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Successful Emotion Regulation Skills Application Predicts Subsequent Reduction of Symptom Severity During Treatment of Major Depressive Disorder

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Objective: Deficits in emotion regulation (ER) skills are considered a putative maintaining factor for major depressive disorder (MDD) and hence a promising target in the treatment of MDD. However, to date, the association between the successful application of arguably adaptive ER skills and changes in depressive symptom severity (DSS) has yet to be investigated over the course of treatment. Thus, the primary aim of this study was to clarify reciprocal prospective associations between successful ER skills application and DSS over the course of inpatient cognitive behavioral therapy for MDD. Additionally, we explored whether such associations would differ across specific ER skills. ***Method:*** We assessed successful ER skills application and DSS 4 times during the first 3 weeks of treatment in 152 inpatients (62.5% women, average age 45.6 years) meeting criteria for MDD. We first tested whether successful skills application and depression were cross-sectionally associated by computing Pearson's correlations. Then, we utilized latent curve modeling to test whether changes in successful skills application were negatively associated with changes in DSS during treatment. Finally, we used latent change score models to clarify whether successful skills application would predict subsequent reduction of DSS. ***Results:*** Cross-sectionally, successful ER skills application was associated with lower levels of DSS at all assessment times, and an increase of successful skills application during treatment was associated with a decrease of DSS. Moreover, successful overall ER skills application predicted subsequent changes in DSS (but not vice versa). Finally, strength of associations between successful application and DSS differed across specific ER skills. Among a broad range of potentially adaptive skills, only the abilities to tolerate negative emotions and to actively modify undesired emotions were significantly associated with subsequent improvement in DSS. ***Conclusions:*** Systematically enhancing health-relevant ER skills with specific interventions may help reduce DSS in patients suffering from MDD.

Keywords: emotion regulation, skills, depression, treatment, latent change score model

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Major depressive disorder (MDD) is one of the most common mental disorders (Kessler & Bromet, 2013; Kessler et al., 2003) and is considered a leading cause of disease burden worldwide (Kessler, 2012; Mathers, Fat, & Boerma, 2008). Although research provides ample evidence for the efficacy of psychosocial interventions for MDD (Cuijpers et al., 2013), findings also demonstrate the limitations of available interventions. For example, at least 40% of patients treated for MDD do not respond to initial treatment (Lemmens et al., 2011). Moreover, partial remission and relapse (Paykel, 2008), subthreshold residual symptoms (Judd et al., 1998), and a chronic course with the disorder (Torpey & Klein, 2008) are common among patients receiving treatment for MDD. Recently, evidence has emerged that treatment efficacy might be overestimated because of publication bias (Cuijpers, Smit, Bohlmeijer, Hollon, & Andersson, 2010) and that high-quality studies have reported smaller effect sizes than lower quality studies (Cuijpers, Van Straten, Bohlmeijer, Hollon, & Andersson, 2010). These findings indicate that more research is needed to

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improve the efficacy and sustainability of psychotherapeutic treatments for depression. The relevant research should include studies aiming to identify mechanisms facilitating change in evidence-based treatments for depression (Kazdin & Nock, 2003). With knowledge of such factors, interventions can be developed that effectively foster these factors and consequently enhance the efficacy of treatments for mental disorders (Laurenceau, Hayes, & Feldman, 2007).

Throughout the past 20 years, deficits in emotion regulation (ER) have often been discussed as a putative maintaining factor in depression (Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010; Gross & Muñoz, 1995; Hollon et al., 2002; Mennin & Fresco, 2009). ER refers to the "extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goal" (Thompson, 1994, pp. 27–28). We argue that deficits in ER contribute to the development and maintenance of MDD through a number of processes. First, deficits in (antecedent-focused; see Gross, 2013) ER skills may lead to a greater intensity or frequency of aversive emotional experiences and thus increase the risk that the current situation is appraised as aversive, which is considered a relevant antecedent of depressogenic information processing (Teasdale & Barnard, 1993). Second, even if the individual feels helpless and hopeless with regard to the situation cueing the negative affective states, effective (response-focused) ER skills can help restore a sense of control and hope because they allow the individual to adaptively cope with significant consequences of the problematic situation (i.e., negative affective states). Contrastingly, the absence of adaptive ER skills increases the risk that the aversive situation is also appraised as uncontrollable and stable over time. If this happens, all three conditions relevant for the activation of depressogenic information processing schema are met (Teasdale & Barnard, 1993) resulting in the elicitation of various dysphoric affective states. In the absence of adaptive ER skills, these states will be appraised as highly aversive, uncontrollable, and stable over time. If this happens, a vicious cycle of negative affect and depressogenic thinking is established that facilitates chronific depressogenic information processing and thus contributes to the development and maintenance of MDD (Berking & Whitley, 2014; Nolen-Hoeksema, 2000; Segal et al., 2006).

Based on the assumption that deficits in ER contribute to the development and maintenance of various mental disorders, Berking (2008; Berking & Schwarz, 2013; Berking & Whitley, 2014) proposed a skill-based model of adaptive coping with emotions (ACE model) that synthesizes and extends previous models of ER (e.g., Gilbert & Procter, 2006; Greenberg, 2002; Gross, 1998; Larsen, 2000; Mayer & Salovey, 1995; Saarni, 1999). In the ACE model, adaptive emotion regulation is conceptualized as a situation-dependent interaction between the following emotion regulation skills: (a) the ability to be consciously aware of emotions, (b) the ability to identify and (c) correctly label emotions, (d) the ability to identify what has caused and maintains one's present emotions, (e) the ability to actively modify emotions in an adaptive manner, (f) the ability to accept and (g) tolerate undesired emotions when they cannot be changed, (h) the ability to approach and confront situations likely to trigger negative emotions if this is necessary to attain personally relevant goals, and (i) the ability to provide compassionate self-support when working to cope with challenging emotions. Empirical evidence for the validity of the model comes from several studies indicating that individual skills as well as an aggregated indicator of the general ability to successfully apply the skills included in the model are cross-sectionally (e.g., Berking et al., 2012; Berking, Wupperman, et al., 2008; Berking & Znoj, 2008) and prospectively (e.g., Berking et al., 2011) associated with various indicators of mental health and that these skills can be effectively enhanced through a systematic training (Berking, Meier, & Wupperman, 2010). In research on depression, the successful application of the ER skills included in the ACE model has been shown to negatively predict subsequent negative affect over a 2-week period (Berking, Orth, Wupperman, Meier, & Caspar, 2008) and subsequent depressive symptoms over a 5-year period (Berking, Wirtz, Svaldi, & Hofmann, 2014). Moreover, changes in successful skills application during treatment were negatively associated with the course of depressive symptoms in a heterogeneous clinical sample (Berking, Wupperman, et al., 2008). Finally, integrating an intense training of the emotion regulation skills included in the model into CBT enhanced the effects of CBT on these skills and on depressive symptoms (Berking, Ebert, Cuijpers, & Hofmann, 2013; Berking, Wupperman, et al., 2008).

