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RESEARCH ARTICLE

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Schema therapy for patients with borderline personality disorder and comorbid alcohol dependence: A multiple-baseline case series design study

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Abstract

This study tested the effectiveness of schema therapy (ST) for borderline personality disorder (BPD) and comorbid alcohol dependence (AD). Twenty patients participated in a case series study with multiple baselines. The baseline phase consisted of treatment as usual. It was followed by a case conceptualization phase, an experiential techniques phase and a behavioural change phase. Patients showed a significant decrease in BPD and AD symptoms; change was mainly accomplished in the experiential techniques phase, with medium to large effect sizes. Three months after termination of therapy, 68% of the patients had remitted from BPD, and the number of drinking days decreased clearly. This study shows that, although treatment is challenging in this group of patients, meaningful change can be obtained in patients with BPD and AD using ST.

KEYWORDS

addiction, alcohol dependence, personality disorder, psychotherapy, substance use disorder

1 | INTRODUCTION

Borderline personality disorder (BPD) and substance use disorder (SUD) constitute a prevalent psychiatric comorbidity (Köck & Walter, 2018; Trull et al., 2000). Prevalence rates of SUD in BPD as high as 64%–78% have been found (Tomko et al., 2014; Zanarini et al., 1998), and alcohol use disorder is the most common SUD in individuals with BPD (Gianoli et al., 2012), with life-time prevalence around 47%–52% (Barth, 2007; Guy et al., 2018). Conversely, the prevalence of BPD in people with alcohol use disorder is also substantial, with a median over studies of 21% (Verheul et al., 1995).

The prognosis of BPD is poorer for those having a comorbid SUD (Skodol et al., 2002; Zanarini et al., 2004a). BPD patients with

comorbid SUD are believed to have more psychiatric symptom severity in general and more social problems than patients suffering from only one of these two disorders (Heath et al., 2017; Links et al., 1995). Comorbid SUDs give a worse prognosis for BPD than other psychiatric comorbidities (Kienast et al., 2014; Zanarini et al., 2004a), and suffering from alcohol dependence (AD) doubles the suicide rate in BPD patients compared with BPD patients without SUD (Stone, 1993).

Three studies investigating the impact of SUD on BPD treatment are known to the authors. In a randomized controlled trial (RCT) on dialectical behaviour therapy (DBT) for BPD patients, Verheul et al. (2003) did not find differences in the effectiveness of treatment between patients with and without comorbid SUD. In this study, DBT was more effective than treatment as usual (TAU) for BPD patients

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with and without SUD in reducing severe BPD symptoms. However, DBT was no more efficacious than TAU in reducing SUD. Both DBT and TAU were not able to target SUD effectively (Gregory et al., 2008; van den Bosch et al., 2002). In a naturalistic follow-up study, alcohol abuse predicted poorer outcomes of time-limited cognitive analytic psychotherapy for BPD patients (Ryle & Golyukina, 2000). However, this finding was not replicated in a study on the prediction of treatment outcomes in schema therapy (ST) and transference-focused psychotherapy for BPD (Arntz et al., 2015).

Further, BPD hinders the treatment of SUD: In 495 heroin users enrolled in a SUD treatment programme, BPD was related to more treatment episodes, poorer global mental health, more depression, overdose, needle sharing and suicide attempts (Darke et al., 2005). This is in line with the findings on the effect of personality disorders in general on SUD treatment: SUD treatment outcomes of patients suffering from SUD and personality disorders are worse than those of patients only diagnosed with an SUD (Thomas et al., 1999; Verheul et al., 2009).

It has been suggested that personality disorders and SUD should be treated in an integrated way, because treatments focusing on only SUD or personality disorder yield limited results (Fridell & Hesse, 2006; van den Bosch & Verheul, 2007; Zanarini et al., 2004a). Several studies have been conducted into the effectivity of such a dual (targeting SUD and personality disorders) focus treatment approach. Four psychotherapeutic methods have been investigated: dynamic deconstructive psychotherapy (Gregory et al., 2008; Gregory et al., 2010), DBT-SUD (Linehan et al., 2006), mentalization-based treatment (Philips et al., 2018) and dual focus schema therapy (Ball & Young, 2000).

Dynamic deconstructive psychotherapy was tested versus TAU in a small clinical trial in patients with BPD and AD. No significant differences were found between the two treatment conditions on outcome variables, but patients in the dynamic deconstructive psychotherapy group (and not in TAU) improved significantly throughout the treatment regarding parasuicidal behaviour, alcohol misuse and care needed (Gianoli et al., 2012; Gregory et al., 2008).

In a randomized controlled study into the effectiveness of mentalization-based treatment for BPD and SUD, SUD treatment alone was compared with SUD treatment in combination with mentalization-based treatment (Philips et al., 2018). No significant differences were found between the two conditions on any outcome variable, possibly due to inadequate treatment adherence by the mentalization-based treatment therapists, high attrition of patients (48%) and low attendance at therapy sessions.

Evidence is found for the effectivity of DBT-SUD in reducing substance abuse, but DBT-SUD did not appear to be more effective in lowering the level of psychopathology or reducing inpatient treatment than TAU (Gianoli et al., 2012; Linehan et al., 2002, 1999; Verheul et al., 2009).

Ball developed dual-focus schema therapy (Ball, 1998; Ball & Young, 2000). Dual-focus schema therapy is an adapted form of ST, targeting a broad range of PDs (among them BPD) and SUD. It has been investigated in several therapy outcome studies (Ball, 2007; Ball

Key Practitioner Message

- Schema therapy decreases the symptoms of BPD and comorbid alcohol dependence.
- Change is mainly accomplished in the experiential techniques phase.
- After therapy, 68% of the patients remit from BPD.
- The number of alcohol drinking days decreases clearly in the schema therapy.

et al., 2005; Ball et al., 2011). Although therapy outcomes were initially promising (Ball, 2007), further results (Ball, 2005, 2007; Ball et al., 2011) suggest that dual-focus schema therapy is not an effective therapy for patients with SUD and PD. Lee and Arntz (2013), however, expressed criticism of the methodology of the Ball et al. (2011) study. Among other things, they stated that because of high early drop-out rates (almost 60%, most patients dropped out before session 13), most patients did not receive the core ingredients of dual-focus schema therapy. Further, the dosage of dual-focus schema therapy (24 sessions) is judged as insufficient.

