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published in
Psychotherapy Research
2021

DOI (link to publisher)
10.1080/10503307.2020.1852482

document version
Publisher's PDF, also known as Version of record

Psychotherapy Research

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/tpsr20

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To cite this article: David Koppers, Henricus Van, Jaap Peen & Jack J.M. Dekker (2021) Psychological symptoms, early maladaptive schemas and schema modes: predictors of the outcome of group schema therapy in patients with personality disorders, Psychotherapy Research, 31:7, 831-842, DOI: 10.1080/10503307.2020.1852482

To link to this article: https://doi.org/10.1080/10503307.2020.1852482

Psychotherapy Research, 2021
Vol. 31, No. 7, 831–842, https://doi.org/10.1080/10503307.2020.1852482

EMPIRICAL PAPER

Psychological symptoms, early maladaptive schemas and schema modes: predictors of the outcome of group schema therapy in patients with personality disorders

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(Received 28 August 2019; revised 11 November 2020; accepted 12 November 2020)

Abstract
Objective: This naturalistic study examined the outcomes of group schema therapy for patients with personality disorders (PD) and the effect of psychological symptoms, early maladaptive schemas (EMS) and schema modes on outcome.
Method: Assessments were made of 194 patients at baseline, during treatment, at treatment termination and at three-month follow-up. We used the Symptom Checklist-General Severity Index (SCL-GSI) to measure the remission-rate of global psychological distress and as a dependent variable in a multilevel model to conduct univariate and multiple variate analyses.
Results: The research sample achieved medium symptom reduction (pre–post $d = 0.65$, 95% CI [0.39–0.91]) and the remission rate was about 30% after 60 sessions. These results remained stable at three-month follow-up (pre-follow-up $d = 0.61$, 95% CI [0.29–0.94]; 28.9%). Higher baseline scores on the SCL scale interpersonal sensitivity, the EMS defectiveness/shame and all the maladaptive schema modes together predicted improvements in global psychological distress after treatment.
Conclusions: A long-term form of group schema therapy proved effective for a broad group of patients with PD. Internalizing symptoms seems predictive for improvement at outcome. Almost a third of the patients achieved remission. There is therefore room for improvement, possibly by increasing dose or intensity in combination with individual sessions.

Keywords: personality disorders; prediction; outcome research; group psychotherapy; long-term psychotherapy

Clinical and methodological significance of this article: This is the first study of the effectiveness of long-term group schema therapy in a broad sample of personality-disordered patients and the effect of clinical characteristics, psychological symptoms, early maladaptive schemas and schema modes on outcome. This study provides preliminary information about the effect of a schema group therapy in a naturalistic outpatient setting for patients with personality disorders at treatment termination and after three months, and the effect of baseline psychological symptoms, maladaptive schemas and schema modes on outcome. In addition, these findings highlight the importance of studying the treatment dosage that is most appropriate for personality disorders.

Introduction

Over the last 15 years, several psychotherapies in both group and individual formats have proven effective for borderline personality disorders (Cristea et al., 2017; McLaughlin et al., 2019). Studies of effectiveness for other personality disorders are relatively scarce (Cristea et al., 2017), even though, taken together, these disorders are more prevalent (Beckwith et al., 2014) and have a negative treatment outcome (Newton-Howes et al., 2017). Although most of the therapy formats (i.e., mentalization-based treatment; dialectic behaviour therapy and transference focused therapy) are specifically developed for borderline personality disorders, schema therapy is one of the therapies where steps are being

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taken to extend application to other personality disorders.

Schema therapy is an integrative treatment approach drawn from the cognitive behavioural learning, attachment, psychodynamic, and gestalt theory. It consists of three constructs: EMS, schema coping styles and schema modes. These constructs are developed by an interaction between temperament and traumatic events during early childhood.

An EMS is a core belief, a dysfunctional cognitive pattern relating to oneself and one's relationship with others. The development of schema coping styles is necessary to adapt to early maladaptive schemas. A schema mode is a mood state activated by life situations and the triggering of EMS. It is a constellation of several EMS, coping responses and distressed emotions (Young et al., 2003).

Studies of the effectiveness of schema therapy have described clear results for borderline personality disorders (Giesen-Bloo et al., 2006; Nadort et al., 2009) and promising results for samples of personality disorders (PD), mainly in cluster C (Bamelis et al., 2014). A short version of schema therapy in group settings with a focus on reduction of EMS with cognitive and behaviour treatment techniques for PD (Broersen & van Vreeswijk, 2012) has been repeatedly examined and found to have positive effects on global psychological distress and EMS (Koppers et al., 2019; Renner et al., 2013; van Vreeswijk et al., 2014). However, studies of long-term schema therapy have focused mainly on individual formats while, in recent years, schema therapy has also been adapted as group forms for mental health settings (Jacob & Arntz, 2013). The possible benefit is that a group may provide a curative context for effectively addressing the interpersonal problems of patients with PD. In addition, a group approach might be a cost-effective way to treat patients and shorten waiting lists because the effectiveness of the approach is similar to that of individual therapy (Burlingame et al., 2016).

