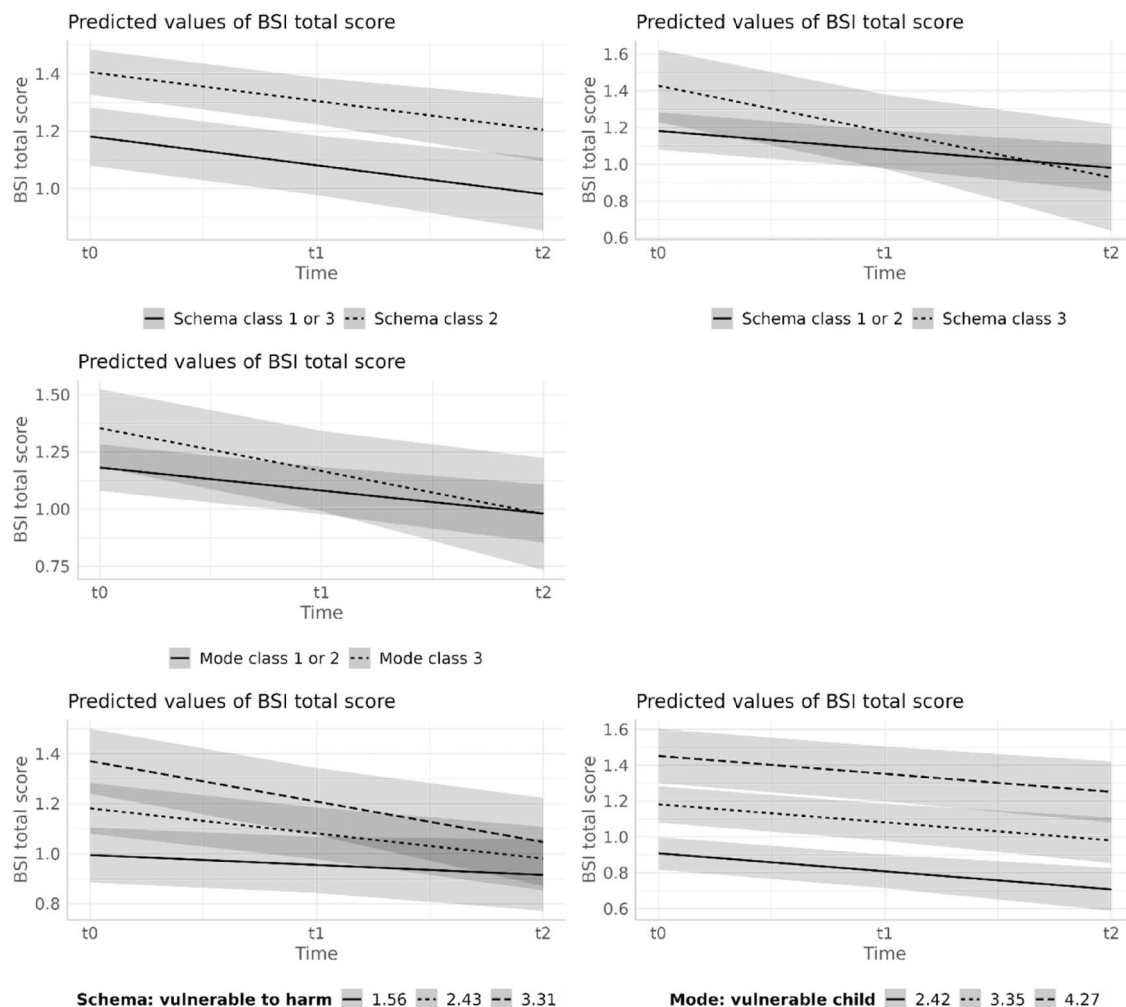


Figure 3. Predicted symptom severity over time by schema and mode classes.