Because of the positive outcomes of ST for especially BPD patients (Giesen-Bloo et al., 2006; Nadort et al., 2009) and the explanatory power of schema theory for problematic substance use (Boog et al., 2018; Boog et al., 2019), the present study was dedicated to investigating whether ST might be an effective therapy for patients with BPD and AD. Taking the studies of Ball and the criticism of Lee and Arntz as a starting point, we designed a phase 1 trial. Using a case series design, we investigated the effectiveness of individual ST that targeted both BPD and AD. We confined the scope of our study to BPD and AD to create a rather homogeneous sample and because of the high prevalence of this comorbidity and the clear effectiveness of ST for BPD.

2 | METHODS

2.1 | Participants

Twenty individuals participated. Inclusion criteria were a main diagnosis of BPD, a BPDSI-IV score higher than 20, AD as the main SUD diagnosis (both diagnoses according to DSM-IV-TR criteria; APA, 2000), Dutch literacy and IQ above 80. Exclusion criteria were ADHD (because of symptom overlap between BPD and ADHD), psychotic disorders (except short, reactive psychotic episodes, as seen in BPD), neurocognitive disorders and bipolar disorder. Further comorbid axis I and axis II disorders were allowed. Further, the use of psychotropic medication during the study was allowed. The start of psychotropic medication was not allowed during the study, nor was an increase in dose. Supervised phasing out was allowed during the study. Table 1 shows the relevant characteristics of participants at baseline.

TABLE 1 Characteristics of subject at baseline

Variable		Mean (SD)/ number (%)
Age (in years)		34.35 (6.41)
Gender	Female	15 (75%)
	Male	5 (25%)
Level of education ^a	Low	7 (35%)
	Intermediate	8 (40%)
	High	5 (25%)
Vocational status	Employed	5 (25%)
	Student	1 (5%)
	Disability	7 (35%)
	Welfare	5 (25%)
	Stay-at-home mother	2 (10%)
Marital status	Married/living together	7 (35%)
	LAT	2 (10%)
	Single	11 (55%)
Current axis I diagnosis besides alcohol dependence	None	0 (0%)
	Other SUD	11 (55%)
	Depression/dysthymia	11 (55%)
	Panic disorder	4 (20%)
	Social anxiety	6 (30%)
	Generalized anxiety	7 (35%)
	Obsessive-compulsive disorder	3 (15%)
	Post-traumatic stress disorder	5 (25%)
	Number of PD criteria met besides BPD	
Psychotropic medication	Anti-depressants	12 (60%)
	Mood stabilizers	2 (10%)
	Antipsychotics	8 (40%)
	Benzodiazepines	6 (30%)
	Other	6 (30%)
	No medication	4 (20%)

Abbreviations: BPD, borderline personality disorder; PD, personality disorder; SUD, substance use disorder.

^aLevel of education: 1 = low (Elementary to Middle school), 2 = intermediate (High school), 3 = high (College or University).

2.2 | Procedure

Patients were recruited at a large mental health care institute (Antes), which specialized in addiction treatment. Potential participants were offered a first, short appointment with a member of the research team, in order to provide information on the research. When patients agreed to participate, informed consent was obtained. Participants

then underwent a full psychological assessment (performed by an independent psychologist), in order to establish axis I and axis II diagnoses, by means of the MINI-International Neuropsychiatric Interview-PLUS (MINI) and the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders Axis II disorders (SCID II). For this full psychological assessment, a 6-week period of abstinence from abusive substances was required. This demand was made to make sure that symptoms of (personality) disorders could not be better explained as consequences of substance use. For inclusion, patients had to meet BPD criteria in the 6-week period of abstinence prior to administration. In addition, to conform with SCID II instructions, they had to meet BPD criteria in the last 5 years. BPD symptoms only occurring in episodes of substance abuse were not considered. When patients met all criteria for inclusion, additional measures were completed, and therapy was started.

Before every therapy session, an assessment was performed by a research assistant. Also, a nurse performed a urine test before or after every therapy session.

Three months after the end of the therapy, a new full psychological assessment was performed by the same psychologists who had done the first psychological assessment.

All therapy sessions were videotaped for the supervision of therapists and to enable the check of treatment integrity.

2.3 | Design

We used a non-concurrent multiple random baseline design (Carr, 2005; Kazdin, 2011). This design made it possible to control for time and nonspecific effects. The baseline phase varied from five to 14 sessions of TAU, with two patients randomly allocated to each of the 10 lengths. It was followed by phase II: 10 sessions in which a case conceptualization was made. This phase assessed nonspecific effects of attention on and exploration of personality problems. In phase III, experiential techniques were applied for 45 sessions. Experiential techniques in ST are emotion-focused techniques and form a hallmark of ST (Kellogg & Young, 2006). The techniques are applied in order to address problematic emotional states and comprise especially chair work and imagery rescripting. Phase IV consisted of 15 sessions, in which behavioural change was targeted. Phases II, III and IV formed the actual ST and together consisted of 70 sessions for every patient. A week after the last therapy session, an assessment took place, which was followed by a 3-month period of no therapy. After this period a last full psychological follow-up assessment took place.

The study protocol was approved by the ethics review board of the department of clinical psychology of the University of Amsterdam. The study was registered in the Dutch trial registry (NTR, number NTR5218).

We are not familiar with ways to perform power analysis for this design in order to estimate the desired sample size. Based on prior research into the effectiveness of ST in BPD (Giesen-Bloo et al., 2006; Nadort et al., 2009), a large effect size can be expected. As an indication, a power analysis for paired *t*-test suggests that with

a sample size of 20, the study will have 90% power to detect a large effect (Cohen's $d \geq .80$; $\alpha = .05$, two-tailed).