Another striking issue is the scarcity of studies of the effect of comorbidity and the effect of high baseline levels of psychological symptoms, EMS and schema modes on the outcome of treatment for PD. Many patients with PD suffer from comorbid mental disorders (Farstad et al., 2016; Friborg et al., 2013; Friborg et al., 2014; Newton-Howes et al., 2017), and they have higher baseline levels of EMS (Nordahl et al., 2005) and schema modes (Bach & Farrel, 2018). Only one randomized clinical trial (RCT) has examined the effect of a comorbid major depressive disorder on treatment outcome but it looked at the effectiveness of individual schema therapy for other PD (Renner et al., 2014). It found that the comorbid group had more severe psychological distress and personality problems at baseline and poorer treatment outcome. Although several studies have found an association between a reduction in EMS and schema modes on the one hand and symptom reduction at treatment termination and at follow-up on the other (Renner et al., 2013; Schaap et al., 2016; van Vreeswijk et al., 2014), prediction outcome studies of baseline EMS and schema mode levels are scarce.

In short, effectiveness studies focus mainly on individual psychotherapy for borderline personality disorders or short-term group therapy while, in clinical practice, there is a move towards psychotherapy in long-term group formats (i.e., lasting more than one year or 50 sessions). This is in line with the definition given by Crits-Christoph and Barber (2000, p. 456). In addition, the patient population in clinical practice typically suffers from PD with comorbid mental disorders and psychological symptoms. However, it is still not known what effect comorbidity has on treatment outcome for PD.

We therefore examined the outcome and effect of comorbid psychological symptoms, EMS and schema modes in schema therapy with a long-term group: Group schema therapy (GST) for patients with PD. We examined this using a naturalistic design in order to test the effectiveness of this treatment intervention in clinical practice. The first aim was to assess the effects of GST on global psychological distress, EMS severity and schema modes at the end of treatment and three-month follow-up. Secondly, we aimed to identify predictors at baseline for treatment outcome at treatment termination and follow-up.

We hypothesized (1) that there would be large effect sizes at treatment termination and at three-month follow-up on global psychological distress, EMS severity and schema modes and (2) that high baseline scores for comorbid psychological symptoms, EMS and maladaptive schema modes should significantly predict worse outcome for global psychological distress after treatment.

Method

Study Design

The present study used an open naturalistic pre–post intervention design to determine the effectiveness of a single intervention and it was conducted in clinical practice.

Patients were recruited between May 2012 and February 2019 at the NPI Centre for Personality Disorders (NPI), a specialized service for PD treatment that is part of the Arkin Mental Health Care Institute

(ARKIN) in Amsterdam. The study was granted an exemption from the provisions of the Medical Research Involving Human Subjects Act (WMO) by the Medical Ethics Review Committee of VU University Medical Centre in Amsterdam and was approved by the ethics board of ARKIN.

Participants

Patients were referred by GPs for treatment of a PD to the NPI. The NPI has a treatment programme consisting of three treatment pathways which differ in focus, treatment dosage and duration. Each pathway consists of a number of treatment modalities.

After a clinical assessment[1] and a process of shared decision-making,[2] patients are referred to one of the modalities of these treatment pathways. The studied intervention, GST, is part of the pathway that targets structural personality change (>1 year of treatment). Our study focuses on the patients who followed the GST modality only.

The inclusion criteria for GST are: Age 18–65 years and fulfilment of the DSM-IV (American Psychiatric Association [APA], 1994) criteria for at least one PD. The diagnosis is made after a clinical assessment by a psychologist or psychiatrist. The exclusion criteria are: Severe suicidality, antisocial personality disorder, severe somatic problems/illness, acute and disruptive psychosocial problems such as homelessness, no income or high debts which dominated the PD, and inability to participate in a group due to communication problems (stuttering, deafness or language barrier). Practical factors, such as the availability of groups or the times at which the patient was available to attend therapy, were also taken into consideration.

During the study period 247 patients were selected. Nine patients (3.6%) refused to start the GST modality. We therefore included 238 (96.4%) participants. Of these participants, 32 (13.4%)—the "early completers"—decided to terminate the group therapy at 40 sessions because they were satisfied with the results and felt that they had attained an acceptable level of improvement. The other participants ($n = 206$, 86.6%)—the "completers"—decided to complete 60 sessions. We examined the effectiveness in the "early completers" and the "completers" separately since the "early completers" stopped therapy a lot (20 weeks) earlier than the "completers." We therefore excluded the "early completers" from the prediction study because the assessments from week 40 (session 40) onwards for the "early completers" and "completers" no longer matched.

Intervention

GST is a semi-structured group therapy format based on the protocol by Aalders and van Dijk (2012). It consists of 60 weekly sessions of group therapy in which patients have the option of terminating the therapy after 40 sessions depending on their therapy needs. Every session lasts 90 minutes. The protocol is a semi-open group format: After every 20 sessions, new patients join the group therapy and patients who have completed 40 or 60 sessions leave.

The programme consisted of two phases: the conceptualization phase (determining the EMS and schema modes) and the schema-change phase (challenging the EMS and schema modes with experiential and behaviour techniques). In the conceptualization phase, the patients identified their three main EMS and determined their schema modes model by discussing the results from the Young Schema Questionnaire (YSQ) and Schema Modes Inventory (SMI) through psycho-education about the schema model and by discussing the origins of the patient's EMS and schema modes. The schema-change phase consists of interventions focused on challenging and changing the EMS, schema modes and maladaptive schema behaviour into more adaptive schema behaviour patterns with cognitive modification techniques, behaviour experiments and experiential interventions. Before the start of the group therapy, the patients were invited to attend two individual introduction sessions at which the GST was explained and a final eligibility check took place. There was a group evaluation at group sessions 20 and 40, and individual evaluations were made at treatment termination and three months after the end of therapy.