Further findings providing evidence that deficits in ER skills contribute to the development and maintenance of depressive symptoms include cross-sectional studies that showed positive associations between such symptoms and cognitive processes that have been conceptualized as maladaptive attempts in coping with negative emotions, such as rumination, avoidance, suppression, catastrophizing, lack of positive reappraisal, and self-blame (Aldao & Nolen-Hoeksema, 2010, 2012; Aldao, Nolen-Hoeksema, & Schweizer, 2010; Garnefski & Kraaij, 2006; Garnefski, Kraaij, & van Etten, 2005). Similarly, depressed individuals have reported deficits in specific ER skills assumed to be effective ways of coping with negative emotions, for example (a) identifying emotions (Honkalampi, Saarinen, Hintikka, Virtanen, & Viinamäki, 1999; Kahn & Garrison, 2009; Rude & McCarthy, 2003), (b) accepting and tolerating negative emotions (Shallcross, Troy, Boland, & Mauss, 2010; Tull, Gratz, Salters, & Roemer, 2004), (c) compassionately supporting themselves when facing challenging emotions (Hofmann, Grossman, & Hinton, 2011; Kuyken et al., 2010), and (d) effective emotion modification (Ehring, Fischer, Schnülle, Bösterling, & Tuschen-Caffier, 2008; Kassel, Bornovalova, & Mehta, 2007).

Longitudinal studies have also yielded evidence that deficits in specific ER skills predict subsequent depressive symptoms. For example, several prospective studies have demonstrated that rumination in response to negative emotions prospectively predicts concurrent and future levels of depressive symptoms as well as onset, duration, and recurrence of depressive disorders in clinical and nonclinical samples and in adults, adolescents, and children (Nolen-Hoeksema, 2000; Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Roelofs et al., 2009; Rood, Roelofs, Bögels, Nolen-Hoeksema, & Schouten, 2009). Deficits in ER also predicted adolescent psychopathology in a large sample of adolescents over a 7-month period (McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011). Recently, a meta-analytic review identified suppression, avoidance, rumination, and problem solving to be predictors for depressive psychopathology (Aldao & Nolen-Hoeksema, 2012).

Experimental studies have additionally indicated that ER skills are causally related to depressive symptoms. For example, instructing depressed participants to suppress their emotions after the induction of dysphoric mood impaired the recovery from this mood (Campbell-Sills, Barlow, Brown, & Hofmann, 2006). In another study, it was shown that participants with a vulnerability for depression tended to spontaneously use suppression more often than did never-depressed individuals (Ehring et al., 2010). Findings from Liverant, Brown, Barlow, and Roemer (2008) provide evidence for the assumption that depressed individuals may tend to use suppression because they can use this strategy to effectively down-regulate negative emotions in the short term. However, these authors also found evidence that suppression was no longer effective at moderate and higher levels of anxiety about depressed mood. Finally, Joormann, Siemer, and Gotlib (2007) found evidence that—unlike healthy controls—depressed individuals could not use memories of pleasant experiences to down-regulate negative mood.

Preliminary evidence for the assumption that ER is not only a maintaining factor but also a promising target in the treatment of MDD comes from research on interventions focusing on these skills, such as the affect regulation training (ART; Berking & Schwarz, 2013; Berking & Whitley, 2014), dialectical behavior therapy (DBT; Linehan, 1993), emotion-focused therapy (EFT; Greenberg, 2002), or exposure-based cognitive therapy for depression (EBCT; Grosse Holtforth et al., 2012). Several studies indicate that ART (Berking et al., 2013; Berking, Wupperman, et al., 2008), DBT (Bohus et al., 2004; Feldman, Harley, Kerrigan, Jacobo, & Fava, 2009; Harley, Sprich, Safren, Jacobo, & Fava, 2008; Lynch, Morse, Mendelson, & Robins, 2003), EBCT (Grosse Holtforth et al., 2012), and EFT (Goldman, Greenberg, & Angus, 2006) are effective in reducing depression.

Despite numerous studies on ER and depression, there are still significant gaps in the literature. For example, in the prospective study by McLaughlin et al. (2011), the reason that ER predicted various aspects of psychopathology but not depression is unclear. In the experimental studies, depressed individuals were unexpectedly able to down-regulate negative mood through the use of suppression (Liverant et al., 2008), yet in treatment outcome studies, the extent to which treatments such as the affect-regulation training impact depression by enhancing relevant ER skills is unclear. Finally and most important for the development of effective treatments for MDD, the effectiveness of adaptive ER on depressive symptoms over the course of treatment for MDD has not been investigated.

We conducted the present study to extend the current literature by clarifying cross-sectional and longitudinal reciprocal associations between ER and symptoms of depression over the course of treatment for MDD. More specifically, we first tested whether the ability to successfully apply arguably adaptive ER skills would be cross-sectionally associated with less depressive symptom severity (DSS) at various stages in treatment. Second, we tested whether changes in successful ER skills application during treatment would be negatively associated with changes in DSS. Third, we aimed to clarify whether such changes would predict subsequent changes of DSS during treatment. Additionally, we explored which specific ER skills would be most strongly associated with subsequent changes in DSS.

Method

Procedures and Participants

The study was conducted in a German mental health hospital between August 2010 and August 2012. All study procedures were in compliance with the human research guidelines of the Helsinki Protocol (World Medical Association, 2013) and were approved by the ethics committee of Marburg University. After every week of treatment, participants completed a set of self-report questionnaires that assessed successful ER skills application (SERSA) and DSS (see Measures). Given that the majority of patients treated in the hospital stayed at least 3 weeks and that the focus of treatment during this time was clearly on depression (comorbid disorders were targeted after the first 3 weeks when necessary), we chose to cover this 3-week period in the analyses. Thus, we included four weekly assessment points, with the first assessment occurring at the beginning of the first week of treatment and the last occurring after the third week of treatment. Questionnaires were provided through an online assessment tool. Data entry, transmission, and storage were strictly protected against unauthorized access.

To be eligible for the study, participants were required to meet the following criteria: (a) current diagnosis of MDD, according to the criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM–IV–TR*; American Psychiatric Association, 2000), (b) pretreatment Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996; German version: Hautzinger, Keller, & Kühner, 2006) score of 11 or above, (c) 18 years of age or older, (d) sufficient German language skills, and (e) no current alcohol or drug addiction, psychoses, bipolar disorder, brain damage, or other severe somatic disorders requiring other treatments. Based on thorough sensitivity and specificity analyses, the BDI score of 11 or above has recently been recommended by Riedel et al. (2010) as a clinical cutoff score for the German version of the BDI-II used in the present study. To maximize the external validity of the findings, we considered no further exclusion criteria (e.g., regarding comorbidity or antidepressive medication).

Diagnostic assessments were conducted at intake with the Structured Clinical Interview for *DSM–IV* (SCID; First, Spitzer, Gibbon, & Williams, 1997; German version: Wittchen, Zaudig, & Fydrich, 1997). The diagnostic interviews were conducted by raters with bachelor's degrees or above in clinical psychology who had all received extensive training in the SCID interview (18 hr of training by a certified trainer) and who were all supervised by experienced psychotherapists (either psychologists or physicians with graduate degrees or above in psychology or medicine). Interrater reliability for the affective disorder section was assessed for 4% of the total sample. A Cohen's kappa of .85 indicated good reliability of diagnostic section relevant for the present study.

The final sample consisted of 152 participants. Average total length of treatment was about 7 weeks ($M = 7.4$; $SD = 2.37$; range = 2.86–22.30). The majority of participants had at least one comorbid Axis I diagnosis (59.9%). The most common comorbidities included: anxiety disorders (any anxiety disorder: 48.7%; agoraphobia: 15.1%; social phobia: 16.6%; posttraumatic stress disorder: 9.9%; generalized anxiety disorder: 10.5%; and panic disorder: 11.2%) followed by comorbid somatoform disorders (25.0%) and dysthymia (7.9%). Almost every third participant

(34.9%) met criteria for at least two comorbid Axis I disorders. About a third of participants (23.0%) met criteria for at least one Axis II disorder. The most common of these disorders were avoidant personality disorder (8.6%), obsessive–compulsive personality disorder (3.9%), and borderline personality disorder (3.3%).