2.4 | Assessments

2.4.1 | Primary outcomes

The BPD checklist (Borderline Personality Disorder Checklist Short Form [BPD-CL-SF]; Wibbelink, 2018) was for the first time used as an outcome measure in the present study. It is aimed at evaluating BPD symptoms time-effectively and frequently. This instrument was derived from the BPD Checklist (Giesen-Bloo & Arntz, 2005). The BPD-CL-SF is a 10-item instrument covering the last 3 days including today. Each of the nine BPD criteria is rated on a 10-point scale ('In the last three days (including today), how much did you suffer from ...?'), in which DSM-IV BPD criterion 9 is queried by two questions (one on dissociation and the other on paranoid ideation). Cronbach's α in our sample was .84. In a mixed sample ($N = 339$), the internal consistency was excellent, Cronbach's $\alpha = .93$, while for the BPD subsample ($N = 140$), it was good, Cronbach's $\alpha = .80$. The correlation with the full-scale score was almost perfect, $r = .98$. Validity was also good, highly similar to that of the full BPD-CL. The cut-off criterion of 13.66 had a specificity of .97 and a sensitivity of 1 (Wibbelink, 2018). The BPD-CL-SF was administered at the start, every session, at the end of the therapy and at follow-up.

The BPDSI-1-week version (BPDSI-W; Arntz & Giesen-Bloo, 2009) is an adapted version of the BPDSI (Arntz & Giesen-Bloo, 1999) that is suitable for frequent administration. The questions of the BPDSI-1-week version are identical to those of the BPDSI. The BPDSI-1-week version, however, covers the last week. On an 8-point scale, specific BPD symptoms are scored (0 = did not occur in the last week, 1 = occurred 1 day in the last week, 7 = occurred daily in the last week). In the present sample, the internal consistency of the sum score (Cronbach's α) was .66 (administration: start, every fifth session, end, follow-up).

Further, patients were asked if, in the last 2 days and today, they had drunk alcohol (any alcohol [Alc] and five or more units of alcohol per day [Alc ≥ 5]) and used illicit drugs or unprescribed medication (Drugs; administration: start, every session, end, follow-up).

A visual analogue scale on craving (VAS craving) for alcohol was administered (see for example Myrick et al., 2004), comprising the day before yesterday, yesterday and today (administration: start, every session, end, follow-up).

2.4.2 | Other assessments

Urine samples were collected and were subsequently analysed in a clinical chemical laboratory, checking for alcohol and illicit drug use (administration: start, every session, end, follow-up).

Assessment of axis I diagnoses was done by means of the MINI-International Neuropsychiatric Interview-PLUS (MINI; Sheehan

et al., 1997; Sheehan et al., 1998), a structured interview for DSM-IV diagnoses. It has good sensitivity, specificity, concurrent validity, test-retest reliability and interrater reliability (Lecrubier et al., 1997; Sheehan et al., 1997, 1998) (administration: start, follow-up).

Axis II personality disorders were examined using the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders Axis II disorders (SCID II; Gibbon et al., 1997). The SCID II is a semi-structured interview for the assessment of personality disorders. Its inter-rater reliability is outstanding (Lobbestael et al., 2011), and test-retest reliability is good (Weertman et al., 2003; Zanarini et al., 2000; Zanarini & Frankenburg, 2001) (administration: start, follow-up).

In the first psychological assessment, the Borderline Personality Disorder Severity Index-IV was administered (Arntz & Giesen-Bloo, 1999; Giesen-Bloo et al., 2010). It is a semi-structured interview, covering the last 3 months, with excellent psychometric qualities (Arntz et al., 2003; Giesen-Bloo et al., 2010). It was employed to confirm the SCID II diagnosis of BPD (score > 20). Participants required a score of 20 or higher for inclusion (Giesen-Bloo et al., 2010); a score of 15 forms the cut-off between patients with BPD and non-patients (Arntz et al., 2003) (administration: start).

The Addiction Severity Index (ASI; Hendriks et al., 1989; McLellan et al., 1992) is a structured interview designed to evaluate the nature and the severity of substance use and comorbid problems. The psychometric qualities of the Dutch ASI are deemed satisfactory (Hendriks et al., 1989) (administration: start, follow-up).

The happiness item is a single question on happiness in the last months preceding assessment (Veenhoven, 2019). On a 7-point Likert scale, respondents are asked to rate their happiness from completely unhappy (1) to completely happy (7). The happiness item has good reliability and validity (Abdel-Khalek, 2006). It has been shown to be able to detect the change in BPD patients in ST (Dickhaut & Arntz, 2014) (administration: start, end, follow-up).

The World Health Organization Quality Of Life-BREF (WHOQOL-BREF; TheWhoqolGroup, 1998) is an abbreviated version of the WHOQOL, a questionnaire measuring the quality of life in the 2 weeks prior to assessment. It has good psychometric qualities (TheWhoqolGroup, 1998; Trompenaars et al., 2005) (administration: start, end, follow-up).

2.5 | Treatment protocol

To conform with prior studies (Giesen-Bloo et al., 2006; Nadort et al., 2009), therapy was individual; every therapy session lasted 45–50 min. Sessions took place twice a week.

In phase I, TAU was employed. This comprised cognitive, motivational and self-control techniques, aimed at lasting abstinence from abusive substances (based on de Wildt, 2002; de Wildt et al., 2011). For example, irrational and unhelpful beliefs regarding the use of alcohol (e.g., 'I've worked so hard on my recovery, I've deserved a beer') were challenged.

TABLE 2 Paired-samples *t*-test for the number of schema therapy techniques in different therapy phases

Phase	Mean (SD)	Phase	Mean (SD)	<i>t</i> (18)	<i>p</i>	η^2
I	11.37 (2.11)	II	15.29 (5.52)	2.72	.014	.29 ^a
I	11.47 (2.11)	III	18.50 (4.01)	6.65	<.001	.71 ^a
I	11.47 (2.11)	IV	17.03 (3.27)	7.03	<.001	.74 ^a
II	15.29 (5.52)	III	18.50 (4.01)	2.77	.013	.30 ^a
II	15.29 (5.52)	IV	17.03 (3.27)	1.04	.312	.06
III	18.50 (4.01)	IV	17.03 (3.27)	1.63	.12	.14

^aLarge effect size according to Cohen (1988).