centered transdiagnostic higher order way to predict treatment outcome for patients with PD. A three-tiered framework was identified for both schemas, referred to as Personality Problem Severity (PPS), and for modes, designated as Personality Profiles (PP). The schema classes primarily varied in severity. Distinctiveness marked the mode profiles, with each manifesting unique characteristics. Specifically, mode class 1 was labeled the Self-Serving Bias PP, mode class 2 the Internalizing PP, and mode class 3 the Externalizing PP. Modeling found that psychological distress levels throughout time-limited ST are predictable—to a substantive degree—from a combination of latent schema and mode profiles and the individual mode of the Vulnerable Child, independent of and above the effect of psychological distress levels at the start of treatment. Contrary to hypothesis (c), which posited that latent schema, latent mode profiles, or a combination of both would be significant predictors of schema group therapy outcomes without the addition of individual schemas and modes improving the predictive models, our further exploration yielded unexpected results. We discovered that incorporating fixed effects and cross-level interaction effects, particularly involving the Vulnerability to Harm schema, significantly improved our model's predictive performance, explaining up to 43% of the variance. However, a more parsimonious model, only containing the schema and mode classes already explained 37.2%.

The modeling results generally suggest that changes in symptom severity over time vary among patients according to schema class membership. Notably, the interaction effect between schema class 3 and time was consistently significant in all models. This pattern indicates that patients experiencing higher psychological distress and more severe personality problems tend to show greater symptom improvement during time-limited ST group therapy. However, the significance of the mode profiles varied across models. The exploratory models, which assessed the additional value of individual schemas and modes, revealed that a more pronounced Vulnerable Child mode was linked to higher psychological distress at the outset as is in line with Bach et al. (2018). However, it did not predict treatment outcomes, as there was no interaction effect over time. The association of the schema Vulnerability to Harm with distress at the start is minimally supported by the current empirical literature and may therefore reflect characteristics of our patient sample. More crucially, interpreting exploratory models, which added individual schemas and modes to schema and mode classes, is complicated by strong correlations among the predictors and potential regression toward the mean

effects. The simpler, more practical model that included both schema and mode classes was nearly as predictive. Since we also observed significant differences among patients across classes in both constructs, this supports the principles of schema therapy, which suggest considering both schemas and mode configurations (Bach et al., 2018).

This study included three distinct time-limited schema therapy (ST) group formats, which varied in focus and duration. Patients and clinicians collaboratively selected the most suitable group format, yet patient differences at initiation were only evident in the number of clinical diagnoses. While minimal fluctuations in psychological distress levels were observed across the formats, interpreting any significant interaction between therapy format and time as evidence of the superior efficacy of experiential techniques would constitute an ecological fallacy. Indeed, the apparent symptom variations across groups are likely due to unrecognized differences among self-selected patients rather than intrinsic qualities of the formats. Recent studies (Boog, 2023; van Maarschalkerweerd et al., 2021; Videler et al., 2018; Vuijk et al., 2023) support this view, indicating no significant superiority of experiential techniques over cognitive behavioral techniques. The group setting itself may enhance therapeutic engagement and interaction, serving as an experiential mechanism within a context of limited reparenting (Spinhoven et al., 2007). Conclusive evidence awaits randomized assignment of patients.

While initially counterintuitive, the observation that patients exhibiting greater personality problem severity (PPS) or an externalizing personality profile (PP) demonstrate the most significant improvement aligns with existing schema group therapy literature on borderline personality disorder (Arntz et al., 2022). This correlation underscores a potentially pivotal therapeutic responsiveness within these populations, consistent with prior empirical findings.

Our findings expand upon those of Yakin et al. (2020), who examined individual schema modes without considering composite mode profiles. They noted that initial Healthy Adult mode scores did not predict therapeutic change (Yakin et al., 2020). In the context of patients seeking mental health care, our results contest the established schema therapy perspective that high scores in the Healthy Adult and Happy Child modes, paired with low scores in the Vulnerable Child mode, invariably signify a stable psychological base. Instead, these profiles might represent both strengths and limitations. These profiles might for instance represent restricted disease insight or emotional engagement, often manifesting as affect phobia and/or deficiencies

in mentalization, the ability to understand mental states that drive behavior. A more latent profile approach might ensure that therapeutic interventions address the full spectrum of psychological health and not just its most overt manifestations.

