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Impulsiveness in borderline personality disorder predicts the long-term outcome of a psychodynamic treatment programme

Wrege, Johannes S ; Busmann, Mareike ; Meyer, Andrea H ; Euler, Sebastian ; Lang, Undine E ; Walter, Marc

Abstract: Despite the preponderance of treatment outcome predictors in patients with borderline personality disorder (BPD), the predictive value of measures of impulsiveness is inconclusive. This naturalistic study consecutively included hospitalized patients with BPD (N = 99) who underwent a standardized and structured 12-week inpatient treatment programme, which integrated cognitive-behavioural and psychodynamic elements. The Brief Symptom Checklist (BSCL) was applied as outcome measure over four time points: pretreatment, posttreatment, first follow-up at 6 to 8 weeks and second follow-up at 1 year after discharge. Impulsiveness was measured using the Barratt Impulsiveness Scale (BIS) at the pretreatment time point. The BSCL significantly decreased between pretreatment and posttreatment, followed by an increase after posttreatment without reaching pretreatment extent. The temporal course of the BSCL significantly varied with pretreatment BIS in that patients with higher impulsiveness revealed a stronger re-increase of symptom severity from posttreatment to end of follow-up than those with lower impulsiveness. The least impulsive patients thereby showed no rebound effect. The robustness of the results was examined by cross-validation. The results indicate that irrespective of the level of impulsiveness, patients with BPD profit from a structured inpatient treatment. However, long-term treatment success was impaired in patients with high level of impulsiveness at pretreatment. Thus, self-ratings of impulsiveness in BPD patients can be utilized for treatment planning. After discontinuation of interventions, relapse prevention should be implemented early in high impulsive patients as symptoms recrudescence in the course after discharge.

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**Impulsiveness in Borderline Personality Disorder Predicts
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Keywords:	borderline personality disorder, BIS-11, psychotherapy, long-term outcome, impulsiveness

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Abstract

Despite the preponderance of treatment outcome predictors in patients with borderline personality disorder (BPD), the predictive value of measures of impulsiveness is inconclusive. This naturalistic study consecutively included hospitalized patients with BPD (N = 99) who underwent a standardized and structured 12-week inpatient treatment program, which integrated cognitive-behavioral and psychodynamic elements. The Brief Symptom Checklist (BSCL) was applied as outcome measure over four time points: pre-treatment, post-treatment, first follow-up at six to eight weeks and second follow-up at one year after discharge. Impulsiveness was measured using the Barratt Impulsiveness Scale (BIS) at the pre-treatment time point. The BSCL significantly decreased between pre and post-treatment, followed by an increase after post-treatment without reaching pre-treatment extent. The temporal course of the BSCL significantly varied with pre-treatment BIS in that patients with higher impulsiveness revealed a stronger re-increase of symptom severity from post-treatment to end of follow-up than those with lower impulsiveness. The least impulsive patients thereby showed no rebound effect. The robustness of the results was examined by cross-validation. The results indicate that irrespective of the level of impulsiveness, patients with BPD profit from a structured inpatient treatment. However, long-term treatment success was impaired in patients with high level of impulsiveness at pre-treatment. Thus, self-ratings of impulsiveness in BPD patients can be utilized for treatment planning. After discontinuation of interventions, relapse prevention should be implemented early in high impulsive patients as symptoms recrudescence in the course after discharge.

Practitioner Points

- Pre-interventional self-ratings of impulsiveness predict long-term treatment outcome
- High impulsive patients with BPD show relapses early after inpatient intervention
- Self-ratings of patients with BPD should be utilized for relapse prevention after discontinuation of intervention

Keywords: borderline personality disorder; impulsiveness; BIS-11; psychotherapy; long-term outcome

1. Introduction

Patients with borderline personality disorder (BPD) represent approximately 1 - 2% of the general population (Coid et al., 2006; Lenzenweger et al., 2007; Ruocco, Lam, & McMain, 2014). In psychiatric populations, patients with BPD reflect a high mental health burden with extensive use of treatments and high costs to societies all over the world. Patients with BPD show symptoms of severe personal, social, and economic adverse consequences, and disability (Coid et al., 2006; Lenzenweger et al., 2007; Ruocco, Lam, & McMain, 2014). BPD can be described as a mental condition with unstable cognitive functioning, an unstable sense of self, and unstable interpersonal relationships (Lieb et al., 2004).