All participants were White (which is quite representative of the German population), the majority were women (62.5%), and the average age was 45.6 years (*SD* = 10.4, range = 18–71). The highest level of schooling (*Abitur*) was reported by 41.5% of the sample, 33.6% reported to have completed the second highest level (*Realschulabschluss*), and 17.1% completed the lowest education level. Nearly half of the participants (50.6%) were married, 14.5% were divorced, 28.9% had never been married, and 59.2% had at least one child.

Treatment

During the treatment period under investigation, participants received an average of 3.68 hr (*SD* = 0.75, range = 3.00–4.50) of individual and 21.13 hr (*SD* = 4.10, range = 12.00–24.00) of group psychotherapy. All these treatments were based on a cognitive behavioral therapy (CBT) rationale and included techniques such as behavior analyses, behavioral activation, cognitive restructuring, and relaxation training (see Barlow, 2008). About half of the group-based therapy focused specifically on depression, utilizing CBT techniques developed and validated for this disorder (Beck, Rush, Shaw, & Emery, 2010). All participants received group treatment for depression during the first 3 weeks, followed by group therapy for comorbid disorders if the latter were present. Psychotherapeutic interventions were supplemented with sports and arts therapy as well as medical treatment when necessary. Psychotherapeutic treatment was delivered by seven experienced therapists and 20 therapists in training—all of whom had a graduate degree in psychology or medicine. Supplemental treatments were delivered by trained co-therapists (nurses, sports and art therapists, physiotherapists) and medical doctors. Treatment integrity was ensured through regular team meetings and weekly supervisions by licensed senior therapists. Treatment approaches that explicitly and exclusively targeted general ER skills were not included in any of the interventions (e.g., Berking, 2008; Greenberg, 2002; Linehan, 1993).

Measures

Emotion-Regulation Skills Questionnaire. We used the German version of the Emotion-Regulation Skills Questionnaire (ERSQ; Berking & Znoj, 2008) to assess successful ER skills application. The ERSQ is a self-report questionnaire, consisting of 27 items answered on a 5-point Likert-type scale (from 0 = *not at all* to 4 = *almost always*), all of which are preceded by the stem "Last week I . . ." Item construction was based on the adaptive coping with emotions model (ACE; Berking, 2008; Berking & Whitley, 2014). Constructed according to the skills of the ART model, successful skills application is assessed through the following nine subscales: *Awareness* (e.g., "I paid attention to my feelings"), *Sensations* (e.g., "My physical sensations were a good indication of how I was feeling"), *Clarity* (e.g., "I was clear about what emotions I was experiencing"), *Understanding* (e.g., "I was aware of why I felt the way I felt"), *Modification* (e.g., "I was able to influence my negative feelings"), *Acceptance* (e.g., "I accepted my emotions"), *Tolerance* (e.g., "I felt I could tolerate my negative feelings"), *Readiness to Confront Distressing Situations When Necessary to Attain Personally Relevant Goals* (e.g., "I did what I had planned, even if it made me feel uncomfortable or anxious"), and *Self-Support* (e.g., "I supported myself in emotionally distressing situations"). The total score of the ERSQ is computed as the mean of all 27 items. Reliability and validity of the ERSQ have been demonstrated in several studies (Berking et al., 2010, 2011, 2012; Berking, Ebert, et al., 2013; Berking, Orth, et al., 2008; Berking, Wupperman, et al., 2008; Berking & Znoj, 2008). As indicated in Table 1, internal consistencies in the present study were very good for the ERSQ total score at all four assessment points ($\alpha_{T1/2/3/4}$ = .95/.96/.96/.96) and at least acceptable for the ERSQ subscales ($\alpha_{T1/2/3/4}$ = .78–86/.68–90/.91-91/.74–92).

Beck Depression Inventory. Depressive symptom severity (DSS) was assessed via the total score of the revised Beck De-

Table 1
Descriptive Statistics for Beck Depression Inventory and Emotion-Regulation Skills Questionnaire Over Time

	Time 1				Time 2				Time 3				Time 4			
Measure	*M*	*SD*	*N*	α	*M*	*SD*	*N*	α	*M*	*SD*	*N*	α	*M*	*SD*	*N*	α
BDI	25.08	9.68	150	.89	21.89	10.23	105	.91	20.08	10.58	103	.92	18.78	11.23	98	.92
$ERSQ_{total}$	1.70	0.98	147	.95	1.88	0.82	103	.96	2.05	0.81	101	.96	2.08	0.79	96	.96
Awareness	2.17	0.89	147	.82	2.34	0.89	103	.85	2.50	0.84	101	.87	2.60	0.84	96	.87
Sensations	2.07	0.88	147	.78	2.28	0.73	103	.68	2.40	0.77	101	.81	2.44	0.77	96	.81
Clarity	2.02	0.92	147	.85	2.24	0.78	103	.83	2.37	0.80	101	.84	2.41	0.86	96	.84
Understanding	1.72	0.91	147	.83	1.94	0.97	103	.89	2.14	0.88	101	.84	2.11	0.94	96	.84
Modification	1.14	0.76	147	.80	1.25	0.81	103	.87	1.45	0.86	101	.89	1.56	0.91	96	.89
Acceptance	1.44	0.85	147	.82	1.65	0.92	103	.88	1.82	0.91	101	.88	1.86	0.94	96	.88
Tolerance	1.35	0.86	147	.86	1.51	0.87	103	.88	1.63	0.95	101	.90	1.70	1.01	96	.90
Readiness	1.97	0.81	147	.85	2.12	0.85	103	.89	2.28	0.87	101	.90	2.24	1.00	92	.90
Self-support	1.47	0.76	147	.80	1.61	0.95	103	.90	1.80	0.98	101	.91	1.84	1.02	96	.91

Note. Means and standard deviations are based on full-information maximal-likelihood estimation. ERSQ = Emotion-Regulation Skills Questionnaire; BDI = Beck Depression Inventory; *M* = mean; *SD* = standard deviation; *N* = number of completers; α = internal consistency; Readiness = readiness to confront.

pression Inventory (BDI–II; Beck, et al., 1996; German version: Hautzinger et al., 2006). The BDI–II is a 21-item self-report measure assessing somatic, behavioral, emotional, and cognitive symptoms of depression on a 4-point Likert scale. The BDI–II is a widely used measure of depression with good objectivity, reliability, and validity (Herzberg, Goldschmidt, & Heinrichs, 2008; Kühner, Bürger, Keller, & Hautzinger, 2007; Smarr & Keefer, 2011). In the current study, the BDI–II showed good internal consistencies for all four points of assessment ($\alpha_{T1/2/3/4}$ = .89/.91/.92/.93).

