

## THE OUTCOME OF PSYCHIATRIC REHABILITATION TREATMENT DEPENDS ON AFFECTIVE STATE AT THE TIME OF ADMISSION

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### SUMMARY

**Background:** In Austria, new approaches of rehabilitation programs focus on the prevention of mental illness and offer treatment not only for acute psychiatric patients, but also for those who are at risk of developing a mental disorder or have recovered from one. The aim of this study was to determine the effects of a psychiatric rehabilitation program on individuals with different mood states.

**Subjects and methods:** 600 patients with a history of affective disorder were tested at the time of admission to an Austrian inpatient psychiatric rehabilitation center. Data of extreme groups - patients who were depressed ( $n=59$ ;  $BDI-II < 9$  and  $HAMD < 8$ ) or euthymic ( $n=59$ ;  $BDI < 18$  and  $HAMD > 19$ ) at the time of therapy start - were analyzed. The participants completed the Maslach Burnout Inventory - General Survey, the Symptom Checklist - Revised and the Stress Coping Questionnaire at the beginning and the end of the 6-weeks rehabilitation program.

**Results:** After 6 weeks, both groups showed significantly less psychiatric symptoms ( $BDI-II$ ,  $HAMD$ ,  $SCL-90$ , and negative coping strategies ( $SVF$ )). Importantly, work-related stress symptoms ("burnout" symptoms) improved significantly in the euthymic group.

**Conclusions:** Euthymic patients seem to be able to focus on work-related stress symptoms including reduced emotional exhaustion through treatment, while currently depressed patients primarily benefit by an improvement in general psychiatric symptomatology. The results indicate the crucial role of mood state validated with standardized psychological questionnaires  $BDI-II$  and  $HAMD$  at time of admission to such programs. These findings could have implications on treatment decisions for psychiatric patients and assist in making a forecast concerning ability to recover and treatment prognosis.

**Key words:** depression - burnout symptoms - psychiatric treatment - psychiatric rehabilitation - observational descriptive study

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### INTRODUCTION

In Austria, psychiatric rehabilitation usually consists of a 6-week inpatient setting for individuals with serious mental illness. In many cases, rehabilitation treatment follows acute psychiatric care. In contrast to acute psychiatric inpatient treatment, the principal goals of psychiatric rehabilitation programs are long-term symptom management, improvement of social skills, active participation in everyday life, strengthening of cognitive functioning, and decreasing the rates of hospitalization and retirement on the grounds of disability (Schuster 2015). Literature is lacking on the topic of how the frame is shifting in the mental health / disorder currently towards the inclusion of assessment of subjective values (e.g., public/patient involvement plans, assessment of quality of life, first person perspective, etc.) (Löffler-Stastka et al. 2021).

The Austrian rehabilitation program is standardized and financed by the health insurance company. Vocational training is not included, but all professional groups work together to support the patient in returning to work. This is a major difference to the German

setting, where medical and vocational rehabilitation are conducted together in day hospitals/day centers or outpatient settings (Riedel-Heller et al. 2012, Stengler et al. 2015).

The challenge of the psychiatric rehabilitation setting comprises somatic as well as psychiatric medical care and psychosocial interventions. Usually, psychiatric rehabilitation is a structured process and targeted program that includes medical, psychiatric, psychological and psychotherapeutic treatment, occupational therapy and physiotherapy as well as diet counseling (Hutchison et al. 2017). According to the Austrian social insurance guidelines, there are three principle requirements for individuals with mental disorders when taking part in psychiatric rehabilitation programs (Gesundheit Österreich GmbH 2017):

- The need for rehabilitation (Necessity of a multi-modal program);
- Potential for rehabilitation (Motivation and physical/psychological capacity);
- A positive prognosis with treatment (Potential to reach a specific aim of rehabilitation).

In general, the psychiatric rehabilitation setting follows acute psychiatric inpatient interventions. The target group consists of individuals with persisting mood symptoms, with long periods of unemployment or with the imminent retirement due to mental illness (Piso & Reinsperger 2014). The beneficial effects of psychiatric/psychosomatic rehabilitation treatments have been demonstrated. Evidence has been found that individuals participating in rehabilitation treatment decrease utilization of inpatient service (Hutchison et al. 2017). In addition, interprofessional care has been shown to reduce medical costs (Seitz et al. 2019).

