Deconstructing depression: unified syndrome or groups of symptoms?

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Chapter 4

Prognostic Value of Pathological Personality Traits for Treatment Outcome in Anxiety and Depressive Disorders: The Leiden Routine Outcome Monitoring Study

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Abstract

Previous studies have failed to take baseline severity into account when assessing the effects of pathological personality traits (PPT) on treatment outcome. This study assessed the prognostic value of PPT (Dimensional Assessment of Personality Pathology-Short Form, DAPP-SF) on treatment outcome (Brief Symptom Inventory, BSI-posttreatment) among patients with depressive and/or anxiety disorders (*N* = 5,689). Baseline symptom level (BSI-pretreatment) was taken into account as a mediator- or moderator variable. Results showed significant effects of PPT on outcome, of which Emotional Dysregulation demonstrated the largest association, β=0.43, *p*<.001. When including baseline BSI score as a mediator variable, a direct effect (β=0.11; *p*<.001) remained of approximately one-third of the total effect. The effects of Emotional Dysregulation (interaction-effect β=0.061, *p*<.001) and Inhibition (interaction-effect β=0.062, *p*<.001), but not Compulsivity or Dissocial Behavior, were moderated by the baseline symptom level. PPT predicts higher symptom levels, both before and after treatment, but yields relatively small direct effects on symptom decline when the effect of pretreatment severity is taken into account.

Keywords: pathological personality traits, depression, anxiety disorders, treatment outcome, Dimensional Assessment of Personality Pathology Short Form (DAPP-SF)

4.1 Introduction

Pathological personality has often been linked to other psychiatric disorders, such as depressive and anxiety disorders [1-3]. Pathological personality can be considered from a categorical as well as a dimensional perspective. From a categorical perspective, personality pathology is assumed to be present when a patient meets the criteria for a personality disorder according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) or according to the Classification of Mental and Behavioral Disorders, the tenth revision [4-6]. Meta-analysis demonstrated that the risk of comorbid personality disorders for major depressive disorder has been estimated at 45% [7]; the risk ranged from 35% to 52% for anxiety disorders [3]. Moreover, in multiple reviews and meta-analyses researchers assessed the associations between personality disorders and treatment outcome of depressive and anxiety disorders [8-14]. It was found that the odds for poor outcome more than doubled when a comorbid personality disorder was present [13]. Evidence regarding anxiety disorders was less conclusive; some researchers found significant negative effects of personality disorders comorbidity [9, 11], but others did not [10, 11]. In one meta-analysis, Olatunji et al. (2010) found no significant effect of comorbid personality disorders on treatment outcome among patients with anxiety disorder.

There is clear empirical evidence that personality disorders are in fact better represented by a dimensional model than by the categorical model [15], in which personality pathology exists on a continuum, ranging from healthy/normal to maladaptive/abnormal psychopathology [16]. Several alternative dimensional approaches for personality disorders are proposed [see for an overview: 17]. A major effort has been made in this regard by Livesley and colleagues, who reorganized lower-order traits described among 100 self-report scales into 18 factors [18, 19]. These 18 factors formed the basis for the development of a self-report scale – The Dimensional Assessment of Personality Pathology [DAPP; 20]. Beside differences in methodology, subsequent studies found a considerable overlap with other models, such as with the five factor model [21]. The DAPP also demonstrated a considerable overlap in pathological personality traits (PPT) with other relevant scales such as the NEO Personality Inventory [NEO-PI; 21], Personality Inventory for DSM-5 [PID-5; 22, 23]), Schedule for Nonadaptive and Adaptive Personality [SNAP; 24], and Severity Indices of Personality

Functioning [SIPP; 25, 26]. Moreover, the identified pathological personality traits (PPT) are often used as a proxy measure of the Alternative DSM-5 model of personality disorders B-criterium personality traits [27].

Within the Leiden Routine Outcome Monitoring Study, it was demonstrated that patients with combined depressive and anxiety disorders displayed the highest mean values of PPT measured with the Dimensional Assessment of Personality Pathology - Short Form (DAPP-SF), followed by patients with singular depressive disorders. Mean values of PPT were lowest for patients with singular anxiety disorders [28]. Van Noorden et al. (2012) and Schat, van Noorden [29] found that PPT predicted an unfavorable treatment outcome (50% reduction of measured psychological distress) in patients with mood-, anxiety-, and somatoform disorders, with a hazard ratio ranging from 0.92 (95% confidence interval; CI [0.81, 1.05]) to 1.30 [95% CI 1.12–1.51; 30]. The present study builds upon this existing work with an extension of the sample, by using continuous outcome measures, and by explicitly taking the effects of baseline symptom level into account.

The effects of PPT on treatment outcome may be substantially lower when taking baseline symptom level into account, usually interpreted as severity. Baseline symptom level of depression and anxiety consistently influences posttest outcomes for depressive and anxiety disorders [8, 10]. The effect of PPT on treatment outcome or disorder persistence is attenuated when baseline symptom level is taken into account [8, 31, 32]. For instance, the effects of neuroticism on the persistence of a depressive disorder over the course of two years decreased from 1.57 RR, 95% CI [1.35, 1.83] to 1.20 RR, [0.92, 1.57], and on the persistence of an anxiety disorder from 1.67, [1.42, 1.95] to 1.09, [0.87, 1.36], after adjusting for baseline symptom level [32]. Adjusting the relationship between PPT and treatment outcome for baseline severity may be too simplistic. After all, patients with high levels of PPT may report higher levels of depression and anxiety. Baseline severity may serve as a mediating factor between PPT and treatment outcome [33]. Candrian et al. (2007) investigated this and found that the effect of personality disorder on an 8 week open-label treatment of fluoxetine was fully mediated by baseline symptom level. Moreover, previous studies found differential clinical characteristics of high and low severe depression and anxiety [34-37]. Baseline symptom severity could be an important moderator of treatment outcome as is demonstrated for patients suffering substance use disorders [38] and borderline personality

disorder [39, 40]. Possibly PPT may be especially predictive for treatment outcome in patients suffering from higher baseline symptom levels. PPT may hamper coping with high disease severity of depression and anxiety [41], in which case baseline severity could be a moderator variable of the effect of PPT on treatment outcome. Surprisingly, the likely intermediary effects (either as a mediator variable, or a moderator variable) of baseline severity on the relationship between PPT and treatment outcome have received little attention in the current literature [38-40].

Our aim was to investigate the prognostic value of dimensional PPT on treatment outcome among patients with anxiety disorders and/or depression while taking the effects of baseline symptom level into account. We first assessed the association between PPT and treatment outcome. Thereafter, we assessed how this possible association was affected by baseline severity. We assessed both the potential of mediation and moderation of baseline symptom level in the relationship between PPT and treatment outcome. The mediation analysis gave us insight into the role of baseline severity within the relationship between PPT and treatment outcome. Moderation analysis gave us insight into whether the effects of PPT on treatment outcome were different for patients with high baseline severity compared to low baseline severity. We used the Dimensional Assessment of Personality Pathology - Short Form (DAPP-SF) to measure a wide variety of maladaptive personality traits [42]. Based on previous research [8, 30, 31, 43], we hypothesized that PPT would be associated with higher symptom levels, both at baseline and after treatment. To assess the potential differential effects of PPT for depression, anxiety, and combined depression/anxiety [28], we performed additional analyses for each diagnostic group separately.