A case conceptualization was made in phase II, based on the symptoms, biography, outcomes of the Young Schema Inventory and the Schema Mode Inventory and therapeutic interaction. For instance, in a specific case, the development of a Mistrust schema was discussed in the light of emotionally unpredictable parents early in life. Further, patient and therapist conceptualized how this mistrust led to dysfunctional coping: excessive drinking of alcohol.

In phase III, in every session, imagery rescripting or chairwork was done. Imagery rescripting and chairwork are core aspects of ST and are intended to change schemas, through experiential learning. A pre-defined sequence was installed: Two sessions of imagery rescripting were followed by two sessions of chairwork and so on. Imagery rescripting is a trauma-focused technique, in which new scripts are imagined for traumatic childhood experiences. For example, a patient who was bullied as a child imagines that his therapist enters the schoolyard and protects him from the bullies. In chairwork, the different coping styles of patients are made tangible, by putting them on different chairs. By doing so, patients will gain more control over their behaviour.

Phase IV was intended to change behaviour. Based on specific goals, patients and therapists tried to improve quality of life by changing behaviour. This was done through skill training, involving significant others and making a relapse management plan. Phase IV was partly focused on enduring abstinence. Interventions stemming from Community Reinforcement Approach (an evidence-based treatment approach for SUD; Meyers et al., 2011) were integrated in this phase.

In phases II, III and IV, therapists applied a schema therapeutic stance, in which techniques such as limited reparenting, empathic confrontation and limit setting play an important role. Abstinence from substances was an important goal in all phases.

2.6 | Therapists and treatment integrity

Therapists were all trained in ST. An ST trainer provided expert supervision once every 3 weeks, in order to monitor treatment integrity. Seventy-five randomly selected videotaped sessions (of every patient and of treatment phases I, II, III and IV) were evaluated by an independent blinded rater. The ST Therapy Adherence and Competence Scale for BPD (Giesen-Bloo et al., 2006) was used, which measures the

application of ST techniques (yes/no items) and the appropriateness and quality of interventions (visual analogue scales).

Paired-samples *t*-tests were conducted to compare the total number of ST interventions in phases I (TAU) and II, III and IV (all three ST phases). The results presented in Table 2 indicate that in phases II, III and IV, more ST techniques were applied than in phase I, supportive of the adherence of the therapists to the treatment protocol. In phase III (experiential), more ST techniques were used than in phase II (case conceptualization), suggesting that most ST techniques were applied in phase III.

2.7 | Statistical analysis

(Generalized) Linear mixed model analyses were performed using SPSS, in order to compare the means and linear change of primary outcomes in the case conceptualization phase, the experiential phase and the behavioural phase versus the TAU (baseline) phase (in line with Arntz et al., 2013, and Renner et al., 2016). Because of a very fast decline in reported symptoms, the first repeated measurements of every patient regarding some instruments were removed. This was done upon visual inspection of the scatter plot of the primary and secondary outcomes; the measurements before a clear screen were removed. This initial fast decline of symptoms was deemed a nonspecific artefact of highly frequent reporting of them, as described by Renner et al. (2016) and Longwell and Truax (2005). This artefact is possibly based on an initial overestimation of symptom severity (Renner et al., 2016). By repeatedly filling in (and reflecting on) questionnaires, a realistic, stable baseline emerges. Possibly, patients become more accurate in estimating their symptoms (Fokkema et al., 2013). The first five measurements of the BPD-CL-SF and the VAS craving were removed (administered twice a week), just as the first measurement of the BPDSI-W (administered every fifth session). The first self-report measurements of alcohol and drug use did not show a similar fast decline and were therefore not removed. Hypothetically, the absence of this artefact in self-reported use of substance was caused by the cross-checking of substance use by means of urinalysis. Data of the patient who dropped out (see Section 3.1) were included in the analyses.

The fixed part of the model comprised (1) dummy variables for the case conceptualization, experiential and behavioural phases (and

follow-up regarding the BPDSI-W), in order to contrast these with the TAU phase, and (2) linear time covariates, for each phase. These time covariates were centred within each phase and represented the change in scores during a phase (time-by-phase interaction). Time is expressed in sessions. The random model part consisted of a random intercept, in order to control for differences between individuals at baseline. Further, the random part included AR1 for the within-subject covariance structure (the covariance structure best fitting the data was identified by comparing different structures [ARMA1, AR1] regarding $-2 \log$ likelihood). Random slopes were not included, since they led to a reduced fit of the model. Because of the positive skewness of the probability distribution regarding the BPD-check, VAS craving and substance use self-report variables, a negative binomial distribution was applied for these variables.

The analysis was started by entering all the predictors. Then, the non-significant centred time variables were deleted in a backward fashion.

In order to assess effect size, Cohen's d was established for every phase as compared with baseline (TAU). Cohen's d was calculated as

the B of every phase divided by the standard deviation estimated by the residual outcome variance. This residual outcome variance is the square root of a subject-specific variance, which consists of a between-subject variance (the variance random intercept of the outcome mean per patient for every phase) + a within-subject variance (residual variance/number of measurements per phase): Cohen's $d = B/SD$, with $SD = \sqrt{(\text{VAR} [\text{random intercept}] + \text{AR1 diagonal}/\#\text{measurements})}$.