During the data collection period, 30 therapists led the groups in therapist pairs. Due to staffing considerations (such as pregnancy leave), there were 26 pairs who led 31 group therapies. Twelve therapists were general mental health psychologists, 10 were clinical psychologists, one was a psychiatrist, two were psychotherapists, one was a resident psychiatrist and four were resident clinical psychologists. Twenty-six (85%) of the therapists were women and four (15%) were men. All the therapists were Dutch and the mean age of the therapists was 38 years at the start of the data collection (May 2012) and 46 years on 1 January 2020. The mean number of years working as a therapist was 9 at the start of data collection and 17 on 1 January 2020.

All therapists completed a 56-hour course in schema therapy and at least 50 hours of group supervision for schema therapy chaired by a schema therapist registered as a supervisor with the Dutch Association of Schema Therapy. In addition, all

therapists attended a weekly peer supervision session lasting one hour.

Baseline Assessments

PDs were diagnosed according to the criteria of the DSM-IV manual (APA, 1994) based on all data of the clinical assessment by a psychologist or psychiatrist. Insurance requirements meant that only patients with a confirmed DSM-IV personality disorder diagnosis (APA, 1994) could be treated in the NPI during the period under consideration.

Measures

All measurement instruments for outcome were completed by patients at baseline, at 20 weeks, at 40 weeks, at treatment termination (60 weeks) and at three months after treatment termination (three-month follow-up). The data were collected and classified by trained research assistants (master-level graduate students in clinical psychology). The following measurement instruments were used:

Symptom Checklist 90-Revised. The Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1994)—for the Dutch translation see Arrindell and Ettema (2005)—is a self-report instrument consisting of 90 items covering different psychological symptom scales. Patients rate their experience of symptoms over the previous week on a five-point Likert scale ranging from "0, not at all" to "4, extremely". The scales are: Anxiety, Phobic anxiety, Depression, Somatization, Insufficiency, Interpersonal sensitivity, Hostility, Sleep problems, and a General Severity Index (GSI) scale. This last scale is the mean for all items and measures global psychological distress (Derogatis, 1994). The instrument is well validated and internal consistency is high (Cronbach α = .82–.97). Test-retest reliability is good (Arrindell & Ettema, 1986).

Young schema questionnaire. The Young Schema Questionnaire (YSQ; Young & Brown, 1994)—for the Dutch version see Young and Pijnaker (1999)—is a 205-item self-report questionnaire covering 16 YSQ scales that is scored on a six-point Likert scale ranging from 1 (completely untrue of me) to 6 (almost always true of me). Each YSQ scale measures an early maladaptive schema (core beliefs) as defined by Young et al. (2003). These 16 early maladaptive schemas are grouped in five schema domains. Schema domain 1= Disconnection and rejection (EMS: *Abandonment/instability, Mistrust/abuse, Emotional deprivation, Social isolation* and *Social undesirability*), schema domain 2 = Impaired autonomy (*Dependency/incompetence*, *Undeveloped self/enmeshment*, *Defectiveness/shame*, and *Failure to achieve*), schema domain 3 = Impaired limits (*Entitlement* and *Insufficient self-control/discipline*), schema domain 4 = Other directedness (*Subjugation* and *Self-sacrifice*), schema domain 5 = Over-vigilance and inhibition (*Emotional inhibition*, *Unrelenting standards* and *Vulnerability to harm/illness*). The YSQ total score is the mean score of all items and measures the overall EMS severity (Young & Brown, 1994).

Research has shown that, in the Dutch version of the YSQ, internal consistency is medium to high for all schema scales. Cronbach's alpha was 0.73–0.93 (Rijkeboer & van den Bergh, 2006) and reliability was good. The squared multiple correlation was R^2 = 0.75 (Rijkeboer & van den Bergh, 2006).

Schema Mode Inventory. The Schema Mode Inventory (SMI; Lobbestael et al., 2010) is a self-report questionnaire. It contains 118 items, which can be scored on a six-point Likert scale ranging from 1 (never, almost never applicable to me) to 6 (always applicable to me). The SMI measures 14 schema modes. These modes are grouped in four domains based on the validation study by van Wijk-Herbrink et al. (2018): The internalizing modes (Vulnerable child; Punitive parent; Compliant surrender; Detached protector), the externalizing modes (Angry child; Enraged child; Undisciplined child mode; Bully and attack mode; Impulsive child mode), the overachieving modes (Demanding parent mode; Self-aggrandizer mode) and the Adaptive healthy modes (Healthy adult and Happy child). The Detached self-soother did not load on any of the domains referred to here. In the present study, we allocated the internalizing modes, externalizing modes and overachieving modes domains to the Maladaptive schema modes and the adaptive healthy modes domain to the Adaptive schema modes.

The internal consistency of the 14 subscales is acceptable (Cronbach α = 0.79–0.96). The test-retest reliability for the separate modes ranges from 0.65 to 0.92, with a mean of 0.84, indicating adequate test-retest reliability (Lobbestael et al., 2010).