4.2 Methods

4.2.1 Participants

In this study, we used data from a sample of 5,755 psychiatric outpatients who received treatment for anxiety- and/or mood disorders at the mental health care provider GGZ Rivierduinen or at the Department of Psychiatry of the Leiden University Medical Centre (LUMC), both located in the Netherlands. We included adult patients (18 years or older) with anxiety disorders and/or depressive disorders of whom data was collected as part of the Leiden Routine Outcome Monitoring Study (2004–2013), and who had completed both the DAPP-SF at baseline and the Brief Symptom Inventory (BSI) at baseline and at 6 to 8 months posttreatment (see Instruments). Patients were recruited in policlinic departments for mood- and/or anxiety disorder. When patients had other primary diagnoses they were referred to other departments and therefore not included in the present study. As data collection in the form of Routing Outcome Monitoring is part of the routine care, this resulted in a representable sample of outpatients with anxiety disorders and/or depressive disorders.

4.2.2 Design and Procedure

Routine outcome monitoring (ROM) data were derived from a prospective cohort study, which was carried out to assess treatment outcome for patients with mood-, anxiety-, and/or somatoform disorders in a naturalistic setting [44]. For our analyses, we used data from assessments collected at the start of treatment and after 6 to 8 months of treatment. The first assessment occurred during an intake procedure; in order to diagnose patients in a standardized and reliable method; research nurses interviewed patients using the Mini International Neuropsychiatric Interview-Plus [MINI-Plus; 45]. Additionally, patients completed a number of self-report questionnaires. For further details regarding our ROM procedure, see de Beurs, den Hollander-Gijsman [44] and Carlier, Andree Wiltens [46]. Patients were treated in accordance with (inter)national evidence-based guidelines, consisting of pharmacotherapy, psychotherapy (e.g., cognitive behavioral therapy or interpersonal therapy), or a combination [e.g., 47, 48].

4.2.3 Instruments

4.2.3.1 Pathological personality traits

The DAPP-SF is a 136-item self-report questionnaire used to assess maladaptive personality traits. Participants rated items on a 5-point scale, ranging from 1 (*very unlike me*) to 5 (*very like me*). The items are clustered into 18 subscales and four higher order constructs. The subscales Submissiveness, Cognitive Distortion, Identity Problems, Affective Lability, Oppositionality, Anxiousness, Suspiciousness, Social Avoidance, Narcissism, Insecure Attachment, and Self-Harm are clustered under *Emotional Dysregulation* as the first higher order construct with 78 items. The subscales Intimacy Problems and Restricted Expression are clustered under *Inhibition* as the second higher order construct with 16 items. The subscales Stimulus Seeking, Callousness, Rejection, and Conduct Problems are clustered under *Dissocial Behavior* as the third higher order construct with 34 items. Finally, the subscale Compulsivity equals the fourth higher order construct *Compulsivity* with 8 items [49].

In accordance with the DAPP-SF manual, subscale scores and higher order construct scores are calculated as the mean of the item scores (see Table 1). Although the DAPP-SF subscales are associated with Cluster A-, B-, and C- Personality Disorders, they can be considered as dimensional scales ranging from “normal” to maladaptive PPT. Psychometric evaluations, both in the community and in clinical samples (i.e., patients with both Axis-I and Axis-II DSM-IV disorders), demonstrated good internal consistency, with Cronbach’s α between 0.78 and 0.89 [42]. The DAPP-SF score ranges from 1–5 and was used in our study as the independent variable (IV), with the higher order constructs serving as primary predictor variables.

4.2.3.2 General Psychopathology

The BSI is a 53-item self-report questionnaire used to assess symptoms of depression, anxiety, somatization, obsessive–compulsivity, interpersonal sensitivity, hostility, phobic anxiety, paranoid ideation, and psychoticism [50]. Participants rate items on a 5-point scale, ranging from 0 (*not at all*) to 4 (*extremely*). A psychometric evaluation of the BSI was performed in a large population of psychiatric patients, and it demonstrated good test–retest reliability and good internal consistency, with Cronbach’s α between 0.71 and 0.84 [51]. The BSI score (total) ranges from 0–4 and was used in our study as a dependent variable (DV) for our statistical analyses.

4.2.4 Statistical Analyses

We took several steps in our analyses to investigate the prognostic value of dimensional levels of PPT and the intermediary effects of baseline symptom level on treatment outcome of patients with anxiety- and depressive disorders. First, we conducted a mediation analysis using Preacher and Hayes [52] mediation model. This procedure allowed us to test the effects of an independent variable (IV; higher order PPT constructs) on BSI posttest (dependent variable; DV), either with or without a mediator (BSI baseline; M). This is demonstrated in Figure 1 A, where the c path denotes the effect of PPT (IV) on treatment outcome (DV) without mediation by baseline symptom levels. Figure 1 B demonstrates the *a* path which denotes the effect of PPT (IV) on BSI (DV) at baseline (M), the *b* path denotes the effect of M on DV, and the *c'* path denotes the direct effect after controlling for the mediator (M) baseline symptom level. Mediation was determined by testing the indirect effect of the IV on the DV via M ($a \times b$). This is quantified as the product of the effect of the IV on M (*a* path) and the effect of M on the DV (*b* path). We used a bootstrapping approach with 5,000 estimates of the $a \times b$ path to estimate the indirect effect. We computed 95% CIs for the empirical distribution, using cutoffs for the 2.5% highest and lowest scores. Mediating effects were considered to be significant when the CI did not include zero. For detailed information about the statistical procedures of the mediation analyses, see Hayes [53] and Loose, Acier [54]. Second, we performed a moderation analysis, in which PPT served as the IV, treatment outcome as the DV, and baseline symptom level as the moderation variable. We assessed whether there was an interaction between PPT and baseline symptom level in relation to treatment outcome. Thereafter, we assessed the effects of PPT for patients with one *SD* lower baseline symptom level and for patients with one *SD* higher baseline symptom level. We repeated these analyses for the 18 underlying DAPP-SF subscales clustered under the four higher order constructs, and we performed additional analyses for each diagnostic group separately (depression, anxiety, or combined depression/anxiety groups) which is included in the Appendix. All outcomes and IVs were standardized (i.e., *Z* scores) to yield standardized beta coefficients that could be compared between measures. Analyses were performed using R, version 3.4.1.

