

Paper I

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Mechanisms of Recurrent Depression: A Cognitive Battle Model and some Preliminary Results

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Theoretical models of cognitive mechanisms assumed to be involved in recurrent depression are discussed and a cognitive battle process between compensatory coping strategies and the automatic processing of negative information is suggested. Preliminary support for the model comes from a study that investigated preferences for positive and negative tape-recorded self-statements in clinically depressed (CD), previously depressed (PD) and never depressed (ND) individuals. The results showed (1) a positive correlation between dysfunctional attitudes and dysphoric symptoms in CDs and PDs, but not in NDs; (2) NDs preferred positive self-statements, whereas CDs preferred neither positive nor negative self-statements; (3) PDs exhibited different patterns of preference depending on the levels of dysfunctional attitudes and dysphoric symptoms. For example, simultaneous high levels of both dysfunctional attitudes and dysphoric symptoms in PDs resulted in a preference for positive self-statements. This finding is discussed as a possible compensatory strategy of avoiding negative information in PDs. Clinical implications for treatment and prevention of depression are discussed. Copyright © 2005 John Wiley & Sons, Ltd.

INTRODUCTION

Beck's (1967, 1976) cognitive theory of depression suggests that individuals who have experienced loss or adversity in childhood will develop negative self-schemata. Such negative self-schemata

may contain dysfunctional attitudes concerning loss, failure, and abandonment. Negative self-schemata are thought to be relatively stable across time, situations and mood states, but also to be relatively dormant and inaccessible during non-depressive states (Clark & Beck, 1999). They can be activated by a wide range of negative and stressful life events or situations, but especially by stress, which reminds the individual of the experience when the negative self-schemata was established (Clark & Beck, 1999). Dysphoric mood has also been suggested to be involved in the activation of negative thinking (Teasdale, 1988), and in the activation of negative self-schemata (Miranda & Persons, 1988). When activated, however, negative self-schemata will tend to generate negative auto-

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matic thoughts and depressive affects, but also to negatively bias the individual's information processing. Beck (1976) also assumed that dysfunctional attitudes, when activated, would negatively influence the individual's coping style and automatic compensatory strategies. Cognitive vulnerability may also be the result of having experienced a depressive episode. For example, in an initial depressive episode negative thinking will increase the individual's depressive knowledge pattern and make it more easily activated when in periods of mildly depressed mood (Ingram, Miranda, & Segal, 1998; Segal, Williams, & Teasdale, 2002).

There are numerous studies supporting Beck's (1967, 1976) assumption that depressed individuals have significantly higher levels of self-reported dysfunctional attitudes and more negative automatic thoughts than non-depressed individuals (Clark and Beck, 1999). However, the depressive content of the cognitions does not persist beyond recovery from the depressive episode (Ingram et al., 1998). In order to test the mood-state hypothesis of the activation of dysfunctional attitudes and negative thinking, Miranda, Gross, Persons, and Hahn (1998) induced dysphoric mood experimentally in their subjects. They found that previously depressed individuals who reported increased negative mood also reported increased dysfunctional attitudes, whereas less vulnerable individuals who reported increased negative mood reported decreased dysfunctional attitudes. Other studies have found a positive correlation between dysphoric mood and dysfunctional thinking in previously depressed individuals, but not in individuals who had never been depressed (Miranda & Persons, 1988; Miranda, Persons, & Byers, 1990; Roberts & Kassel, 1996). Furthermore, Alloy, Abramson, Murray, Whitehouse, and Hogan (1997), who defined vulnerability in terms of dysfunctional attitudes and inferential styles, found that cognitive high-risk individuals processed a greater amount of negative self-referent information. Altogether, these findings seem to support the suggestion that dysphoric mood is able to activate dysfunctional attitudes and negative thinking, which in turn will further bias the information processing negatively.