3 | RESULTS

3.1 | Patient accrual

Patient flow is displayed in Figure 1. Of 143 patients referred to the study, 55 patients were not interested in participation. Another 37 patients turned out not to be eligible for enrolment in a brief screening, mainly because there were clearly no signs of BPD or AD. Fifty-one patients underwent a full psychological assessment, of

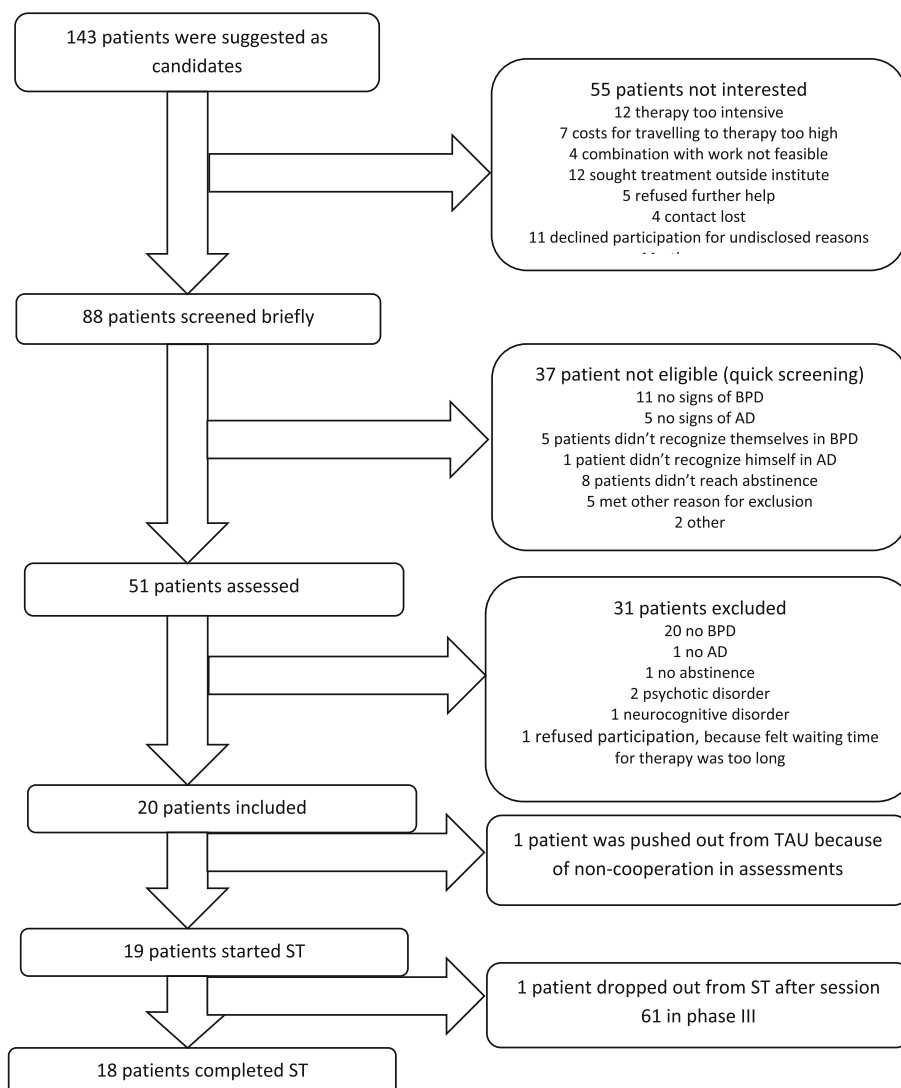


FIGURE 1 Patient flow in the case series study. AD, alcohol dependence; BPD, borderline personality disorder; ST, schema therapy SUD, substance use disorder; TAU, treatment as usual

whom 31 were excluded. In most cases, they did not reach a full BPD diagnosis. One patient was pushed out in phase I of the study (TAU) because she would not meet basic requirements (she refused to cooperate in urine testing and psychological assessments). The data of this patient were not included in the analyses. Another patient dropped out of ST in phase III, apparently due to BPD symptoms and possibly following a relapse in substance abuse. This patient was lost to assessments as well. This patient's data were included in the analyses.

3.2 | Primary outcomes

Mixed regression analysis (Table 3 and Figure 2a) of the BPDSI-W revealed the main effects of phases III, IV and follow-up to be significant (the change halfway respective phases compared with baseline). No significant effect for phase II was found. A significant time-by-phase effect was found in phase III, indicating a linear decrease in BPDSI-W scores in phase III. The effect sizes as compared with baseline were small for phase II, large for phase III (very large at the end of phase III), and very large for phase 4 and follow-up.

Regarding the BPD-CL-SF (Table 3 and Figure 2b), the main effect of phase II was non-significant, although the slope in phase II was significant, indicating a significant increase in BPD-CL-SF scores in phase II. The main effects of phases III and IV were significant, as was the time-by-phase effect for phase III, indicating a decrease in BPD-CL-SF scores. Effect sizes were marginal (phase II, although the effect size at the end of phase II was medium, indicating a clear increase in score in this phase), small (phase III, although the effect size at the end of phase III was medium) and medium (phase IV).

In the mixed regression analysis of Alc (Table 3 and Figure 2c), only phase IV had a significant main effect. The effect size of phase IV versus baseline was small. Analysis of Alc \geq 5 (Table 3 and Figure 2d) led to similar results: a significant main effect for phase IV. The effect size was in this case, however, medium.

Regarding VAS craving (Table 3 and Figure 2e), the effects of phases III and IV were significant. The slope in phase III was significant, showing a decrease in craving in phase III. The effect sizes for phases III and IV were medium; the effect size based at the end of phase III was large.

All three phases had a significant effect on Drugs (Table 3 and Figure 2f). The effect size of the reduction in the use of drugs from baseline to phase II was small; from baseline to phases III and IV, the effect sizes were medium.

3.3 | Other assessments

In Table 4, the outcomes of other assessments are presented. All these assessments took place at the start of the therapy, some at the end of therapy and all at 3-month follow-up. Of the 19 patients who underwent ST, 13 did not meet five criteria needed for a BPD diagnosis (remission) at follow-up. The average number of BPD criteria decreased. The number of drinking days (ASI) decreased too from

start to follow-up, especially drinking five or more units of alcoholic drinks. An incline in WHOQOL-BREF scores was observed for all domains, indicating improvement in quality of life. However, scores regarding physical well-being and environment went down at follow-up (but not below baseline). Patients happiness score (on a 1–7 scale) improved: from 2.9 at start (very unhappy–rather unhappy) to 3.7 at the end of therapy (rather unhappy–not unhappy/not happy), and finally to 4.1 (not unhappy/not happy–rather happy).

Further, the outcomes of the self-reported use of any quantity of alcohol (Alc: χ^2 [6] = 662.23, $p < .001$, Cramer's $V = .48$), the use of five or more units of alcohol (Alc \geq 5: χ^2 [6] = 391.52, $p < .001$, Cramer's $V = .37$) and the use of drugs (Drugs: χ^2 [6] = 63.20, $p < .001$, Cramer's $V = .36$) were significantly associated with the outcomes of urine tests (all three effect sizes large).