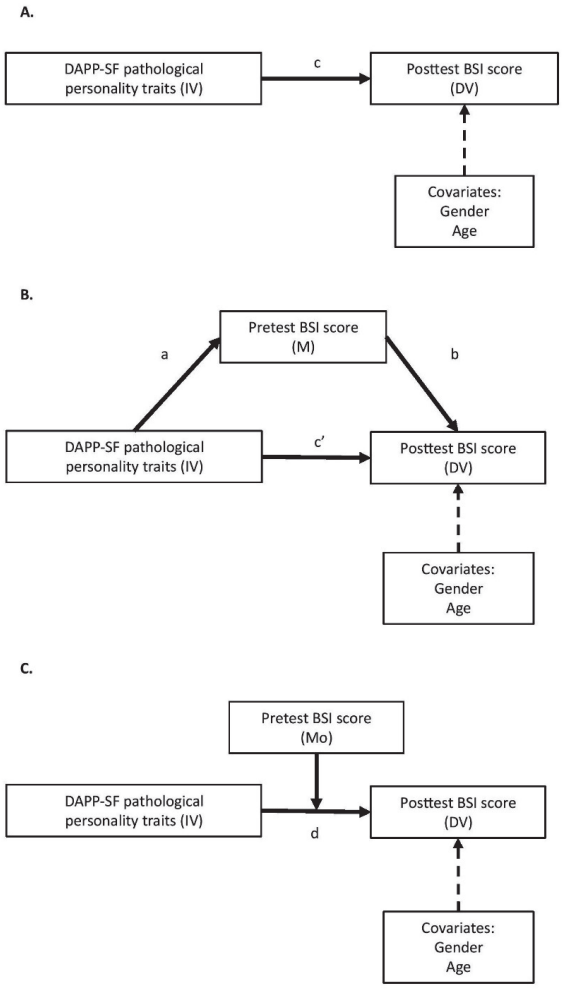

Figure 1. Model of psychopathology (DAPP-SF dimensions), baseline level of symptoms (baseline BSI score), and treatment outcome (posttest BSI score), suggesting that an increased baseline symptom level is an intermediate factor between psychopathology and treatment outcome. "IV" denotes independent variable (DAPP-SF). "DV" denotes dependent variable (posttest BSI score). "M" denotes mediating variable (baseline BSI). "Mo" denotes moderating variable (baseline BSI). "*c*" denotes total effect of IV on DV. "*a*" denotes effect of IV on M. "*b*" denotes effect of M on DV. "*c*" denotes direct effect of IV on DV. "d" denotes the moderated effect of IV on DV.

4.3 Results

4.3.1 Sample Characteristics

Table 1 presents the sample characteristics. On average, patients were 38 years old (*SD* = 12.5), and women (62.8%) were overrepresented compared to men (37.2%). The mean BSI score was 1.33 (*SD* = 0.70) at baseline, and 0.85 (*SD* = 0.72) after 6 to 8 months of treatment. The highest BSI scores were found among the combined depression and anxiety group, *p <0.001* (see Appendix Table 1). The DAPP-SF higher order PPT constructs ranged from 1.90 (Dissocial Behavior) to 2.93 (Compulsivity). The highest levels of PPT were found among the combined subgroup compared to the depression and anxiety subgroups (see Appendix Table 1).

Table 1

Demographic and Clinical Sample Characteristics at Baseline.

	Total sample (*n* = 5,689)
Variable	**Mean (*SD*) *n* (%)**
Age	38.8 (12.5)
Gender (female)	3572 (62.8)
BSI baseline score	1.33 (0.70)
BSI posttreatment score	0.85 (0.72)
MDD – single episode	1451 (25.5)
MDD – recurrent episode	2668 (46.9)
Dysthymia	682 (12.0)
Posttraumatic Stress Disorder	794 (13.6)
Social Phobia	776 (8.5)
Generalized Anxiety Disorder	481 (8.5)
Panic Disorder	1392 (24.5)
Obsessive-compulsive disorder	414 (7.3)
DAPP-SF (sub)scales	
Emotional Dysregulation	2.7 (0.66)
Submissiveness	2.9 (0.92)
Cognitive distortion	2.3 (0.95)
Identity problems	3.1 (0.99)
Affective lability	3.2 (0.85)
Oppositionality	2.8 (0.89)
Anxiousness	3.4 (0.92)
Suspiciousness	2.2 (0.98)
Social avoidance	3.0 (1.06)
Narcissism	2.4 (0.82)
Insecure attachment	2.9 (1.11)
Self-harm	1.8 (0.95)
Inhibition	2.8 (0.65)
Intimacy problems	2.4 (0.84)
Restricted expression	3.2 (0.85)
Compulsivity	2.9 (0.95)
Dissocial Behavior	1.9 (0.54)
Stimulus seeking	2.1 (0.81)
Callousness	1.8 (0.60)
Rejection	2.3 (0.82)
Conduct problems	1.4 (0.57)

Note. "BSI" denotes the Brief Symptom Inventory, DAPP-SF denotes Dimensional Assessment of Personality Pathology Short Form, "MDD" denotes major depressive disorder. DAPP-SF scales are demonstrated as mean item score (1–5).

4.3.2 Total Effect of PPT on Treatment Outcome (Figure 1A)

The total effect of PPT on treatment outcome is presented in Table 2 under "Total effect of PPT (IV) on treatment outcome (DV)'" and Table 3. Table 2 shows the total effect of PPT on treatment outcome, which is defined as the posttreatment BSI score. All higher order constructs of PPT were significantly associated with treatment outcome (i.e. less improvement), ranging from β = 0.10 (*SE* = 0.02, *p* < .001) for Compulsivity to β = 0.43 (*SE* = 0.02, *p* < .001) for Emotional Dysregulation. We found similar results for the subgroups anxiety, depression, or combined group (see Appendix Table 2).

Table 2

Predicting treatment outcome with DAPP-SF higher order constructs of pathological personality traits (PPT) mediated by baseline level of symptoms within patients with depression and/or a anxiety disorder (see also Figure 1 A and B)

Independent variable (IV)	Total effect of PPT (IV) on treatment outcome (DV)	Direct effect of PPT (IV) on treatment outcome (DV)	Effect of PPT (IV) on baseline symptom level (M)	Effect of baseline symptom level (M) on treatment outcome (DV)	Mediating effect
In Figure 1 denoted as:	**c**	**c'**	**a**	**b**	**a × b; 95% CI**
Total (*n* = 5,689)					
Emotional Dysregulation	0.43***	0.11 ***	0.67***	0.45***	0.31 [0.28, 0.33]
Inhibition	0.24***	0.08***	0.32***	0.51***	0.17 [0.15, 0.18]
Compulsivity	0.10***	−0.02	0.22***	0.54***	0.12 [0.11, 0.14]
Dissocial Behavior	0.15***	0.04 **	0.22***	0.53***	0.12 [0.10, 0.13]

Note. All variables are standardized. DAPP-SF subscale represents the independent variable (IV), baseline (BSI sum score at baseline) represents the mediating variable (M), and posttest (BSI sum score at follow up) represents the dependent variable (DV). "*c*" denotes direct effect, "*c*" denotes total effect, "*a*" denotes effect of IV on M, "*b*" denotes effect of M on Y, "*a* × *b*" denotes indirect mediating effect. Analyses are adjusted for age and gender.

