Negative Affect Repair Questionnaire (NARQ):
Development and validation of an instrument assessing negative affect regulation strategies

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Abbreviations

ADHD  Attention-deficit/ hyperactivity disorder
ANOVA  Analysis of variance
BDI  Beck Depression Inventory
C  Cognitive regulation strategies
CERQ  Cognitive Emotion Regulation Questionnaire
CFA  Confirmatory Factor Analysis
CFI  Comparative Fit Index
CI  Confidence interval
DERS  Difficulties in Emotion Regulation Scale
Dis  Calming/ distractive strategies
DSM  Diagnostic and Statistical Manual of Mental Disorders
EFA  Exploratory Factor Analysis
ERQ  Emotion Regulation Questionnaire
Ex  Externalizing strategies
F  Factor
GFI  Goodness of fit index
ICD  International Classification of Diseases
IDCL  International Diagnostic Checklist
M  Mean
MDD  Major Depressive Disorder
MLE  Maximum likelihood estimation
MnSq  Mean square
NARQ  Negative Affect Repair Questionnaire
NFI  Normed Fit Index
NMR  Generalized Expectancies for Negative Mood Regulation
PC  Patients with physical conditions
RMSEA  Root mean square error of approximation
S  Social regulation strategies
SD  Standard deviation
SEM  Structural Equation Modelling
SRSMQ  Self-Regulating Strategies of Mood Questionnaire
TLI  Tucker-Lewis Index
TMMS  Trait Meta-Mood Scale
1 General introduction

Spock: "Listen, Doctor McCoy! You have to learn to handle your emotions, otherwise you will break down one day." (The Wrath of Khan / Star Trek II)

Negative affective states are sometimes useful and inevitable. Even though, to get along with others, it is necessary to manage one’s subjective experience of affect, especially its intensity and duration, and to manage strategically one’s expression of affective state (Saarni, 1999).

1.1 The construct of negative affect regulation

1.1.1 Defining the term affect

The field of affect regulation is characterized by a “conceptual and definitional chaos”. Several distinctions have been made to structure that chaos. Many of these distinctions are idiosyncratic. In some contexts, the terms affect, emotion and mood were used interchangeable. In others, emotions were distinguished from moods. One distinguishing feature is duration. “If emotional reactions are like storms, then moods are like seasonal climate change” (Rottenberg & Gross, 2003). The term emotion indicates acute emotional states that occur in response to specific stimuli (Parkinson et al., 1996). Mood, however, is generally thought to be longer, slower moving, and less tied to specific objects or elicitors (Watson, 2000) (see Figure 1).

![Figure 1. Terminologies in Affective Sciences (Parkinson et al., 1996).](image-url)
Another distinguishing feature is intensity. Emotions tend to be more intense and “scream at us”, whereas moods “nag at us” (Larsen, 2000). Parkinson et al. (1996) also argued that emotions and mood differ in their time course. Emotions are seen to have a distinct onset and offset in time, with a peak in between. Moods build up gradually and it is difficult to define an exact start or peak.

Despite these distinguishing features of emotion and mood, they have also a few features in common. Emotion and mood are multi-component response tendencies with overlapping aspects in experience, expression and physiology (e.g., Gross, 1998). They are experiential entities, which are felt or sensed (Larsen, 2000). These felt aspects of emotion and mood are referred to as affective components. Another shared feature is the expression of the emotion or mood. A final overlapping aspect is the physiological change associated with emotion and mood. With respect to these overlapping features of both, affect is considered an umbrella term that encompasses emotion and mood (e.g., Campbell-Sills & Barlow, 2007; Larsen, 2000; Parkinson et al., 1996). In this sense, affect can be seen as a superordinate category for emotion and mood.

1.1.2 Defining the term negative affect regulation

Affect regulation can be seen as the regulation of all valenced states, including emotion and mood regulation. A common distinction is generated between the regulation of a positive or a negative affect. The focus in our studies was the regulation of a negative affect, that is, asking people what they do to overcome a negative affect. This repairing of a negative affect (negative affect repair) refers mainly to strategies, thoughts, and behaviours intended to improve negative mood and emotional states (Campbell-Sills & Barlow, 2007).
1.2 The relevance of negative affect regulation

1.2.1 Negative affect regulation in daily life

Different affect regulation strategies have divergent consequences for cognitive, affective, and social functioning (Gross & John, 2002). In everyday life, negative affect regulation plays an important role for effective social interactions and well-being (e.g., Eisenberg et al., 2000; Gross, 1998). Individuals who are unable to regulate their negative affect are more likely to become physiologically over-aroused and to behave in ways that undermine the quality of social interactions (Eisenberg et al., 2000). The ability to regulate negative affects influences the functioning in public (e.g., at work or at school) as well as in private (e.g., in intimate relationships, friendships) situations (Fichman et al., 1999; Larsen, 2000).

1.2.2 The clinical relevance of negative affect regulation

Negative affect regulation processes are central to mental health (Gross, 1998). Indeed, affect dysregulation is implicated in over half of the DSM-IV Axis I disorders and in all of the Axis II disorders (APA, 1994; Gross & Levenson, 1997). Difficulties in negative affect regulation are associated with clinical problems including mood disorders (Campbell-Sills & Barlow, 2007), generalized anxiety disorders (Mennin et al., 2002), borderline personality disorder (Linehan, 1993), ADHD (Barkley, 1997), impulse control disorders and substance abuse (Hayes et al., 1996; Sher & Grekin, 2007), and externalizing disorders (Rubin et al., 1995). Therefore, new versions of cognitive-behavioural therapy focus on the integration of treatments for deficits in negative affect regulation, for example in the therapy of depression and anxiety (e.g., Barlow et al., 2004). But more research is required to explore the relationship between affect regulation strategies and clinical disorders and to test the assumptions about negative affect regulation in clinical populations that underlie these treatments.
1.3 Methods of test construction

In the present thesis the development and validation of a new assessment instrument, the Negative Affect Repair Questionnaire (NARQ), is described. Therefore available methods of test construction (deductive method, external method, inductive method, prototype method) are characterised in the following chapter (see Figure 2).

![Methods of test construction diagram]

Figure 2. Methods of test construction and its statistical analyses.

The particular test construction method defines the construct and implies a special statistical analysis. Each test construction method has advantages and disadvantages but no single method can be shown to be better than the others (Burisch, 1984). The aim of the external method is to sample items that can discriminate between empirical groups. These differences have to be validated in a second sample. Subscales constructed by the external method often contain heterogeneous items and are interpreted post-hoc. The inductive method uses the Exploratory Factor Analysis (EFA),
which groups items that correlate high with each other and assume a common dimension of these items. Items are allowed to load on all factors. The interpretation of the factors occurs a posteriori and the labels are often neologism of the grouped items. Another point is that empirical scales are often fragile to the constitution of a specific sample (Amelang & Zielinski, 2002). By the use of the act-frequency approach a typical object (prototype) can be defined and items with a similarity to the prototype are added to the category. The deductive or rational method assumes a theory and tests it by the use of Confirmatory Factor Analysis (CFA) on empirical data. The deductive method is economic and the scale labels are often clear and better to communicate (Amelang & Zielinski, 2002). We used the deductive method for the development of the Negative Affect Repair Questionnaire (NARQ). In the following subchapters the theoretical background and the applied statistical method of the NARQ are described in greater detail.

1.3.1 The theoretical background of the NARQ

The NARQ is theoretically based on the developmental approach of Saarni (1999). Saarni (1999) describes the developmental shift from interpersonal to intrapersonal affect regulation. Infants cannot meet their own needs, and must enlist other’s help to do so, initially by crying (Bowlby, 1969). Saarni (1999) describes the emotional development of children and young adolescents vulnerable to maladaptive behaviour. She formulates eight skills, where self-regulation (beside e.g. self awareness and social awareness) is embedded in a broader concept, the construct of emotional competence. Saarni (1999) discusses self regulation as a form of intrapersonal regulation (“on the inside”) and also how one manages his/her mood-expressive behaviour “on the outside”. In the constructive process of the NARQ we referred to Saarni’s concept (1999) and differentiated intrapersonal and interpersonal negative affect repair strategies.
We considered cognitive regulation strategies and calming/distractive strategies as part of intrapersonal regulation and social regulation strategies and externalizing strategies as part of interpersonal regulation (see Figure 3).

![Subscales of strategies in NARQ](image)

**1.3.2 The applied statistical method**

To test the applied theoretical model of the NARQ, we used the statistical technique of Confirmatory Factor Analysis (CFA). The CFA is a special form of factor analysis and is also frequently used as a first step to assess the proposed measurement model in a Structural Equation Model. In contrast to Exploratory Factor Analysis (EFA), where all loadings are free to vary, CFA allows for the explicit constraint of certain loadings to be zero. CFA usually starts by specifying a model on the basis of a theory. In contrast to EFA, CFA assumes each manifest variable to be a distinct indicator of an underlying latent construct. Therefore, items in the CFA load only on one factor, whereas items in the EFA are allowed to load on each factor. Strengths of CFA are the ability to model constructs as latent variables, variables which are not measured directly, but are estimated in the model from measured variables which are assumed to tap into the latent variables. The correlations between latent factors can either be free to vary or constrained to be zero.