It is well known that patients suffering from depressive symptoms often exhibit so called *burnout symptoms* (Bianchi et al. 2015, Bianchi et al. 2017). Burnout and depression exhibit similar and partly correlating clinical symptoms (as low energy and self-esteem), the overlap between depression and burnout symptoms has also been found in the correlations between emotional exhaustion, one core facet of burnout, and depressive symptoms in psychometric analyses (Ahola et al. 2014, Schonfeld et al. 2019, Chen & Meier 2021). In literature, the three main dimensions of the burnout syndrome are defined as *emotional exhaustion*, *depersonalisation* and a *lack of sense of personal accomplishment* (Maslach et al. 2001). In previous studies, the burnout facet emotional exhaustion was found to be highly correlated with clinical symptoms of depression (Maslach et al. 2001, Chen & Meier 2021). Furthermore, there is a strong association between depression and physiological and psychological stress (Black et al. 2015, Slavich & Irwin 2014). Multiple studies found high cortisol levels and a hyperactivity of the hypothalamic-pituitary-adrenal axis in patients suffering from depression (Birur et al. 2017, Doolin et al. 2017, Mahar et al. 2014, Pochigaeva et al. 2017, Rhebergen et al. 2015). In addition, (epi)genetically determined changes as well as intergenetically transmission of stress hormone regulation might play a role (Halldorsdottir et al. 2019; Koenig et al. 2018).

In many cases, depressive individuals with additional burnout symptoms are undergoing psychiatric rehabilitation with the aim to regain better working capacity. Hence, to improve the psychological well-being and especially to enable reintegration in the work place, the reduction of work-related stress symptoms is of high relevance in psychiatric treatment. However, it is unclear whether individuals with persisting depressive symptoms benefit equally compared to remitted individuals. As we hypothesize that the patient's affective state is of high relevance to the treatment success, the aim of the current pilot-study was to examine the effects of a psychiatric rehabilitation program on the basis of clinical symptoms, depending on the current mood state at the time of admission.

Therefore, we analyzed treatment outcome by comparing two well-characterized psychiatric samples - euthymic patients on the one hand and moderately/severe depressive patients on the other hand. We hypothesized that rehabilitation shows person-specific differences: We assume that euthymic persons experience an improvement in different areas of the burnout-related scales than persons with moderate/severe depressive symptoms during the course of psychiatric rehabilitation.

The practicable benefit of such an examination is to gain further knowledge about the best time for assigning patients to a psychiatric rehabilitation program – either directly after the psychiatric inpatient care or after remission. In addition, we expect to gain knowledge about factors influencing rehabilitation prognosis.

## SUBJECTS AND METHODS

### Subjects

The study was conducted at a psychiatric rehabilitation center in Upper Austria with treatment focus on affective and stress-related disorders. To examine differences in rehabilitation effects depending on mood state at therapy start, data of 600 individuals were available, whereof 29 persons were excluded due to missing data of the Beck Depression Inventory (BDI-II) (Hautzinger et al. 2006) or the Hamilton Depression Scale (HAMD; Hamilton 1960) at the time of admission. Out of 600 patients, one-hundred eighteen individuals with a history of affective or anxiety disorders, treated between April 2015 and April 2017, were included in the study. For the current analysis, out of this data set, two extreme groups – current euthymia (EUTH, n=59) versus current depression (DEPR, n=59) – of patients with a F3 or F4 diagnosis were built. The groups were created using standardized cutoff scores of the BDI-II and the HAMD. In the EUTH group, BDI-II scores were lower than 9 and HAMD scores lower than 8 at the time of admission. DEPR was defined as BDI-II scores higher than 18 and HAMD scores higher than 19, displaying moderate to severe depressive symptoms according to the manuals. Individuals that did not fulfill the criteria for euthymia or moderate/severe depression (n=453) were excluded from the current analysis. Additional exclusion criteria were schizophrenia, substance abuse, neurodegenerative disorders or mental retardation.