****p value* <.001;

***p* value <.01

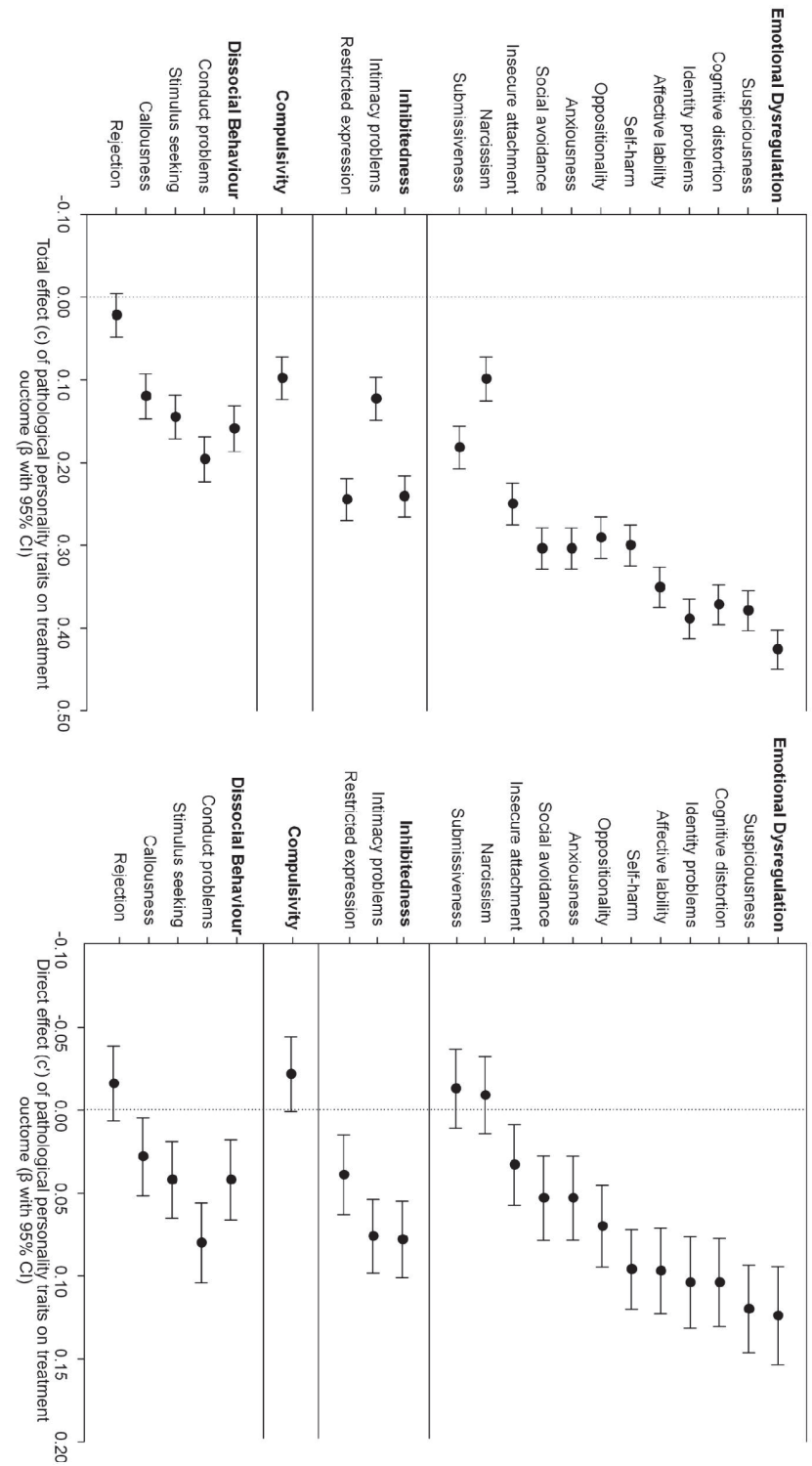
A.
Emotional Dysregulation
Suspiciousness
Cognitive distortion
Identity problems
Affective lability
Self-harm
Oppositionality
Anxiousness
Social avoidance
Insecure attachment
Narcissism
Submissiveness
Inhibitedness
Intimacy problems
Restricted expression
Compulsivity
Dissocial Behaviour
Conduct problems
Stimulus seeking
Callousness
Rejection
-0.10 0.00 0.10 0.20 0.30 0.40 0.50
Total effect (c) of pathological personality traits on treatment outcome (β with 95% CI)
B.
Emotional Dysregulation
Suspiciousness
Cognitive distortion
Identity problems
Affective lability
Self-harm
Oppositionality
Anxiousness
Social avoidance
Insecure attachment
Narcissism
Submissiveness
Inhibitedness
Intimacy problems
Restricted expression
Compulsivity
Dissocial Behaviour
Conduct problems
Stimulus seeking
Callousness
Rejection
-0.10 -0.05 0.00 0.05 0.10 0.15 0.20
Direct effect (c') of pathological personality traits on treatment outcome (β with 95% CI)

Figure 2. A demonstrates the total effect (c) of individual DAPP-SF pathological personality traitson treatment outcome (posttest BSI score). B demonstrates the direct effect (c') of individual DAPP-SF pathological personality traits on treatment outcome (posttest BSI score).

Regarding the individual subscales underlying the higher order constructs (Figure 2A and Appendix Table 3), we found beta-coefficients ranging from β = 0.02 (*SE* = 0.01, *p* = .09) for Rejection to β = 0.39 (*SE* = 0.01, *p* < .001) for Identity Problem. The subscales Identity Problems (β = 0.39, *SE* = 0.01, *p* < .001), Suspiciousness (β = 0.38, *SE* = 0.01, *p* < .001), Cognitive Distortion (β = 0.37, *SE* = 0.01, *p* < .001), and Affective Lability (β = 0.36, *SE* = 0.02, *p* < .001) demonstrated the strongest effects and were all part of the Emotional Dysregulation higher order construct. The subscale Rejection (part of the Dissocial Behavior construct) demonstrated a remarkably lower effect on treatment outcome compared to the other subscales.

4.3.3 Association between PPT and Baseline Symptom Level (Figure 1B)

The relationships between the DAPP-SF higher order constructs and BSI baseline symptom level for the total group are presented in Table 2 under "Effect of PPT (IV) on baseline symptom level (M)". We found that all constructs were significantly, *p* < .001, related to baseline BSI symptom level, ranging from 0.22 (*SE* = 0.02, *p* < .001) for Dissocial Behavior to β = 0.67 (*SE* = 0.02, *p* < .001) for Emotional Dysregulation within the total sample. We found no consistent differences in the magnitude of this association between the subgroups (see Appendix Table 2).

When assessing the underlying DAPP subscales of the higher order constructs, we found large differences in association with baseline symptom level. The subscales Identity Problems (β = 0.61, *SE* = 0.01, *p* < .001), Cognitive Distortion (β = 0.57, *SE* = 0.01, *p* < .001), Suspiciousness (β = 0.56, *SE* = 0.01, *p* < .001), and Affective Lability (β = 0.53, *SE* = 0.011, *p* < .001) demonstrated the strongest associations with baseline symptom level and were all part of the Emotional Dysregulation construct. Subscales Rejection (β = 0.08, *SE* = 0.01, *p* < .001; "Rejecting others") and Intimacy Problems (β = 0.09, *SE* = 0.01, *p* < .001) demonstrated the lowest associations regarding baseline symptom level and were part of Dissocial Behavior and Inhibition, respectively (see Appendix Table 3).

4.3.4 Mediation of Baseline Symptom Level (Figure 1B)

The relationship between PPT and treatment outcome was mediated by baseline symptom level. Table 2 under "Mediating effect" shows the results of the mediation analysis of PPT in relation to treatment outcome, with baseline symptom level as the M (mediator). We found

a strong mediating effect ($a \times b$) of baseline symptom level, with coefficients ranging from β = 0.12, 95% CI [0.10, 0.13], for Dissocial Behavior to β = 0.31, [0.28, 0.33], for Emotional Dysregulation.

The direct effect of PPT (c'), which takes into account the mediating effect of pretreatment level of symptoms, was approximately one third of the total effect and remained significant for Emotional Dysregulation, Inhibition, and Dissocial Behavior but was no longer significant for Compulsivity. This suggests that the effect is largely, but not entirely, mediated through the effects of baseline symptom level. The direct effect ranged from β = −0.02 (*SE* = 0.02, *p* = .071) for Compulsivity to β = 0.11 (*SE* = 0.02, *p* < .001) for Emotional Dysregulation. Individual DAPP-SF subscales demonstrated similar proportions of the total effect being mediated through baseline symptom level (see Figure 2B). The direct effect was no longer significant for the subscales Narcissism, Submissiveness, and Rejection. On average, Emotional Dysregulation demonstrated the strongest effect on treatment outcome. There were no consistent differences in the diagnostic subgroups (see Appendix Table 3).