The aim of the CFA is to compare the theoretically based model with the “model fit” to
the empirically derived model. The “model fit” measures the extent to which the covariances predicted by the model correspond to the observed covariances in the data. This will be obtained by numerical maximization of a fit criterion as provided by maximum likelihood, weighted least square or asymptotically distribution-free methods. The appropriateness of a specific CFA model is assessed by measures of global and local model fit (e.g., normed fit index, NFI; Tucker-Lewis index, TLI; comparative fit index, CFI).

1.4 The aim of study one

Given the obvious clinical relevance of affect regulation the lack of reliable assessment instruments designed for clinical populations is surprising. Therefore, the aim of study one was the development of a new negative affect repair questionnaire (NARQ), which is applicable to clinical and non-clinical populations. The new developed questionnaire should contain relevant clinical regulation strategies and should be based on a theoretical model. The new feature of study one should be the development and validation of the questionnaire in clinical samples.

1.5 The aim of study two

Affect regulation seems to play a significant role for onset and maintenance of depression (e.g., Campbell-Sills & Barlow, 2007; Gross & Munoz, 1995). Therefore, a better understanding of negative affect regulation is of major relevance for patients with depression. Studies exploring the spontaneous use of negative affect regulation strategies in clinical samples are relatively rare. The aim of study two was to determine the prevalence of a broad range of negative affect repair strategies (NARQ) in a sample of depressed patients and a matched healthy control group.

These two studies will be described in detail in the following two chapters. Each chapter is structured into introduction, methods, results, and discussion and is currently submitted for publication.
2 Study one: Assessing affect regulation strategies with the Negative Affect Repair Questionnaire (NARQ): factor structure and psychometric properties in a clinical sample

2.1 Introduction

Negative affects have a profound effect on the quality of social interactions, social functioning and well-being (Eisenberg et al., 2000; Gross, 1998; John & Gross, 2004). Consequently people try to regulate negative affects using various strategies (Thayer et al., 1994), with some strategies being more effective or successful than others (John & Gross, 2004; Thayer et al., 1994). Difficulties in affect regulation can have adverse consequences, from ordinary unhappiness to outright psychopathology (Gross et al., 2006; Rottenberg et al., 2003), such as mood disorders (Campbell-Sills & Barlow, 2007), generalized anxiety disorder (Mennin et al., 2002), personality disorders (Westen et al., 1997), and substance abuse (Hayes et al., 1996; Sher & Grekin, 2007).

Given the obvious clinical relevance of affect regulation the dearth of reliable assessment instruments designed for clinical populations is surprising. The Emotion Regulation Questionnaire (ERQ, Gross & John, 2003) covers a small spectrum of emotion regulation strategies. This 10-item measure is based on the two-factor theory of emotion regulation (Gross, 1998) and consists of the subscales “cognitive reappraisal” and “suppressive expression”. However, information on the psychometric quality of the ERQ is limited. Egloff et al. (2006) reported internal consistencies (mean $\alpha = .81$) for a German adaptation of the ERQ in a sample of 82 psychology students. Garneski et al. (2001) developed the Cognitive Emotion Regulation Questionnaire (CERQ), assessing nine dimensions of cognitive emotion regulation: self blame, blaming others, acceptance, refocus on planning, positive refocusing, rumination or focus on thought, positive reappraisal, putting into perspective and catastrophising. The sample in Garneski et al. (2001) were 547 secondary school students (mean age = 14 years).
Reported reliability scores of subscales were good (between .89 and .82), with reliabilities for only two subscales smaller than .70. Test-retest reliabilities of the subscales ranged between .41 and .59 after a five-month follow-up period.

Another regulation questionnaire (Self-Regulating Strategies of Mood Questionnaire, SRSMQ) was developed by Thayer et al. (1994), who identified six dimensions of mood regulation: active mood management (e.g., stress management, exercise), seeking pleasurable activities/ distraction, passive mood management (e.g., eat something, sleep), social support/ ventilation/ gratification (e.g., talk to someone), direct tension reduction (e.g., drugs, alcohol) and withdrawal-avoidance. The SRSMQ is a 29-item questionnaire consisting of three-parts assessing strategies to change negative mood, raise energy, and reduce tension. Psychometric properties of this questionnaire have not yet been reported.

Some questionnaires in the field of affect regulation treat mood and emotion regulation only as a subscale imbedded in a broader theoretical concept (e.g., emotional intelligence). One example is the Trait Meta-Mood Scale (TMMS, Salovey et al., 1995). The six item scale “repair of emotion” is one of three scales assessing the construct “perceived emotional intelligence”. Internal consistencies of the scales attention to, clarity, and repair of emotions ranged between .81 and .88 for the German adaptation of the TMMS in a student sample (Otto et al., 2001).

Instruments, assessing mood and emotion regulation strategies imbedded in the concept of individual expectancy that some behaviour or cognition will alleviate a negative affective state, are the NMR and DERS (Catanzaro & Mearns, 1990; Gratz & Roemer, 2004). The Generalized Expectancies for Negative Mood Regulation (NMR, Catanzaro & Mearns, 1990; Backenstrass et al., 2008) is a 30-item questionnaire. The internal consistencies of the NMR scales general, cognitive and behavioural regulation ranged between .86 and .92. The NMR was developed and validated in samples of college undergraduates.
The NMR was used as a template for the development of the *Difficulties in Emotion Regulation Scale* (DERS, Gratz & Roemer, 2004). The DERS is a 41-item questionnaire consisting of six sub-scales: non-acceptance of emotional responses, difficulties in engaging in goal-directed behaviour, impulse control difficulties, lack of emotional awareness, limited access to emotional regulation strategies, and lack of emotional clarity. Difficulties in emotion regulation are assessed with eight items and the introduction “When I’m upset, I believe that …”. Cronbach’s alphas from a homogenous sample of psychology students (mean age = 23 years) range between .80 and .89, and construct validity with the NMR (Catanzaro & Mearns, 1990) between -.34 and -.69.

This brief overview of questionnaires designed to assess mood and emotion regulation suggests a number of issues that these measures have in common. First, the terms, affect, emotion, and mood, are used inconsistently, and often interchangeable. In order to avoid this confusion we use the term “affect regulation” in the sense of a superordinate category for all valenced states. Consequently, negative affect regulation describes the tendency to actively and positively influence negative affect with various strategies. Second, all of these questionnaires were designed for and validated in non-clinical populations (mainly students) making their use potentially difficult for clinical groups. Third, the majority of the instruments are empirically derived (by use of exploratory factor analyses), i.e. without theoretical foundation or without testing the appropriateness of the theoretical model used. This may lead to problems in the interpretation of the empirically derived factor structure. However, one exception is the theoretically postulated and empirically confirmed two-factor structure of the ERQ (Gross & John, 2003).

It is high probable that these issues contribute to the current lack of agreement on important affect regulation strategies and the number of dimensions of the construct. This provides the rationale for developing a new negative affect regulation questionnaire (i.e., NARQ), which can be used for clinical and non-clinical populations. The NARQ contains strategies frequently found in other questionnaires in addition to other relevant
clinical regulation strategies, such as aspects of self-harm and substance use (Linehan, 1993; Swendsen et al., 2000). Primarily Linehan’s work (1993) supports the role of self-harm (e.g., aggressive, impulsive behaviour) as a negative affect regulation strategy, particularly in clinical samples.

In contrast to most other questionnaires in this field, the development of the NARQ is based on a theoretical model, i.e. the developmental approach of Saarni (1999). In this model she describes a developmental shift from external to internal regulation from childhood to adulthood. The model proposes affect regulation as one of eight emotional skills, where self-regulation (besides, e.g., self awareness and social awareness) is embedded in the broader concept of emotional competence. Adapted for the NARQ we assumed four factors: cognitive and calming/ distractive strategies as internal regulation strategies and social and externalizing strategies as regulation strategies on the outside. The scale externalizing strategies contains clinical relevant aspects of self-harm aspects and substance use.

In summary, the aim of the current study was the development of a theoretical derived and reliable questionnaire to measure negative affect regulation strategies. This questionnaire should be applicable to clinical groups assessing a broad spectrum of strategies to regulate negative affective states. We assume that the theoretically derived scale structure of the NARQ is as good as or even better than the empirically derived structure.

2.2 Methods

2.2.1 Participants

The present study included a total of 225 patients, 105 with a diagnosis of Major Depressive Disorder (MDD) and 120 patients with physical conditions. Patients with MDD were recruited from a psychiatric department of a university hospital and had a mean score of 28.3 in Beck’s Depression Inventory (BDI, Beck & Steer, 1987; Hautzinger et al., 1995). The diagnosis MDD was confirmed by the International
Diagnostic Checklists (IDCL, Hiller et al., 1999). As another inpatient group without the diagnosis of MDD, patients with physical conditions from a cardiology or otorhinolaryngology department of a university hospital were recruited. The mean BDI score of this group was 4.1 and IDCL confirmed that no MDD or other mental disorder was present in these patients. The majority of conditions in otorhinolaryngology patients concerned diseases of the mouth, throat, pharynx, respiratory system, and inner ear. Most cardiology patients suffered from ischaemic heart disease, atrial fibrillation and angina pectoris.

Patients’ age ranged from 18 to 78 years, with a mean age of 40.2 (SD = 12.6). Table 1 shows detailed demographic and clinical characteristics for the total sample and the subgroups.

