PREPRINT

Comparing the magnitude of improvement for patients with and without personality disorders
in open-ended psychotherapy

Magnus Nordmo¹, Jon T. Monsen¹, Per Andreas Høglend², Ole Andre Solbakken¹

¹Department of Psychology, University of Oslo, Oslo, Norway

² Institute of Clinical Medicine, Division of Mental Health and Addiction, University of Oslo,
Oslo, Norway

*Correspondence to: Nordmo Magnus, Department of Psychology, University of Oslo, P.O.

Box 1094, Blindern, 0317 Oslo, Norway. E-mail: magnus.nordmo@psykologi.uio.no

Abstract

Psychotherapy tends to produce meaningful and sustained positive changes for individuals suffering from a mental illness. A salient distinction can be made between patients with a Personality Disorder (PD) and those without. There is some evidence that patients with PD have poorer treatment outcomes, but the majority of these studies are from time-limited interventions that might be less suited for patients with PD. In contrast, the present study provided open-ended psychotherapy to a sample of patients ($N = 370$), half of which had at least one PD before treatment. The therapists received instruction to organize their treatments in cooperation with patients so that therapy was tailored to each patient's individual needs and characteristics. The results revealed that patients with a PD demonstrated equal symptomatic improvement and greater interpersonal improvement compared to patients without a PD. Similarly, observer-rated diagnostic changes were equivalent across the two groups. Both groups demonstrated enduring improvements when assessed at a two-and-half-year follow-up. The degree of personality pathology was positively related to the magnitude of change, i.e. patients with more severe personality problems demonstrated greater gains in the open-ended treatment format.

Keywords: *Personality Disorder, Open-Ended Treatment, Effectiveness*

There is a substantial literature supporting the notion that psychotherapy generally produces meaningful positive change for individuals suffering from mental illness (Dragioti et al., 2017). The majority of this literature is focused on clinical disorders such as anxiety- and mood disorders, also known as Axis I disorders in the multi-axial system of the Diagnostic and Statistical Manual IV (DSM-IV: American Psychiatric Association, 1994). Historically, there has been far less outcome research on Personality Disorders (PDs), or Axis II disorders. This has changed in recent years with a surge of interest surrounding specialized treatments for patients with PDs. Several research projects have set out to establish empirically supported treatment for PDs, mostly focusing on Borderline Personality Disorder (BPD). The main findings from this research effort are that specialized treatments are superior when compared to ill-defined treatments that involve little active therapy (Budge et al., 2013). When specialized treatments are compared to well defined and structured psychiatric care, the evidence suggests that they produce equivalent outcomes (Livesley & Larstone, 2018).

The heterogeneity found across PD diagnoses and patient cohorts represent a challenge when evaluating treatment outcomes from different treatments. While some trials are aimed at hospitalized patients with severe pathology, others are aimed at high-functioning patients treated in outpatient clinics. Also, treatments that were designed and implemented to work with BPD might not produce the same outcomes when applied to other PDs. While the specialized treatments have a natural experimental control, namely treatment-as-usual, treatment-as-usual itself has no practical control group. As has been argued elsewhere (Maat et al., 2007), long-duration treatment for patients with severe psychopathology fits poorly with the RCT mold. This is mainly because suitable experimental control is not achievable. The traditional wait-list control is often practically impossible as urgent patient needs outweigh research integrity.

The evidence from trials aimed at a particular clinical disorder which includes patients with comorbid PD, or a high degree of interpersonal problems, provides mixed results in terms of their moderating effect. Most studies find that the presence of PD, or a high degree of interpersonal problems, predicts poorer outcomes (Beard et al., 2016; Goddard et al., 2015; Haug et al., 2015; Newton-Howes et al., 2006; Porter & Chambless, 2015) while others do not (Aaronson et al., 2008; Bédard et al., 2015; Carter et al., 2013; Dreessen & Arntz, 1998; Olatunji et al., 2010). A parallel to research on treatment outcomes is treatment retention, which demonstrates the same pattern of mixed findings. Some evidence suggests that patients with more personality problems drop out of therapy more often than their peers with fewer personality problems (Cooper & Conklin, 2015), while others do not find this pattern (Kampman et al., 2008; Keijsers et al., 2001). The diverging findings are not surprising given the large heterogeneity in treatment formats and patient characteristics. Another confounding issue is the various ways of constructing and measuring PDs and interpersonal problems in general. These include self-rated questionnaires or observer-rated indexes, which measure personality problems on continuous scales, as well as dichotomous diagnostic assessment. Some of these constructs mainly focus on relating to others while others focus on problems stemming from the sense of identity and coherence (McCabe & Widiger, 2020). It is also worth noting that a large proportion of research on the treatment of clinical disorders excludes patients with a comorbid PD (Newton-Howes et al., 2006). The studies that do not are mostly based on manualized and structured interventions aimed at the symptoms of the clinical disorder. The manualized nature of these interventions might adversely affect treatment outcomes for patients who are more disturbed by problems associated with maladaptive personality traits (Owen & Hilsenroth, 2014). These patients might benefit from flexible treatments that allow the therapist to also focus on problems stemming from strongly habituated and ingrained personality problems (Solbakken et al., 2012). Indeed, several

theories of psychotherapy emphasize the importance of treatment flexibility when treating patients with a PD (Kramer, 2019; McMain et al., 2015; Werbart et al., 2019).

In sum, the majority of investigations on psychotherapeutic interventions for PD are aimed at assessing the effectiveness of specialized treatment for patients with a specific PD diagnosis, most typically BPD. However, the relatively meager research literature on PD as an outcome moderator provides mixed findings. This divergence can be attributed to the large heterogeneity in both the treatments provided and well as the PD construct itself. The present study provided predominantly open-ended psychotherapy to a sample of 351 patients, approximately half of which satisfied criteria for at least one PD. Therapists in the study received instruction to organize treatments flexibly and in cooperation with patients so that therapy could be tailored to each patient's psychopathology and personal characteristics. The goal of this paper is to examine the following research questions: 1) Does a pretreatment PD diagnosis moderate the changes seen in self-reported psychiatric symptoms, interpersonal problems, or observer-rated diagnostic changes as patients receive open-ended psychotherapy? 2) Does pretreatment PD moderate the maintenance of gains in the follow-up period? 3) Does the severity of personality problems moderate changes or maintenance of improvement?