Table 3

Moderating effects of baseline level of symptoms when predicting treatment outcome with DAPP-SF higher order constructs of pathological personality traits (PPT), within patients with depression and/or a anxiety disorder (see also Figure 1 C)

Treatment Outcome: posttreatment BSI score	**Interaction PPT (IV) with Baseline symptom level (Mo)**		**Effect PPT (IV) for 1 *SD* below Mean baseline level of symptoms (Mo)**		**Effect PPT (IV) for mean baseline level of symptoms (Mo)**		**Effect PPT (IV) for 1 *SD* above Mean baseline level of symptoms (Mo)**	
In Figure 1 denoted as:			**d – low baseline symptoms**		**d**		**d – high baseline symptoms**	
Independent variable (IV)	**Beta (SE)**	***p* value**	**Beta (SE)**	***p* value**	**Beta (SE)**	***p* value**	**Beta (SE)**	***p* value**
Total (*n* = 5,689)								
Emotional Dysregulation	0.061 (0.010)	<.001	0.070 (0.017)	<.001	0.130 (0.015)	<.001	0.191 (0.019)	<.001
Inhibition	0.062 (0.010)	<.001	0.012 (0.016)	.464	0.043 (0.012)	<.001	0.135 (0.015)	<.001
Compulsivity	−0.009 (0.011)	.378	−0.010 (0.016)	.546	−0.019 (0.011)	.096	−0.028 (0.015)	.061
Dissocial Behavior	−0.012 (0.011)	<.265	0.052 (0.018)	.003	0.039 (0.012)	.001	0.028 (0.015)	.066

Note. DAPP-SF subscale represents the independent variable (IV). Baseline BSI score represents the moderator variable (Mo). Beta denotes standardized regression coefficients. SE denotes standard error. Analyses are adjusted for age and gender.

4.3.5 Moderation of Baseline Symptom Level (Figure 1C)

Baseline symptom level was examined as a moderator of the relationship between PPT and treatment outcome and is demonstrated in Table 3. Baseline symptom level was a significant moderator of the relationship between Emotional Dysregulation and Inhibition and treatment outcome. Interaction effects between PPT and baseline symptom level were statistically significant for Emotional Dysregulation (β = 0.061, *SE* = 0.010, $p < .001$) and Inhibition (β = 0.062, *SE* = 0.062, $p < .001$). No significant interaction effect was found for Compulsivity and Dissocial Behavior. The standardized simple slope of Emotional Dysregulation for participants with one *SD* below the mean of baseline was 0.070, the standardized simple slope for participants with a mean level of baseline severity was 0.130, and the standardized simple slope for participants with one *SD* above mean baseline severity was 0.191. The standardized simple slope of Inhibition for participants with one *SD* below the mean of baseline was 0.012, the standardized simple slope for participants with a mean level of baseline severity was 0.043, and the standardized simple slope for participants with one *SD* above mean baseline severity was 0.135. Thus, Emotional Dysregulation and Inhibition were most predictive of high BSI score after treatment among participants with high baseline symptom level. These results were similar across separate diagnostic groups, though for the anxiety subgroup the interaction between Inhibition and baseline symptom level was no longer statistical significant. The results for each diagnostic group separately is demonstrated in Appendix Table 5.

All subscales that were part of Emotional Dysregulation and Inhibition and with the addition of Rejection demonstrated significant interaction effects (see Appendix Table 4). Interestingly, among patients with high baseline symptom level Narcissism had a beneficial effect on treatment outcome, though with a small effect size (β = −0.34, *SE* = 0.016, $p = .032$).

4.4 Discussion

We examined the effects of dimensional levels of PPT on treatment outcome after 6 to 8 months of treatment in a large sample of outpatients with depressive disorders, anxiety disorders, and combined depressive/anxiety disorders. The findings support our hypothesis that PPT is strongly related to higher symptom levels both before and after treatment, even when patients do not meet criteria for a personality disorder. Patients with one *SD* higher dimensional level of PPT had on average 0.20 to 0.43 *SD* higher levels of general psychopathology (BSI) after receiving treatment. At first glance, this suggests that dimensional levels of PPT had a significant and seemingly clinically relevant predictive effect on treatment outcome. However, when taking baseline symptom level into account, we found that patients with high symptom levels at baseline had substantially higher symptom levels after treatment regardless of PPT level. Baseline symptom level could be considered an important mediator of the relationship between PPT and treatment outcome. PPT was related to higher baseline symptom levels. The direct adverse effect (c') of PPT on outcome when baseline symptom level was taken into account was approximately one third of the total. This direct effect was no longer significant for Compulsivity. Furthermore, we found that the baseline symptom level moderated the predictive effects of Emotional Dysregulation and Inhibition, which were slightly more predictive of treatment outcome among participants with high baseline symptom level. However, the effect size of this interaction was small. We found a similar effect of PPT on treatment outcome among the three patient groups (see Appendix).

Our results replicate findings of previous studies, in which PPT was found to have a negative impact on treatment outcome in patients with anxiety- and depressive disorders [29, 30, 55-58]. Many studies, however, did not factor in the importance of baseline symptom levels. Because baseline symptom levels proved to have a strong and consistent relation to treatment outcome in the present and in previous studies, it is plausible that PPT has less prognostic value when researchers adjust for baseline symptom levels [8, 37]. Previous studies have also found higher levels of symptomatology (both pre- and posttreatment) when PPT was present, but with a similar symptom decline during treatment [43]. Studies that adjusted for baseline symptom levels found (at most) a small effect of PPT on treatment

outcome for both depressive- and anxiety disorders, or no effect [10, 59]. In this regard, the findings of the current study are in line with prior literature. We approached baseline symptom level as a mediating variable in which PPT is related to higher symptom severity and perceived stress at baseline/ which in turn leads to higher levels of symptoms after treatment [60]. Moreover, for PPT constructs Emotional Dysregulation and Inhibition, baseline symptom level served as a moderator variable, in which PPT was more predictive for adverse treatment outcome when patients experienced high symptom severity. This is in line with previous literature which found that baseline symptom severity was a moderator for treatment outcome for substance use disorders [38] and borderline personality disorder [39, 40]. The present study is the first to assess the moderating effects of baseline severity on treatment outcome among depression and anxiety patients.

Conventionally, the relationship between PPT and depression/anxiety may be considered as an etiological one, in which PPT causes higher symptom levels of psychopathology. Researchers have demonstrated that PPT can be a predictor for future psychopathology in response to life stress [61]. Furthermore, PPT can cause increased levels of distress because it contributes to problems in physical health, increased financial difficulties, dissolution of relationships, and other negative life outcomes [62]. PPT likely hampers patients to cope with the burden of depression or anxiety [63]. In line with this, we found that PPT was associated with higher symptom levels of depression and anxiety at both pre- and posttreatment. In particular, we found that Suspiciousness, Cognitive Distortion, Identity Problems, and Affective Lability related strongly to symptom level before and after treatment; these constructs may be especially linked to maladaptive reactions to life events.