Table 1: Demographic and clinical characteristics of the two patient groups and the total sample.

<table>
<thead>
<tr>
<th></th>
<th>Total sample</th>
<th>Pat. with MDD</th>
<th>Pat. with PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>225</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>Mean age (SD)</td>
<td>40.2 (12.6)</td>
<td>41.1 (11.9)</td>
<td>42.9 (14.5)</td>
</tr>
<tr>
<td>Female, %</td>
<td>44.0</td>
<td>58.1</td>
<td>31.7</td>
</tr>
<tr>
<td>Mean BDI score (SD)</td>
<td>15.3 (14.1)</td>
<td>28.3 (10.0)</td>
<td>4.1 (2.9)</td>
</tr>
</tbody>
</table>

Note. BDI = Beck Depression Inventory, Pat. with MDD= patients with major depressive disorder, Pat. with PC= patients with physical conditions.

2.2.2 Instruments

Negative Affect Repair Questionnaire (NARQ) The NARQ is a self-report rating scale designed to assess strategies to “repair” negative affect. The instruction ("To cope with my current bad mood and to try to make myself feel better, … ") is followed by 29 items (see Appendix A). Patients rate how frequently they endorse each of the listed strategies on a 5-point Likert scale ranging from 0 (never) to 4 (always).
Concurrent with empirical findings and theoretical models (e.g., Thayer et al., 1994; Parkinson & Totterdell, 1999), we suggest a multidimensional structure for the NARQ. Based on the developmental approach of Saarni (1999) we assume four factors: 
cognitive regulation strategies (e.g., I try to think positively, I try to reappraise the situation), calming/ distractive strategies (e.g., I do things to distract myself, I relax with music), social strategies (e.g., I talk with my friends, I express my feelings) and externalizing strategies (e.g., I hurt myself, I drink alcohol or take some drugs to help me relax).

The item selection was conducted in three steps: (1) screening of all relevant questionnaires in the field of affect regulation (e.g., SRSMQ, ERQ) with a selection of relevant items; items were adapted, rephrased and allocated to the supposed NARQ factors, (2) formulation of additional behaviour-related items of affect regulation, and (3) formulation of items relevant for clinical populations. For the second and third steps clinicians (i.e., psychotherapists) were asked to suggest further relevant regulation strategies. Strategies such as self-harm (Linehan, 1993) and substance use (Swendsen et al., 2000), especially self-destructive aspects assessed in factor externalizing strategies, were taken as of particular relevance for clinical populations.

Diagnostic Interview. In order to establish whether participants fulfilled ICD-10 diagnostic criteria for depression a clinical interview was carried out using the International Diagnostic Checklist (IDCL) for Depression (Hiller et al., 1999).

Beck Depression Inventory (BDI). The BDI was used to provide a quantitative measure of depression (Beck & Steer, 1987; Hautzinger et al., 1995). It contains 21 items with item scores ranging from 0 to 3. Participants are asked to choose one or more statements per item that best represents their mental state during the last week. A total score of $\geq 11$ indicates mild to moderate depression and a total score of $\geq 18$ indicates moderate to severe depression.
2.2.3 Procedure

All participants were inpatients, recruited from three care settings: psychiatry, cardiology, and otorhinolaryngology of a university hospital. All patients completed the BDI (Beck & Steer, 1987; Hautzinger et al., 1995), the NARQ and a demographical data sheet. Each test session started with the diagnostic interview conducted by trained staff. Demographic data and additional clinical information were taken from medical records. All patients gave written informed consent and participated voluntarily. Ethical approval was given by the University Hospital Ethics Board. None of the participants was paid.

2.2.4 Data analysis

Confirmatory Factor Analysis (CFA). CFA was conducted as a first step to corroborate the intended factor structure of the NARQ and to determine the reliability of the empirically derived factor structure. CFA assumes each manifest variable to be a distinct indicator of the underlying latent construct. Therefore, items in the CFA load only on one factor, and correlations between the latent factors are allowed. CFA with maximum likelihood method was performed using AMOS 7.0. The appropriateness of a specific CFA model was assessed by measures of global and local model fit. Goodness of fit was tested with $\chi^2$. Measures of the global fit indicate whether the empirical associations among the manifest variables are appropriately reproduced by the model (Boomsma, 2000; Kline, 2005). The root mean square error of approximation (RMSEA) can be interpreted as the amount of information within the empirical covariance matrix that cannot be explained by the proposed model. The model may be classified as acceptable if only 8 percent or less of the information are not accounted by the model (RMSEA $\leq 0.80$; Hu & Bentler, 1999).

Furthermore, a range of measures of incremental fit were employed (Tabachnik & Fidell, 1996) (normed fit index: NFI; Tucker-Lewis index: TLI; comparative fit index: CFI). NFI, TLI and CFI values of $\geq 0.95$ indicate a good model fit, whereby values of $\geq 0.80$ are regarded as acceptable (Hu & Bentler, 1999). Finally, in order to test theoretically and
empirically derived models against each other, $\chi^2$ values as well as the dfs of the models were subtracted from each other. When $\Delta\chi^2$ is significant for $\Delta$df, the models are seen as significantly different.

Exploratory Factor Analysis (EFA). The empirical structure of the NARQ was assessed using EFA. Responses were subjected to principal axis factoring method of extraction and oblique rotation under the assumption of correlated dimensions with the statistic program SPSS 15.0. Factors were extracted on the basis of a scree-plot criterion (= cutoff score around level one).

To determine inter-scale correlations and the discriminant validity of the NARQ Pearson product-moment correlation coefficients were calculated. Correlations below .30 can be valued as low, between .50 and .70 as sufficient and above .80 as good. Cronbach’s Alpha was calculated to determine internal consistencies of the NARQ subscales. A Cronbach’s Alpha above .80 can be valued as good. Group differences between patients with MDD and patients with physical conditions were analyzed using 4 x 2 repeated analyses of variance (ANOVA) with negative affect repair strategies (NARQ scales) as the within-subject factor and group (patients with MDD, patients with physical conditions) as the between-subject factor. Higher scores in a NARQ-subscale would indicate increased use of this group of regulation strategies. These analyses were performed with the computer program SPSS 15. In addition, effect sizes ($d$) were examined using an effect size calculator. Effect sizes of $d = .80$ or above can be valued as strong.

2.3 Results

2.3.1 Confirmatory Factor Analysis (CFA)

Initially 29 items were included as indicators of the underlying four latent constructs (cognitive regulation strategies, calming/ distractive strategies, social regulation strategies, and externalizing strategies). According to global-fit measures, the original CFA model did not show a good fit to the data $[\chi^2 (371, N = 225) = 1056.6, p < .001,$
χ²/df = 2.85, RMSEA (.091), TLI (.59), CFI (.63)]. None of the fit criteria was in the acceptable range. According to the modification indices, the original CFA model was changed. Indicators with insufficient model compatibility were sequentially eliminated from the model until the criteria for a good model fit were reached. Items were eliminated if (1) item-scale correlations were low (< 0.3; Hair et al., 2004) and the elimination of the item would not reduce the internal consistence of the scale, or (2) modification indices suggested that residual correlations would entail a substantial improvement of fit (Kline, 2005). In this step the following items were eliminated: be aggressive to others (r = .29), hurt others (r = .20), withdraw (r = .41), eat something (r = .25), hit things (r = .15). The item distract myself (r = .29) was kept because its elimination led to reduced scale reliability. In addition, modification indices supported a correlation between the items analyse the cause of my bad mood and think about how to avoid the cause in the future. An additional correlation between the item drink alcohol/take drugs and take medication in the model also improved the model fit.

The resulting modified CFA model contained 24 items (see Appendix B) and yielded a better data fit: [χ² (244, N = 225) = 529.8, p < .001, χ²/df = 2.17, RMSEA (.072), TLI (.78), CFI (.81)]. The item-scale correlations for each item and the scale structure of the modified CFA model are displayed in Figure 4 (correlations between latent variables are not reported in here).
Figure 4. Factor structure of the modified CFA model with item-scale correlations (R= item scores revised).
Finally, it was tested if the exploratory factor structure shows a better fit of the data than the theoretical implied factor structure by subjecting the empirically derived structure to CFA. The initially conducted Exploratory Factor Analysis (EFA) revealed a six-factor-solution, which explained 41.7 percent of the variance (see Figure 5). In general, the interpretation of the factors was difficult and two factors consisted only of three items.
Figure 5. Structure of the EFA model (Note: F= Factor).
The global fit measures for the EFA model were comparable to the global fit measures of the modified CFA model: \( \chi^2 (362, N = 225) = 788.1, p < .001, \chi^2/df = 2.18, \text{RMSEA} (.072), \text{TLI} (.74), \text{CFI} (.77) \). In both models the RMSEA was in the acceptable range.

In line with the goodness of fit indices for the different models, comparing the two models showed that the modified CFA model fit the data significantly better than the original CFA model \( \Delta \chi^2 (127, N = 255) = 526.8, p < .001 \) and the EFA model \( \Delta \chi^2 (118, N = 255) = 258.3, p < .001 \). Finally, the EFA model fit the data significantly better than the original CFA model \( \Delta \chi^2 (9, N = 255) = 268.5, p < .001 \).