Methods

Study Overview

We adopted treatment data collected in the Norwegian Multicenter Study of Process and Outcomes in Psychotherapy (NMSPOP). An in-depth description of the project is provided in Nordmo et al. (2020). The NMSPOP includes patients ($N = 370$) from six psychiatric clinics, one student training clinic, and one clinic specializing in somatoform disorders. Over half of the patients (59 %) included satisfy the DSM-4 (American Psychiatric Association, 1994) criteria for at least one personality disorder at treatment start. The

treatments provided in the NMSPOP trial were predominantly open-ended, i.e. therapist and patient were instructed to come to an agreement about when to terminate therapy based on the patient's individual treatment needs. No further instructions are given with regards to treatment length. However, one treatment site, treating 56 (16 %) patients, had a max duration of 40 sessions. The following exclusion criteria were applied: Age less than 20 years, active psychosis, drug/alcohol abuse as the primary problem, need for emergency treatment or hospitalization, and intellectual disability ($IQ < 70$). These criteria are in line with commonly used criteria in the evaluation of patients for individual psychotherapy at outpatient clinics. The Regional Committee for Medical Research Ethics in Eastern Norway approved the protocol for the study.

After receiving study information and signing written consent, the patients completed self-report questionnaires, as well as Structured Clinical Interview (SCID) based on the DSM IV criteria for Axis I and II disorders. Patients completed self-report questionnaires during treatment after the 3rd, 12th, and 20th session, as well every subsequent 20th session, for as long as they received therapy. Following treatment completion, patients repeated the SCID interview. Self-report questionnaires were also repeated at the posttreatment assessment. The patients were reassessed with SCID interviews and self-report questionnaires at six months, one year, and two and a half years following the posttreatment assessment.

Sample characteristics

The mean sample age was 35.2 (SD = 9.4) years with a majority of female patients (69.5 %). Patients were referred to the clinics through regular pathways, mainly from primary care services. Axis I disorders were distributed as follows: affective, 50%; anxiety, 64%; somatoform, 24%; eating-disorder, 9%; substance-related, 3%; other, 5%. In total, 86.8 % of patients had one or more Axis I disorders. Distribution of Axis II disorders were as follows:

Cluster A, 22%; Cluster B, 19%; Cluster C, 46%; Not Otherwise Specified, 2%. The mean number of pretreatment SCID II criteria of personality disorder was 12.7 (SD = 5.8).

Therapists

The therapists (n = 88) were mainly experienced clinicians with a mean of 10 years (SD = 6.5) of psychotherapy experience. They were clinical psychologists (47 %), clinical psychologist in training (18 %), psychiatrists (11 %), psychiatrists in training (2 %), physicians (7 %), physiotherapists (13 %), or social workers (2 %). The majority were female (56 %) with a mean age of 41.2 (SD = 8.6). Excluding the students, the majority of therapists had postgraduate professional training, including a mean of 5.9 years (SD = 4.3) of clinical supervision. The students received intensive supervision as part of their training. The mean number of patients per therapist was 5.6 excluding the student therapists where each student saw one patient. When asked to rate themselves on a scale from 0 (no influence) to 5 (maximum influence), the overall mean therapist ratings of self-identified theoretical orientations were: Analytic/Psychodynamic (3.4), Behavioral (1.5), Cognitive (2.4), Humanistic (2.4), System Theory (1.9) and Other (2.4). Therapists were instructed to provide their usual therapeutic practice including their preferred treatment methodology.

Assessment Instruments

We used the Symptom Checklist – 90 (SCL-90: Derogatis & Unger, 2010) to assess overall symptom presence and severity. It contains 90 questions asking patients to rate, on a Likert scale from 0 (not at all) to 4 (very much), the intensity of a given symptom during the last week. We used the Global Severity Index (GSI) as an overall symptom severity measure, which is the mean rating across the entire checklist. The SCL-90 demonstrated high internal consistency in our sample with a pretreatment Cronbach's alpha of .97. We applied the Inventory of Interpersonal Problems – 64 (IIP - 64: Horowitz et al., 1979) to assess levels of interpersonal problems. It consists of 64 questions rated on a five-point Likert scale from 0

(*not at all*) to 4 (*very much*). The first 39 questions begin with the phrase “*It is hard for me to...*” while the remaining 25 questions ask about “*Things that I do too much.*” We used the IIP global, which is the mean scores across the entire inventory. The IIP-64 demonstrated high internal consistency with a pretreatment Cronbach’s alpha of .93.

SCID Interview

The SCID interview was developed for the assessment of both Axis I Clinical Disorders (SCID I) and Axis II Personality Disorders (SCID II) according to the DSM IV (American Psychiatric Association, 1994). Each condition is associated with a set of items that assess different manifestations of the disorder. Each item can be scored as either absent, sub-threshold, true, or inadequate information to code. The items corresponding to each particular condition is then summed to assess whether the patient qualifies for a given disorder. To assess changes in diagnostic status for each Axis, we employ a dichotomy between no diagnosis (0), and one or more diagnoses present (1). In addition to the dichotomous diagnostic measure, we also utilize a continuous measure of the total amount of SCID II items that were score as true. This is a measure of overall degree of personality disorder. A sample of 40 SCID I and 20 SCID II interviews were selected at random to assess inter-rater reliability. Cohen's Kappa for Axis I disorders ranged from .53 to 1.00 with a mean of .75, indicating fair to excellent agreement. Cohen's Kappa for Axis II disorders ranged from .63 - 1.00 with a mean of .82, indicating good to excellent agreement. The coordinator at each site completed the diagnostic interviews. The coordinators did not treat patients included in this study.