Statistical Analyses

Cross-sectional association and associations of change. To test whether SERSA and DSS were negatively correlated (Hypothesis 1), we computed Pearson product–moment coefficients (*r*) for all four points of assessment. To clarify whether changes in SERSA were negatively associated with changes in DSS over the course of treatment (Hypothesis 2), we used bivariate latent curve modeling (LCM), which is calculated using structural equation modeling (SEM) algorithm, as described by McArdle (1988, 2009). In bivariate LCM, for each of two variables, an individual curve over time is calculated and correlated with the components of the other latent curve. Figure 1 illustrates the path diagram of the bivariate latent curve model used in this study. The means of individual slopes and intercepts describe the group trend of change in the total sample (fixed effects), and the variability of the mean slope and intercept factors (random effects) represent the extent of intraindividual change (Christ, Schmidt, Schlüter, & Wagner,

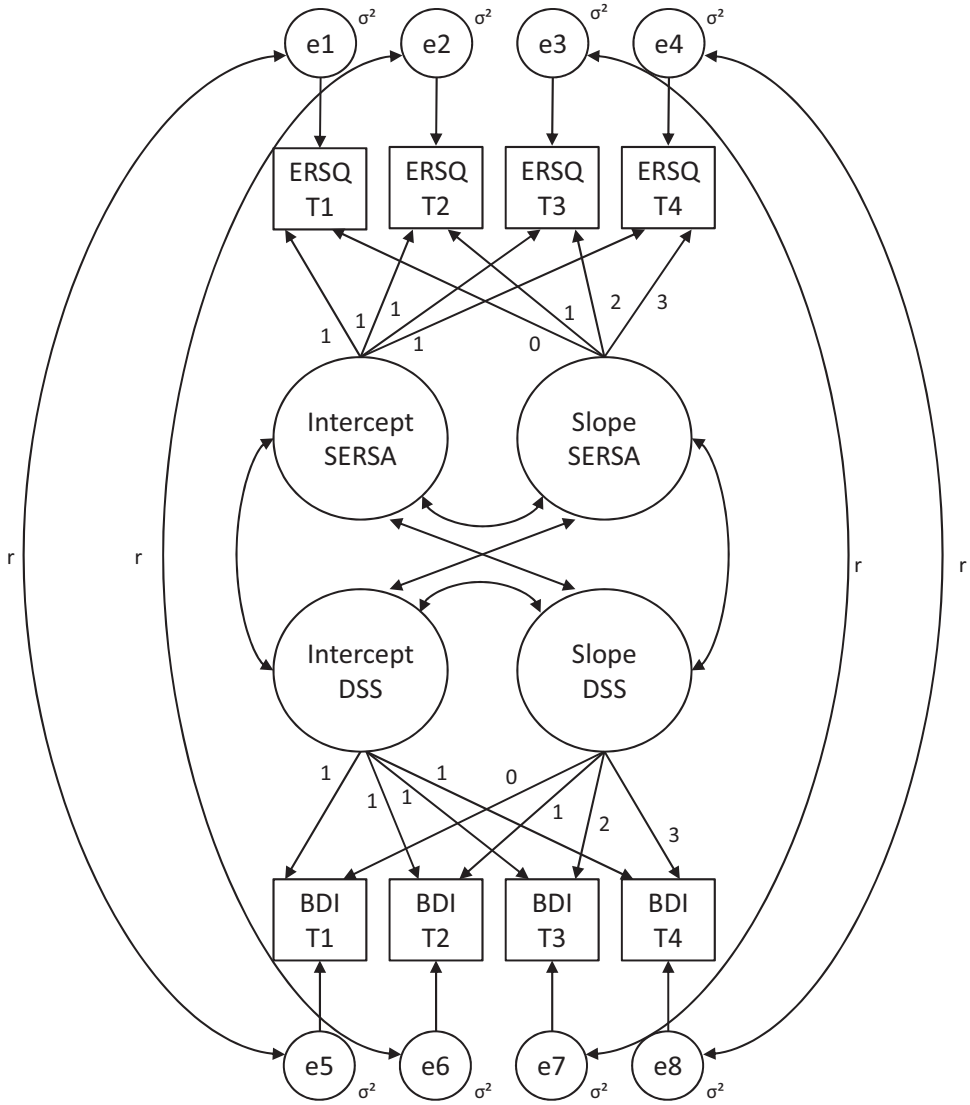

Figure 1. Path diagram of the bivariate latent curve model. ERSQ = Emotion-Regulation Skills Questionnaire; BDI = Beck Depression Inventory; SERSA = successful emotion regulation skills application; DSS = depressive symptoms severity; e = residual error; σ^2 = variance; T = Time; r = cross-construct error covariance (set equal across time); residual errors were allowed to covary across constructs within time to avoid bias due to variance related to specific assessment occasions and to increase model parsimony (Grimm, 2007).

2006; Grimm, 2007). Correlations of intercepts indicate the strength of association between the initial level of SERSA and the initial level of depression, and correlations of slopes indicate the strength of the association between change in SERSA and change in depression during treatment (Ferrer & McArdle, 2003; Grimm, 2007). Following procedures proposed by Grimm (2007) and many others, loadings for the intercept were fixed to 1 and loadings for the slope were fixed to model linear growth, starting with 0 for the first assessment point and ending with 3 for the final measurement at T4.

Prediction of subsequent latent change. To test whether SERSA would predict subsequent reduction of DSS (Hypothesis 3), we used a latent change score (LCS; McArdle, 2009; McArdle & Hamagami, 2001) modeling approach. These models have recently been introduced into treatment outcome research to help identify relevant predictors of change by clarifying reciprocal pathways between two (or more) variables over time (e.g., Berking, Neacsiu, Comtois, & Linehan, 2009; Hawley, Ho, Zuroff, & Blatt, 2006; Jajodia & Borders, 2011; Lindwall, Larsman, & Hagger, 2011; McArdle, 2006; McArdle & Prindle, 2008; Tasca & Lampard, 2012). Bivariate LCS modeling integrates latent curve models and cross-lagged regression models to examine reciprocal dynamic processes between two variables. More specifically, time-lagged associations between Variable A and subsequent changes of Variable B and time-lagged associations between Variable B and subsequent changes of Variable A are estimated in the same model. To the extent that an influence of unknown third variables associated with the dependent variable can be excluded (e.g., through sound theoretical assumption or statistical procedures), significant associations between Variable A and subsequent changes in Variable B provide evidence for a causal effect of A on B (and vice versa).

Figure 2 illustrates the bivariate LCS model we used to test Hypothesis 3. As indicated in the figure, the trajectory for true scores of both variables is composed of an initial level of the unobserved score (intercept) and the accumulation of *true* latent changes in the unobserved variable. Latent change scores ($_{\Delta}$DSS and $_{\Delta}$SERSA) are implied as a function of (a) a constant change factor (slope) referring to systematic change over time, (b) a proportional parameter (β), representing influence of the same variable at the previous measurement, and (c) a coupling parameter (γ), representing influence of the other variable at the previous time point. These coupling parameters describe dynamic aspects of the model, because they represent the impact of one variable at time $t - 1$ on the other variable at the next point in time t (Ferrer & McArdle, 2003, 2010; Grimm, 2007).

By setting different restrictions to the coupling parameters, one can test specific hypotheses about the dynamic associations of depression and emotion regulation. As advocated by Ferrer and McArdle (2003) and McArdle and Grimm (2010), we compared model fit across the unrestricted model and three nested models that result from restricting the coupling parameters in accordance with assumptions on prospective associations: (a) a coupling effect exists for both parameters (bidirectional model, $\gamma_{SERSA} \neq 0$, $\gamma_{DSS} \neq 0$), (b) a coupling effect exists only for the SERSA to DSS association (unidirectional model, $\gamma_{SERSA} \neq 0$, $\gamma_{DSS} = 0$), (c) coupling effect exists only for the DSS to SERSA association (unidirectional model, $\gamma_{SERSA} = 0$, $\gamma_{DSS} \neq 0$) and (d) no-coupling effects exist for any of the parameters ($\gamma_{SERSA} = 0$; $\gamma_{DSS} = 0$). More specifically, we tested whether the bidirectional, or any of the unidirectional models, would show a significantly better fit than the no-coupling model.