Impulsive behavior is one diagnostic criterion according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the International Statistical Classification of Diseases and Related Health Problems (ICD-10/11), and its manifold presentation is a core feature of BPD (American Psychiatric Association, 2013; World Health Organization, 2004; Skodol et al., 2002). Studies have shown that impulsiveness traits are connected to different behaviors of BPD pathology like substance misuse, self-harm behavior, eating problems, or unstable relationships (Bohus et al., 2000; Clarkin, Hull, & Hurt, 1993; Rosval et al., 2006). Other BPD symptoms are also related to impulsiveness such as self-regulation skills, deficits in response inhibition, decision making, or planning (Busmann et al., 2019; Paret et al., 2017; Unoka & Richman, 2016).

After decades of great clinical efforts and the development of to date five manualized and evidence-based treatment approaches (Emmelkamp & Meyerbröker, 2020), there is a broad consensus that BPD is a treatable disorder (Leichsenring, Rabung, & Leibing, 2011; Lieb et al., 2010; Storebø et al., 2020). Mostly developed for ambulant psychotherapeutic settings, there are cognitive-behavioral (Beck, Davis, Freeman, 2015), dialectic-behavioral (Linehan, 2018), schema-focussed (Young et al., 2003), transference-focussed (Clarkin et al., 1999; Yeomans, Clarkin, & Kernberg, 2002), and mentalization-based therapy approaches (Bateman & Fonagy, 2004). Additionally, there are also efficacious short-term inpatient psychotherapy treatments in Scandinavia and in German-speaking countries (Karterud, 2015; Sollberger et al., 2015) as well as evidence-based crisis-intervention programs (Borschmann et al., 2012). Even though

they are underfinanced with respect to the needs of specialized training requirements of the personnel (Bohus et al., 2016).

Patients with BPD vary in the degree to which they benefit from specialized treatments (Barnicot et al., 2012). Research on factors influencing the psychotherapeutic process has lacked coherence, but some factors are already identified and confirmed (Barnicot et al., 2012). For example, these are higher symptom severity, childhood adverse events, poorer current and therapeutic relationships, higher level of anger and suicidal behaviors, or more psychiatric comorbidities (Busmann et al., 2019; Gratz, Dixon-Gordon, & Tull, 2014; Gunderson et al., 2006; Wnuk et al., 2013).

Considering that impulsiveness measures have been shown to be stable over time and show unique trait profile in BPD (Wilson et al., 2007), it also is a robust predictor of vocational outcome (Sio et al., 2011). However, there is a broad diversity of the predictive value of measures of impulsiveness in BPD. Links, Heslegrave, & Reekum (1999) and Links, Mitton, & Steiner (1990) found impulsivity to be the best long-term predictor for BPD psychopathology and predictive for poor short- as well as long-term treatment outcome. The authors measured impulsiveness using the impulse action subscale score from the Diagnostic Interview for Borderline (DIB) (Gunderson, Kolb, & Austin, 1981). Using a semi-structured interview for the BPD severity index (Arntz et al., 2003) with 11 items for impulsiveness, van den Bosch et al. (2005) found that, among impulsiveness, DBT has a sustained effect on core symptoms of BPD at 6 month after discontinued 12-months treatment. Self-ratings of impulsiveness using the Personality Assessment Inventory (PAI) (Morey, 1991) predicted the presence of BPD symptoms two years later (Tragesser et al., 2007). In contrast, Wnuk et al. (2013) have found no predictive value of impulsiveness for treatment outcome, even though they use the Zanarini Rating Scale for Borderline Personality Disorder (ZAN-BPD), which shows good psychometric properties (Zanarini, 2003). In conclusion, several authors (Bornovalova et al., 2005; Skodol et al., 2002; Wnuk et al., 2013) proposed that more robust measures of impulsiveness such as the Barratt Impulsiveness Scale of Patton, Stanford, and Barratt (1995) should be applied in BPD research.