4 | DISCUSSION

BPD hinders the treatment of SUD. Although integrated treatment of both disorders is recommended, evidence-based treatment programmes are scarce. Therefore, we studied ST as a treatment for BPD and AD, using a multiple-baseline case series design. Mixed regression showed significant effects of experiential techniques (phase III) and behavioural change techniques (phase IV) on BPD symptoms. The improvement regarding BPD symptoms appeared to have taken place within phase III. Formulating a case conceptualization (phase II) did not improve BPD symptoms; one of the instruments used (BPD-CL-SF) even suggests a deterioration in phase II. The outcomes regarding the effect sizes of ST on BPD symptoms are somewhat contradictory: The BPD-CL-SF suggests a medium effect size, comparing the end of the therapy with baseline. The BPDSI-W suggests a very large effect size, reached at the end of phase III and maintained until follow-up at 3 months after the therapy. Regarding the SUD variables, we found a significant effect of ST on the use of alcohol and drugs and craving for alcohol, with mainly medium effect sizes. A significant change was reached in different phases for different variables (but for all variables, a significant main effect of phase IV was found). Effect size regarding heavy drinking (five or more units daily) was larger than for any drinking. All in all, most of the change in BPD and SUD symptoms seems to have occurred in phase III.

Further, 13 out of 19 (68%) patients reached remission from BPD at follow-up. The number of drinking days in the last month decreased from 17.3 to 6.2, and the number of days drinking heavily in the last month went from 16.4 to 1.8. Arguably, heavy drinking is a more relevant variable in SUD patients, because it represents the loss of control over drinking. Based on pre-therapy versus follow-up comparison, and in concordance with outcomes of the mixed regression analyses (see above), ST seemed to have a larger effect on heavy drinking than on any drinking.

Drop-out in the present study was low (5.3%). In psychotherapy research in patients with SUD and personality disorders, drop-out rates of for example 48% (Philips et al., 2018) and 58% (Ball et al., 2011) are found. Low attrition is an attribute of ST (Bamelis

TABLE 3 Mixed regression analyses of primary outcomes of schema therapy for borderline personality disorder patients and alcohol dependence

	Parameter	B	95% CI (B)	Estimated mean	95% CI estimated mean	T	df	p	d
BPDSI-W ^a	Intercept	11.99	10.34 to 13.63	11.99	10.34 to 13.63				
	II: Case conceptualization	-1.03	-2.60 to .54	10.96	9.93 to 11.45	-1.29	298.39	.197	.42
	III: Experiential	-2.59	-4.06 to -1.12	9.4	7.93 to 10.87	-3.50	107.89	.001	1.06/1.48 ^h
	IV: Behavioural change	-4.33	-6.28 to -2.39	7.66	5.71 to 9.6	-4.50	44.16	<.001	1.77
	V: Follow-up	-4.22	-6.85 to -1.60	7.77	5.14 to 10.39	-3.26	37.22	.002	1.72
	Time within Experiential	-.26	-.50 to -.01	8.23 ⁱ		-2.09	125.74	.038	
BPD-CL-SF ^{b,c}	Intercept	3.29	2.96 to 3.61	36.74	29.36 to 46.94				
	II: Case conceptualization	.017	-.17 to .20	37.20	29.93 to 47.11	.18	.334	.86	.03/.76 ^h
	III: Experiential	-.19	-.36 to -.02	32.16	26.51 to 39.74	-2.15	334	.03	.31/.57 ^h
	IV: Behavioural change	-.36	-.56 to -.17	28.62	23.70 to 35.29	-3.66	334	<.001	.60
		Time within case conceptualization	.044	.01 to .08	43.89 ⁱ		2.37	772	.02
	Time within Experiential	-.01	-.01 to .00	27.78 ⁱ		-2.64	279	.01	
Alc ^{c,d}	Intercept	-2.54	-3.36 to -1.7	.079	.04 to .18				
	II: Case conceptualization	.05	-.46 to .55	.083	.04 to .19	.17	1495	.86	.03
	III: Experiential	.05	-.34 to .44	.083	.04 to .18	.23	1495	.82	.03
	IV: Behavioural change	-.52	-1.02 to -.02	.047	.02 to .11	-2.02	1495	.04	.32
Alc ≥ 5 ^{c,e}	Intercept	-3.09	-4.00 to -2.19	.045	.018 to .112				
	II: Case conceptualization	.00	-.57 to .57	.045	.018 to .113	.00	500	.99	.001
	III: Experiential	-.30	-.76 to .15	.033	.014 to .078	-1.32	500	.19	.18
	IV: Behavioural change	-1.07	-1.72 to -.41	.016	.006 to .042	-3.17	500	.002	.63
Craving ^{f,c}	Intercept	3.77	3.30 to 4.24	43.28	27.01 to 69.34				
	II: Case conceptualization	-.34	-.67 to .01	30.97	19.87 to 48.27	-1.93	1399	.054	.38
	III: Experiential	-.48	-.77 to -.18	26.89	18.03 to 40.09	-3.18	1399	.002	.55/.86 ^h
	IV: Behavioural change	-.56	-.89 to -.22	24.85	16.18 to 38.18	-3.26	1399	.001	.65
	Time within experiential	-.012	-.02 to -.004	20.66 ⁱ		-2.81	1399	.005	
Drugs ^g	Intercept	-2.84	-3.96 to -1.71	.059	.02 to .18				
	II: Case conceptualization	-.83	-1.52 to -.14	.026	.01 to .08	-2.36	1495	.018	.41
	III: Experiential	-1.39	-1.96 to -.82	.015	.01 to .04	-4.81	1495	<.001	.68

TABLE 3 (Continued)

Parameter	B	95% CI (B)	Estimated mean	95% CI estimated mean	T	df	p	d
IV: Behavioural change	-1.06	-1.75 to -.38	.020	.01 to .07	-3.05	1495	.002	.52

Note: Time is expressed in sessions and centred within a phase.