From a review of the research literature on cognitive processes in depression, Hartlage, Alloy, Vazquez, and Dykman (1993) conclude that depression interferes with effortful processing, but only minimally with more automatic processing. Decreased effortful processing, they argue, may be explained either by stress or by the dysphoric

mood itself. While stress seems to reduce the cognitive capacity available by diminishing neural activity in anatomical structures serving effortful processing, dysphoric mood seems to narrow the focus of attention on task-irrelevant thoughts, or on thoughts specifically relevant to depression. Furthermore, because individuals vulnerable to depression have a long practice in processing negative self-referent information, Hartlage et al. (1993) argue, they will process this information automatically with minimal requirements on attention resources. Consequently, when effortful processes are decreased, individuals prone to depression may be less able to counteract their negative thinking through effortful strategies. Accordingly, Teasdale (1988), Miranda and Persons (1988) and Hartlage et al. (1993) have in a similar way argued that dysphoric mood may activate dysfunctional attitudes and automatic processing of negative self-referent information.

However, the extent to which dysphoric mood may work either as a primer of depressive knowledge patterns and dysfunctional attitudes, or to decrease the capacity to control negative thinking, or both, is still unclear. For example, Clark and Beck (1999) argue that positive self-schemata, which generate positive thoughts and appraisals as part of a more constructive thinking, will primarily involve effortful processing, since positive self-schemata, during depression, have a higher activation resting level. Consequently, they suggest, when effortful processing in depression is reduced, the ability to process positive stimuli will also decrease and result in a disparity between the processing of positive and negative information. This suggestion has been supported by several studies, which have found individuals who had never been depressed to have a tendency to process information in a positively biased direction. Depressed individuals, on the other hand, have shown to either process information in a negatively biased direction, or to have an equal preference for positive and negative information, indicating a lack of a positivity bias in a wide range of cognitive processes (Clark & Beck, 1999). According to the 'The State of Mind Model' (Schwartz, 1986, 1997; Schwartz & Garmoni, 1986, 1989) it is rather the relative balance of positive and negative cognitions than the absolute number of each thought class of valence that differentiates between functional and dysfunctional states. Among normal individuals, this positive-negative ratio (positivity bias) is around 62–38% (Pierce, Sewell, & Cromwell, 1992). However, as with

depressive cognitions in general, it seems that, when no longer clinically depressed, previously depressed individuals return to their 'normal' positive-negative ratio of cognitions (Clark & Beck, 1999; Ingram et al., 1998).

The absence of depressive cognitions in previously depressed individuals may also be explained by the suppression or avoidance of negative thinking, rather than the absence of a relevant primer. For example, Wenzlaff, Rude, and West (2002) argue that the mood-state hypothesis (Miranda & Persons, 1988) is vague concerning how dysfunctional attitudes become dormant. The prevailing explanation seems to be that 'when external circumstances improve, negative cognitions ebb and eventually become dormant, thereby facilitating a return to a normal state' (Wenzlaff et al., 2002, p. 535). As an alternative explanation, Wenzlaff et al. (2002) suggest that previously depressed individuals actively suppress dysfunctional thinking in an attempt to ward off the depressive thoughts that threaten their emotional well-being. However, thought suppression will have the ironic consequence of triggering the automatic processing system to be especially alert on the negative information to be suppressed. Consequently, when effortful processing is decreased by dysphoric mood, the ability to suppress dysfunctional thinking will decrease and the ironic processing of negative stimuli will dominate the individuals' information-processing (Wenzlaff & Wegner, 2000).

Wenzlaff and colleagues suggest that formerly depressed individuals, in an attempt to *maintain* their emotional well-being, are cognitively characterized by continuously suppressing dysfunctional thinking. Self-regulation theories of depression however emphasize more what happens to cognitively vulnerable individuals when confronted with a stressful situation. In these theories, a negative event initiates a shift in attention to evaluate the current situation (Gray, 1994; Higgins, 1987; Pyszczynski & Greenberg, 1987). This shift in attention begins with attention directed internally to focus on the self (Carver & Scheier, 1998), which allows individuals to compare their current state with their desired state and to initiate behaviour to reduce the discrepancy. Such a shift in attention is generally an adaptive response because people switch their attention to the problem in an attempt to resolve it (Abramsom et al., 2002). In other words, this is a normal, healthy coping strategy. However, while less vulnerable individuals are able to disengage from this self-focused attention, cognitively vulnerable individuals seem to become