Measurement Procedure

We first measured outcomes at three levels: global psychological distress (as assessed by the GSI of the SCL-90-R); overall EMS severity (according to the YSQ total score) and schema modes (according to the SMI).

Secondly, we determined treatment success with the two-step approach of Jacobson and Truax

(1991) based on pre- to post- and follow-up treatment changes on the SCL-GSI. The Reliable Clinical Index (Jacobson & Truax, 1991) was calculated first, followed by the symptom remission rate.

Statistical Analysis

Within-group effect sizes (Cohen's *d*) with 95% confidence intervals were calculated at week 60 and at three-month follow-up. These within-group effects were corrected using the correlations between the measurements (formula: Cohen's *d*/[sqrt(1-*r*)]). Paired sample *t*-tests were used to compare treatment effects for these time points with baseline. The within-group effect size calculations were based on the raw scores. We also established T scores for the SCL measurement. These T scores were calculated using the following rule of thumb:

$$T\ score = Mean\ T\ score + \left(10* \frac{(Mean\ patient - Mean\ reference\ population)}{(SD\ reference\ population)}\right)$$

Within-group effect sizes at week 60 and at three-month follow-up were also calculated for the YSQ total score, the SMI maladaptive schema modes and the adaptive schema modes.

Remission rates for the SCL-GSI were calculated on the basis of the two-step approach of Jacobson and Truax (1991). Reliable change was calculated first. Using Cronbach's alpha of .97 for the SCL-GSI, reliable change was considered to have been achieved in this study if there was a 25.4 difference on the SCL-GSI. Patients were then categorized using cut-off scores based on Lambert et al. (2008). The cut-off scores used were 57.66 for the population as a whole, 51.90 for men and 63.73 for women. Patients with reliable change and a SCL-GSI score below the cut-off score were considered to have achieved remission.

In univariate analyses, using chi-square tests and ANOVA, we looked at whether baseline characteristics were related to remission.

By using linear mixed models with the repeated outcomes on the SCL-GSI as a dependent variable, we examined which baseline subscales predicted outcome. We used mixed-model analyses to evaluate outcome measures over time in order to deal with the dependency of repeated measures within participants over time and to deal with missing data in longitudinal follow-up using the MIXED procedure of SPSS, version 26. The results of our study are therefore based on a non-imputed data set.

First, we performed three separate analyses of the subscales of the SCL (9 subscales), YSQ (5 scales) and SMI (2 scales) using linear mixed models with the repeated outcomes on the SCL-GSI as the dependent variable. These analyses were conducted with a three-level structure (repeated measures, therapist couple and patients). As there was no variation at the therapist-couple level, this level was not included in the final analyses. These analyses were performed in four steps. In the first step, we looked at whether the individual subscales had a significant effect ($p < .001$) in relation to the SCL-GSI. Those subscales which were found to be significantly related were then included in a multivariate model. In the second step, the non-significant scales were deleted one by one until only significant scales remained ($p < .001$). In the third step, we added interaction terms for the subscales with time and deleted the non-significant interactions one by one until only significant interactions remained ($p < .001$). In the fourth step, we tested whether a quadratic or cubic model performed better than the linear model by adding three- and four-way interaction terms.

Results

Description of Patient Flow Chart

All 247 patients were found to be potentially eligible and were invited for baseline assessment. Nine (3.6%) refused to start the GST and 238 (96.4%) agreed. Of these patients, 32 (13.4%)—the "early completers"—decided to terminate the group therapy after 40 sessions because they were satisfied with the results and felt that they had attained an acceptable level of improvement. We found no differences between the sociodemographic and clinical baseline variables of the "completers" and "early completers" other than a significantly larger proportion of university-educated patients in the "early completers" group ($\chi^2(3) = 8.624$, $p = 0.04$).

We analysed separately the effectiveness of this subgroup from the sample of "completers" but we excluded this subgroup from the prediction analyses of this study because the assessments of the "early completers" no longer matched those of the considerably larger group of "completers" after the assessment at 40 weeks (i.e., 40 sessions).

We were unable to determine whether there was any remission in 12 (5.8%) of the 206 "completers" (86.6%) because SCL-90 baseline measurements were missing. We therefore included 194 (94.2%) patients in the prediction study. This group will be

referred to as the research sample in the remainder of the present paper.

A total of 55 (28.4%) patients dropped out during treatment. Drop-out history was not associated with drop-out during the intervention ($\chi^2(1) = 0.188$, $p = 0.91$). The drop-outs had higher baseline scores for SCL *Hostility* ($F(1) = 5.535$, $p = 0.02$) and for SMI *Adaptive* schema modes ($F(1) = 4.919$, $p = 0.03$) than the treatment completers. There were no differences between the drop-outs and treatment completers in terms of other sociodemographic and clinical variables. Of the drop-outs, 27 (52.9%) patients dropped out early (drop-out during the first 20 sessions), 17 (33.3%) patients dropped out between session 20 and session 40, and 7 (13.7%) patients dropped out during the last 20 sessions. We had no information for four (7.3%) patients about the moment of drop-out.

GST was continued by 194 (94.2%) patients until treatment termination in line with the treatment format (60 sessions). Of these patients, 152 (78%) completed the measurements at week 20, 121 (62%) patients completed the measurements at week 40, 117 (59%) patients did so at week 60 (at treatment termination) and 76 (40%) patients did so at three-month follow-up.