Statistical Analysis

We carried out all statistical analyses using R version 3.6.2 (R Core Team, 2018). We used the lme4 package (Bates et al., 2014) to fit linear mixed models, and ggplot2 (Wickham,

2016) to make figures. We employed ggeffects (Lüdtke, 2018) to estimate marginal effects. Imputation was performed using the mice package (Buuren & Groothuis-Oudshoorn, 2011).

Longitudinal Self-Report Questionnaires

We analyzed self-report data using Multilevel Modeling (MLM) with maximum likelihood estimation and Bayesian Information Criteria (BIC) as our indicator of model fit. MLM allows for nesting measurements within individuals, sidestepping the violation of the independence assumption found in ordinary least squares regression. MLM has been shown to outperform traditional methods (e.g., last observation carried forward method) when handling missing data and accounting for potential dropout bias (Hamer & Simpson, 2009). For the treatment-phase models, we applied the session number as a fixed occasion time estimate, as this allows for between-subjects comparisons of regression coefficients. We centered treatment start at zero and coded the posttreatment assessment as the last session number from the longest treatment series, plus one, which was 361. For our follow-up models, we centered time as zero at treatment completion and used month after treatment completion as our time measure. After both visual and empirical inspection, we decided to $\log^{10}$ transform our time variable, as these models produced better fit as measured by the BIC. The superior fit of $\log^{10}$ time was true for both the treatment phase and the follow-up phase, although the magnitude of change was marginal during follow-up.

Diagnostic Changes

We used logistic regression with change in Clinical Diagnosis as our outcome variable and the presence of PD at pretreatment as a predictor. Only patients who qualified for at least one Axis I clinical diagnosis at pretreatment were included in these models (84 %). We performed two separate logistic models to assess changes seen from pretreatment to posttreatment, as well as changes from pretreatment to last follow-up measure.

Clinical Recovery and Effect Size

We used Jacobsen and Truax's (1991) criteria C as our recovery set-point. This is the halfway point between the two overlapping distributions of a pathological and a normal population sample. When a patient crosses this point, he or she is more similar to the normal population, compared to the pathological population. These cut-offs were 0.73 and 1.22 for the GSI and IIP Global, respectively. We used norm data from Vassend, Lian, & Andersen (1992) and Bjerke et al. (2011) for each respective outcome measure.

We estimated effect size with Cohens d using estimated scores as produced the respective MLM's. This entails subtracting the estimated post scores from the pre scores and dividing this number with the SD of estimated scores across all time points for each respective outcome questionnaire. Similarly, the follow-up changes were calculated using the predicted scores at a two-and-a-half-year follow-up minus the predicted posttreatment scores. These measures were further split into separate analyses of PD and no PD.

Results

Patient Flow and Data Completeness

Out of the original sample of 370 patients, nineteen did not take any self-report assessment following the pretreatment assessment or were not served a pretreatment SCID interview, resulting in a sample of 351 in the main outcome analyses. See Nordmo et al. (2020) for further information on patient attrition. When analyzing diagnostic follow-up data, the last available assessment was used. A few patients had a last measurement six years ($n = 23$) after treatment, while the majority of the patients had follow-up assessments approximately two and a half years after treatment completion (Mean = 28.1 months, SD = 8.6). A total of 52 (14.1 %) patients had no follow-up measurement of main outcomes while 102 (29 %) patients had no diagnostic follow-up assessment.

To account for missing data, we used a Multiple Imputation by Chained Equation (MICE) analysis. MICE entails running a series of regression models where each variable

with missing data is modeled conditional upon the other variables in the dataset. The MICE algorithm cycles through different imputed values for each variable, according to Rubin's (1976) rules, and converges on the best fitting parameters (van Ginkel et al., 2019). Missing data were imputed based on symptom severity (GSI), interpersonal problems (IIP-Global), number of positive SCID 2 Personality Disorder items, and presence of personality disorder, all measured pretreatment. Ten multiply imputed datasets were utilized. Using a complete dataset, we reanalyzed all hypotheses and found that none of our results or conclusions were significantly affected.

Treatment Utilization

We found that patients varied considerably in terms of treatment length as defined as the number of therapy sessions. The mean therapy length was 51.3 sessions (SD = 58.9). For patients without a PD the mean was 39.5 (SD = 37.8, Median = 34) while patients with a PD had a mean of 62.79 (SD = 70.2, Median = 40). The differences between treatment utilization was statistically significant, $t(316.14) = 3.99, p < .001$

Self-Report Measures

Table 1 shows the total sample and subgroups pretreatment levels of symptoms and interpersonal problems. See Table 2 for statistical models and corresponding coefficients for the self-reported outcome measures, as well as the impact of PD status. The presence of personality disorder had a statistically significant main effect on both outcome measures, demonstrating that patients with PD experience more symptomatic distress, as well as interpersonal problems at pretreatment. When assessing both time and PD status in interaction we found a statistically significant effect on IIP Global, but not on GSI. See Figure 1 for a violin plot of predicted effects. The follow-up models revealed a further statistically significant decrease in the IIP Global, but not the GSI. However, there was no interaction effect of time and PD in either outcome measure for the follow-up phase. Table 3 shows the

effect sizes comparing pre- and posttreatment estimated scores and Table 4 shows the improvements in terms of clinically significant change. For the patients that did not provide any follow-up measure, we utilized the posttreatment measure.