Evaluation of the SEM model fit was based on current recommendations (Hu & Bentler, 1998, 1999). Aside from the chi-square statistic, we used three fit indices that were most suitable for our data characteristics (moderate sample size and missing values). Hu and Bentler (1999) suggested that a *good fit* is indicated by comparative fit index (CFI) values greater than or equal to .95, standardized root-mean-square residual (SRMR) values less than or equal to .08, and root-mean-square error of approximation (RMSEA) values less than or equal to .06. We also reported the RMSEA confidence interval and the *p* value for the null hypothesis that the RMSEA coefficient in the population is not greater than .05 (*p* close fit; MacCallum, Browne, & Sugawara, 1996).

With regard to missing values, we used the full information maximum-likelihood estimation (FIML), which has been recommended for the use in longitudinal data models (Graham, 2009), under the usual constraints (see McArdle & Hamagami, 1992) and is considered superior to other methods, including listwise or pairwise deletion (Enders & Bandalos, 2001). Analyses were performed with FIML estimates using an alpha level of 0.05, and one-sided tests were used for unidirectional and two-sided tests for bidirectional hypotheses. When exploring differences across skills with regard to strength of cross-sectional and prospective associations, we used Benjamini–Hochberg procedure (Benjamini & Hochberg, 1995) to adjust for potential effects of Type I error accumulation. We used SPSS 19 for preliminary analyses and MPlus Version 7 (Muthén & Muthén, 2012) for SEM.

Results

Preliminary analyses confirmed that all statistical assumptions (normality, linearity, collinearity, reliability, and missing value analysis) for using SEM with FIML were met. Indicators suggested an acceptable (chi square and RMSEA statistics) to good (SRMR and CFI values) model fit for the LCM model and a good fit for the LCS model (see Table 2).

Cross Sectional Associations and Associations of Change

As shown in Table 3, the ERSQ total score was negatively correlated with the BDI sum scores at all four assessment points. This finding supports the hypothesis that SERSA is negatively associated with depressive symptom severity. According to Cohen (1988), the correlation coefficient indicates a moderate to large effect size. All ERSQ subskills displayed in Table 3 were negatively associated with the BDI at all assessment points, even when a potential Type I error accumulation was controlled. The largest effect sizes resulted for the subscales Modification, Acceptance, Tolerance and Self-Support.

In the bivariate LCM model, which was used to examine whether changes in SERSA were associated with changes in depression symptom severity (DSS), the means of intercept and slope for overall SERSA and DSS differed significantly from zero (see Table 4), suggesting significant intraindividual change in the sample (fixed effects). For both variables, the variances of mean intercept and slope differed significantly from zero suggesting

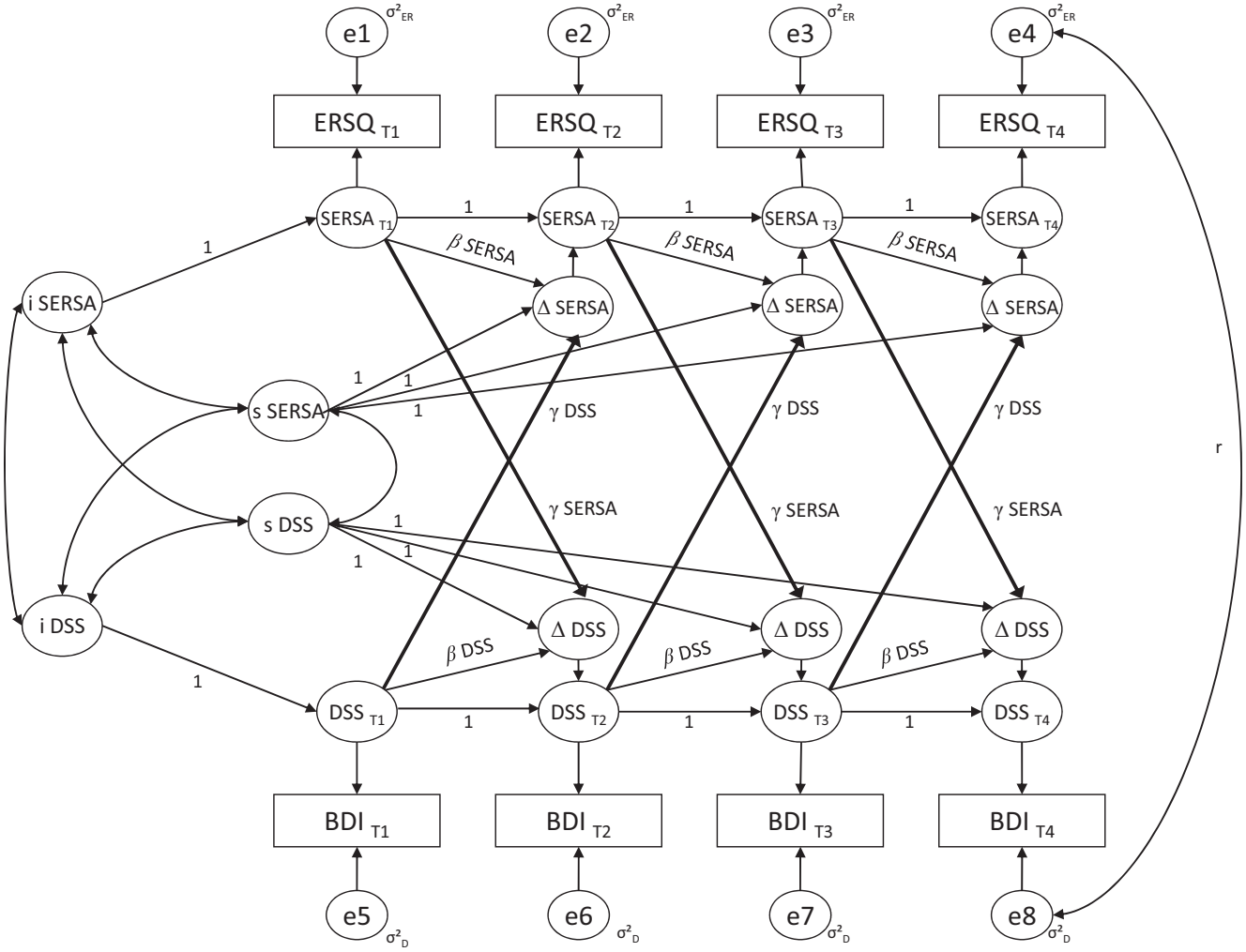

Figure 2. Path diagram of the bivariate latent change score model. ERSQ = Emotion-Regulation Skills Questionnaire; BDI = Beck Depression Inventory; SERSA = successful emotion regulation skills application; DSS = depressive symptom severity; r = cross-construct error covariance; i = intercept; s = slope; γ = coupling parameter; β = proportion parameter; Δ = latent change score; for purpose of clarity, cross-construct error covariances are only shown for Time (T) 4 but are also included for the other measurement points; error variances were set equal within constructs; loadings of growth factors and autoregressive proportions were set equal to one; proportion and coupling parameters were set equal across time within constructs; for model identification, means of errors and intercept of observed variables were set equal to zero (Ferrer & McArdle, 2010; McArdle & Grimm, 2010).

significant differences in the intraindividual change across individuals (random effects). Within both SERSA and DSS, the correlations between intercept and slope were nonsignificant indicating that change in neither variable is associated with pretreatment level of SERSA or DSS. As also shown in Table 4, the intercepts of all ERSQ subscales were significantly (negatively) correlated with DSS intercepts. This finding replicates the cross-sectional correlations on a latent level, that is, higher pretreatment SERSA values indicate lower pretreatment DSS values.