### Table 2. Measures of global fit for all models estimated and Hierarchical model tests (chi-square).

<table>
<thead>
<tr>
<th></th>
<th>( \chi^2 )</th>
<th>df</th>
<th>p</th>
<th>( \chi^2/df )</th>
<th>NFI</th>
<th>TLI</th>
<th>CFI</th>
<th>RMSEA</th>
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</thead>
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<tr>
<td>Tresholds for</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>acceptable fit</td>
<td>&gt; .05</td>
<td>&lt; 3</td>
<td>≥ .90</td>
<td>≥ .90</td>
<td>.08</td>
<td></td>
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</tr>
<tr>
<td><strong>Clinical sample</strong> (N = 225)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Original CFA model</td>
<td>1056.6</td>
<td>371</td>
<td>&lt;.001</td>
<td>2.8</td>
<td>.53</td>
<td>.59</td>
<td>.63</td>
<td>.091</td>
</tr>
<tr>
<td>Modified CFA model</td>
<td>529.8</td>
<td>244</td>
<td>&lt;.001</td>
<td>2.1</td>
<td>.70</td>
<td>.78</td>
<td>.81</td>
<td>.072</td>
</tr>
<tr>
<td>EFA model</td>
<td>788.1</td>
<td>362</td>
<td>&lt;.001</td>
<td>2.2</td>
<td>.65</td>
<td>.74</td>
<td>.77</td>
<td>.072</td>
</tr>
</tbody>
</table>

### 2.3.2 Reliability

In order to determine the reliability of the NARQ, internal consistencies of the theoretically and empirically derived scales were calculated. The internal consistencies for the NARQ, structure based on the modified CFA model, were satisfactory or good: \( \alpha = .79 \) for *cognitive regulation strategies* (8 items), \( \alpha = .63 \) for *calming/ distracting strategies* (6 items), \( \alpha = .71 \) for *social strategies* (5 items) and \( \alpha = .77 \) for *externalizing strategies* (5 items). Item scale correlations ranged from .29 to .62 (see Figure 4).

Internal consistencies for the empirically derived scales were in the same range: \( \alpha = .62 \) for factor 1 (4 items), \( \alpha = .73 \) for factor 2 (6 items), \( \alpha = .80 \) for factor 3 (3 items), \( \alpha = .64 \) for factor 4 (3 items), \( \alpha = .64 \) for factor 5 (6 items) and \( \alpha = .77 \) for factor 6 (7 items). The internal consistencies of the two models are not statistically different. However, the
theoretically derived structure of the NARQ is superior in interpretation and clarity of the construct. Some factors of the empirically derived model only include three items with heterogeneous strategies. For example, factor 5 consists of cognitive and behavioural regulation strategies, whereas factor 6 also consists of cognitive regulation strategies (see Figure 5). Therefore, we decided to accept the structure of the modified CFA model as a basis for the NARQ. All following results are therefore based on the 24 items-NARQ with the reported four factors.

2.3.3 Scale means and standard deviations

Figure 6 displays the means of the NARQ scales in the total sample as well as in the two subgroups. Scale means and standard deviations ranged from $M = 11.7$ ($SD = 5.4$) to $M = 16.0$ ($SD = 5.7$) for cognitive regulation strategies (max. 32), from $M = 8.5$ ($SD = 3.8$) to $M = 11.3$ ($SD = 3.8$) for calming and distractive strategies (max. 24), from $M = 8.0$ ($SD = 4.1$) to $M = 10.5$ ($SD = 3.6$) for social regulation strategies (max. 20) and from $M = 0.8$ ($SD = 1.3$) to $M = 5.5$ ($SD = 4.0$) for externalizing strategies (max. 20).

![Figure 6. NARQ scale means of the total sample and the two subgroups.](image)

Note: Pat. with MDD= patients with major depressive disorder. Pat. with PC= patients with physical conditions.
In the overall sample as well as in both subgroups cognitive regulation strategies were the most frequently strategies, followed by calming/distractive and social strategies. The least-used strategies were related to externalizing strategies. In general, patients with physical conditions showed more regulation attempts than patients with MDD. In addition, patients with physical conditions used significantly more cognitive regulation, $F(1, 223) = 33.8, p < .001, d = 0.77$, calming/distractive strategies, $F(1, 223) = 29.8, p < .001, d = 0.73$, and social strategies, $F(1, 223) = 23.2, p < .001, d = 0.64$, than patients with MDD. The group difference in the use of externalizing strategies was also significant, with lower scores in self-harm and substance use for patients with physical conditions than patients with MDD, $F(1, 223) = 145.5, p < .001, d = -1.61$.

2.3.4 Pearson's inter-correlations between NARQ scales

Final analyses were conducted to examine the relationship between the four adopted NARQ scales. Results revealed significant but low negative correlations between the scales externalizing strategies and cognitive regulation strategies, $r(225) = -.27, p < .001$, calming and distractive strategies, $r(225) = -.22, p < .001$ and social strategies, $r(225) = -.34, p < .001$. Low, positive correlations were found between the scales social strategies and cognitive regulation strategies, $r(225) = .36, p < .001$ and calming and distractive strategies, $r(225) = .24, p < .001$. In addition, there was a moderate, positive correlation between the scales cognitive regulation strategies and calming/distractive strategies, $r(225) = .50, p < .001$.

2.3.5 Discriminant validity of the NARQ

In order to explore discriminant validity, correlations between the NARQ scales and BDI scores were assessed. The results revealed weak, but significant, negative correlations between the BDI and NARQ scales (cognitive regulation strategies, $r(223) = -.41, p < .001$; calming and distractive strategies, $r(223) = -.32, p < .001$; social regulation strategies, $r(223) = -.38, p < .001$), indicating that increased scores on these NARQ
scales are associated with fewer depressive symptoms. In contrast, the correlation between the scale externalizing strategies and the BDI score was moderately positive: $r_{(223)} = .70, p < .001$, suggesting that with an increased score in externalizing strategies the depression score also increased.

2.4 Discussion

Deficits in affect regulation are considered to take a central role in the development and maintenance of mood disorders (Campbell-Sills & Barlow, 2007). Therefore, the dearth of reliable measurement instruments to assess affect regulation strategies is surprising. The aim of the current study was the development of a theoretically derived and reliable measure, applicable in clinical groups assessing a broad spectrum of strategies to regulate negative affects. The psychometric properties of the NARQ were examined in two clinical samples with either MDD or with physical conditions. The a-priori, theoretically derived scale structure was tested against the empirically derived factor structure using CFA.

The results are in line with the hypothesised four factor structure of the NARQ and confirm the multidimensionality of the construct negative affect regulation (Garnefski et al., 2001; Gratz & Roemer, 2004; Thayer et al., 1994).

With the NARQ we were able to identify four affect regulation strategies: cognitive, calming/distractive, social and externalizing strategies (clinical relevant regulation strategies, like self-harm and substance use). The theoretically assumed factor structure based on the developmental approach of Saarni (1999) provided a better solution than the empirically derived factor structure of the NARQ.

The multidimensional structure of the NARQ is not surprising. Previous questionnaires differentiate between two and six factors (e.g., Gross & John, 2003; Thayer et al., 1994), most frequently between cognitive, distractive and social regulation strategies (e.g., Morris & Reilly, 1987; Parker & Brown, 1982). The ERQ, for example, consists of two scales assessing cognitive reappraisal and suppressive expression, a narrow spectrum
of emotion regulation (Gross & John, 2003). Cognitive reappraisal is contained in the NARQ subscale *cognitive regulation strategies*, and suppressive expression is assessed in subscale *social strategies* (e.g., do not show other people how bad I am feeling). The CERQ (Garnefski et al., 2001) measures cognitive regulation strategies, comprehensively but neglects behavioural and social strategies. These cognitive aspects of the CERQ, e.g., positive reappraisal, positive refocusing, social comparison, are reflected in the NARQ subscale *cognitive regulation strategies*. The SRSMQ (Thayer et al, 1994) measures calming and distractive strategies, social support and withdrawal in particular, but cognitive regulation strategies only on a limited level.

In general, some questionnaires (e.g., SRWMQ, TMMS) report cognitive and distractive strategies as one empirically derived factor. In the NARQ both strategies are assessed with separate factors but a moderate positive correlation between cognitive and calming/distractive strategies suggests a similar direction. Overlapping aspects may be the cognitive distraction of the mood state. Generally, we prefer the separate assessment of cognitive and behavioural distractive strategies because different arousal states may be involved in the regulation process (Mayer et al., 1991).

Strategies of self-harm, self-blame, and substance use as assessed in the NARQ subscale *externalizing strategies* are not usually covered by other questionnaires. Only the SMSMQ assesses the use of drugs and alcohol with two items (Thayer et al, 1994). In contrast, the NARQ provides a broader spectrum of clinically relevant items.