The diagnoses of those selected were affective disorders (F3; EUTH 59.7% and DEPR 74.1%) as well as neurotic, stress-related and somatoform disorders (F4; EUTH 45.2% and DEPR 32.2%). The diagnoses of those not selected were (multiple diagnoses were possible): F1 (mental and behavioural disorders due to substance abuse) 8.4% (n=38), F31 (bipolar affective disorder) 6% (n=27), F32-33 (depressive episode, recurrent depressive disorder) 69.3% (n=314), F4 (neurotic,

stress-related and somatoform disorders) 34.7% (n=157), F5 (behavioural syndromes associated with physiological disturbances and physical factors) 1.8% (n=8). The whole study comprises complete actual and lifetime psychiatric history according to the International classification of mental disorders (Dilling et al. 2014), anthropometric measurement, fasting blood, psychological and specific cognitive testing, and various lifestyle questionnaires. The study has been approved by the local ethics committee of the Medical University of Linz, Austria in accordance with *The Code of Ethics* of the World Medical Association (2013), ICH guideline for Good Clinical Practice and current regulations (EK-number: E-24-14). Written consent was obtained from all participants at the time of admission and all of them received the same study procedure.

## Procedure

All participants completed the 6-week rehabilitation program, consisting of weekly medical consultations, psychotherapy (individual and group setting), occupational therapy, physiotherapy, physical training as well as diet counseling. The medical visits were conducted through a specialist for psychiatry once a week in an individual setting. Psychotherapy followed a cognitive behavioral approach and patients received a total of 2x2 plus 4x1 hours of psychological group therapy and two hours of individual sessions. Physiotherapy with sports program and medical consultations were also part of the standard treatment program. All patients received occupational therapy (creative therapy, sensual perception therapy, etc.) for six hours per week.

## Psychometric measurements

Questionnaires to assess current psychiatric as well as stress-related symptomatology at the time of admission (t1) and at the time of discharge (t2) were used in German language.

As described above, depressive symptoms were assessed with the *HAMD* and the *BDI-II*. The *BDI-II* assesses the severity of depressive symptoms on the basis of 21 items and each group contains four statements (Hautzinger et al. 2006, Kühner et al. 2007). As *BDI-II* is a self-assessment inventory, participants have to pick a statement which best describes their emotional state during the last two weeks. The items include questions about mood, sleep, eating habits, sex drive and suicidal tendencies. Cronbach's alpha lies between 0.90 and 0.93 and retest-reliability after five months is  $r=0.78$ . Validity with self-assessed depression (FDD-DSM IV) lies between  $r=0.72$  and  $r=0.89$  and with a semi-structured clinical interview rated by an expert (Montgomery and Asperg Rating Scale MADRS) lies between  $r=0.68$  and  $r=0.70$ . Norms exist for depressive patients (n=266), as well as healthy persons

(n=582) and the *BDI-II* usually takes between five and ten minutes to complete. According to Hautzinger and colleagues a score of 18 or higher on a scale from 0 to 63 indicates a clinically relevant depression.

The *HAMD* is an expert rating to determine the severity of depression based on 21 symptoms or symptom complexes (Hamilton 1960, Carneiro et al. 2015). *HAMD* shows an interrater-reliability between  $r=0.52$  and  $r=0.98$ , and internal consistency lies between  $r=0.73$  and  $r=0.91$ . Concerning validity, *HAMD* was developed to measure specific psychopathologies characteristic of depressive disorders and reveals a correlation of  $r=0.37$  with Beck-Depression-Inventory (*BDI*). There are norms for neurotic depressions, endogenous depressions, as well as bipolar disorder for depressive episodes (n=150).

The *Symptom Checklist - Revised* (*SCL-90-R*) by Franke and Derogatis (1995) measures acute psychiatric symptoms on nine subscales (somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism) and three global scales (the Global Severity Index, *GSI*; the Positive Symptom Total, *PST*; the Positive Symptom Distress Index, *PSDI*). For the current analysis, T-values of the three global scales have been used. The *SCL-90-R* was used as measure of global symptom load beyond the classic burnout and depression scales. We used this inventory to supplement the clinical picture of our test subjects and to gain more insights about psychological symptoms in addition to the classic burnout and depression symptoms.

To measure work-related stress symptoms, we used the *Maslach Burnout Inventory - General Survey* (*MBI-GS-D*) by Maslach, Jackson, and Leiter (1986) including the subscales *Emotional exhaustion* (*MBI-GS-D-EE*), *Depersonalisation* (*MBI-GS-D-DE*), and *Personal accomplishment* (*MBI-GS-D-PA*). The *MBI-GS-D* is the most commonly used questionnaire to assess burnout symptoms in clinical settings as well as research.