^aBPDSI-W, Borderline Personality Disorder Severity Index-1-week version.

^bBPD-CL-SF, Borderline Personality Disorder Checklist Short Form.

^cA negative binomial distribution with a log-link was employed (using generalized linear mixed models); the betas are in the transformed dimension.

^dAlc, drinking of alcohol in the last 2 days and today.

^eAlc ≥ 5 , drinking of five or more units of alcohol per day in the last 2 days and today.

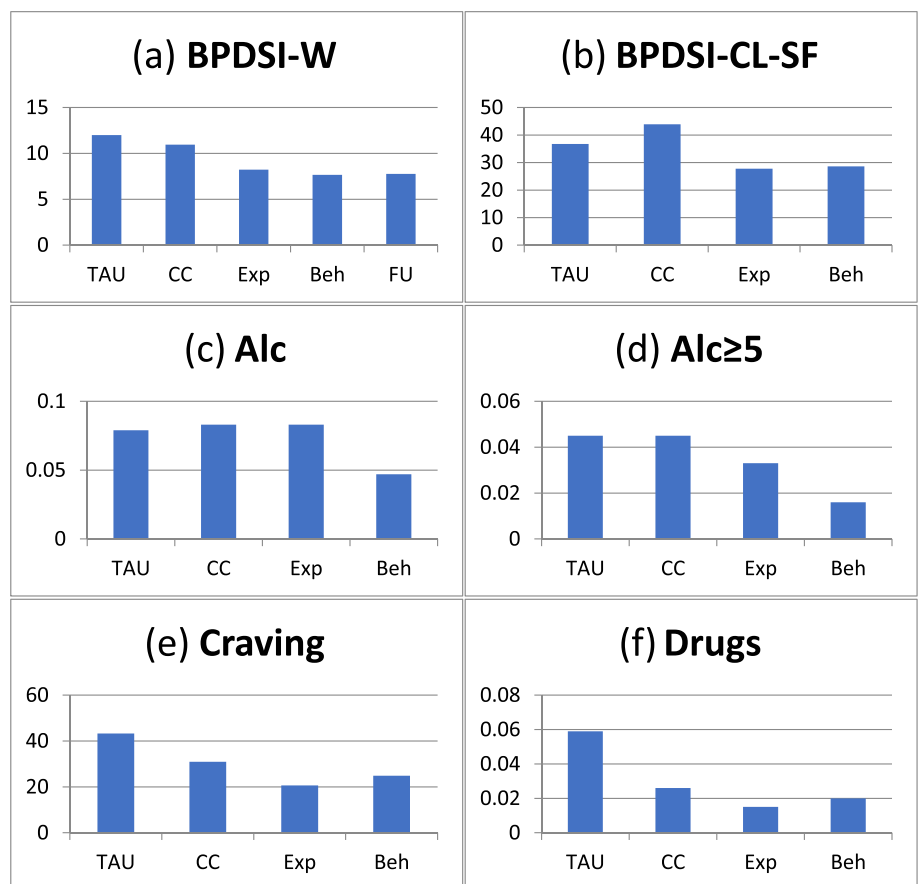
^fCraving, craving for alcohol in the last 2 days and today.

^gDrugs, use of drugs or unprescribed medication in the last 2 days and today.

^hEffect size based on end of phase.

ⁱEstimated mean at end of phase.

FIGURE 2 Estimated means per phase. Note: In case of significant slopes within a phase, the mean at the end of the phase is depicted. 2a, Mean BPDSI-W (Borderline Personality Disorder Severity Index-1 week version) score per phase. 2b, Mean BPDSI-CL-SF (Borderline Personality Disorder Severity Index Checklist Short Form) score per phase. 2c, Mean Alc (use of any alcohol, last 2 days and today) score per phase. 2d, Mean Alc ≥ 5 (use of alcohol, five or more units a day, last 2 days and today) score per phase. 2e, Mean Craving (VAS scale craving for alcohol last 2 days and today) score per phase. 2f, Mean Drugs (use of drugs, last 2 days and today) score per phase



et al., 2014; Giesen-Bloo et al., 2006), probably caused by the emphasis put on building a strong therapeutic relationship in ST (Young et al., 2003) early in therapy (Spinhoven et al., 2007).

In the present study, an unexpected decrease in BPD symptoms and craving was observed in the baseline (TAU) phase. Thereupon, the first measurements were removed from analysis. Although we cannot be sure that the decrease was not a true improvement in symptoms, it seems more likely that a measurement artefact occurred. Longwell and Truax (2005) demonstrated this artefact by experimentally investigating the re-test effect of the Beck Depression Inventory. In their

study, frequent administration with short time intervals between assessments caused a significant decrease in scores. This decrease was not witnessed in individuals who were tested less frequently. Through investigation of the nature of the changes (by relating the Beck Depression Inventory to other measures), it was concluded that the changes observed were unlikely to be the consequence of a true change. In their study, Longwell and Truax (2005) found this artefactual decrease in scores through the fifth administration, after which stabilization occurred. Renner et al. (2016) encountered this artefact in their case series study on ST for chronic depression. Moreover,

	Start	End	3-Month follow-up
# patients with BPD	19	-	6
Mean (SD) # BPD criteria met	6.9 (1.3)	-	2.6 (2.1)
Mean (SD) # drinking days last month	17.3 (13.2)	-	6.2 (7.4)
Mean (SD) # drinking days \geq 5 units last month	16.4 (13.4)	-	1.8 (3.0)
Mean (SD) WHOQOL-BREF			
Physical	11.0 (2.5)	12.5 (2.0)	11.9 (2.9)
Psychological	9.1 (1.7)	10.8 (2.6)	10.9 (2.9)
Social	9.8 (2.4)	10.2 (3.2)	11.4 (3.9)
Environment	13.0 (2.0)	13.6 (2.3)	13.4 (2.2)
General	10.7 (3.1)	11.4 (3.1)	12.1 (3.1)
Mean (SD) Happiness item ^a	2.9 (.8)	3.7 (1.2)	4.1 (1.4)

Abbreviations: BPD, borderline personality disorder; ST, schema therapy; WHOQOL-BREF, World Health Organization Quality Of Life-BREF.