Other measurement instruments, such as the TMMS, the NMR and the DERS assess affect regulation as one aspect imbedded in a broader construct, for example emotional intelligence or generalized expectancies of negative mood regulation (Catanzaro & Mearns, 1990; Gratz & Roemer, 2004; Salovey et al., 1995). However, the assessment of affect regulation with one scale only, for example consisting of eight items (NMR, Catanzaro & Mearns, 1990), in a questionnaire designed to assess a mood-related construct can lead to quite different responses. The DERS and the NMR are assessing the belief in the effectiveness of affect regulation strategies and not mood and emotion
regulation per se (Catanzaro & Mearns, 1990; Gratz & Roemer, 2004). Items imbedded in such a construct may produce different responses than items designed to assess strategies of mood and emotion regulation. Currently, there are no established questionnaires designed to exclusively assess emotion- and mood-regulation strategies, or existing ones are not comprehensive (e.g., ERQ, CERQ, SRSMQ).

In summary, the factor structure of the NARQ is in line with the literature (e.g., Morris & Reilly, 1987; Parker & Brown, 1982) and with other established emotion and mood regulation questionnaires (ERQ, Gross & John, 2003; CERQ, Garnefski et al., 2001; SRSMQ, Thayer et al., 1994). In contrast to previous questionnaires, however, the NARQ assesses clinical-relevant aspects in more detail. To the best of our knowledge no published questionnaire reports any clinical-relevant affect regulation strategies. Most of the established measurement instruments (e.g., ERQ, CERQ, DERS, SRSMQ, NMR, TMMS) are developed and validated in healthy or student samples. The generalization of the results and the application of the measurement in clinical samples are therefore limited. The NARQ fills this gap.

The present findings reflect the use of different affect regulation strategies in two clinical groups, i.e. patients with MDD and with physical conditions. The present results indicate that patients with MDD show less affect regulation attempts than patients with physical conditions. The samples not only differed in the level of attempts to regulate negative affect but also in the preference for different regulation strategies: patients with MDD used cognitive, distractive/calming and social regulation strategies significantly less but clinically relevant affect regulation strategies (e.g., self harm, substance use) more compared with patients with physical conditions. These results are in line with findings from Campbell-Sills and Barlow (2007) who suggest that individual differences in affect regulation may relate to vulnerability and resilience to anxiety and mood disorders. Linehan (1993) and Swendsen et al. (2000) postulated that patients with mental disorders use significantly more strategies of self-harm and substance use. Gender differences in affect regulation may also have contributed to the current group.
differences (Gross & John, 2003). In the MDD sample 58% of the patients were female, as opposed to 31% in the group with physical conditions. It remains unclear if the differences in level and nature of affect regulation strategies employed by the two groups is due to the differences in depression or gender.

Some limitations of the study should be noted. Due to the nature of the current study the data consisted of self-reports. It cannot be ruled out, that social desirability could have had an effect on the reporting behaviour of affect regulation strategies such as self-harm or other behaviours that are considered as socially undesirable (e.g., taking drugs or alcohol). It may also be possible to define “negative affect” in a broader range, e.g., including anger or sadness. As a consequence, for different samples, non-clinical vs. clinical, “negative affect” may imply different emotional experiences with resulting differences in the use of affect regulation strategies.

A methodological shortcoming was the insufficient global fit indices of the CFA models. Therefore, further replication of the NARQ scale structure in different samples is necessary. Limitations in study design concern the lack of retest reliability assessment (e.g., after 2 weeks), construct validity (the correlation with another measure of affect regulation, for example the DERS) and predictive validity (the association of NARQ scales with clinically relevant behavioural outcomes, e.g., quality of life). Although the association between affect regulation strategies and the BDI were examined, other indices of depression (e.g., the frequency of deliberate self-harm or the frequency of depressive episodes) would also have been useful. Discriminant validity of the NARQ could be adjusted, especially with respect to other measures of general distress or psychopathology. This should be explored further in future studies in the developmental process of the NARQ.

The current study provides psychometric properties of a well constructed measure to assess affect regulation strategies. The theoretically derived factor structure of the NARQ was confirmed in a clinical sample. The good NARQ item reliabilities should be confirmed in further evaluation studies in other clinical and non-clinical samples. The
results indicate that the NARQ constitutes a reliable measure for the assessment of affect regulation strategies covering a wide range of cognitive and behavioural strategies in clinical samples. Clinical applications of the NARQ include the monitoring of individual changes during the therapeutic process.
3. **Study two: Negative affect regulation strategies in patients with a Major Depressive Disorder**

3.1 **Introduction**

Negative affect repair refers to strategies, thoughts and behaviors intended to improve negative mood and emotional states (Campbell-Sills & Barlow, 2007). Negative affect is part of everyday life, with a profound impact on emotional adjustment, interpersonal functioning, mental health and well-being (e.g., Eisenberg et al., 2000; Gross, 1998). Therefore, people tend to actively change their negative affect, often by using strategies such as cognitive reappraisal, spending time with others, and seeking pleasurable activities or distraction (e.g., Fichman et al., 1999; Thayer et al., 1994). It is evident that persons differ in the use of affect repair strategies and that different pattern of use can have positive or negative effects on mood and well-being (e.g., Campbell-Sills et al., 2006; John & Gross, 2004). Therefore, a better understanding of negative affect regulation is not only of major relevance for healthy people but also for patients with mental disorders (e.g., Linehan, 1993; Swendsen et al., 2000). Affect regulation, for example, seems to play a significant role for onset and maintenance of depression (e.g., Campbell-Sills & Barlow, 2007; Gross & Munoz, 1995; Joormann et al., 2007).

In regard to the clinical relevance of negative affect repair in depression, it is of importance, to determine which strategies patients with depression use to regulate their negative affect. Surprisingly, to our knowledge there are only a few studies published so far in which the prevalence of a broad range of negative affect repair strategies in patients with depression is investigated. Most of the published studies researched affect regulation in an experimental design, in which regulation strategies were instructed and their consequences on affect or cognition were determined. Strategies analysed in such an experimental design with patients suffering under depression were, for example, *recall of positive memories* (Joormann et al., 2007), *distraction* (Donaldson & Lam, 2004; Joormann et al., 2007; Lavender & Watkins, 2004), *cognitive reappraisal*, and
suppression of feelings (Gross & John, 2003). These studies gave evidence for the negative and positive consequences of the instructed strategies but provided no information of the prevalence of strategies in patients with depression.

Spontaneous use of affect regulation strategies in depressed patients were examined in a sample of 60 patients with the diagnosis of anxiety or depressive disorder and 30 healthy participants (Campbell-Sills et al., 2006). In comparison to healthy participants patients more frequently used the strategy suppress my feelings. In contrast, patients with depression and/or anxiety used the strategy acceptance less frequently than healthy participants (Campbell-Sills et al., 2006). In another study, cognitive emotion regulation strategies were assessed in a heterogeneous sample of 301 psychiatric outpatients and 620 healthy controls (Garnefski & Kraaij, 2006). Patients hold diagnosis typically found in a psychiatric institution and scored more frequently on self-blame, acceptance, rumination, catastrophizing, and other-blame than controls. However, they used the strategies positive refocusing, and positive reappraisal less frequently than healthy controls. In a similar study, Ehring et al. (2008) assessed the prevalence of cognitive emotion regulation strategies as well as difficulties in emotion regulation in recovered depressed participants. 42 recovered depressed students were compared with 42 never-depressed students in the spontaneous use of regulation strategies. Ehring et al. (2008) found that recovered depressed participants used the strategy putting into perspective less frequently than never-depressed participants. In addition, catastrophizing, limited access to strategies, difficulties in goal-directed behaviour were more prevalent in recovered depressed participants than healthy controls.

To summarize, there is limited information about the everyday use of negative affect repair strategies in patients with depression. Published studies indicate that patients with depression seems to use strategies such as suppression of feeling (Campbell-Sills et al., 2006), self-blame, other-blame (Garnefski & Kraaij, 2006), catastrophizing (Ehring et al., 2008; Garnefski & Kraaij, 2006) more frequently than healthy participants. Patients with depression use strategies such as acceptance, positive refocusing, positive
reappraisal (Campbell-Sills et al., 2006; Gamefski & Kraaij, 2006), putting into perspective (Ehring et al., 2008) less frequently than healthy participants. In regard to these findings, the purpose of the current study was to provide a fine grained picture of negative affect repair strategies in patients with depression. Therefore, the prevalence of a broad range of negative affect repair strategies is documented in a sample of patients with MDD and a matched control group with a new negative affect repair questionnaire (Eberle et al., submitted). We hypothesized that participants with MDD use cognitive, distractive and social regulation strategies less often than controls.

3.2 Methods

3.2.1 Participants

A total of 225 participants were included, 104 with a diagnosis of Major Depressive Disorder (MDD) and 121 healthy controls. Participants with MDD were recruited from a psychiatric department of a university hospital. The diagnosis MDD was confirmed by the International Diagnostic Checklists (IDCL, Hiller et al., 1999). To be included in the depression group patients had to meet ICD-10 criteria for a major depressive episode without organic, psychotic or manic features, be free from co-morbid anxiety disorder or substance abuse and have a score of 11 or above in Beck’s Depression Inventory (BDI, Beck & Steer, 1987; Hautzinger et al., 1995). Control participants were recruited by associates of the authors from among family and friends. Participants for the control group were pre-selected in regard to gender, age and educational status to be comparable with the patient group. Questionnaire packages were handed to control participants and were to be sent back in an anonymous envelope. Of the displayed questionnaire packages 58 percent (N= 121) were returned. Control participants were accepted if they did not meet ICD-10 criteria (Hiller et al., 1999) for any Axis 1 disorder, had a BDI score of 10 or lower and did not have a history of mental disorder. There was no significant difference between the depressed and the control group in age, gender and education. Participants’ age ranged from 18 to 78 years, with a mean age of
Nicole Eberle – Negative Affect Repair Questionnaire

41 years (SD = 12), 60% were female, with approximately 11 years of education. Significant group differences occurred in BDI score, percent of critical life events, family status and employment status. In Table 3 demographic and clinical characteristics for the two subgroups were depicted.