Finally, consistent with Hypothesis 2, the slopes of overall SERSA and DSS were significantly (negatively) correlated. This finding indicates that an increase in overall successful skills application is significantly associated with a decrease in DSS and vice versa. Changes in ERSQ subscales Modification, Acceptance, Tolerance, Readiness to Confront, and Self-Support are negatively associated with changes in the DSS, even when controlling for a potential Type I error (see Table 4).

Prediction of Subsequent Latent Change

Time-lagged associations between SERSA and DSS were tested with the help of the LCS model illustrated in Figure 2 (see online supplemental material for a complete list of all LCS parameters). As shown in Table 5, the cross-lagged effect from SERSA to subsequent changes in DSS was significant and negative ($\gamma_{\text{SERSA}} = -11.92, p = < .01$). Consistent with Hypothesis 3, this

Table 2
Fit Indices of the Models Tested

Model	χ^2	*df*	χ^2/df	CFI	RMSEA (*p* close-fit)	90% CI RMSEA	SRMR
Bivariate latent curve model							
$ERSQ_{total}$	44.97***	21	2.14	.97	.09 (.05)	[.05, .12]	.05
Awareness	38.70*	21	1.84	.97	.07 (.13)	[.04, .11]	.06
Sensations	44.73**	21	2.13	.96	.09 (.05)	[.05, .12]	.07
Clarity	42.18**	21	2.01	.97	.08 (.74)	[.05, .12]	.06
Understanding	37.80*	21	1.80	.97	.07 (.15)	[.03, .11]	.06
Modification	47.69**	24	1.99	.96	.08 (.07)	[.05, .11]	.05
Acceptance	41.61***	21	1.98	.97	.08 (.08)	[.04, .12]	.06
Tolerance	63.52***	27	2.35	.95	.09 (.01)	[.06, .13]	.05
Readiness to confront	47.68***	21	2.27	.96	.09 (.03)	[.06, .13]	.07
Self-support	36.31*	21	1.73	.98	.07 (.19)	[.03, .11]	.07
Bivariate latent change score model							
$ERSQ_{total}$	28.49	23	1.24	.99	.04 (.61)	[.00, .08]	.03
Awareness	34.52	23	1.50	.98	.06 (.35)	[.00, .10]	.05
Sensations	34.82	23	1.51	.98	.06 (.34)	[.00, .10]	.04
Clarity	31.55	23	1.37	.99	.05 (.47)	[.00, .09]	.04
Understanding	34.82	23	1.52	.98	.06 (.34)	[.00, .10]	.06
Modification	27.19	23	1.18	.99	.04 (.67)	[.00, .08]	.03
Acceptance	27.86	23	1.21	.99	.04 (.64)	[.00, .08]	.05
Tolerance	23.44	23	1.02	1.00	.01 (.82)	[.00, .07]	.03
Readiness to confront	24.38	20	1.22	.99	.04 (.62)	[.00, .08]	.05
Self-support	24.17	23	1.05	1.00	.02 (.80)	[.00, .07]	.04

Note. CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean square residual; ERSQ = Emotion-Regulation Skills Questionnaire.
* $p < .05$. ** $p < .01$. *** $p < .001$.

finding indicates that successful ER skills application predicts change in subsequent level of DSS. Patients reporting more successful ER skills application were likely to experience a greater reduction of DSS. Contrastingly, the other coupling effect predicting changes in successful ER skills application from previous DSS scores was nonsignificant ($\gamma_{DSS} = -0.01$, $p = .60$).

In the subscales analysis, the ERSQ scales Tolerance, Modification, Self-Support, and Understanding were significantly associated with subsequent changes in depression (see Table 5). The subscales Modification and Tolerance still reached the level of statistical significance when the Benjamini–Hochberg procedure was applied to control for a potential Type I error accumulation.

For the total ERSQ score and each of the subscales displaying significant γ_{SERSA} regression paths, we tested whether the fit of the bidirectional model (unrestricted estimation of γ_{SERSA} and γ_{DSS}) and the two unidirectional models (γ_{SERSA} or γ_{DSS} set to zero) would differ significantly from the fit of the no-coupling model (γ_{SERSA} and γ_{DSS} set to zero). For the ERSQ total score and for the subscale Tolerance, the bidirectional and the unidirectional model including γ_{SERSA} resulted in a significant improvement in model fit over the no-coupling model, whereas the unidirectional model with γ_{DSS} did not differ significantly from the no-coupling model (see Table 6). This finding indicates that changes in SERSA predict subsequent changes in DSS but not vice versa. In contrast, for the subscale Modification, the bidirectional and both unidirectional models display a significantly better fit than the no-coupling model, indicating that both coupling effects are significant.

Table 3
Correlations of Emotion-Regulation Skills Questionnaire Scales and Beck Depression Inventory for Each Assessment Point

Measure	*r* Time 1	*r* Time 2	*r* Time 3	*r* Time 4	*r* total time
$ERSQ_{total}$	−.57**	−.54**	−.58**	−.69**	−.60
Awareness	−.38**	−.30**	−.31**	−.48**	−.37
Sensations	−.35**	−.21*	−.37*	−.37**	−.33
Clarity	−.34**	−.33**	−.41**	−.31**	−.35
Understanding	−.42**	−.42**	−.46**	−.51**	−.45
Modification	−.48**	−.60**	−.60**	−.67**	−.59
Acceptance	−.52**	−.54**	−.55**	−.71**	−.59
Tolerance	−.55**	−.51**	−.55**	−.64**	−.56
Readiness	−.40**	−.30**	−.32**	−.51**	−.39
Self-support	−.46**	−.53**	−.50**	−.64**	−.54

Note. ERSQ = Emotion-Regulation Skills Questionnaire; *r* = Pearson correlation; *r* total time = correlation averaged across all assessment points; Readiness = readiness to confront.
* $p < .05$. ** $p < .01$. (All correlations were still significant when Type I error accumulation was controlled.)

Discussion

Research suggests that deficits in emotion regulation (ER) are an important maintaining factor for major depressive disorder (MDD) and hence a promising target for treatment. However, the association between the successful application of arguably adaptive ER skills and depressive symptom severity (DSS) over the course of treatment has not yet been investigated. Using four weekly assessments of self-reports on successful ER skills application (SERSA) and DSS in a sample of 152 inpatients treated with CBT for MDD, we first tested whether SERSA would be cross-sectionally associated with less DSS. Second, we used latent

Table 4
Latent Curve Model: Parameter Estimates for Intercepts, Slopes, and Correlations of Slopes and Intercepts

	Intercept				Slope				Correlation of slopes		Correlation of intercepts	
Measure	*M*	*SE*	σ^2	*SE*	*M*	*SE*	σ^2	*SE*	Estimate	*SE*	Estimate	*SE*
BDI	1.16***	0.04	.16***	.03	−0.10***	0.01	.01*	.01	—	—	—	—
$ERSQ_{total}$	1.72***	0.05	.33***	.05	0.13***	0.02	.02**	.01	−.008**	.003	−.129***	.026
Awareness	2.17***	0.07	.66***	.10	0.15***	0.03	.06***	.02	−.006	.004	−.103**	.035
Sensations	2.41***	0.07	.41***	.08	0.12***	0.02	.02	.01	−.005	.004	−.093**	.031
Clarity	2.06***	0.07	.59***	.10	0.14***	0.03	.05**	.02	−.005	.004	−.095**	.035
Understanding	1.74***	0.08	.71***	.11	0.15***	0.03	.08***	.02	−.006	.005	−.155***	.037
Modification	1.44***	0.07	.55***	.08	0.15***	0.02	.01	.01	−.009*	.005	−.248***	.040
Acceptance	1.47***	0.07	.50***	.09	0.15***	0.03	.04*	.02	−.011**	.004	−.163***	.035
Tolerance[a]	1.36***	0.07	.51***	.08	0.13***	0.02	.02	.01	−.012**	.004	−.180***	.036
Readiness	1.99***	0.07	.46***	.08	0.11***	0.03	.03	.02	−.010**	.004	−.096**	.032
Self-support	1.48***	0.06	.41***	.07	0.13***	0.02	.03*	.01	−.010**	.004	−.122***	.031