Table 1: GSI and IIP-Global Means (Standard Deviation)

	Pretreatment			Posttreatment			Follow-Up		
	GSI	IIP-G	N	GSI	IIP-G	N	GSI	IIP-G	N
Total Sample	1.3 (.65)	1.5 (.52)	351	0.8 (.65)	1.17 (.58)	350	0.8 (.63)	1.1 (.58)	314
No PD	1.1 (.51)	1.3 (.49)	150	0.6 (.57)	1.0 (.54)	152	0.6 (.51)	0.9 (.54)	141
PD	1.5 (.68)	1.7 (.48)	201	0.9 (.68)	1.3 (.59)	198	0.93 (.68)	1.3 (.57)	173
PD Subgroups									
Avoidant	1.7 (.75)	1.9 (.41)	96	1.1 (.70)	1.4 (.59)	95	1.5 (.73)	1.4 (.58)	78
Obsessive-Compulsive	1.8 (.71)	1.7 (.59)	52	1.2 (.74)	1.4 (.58)	52	1.0 (.58)	1.3 (.56)	42
Paranoid	1.7 (.71)	1.8 (.55)	43	1.2 (.82)	1.4 (.61)	43	1.1 (.76)	1.2 (.56)	37
Borderline	1.9 (.75)	1.9 (.52)	32	1.3 (.82)	1.4 (.58)	32	1.2 (.86)	1.3 (.59)	22
Antisocial	1.7 (.70)	1.7 (.48)	28	1.3 (.86)	1.5 (.60)	28	1.1 (.89)	1.2 (.71)	20
Dependent	1.9 (.65)	1.9 (.41)	20	1.3 (.71)	1.6 (.43)	20	1.1 (.69)	1.4 (.51)	15
Schizoid	1.9 (.79)	2.1 (.49)	8	1.3 (.76)	1.7 (.73)	8	1.4 (.96)	1.5 (.73)	6
Schizotypal	2.1 (.29)	2.1 (.41)	6	0.8 (.55)	1.1 (.63)	6	0.7 (.55)	1.1 (.27)	4
NOS	1.2 (.38)	1.6 (.67)	6	0.4 (.15)	0.9 (.34)	6	0.4 (.28)	0.9 (.35)	6
Histrionic	1.4	2.3	1	1.1	1.7	1	1.0	1.5	1

Note: PD Subgroups grouped by status attained at pretreatment. Patients can qualify for multiple PD's.

The magnitude of improvement was positively correlated with the number of SCID 2 criteria, indicating that patients with more personality pathology experienced larger changes during treatment (see Table 2). The amount SCID 2 criteria did not moderate the change seen in the follow-up period indicating that the degree of personality pathology pre-treatment did not predict later relapse rates. See Figure 2 for a plot of predicted effects.

Table 2: GSI & IIP Global Development with Pretreatment PD Status Interaction

	Treatment Phase Models					
	GSI			IIP Global		
	Estimate	Std.Error	<i>p</i>	Estimate	Std.Error	<i>p</i>
Intercept	1.04	.05	< .001	1.20	.04	< .001
Time	-0.15	.02	< .001	-0.80	.02	< .001
PD	0.50	.07	< .001	0.46	.05	< .001
Time*PD	-0.06	.03	.06	-0.06	.02	.018
	Follow-Up Phase Models					
	Estimate	Std.Error	<i>p</i>	Estimate	Std.Error	<i>p</i>
	Estimate	Std.Error	<i>p</i>	Estimate	Std.Error	<i>p</i>
Intercept	.64	.05	< .001	1.03	.05	< .001
Time	-0.02	.03	.36	-0.06	.02	.016
PD	0.31	.07	< .001	0.28	.06	< .001
Time*PD	0.03	.04	.47	0.03	.03	.32

Note: Reference category: No personality disorder. Pretreatment and posttreatment time fixed to zero and log10(361) respectively. Follow-up model use post measure as zero and log10(month-after-treatment).

Table 2: GSI & IIP Global Development with SCID 2 Items Interaction

	Treatment Phase Models					
	GSI			IIP Global		
	Estimate	Std.Error	<i>p</i>	Estimate	Std.Error	<i>p</i>
Intercept	0.78	.05	< .001	1.02	.04	< .001
Time	-0.12	.02	< .001	-0.05	.02	< .001
SCID 2 Items	0.04	.002	< .001	0.03	.002	< .001
Time*SCID2 Items	-0.01	.001	< .001	-0.005	.001	<.001
	Follow-Up Phase Models					
	Estimate	Std.Error	<i>p</i>	Estimate	Std.Error	<i>p</i>
Intercept	.49	.06	< .001	0.92	.05	< .001
Time	0.002	.03	.96	-0.04	.03	.14
SCID2 Items	0.02	0.003	< .001	0.02	.003	< .001
Time*SCID2 Items	0.001	0.002	.65	-0.001	.002	.84

Note: Reference category: Zero SCID2 items. Pretreatment and posttreatment time fixed to zero and log10(361) respectively. Follow-up model use post measure as zero and log10(month-after-treatment).

Figure 1: Violin Plot of Predicted Marginal Effects

Figure 2: Predicted GSI and IIP Global as a Function of Time*SCID2 Item Interaction

Table 3: Effect Sizes of Estimated Values

	GSI				IIP Global			
	Pre/Post		Post/Follow-Up		Pre/Post		Post/Follow-Up	
	Difference	Cohen's <i>d</i>	Difference	Cohen's <i>d</i>	Difference	Cohen's <i>d</i>	Difference	Cohen's <i>d</i>
No PD	.42	.96	.06	.13	.24	.53	0.10	.24
PD	.56	.97	-.003	-.006	.37	.78	.04	.09
SCID II								
0	.31	.53	.002	.004	.16	.30	.06	.12
10	.45	.77	.02	.02	.27	.54	.07	.13
20	.60	1.01	.03	.05	.39	.77	.07	.13
30	.74	1.25	.04	.07	.51	1.00	.08	.14

Note: Cohen's *d* calculated using differences in estimated scores / the SD of estimated scores across all timepoints.