Table 3. Demographic and clinical characteristics of patients with a Major Depressive Disorder (MDD) and control participants (controls).

<table>
<thead>
<tr>
<th></th>
<th>MDD</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>104</td>
<td>121</td>
</tr>
<tr>
<td>M (SD) age in years</td>
<td>40.9 (11.7)</td>
<td>42.8 (12.8)</td>
</tr>
<tr>
<td>Percent female</td>
<td>59.8</td>
<td>58.7</td>
</tr>
<tr>
<td>M (SD) years of education</td>
<td>11.2 (1.8)</td>
<td>11.5 (1.6)</td>
</tr>
<tr>
<td>M (SD) BDI score</td>
<td>28.2 (10.0)</td>
<td>4.3 (3.1)</td>
</tr>
<tr>
<td>Percent critical life events in the last three month</td>
<td>85.6</td>
<td>42.1</td>
</tr>
<tr>
<td>Percent married, partnership</td>
<td>42.5</td>
<td>62.8</td>
</tr>
<tr>
<td>Percent divorced, widowed</td>
<td>21.8</td>
<td>10.8</td>
</tr>
<tr>
<td>Percent full/part-time employed</td>
<td>27.1</td>
<td>72.6</td>
</tr>
<tr>
<td>Percent unemployed or retired because of disorder</td>
<td>59.4</td>
<td>10.3</td>
</tr>
</tbody>
</table>

Note. BDI = Beck Depression Inventory.

3.2.2 Instruments

*Negative Affect Repair Questionnaire (NARQ)*. The NARQ is a self-report rating scale designed to assess strategies to “repair” a negative affect (Eberle et al., submitted). The instruction (“To cope with my current bad mood and to try to make myself feel better,....”) is followed by 24 items (see Appendix B). Patients rated how frequently they endorse each of the listed strategies on a 5-point Likert scale ranging from 0 (never) to 4 (always).

Concurrent with empirical findings and theoretical models (e.g., Thayer et al., 1994; Parkinson & Totterdell, 1999), a multidimensional structure for the NARQ is suggested
and empirically confirmed (Eberle et al., submitted). Based on the developmental approach of Saarni (1999) a four factors structure of the NARQ is postulated: cognitive regulation strategies (e.g., I try to think positively, I try to reappraise the situation), calming/ distractive strategies (e.g., I do things to distract myself, I relax with music), social strategies (e.g., I talk with my friends, I suppress my feelings) and externalizing strategies (e.g., I hurt myself, I drink alcohol or take some drugs to help me relax). The internal consistencies for the NARQ were satisfactory or good: \( \alpha = .79 \) for cognitive regulation strategies (8 items), \( \alpha = .63 \) for calming/ distractive strategies (6 items), \( \alpha = .71 \) for social strategies (5 items) and \( \alpha = .77 \) for externalizing strategies (5 items).

Reliability coefficients (Cronbach’s \( \alpha \)) for the NARQ-subcales were calculated in the current sample: cognitive regulation strategies (\( \alpha = .82 \)), calming/ distractive strategies (\( \alpha = .70 \)), social regulation strategies (\( \alpha = .76 \)) and externalizing strategies (\( \alpha = .78 \)).

Results revealed significant but low negative correlations between the scales externalizing strategies and cognitive regulation strategies, \( r (225) = -.27, p < .001 \), calming/ distractive strategies, \( r (225) = -.22, p < .001 \) and social strategies, \( r (225) = -.34, p < .001 \). Low, positive correlations were found between the scales social strategies and cognitive regulation strategies, \( r (225) = .36, p < .001 \) and calming/ distractive strategies, \( r (225) = .24, p < .001 \). In addition, there was a moderate, positive correlation between the scales cognitive regulation strategies and calming/distractive strategies, \( r (225) = .50, p < .001 \).

**Diagnostic Interview.** In order to establish whether participants fulfilled ICD-10 diagnostic criteria for depression, a clinical interview was carried out with all patients. The International Diagnostic Checklist (IDCL) for Depression was used to verify the diagnosis (Hiller et al., 1999).

**Beck Depression Inventory (BDI).** The BDI was used to provide a quantitative measure of depression (Beck & Steer, 1987; Hautzinger et al., 1995). It contains 21 items with item scores ranging from 0 to 3. Participants were asked to choose one or more statements per item that best represents their mental state during the last week. A total
score of $\geq 11$ indicates mild to moderate depression and a total score of $\geq 18$ indicates moderate to severe depression.

### 3.2.3 Procedures

All participants completed the BDI, the NARQ and individual demographic details. In addition, control participants completed a clinical questionnaire asking for previous and present mental disorders. Each test session started with a diagnostic interview for the clinical group conducted by trained staff. Demographic data and additional clinical information were taken from medical records. All patients participated voluntarily and signed a written declaration of consent. Ethical approval was given by the University Hospital Ethics Board. None of the participants was paid.

### 3.2.4 Data Analysis

NARQ data were analyzed using analyses of variance (ANOVA) with each negative affect repair strategy (cognitive regulation strategies, calming/distractive strategies, social regulation strategies, externalizing strategies) as the dependent variable and group (MDD – controls; moderate MDD – severe MDD) as the independent variable. Higher scores among participants with MDD in a NARQ-subscale would indicate increased use of this group of regulation strategies. All analyses were performed with the computer program SPSS 15. In addition, effect sizes (d) were examined using an effect size calculator. Effect sizes of $d = 0.80$ or above can be valued as strong.

### 3.3 Results

#### 3.3.1 Descriptive analysis

Means and standard deviations were calculated for each NARQ-subscale for the total sample as well as for participants with MDD and controls (see Figure 7). Results in the total sample demonstrate that cognitive regulation strategies ($M = 15.1, SD = 5.8$) are preferable compared to the other strategies to regulate a negative affect. Calming/distractive strategies ($M = 10.5, SD = 4.0$) and social regulation strategies ($M = 9.5, SD$
= 4.0) were other high prevalent strategies. Externalizing strategies $$(M = 3.1, \ SD = 3.7)$$ were used less frequently than the other regulation strategies. The rank order of the subscales is valid in the total sample as well as in the subgroups. In general, patients with MDD showed a less frequent use of the strategies (scale mean between 5.5 and 11.7) than controls (scale mean between 1.0 and 18.1).

3.3.2 Group differences in NARQ-subscales

To investigate whether there are differences in the use of negative affect repair strategies between patients with MDD (group 1) and healthy controls (group 2), simple effects ANOVAs were calculated. Results were displayed in Figure 7.

![Figure 7. Means of the subscales of the Negative Affect Repair Questionnaire (NARQ) in patients with a Major Depressive Disorder (MDD) and control participants (controls).](image)

Results indicated that patients with MDD used cognitive regulation strategies $$(M_1 = 11.7, \ SD = 5.5; M_2 = 18.1, \ SD = 4.2), F (1, 223) = 98.2, p < .001, d = -1.3$$; calming/distractive strategies $$(M_1 = 8.5, \ SD = 3.8; M_2 = 12.2, \ SD = 3.3), F (1, 223) = 59.9, p < .001, d = -1.0$$; social regulation strategies $$(M_1 = 8.0, \ SD = 4.1; M_2 = 10.9, \ SD = 3.3), F (1, 223) = 33.1, p < .001, d = -0.8$$; less frequently than healthy controls. One exception are externalizing strategies $$(M_1 = 5.5, \ SD = 4.1; M_2 = 1.0, \ SD = 1.3), F (1, 223) = 130.9, p < .001, d = 1.5$$, which were more frequently used by patients with MDD than by
controls. In general, patients with MDD showed higher standard deviations in all NARQ-sub scales than controls.

For patients with MDD and for controls the five most frequently and less frequently used negative affect repair strategies were displayed (see Figure 8).
Figure 8. More and less frequently reported use of negative affect repair strategies in items of the Negative Affect Repair Questionnaire (NARQ) separated for patients with a Major Depressive Disorder (MDD) and control participants (controls).
3.3.3 Group differences between patients with moderate vs. severe depression

To investigate whether severity of depression has an influence on use of affect regulation strategies simple effects ANOVAs and effect sizes were calculated to explore group differences between patients with moderate vs. severe MDD (Table 4). As expected, patients with moderate MDD (BDI = 11-17) used cognitive regulation strategies, $F(1, 102) = 10.1, p = .002$, and social regulation strategies, $F(1, 102) = 9.4, p = .003$, more frequently than patients with severe MDD (BDI > 17). In contrast, patients with severe MDD used externalizing strategies, $F(1, 102) = 7.4, p = .008$, more frequently than patients with moderate MDD. In calming/ distractive strategies, $F(1, 102) = 2.9, p = .088$, no significant group difference occurred.