The *Stress Coping Questionnaire* (*SVF-78*) by Janke, Erdmann, and Kallus (Janke & Erdmann 2002) was applied to measure coping strategies. The *SVF* includes positive – stress reducing – (Play down, Guilt Denial, Distraction from Situation, Substitute Gratification, Situation Control, Reaction Control, Positive Self-instruction) as well as negative – stress enhancing – (Escape, Rumination, Resignation, Self-blame) coping strategies.

The *Tedium Measures* (*TM*) by Pines, Aronson, and Kafry (1981) were used to assess the degree and frequency of Tedium, defined similarly to burnout: the experience of physical, emotional, and mental exhaustion characterized by the negation of one's self, one's environment, one's work, and one's life.

The *Multiple-Choice Vocabulary Intelligence Test - Version B* (*MWT-B*) by Lehrl, Triebig, and Fischer (1995) was applied to test the premorbid verbal intelligence level.

## Statistics

Independent *t*-tests were used to compare means between the groups (DEPR and EUTH) at t1. When normal distribution was not given (age, premorbid intelligence, BDI-II, HAMD), the Mann-Whitney-U-Test was used.

Analyses of variance with repeated measures design (RM-ANOVAs) were applied to compare time\*group effects (DEPR and EUTH) regarding the course of treatment. Since the groups did not significantly differ in relevant variables (e.g. age, IQ, BMI, smoking, education, psychiatric treatment), no covariates were introduced into the model. In addition, comparisons with paired sample *t*-tests were performed to calculate time effects within the groups. Error probabilities below 0.05 were accepted to denote statistical significance.

## RESULTS

### Descriptive data

Age, sex, and premorbid intelligence did not differ significantly between the two extreme-groups (DEPR and EUTH; see Table 1). Main diagnoses according to ICD-10 were affective disorders (F3) as well as neurotic, stress-related and somatoform disorders (F4).

In the EUTH group, 59.7% suffered from affective disorders (6.8% from the EUTH group had a diagnosis of bipolar disorder) and 45.2% had F4 diagnoses. In the DEPR group, 74.1% suffered from affective disorders (5.1% from the DEPR group had a diagnosis of bipolar disorder) and 32.2% had F4 diagnoses.

### Clinical data at t1

According to the study design, individuals in the DEPR group had significantly lower BDI-II and HAMD scores at t2 compared to t1 (for means and standard deviations see Table 1).

### Treatment effects regarding psychiatric symptoms

Overall, EUTH patients showed significantly lower psychiatric symptoms in all global scales of the SCL-90-R than DEPR patients at t1. Over time, both groups improved in all scales and a positive interaction (Time x Group) was found in the SCL-90-R subscale PSDI, indicating higher improvement in the DEPR group. Paired sample *t*-tests showed improvements in all SCL-90-R scales (see Table 2) and in stress coping (see Table 3) in both groups from t1 to t2.

**Table 1.** Extreme group comparison - Descriptive data at time of admission (t1)

| Descriptive and clinical data                                      | Euthymia (n=59)          | Depression (n=59)           | p          |
|--|--------------------------|-----------------------------|------------|
|  | Mean (SD)                | Mean (SD)                   |            |
| Age (years)  | 52.96 (6.33)             | 50.15 (8.99)                | 0.052 n.s. |
| Females (%)  | 49.2                     | 45.8                        | 0.715 n.s. |
| Body Mass Index (kg/m <sup>2</sup> )                               | 26.4 (4.80)              | 27.22 (4.90)                | 0.366 n.s. |
| Smoker (%)   | 27.1                     | 39.0                        | 0.174 n.s. |
| Verbal premorbid IQ (MWT-B)  | 111.97 (13.93)           | 107.56 (15.60)              | 0.116 n.s. |
| Highest school education (1-7) #                                   | 4.72 (1.87)              | 4.26 (1.71)                 | 0.229 n.s. |
| Sick leaves (psychiatric problems) in the last five years (months) | 5.578 (6.57)             | 8.05 (6.71)                 | 0.094 n.s. |
| Age of first psychiatric treatment (years)                         | 45.26 (10.34)            | 42.74 (12.26)               | 0.261 n.s. |
| Number of inpatient treatments in the last five years              | 2.05 (2.16)              | 2.00 (2.54)                 | 0.945 n.s. |
| Beck's Depression Inventory (t1/t2)                                | 3.56 (2.71)/ 3.23 (5.25) | 29.56 (6.40)/ 16.07 (10.79) | p<0.01     |
| Hamilton Depression Scale (t1/t2)                                  | 3.73 (2.18)/ 2.45 (2.12) | 23.75 (3.73)/ 14.32 (7.40)  | p<0.01     |