Baseline Characteristics of the Research Sample

The majority of the research sample were Dutch, lived alone, had a job and were highly educated. Almost all patients had received treatment before in other mental health services and about a fifth had a history of drop-out from treatment.

Table I shows the baseline sociodemographic, clinical characteristics and severity scores.

There were 75 patients (38.7%) with more than one PD in the sample. The most common PD were Avoidant PD 49 (25%), Borderline PD 29 (15%) and Obsessive-compulsive PD 13 (7%); 94 (49%) patients had an unspecified PD.

Effectiveness of Global Psychological Distress, Early Maladaptive Schema Severity and Schema Modes

The mean scores (with standard deviations in parentheses [SD]) for global psychological distress (SCL-GSI) were 84.90 (52.99) at treatment termination and 84.82 (55.34) at three-month follow-up. The effect sizes were medium at treatment termination ($d = 0.65$, 95% CI [0.39, 0.91]) and at follow-up ($d = 0.61$, [0.29, 0.94]): the remission rates were 29.9% (35/117) and 28.9% (22/76), respectively.

According to the YSQ total score, the mean scores (SD) were 2.47 (0.59) at treatment termination and 2.44 (0.65) at three-month follow-up. The effect sizes were large ($d = 0.97$, 95% CI [0.70, 1.24]) at treatment termination and follow-up ($d = 0.99$, [0.66, 1.31]).

According to the SMI maladaptive schema modes, the mean scores (SD) were 2.43 (0.49) at treatment termination and 2.39 (0.49) at three-month follow-

Table I. Baseline characteristics of the research sample.

Baseline characteristics	Research sample	
Clinical baseline scores	*M*	*SD*
Age	37.29	9.25
SCL-90 GSI score (a)	111.20	52.84
YSQ total score	2.84	0.58
Schema modes		
SMI *maladaptive schema modes*	2.75	0.48
SMI *adaptive schema modes*	3.29	0.59
Socio-demographics	*n*	%
Gender		
Male	58	29.9
Cultural background		
Dutch	171	88.1
Non- Western	23	11.9
Marital status		
Alone	132	68.4
Married/living together	54	28.0
Divorced	7	3.6
Living situation		
Living alone	129	66.5
Living alone with children	5	2.6
Living with parent/caretaker	6	3.1
Living together	40	20.6
Living together with kids	14	7.2
Job status		
Job	128	66.0
Student	16	8.2
Sickness benefits/Social security benefits	21	10.8
Unemployed	27	13.9
Other	2	1.0
Educational level		
Low	1	0.5
Intermediate	35	18.1
High	101	52.3
University	56	29.0
Clinical characteristics		
Medication	78	40.8
Sort medication		
Antidepressiva	51	65.4
Antipsychotics	3	3.8
Benzodiazepines	4	5.1
Other mental	20	25.6
Medication somatics	9	11.5
≤1 Previous mental health care	180	92.8
Drop out history	43	25.1

Note. $N = 194$. SCL-90 GSI = Symptom Checklist-90 General Severity Index; YSQ = Young Schema Questionnaire; SMI = Schema Mode Inventory; *M* = Mean; *SD* = Standard Deviation.
a. Mean T score = 49.61, *SD* T score = 8.58.

up. The effect sizes were large ($d = 0.90$, 95% CI [0.63, 1.17] and $d = 0.91$, [0.58, 1.23], respectively).

According to the SMI adaptive schema modes, the mean scores (SD) were 3.70 (0.73) at treatment termination and 3.70 (0.73) at three-month follow-up. The effect sizes were large ($d = 1.00$, 95% CI [0.73, 1.28] and $d = 0.94$, [0.61, 1.27], respectively).

The mean scores for effectiveness in the "early completers" group for SCL-GSI were 68.30 (47.04) at treatment termination and 42.06 (26.55) at three-month follow-up. The effect sizes were large at treatment termination ($d = 1.23$, 95% CI [0.65, 0.81]) and at follow-up ($d = 2.33$, [1.43, 3.22]): the remission rates were 51.9% (14/27) and 68.8% (11/16), respectively.

The mean scores (SD) at treatment termination for the YSQ total score, SMI maladaptive and SMI adaptive schema modes were 2.21 (0.66), 2.19 (0.53) and 3.92 (0.77), respectively, and 2.07 (0.59), 2.07 (0.52) and 4.09 (0.60), respectively, at three-month follow-up. All three measurements indicated that the "early completers" improved, with very large effect sizes at treatment termination ($d = 1.79$, 95% CI [1.14, 2.43], $d = 1.79$, [1.13, 2.44] and $d = 1.46$, [0.84, 2.09], respectively) and at three-month follow-up ($d = 2.46$, 95% CI [1.57, 3.35], $d = 2.57$, [1.66, 3.48] and $d = 1.35$, [0.61, 2.10], respectively).

Association of Comorbid Psychological Symptoms, Early Maladaptive Schemas and Schema Modes with Post-treatment Remission

Univariate analysis revealed that there were no correlations between remission at treatment termination (week 60) on the one hand and demographic and clinical variables, and frequency and type of personality disorder on the other. Table II shows the univariate analysis of the prediction of the SCL, Schema domain and Schema mode scales for remission at treatment termination.