Patients with BPD rate highest on self-ratings of impulsiveness using the BIS (Bornovalova et al., 2005), and BIS scores are positively correlated with BPD features in non-clinical populations (Chapman, Leung, & Lynch, 2008; Fossati et al., 2004).

Moreover, inattentiveness and lack of anticipating consequences measured with BIS is seen to represent central aspects of impulsiveness in BPD (Van Reekum et al., 1996). Building upon recent research on treatment outcome of patients with BPD, the aim of this study was 1) to analyze the long-term course of the psychopathology within a standardized inpatient treatment program for patients with BPD, and 2) to assess whether the course of treatment was related to patients' impulsiveness at pre-treatment as measured by the BIS. We hypothesized 1) a general symptom reduction within the treatment phase, and 2) that patients with high BIS ratings would reveal less overall symptom reduction from pre- to post-treatment as well as high rebound effects during follow-up compared to patients with low BIS ratings.

2. Methods

2.1. Design

Recruitment of subjects for this prospective naturalistic study took place from October 2014 until November 2017 at the *anonymized*. Eligibility for treatment inclusion was assessed during ambulant preliminary talks when subjects were seeking psychotherapy. After admission to the ward, all patients were asked to participate in the study. During the first week, the participating patients first provided informed consent. Subsequently, their clinical diagnosis was confirmed with the SCID interview. The study protocol included four measurement points. The first measurement was at the beginning of the treatment (day 0-7). Demographic variables were recorded and additional questionnaires were filled in as follows: the Brief Symptom Checklist – BSCL (Franke, 2016), the BIS, and the Beck Depression Inventory (BDI, Beck, Steer, & Brown, 1996). The second time point for assessing the BSCL was placed during the final phase of the treatment (day 80-90). After a standardized discharge at day 90, there were two follow-up BSCL measurements at day 130-160 and at day 360-450.

2.2. Sample

The sample ($N = 99$) was recruited from an inpatient psychotherapeutic treatment of the *anonymized*. The primary inclusion criterion was a diagnosis for BPD assessed with the SCID-II interview (American Psychiatric Association, 2013). The SCID shows high reliability and was performed by advanced clinical psychologists and

psychiatrists (Lobbestael, Leurgans, & Arntz, 2011). In weekly conformational meetings the diagnoses have been supervised by a senior clinician of the ward. The training of the psychologists and psychiatrists consisted at minimum two years in general psychotherapy and at least 1 year in the field of personality disorders. Patients were not included in the study in case of current substance use until one week before admission, psychotic symptoms, intellectual disability, and age below 18. Over the course of the treatment program, total abstinence were controlled via eight unannounced urine and breathalyzer tests. Table 1 presents the sociodemographic and the clinical data of the sample.

--- Please insert here Table 1 ---

2.3. Treatment

The inpatient psychotherapeutic treatment of the *anonymized* is an integrated and standardized evidence-based psychotherapeutic 12-week program *authors anaonymized* . The psychotherapeutic components were individual short-term psychodynamic psychotherapy, 45 minutes two times a week and Mentalization-Based Group Therapy, 75 minutes three times a week (Karterud, 2015; Leichsenring, Rabung, & Leibing, 2004). The psychotherapeutic sessions were conducted by advanced clinical psychologists and psychiatrists which participated in weekly supervisions by a senior psychiatrist. Additionally, the treatment comprised clinical management by primary nurses, psychiatric consultations, therapeutic group sessions of art, music, and body. Manualized trainings in group sessions, e.g. mindfulness and skills training according to the Dialectical Behavioral Therapy are also included (Linehan, 2014). The treatment consisted of 80 inpatient days following ten days of partial hospitalization. A premature termination, the dropout event, was defined by breaking off before day 80. The dropout rate in this sample was $n = 31$ (31.3%) and was reported elsewhere *authors anonymized*. Obligatory, every patient had to have psychiatric outpatient appointments after discharge at least every 14 days.