# 1 = no school finished, 7 = university degree; MWT-B = Multiple-Choice Vocabulary Intelligence Test - Version B; SD = Standard Deviation; t1 = time of admission; t2 = time of discharge; n.s. = not significant at p<0.05

**Table 2.** Extreme group comparison- psychiatric symptoms

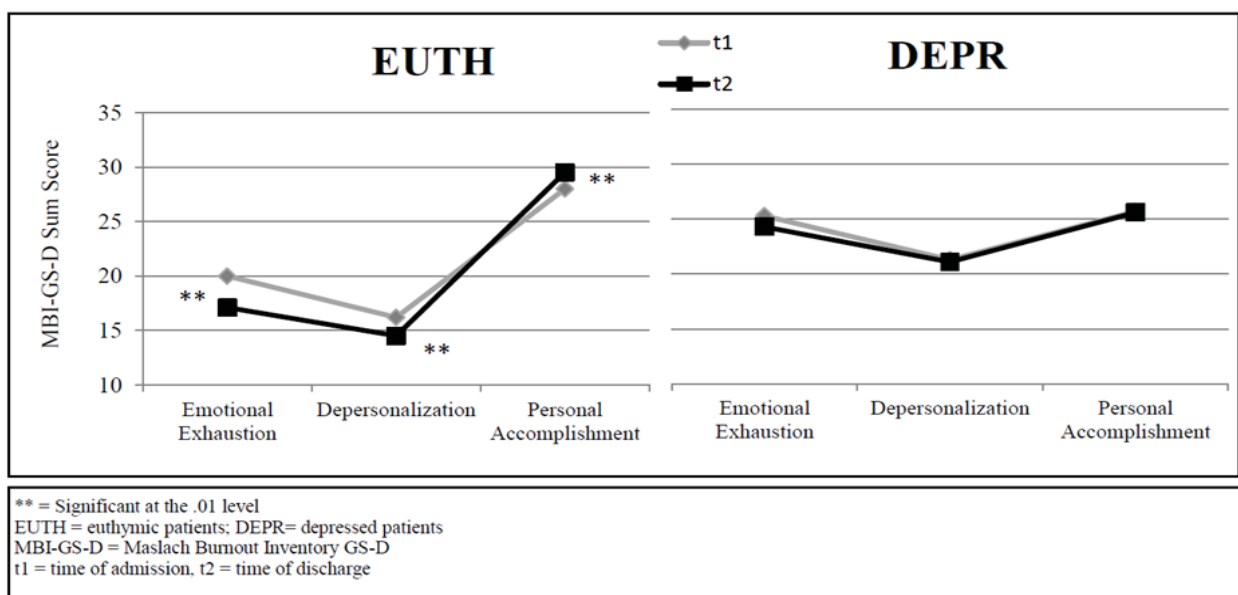
| General psychiatric symptoms                    | Mood state at beginning and end of rehabilitation treatment |              | Differences – Group (between-subject) | Differences – Time (within-subject) | Interaction Group x Time multivariate: F(3,111)=6.81, p=0.000 | Paired t-tests (post-hoc) |
|---|---|--------------|---------------------------------------|-------------------------------------|---|---------------------------|
|   | t1  | t2           |                                       |                                     |   |                           |
|   | Mean (SD)   | Mean (SD)    |                                       |                                     |   |                           |
| SCL-90-R Global Severity Index (GSI)            |   |              |                                       |                                     |   |                           |
| euthymia  | 50.3 (6.9)  | 45.4 (8.5)   | F=219.45**                            | F=39.33**                           | n.s.  | T(57)=5.16**              |
| depression                                      | 70.56 (10.67)   | 63.04 (8.18) | η <sup>2</sup> =0.66                  | η <sup>2</sup> =0.426               |   | T(56)=4.31**              |
| SCL-90-R Positive Symptom Total (PST)           |   |              |                                       |                                     | n.s.  |                           |
| euthymia  | 51.0 (6.8)  | 46.4 (8.5)   | F=206.57**                            | F=58.59**                           |   | T(56)=5.04**              |
| depression                                      | 67.49 (5.41)  | 62.42 (6.71) | η <sup>2</sup> =0.65                  | η <sup>2</sup> =0.34                | T(56)=5.81**  |                           |
| SCL-90-R Positive Symptom Distress Index (PSDI) |   |              |                                       |                                     |   |                           |
| euthymia  | 46.8 (7.1)  | 43.4 (7.8)   | F=162.41**                            | F=70.95**                           | F=15.50**   | T(56)=3.32**              |
| depression                                      | 65.63 (6.41)  | 56.04 (9.60) | η <sup>2</sup> =0.59                  | η <sup>2</sup> =0.39                | η <sup>2</sup> =0.12  | T(56)=8.37**              |