Limitations and Future Directions

There are several limitations of this study. Firstly, this study did not employ randomization, lacked systematic diagnostic assessments, and observed significant disparities in patient numbers across various treatments, formats, and dosages. Consequently, drawing definitive conclusions about differential effectiveness is not possible. Subsequent moderation analyses are needed to examine whether these variables predict differential treatment effects and are also useful in assigning patients to specific ST formats. Second LCA was done with a relative low number of patients (Kongsted & Nielsen, 2017). The fit indices did not consistently point to a 3-profile solution. Although the BIC and BLRT favored a 5-profile solution, we decided to select the more parsimonious 3-profile solution based on the LMR test and posterior classification probabilities. Moreover, a 4- or 5-profile solution would not result in new clearly “distinguishable” profiles and yield profiles with less than 25 persons, precluding further statistical analyses with sufficient statistical power. Furthermore, we factored in the practical clinical utility of each profile. Future studies with larger samples may benefit from exploring the fit of >3 profiles, but, at the same time, should be cautious for overfitting and taking only a statistical approach into account. Moreover, these powerful studies could assess the possible moderating qualities of these latent profiles, thereby giving more insight into schema and mode interaction and constructs.

Third, clinical diagnoses were based on the assessment of experienced clinicians and not assessed systematically. Fourth psychological distress and schemas and modes severity were assessed by self-reports only, and therefore findings might be biased as some patients are not willing to share or lack insight and thus underestimate or exaggerate their problems (Cramer et al., 2016; Eurelings-Bontekoe et al., 2012). Lastly, scores on the self-reports were explicitly used to discuss therapy progress with the patients and so neither patients nor therapists were blinded. An adequately powered randomized controlled trial (RCT) is necessary to validate our findings, also taking into account potential variations in therapy dosage. Furthermore, studies could investigate other variables associated with the profiles (e.g., level of resilience, insight, mentalization, affect phobia, attachment, etc.). To refine our

understanding of “what works for whom” in schema therapy, future research should investigate whether latent schema and mode profiles not only predict treatment outcomes but also serve as moderators. Specifically, it would be beneficial to determine if these profiles can indicate which patients would most benefit from specific ST techniques, therapist styles of limited reparenting, and treatment modalities—be they group or individual sessions, and whether short-term or long-term interventions are more effective. This approach would transition our predictive models to moderating models, facilitating a more tailored therapeutic strategy.

Strengths and Conclusion

The strengths of this study are firstly that it is to our knowledge the first study into the predictive value of a transdiagnostic person-centered latent profiles approach based on schemas and modes and schema group therapy outcome. These latent profiles were furthermore substantiated by the clinical diagnoses, but not related to other demographical or clinical variables and might add theoretical understanding to the dimensional model of personality disorders in the DSM-5 (Bach et al., 2016). They might be also applicable to different patient populations than the current studies into individual schemas and modes. Our findings suggest that a transdiagnostic person-centered latent profile approach might be more parsimonious and meaningful than a variable-centered approach of developing more schemas and modes to be able to understand pathology (Arntz et al., 2021). Since the current population was very heterogeneous and generally representative of the general outdoor mental health care population, this might provide a higher external validity than most RCT studies with stricter in- and exclusion criteria.

To summarize, our findings reveal that patients with high scores on the personality problem severity profile or externalizing personality profile demonstrate the most substantial improvement in short-term schema group therapy. This suggests that an approach focusing on schema and mode profiles may be more crucial than concentrating on individual schemas and modes in schema therapy. Further research replicating the investigation of the transdiagnostic underlying structure in diverse samples would strengthen our conclusions and broaden their applicability.

Conflict of Interest

The first author is co-author of two treatment protocols which are described in this article.

Supplemental data

Supplemental data for this article can be accessed
<https://doi.org/10.1080/10503307.2024.2375251>.

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