There was no association between most of the scales at baseline and remission after 60 weeks of treatment. Only the following variables were significantly associated with remission at treatment termination: Schema Domain *Impaired Autonomy* and *Adaptive* Schema modes.

Prediction of Change in Global Psychological Distress After Treatment

As explained in the Method section, the first linear mixed model analyses were conducted using a three-level structure: repeated measures, therapist couple and patients. In these analyses there was no variation at the therapist-couple level and so there was no association between the therapist couples and the dependent SCL-GSI variable.

This level was therefore not included in the subsequent analyses that were conducted to make a prediction model. Table III lists the significant subscales that predict outcome.

The most significant multivariate model included SCL *interpersonal sensitivity*, YSQ *defectiveness/shame* and *Maladaptive* schema modes. The multivariate quadratic regression analyses showed that patients with high levels of SCL i*nterpersonal sensitivity* improved significantly more in terms of global psychological distress than patients with lower SCL *interpersonal sensitivity*. This is also the case for patients with a higher baseline *defectiveness/shame* schema and higher baseline *Maladaptive* schema modes. So higher baseline scores of *interpersonal sensitivity*, early maladaptive schema *defectiveness/shame* and *Maladaptive* modes are predictors for improvement in terms of global psychological distress at treatment termination.

Discussion

As far as we know, this is the first study of the effectiveness of a long-term GST in a broad sample of personality-disordered patients and the predictive value of baseline characteristics for outcome.

We found improvement in global psychological distress, EMS severity and schema modes. The effect sizes varied from medium for global psychological distress to large for EMS severity and schema modes. Effect sizes were slightly better for EMS severity and schema modes than for global psychological distress. On the basis of earlier studies (Bamelis et al., 2014; Renner et al., 2013; van Vreeswijk et al., 2014), our first hypothesis was large effect sizes for all measures. In this sample, this was confirmed by the improvement of maladaptive schemas and schema modes. However, effect sizes were only medium for the improvement in global psychological distress, possibly because of the focus of schema therapy on EMS and schema modes (in other words, *underlying core beliefs and social functioning*) rather than psychological symptoms. Nordahl et al. (2005) found a positive relationship between severity of early maladaptive schemas and psychological symptoms. In addition, changes in all the specific early maladaptive schemas predict relief in global psychological distress as measured by the SCL-GSI post-treatment score, which is a promising finding for the examined treatment intervention in our study.

Table II. Associations of psychological symptoms, early maladaptive schemas and schema modes variables with remission at post-treatment.

Variable	Non-remission ($n = 82$)				Remission ($n = 35$)				Treatment termination Remission	
	M	*SD*	*M* (T score)	*SD* (T score)	*M*	*SD*	*M* (T score)	*SD* (T score)	*F* (df)	*p*
SCL *Anxiousness*	12.82	8.66	47.11	8.50	10.49	6.20	37.96	3.16	2.08	.15
SCL *Agoraphobia*	4.49	4.97	45.65	5.53	3.34	4.07	41.66	1.74	1.44	.23
SCL *Depression*	27.66	13.80	49.72	8.93	25.51	10.61	36.69	3.73	0.67	.41
SCL *Somatization*	11.88	9.23	48.24	8.46	9.86	7.05	40.19	3.06	1.34	.25
SCL *Insufficiency*	14.30	7.69	51.40	8.21	13.57	5.74	41.26	5.59	0.26	.61
SCL *Interpersonal Sensitivity*	22.30	14.16	49.99	7.84	19.74	9.73	40.70	3.77	0.95	.33
SCL *Hostility*	3.59	2.96	46.81	7.04	4.11	3.53	42.02	2.53	0.70	.41
SCL *Sleep*	5.09	3.79	52.45	9.63	4.74	3.59	43.45	5.41	0.21	.65
SCL *GSI*	111.91	57.59	48.82	7.82	99.66	41.09	37.21	3.10	1.30	.26
Schema domain *Disconnection/ rejection*	3.00	0.80	n/a	n/a	2.77	0.64	n/a	n/a	2.20	.14
Schema domain *Impaired Autonomy*	2.73	0.68	n/a	n/a	2.36	0.57	n/a	n/a	7.39	.01*
Schema domain *Impaired Limits*	2.72	0.70	n/a	n/a	2.55	0.51	n/a	n/a	1.60	.21
Schema domain *Other directedness*	3.25	0.74	n/a	n/a	3.08	0.65	n/a	n/a	1.36	.25
Schema domain *Over-vigilance and inhibition*	2.88	0.64	n/a	n/a	2.84	0.61	n/a	n/a	0.12	.73
YSQ total score	2.91	0.61	n/a	n/a	2.69	0.47	n/a	n/a	3.47	.07
Maladaptive schema modes	2.78	0.52	n/a	n/a	2.64	0.40	n/a	n/a	2.15	.15
Adaptive schema modes	3.18	0.53	n/a	n/a	3.42	0.57	n/a	n/a	4.58	.04*

Note. Number of non-remissions = 82, number of remissions = 35, total $N = 117$. SCL = Symptom Checklist; GSI = Global Severity Index; YSQ = Young Schema Questionaire; *M* = Mean; *SD* = Standard Deviation.
* $p < 0.05$.