Table 4: Clinically significant change

Measures and status	Number and Percentages of Patients			
	Pretreatment to termination of treatment		Pretreatment to two-year follow-up	
	No PD *	PD **	No PD *	PD **
Global Severity Index (SCL-90)				
Recovered	81 (54 %)	61 (30 %)	72 (48 %)	61 (30 %)
Improved	28 (19 %)	81 (39 %)	23 (14 %)	55 (27 %)
Unchanged	39 (26 %)	60 (29 %)	52 (36 %)	79 (40 %)
Deteriorated	2 (1 %)	3 (1 %)	3 (2 %)	6 (3 %)
IIP Global (IIP-64)				
Recovered	37 (24 %)	48 (23 %)	42 (28 %)	53 (26 %)
Improved	10 (7 %)	29 (14 %)	9 (6 %)	34 (17 %)
Unchanged	98 (65 %)	126 (61 %)	95 (63 %)	109 (54 %)
Deteriorated	5 (4 %)	3 (1 %)	4 (3 %)	5 (2 %)

Note:

* Percentage from no PD sample (n = 150)

** Percentage from PD sample (n = 201)

Changes in Observer Rated Clinical Disorders

The logistic regression model for the odds of losing clinical diagnosis as predicted by PD status at pretreatment was not significant (OR = 1.5, CI = 0.9 | 2.52, $p = .11$), indicating no difference in the degree of Axis I diagnostic improvement between patients with and without a PD. In contrast, we found that PD status at pretreatment did predict a statistically significant decrease in the likelihood of losing the clinical diagnosis from pretreatment to follow-up (OR = 2.17, CI = 1.22 | 3.84, $p = .007$), i.e. that patients with a personality disorder were about half as likely to have lost their co-morbid Axis-I clinical disorder at the last follow-up. For the 201 patients with a PD at pretreatment, only 73 patients (36 %) qualified

for one or more PDs at posttreatment. Of the 163 PD-at-pretreatment patients who were diagnostically assessed at follow-up, only eight (5 %) qualified for one or more PDs. A Chi-Square analysis of reduction in Axis-I Diagnoses from pre- to posttreatment revealed no statistically significant change between the PD and no PD group, $\chi^2(1, N = 809) = .17, p = .68$. Please see Table 5 & Table 6 for a detailed description of diagnostic changes.

Table 5: Summary of Diagnostic Changes

	PD Subsample						Clinical Disorder Subsample					
	Pretreatment		Posttreatment		Follow-Up		Pretreatment		Posttreatment		Follow-Up	
	N	%	N	%	N	%	N	%	N	%	N	%
N Patients / % of total pretreatment sample ¹	175	48 %	136	34 %	125	34 %	193	52 %	162	44 %	136	37 %
Missing diagnostic data	0		39	11 %	50	14 %	0		31	8 %	57	15 %
Number of Diagnoses / Mean sum diagnosis per patient	N	M	N	M	N	M	N	M	N	M	N	M
Mood Disorders ²	119	0.7	34	0.3	24	0.2	92	0.5	22	0.1	14	0.1
Anxiety Disorders ²	279	1.6	71	0.5	58	0.5	141	0.7	40	0.2	28	0.2
Somatoform Disorders ²	57	0.3	10	0.1	10	0.1	61	0.3	17	0.1	13	0.1
Eating Disorders ²	20	0.1	6	0.0	3	0.0	12	0.1	4	0.0	2	0.0
Substance-Use Disorders ²	7	0.0	2	0.0	3	0.0	2	0.0	2	0.0	2	0.0
Adjustment Disorder ²	2	0.0	1	0.0	1	0.0	12	0.1	3	0.0	0	0.0
Others ²	1	0.0	1	0.0	0	0.0	4	0.0	1	0.0	1	0.0
Sum diagnoses Axis-I	485		125		99		324		89		60	
Sum patients with Axis-I diagnoses ²	160	91 %	65	52 %	58	46 %	168	87 %	56	35 %	37	27 %
Sum patients without Axis-I diagnoses ²	15	9 %	71	57 %	67	54 %	25	13 %	106	65 %	99	73 %
Cohen's d ³			1.07		1.14				0.65		0.71	

Note: ¹ Percentage of inclusive pretreatment sample (N=368). ² Mean values based on sample size within each occasion (Pretreatment N=175 /193, Posttreatment N= 136 / 162, Follow-Up N= 125 / 136). ³Cohen's *d* calculated by (Mean-Pre – Mean-Post)/ SD pooled.

Patients with Mood disorder diagnoses	101	58 %	30	22 %	20	16 %	83	43 %	12	7 %	13	10 %
Patients with Anxiety diagnoses	134	77 %	44	32 %	45	36 %	99	51 %	33	20 %	20	15 %

Patients with Somatoform Diagnoses	37	21 %	6	4 %	10	8 %	52	27 %	15	9 %	10	7 %
Patients with Eating Diagnoses	20	11 %	6	4 %	3	2 %	11	6 %	4	2 %	2	1 %
Patients with Substance use diagnoses	7	4 %	2	1 %	3	2 %	2	1 %	2	1 %	2	1 %
Patients with Adjustment Disorder	2	1 %	1	1 %	1	1 %	12	6 %	3	2 %	0	0 %
Other	1	1 %	1	1 %	0	0 %	4	2 %	1	1 %	1	1 %
<hr/>												
Total sum Patients with Axis I - Diagnoses	160	91 %	65	48 %	58	46 %	168	87 %	56	35 %	37	27 %
Sum patients without Axis -I Diagnoses	15	9 %	71	52 %	67	54 %	25	13 %	106	65 %	99	73 %
Mean Comorbidity Axis-I (Effect size)	2.8	(2.1)	0.9	(1.3)	0.8		1.7		0.6		0.4	
SD (both groups)	2.06		1.29		1.19		1.17		0.93		0.85	
Min-Max Comorbidity	0-10		0-7		0-8		0-5		0-5		0-5	