PP is generally thought to be present before depression and anxiety; however, Widiger (2011) posited the presence of a *pathoplastic* as well as a *spectrum* relationship in addition to an *etiological* one. A pathoplastic relationship would suggest that the presentation and expression of PPT and psychopathology (in this case depression and/or anxiety) would bidirectionally influence each other. Both PPT and depression/anxiety are considered impairments to how an individual thinks, feels, and behaves in relation to others. A priori PPT results in higher levels of impairment in these areas, resulting in higher levels of reported depression/anxiety, but high levels of psychopathology may also influence the reported level of PP. Patients who are very anxious or depressed may fail to provide accurate self-

descriptions [64-66]. Although some may consider the above as self-report bias, others argue that PPT causes patients to respond to stress with (or relapse in) depression. Thus, self-reported levels of depression are considered accurate expressions of underlying PP. Subsequently, patients who report lower (depression) symptom levels after treatment may also display a decrease in levels of PPT [67]. In further support of a pathoplastic relationship, levels of reported PPT were substantially higher when patients were diagnosed with both a depression and an anxiety disorder and had a higher BSI baseline symptom level. Unfortunately, we only measured PPT at baseline and therefore cannot make statements about the posttreatment decrease of PPT alongside the decrease of depression and anxiety. Alternatively, our findings can be interpreted in terms of a spectrum relationship. PPT and depression/anxiety can be (partly) considered as manifestations of one and the same underlying common spectrum [65]. In support of a spectrum relationship, we found the strongest associations with the higher order construct of Emotional Dysregulation, which has demonstrated overlap with depression and anxiety. Symptoms of anxiety and depression may lie in the same spectrum as Emotional Dysregulation. In our study, PPT was measured at the same time point as baseline symptom level. According to earlier findings [59] and the theory of the pathoplastic and spectrum relationships, PPT was likely influenced by an individual's current depressive or anxious state, which could have affected our mediation analyses.

Our findings could be valuable for clinical practice with regard of making prognosis. We found that baseline symptom level had far greater prognostic value compared to PPT measured with the DAPP-SF. The DAPP-SF, however, was still of added predictive value. Moreover, the DAPP-SF may provide relevant patient-specific information, which may be a focus for psychological therapy [27, 68]. With regard of treatment, we found that patients with high levels of PPT experience higher symptom levels after 6 to 8 months of treatment for depression and anxiety. The implicationsregarding to treatment can be interpreted in several ways. One can argue that patients with concurrent high levels of PPT do benefit from a treatment that does not necessarily focusses on Personality Pathology. An additional treatment aimed at PPT may be appropriate only for patients who remain symptomatic in spite of treatment. Moreover, it is likely that patients with higher levels of PPT simply need to be treated longer in order to achieve full remission in symptoms [69]. However, one could also argue that patients with high PPT should be treated differently or more intensely, in order to achieve the same

symptom level after 6 to 8 months of treatment as their lower PPT counterparts [70]. Both of these treatment options need further research and policymaking, in which clinical aspects and efficiency play a role [71, 72].

4.4.1 Strengths and Limitations

The strengths of our study include its large sample size and the distinction of diagnostic groups of depression and anxiety. By collecting data in a naturalistic setting, we were able to analyze data from a clinical sample, which was representative of day-to-day patient care. We also measured PPT dimensionally, which is considered a strength in light of how PPT is currently conceptualized. Previous studies have consistently criticized categorical definitions of PPT (i.e., personality disorders), and there is still no consensus on how to best classify patients with personality problems [13, 17]. Dimensional levels of PPT do not equate to personality disorders, but there is evidence that PPT could be a reasonable proxy for the personality disorder diagnosis itself [73-76]. Contrary to most studies, we assessed the intermediary effects of baseline symptom severity as both a mediator and a moderator in the prospective relation of PPT to treatment outcome.

Our findings should also be considered in light of their limitations. First, personality pathology is a broad concept, which could also include other definitions such as psychodynamic functioning, personality organization, coping styles, attachment constructs, etc. Though the DAPP-SF is based on 18 empirically sound factors [18, 19] and increasingly used as a proxy measure for the Alternative DSM-5 model of personality disorders B-criterium personality traits [27], caution is warranted when generalizations are made to other realms of personality. Second, with the current study design, causality between PPT and baseline symptom level was assumed but could not be formally analyzed because both were measured at the same time point. Mediation analysis is fitting when the results are interpreted as a etiological relationship between PPT and depression/anxiety. As discussed, the reality may be more complex. Third, we limited the assessment of outcome to 6 to 8 months of treatment. Some patients did not complete their follow-up and were left out of the analysis, potentially introducing selection bias [77]. Fourth, we lacked information regarding the type of treatment patients received (psychotherapy, medication, or both). This may be relevant because certain treatments may be better suited to patients with PPT than others [78]. Fourth, patients with personality disorders as primary diagnoses were referred to other departments and therefore

not included in the present study. Therefore. our sample might not have been representative for patients with the highest levels of PP. Lastly, PPT was only measured once, and not repeatedly. Earlier studies demonstrated that a decrease of (self-reported) PPT can occur after psychopathology is treated and has declined [64-66].

4.4.2 Conclusions

We expanded the way in which researchers can examine the prognostic value of PPT for treatment outcome in depressive- and/or anxiety disorders. Our results showed that PPT had a negative effect on treatment for patients with anxiety- and depressive disorders, of which the PPT constructs Emotional Dysregulation and Inhibition among participants with high baseline symptom level demonstrated the strongest effect. This effect was to a large extend mediated by baseline symptom levels. High PPT was related to both higher symptom levels before and after treatment. and the added (direct) effect of PPT on symptom decline after treatment was relatively small. Moreover, the effects of Emotional Dysregulation and Inhibition were also moderated, and demonstrated to have a stronger effect on treatment outcome when patients experienced high baseline severity, although with a small effect size.

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Conflicts of Interest statement and sources of funding

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Ethical Considerations

The Medical Ethical Committee of the LUMC approved the general study protocol—with Routine Outcome Monitoring (ROM) being integral to the treatment process (no written informed consent was required). All participants gave permission for the anonymized use of their data for research purposes.

Author Statement

Wessel A. van Eeden: conceptualisation, methodology, statistical analysis, writing – original draft. Albert M. van Hemert: writing – review and editing. Erik J. Giltay: methodology, statistical analysis, writing – figures, review and editing. Philip Spinhoven: writing – review and editing. Edwin de Beurs: writing – review and editing. Ingrid V. E. Carlier: conceptualization, writing – original draft, supervision. All authors have read and approved the submitted manuscript.

Disclosures

The authors declare no conflicts of interest.