euthymia n=58, depression n=57, t1 = time of admission, t2 = time of discharge; SCL-90-R = Symptom checklist 90; \*\* p<0.01

**Table 3.** Extreme group comparison – Burnout and stress-related symptoms

| Burnout and stress symptoms               | t1<br>Mean (SD) | t2<br>Mean (SD) | Differences –<br>Group (between-subject) | Differences –<br>Time (within-subject) | Interaction Group x<br>Time multivariate:<br>$F(6,97)=2.51, p=0.027$ | Paired t-tests<br>(post-hoc) |
|---|-----------------|-----------------|--|--|--|------------------------------|
| <b>Emotional Exhaustion (MBI-GS-D)</b>    |                 |                 |  |  |  |                              |
| euthymia                                  | 19.91 (5.69)    | 17.09 (5.89)    | $F=39.83^{**}$                           | $F=9.72^{**}$                          | $F=4.79^*$   | $T(52)=3.38^{**}$            |
| depression                                | 25.02 (5.15)    | 24.44 (5.53)    | $\eta^2=0.28$                            | $\eta^2=0.87$                          | $\eta^2=0.05$  | $T(53)=0.33$                 |
| <b>Depersonalisation (MBI-GS-D)</b>       |                 |                 |  |  |  |                              |
| euthymia                                  | 16.11 (5.90)    | 15.04 (6.14)    | $F=36.87^{**}$                           | n.s.                                   | n.s.   | $T(51)=0.16$                 |
| depression                                | 21.50 (4.79)    | 21.19 (5.32)    | $\eta^2=0.27$                            |  |  | $T(53)=0.63$                 |
| <b>Personal Accomplishment (MBI-GS-D)</b> |                 |                 |  |  |  |                              |
| euthymia                                  | 28.38 (4.86)    | 29.40 (5.16)    | $F=12.07^{**}$                           | n.s.                                   | n.s.   | $T(51)=0.06$                 |
| depression                                | 25.65 (5.35)    | 25.44 (5.96)    | $\eta^2=0.11$                            |  |  | $T(53)=0.74$                 |
| <b>Tedium Measures</b>                    |                 |                 |  |  |  |                              |
| euthymia                                  | 2.44 (0.82)     | 2.14 (0.95)     | $F=150.20^{**}$                          | $F=31.70^{**}$                         | n.s.   | $T(57)=2.73^{**}$            |
| depression                                | 4.51 (0.81)     | 3.91 (0.93)     | $\eta^2=0.60$                            | $\eta^2=0.24$                          |  | $T(56)=5.05^{**}$            |
| <b>SVF Positive Coping</b>                |                 |                 |  |  |  |                              |
| euthymia                                  | 52.34 (9.63)    | 54.29 (9.03)    | $F=17.84^{**}$                           | $F=5.97^*$                             | n.s.   | $T(57)=-2.09^*$              |
| depression                                | 44.60 (10.63)   | 46.69 (11.06)   | $\eta^2=0.15$                            | $\eta^2=0.06$                          |  | $T(56)=-1.70$                |
| <b>SVF Negative Coping</b>                |                 |                 |  |  |  |                              |
| euthymia                                  | 49.71 (9.25)    | 46.16 (10.87)   | $F=61.03^{**}$                           | $F=17.12^{**}$                         | n.s.   | $T(57)=3.18^{**}$            |
| depression                                | 64.90 (10.92)   | 60.62 (11.45)   | $\eta^2=0.37$                            | $\eta^2=0.14$                          |  | $T(56)=2.97^{**}$            |

euthymia n=52, depression n=52, t1 = time of admission, t2 = time of discharge; MBI-GS = Maslach Burnout inventory; SVF = Stressverarbeitungsfragebogen; \* $p<0.05$ , \*\* $p<0.01$