Table 6: Diagnostic Changes Grouped by Clusters

		PD-subsample						Clinical Disorder Subsample					
		Pretreatment		Posttreatment		Follow-Up		Pretreatment		Posttreatment		Follow-Up	
		N	%	N	%	N	%	N	%	N	%	N	%
N Patients / % of total pretreatment sample ¹		175	48 %	137	37 %	126	34 %	193	52 %	162	44 %	139	38 %
Missing diagnostic data ¹		0		38	10 %	49	13 %	0		31	8 %	52	14 %
Cluster													
A	Paranoid ²	46	26 %	14	10 %	5	4 %	0		1	1 %	3	2 %
	Schizoid ²	8	5 %	5	4 %	3	2 %	0		0	0 %	0	0 %
	Schizotypal ²	6	3 %	5	4 %	0	0 %	0		0	0 %	1	1 %
Cluster													
B	Antisocial ²	9	5 %	2	1 %	3	2 %	0		0	0 %	0	0 %
	Borderline ²	32	18 %	7	5 %	5	4 %	0		1	1 %	1	1 %
	Histrionic ²	1	1 %	0	0 %	1	1 %	0		0	0 %	0	0 %
	Narcissistic ²	1	1 %	0	0 %	0	0 %	0		1	1 %	0	0 %
Cluster													
C	Avoidant ²	98	56 %	36	26 %	23	18 %	0		7	4 %	4	3 %
	Dependent ²	21	12 %	4	3 %	1	1 %	0		0	0 %	0	0 %
	Obsessive compulsive ²	54	31 %	12	9 %	7	6 %	0		3	2 %	2	1 %
	PD NOS ²	7	4 %	4	3 %	1	1 %	0		2	1 %	2	1 %
Sum PD diagnoses		283		89		49		0		15		13	
Sum patients with PD diagnosis ²		175	100 %	59	43 %	34	27 %	0		12	7 %	10	7 %
PD comorbidity mean		1.6		1.51		1.44				1.3		1.3	

Note: ¹ Percentage of inclusive pretreatment sample (N=368). ² Percentage of sample size within each occasion (Pretreatment N=175 /193, Posttreatment N= 137 / 162, Follow-Up N= 126 / 139).

Discussion

Our results reveal that patients with a PD experience more extensive psychological problems but receive equal or greater symptomatic benefit from open-ended psychotherapy, compared to patients without PD. We also found that patients with PD have a higher magnitude of improvement in interpersonal problems. However, it may be that this differential effect comes about due to the no PD group reporting relatively little interpersonal problems at pretreatment, thus having modest potential for change. When assessed as a continuous measure of personality pathology, we found that personality problems were positively related to the magnitude of change. Both the PD and no PD groups demonstrated enduring improvements when assessed at a two-and-half-year follow-up. However, patients with a PD at pretreatment were more likely to relapse and regain their clinical disorder during follow-up.

It seems plausible that the overall equivalence of outcomes between the two groups is related to the open-ended aspect of the treatment. Support for this notion comes from the observation that patients with a PD utilize significantly more therapy and the positive relationship between the magnitude of improvement and degree of personality pathology at pretreatment. Patients with a PD might require more sessions due to difficulties establishing and maintaining a working alliance (Lingiardi et al., 2005) or that the therapeutic processes that are associated with the treatment of PD patients requires more sessions. There is evidence suggesting that treating interpersonal problems require longer treatments when compared to non-relational psychiatric symptoms (Hansen et al., 2006). The open-ended nature of therapy might be positive for patients with PD as it allows for the flexible treatment of dysfunctional patterns of interpersonal behavior. This is in contrast to inflexible policies on treatment length that might not have facilitated this change. Further evidence for this proposition is found in the many time-limited interventions which show that patients with more severe interpersonal

problems or a PD diagnosis, attain less benefit from treatment (Beard et al., 2016; Goddard et al., 2015; Haug et al., 2015; Porter & Chambless, 2015). The few studies that do not find this effect still report lower rates of acceptability or completion for PD patients (Aaronson et al., 2008; Bédard et al., 2015). It should also be noted that despite open-ended treatment, patients with PD were more likely to regain their clinical disorder during the follow-up period. This indicates that open-ended treatment should not be regarded as a magic bullet against failure to retain treatment gains. Similarly, many patients do not reliably improve, despite long treatments.

The similarity of treatment effects between the PD and no PD groups stands in stark contrast to the differences in baseline problems. There are substantial differences between the two groups, which appear persistent throughout both the treatment and the follow-up phase. Although patients with a PD experience the same or larger benefit from therapy compared to patients without a PD, they still experience a substantial amount of interpersonal problems and psychiatric symptoms posttreatment. It appears that the PD-patients in our sample ended treatment with approximately the same level of psychiatric problems that the no PD patients demonstrated before entering treatment. There seems to be some discrepancy between self-rated symptomatic and interpersonal problems and observer-rated diagnostic assessments, as only a small fraction of initial PD patients maintained their PD diagnosis at follow-up. This is in line with evidence indicating that clinicians and third-party observers are more outcome optimistic compared with the patients themselves (Cuijpers et al., 2010; Horvath, 2013). We cannot rule out the possibility of a positive expectancy bias influencing our evaluators as we did not blind them with respect to the patient's status as either pre- or posttreatment, or follow-up.

When contrasting the PD and no PD subgroups in terms of effect size it is apparent that the PD subgroup demonstrates more total change, but also more subsample variability which

lowers their overall Cohens d . This was especially pronounced for raw GSI scores with standard deviations differing by .17 between the PD and No PD subsample. Overall, we caution effect size comparisons between specialized interventions for a particular disorder and treatment studies with a highly heterogeneous patient population, such as this one.

Some limitations should be noted. Firstly, our tentative conclusions regarding the benefits of open-ended treatment should be weighed against the limits in our methodology. An RCT comparing PD patients in a time-limited versus open-ended format is required for a definitive conclusion. Based on the current study, we cannot provide evidence that it was the open-ended and flexible nature and not some other causal force, that was responsible for the equivalence between the two groups. Secondly, our patients were not randomly selected for participation in the NMSPOP trial. Rather, a designated coordinator at each treatment site was responsible for selecting patients as randomly as possible, while ensuring that the sample was both heterogeneous and included patients with a diagnosed personality disorder. This might have resulted in unwanted selection bias. Also, we did not monitor the treatment provided by the therapists. This precludes us from analyzing treatment effects against the actual moment-to-moment treatment provided. Lastly, there was some dropout throughout the different phases, particularly missing follow-up measures. Although repeated analyses on the imputed dataset provided similar results, we cannot completely exclude the possibility that this dropout biases our conclusions. Conversely, several features of this current study should be noted as strengths. This is a highly representative patient sample from routine outpatient clinics. They reflect the large heterogeneity in this population including both mild and severe conditions. We believe that this feature entails a high degree of ecological validity. Also, we do not limit our assessment to traditional self-assessment but also include observer-rated assessments. Our overall conclusion is that patients with a PD demonstrate equal or superior treatment outcomes, compared with no PD patients, when given open-ended treatment. The

causal relationship between treatment length flexibility and patient characteristics such as PD status should be further explored with focused and experimental investigations.