Note. Unstandardized parameter estimates are presented; *M* = mean; *SE* = standard error; σ^2 = variance; ERSQ = Emotion Regulation Skills Questionnaire; BDI = Beck Depression Inventory; slope–slope correlation significant after control for Type I error accumulation; Readiness = readiness to confront.
[a] Residual variance set equal over time within construct.
* $p < .05$. ** $p < .01$. *** $p < .001$.

curve modeling to test whether changes in SERSA during treatment would be negatively associated with changes in DSS. Third, we used latent change score modeling to test whether SERSA would predict subsequent reduction of DSS. Finally, we explored for which specific ER skills SERSA would be most strongly associated with DSS.

Results indicated that consistent with Hypothesis 1, overall SERSA and DSS were negatively correlated at all four assessment points. Consistent with Hypothesis 2, changes in SERSA during treatment were negatively associated with changes in DSS. In line with Hypothesis 3, overall SERSA predicted subsequent changes in DSS (whereas no such effect was found for the association between DSS and subsequent overall SERSA). With regard to specific ER skills, the abilities to tolerate negative emotions and to actively modify emotions were significantly associated with subsequent changes in depression, even if potential influence of Type I error accumulation was controlled. Among these skills, only changes in the ability to modify undesired emotions were predicted by previous DSS.

In sum, these results add to a body of evidence supporting the hypotheses that deficits in ER are an important risk and maintaining factor for MDD (Berking et al., 2013). The findings contribute significantly to the literature by demonstrating that a more successful application of supposedly adaptive ER skills is associated with greater subsequent decrease in DSS over the course of treatment. Given the lack of significant effects of DSS on subsequent overall SERSA, the findings also provide evidence that the association between deficits in ER and DSS is unlikely to exclusively result from the impairment of ER skills as a consequence of MDD. Furthermore, the findings also provide preliminary support for the

Table 5
Bivariate Latent Change Score Model: Estimates of Regression Coefficients

	Coupling parameter				Proportion parameter			
	γ_{SERSA} (SERSA → $_{\Delta}$DSS)		γ_{DSS} (DSS → $_{\Delta}$SERSA)		β_{SERSA} (SERSA → $_{\Delta}$SERSA)		β_{DSS} (DSS → $_{\Delta}$DSS)	
Model	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
$ERSQ_{total}$[a]	−11.92**	4.24	−0.01	0.02	−1.17***	0.22	−0.57*	0.34
Awareness	0.05	0.11	0.22	0.43	−0.06	0.31	−0.48**	0.15
Sensations	−0.04	0.11	−0.52	0.32	−0.96***	0.20	−0.59***	0.16
Clarity	0.09	0.10	0.51	0.38	−0.21	0.21	−0.41**	0.17
Understanding	−0.15*	0.09	0.45	0.48	−0.15	0.28	−0.70***	0.13
Modification[a]	−0.40*	0.19	−0.64	0.57	−0.73	0.43	−1.03***	0.22
Acceptance	−0.31	0.41	−0.41	0.76	−0.71	0.56	−0.94*	0.49
Tolerance[a]	−0.65**	0.27	−0.11	0.37	−0.37	0.38	−1.10***	0.25
Readiness to confront	−0.90	0.64	0.01	0.82	−0.38	0.77	−1.39*	0.67
Self-support	−0.23*	0.12	−0.73*	0.42	−0.89**	0.29	−0.81***	0.15

Note. Unstandardized parameter estimates are presented; coefficients β_{SERSA}, β_{DSS}, γ_{SERSA} and γ_{DSS} as denoted in Figure 2. SE = standard error; SERSA = successful emotion regulation skills application; DSS = depressive symptoms severity; $_{\Delta}$ = Difference between two subsequent time points of assessment.
[a] γ_{SERSA} significant after Type I error accumulation is controlled.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6
Bivariate Latent Change Score Models: Stepwise Test of Coupling Effects ($\Delta\chi^2/\Delta df$ for Comparisons With No-Coupling Model)

Variable	Bidirectional model SERSA ↔ DSS $\gamma_{SERSA} \neq 0$, $\gamma_{DSS} \neq 0$	Unidirectional model γ_{SERSA} SERSA $\rightarrow_{\Delta}$DSS $\gamma_{SERSA} \neq 0$, $\gamma_{DSS} = 0$	Unidirectional model γ_{DSS} DSS $\rightarrow_{\Delta}$SERSA $\gamma_{SERSA} = 0$, $\gamma_{DSS} \neq 0$
$ERSQ_{total}$	8.2/2*	7.9/1**	0.001/1
Modification	7.5/2*	6.4/1*	4.5/1**
Tolerance	19.9/2**	19.8/1**	3.7/1

Note. Coefficients γ_{SERSA} and γ_{DSS} as denoted in Figure 2. SERSA = successful emotion regulation skills application; DSS = depressive symptoms severity.
* $p < .05$. ** $p < .01$.

assumption that deficits in ER may increase the risk of appraising one's situation (as well as affective symptoms of MDD) as aversive, uncontrollable and stable over time and may hence contribute to the development of chronic depressogenic information processing (Teasdale & Barnard, 1993). Alternatively, the present findings could be explained by assuming that the availability of adaptive ER skills may help patients engage in painful but effective interventions (such as confronting feared topics, grief work, gaining greater depth of emotional processing, and so on). Preliminary support for this hypothesis comes from research in the field of posttraumatic stress disorder (PTSD) showing that improvement in negative mood regulation during an affect regulation skills training was a significant predictor of PTSD symptom reduction during subsequent prolonged exposure treatment (Cloitre, Koenen, Cohen, & Han, 2002).

The present study further contributes to the literature by simultaneously exploring cross-sectional and prospective associations of the successful application of a broad range of arguable adaptive ER skills with (subsequent) DSS. Consistent with findings from earlier studies (Berking et al., 2011; Berking, Wupperman, et al., 2008), the abilities to tolerate and to actively modify negative emotions were significantly associated with subsequent changes in DSS. This finding provides further evidence for the assumption that tolerance toward unpleasant emotions and the ability to change them are relevant for mental health (e.g., Linehan, 1993). The finding is also consistent with the assumption that skills, such as the ability to be aware of one's emotions and identify them, are less relevant than modification and tolerance skills, or the assumption that the former are only relevant to the extent of which they facilitate the successful application of the latter (Berking & Schwarz, 2013; Berking & Whitley, 2014).

In addition to these theoretical implications, findings from the present study have important clinical implications by providing further evidence that adaptive ER may help to cope successfully with symptoms of depression. This additional evidence also supports the hypothesis that systematically enhancing adaptive ER skills in CBT might help to further improve the efficacy of current treatments for MDD. Consistent with this assumption, Berking, Wupperman, et al. (2008) found that including a systematic training of ER skills into a CBT-based treatment enhanced the outcomes in a heterogeneous sample of inpatients about half of whom met criteria for MDD. Recently, this finding was replicated in a randomized clinical trial with 432 inpatients all meeting criteria for MDD. In this study, patients who were randomly allocated to a condition in which parts of the traditional CBT-based treatment were replaced with a systematic training of emotion regulation skills (Berking & Schwarz, 2013; Berking & Whitley, 2014) reported a significantly greater increase in health-relevant ER skills and a significantly greater reduction of depressive symptoms than patients receiving traditional CBT-based treatment (Berking et al., 2013).