2.4. Measurements

2.4.1. Brief Symptom Checklist (BSCL)

The BSCL by Derogatis (1977) is a reliable and valid self-report questionnaire for patients. The German short form, BSCL-53, is developed by Franke (2016). The BSCL contains of nine scales with a total of 53 items. Each item has a five-point Likert scale ranging from “not at all” (0) to “extremely” (4). The nine scales cover psychopathology of anger, hostility, anxiety, depression, paranoid ideation, phobic anxiety, psychoticism, somatization, interpersonal sensitivity, and obsessive-compulsive symptoms. The global severity index (GSI) was calculated based on these nine scales. In our sample, the internal consistency of the GSI measured by the nine scale scores was satisfying (Cronbach’s $\alpha = .95$).

2.4.2. *Barratt Impulsiveness Scale (BIS)*

The BIS by Patton et al. (1995) is a reliable and valid self-report measurement for patients. The German version was validated by Hartmann, Rief, and Hilbert (2011). The BIS consists of 30 items including a four-point Likert scale (“rarely/never” (1) to “almost always/always” (4)). The BIS has a total score and three subscales, attentional, motor, and non-planning impulsivity. The reliability analyses of our sample revealed a satisfying internal consistency for the total score (Cronbach’s $\alpha = 0.76$) and the factor non-planning (Cronbach’s $\alpha = 0.65$). The internal consistency for the factors attentional (Cronbach’s $\alpha = 0.44$) and motor impulsivity (Cronbach’s $\alpha = 0.58$) was low.

2.5. *Statistical analyses*

We analyzed the temporal course of the BSCL across the four time points in applying a multi-level model with ‘time’ as a four-level factor, patient ID as random intercept, and the following covariates: age, sex, education, medication, dropout, and BDI. We then used the same multi-level model as described adding the BIS total score as predictor at pre-treatment and its interaction with time. We were thereby interested in the interaction term ‘BIS x time’, reflecting differential time courses depending on the respective predictor value. Additionally, we ran explorative analyses with the second model separately based on each of the BIS subscales. For all models we conducted repeated ($n = 5$) 10-fold cross-validation in order to assess their predictive accuracy, i.e. how they perform when applied to test rather than training data (Olsen & Zachariae, 2019). We thereby used the root mean square error (RMSE) as measure of model

accuracy. All analyses were conducted with R 3.5.2 (R Core Team, 2018). Due to missing values in the BIS variables and/or the covariates, the number of patients analyzed in the multilevel models was reduced to 85 or 84 respectively (see results).

3. Results

The BSCL strongly varied among the four time points ($F(3,120) = 15.5, p < 0.001$). RMSE values were 0.363 based on the training data and 0.592 based on the cross-validated test data. Between pre- and post-treatment we found a significant decrease of the BSCL ($b = -0.376, SE = 0.075, p < 0.001$), while no further changes were observed during follow-up (post-treatment to first follow-up time point: $b = -0.111, SE = 0.086, p = 0.567$; first to second follow-up time point: $b = 0.080, SE = 0.129, p = 0.925$).

Of the 97 patients for whom at least one BSCL was assessed across the four time points, 16 had their last assessment point at pre-treatment, 24 at post-treatment, 36 at first follow-up, and 21 at second follow-up. These four groups did not differ with respect to baseline BIS total and BSCL scores, years of education, age, and sex ($p > 0.27$ for each test, based on one-way ANOVA). Only 12 patients had BSCL values assessed at all four time points.

3.1. BIS total score as predictor for treatment outcome

The descriptive data of the BIS at pre-treatment is depicted in table 2. The Pearson correlation coefficient between baseline BSCL and BIS total score was $r = 0.26$ ($p = .008$).