References

- Aaronson, C. J., Shear, M. K., Goetz, R. R., Allen, L. B., Barlow, D. H., White, K. S., Ray, S., Money, R., Saksa, J. R., & Woods, S. W. (2008). Predictors and Time Course of Response Among Panic Disorder Patients Treated With Cognitive-Behavioral Therapy. *The Journal of Clinical Psychiatry*, 69(3), 418–424.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders: DSM-IV* (4th ed.). Author.
- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2014). Fitting linear mixed-effects models using lme4. *ArXiv Preprint ArXiv:1406.5823*.
- Beard, C., Stein, A. T., Hearon, B. A., Lee, J., Hsu, K. J., & Björgvinsson, T. (2016). Predictors of Depression Treatment Response in an Intensive CBT Partial Hospital. *Journal of Clinical Psychology*, 72(4), 297–310. <https://doi.org/10.1002/jclp.22269>
- Bédard, M., Russell, J. J., & Myhr, G. (2015). Impact of personality psychopathology on outcome in short-term cognitive-behavioral therapy for Axis I disorders. *Psychiatry Research*, 230(2), 524–530. <https://doi.org/10.1016/j.psychres.2015.09.049>
- Bjerke, E., Hansen, R. S., Solbakken, O. A., & Monsen, J. T. (2011). Interpersonal problems among 988 Norwegian psychiatric outpatients. A study of pretreatment self-reports. *Comprehensive Psychiatry*, 52(3), 273–279. <https://doi.org/10.1016/j.comppsy.2010.07.004>
- Budge, S. L., Moore, J. T., Del Re, A. C., Wampold, B. E., Baardseth, T. P., & Nienhuis, J. B. (2013). The effectiveness of evidence-based treatments for personality disorders when comparing treatment-as-usual and bona fide treatments. *Clinical Psychology Review*, 33(8), 1057–1066. <https://doi.org/10.1016/j.cpr.2013.08.003>

- Buuren, S. van, & Groothuis-Oudshoorn, K. (2011). **mice**: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*, 45(3).
<https://doi.org/10.18637/jss.v045.i03>
- Carter, J. D., McIntosh, V. V., Jordan, J., Porter, R. J., Frampton, C. M., & Joyce, P. R. (2013). Psychotherapy for depression: A randomized clinical trial comparing schema therapy and cognitive behavior therapy. *Journal of Affective Disorders*, 151(2), 500–505. <https://doi.org/10.1016/j.jad.2013.06.034>
- Cooper, A. A., & Conklin, L. R. (2015). Dropout from individual psychotherapy for major depression: A meta-analysis of randomized clinical trials. *Clinical Psychology Review*, 40, 57–65. <https://doi.org/10.1016/j.cpr.2015.05.001>
- Cuijpers, P., Li, J., Hofmann, S. G., & Andersson, G. (2010). Self-reported versus clinician-rated symptoms of depression as outcome measures in psychotherapy research on depression: A meta-analysis. *Clinical Psychology Review*, 30(6), 768–778.
<https://doi.org/10.1016/j.cpr.2010.06.001>
- Derogatis, L. R., & Unger, R. (2010). Symptom Checklist-90-Revised. In I. B. Weiner & W. E. Craighead (Eds.), *The Corsini Encyclopedia of Psychology*. John Wiley & Sons, Inc. <https://doi.org/10.1002/9780470479216.corpsy0970>
- Dragioti, E., Karathanos, V., Gerdle, B., & Evangelou, E. (2017). Does psychotherapy work? An umbrella review of meta-analyses of randomized controlled trials. *Acta Psychiatrica Scandinavica*, 136(3), 236–246. <https://doi.org/10.1111/acps.12713>
- Dreessen, L., & Arntz, A. (1998). The impact of personality disorders on treatment outcome of anxiety disorders: Best-evidence synthesis. *Behaviour Research and Therapy*, 36(5), 483–504. [https://doi.org/10.1016/S0005-7967\(98\)00026-6](https://doi.org/10.1016/S0005-7967(98)00026-6)

- Goddard, E., Wingrove, J., & Moran, P. (2015). The impact of comorbid personality difficulties on response to IAPT treatment for depression and anxiety. *Behaviour Research and Therapy*, 73, 1–7. <https://doi.org/10.1016/j.brat.2015.07.006>
- Hamer, R. M., & Simpson, P. M. (2009). Last Observation Carried Forward Versus Mixed Models in the Analysis of Psychiatric Clinical Trials. *American Journal of Psychiatry*, 166, 639–641. <https://doi.org/10.1176/appi.ajp.2009.09040458>
- Hansen, N. B., Lambert, M. J., & Forman, E. M. (2006). The Psychotherapy Dose-Response Effect and Its Implications for Treatment Delivery Services. *Clinical Psychology: Science and Practice*, 9, 329–343. <https://doi.org/10.1093/clipsy.9.3.329>
- Haug, T., Nordgreen, T., Öst, L.-G., Kvale, G., Tangen, T., Andersson, G., Carlbring, P., Heiervang, E. R., & Havik, O. E. (2015). Stepped care versus face-to-face cognitive behavior therapy for panic disorder and social anxiety disorder: Predictors and moderators of outcome. *Behaviour Research and Therapy*, 71, 76–89. <https://doi.org/10.1016/j.brat.2015.06.002>
- Horowitz, L. M., Alden, L. E., Wiggins, J. S., & Pincus, A. L. (1979). *Inventory of interpersonal problems*. American Psychological Association.
- Horvath, A. O. (2013). You can't step into the same river twice, but you can stub your toes on the same rock: Psychotherapy outcome from a 50-year perspective. *Psychotherapy*, 50(1), 25–32. <https://doi.org/10.1037/a0030899>
- Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59(1), 12–19. <https://doi.org/10.1037/0022-006X.59.1.12>
- Kampman, M., Keijsers, G. P. J., Hoogduin, C. A. L., & Hendriks, G.-J. (2008). Outcome Prediction of Cognitive Behaviour Therapy for Panic Disorder: Initial Symptom Severity is Predictive for Treatment Outcome, Comorbid Anxiety or Depressive