Table 4. Reported use of negative affect repair strategies in the subscales of the Negative Affect Repair Questionnaire (NARQ) for patients with a moderate (BDI = 11-17) and severe (BDI > 17) Major Depressive Disorder (MDD).

<table>
<thead>
<tr>
<th>Subscales of the NARQ</th>
<th>$M_m$ (SD$_m$)</th>
<th>$M_s$ (SD$_s$)</th>
<th>d</th>
<th>CI lower</th>
<th>CI upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>cognitive</td>
<td>15.2 (5.3)</td>
<td>10.9 (5.2)</td>
<td>0.8</td>
<td>0.3</td>
<td>1.3</td>
</tr>
<tr>
<td>calming/distractive</td>
<td>9.9 (3.5)</td>
<td>8.2 (3.8)</td>
<td>0.5</td>
<td>-0.1</td>
<td>0.9</td>
</tr>
<tr>
<td>social</td>
<td>10.6 (3.4)</td>
<td>7.5 (4.0)</td>
<td>0.8</td>
<td>0.3</td>
<td>1.3</td>
</tr>
<tr>
<td>externalizing</td>
<td>3.2 (4.1)</td>
<td>5.9 (3.9)</td>
<td>-0.7</td>
<td>-1.2</td>
<td>-0.2</td>
</tr>
</tbody>
</table>

Note. Sample $m$ = Patients with moderate MDD (BDI ranging between 11 and 17), $N = 18$; Sample $s$ = Patients with severe MDD (BDI > 17), $N = 86$.

3.4 Discussion

Deficits in negative affect regulation are considered to play an important role in the development and maintenance of depression (Campbell-Sills & Barlow, 2007; Gross & Munoz, 1995; Joormann et al., 2007). In this study, we examined the prevalence of negative affect repair strategies in patients with MDD. Results indicate that patients with
MDD showed less affect repair attempts than controls. Significant group differences in the use of strategies occurred between patients with MDD and control participants. Patients with MDD used cognitive regulation strategies less frequently than controls, a finding that is consistent with findings from other studies (e.g., Ehring et al., 2008; Garnefski & Kraaij, 2006). On the one hand, Garnefski & Kraaij (2006) demonstrated that participants with depression used strategies such as positive refocusing, positive reappraisal, putting into perspective less frequently than controls. On the other hand, depressed participants seemed to show higher scores on catastrophizing, self-blame, than controls (Garnefski & Kraaij, 2006). An impaired ability to use the regulation strategy positive recall was proposed in patients with MDD (Joormann et al., 2007).

Another important finding in the present study is that patients with MDD scored lower in the NARQ-subscale calming/ distractive strategies than healthy controls, a group of strategies which one of the most frequently mentioned regulation strategies in healthy participants (e.g., Parker & Brown, 1982; Thayer et al., 1994; Rippere, 1977). Furthermore, patients with MDD showed less use of social regulation strategies than controls in the current study. This finding is consistent with previous studies which report that social strategies such as spending time with others were less used strategies in participants with depressive style in comparison to healthy controls (Fichman et al., 1999; Thayer et al., 1994; Rippere, 1977).

Externalizing strategies containing self-harm, substance abuse, were more frequently used by patients with MDD than controls. These results are in line with findings from Campbell-Sills & Barlow (2007) who suggest that individual differences in affect regulation may relate to vulnerability and resilience to anxiety and mood disorders. Linehan (1993) and Swendsen et al. (2000) postulated strategies of self-harm and substance use as possible strategies to repair a negative affect.

Overall, cognitive regulation strategies were the most frequently used strategies to repair a negative affect in patients with MDD and controls. Other high prevalent strategies in both samples were calming/ distractive strategies and social regulation
strategies. Externalizing strategies, containing substance abuse, self-harm, were less frequently used to regulate a negative affect. There was a significantly higher use of externalizing strategies in participants with MDD which is consistent with findings predicting the relevance of these strategies in clinical samples (e.g., Linehan, 1993; Swendsen et al., 2000).

Furthermore, the present study suggests a relationship between the strength of the depression (the number of symptoms) and the use of negative affect repair strategies. Group differences between patients with moderate and severe MDD occurred in cognitive strategies, social strategies and externalizing strategies. Patients with severe MDD used cognitive and social regulation strategies less frequently than patients with moderate MDD. In contrast, patients with severe MDD used externalizing strategies more frequently than patients with moderate MDD.

In summary, patients with MDD were found to use externalizing strategies more frequently than healthy participants. Whereas strategies like cognitive, calming/distractive and social regulation strategies were less frequently used by patients with MDD than healthy controls. The results of this study confirmed difficulties in negative affect repair in patients with depression (e.g., Campbell-Sills & Barlow, 2007; Gross & Munoz, 1995; Joormann et al., 2007). Some literature suggests the use of specific regulation strategies may partly be due to the symptomatology of depression. For example, the self-focused cognitive style in MDD can lead to a restricted availability and use of successful cognitive regulation strategies (e.g., Deveney & Deldin, 2006; Nolen-Hoeksema & Morrow, 1993). Dysfunctional thinking and negative beliefs about oneself, others and the future were proposed as part of the cognitive deficit in depression (Beck et al., 1979). Furthermore, a disturbed activity in approach and withdrawal motivational system was found in depression (e.g., Clark et al., 1994; Kring & Bachorowski, 1999). A reduced activity and self-reinforcement as well as a greater withdrawal, pure social interactions and social networks were reported as characteristic of depression (Klerman et al., 1984; Lewinsohn, 1975; Rehm, 1977). These findings support the conclusion, that
the existence of depressive symptoms may support the less frequent use of social, cognitive, and distractive regulation strategies in patients with MDD. Some studies, however, including those with participants with a history of depression and a current absence of depressive symptoms report a similar deficit in negative affect repair skills as studies with current depressed participants (e.g., Rude & McCarthy, 2003). Therefore, reported difficulties in negative affect repair may not only be related to a current depressive state, rather it may be seen as a deficit in person’s affect regulation skills, which may be a vulnerability factor for the occurrence of a MDD. The dramatic rise of the subsequent risk to suffer another depressive episode after a prior episode may support the vulnerability hypothesis (Keller et al., 1992; Rude & McCarthy, 2003). It remains unclear, however, whether the ability to repair a negative affect is due to the successful application of affect regulation skills, which can be targeted and improved in treatment (e.g., Berking et al., 2008), or instead, due to more stable personality traits (e.g., Kokkonen & Pulkinnen, 2001). Therefore, additional longitudinal and intervention studies are necessary to explore whether an increase of negative affect repair skills accompanies a decrease in depressive symptomatology as well as an improvement in adjustment.

The important and novel feature of the current study is the assessment of the prevalence of a broad spectrum of negative affect repair strategies in patients with MDD, in comparison with a gender-, age-, education-matched control sample. Most studies in the field of negative affect regulation in depression, are based on non-clinical data, used an experimental/ instructional design or focused on a few strategies, e.g., cognitive reappraisal, suppression (e.g., Campbell-Sills et al., 2006; Donaldson & Lam, 2004; Garnefski & Kraaij, 2006; Joormann et al., 2007). The current study expanded the spectrum of explored negative affect repair strategies in patients with depression, including cognitive, behavioral, social, and clinical relevant strategies, such as self-harm and substance abuse.
Some limitations of the study should be noted. Due to the nature of the current study, the data consisted of self-reports. It cannot be ruled out, that social desirability could have had an effect on the reporting behavior of affect regulation strategies such as self-harm or other behaviors that are considered as socially undesirable (e.g., taking drugs or alcohol). It may also be possible to define “negative affect” in a broader range, e.g., including anger or sadness. As a consequence, for different samples, non-clinical vs. clinical, “negative affect” may imply different emotional experiences with resulting differences in the use of affect repair strategies. The different setting and assessment method in the clinical and non-clinical sample should also be taken into account. In addition, strategies were assessed by a questionnaire, which is not yet popular.
4 General conclusion and future perspectives

A reliable instrument for the assessment of a wide range of cognitive and behavioral affect regulation strategies is not only of major relevance for healthy people but also for patients with mental disorders. The results of the present thesis suggest that the Negative Affect Repair Questionnaire (NARQ) is a well-defined and a reliable instrument for the assessment of affect regulation strategies, particularly in clinical populations. Findings to the prevalence of negative affect repair strategies in patients with MDD emphasize the importance of negative affect regulation in the psychopathology of depression.

The aim of study one was the investigation of the factor structure and the psychometric properties of the new developed Negative Affect Repair Questionnaire (NARQ) which assesses clinical-relevant aspects in more detail. The NARQ was developed and psychometrically evaluated in a sample of 105 patients with Major Depressive Disorder (MDD) and 120 non-psychiatric patients. The theoretically assumed factor structure based on the developmental approach of Saarni (1999) provided a better solution than the empirically derived factor structure of the NARQ. The theoretically derived factor structure of the NARQ consists of four factors: cognitive regulation strategies, calming and distractive strategies, social regulation strategies, and externalizing strategies (e.g. self harm, drug use). Reliability scores (Cronbach’s α) for the four NARQ factors ranged between .63 and .79. Discriminant validity results demonstrated the independence of most scales and the Beck Depression (BDI) score. A higher positive correlation was found between externalizing strategies and BDI scores.