--- Please insert here Table 2 ---

Overall, the temporal course of the BSCL significantly varied with patients' pre-treatment total score of BIS ('BIS total score x time', $F(3,114) = 3.04, p = 0.032, N = 85$, see Figure 1). This was mainly due to the follow-up period during which the BSCL increased with increasing BIS values (change in slope across time for a one unit increase in BIS, $b = 0.027, SE = 0.010, p = .007$), whereas no such clear pattern was observed during the treatment phase ($b = -0.012, SE = 0.007, p = .079, N = 84$). Thus, patients with high impulsiveness revealed a stronger re-increase of symptom severity between post-

treatment and end of follow-up than those with low impulsiveness. This is depicted in Figure 1, where the BSCL in the highest BIS total category (75th percentile) increased between time points 2 and 4, but slightly decreased in the smallest BIS total category (25th percentile) during the same period. Thus, there was no apparent rebound effect for the least impulsive patients (i.e. 25th percentile). RMSE values based on the training and cross-validated test data were 0.358 and 0.561 for the BIS total score.

--- Please insert here Figure 1 ---

3.2. *Explorative analysis of BIS subscales*

The temporal course of the BSCL varied with patients' pre-treatment values of the BIS motor impulsiveness subscale ('BIS motor impulsiveness x time', $F(3,114) = 3.37$, $p = 0.021$). Similar to the BIS total predictor, patients with high values for motor impulsiveness revealed stronger re-increases of symptom severity between post-treatment and end of follow-up compared to those with low BIS motor impulsiveness values. This pattern was also observed for attentional impulsiveness ('BIS attentional impulsiveness x time', $F(3,114) = 3.13$, $p = 0.028$), whereby lower attentional impulsive patients revealed a stronger decline of symptoms (BSCL) from post-treatment to first follow-up than higher attentional impulsive patients. Finally, for the BIS subscale non-planning impulsiveness the interaction effect with time was weak ('BIS non-planning impulsiveness x time', $F(3,114) = 1.87$, $p = 0.139$).

4. Discussion

This study aimed to assess the long-term treatment outcome of a standardized inpatient treatment program for BPD and the predictive value of a robust self-rated measure of impulsiveness on these outcome courses over time. In line with our first hypothesis, irrespective of the level of pre-treatment impulsiveness, all patients with BPD benefitted significantly from the structured inpatient treatment. That is, the short-term inpatient treatment revealed sustained effects until one year after discontinuation of treatment. However, the temporal course of symptom severity was strongly influenced depending on the level of pre-treatment impulsiveness. The

progression of symptom severity differed between the treatment phase (pre to post) and the phase after discharge (follow-up time points), with a significant rebound only for high impulsive patients with BPD from post to end of follow-up.

In specific, during treatment and in contrast to our second hypothesis, high impulsive patients with BPD revealed strong overall symptom reduction comparable to that of moderate or low impulsive patients with BPD. However, after discharge from treatment and in accordance with our second hypothesis, only high level of pre-treatment impulsiveness was associated with significant re-increases in symptom severity during the follow-up. Moderate and low level of pre-treatment impulsiveness predicted no rebound of symptom severity after discharge. The overall model from post-treatment to second follow-up time point was not significant indicating that, until one year after treatment, symptom severity did not reach the level of pre-treatment.

The mean BIS total score of our sample was similar compared to the original clinical sample of Patton et al. (1995) and higher compared to the non-clinical samples of Patton et al. (1995) and Fossati et al., (2001). Among the subscales of the BIS, the attentional and motor impulsiveness, but not the non-planning impulsiveness influenced significantly the long-term treatment outcome of our sample. In contrast, Martino et al. (2012) retrospectively analyzed features of a drop-out group of a one-year outpatient program for personality disorders and found significantly more BPD diagnoses and high ratings on the non-planning subscale of the BIS. However, these exploratory analyses need to be treated with caution due to limited internal consistencies. According to Preuss et al. (2008), for the German manual, it is recommend to use only the BIS total score because of the insufficient internal consistency of the three subscales.