**Figure 1.** Changes in MBI-GS-D

In the MBI-GS-D, the EUTH had significantly lower Emotional exhaustion ( $T=-4.82, p<0.01$ ) and Depersonalisation scores ( $T=-5.75, p<0.01$ ) as well as higher Personal accomplishment scores ( $T=2.89, p<0.01$ ) compared to the DEPR at t1. Scores of the *Tedium Measures* were significantly lower in the EUTH compared to the DEPR at t1 ( $T=-13.35, p<0.01$ ). In addition, the EUTH group showed significantly more positive coping strategies ( $T=4.14, p<0.01$ ) and less negative coping strategies ( $T=-7.97, p<0.01$ ) in the SVF in comparison to the DEPR group at t1 (see also Table 3).

### Treatment effects regarding burnout and stress-related symptoms

Figure 1 displays the changes in MBI-GS-D in both groups. There was a significant Time x Group interaction between the groups in Emotional Exhaustion ( $F=4.79, p<0.05, \eta^2=0.05$ ); post-hoc paired sample *t*-tests indicated improvements in Emotional Exhaustion in EUTH ( $T=3.38, p<0.01$ ) but not in DEPR (see Table 3).

Positive coping strategies improved significantly in the whole cohort ( $F=5.97, p<0.05, \eta^2=0.06$ ), but only the group of euthymic individuals were able to improve

significantly in the post-hoc test. Over time, both groups had significantly less negative coping strategies ( $F=17.12$ ,  $p<0.01$ ,  $\eta^2=0.14$ ) as well as lower scores in the *Tedium measures* ( $F=31.70$ ,  $p<0.01$ ,  $\eta^2=0.24$ ; see Table 3).

## DISCUSSION

The current study investigated individuals in a 6-week inpatient psychiatric rehabilitation setting aiming to compare treatment effects on outcome depending on the mood state, assessed with the self-rating /expert-rating BDI/HAMD, at the time of admission.

Overall, the psychiatric rehabilitation program showed beneficial effects with a high effect size on the occurrence and severity of psychiatric and work-related stress symptoms in both groups (DEPR and EUTH). Furthermore, there was a significant improvement in depressive symptomatology (*BDI-II*, *HAMD*) in both groups. Importantly, work-related stress symptoms assessed with the MBI-GS-D improved significantly in euthymic patients. It is important to distinguish between the depressive symptoms that can accompany the development of burnout and a major depressive episode, although this distinction is not always clinically possible (Brühlmann 2010). According to ICD 10, the hallmarks of a major depressive episode include the occurrence of the three main criteria for a period of at least two weeks: 1.) depressed mood, 2.) reduction in drive and activity, and 3.) the loss of interest and joy. There may also be symptoms such as pronounced tiredness, sleep disorders, changes in appetite, low self-esteem, feelings of guilt, psychomotor inhibition/agitation and loss of libido. In descriptive diagnostics, however, burnout symptoms cannot be adequately differentiated from major depressive episode symptoms and overlaps are common.

To our knowledge, this is the first study to compare the effects of a multidisciplinary inpatient psychiatric rehabilitation setting on psychological parameters between euthymic and depressed individuals. There is literature in individuals with fibromyalgia, evaluating the effects of psychosomatic interventions depending on the current mood state (McIntyre & Lee 2016). Depression symptom severity was commonly measured with the Hamilton Depression Rating Scale. Differences in the general treatment success depending on the psychiatric symptomatology at the time of admission were reported. In line with these studies, our findings describe the clinical effects of an Austrian inpatient psychiatric rehabilitation setting as well as differences in the treatment outcome between extreme groups of euthymic individuals and individuals with moderate to severe depressive symptomatology. Those differences were mostly observed in burnout scales.

Nevertheless, measurement of burnout symptoms and their discriminative power in relation to depression can be criticized. Importantly, emotional exhaustion, measured with the MBI, was more highly correlated with the depression and anxiety scales than it was with depersonalization and personal accomplishment (Schonfeld et al. 2019). As in our study Emotional Exhaustion decreased significantly over time only in EUTH but not in DEPR patients, the prevalence of depressive symptoms in the DEPR group might have influenced the results.