Deficits in negative affect regulation are considered to play a central role in the development and maintenance of major depressive disorder (MDD). Therefore, in a second study the self-reported negative affect repair strategies of 104 patients with Major Depressive Disorder (MDD) and of 121 healthy control participants were compared to determine the prevalence of negative affect repair strategies. Patients with MDD overall reported fewer use of affect repair strategies compared with healthy
controls. They used less frequently cognitive regulation strategies, calming/ distractive strategies and social regulation strategies than controls. In contrast, externalizing strategies (e.g., substance abuse, self-harm) were more frequently found in patients with MDD than controls. These findings emphasize the importance of negative affect repair strategies in the psychopathology of patients with MDD.

There are several suggestions for further investigations. The continuous improvement of the new developed questionnaire (NARQ) should be a recommendation of utmost importance for further investigations. The theoretically derived factor structure should be validated in other clinical and non-clinical samples. To improve the psychometric properties of the NARQ, a validation study should explore test-retest reliability in follow up sample, e.g., two weeks later. Furthermore, construct validity (correlation of the NARQ with another established measure for affect regulation strategies) and predictive validity (correlation between NARQ scores and clinically important behavioral outcomes ought to be associated with affect dysregulation) could be assessed.

Another recommendation is the validation of the results of the second study in longitudinal and treatment studies to explore whether an increase of negative affect repair skills is accompanied by a decrease in depressive symptomatology as well as an improvement in adjustment. The use of negative affect regulation strategies should also be studied in other mental disorders, in which difficulties in affect regulation are postulated, e.g. generalized anxiety disorder (Mennin et al., 2002), personality disorders (Westen et al., 1997), borderline personality disorder (Linehan, 1993) and substance abuse (Hayes et al., 1996; Sher & Grekin, 2007). Further studies should take into account that a negative affect may imply different emotional experiences with resulting differences in the use of affect repair strategies in clinical and non-clinical samples. It may also be possible that especially clinical participants have another definition of negative affect than healthy participants. Furthermore, the results of this thesis could be validated in an extended healthy sample and gender- as well as age-effects could be determined. Temperamental, cultural and socialization effects may play a substantial
role in the development of preferences of different strategies (Derryberry & Rothbart, 1997; Markus & Kitayama, 1991). Gender differences were found in the awareness of affect as well as in the use of negative affect regulation strategies (e.g., Buck & Powers, 2005; Tamres et al., 2002, Thayer et al., 1994). Another important challenge is to examine the developmental course of affect regulation across the life span. For example, Gross et al. (1997) postulated that emotional control may actually increase with age.

Further it should be taken into account that regulation strategies are thought to be an interplay between the individual and its environment (Saarni, 1999). Gross et al. (2006) reported that the frequency of regulation strategies varies with the context. In addition, it was found that an anticipated social interaction influenced affect regulation (Erber et al., 1996). For example, a birthday party requires happiness and someone’s funeral requires sadness (Erber & Erber, 2000). The postulated desired positive affect state in all situations is discussed controversial (Erber & Erber, 2000). An effective affect regulation probably involves a combination of selecting “good” strategies and being able to apply such strategies flexibly depending on contextual demands (Bonanno et al., 2004). A deficit in affect regulation can be seen not only in a lower attempt for regulation, but rather in inflexibility in the use of strategies. This context-sensitive manner of negative affect regulation should be explored in further studies.

In general, the results of the present thesis have demonstrated that the new developed Negative Affect Repair Questionnaire (NARQ) is a well-defined and a reliable instrument for the assessment of affect regulation strategies, particularly in clinical populations. The NARQ provides an adequate item pool for assessing vulnerability factors of depression. Further research is needed to better understand functional and dysfunctional aspects of negative affect regulation.
5 Zusammenfassung

Eine genaue und gültige Erfassung eines breiten Spektrums verhaltensbasierter und kognitiver Affektregulationsstrategien spielt nicht nur im Alltag, sondern vor allem bei psychischen Störungen eine bedeutende Rolle. In der vorliegenden Arbeit wurde ein Fragebogen zur Erfassung von Strategien zur Verbesserung einer negativen Affektlage (Negative Affect Repair Questionnaire – NARQ) entwickelt und validiert. Ein Ziel war es, die Affektregulation bei depressiven Patienten zu erfassen.


6 References


7 Appendices

A The original Negative Affect Repair Questionnaire (NARQ)

B Preliminary English translation of the modified Negative Affect Repair Questionnaire (NARQ)
Appendix A:

The original Negative Affect Repair Questionnaire (NARQ)
Wir alle kennen Zeiten, in denen wir uns schlecht fühlen. Vielleicht weil etwas Trauriges passiert ist, weil wir uns um unsere Zukunft sorgen oder weil wir uns mutlos fühlen.

Wie reagieren Sie auf solche Zeiten? Wie gehen Sie mit Ihren Gefühlen um?

Bitte lesen Sie jeden der folgenden Sätze und geben Sie auf der rechten Seite an, welche Aussage am besten beschreibt, wie Sie in solchen Situationen reagieren. Bitte geben Sie an, wie häufig Sie eine der nachfolgenden Strategien anwenden!

Vielen Dank für Ihre Mitarbeit!

### Wenn es mir momentan nicht gut geht und ich mich besser fühlen möchte, …

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Schilderung</th>
<th>nie</th>
<th>selten</th>
<th>gelegentlich</th>
<th>meistens</th>
<th>immer</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>…denke ich an etwas Positives.</td>
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<td>3</td>
<td>4</td>
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<td>2</td>
<td>…denke ich über stressige Situationen so nach, dass ich die Ruhe bewahren kann.</td>
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<td>4</td>
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<td>3</td>
<td>…unterdrücke ich meine Gefühle.</td>
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<td>4</td>
<td>…tue ich mir selbst weh.</td>
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<td>5</td>
<td>…bewerte ich die Situation neu.</td>
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<td>…verletze ich andere verbal.</td>
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<td>7</td>
<td>…suche ich nach der Ursache für meine schlechte Stimmung.</td>
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<tr>
<td>8</td>
<td>…überlege ich, wie ich den Grund bzw. den Auslöser meiner schlechten Stimmung zukünftig vermeiden kann.</td>
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<td>4</td>
</tr>
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<td>9</td>
<td>…bestrafe ich mich selbst.</td>
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<td>4</td>
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<td>10</td>
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</table>
### Wenn es mir nicht gut geht und ich mich besser fühlen möchte, …

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</table>
Gibt es noch andere Dinge, die Sie tun, um sich besser zu fühlen? Falls ja, beschreiben Sie diese bitte nachfolgend. Bitte geben Sie außerdem an, wie oft Sie diese Strategien anwenden, indem Sie dahinter “gelegentlich”, “meistens” oder “immer” schreiben.

1. ………………………………………………………………………………………………………………………………………………………………………………………………………

2. ………………………………………………………………………………………………………………………………………………………………………………………………………

3. ………………………………………………………………………………………………………………………………………………………………………………………………………

Vielen Dank, dass Sie sich für die Beantwortung der Fragen Zeit genommen haben!
Appendix B:

Preliminary English translation of the modified Negative Affect Repair Questionnaire (NARQ)
Items of the modified NARQ scales. Items are Likert-scaled with scale points 0 (never), 1 (rarely), 2 (occasionally), 3 (often), 4 (always).

Scale - Cognitive regulation strategies

To cope with my bad mood and to try to make myself feel better,…
… I try to think positively.
… I reflect on the situation, so that I can keep calm.
… I try to reappraise the situation.
… I analyse the situation to try to understand why I feel the way I do.
… I avoid people or things that caused me to feel bad.
… I think about pleasant situations from the past.
… I compare myself to someone who is worse off than I am.
… I think about my feelings objectively.

Scale - Calming and distractive strategies

To cope with my bad mood and to try to make myself feel better,…
… I do things to distract myself.
… I do things that I enjoy, such as pampering myself.
… I exercise.
… I accept things the way they are.
… I relax with music.
… I keep busy doing things.

Scale - Social regulation strategies

To cope with my bad mood and to try to make myself feel better,…
… I try to suppress my feelings. (R)
… I consider asking other people for their advice.
… I talk with my friends.
… I express my feelings.
… I do not show other people how bad I am feeling. (R)
Scale - Externalizing strategies

To cope with my bad mood and to try to make myself feel better,...

... I hurt myself.
... I punish myself.
... I drink alcohol or take some drugs to help me relax.
... I take medication to stabilize my mood.
... I think about death or dying.

\((R)\) = revised item scores
8 Acknowledgements

I would like to thank

Prof. Dr. Siegfried Gauggel
Prof. Dr. Claus Vögele
Dr. Maren Böcker
Dr. Thomas Forkmann
Dipl.-Psych. Susann Brisebois
Dipl.-Psych. Sandra Sukalla
Julia Kummer

&

My parents, partner and friends
9 Erklärung § 5 Abs. 1 zur Datenaufbewahrung

Hiermit erkläre ich, dass die dieser Dissertation zu Grunde liegenden Originaldaten im

Institut für Medizinische Psychologie und Medizinische Soziologie,
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Pauwelsstraße 30, 52074 Aachen

hinterlegt sind.
10 Curriculum Vitae

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Geburtsort: Meiningen
Nationalität: German
Familienstand: ledig

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1999: European Vocational College London

Berufserfahrung
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Publications and quotable abstracts