^aMean (SD) in Dutch general population in 2013: 5.46 (.74) (Veenhoven, 2019).

stability regarding the dependent variable in the baseline phase of a case series design study is deemed an important requirement (Nock et al., 2007; Smith, 2012).

Regarding the discrepancy between the effect sizes of the change in BPDSI-W and BPD-CL-SF, a possible limitation of the present study is faced. Both were for the first time used as outcome instruments in the present study. We needed measures of BPD that were suitable for highly frequent administration. Both instruments were derived from validated instruments (BPDSI and BPD Checklist). The BPDSI-W and BPD-CL-SF were both administered by a trained and supervised research assistant. In the administration of the BPDSI-W, the assistants were trained to persistently explore the answers given by the patients, which increases the validity of the scores. In contrast, in the administration of the BPD-CL-SF, the first answer given by the patient was registered and no further questions were posed, which might lead to less valid scores. Moreover, previous research has shown considerably higher effect sizes on the BPDSI than on the BPD Checklist (e.g., Arntz et al., 2022). Thus, similar to what we found in the present study, the semi-structured clinical interview (BPDSI) seems to yield scores that are more precisely assessing BPD pathology and are more sensitive to change. Further, the BPDSI-W focuses on more objective manifestations of BPD. It investigated the number of times a specific BPD manifestation was exhibited. The BPD-CL-SF administers the subjective burden of BPD. The BPD-CL-SF therefore might represent a more general state of well-being. This possibly explains the higher Cronbach's α in the BPD-CL-SF as compared with Cronbach's α of the BPDSI-W (.84 vs. .66) in the present study. Possibly, the BPD-CL-SF represents a more unitary concept (general well-being), whereas the BPDSI-W represents a more multifaceted concept: the various manifestations of BPD. In short, because the BPDSI-W more specifically and directly measures the BPD concept (and the BPD-CL-SF represents the subjective burden due to BPD), the BPDSI-W possibly is a more valid measure in detecting a change in BPD manifestations.

TABLE 4 Other assessments of ST for BPD patients and alcohol dependence

Further limitations should be kept in mind while the results of this study are interpreted. First, a small percentage of the patients considered for participation was eventually included. This appeared to be mostly due to the overestimation of BPD in SUD patients who are quitting their use of substances. Comparable ratios of assessment for eligibility versus inclusion were found in prior research on psychotherapy for SUD and personality disorders (Ball et al., 2011; Gregory et al., 2008; Philips et al., 2018). Second, we did not include a control group. Although a multiple-baseline TAU phase and an explorative case conceptualization phase were included to control for time and general therapeutic factors, we cannot be sure that the effects found are caused by ST. Third, all participants were clean before the start of TAU, in order to enable a psychological assessment. We believe that sobriety is needed to differentiate between personality disorders and SUD and that being as clean as possible during therapy is important to increase psychotherapeutic outcomes. It is however possible that a sampling bias occurred, caused by this procedure.

Strengths of this study include the use of independent research assistants, supervised by an independent psychologist. Independent psychologists executed axis I and II assessments; they were supervised by an independent psychologist regarding follow-up assessments. The validity of the BPD diagnoses was further enhanced by the administration of the BPDSI at inclusion. Further, the sample size was large for this type of design. A final strength of the present study was the use of urinalyses to cross-check the self-report of the use of substances. There was a strong association between self-report and urinalysis, indicating that patients were open about relapses.

Our study is the first controlled study that offers preliminary support for the effectiveness of both SUD and personality disorder of dual-focus psychotherapy. Effect sizes were smaller (except for the BPDSI-W) than found in prior studies on ST for BPD (Giesen-Bloo et al., 2006; Nadort et al., 2009), which showed very large effect sizes. However, the treatment duration and the number of ST sessions were considerably smaller than in previous studies of ST for BPD. The

medium effect sizes regarding SUD variables might also be caused by the fact that patients were already abstinent by the start of the therapy limiting the possibility to detect large changes. The benefits of ST might be especially observed in prolonged abstinence, as personality disorders generally do not prevent sobriety in SUD patients (Cacciola et al., 1995; Cacciola et al., 1996; Verheul et al., 1999). However, continued abstinence in SUD patients with comorbid personality disorders is regarded as challenging (Verheul et al., 2009). Further, the accomplishment of medium effect sizes might be a good first step when targeting pathology that is regarded as very severe (Ryle & Golyukina, 2000; Zanarini et al., 2004b). Perhaps, ST should be provided for a longer period of time than in the present study, in order to obtain larger effects. In a substantial number of cases in the present therapy, therapists and patients deemed the therapy (80 sessions on average, of which 70 ST sessions) as too short.

As to the working mechanisms of ST in the population under investigation, we found indications for the importance of experiential techniques in the reduction of symptoms. This is in accordance with theories on ST: Persistent experiential work is regarded as crucial. Regarding the case conceptualization, no reduction in symptoms was found—there were even indications of deterioration. This deterioration is in line with schema theory (getting cognitive insight into your pathology might increase emotional pain, and therefore, symptom increase might occur), and it is in line with previous research (Weertman & Arntz, 2007). It contradicts that treatment effects were due to nonspecific factors like attention and exploration. This finding however does not imply that formulating a case conceptualization can be skipped: It is regarded as crucial for further ST. Strikingly, the improvements achieved in therapy seem to have been maintained until follow-up. This follow-up was preceded by 3 months of no support from any health care professional.

Future research should further address the effectivity of ST for BPD and AD more rigorously, applying an RCT. In addition, research is needed to find out whether ST is effective for other SUD and other personality disorders. Finally, there is the issue of dosage: It is important to find out whether longer periods of ST and more sessions yield better outcomes for BPD patients with comorbid SUD.

CONFLICT OF INTEREST

None.

ETHICAL APPROVAL

The study protocol was approved by the ethics review board of the department of clinical psychology of the University of Amsterdam. The study was registered in the Dutch trial registry (NTR, number NTR5218). When patients agreed to participate, informed consent was obtained.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, MB, upon reasonable request.

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