The differences found across ER skills in the association with the subsequent reduction of DSS suggest that some ER skills might be more relevant treatment targets than others. In particular, the findings provide preliminary evidence that both the abilities to effectively modify undesired emotions and to tolerate them should be enhanced in treatment. This finding is consistent with the finding that an increase in the successful application of tolerance and modification were among the skills most strongly associated with symptom reduction in one of our previous studies (Berking, Wupperman, et al., 2008). However, we emphasize that the level of statistical significance is a mere and to some extent arbitrary convention (Cohen, 1988). Thus, the binary criteria of statistical significance should not be taken as evidence that some skills are important, whereas others are not. Instead, different ER skills likely vary along a continuum of efficacy and differ in efficacy depending on contextual factors (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). Future research should aim to identify factors moderating the efficacy of different ER skills and also work to clarify how various ER skills interact to most effectively reduce depression (Aldao & Nolen-Hoeksema, 2013; Barrett, Gross, Christensen, & Benvenuto, 2001; Berking et al., 2012).

The strengths of the study include the use of a large and carefully diagnosed clinical sample treated in a routine health care setting, the repeated assessment of successful ER skills application and DSS over the course of treatment, and the application of advanced statistical methods that have been developed to clarify reciprocal associations of interacting variables over time, as well as the simultaneous assessment of a broad range of potentially relevant ER skills. Moreover, unlike other measures assessing concepts often subsumed under a broad definition of ER (such as avoidance, acceptance, catastrophizing, cognitive flexibility, depressogenic appraisals, expressional suppression, or rumination), the ERSQ unambiguously focuses on emotions (as opposed to focusing on processes that are involved in coping with situations or thoughts and that may or may not be motivated by the desire to influence one's feelings, or processes aiming to manage the impression on significant others rather than one's feelings).

Major limitations of the study include the exclusive use of self-reports, the exclusive focus on an inpatient setting, and the lack of an untreated control condition, as well as the lack of control for potentially relevant third factors (such as general psychopathological symptom load). More specifically, it is of note that the self-report measure of ER used in the present study does not differentiate whether participants (a) tried to apply emotion regulation skills but were unable to do so successfully, (b) had never developed these skills and could hence not even try to apply them, or (c) had access to these skills but did not try to apply them. Therefore, future research should assess these potential sources of deficits in successful skills application separately. Moreover, given

that processes, such as being aware of one's emotions, can be purposefully used to coordinate goal-directed responses to one's emotions and can also be systematically trained with the help of specific interventions (Berking, Ebert, et al., 2013), the ERSQ conceptualizes various processes that occur in the context of ER as *skills* (a decision that also facilitates the use of the model in treatment). However, it can also be argued that these processes merely build the basis for effective ER, but are not necessarily part of the regulatory response itself and should therefore be conceptualized instead as *processes* involved in monitoring, evaluating, and influencing one's feelings. Additionally, the ERSQ can be criticized (along with many other measures of emotion regulation) for not discriminating between ER skills across different emotions. Therefore, future research should assess regulation skills separately across various emotions (Ebert, Christ, & Berking, 2013) and identify the skills that are most effective for regulating emotions particularly relevant for depressed individuals. Ideally, such studies should use multiple (e.g., self-report based, observer based, experimental, and biological) ways of assessing (emotion-specific) ER and DSS in treated and untreated samples while combining latent change score analysis with multitrait–multimethod approaches (Geiser, Eid, Nussbeck, Courvoisier, & Cole, 2010).

With regard to the external validity of the present study, it should be noted that inpatient treatment for mental disorders plays a more significant role and is more readily used in the German health care system than in almost any other country in the world (Zeeck, von Wietersheim, Weiss, Beutel, & Hartmann, 2013). This likely explains why the average BDI score in the present sample was lower than what would be expected in inpatient samples in countries such as the United States. Thus, future research needs to clarify the extent that the present findings can be generalized to more severely depressed patients. Another limitation of this study is that it is unknown if the findings can be generalized to psychopathology beyond depression. Since deficits in ER skills have been shown to be associated with various mental disorders other than depression (Aldao & Nolen-Hoeksema, 2010; Berking & Wupperman, 2012; Bradley et al., 2011; Wirtz, Hofmann, Riper, & Berking, 2014), future studies should aim to systematically compare prospective associations between deficits in ER and psychopathology during treatment across a broad range of mental disorders.

Future research should also attempt to clarify how the ER skills assessed in the present study relate to other putative mechanisms of change in treatments for depression such as depressogenic appraisals (Hofmann, Asmundson, & Beck, 2013), avoidance/withdrawal (Hayes, Beevers, Feldman, Laurenceau, & Perlman, 2005), perceived responsiveness to interpersonal needs (Ibarra-Rovillard & Kuiper, 2011), or cognitive flexibility (Dennis & Vander Wal, 2010; Murphy, Michael, & Sahakian, 2012). For this purpose, future studies should investigate whether successful ER skills application would predict the course of DSS during treatment for MDD over and above the effects of more established mechanisms of change that are not characterized by an explicit and exclusive focus on a broad range of assumingly adaptive ER skills. If findings from these studies provide further evidence for the relevance of these skills, subsequent research should investigate the extent that adaptive ER skills positively influence other relevant mechanisms of change. Eventually, such research may lead to more comprehensive models of depression that can be used to identify promising treatment targets for individual patients.

With regard to further improving treatments for MDD, future research should work to identify and develop therapeutic interventions that are most effective for enhancing ER skills associated with mental health. Building upon such knowledge, interventions can be developed that can be applied as stand-alone interventions or as adjunctive interventions complementing empirically validated treatment for MDD whenever a focus on enhancing general ER skills is desired (e.g., Berking & Whitley, 2014). In this context, one of the advantages of the ER perspective is that it allows for an integrated but flexible application of a broad range of evidence-based interventions (e.g., reappraisal, behavior modification, and self-compassion). Such an approach might be superior to the exclusive use of a single strategy (e.g., reappraisal in cognitive therapy) as it offers alternatives for individuals failing to benefit from this strategy (e.g., Ng & Diener, 2009). However, rapidly switching treatment strategies in the face of a(n) (initial) lack of progress may also impede outcome (Schulte & Eifert, 2002), and utilizing a flexible approach to positively influence health-relevant factors other than emotion regulation (e.g., quality of interpersonal relationships) might be even more effective (e.g., Cuijpers et al., 2011; Ibarra-Rovillard & Kuiper, 2011). Thus, future studies need to empirically clarify whether and under what circumstances a stronger focus on systematically enhancing general ER skills (through multiparadigmatic interventions) will help enhance the efficacy of psychotherapeutic treatments for MDD. Although preliminary evidence suggests that integrating an intense ER skills training into routine inpatient CBT may improve outcome (Berking, Ebert, et al., 2013; Berking, Wupperman, et al., 2008), it has yet to be clarified to what extent such an intervention is also effective in more severely disturbed patients, in other treatment settings, as a stand-alone intervention, or in combination with treatments other than CBT. Moreover, it needs to be clarified whether such intervention is particularly effective as strength-building intervention best applied after (partial) recovery in order to help expand and sustain outcome.

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