Appendix

Appendix Table 1

Variable	Anxiety group (*n* = 1,993) Mean (*SD*) *n* (%)	Depression group (*n* = 1,664) Mean (*SD*) *n* (%)	Combined depression and anxiety group (*n* = 2,032) Mean (*SD*) *n* (%)
Age	36.7 (12.6)	41.6 (12.7)	38.6 (11.8)
Gender (female)	1293 (64.9)	955 (57.4)	1324 (65.2)
BSI baseline item score	1.00 (0.59)	1.32 (0.62)	1.659 (0.70)
BSI posttreatment item score	0.63 (0.57)	0.79 (0.65)	1.12 (0.82)
MDD – single episode	-	591 (35.5)	584 (28.7)
MDD – recurrent episode	-	958 (57.6)	1237 (60.9)
Dysthymia	-	249 (15.0)	366 (18.0)
Posttraumatic Stress Disorder	248 (12.4)	-	535 (26.3)
Social Phobia	351 (17.6)	-	415 (20.4)
Generalized Anxiety Disorder	220 (11.0)	-	254 (12.5)
Panic Disorder	718 (36.0)	-	671 (33.0)
Obsessive-compulsive disorder	219 (11.0)	-	192 (9.4)
DAPP-SF (sub)scales			
Emotional Dysregulation	2.49 (0.64)	2.72 (0.62)	2.96 (0.64)
Submissiveness	2.83 (0.93)	2.92 (0.89)	3.15 (0.92)
Cognitive distortion	2.06 (0.87)	2.33 (0.91)	2.60 (0.97)
Identity problems	2.65 (0.96)	3.24 (0.92)	3.45 (0.90)
Affective lability	3.01 (0.87)	3.22 (0.82)	3.49 (0.80)
Oppositionality	2.50 (0.84)	2.92 (0.87)	3.03 (0.87)
Anxiousness	3.17 (0.92)	3.33 (0.90)	3.64 (0.87)
Suspiciousness	1.92 (0.88)	2.10 (0.93)	2.41 (1.04)
Social avoidance	2.75 (1.07)	2.89 (1.00)	3.27 (1.02)
Narcissism	2.34 (0.82)	2.35 (0.81)	2.40 (0.82)
Insecure attachment	2.74 (1.08)	2.73 (1.09)	3.15 (1.09)
Self-harm	1.40 (0.70)	1.91 (0.98)	1.98 (1.03)
Inhibition	2.64 (0.62)	2.88 (0.63)	2.95 (0.65)
Intimacy problems	2.29 (0.78)	2.48 (0.83)	2.47 (0.88)
Restricted expression	2.99 (0.85)	3.27 (0.83)	3.42 (0.82)
Compulsivity	2.89 (0.94)	2.87 (0.92)	3.01 (0.97)
Dissocial Behavior	1.86 (0.50)	1.95 (0.55)	1.93 (0.55)
Stimulus seeking	1.99 (0.75)	2.18 (0.83)	2.16 (0.83)
Callousness	1.76 (0.58)	1.78 (0.60)	1.79 (0.61)
Rejection	2.32 (0.81)	2.39 (0.83)	2.30 (0.83)
Conduct problems	1.36 (0.52)	1.45 (0.59)	1.48 (0.60)

Note. "BSI" denotes the Brief Symptom Inventory, DAPP-SF denotes Dimensional Assessment of Personality Pathology Short Form, "MDD" denotes major depressive disorder. DAPP-SF scales are demonstrated as mean item score (1–5).

Appendix Table 2

Predicting treatment outcome with DAPP-SF higher order constructs of Pathological Personality Traits (PPT) mediated by baseline level of symptoms within a depression group, anxiety group, or combined group (see also Figure 1)

Independent variable (IV)	Total effect of PPT (IV) on treatment outcome (DV)	Direct effect of PPT (IV) on treatment outcome (DV)	Effect of PPT (IV) on baseline symptom level (M)	Effect of baseline symptom level (M) on treatment outcome (DV)	Mediating effect
In Figure 1 denoted as:	**c**	**c'**	**a**	**b**	**a × b; 95% CI**
Anxiety group (*n* = 1,993)					
Emotional Dysregulation	0.38***	0.18***	0.56***	0.34***	0.20 [0.16, 0.23]
Inhibition	0.17***	0.06***	0.24**	0.45***	0.11 [0.09, 0.13]
Compulsivity	0.10***	0.01	0.18***	0.47***	0.09 [0.07, 0.11]
Dissocial Behavior	0.17***	0.07***	0.21***	0.45***	0.10 [0.07, 0.12]
Depression group (*n* = 1,664)					
Emotional Dysregulation	0.35***	0.11***	0.58***	0.42***	0.24 [0.20, 0.29]
Inhibition	0.15***	0.06**	0.21***	0.48***	0.10 [0.07, 0.12]
Compulsivity	0.07**	−0.02	0.19***	0.50***	0.10 [0.07, 0.12]
Dissocial Behavior	0.14***	0.05*	0.19***	0.48***	0.09 [0.06, 0.12]
Combined depression and anxiety group (*n* = 2,032)					
Emotional Dysregulation	0.39***	0.07**	0.65***	0.48***	0.31 [0.27, 0.36]
Inhibition	0.24***	0.09***	0.30***	0.50***	0.15 [0.12, 0.17]
Compulsivity	0.08***	−0.04	0.24***	0.53***	0.13 [0.10, 0.15]
Dissocial Behavior	0.10***	0.01	0.18***	0.52***	0.09 [0.07, 0.12]

Note. All variables are standardized. DAPP-SF subscale represents the independent variable (IV), baseline (BSI sum score at baseline) represents the mediating variable (M), and posttest (BSI sum score at follow up) represents the dependent variable (DV). "*c*" denotes direct effect, "*c*" denotes total effect, "*a*" denotes effect of IV on M, "*b*" denotes effect of M on Y, "*a* × *b*" denotes indirect mediating effect. Analyses are adjusted for age and gender.

***p value <.001;

**p value <.01;

*p value <.05

Appendix Table 3

Predicting treatment outcome with DAPP-SF subscales of pathological personality traits (PPT) mediated by baseline level of symptoms within a group of patients with an anxiety disorder, depression, or both (n = 5,689)

Independent variable (IV)		Total effect of PPT (IV) on treatment outcome (DV)	Direct effect of PPT (IV) on treatment outcome (DV)	Effect of PPT (IV) on baseline symptom level (M)	Effect of baseline symptom level (M) on treatment outcome (DV)	Mediating effect
In Figure 1 denoted as:		***c***	***c'***	***a***	***b***	***a × b; 95% CI***
Emotional Dysregulation	Submissiveness	0.20***	−0.01	0.38***	0.54***	0.20[0.19, 0.22]
	Cognitive distortion	0.37***	0.10***	0.57***	0.48***	0.27 [0.25, 0.29]
	Identity problems	0.39 ***	0.10 ***	0.61***	0.47***	0.29 [0.27, 0.31]
	Affective lability	0.36 ***	0.10 ***	0.53***	0.48***	0.26 [0.24, 0.28]
	Oppositionality	0.29***	0.07***	0.44***	0.51***	0.22 [0.21, 0.24]
	Anxiousness	0.31***	0.05***	0.50***	0.51***	0.25 [0.24, 0.27]
	Suspiciousness	0.38***	0.11***	0.56***	0.47***	0.26 [0.34, 0.29]
	Social avoidance	0.31***	0.05***	0.50***	0.51***	0.25 [0.23, 0.27]
	Narcissism	0.11***	−0.01	0.23***	0.54***	0.11 [0.10, 0.13]
	Insecure attachment	0.25***	0.03**	0.42***	0.52***	0.22 [0.20, 0.24]
	Self-harm	0.30***	0.09***	0.42***	0.50***	0.21 [0.19, 0.22]
Inhibition	Intimacy problems	0.12***	0.08***	0.09***	0.53***	0.05 [0.03, 0.06]
	Restricted expression	0.24***	0.04**	0.40***	0.52***	0.21 [0.19, 0.23]
Compulsivity	Compulsivity	0.10***	−0.02	0.22***	0.54***	0.12 [0.11, 0.14]
Dissocial Behavior	Stimulus seeking	0.15***	0.04***	0.20***	0.53***	0.11 [0.09, 0.12]
	Callousness	0.12***	0.03*	0.17***	0.53***	0.09 [0.08, 0.11]
	Rejection	0.02	−0.02	0.08***	0.54***	0.03 [0.03, 0.05]
	Conduct problems	0.20***	0.08***	0.22***	0.52***	0.12 [0.10, 0.13]

Note. All variables are standardized. DAPP-SF subscale represents the independent variable (IV), baseline (BSI sum score at baseline) represents the mediating variable (M), and posttest (BSI sum score at follow up) represents the dependent variable (DV). "*c*" denotes direct effect, "*c*" denotes total effect, "*a*" denotes effect of IV on M, "*b*" denotes effect of M on Y, "*a* × *b*" denotes indirect mediating effect. Analyses are adjusted for age and gender.