In the view of the fact that there are different theoretical concepts of impulsiveness (Eysenck, 1993; Plomin & Buss, 1973), it has no unique neurobiological basis and consists of several independent factors that interact and modulate behavior (Evenden, 1999). Consequently, the factor structure of the BIS was based on theoretical considerations to include a number of sub-traits (Eysenck & Eysenck, 1977; Patton et al., 1995). Due to ambiguities and multiple definitions there exists a wide variety of operationalizations of impulsiveness as self-report measures, behavioral laboratory measures, and event-related potentials (Moeller et al., 2001). These measures often

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3 reveal discrepancies, e.g. between behavioral and self-report measures (Dolan & Fullam,
4 2004; Wrege et al., 2014).

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7 In clinical research of BPD, however, impulsive behavior derives from problems
8 in self-regulation and cognitive dysregulation (Unoka & Richman, 2016). Factor-analytic
9 models substantiate the importance of impulsiveness as an independent domain, and
10 familial as well as within-subject co-aggregation of cognitive dysregulation have been
11 proposed as a phenotype in patients with BPD (Ruocco et al., 2015). Although
12 impulsiveness traits are stable over time, it is also medically targeted as a potential
13 factor for BPD treatment outcome in current research (Dimeff, McDavid, & Linehan,
14 1999; Villeneuve & Lemelin, 2005).

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17 Evidence-based psychotherapeutic treatment approaches of different
18 theoretical background aim specifically to enhance limited self-regulation in patients
19 with BPD in order to improve behavioral, social, and functional impairments (Bateman
20 & Fonagy, 2004; Bohus et al., 2016; Linehan, 2014; Yeomans et al., 2002; Young et al.,
21 2003). Reported psychotherapeutic long-term efficacy of impulsiveness in BPD is mixed
22 (Bozzatello & Bellino, 2016; Matthies & Philipsen, 2014; Rudge, Feigenbaum, & Fonagy,
23 2020; Van den Bosch et al., 2005). On the one hand, this may reflect differences in the
24 selected clinical populations, e.g. outpatients vs. inpatients, which can have very
25 different level of personality impairments exhibiting significant differences in pre-
26 treatment impulsiveness. On the other hand, this can reflect the clinical experience of
27 severely impaired patients with BPD lacking appropriate learning from experience (Euler
28 et al., 2019; Fonagy, Luyten, & Allison, 2015), or this may just as well be down to the
29 value of the applied impulsiveness measures (see introduction).

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32 Our data support the notion that self-ratings of impulsiveness can be utilized for
33 treatment planning, especially in severely impaired inpatients with BPD. Even though
34 they may have difficulties in their capacity to make sense of themselves and others in
35 terms of mental states (Fonagy & Bateman, 2008), using the BIS, our data supports that
36 self-ratings of impulsiveness in BPD is a robust predictor of treatment outcome until one
37 year after end of intervention. The BIS or other dimensional measures of impulsiveness
38 should be implemented for an individualized treatment schema, which stresses out
39 theory driven techniques to improve impulse control and mechanisms of change of
40 psychotherapy based on self-regulation enhancement (Euler et al., 2019). During
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treatment, high impulsive patients with BPD did improve clinically, but already in the first 6 to 8 weeks after discharge we saw recrudescing symptoms. Hence, for identified high impulsive patients with BPD, treatment planning should focus on self-regulation techniques during the intervention, and relapse prevention programs should be installed especially directly after treatment termination.