Table III. Predictor for change on global psychological distress (SCL-GSI).

Variable	Estimated marginal means		95% CI		df	*t*	*p*
	M	*SE*	*LL*	*UL*			
SCL scales							
Intercept	10.99	5.86	−.54	22.51	423.71	1.87	.06
Time	5.82	1.15	3.56	8.07	533.71	5.06	<.001*
Time*Time	−.27	.06	−.38	−.16	524.35	−4.86	<.001*
SCL *Interpersonal sensitivity*	1.81	.24	1.34	2.28	379.62	7.57	<.001*
SCL *Depression*	1.38	.23	.93	1.83	215.24	6.04	<.001*
SCL *Somatization*	1.96	.31	1.35	2.58	226.02	6.27	<.001*
Time*SCL *Interpersonal sensitivity*	−.33	.04	−.42	−.24	541.45	−7.45	<.001*
Time*Time*SCL *Interpersonal sensitivity*	.01	.00	.01	.02	528.34	5.91	<.001*
Schema modes							
Intercept	−1.64	28.68	−58.11	54.82	263.20	−0.06	0.95
Time	14.94	3.74	7.58	22.28	483.52	3.99	<.001*
Time*Time	−.58	.18	−.94	−.22	475.29	−3.16	.002
Maladaptive schema modes	64.64	7.23	50.42	78.86	350.78	8.94	<.001*
Adaptive schema modes	−19.40	5.12	−29.50	−9.30	201.92	−3.79	<.001*
Time*Maladaptive schema modes	−6.08	1.34	−8.72	−3.44	483.57	−4.52	<.001*
Time*Time*Maladaptive schema modes	.22	.07	.09	.35	475.52	3.32	<.001*
YSQ scales							
Intercept	−47.28	15.50	−77.78	−16.78	296.08	−3.05	.002
Time	2.71	.88	.98	4.44	518.12	3.08	.002
YSQ scale *Social undesirability*	26.48	5.44	15.75	37.21	180.95	4.87	<.001*
YSQ scale *Defectiveness/shame*	31.43	6.22	19.18	43.68	258.06	5.05	<.001*
Time*YSQ scale *Defectiveness/shame*	−1.41	.30	−2.00	−.82	515.31	−4.71	<.001*

Note. SCL = Symptom Checklist; GSI = Global Severity Index; YSQ = Young Schema Questionnaire; *M* = Mean; *SE* = Standard Error; CI = Confidence Interval; *LL* = Lower Limit; *UL* = Upper Limit.
* $p < .001$.

The remission rate was about 30% after 60 sessions. The effectiveness and remission rates remained stable at three-month follow-up. It is interesting to note that the mixed model analyses showed that the therapist-couple level had no effect on outcome. The "early completers" improved and remitted considerably more than the "completers" did after 60 sessions. This indicates that, for them, a lower dose of 40 sessions was sufficient. We did not find a clear difference between "early completers" and "completers," indicating that it is not possible to identify them at the outset before planning treatment. However, offering an option of leaving therapy earlier could be useful in clinical practice.

A comparison of our results with the study of Lorentzen et al. (2015) of long-term psychodynamic group therapy consisting of 80 weekly sessions shows a slightly lower effect size (SCL-GSI, $d = 0.4$) two years after baseline (in other words, at treatment termination). However, Lorentzen et al. (2015) reported a higher remission rate (41.4% three years after baseline). This may be due to a positive effect on remission as a result of the higher number of sessions (80 in their case) (Stulz et al., 2013). In addition, Lorentzen's study used a higher SCL-GSI cut-off score (165 for the total sample) for remission. The cut-off score in our study was 147.66 for the total sample. Furthermore, significantly more patients in our study had previous mental health care than in the Lorentzen study.

It is noteworthy that a study by our research group (Koppers et al., 2019) of a short form of group schema therapy (20 group sessions) for PD identified improvements (SCL-GSI $d = 0.50$) and remission rates (i.e., 26%) similar to those in this study, which involved a considerably longer course of treatment (i.e., 60 sessions). However, Lorentzen et al. (2015) conducted a RCT which indicated that long-term psychodynamic group therapy reduces symptoms more effectively than short-term psychodynamic group therapy for PD.

We did not find that sociodemographic characteristics were predictive of outcome. This finding is in line with the systematic review of Barnicot et al. (2012). Neither did frequency or type of PD have any effect on psychological symptom relief at treatment termination. This finding is in line with the study of Feenstra et al. (2014), who concluded that type of personality disorder and frequency of traits were not predictive for change in psychological symptoms at treatment termination in Inpatient Psychotherapy for Adolescents.

Turning to psychological symptoms, EMS and schema modes as predictors, the results of this study rejected the second hypothesis, namely that high baseline scores of psychological symptoms, EMS and schema modes do not predict worse outcome.

We found that the schema domain *impaired autonomy* and the schema mode domain *Adaptive* schema modes predicted remission. Patients with higher baseline levels of SCL *Interpersonal sensitivity*, *Adaptive* schema modes and the EMS *Defectiveness/shame* improved in terms of global psychological distress at treatment termination.