The significant improvement of work-related stress symptoms evident in participants with euthymia might be caused by other factors than the existence or non-existence of depression. Individuals with fewer psychiatric symptoms might be able to focus more on their work-related stress symptoms, whereas patients with severe depressive symptoms might primarily focus on symptom improvement and might be more occupied with negative thoughts, rumination and worrying. A further explanation is cognitive dysfunction, which is a key feature and symptom of mood disorders (McIntyre & Lee 2016). A decline in cognitive deficits is even more associated with psychosis, whether schizophrenia or bipolar disorders, as demonstrated by the AESOP study (Mellacqua et al. 2012). Attention and memory deficits in depressed individuals could impede the learning of new coping strategies and stress management skills. Furthermore, depressed individuals are known to have more severe social skill deficits, persistent sense of hopelessness and need more time to adapt to changed circumstances in comparison to euthymic individuals (Picardi & Gaetano 2014), inhibiting or prolonging the healing process. Nevertheless, our data show also improvement in the stress-related scales in the extreme group of moderate to severe depressive symptomatology, suggesting that coping with stress, which is also an important resource at the working place, improves significantly over the 6-week treatment.

As also the psychiatric-symptoms of individuals with current moderate to severe depressive symptomatology improved significantly due to the treatment, a follow-up stay in a day hospital/day center or outpatient psychiatric rehabilitation program after remission of depressive symptoms (e.g. after a time period of one year) could be useful. In that way, a reintegration into work life could be facilitated.

Nevertheless, it does not mean that these individuals should not be re-integrated in the working process as soon as possible but that further support programs might be useful. There are different international models of work integration, some based on a “first train, then place” approach, while others focus on the immediate re-integration into work with

supported employment (“first place, then train”) (Riedel-Heller et al. 2012, Stengler et al. 2015, Stengler et al. 2016). It is not possible to interpret our findings in the context of these models, as the measurement of re-integration was not part of this study.

In addition, in times where waiting times for psychiatric rehabilitation in Austria (in many cases after acute psychiatric care) tend to take several weeks up to several months, the findings support the belief that already remitted, previously depressed individuals, still benefit from interventions targeted by psychiatric rehabilitation programs including the dealing with work related emotions. Hence, the admission of rehabilitated or currently euthymic patients to rehabilitation programs could prevent the occurrence or recurrence of psychiatric symptoms and ensure the workableness of persons concerned but could maybe achieved in a less costly outpatient setting.

### Fazit for clinical practice

There is a necessity of being aware of the “mood state” measured with self-ratings in addition to clinical assessment and expert ratings to include structured patient orientated perspectives in the therapeutic process.

Use of screenings with validated self- and expert-ratings (BDI-II, HAMD) might be useful for clinical outcome prediction in individuals undergoing psychiatric rehabilitation settings

### Limitations

There are some limitations of the current study. First, there were no standardized values of the MBI-GS-D; therefore, an interpretation of the severity of work-related stress symptoms is not possible. Second, illness duration as well as medication was not obtained but might have influenced the individual’s outcome. Third, a follow-up investigation, e.g. one year after completing the rehabilitation program, would be needed to acquire more information about long-term effects and sustainability of rehabilitation programs.

### CONCLUSIONS

In conclusion, changes in mood, psychiatric symptoms, and stress coping due to psychiatric rehabilitation are possible regardless of the mood state at time of therapy beginning. Nevertheless, euthymic individuals improved not only in psychiatric symptoms, but additionally in work-related stress symptoms. This was not shown for depressed individuals. Such findings can serve to improve treatment decisions for psychiatric patients and assist in making a forecast concerning treatment prognosis. It remains unanswered by this

study if such inpatient rehabilitation programs could be delivered effectively to euthymic to mild/moderately depressive patients in a less costly day hospital/day center or outpatient setting. As in most psychiatric diseases a lifelong vulnerability for psychiatric symptoms can be assumed, treatment programs especially in euthymia might help to reduce work-related stress symptoms including feelings of emotional exhaustion.

Importantly, there is a necessity to include patient self-reported mood states in the treatment of patients as well as to include patient-orientated outcome research and public/patient perspectives (Löffler-Stastka et al. 2021).

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Substantial contributions to the conception or design of the work: Bernd Reininghaus, Nina Dalkner & Eva Z. Reininghaus.

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Interpretation of data: all authors.

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