4.1. Limitations

The results of this clinical study are robust as we controlled for age, sex, education, and medication effects, as well as for dropout, and depressive symptoms at baseline. As the attrition of the collected data over the four time points was high, we applied statistical multi-level models, which are less sensitive to missing data in that estimated coefficients based on these models are expected to be unbiased under missing at random conditions. Also, missing data analyses revealed that patients who differed with respect to the last available data point of the BSCL had comparable baseline values of BIS total, BSCL, and socio-demographics. The observed interaction effects for the temporal course of the BSCL with BIS must nevertheless be taken with care as these were mainly observed during the follow-up period where the proportion of patients still providing data were the least. To test against type-I error, our 10-fold cross-validation underscored the robustness of the predictive value of BIS self-ratings. The sample consisted of severely impaired subjects with very high rates of comorbidities (Table 1), e.g. substance use disorders 41.1% and 73.7% received psychotropic medication. Thus, even that all participants were required to be drug-free during the treatment, we cannot exclude a possible influence on ratings of impulsivity. This reflects a common population prospectively drawn from an university clinics inpatient treatment facility. The used follow-up study design was naturalistic in the sense that we did not control for outpatient therapy or obligatory psychiatric outpatient appointment after discharge from the inpatient treatment program. Our quasi-experimental design did not include a control group of either waiting list or treatment with usual care, which limits our interpretations of treatment effects. However, our treatment program integrates manualized elements from cognitive-behavioral and psychodynamic approaches (see section 2.3.) and did not aim to comparatively test the efficacy of its elements. In therapeutic process research, on the one hand this reflects a good external

validity as the study design is aligned to the clinical reality and results can be interpreted in the light of day-to-day practice (Howard et al., 1996; Leichsenring, 2004; Desmet, 2013). In contrast, on the other hand naturalistic designs suffer from low internal validity (Howard et al., 1996; Desmet, 2013). Specificity and causality of symptom reduction cannot be evaluated without a comparative control group.

4.2. Conclusion

This naturalistic study of inpatient treatment outcome courses of severely impaired patients with BPD suggests that pre-treatment measures of impulsiveness can be harnessed to foster treatment planning. Self-ratings of impulsiveness at pre-treatment successfully predicted rebounds in long-term treatment outcome, especially in high impulsive patients with BPD. Particularly after discontinuation of inpatient interventions, relapse prevention should be implemented early for identified high impulsive patients with BPD. Sustained treatment effects were negatively influenced by high level of pre-treatment impulsivity. However, irrespective of the level of impulsiveness, all patients with BPD profited from the structured inpatient treatment program.

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Table 1: Clinical and demographic data (N = 99)

	M, SD	n, %
Female		75, 75.8
Male		24, 24.2
Age (years)	30.2, 9.9	
Education (years)	13.1, 2.5	
Clinical co-morbidities according to DSM-IV:		
Borderline personality disorder		99, 100
Paranoid personality disorder		12, 12.1
Schizoid personality disorder		5, 5.1
Schizotypal personality disorder		3, 3.0
Antisocial personality disorder		11, 11.1
Histrionic personality disorder		4, 4.0
Narcissistic personality disorder		10, 10.1
Avoidant personality disorder		26, 26.3
Dependent personality disorder		11, 11.1
Obsessive-compulsive personality disorder		13, 13.1
Depressive personality disorder		14, 14.1
Negativistic personality disorder		16, 16.2
Depression		35, 35.4
Anxiety disorders		19, 19.2
Eating disorders		14, 14.1
Substance use disorders		41, 41.4
Somatoform disorders		4, 4.0
Posttraumatic Stress Disorder		4, 4.0
Psychopharmacological medication		73, 73.7

Note. M = mean, SD = Standard Deviation, DSM = Diagnostic and Statistical Manual of Mental Disorders.

Table 2: Descriptive data of the Barratt Impulsiveness Scale (BIS)

N = 99	M	SD	CI
BIS total score	70.01	10.83	67.79 – 72.23
BIS attentional impulsiveness	19.79	3.53	19.07 – 20.51
BIS motor impulsiveness	23.06	4.70	22.10 – 24.03
BIS non-planning impulsiveness	27.16	5.09	26.12 – 28.20
Percentiles (Turkey's Hinges)	25.	50.	75.
BIS total score	64.00	70.50	77.00

Note. M = mean, SD = Standard Deviation, CI=Confidence Interval

Figure 1. Temporal course of BSCL values for patients with average (median, $M = 70.5$), high (75th percentile, $M = 77$), and low (25th percentile, $M = 64$) BIS total scores at baseline. Trend lines denote predicted values from a multilevel model, shaded areas denote 95%-confidence limits of trend lines.

149x107mm (300 x 300 DPI)