A study by Pedersen and Karterud (2010) showed that variance on the SCL *Interpersonal sensitivity* scale was associated with traits of an avoidant PD. In this study, the SCL scales *Interpersonal sensitivity*, *Hostility* and *Paranoid ideation* accounted for interpersonal vulnerability. A study by Pedersen and Karterud (2004) showed an association between high scores for SCL *Interpersonal sensitivity* and social phobia. We have found no studies relating to the predictive value of SCL *Interpersonal sensitivity*.

A later study by Renner et al. (2013) concluded that a high baseline score for overall EMS severity is a predictor of improvement in global psychological distress at mid-treatment in short-term schema group therapy but that the predictive value did not persist until treatment termination. In our study, the predictive value of a high baseline score for overall EMS severity for remission was a trend.

A prediction study by Sunde et al. (2019) of patients with obsessive-compulsive disorders who received group psychotherapy showed that high baseline scores for overall EMS severity did not predict outcome at treatment termination. This is in line with our study, in which most of the early maladaptive schema domains had no predictive value for treatment termination with the exception of the early maladaptive schema domain Impaired autonomy. Sunde et al. (2019) found that two EMS (Dependence and Vulnerability for harm) in the Impaired autonomy schema domain had predictive value for non-recovery at extended follow-up. In another study, Renner et al. (2012) concluded that the *Impaired autonomy* schema domain was related to depressive symptom severity after 16 weeks of an outpatient treatment course for patients with major depressive disorders.

With regard to the *Defectiveness/shame* EMS, Calvete et al. (2005) showed an association between this EMS and depressive symptom severity. Bach and Farrel (2018) found that this EMS, in combination with the *Mistrust/abuse* EMS and the *Angry child*, *Impulsive child* and (low) *Happy child* schema modes, is strongly related to borderline personality disorder. They see the identification of the *Defectiveness/shame* EMS as an underlying core feature of borderline personality disorder and as a central treatment goal of schema therapy. This is a possible

explanation of the predictive value of *Defectiveness/shame* EMS for improvement after GST.

With regard to the *Adaptive* schema mode domain (*Happy child* mode and *Healthy adult* mode) as a predictor of improvement, a study by Yakın et al. (2020) showed that strengthening the *Healthy adult* is strongly associated with an improvement in PD-functioning.

Taken together, *Interpersonal sensitivity*, the *Impaired autonomy* schema domain and the *Defectiveness/shame* EMS are, in our opinion, mainly related to internalizing symptoms (depression severity, social phobia, avoidant personality problems) as defined in the DSM-IV (APA, 1994). This may indicate that the GST studied here is mostly suitable for patients with internalizing symptoms.

A major strength of this study was the strong ecological validity and generalizability to clinical practice as a result of the naturalistic clinical setting. However, the patients in our study were recruited from a specialized treatment centre for PD and generalizability to clinical practice in an ordinary outpatient mental health setting is in some respects relative. Although a RCT is the preferred choice for efficacy studies, a naturalistic study design is also valid given our research focus on effectiveness in clinical practice rather than an experimental efficacy "lab" study of the intervention (Leichsenring, 2004). In addition, a study with a high ecological validity closes the gap between the researcher and practitioner. A disadvantage of a naturalistic research design is the low internal validity, and therefore its vulnerability to the impact of unpredictable confounding factors and attrition bias (Song & Chung, 2010). In addition, the absence of randomization could result in selection bias (Deeks et al., 2003).

A second strength of this study was that it is the only study to date that has looked at long-term outpatient schema group therapy for PD, the impact of psychological symptoms, EMS and schema modes on outcome and the assessment of a three-month follow-up after treatment termination. Thirdly, we had a large sample that resulted in high power and a smaller confidence interval, and therefore in strong validity and reliability with respect to the results.

The first limitation of this study was the lack of a control group. We cannot therefore state the extent to which improvement after treatment was attributable to the schema group therapy or to natural symptom variations over time. However, it is important to bear in mind that the evaluated intervention was implemented in a complex patient population with long-standing problems. We would therefore expect improvement attributable to natural variation over time to be very limited in these patients. This was also suggested by a study of patients with a range of mental disorders in Germany and Denmark: effect sizes ranging from 0.12 to 0.19 were reported when the patients were on a waiting list (Hougaard et al., 1999; Leichsenring et al., 2005). Secondly, the diagnosis of a PD was evaluated during a regular clinical assessment and not assessed by structured clinical interviews such as the SCID-PD. However, almost all our patients had been treated unsuccessfully in the past, mainly due to presumed PD, and they had therefore been referred for treatment to specialized mental health services for PD. Thirdly, only 41% (76/184) participated in the three-month follow-up and so the outcome at follow-up should be interpreted with caution.

In conclusion, a long-term form of schema therapy in groups showed improvement in a broad group of patients with PD, in particular those with severe internalizing comorbid symptoms. However, the majority of patients did not achieve remission in global psychological distress. There is therefore room for improvement, possibly by increasing the dose or intensity (Jensen et al., 2010) in combination with individual sessions (Farrell et al., 2009). Replication studies are needed to examine the association between treatment duration and outcome of treatment modalities.

Notes

[1] The clinical assessment procedure included at least two interviews, the first to make a general evaluation of the patient's psychopathology, the "clinical anamnesis", and the second to establish a semi-structured biographical interview (i.e., covering standardised topics such as family, education and interpersonal history etc).

[2] A strategy in which the patient and therapist decide on the patient's treatment plan in consultation (Elwyn et al., 2017).

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