- Disorder, Cluster C Personality Disorders and Initial Motivation Are Not. *Behavioural and Cognitive Psychotherapy*, 36(1), 99–112.
<https://doi.org/10.1017/S1352465807004018>
- Keijsers, G. P. J., Kampman, M., & Hoogduin, C. A. L. (2001). Dropout prediction in cognitive behavior therapy for panic disorder. *Behavior Therapy*, 32(4), 739–749.
[https://doi.org/10.1016/S0005-7894\(01\)80018-6](https://doi.org/10.1016/S0005-7894(01)80018-6)
- Kramer, U. (2019). Personality, personality disorders, and the process of change. *Psychotherapy Research*, 29(3), 324–336.
<https://doi.org/10.1080/10503307.2017.1377358>
- Lingiardi, V., Filippucci, L., & Baiocco, R. (2005). Therapeutic alliance evaluation in personality disorders psychotherapy. *Psychotherapy Research*, 15(1–2), 45–53.
<https://doi.org/10.1080/10503300512331327047>
- Livesley, J., W., & Larstone, R. (2018). Empirically based treatments. In *Handbook of Personality Disorders* (2nd ed., pp. 481–487). The Guilford Press.
- Lüdtke, D. (2018). ggeffects: Tidy Data Frames of Marginal Effects from Regression Models. *Journal of Open Source Software*, 3(26), 772.
<https://doi.org/10.21105/joss.00772>
- Maat, S. de, Dekker, J., Schoevers, R., & Jonghe, F. de. (2007). The effectiveness of long-term psychotherapy: Methodological research issues. *Psychotherapy Research*, 17(1), 59–65. <https://doi.org/10.1080/10503300600607605>
- McCabe, G. A., & Widiger, T. A. (2020). A comprehensive comparison of the ICD-11 and DSM-5 section III personality disorder models. *Psychological Assessment*, 32(1), 72–84. <https://doi.org/10.1037/pas0000772>

- McMain, S. F., Boritz, T. Z., & Leybman, M. J. (2015). Common strategies for cultivating a positive therapy relationship in the treatment of borderline personality disorder. *Journal of Psychotherapy Integration*, 25(1), 20–29. <https://doi.org/10.1037/a0038768>
- Newton-Howes, G., Tyrer, P., & Johnson, T. (2006). Personality disorder and the outcome of depression: Meta-analysis of published studies. *British Journal of Psychiatry*, 188(1), 13–20. <https://doi.org/10.1192/bjp.188.1.13>
- Nordmo, M., Snderland, N. M., Havik, O. E., Eilertsen, D.-E., Monsen, J. T., & Solbakken, O. A. (2020). Effectiveness of Open-Ended Psychotherapy Under Clinically Representative Conditions. *Frontiers in Psychiatry*, 11, 384. <https://doi.org/10.3389/fpsyt.2020.00384>
- Olatunji, B. O., Cisler, J. M., & Tolin, D. F. (2010). A meta-analysis of the influence of comorbidity on treatment outcome in the anxiety disorders. *Clinical Psychology Review*, 30(6), 642–654. <https://doi.org/10.1016/j.cpr.2010.04.008>
- Owen, J., & Hilsenroth, M. J. (2014). Treatment adherence: The importance of therapist flexibility in relation to therapy outcomes. *Journal of Counseling Psychology*, 61(2), 280–288. <https://doi.org/10.1037/a0035753>
- Porter, E., & Chambless, D. L. (2015). A systematic review of predictors and moderators of improvement in cognitive-behavioral therapy for panic disorder and agoraphobia. *Clinical Psychology Review*, 42, 179–192. <https://doi.org/10.1016/j.cpr.2015.09.004>
- R Core Team. (2018). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Rubin, D. B. (1976). Inference and missing data. *Biometrika*, 63(3), 581–592. <https://doi.org/10.1093/biomet/63.3.581>
- Solbakken, O. A., Hansen, R. S., Havik, O. E., & Monsen, J. T. (2012). Affect integration as a predictor of change: Affect consciousness and treatment response in open-ended

psychotherapy. *Psychotherapy Research*, 22(6), 656–672.

<https://doi.org/10.1080/10503307.2012.700871>

van Ginkel, J. R., Linting, M., Rippe, R. C. A., & van der Voort, A. (2019). Rebutting Existing Misconceptions About Multiple Imputation as a Method for Handling Missing Data. *Journal of Personality Assessment*, 1–12.

<https://doi.org/10.1080/00223891.2018.1530680>

Vassend, O., Lian, L., & Andersen, H. T. (1992). Norske versjoner av NEO-Personality Inventory, Symptom Checklist 90 Revised og Giessen Subjective Complaints List. Del I. [Norwegian versions of the NEO-Personality Inventory, Symptom Checklist 90 Revised, and Giessen Subjective Complaints List: I.]. *Tidsskrift for Norsk Psykologforening*, 29(12), 1150–1160.

Werbart, A., Missios, P., Waldenström, F., & Lilliengren, P. (2019). “It was hard work every session”: Therapists’ view of successful psychoanalytic treatments. *Psychotherapy Research*, 29(3), 354–371. <https://doi.org/10.1080/10503307.2017.1349353>

Wickham, H. (2016). *ggplot2*. Springer International Publishing.
<https://doi.org/10.1007/978-3-319-24277-4>