****p* value <.001;

***p* value <.01;

**p* value <.05

Appendix Table 4

Moderating effects of baseline level of symptoms (Mo) when predicting treatment outcome with DAPP-SF subscales of pathological personality traits (PPT), within patients with depression and/or a anxiety disorder (see also Figure 1 C)

Treatment Outcome: posttreatment BSI score	**Interaction PPT (IV) with Baseline symptom level (Mo)**		**Effect PPT (IV) for 1 *SD* below Mean baseline level of symptoms (Mo)**		**Effect PPT (IV) for mean baseline level of symptoms (Mo)**		**Effect PPT (IV) for 1 *SD* above Mean baseline level of symptoms (Mo)**	
In Figure 1 denoted as:			**d – low baseline symptoms**		**d**		**d – high baseline symptoms**	
Independent variable (IV)	**Beta (SE)**	***p* value**	**Beta (SE)**	***p* value**	**Beta (SE)**	***p* value**	**Beta (SE)**	***p* value**
Emotional Dysregulation								
Submissiveness	0.022 (0.011)	.043	−0.028 (0.022)	.068	−0.007 (0.012)	.588	0.016 (0.017)	.357
Cognitive distortion	0.028 (0.010)	.006	0.069 (0.018)	<.001	0.097 (0.014)	<.001	0.125 (0.016)	<.001
Identity problems	0.069 (0.011)	<.001	0.049 (0.016)	.003	0.118 (0.014)	<.001	0.187 (0.019)	<.001
Affective lability	0.066 (0.011)	<.001	0.048 (0.016)	.002	0.114 (0.013)	<.001	0.180 (0.018)	<.001
Oppositionality	0.048 (0.011)	<.001	0.021 (0.016)	.188	0.070 (0.012)	<.001	0.118 (0.016)	<.001
Anxiousness	0.048 (0.011)	<.001	0.015 (0.016)	.324	0.063 (0.013)	<.001	0.110 (0.018)	<.001
Suspiciousness	0.040 (0.010)	<.001	0.059 (0.019)	.002	0.099 (0.014)	<.001	0.139 (0.015)	<.001
Social avoidance	0.060 (0.011)	<.001	0.001 (0.016)	.944	0.061 (0.013)	<.001	0.121 (0.018)	<.001
Narcissism	−0.025 (0.011)	.023	0.016 (0.016)	.338	−0.009 (0.012)	.438	−0.034 (0.016)	.032
Insecure attachment	0.038 (0.011)	<.001	−0.005 (0.017)	.741	0.032 (0.012)	.009	0.070 (0.016)	<.001
Self-harm	0.027 (0.011)	.010	0.056 (0.020)	.004	0.083 (0.013)	<.001	0.111 (0.014)	<.001
Inhibition								
Intimacy problems	0.047 (0.010)	<.001	0.023 (0.016)	.145	0.070 (0.011)	<.001	0.117 (0.014)	<.001
Restricted expression	0.049 (0.011)	<.001	−0.001 (0.016)	.629	0.041 (0.012)	<.001	0.089 (0.017)	<.001
Compulsivity								
Compulsivity	−0.009 (0.011)	.378	−0.010 (0.016)	.546	−0.019 (0.011)	.096	−0.028 (0.015)	.061
Dissocial Behavior								
Stimulus seeking	−0.013 (0.011)	.233	0.055 (0.017)	.001	0.042 (0.012)	<.001	0.029 (0.015)	.051
Callousness	−0.003 (0.011)	.808	0.028 (0.017)	.098	0.026 (0.012)	.033	0.023 (0.015)	.120
Rejection	−0.022 (0.011)	.039	0.006 (0.016)	.691	−0.016 (0.012)	.177	−0.038 (0.015)	.012
Conduct problems	−0.002 (0.011)	.889	0.083 (0.019)	<.001	0.082 (0.013)	<.001	0.080 (0.014)	<.001

Note. DAPP-SF subscale represents the independent variable (IV). Baseline BSI score represents the moderator variable (Mo). Beta denotes standardized regression coefficients. SE denotes standard error. Analyses are adjusted for age and gender.

Appendix Table 5

Moderating effects of baseline level of symptoms (Mo) when predicting treatment outcome with DAPP-SF higher order constructs of pathological personality traits (PPT), within a depression group, anxiety group, or combined group (see also Figure 1 C)

Treatment Outcome: posttreatment BSI score	Interaction PPT (IV) with Baseline symptom level (Mo)		Effect PPT (IV) for 1 *SD* below Mean baseline level of symptoms (Mo)		Effect PPT (IV) for mean baseline level of symptoms (Mo)		Effect PPT (IV) for 1 *SD* above Mean baseline level of symptoms (Mo)	
In Figure 1 denoted as:			**d – low baseline symptoms**		**d**		**d – high baseline symptoms**	
Independent variable (IV)	**Beta (SE)**	**p value**	**Beta (SE)**	**p value**	**Beta (SE)**	**p value**	**Beta (SE)**	**p value**
Anxiety group (*n* = 1,993)								
Emotional Dysregulation	0.080 (0.016)	<.001	0.161 (0.021)	<.001	0.227 (0.023)	<.001	0.294 (0.031)	<.001
Inhibition	0.078 (0.018)	<.001	0.035 (0.018)	.046	0.100 (0.018)	<.001	0.166 (0.029)	<.001
Compulsivity	0.015 (0.017)	.390	0.004 (0.017)	.830	0.016 (0.017)	.345	0.029 (0.027)	.283
Dissocial Behavior	0.007 (0.018)	.701	0.070 (0.020)	<.001	0.076 (0.019)	<.001	0.082 (0.027)	.003
Depression group (*n* = 1,664)								
Emotional Dysregulation	0.109 (0.019)	<.001	0.022 (0.030)	.468	0.118 (0.058)	<.001	0.215 (0.032)	<.001
Inhibition	0.098 (0.021)	.063	−0.035 (0.028)	.206	0.051 (0.020)	.011	0.138 (0.027)	<.001
Compulsivity	−0.012 (0.021)	.554	−0.012 (0.027)	.654	−0.023 (0.020)	.253	−0.034 (0.027)	.212
Dissocial Behavior	<0.001 (0.020)	.991	0.051 (0.028)	.073	0.051 (0.021)	.016	0.051 (0.026)	.054
Combined depression and anxiety group (*n* = 2,023)								
Emotional Dysregulation	0.049 (0.021)	.021	0.006 (0.042)	.892	0.055 (0.031)	.073	0.104 (0.033)	.001
Inhibition	0.041 (0.020)	.044	0.031 (0.038)	.414	0.072 (0.025)	.004	0.113 (0.025)	<.001
Compulsivity	−0.013 (0.021)	.548	−0.021 (0.039)	.588	−0.034 (0.025)	.177	−0.046 (0.024)	.058
Dissocial Behavior	−0.014 (0.021)	.522	0.032 (0.042)	.449	0.018 (0.027)	.503	0.004 (0.025)	.858

Note. DAPP-SF subscale represents the independent variable (IV). Baseline BSI score represents the moderator variable (Mo). Beta denotes standardized regression coefficients. SE denotes standard error. Analyses are adjusted for age and gender.