stuck in this checking process. Nolen-Hoeksema (1991) has described this cognitive condition as depressive rumination. More recently, researchers have tried to understand depressive rumination from a meta-cognitive perspective (Segal et al., 2002; Wells, 2000). For example, Papageorgiou and Wells (2001) found that previously depressed individuals both held positive and negative beliefs about rumination. Positive beliefs reflect themes concerning rumination as a coping strategy (i.e. 'I need to think about things in this way to find answers to my depression and reduce my distress'). It is positive beliefs about rumination that motivate individuals to engage in sustained rumination. However, thinking about negative aspects of the self or the negative situation rather serves to perpetuate than to resolve the negative feelings (Segal et al., 2002). As a consequence, negative beliefs about rumination will arise and be reflected in themes concerning the uncontrollability and the harm of rumination, and its interpersonal and social consequences. Papageorgiou and Wells (2003) suggest that it is especially the activation of negative beliefs that contributes to the experience of depression. Accordingly, Papageorgiou and Wells argue that rumination is a coping strategy, which ultimately backfires. To summarize, two qualitatively different coping strategies, i.e. suppression and rumination, have been suggested as responsible for the escalation process of dysphoric mood to clinical depression.

A Cognitive Battle Model of Recurrent Depression

The assumption that previous life events, primarily experienced in childhood, make individuals vulnerable to depression is central to theories of depression. One of their common features is how they emphasize the class of experiences that are associated with the loss of emotional care, social reinforcement, self-worth and feelings of control (for a review, see Gotlib & Hammen, 2002). Moreover, several researchers have discussed how the depressive condition may result in social rejection and lowered self-worth and thereby reinforce the depressive symptoms (for a review, see Joiner & Coyne, 1999). However, little attention has actually been paid to the fact that a clinical depressive episode by itself may be experienced as a highly uncontrollable and traumatic life event. Accordingly, a central question to ask is what happens when previously depressed individuals are confronted with a situation that reminds them of the

previous depressive episode. How do they emotionally react and how do they cope? It seems likely that they will feel anxious and try to avoid the situation and to suppress dysphoric symptoms and depressive thinking. In contrast to Wenzlaff and Wegner (2000), we do not propose that previously depressed individuals are *continuously* suppressing dysfunctional thinking in order to maintain their emotional well-being. Instead, we suggest that avoidance and suppression are situation-released strategies to cope with the anxiety of again losing control, i.e. falling into a new depressive episode.

A cognitive battle model of the escalation process of dysphoric mood to clinical depression is presented in Figure 1. (1) When previously depressed individuals experience mild dysphoric mood, it activates dysfunctional attitudes, which in turn will increase the processing of negative self-referent information. (2) Since either the dysphoric symptoms itself, or the increased processing of negative self-referent information, or both of them, remind the formerly depressed individual of a previous depressive episode, affective distress will be evoked. (3) To cope with the pending threatening, highly unpleasant negative emotions, this affective distress (e.g. anxiety about a potential new depressive episode) will activate regulatory strategies such as suppression or avoidance of the threatening stimulus. (4) Since avoidance and suppression primarily serve compensatory functions aimed at blocking activation of possible negative emotions, these coping strategies are presumed to be inflexible and rigid. They are also supposed to compromise effortful, conscious thinking and perception by avoiding information, which reminds the individual of the previous depressive episode (i.e. suppressing negatively valenced emotions, perceptions, memories, and thoughts). (5) However, because avoidance and suppression will occupy effortful processing, the automatic processing of negative self-referent information will increasingly dominate the effortful processing of positive stimuli. Accordingly, these compensatory coping strategies will actually have the opposite effect to that intended; the automatic processing of negative self-referent information will perpetuate the affective distress and increase the dysphoric mood. (6) As the affective distress persists and the dysphoric mood escalates, a 'cognitive battle' will take place between compensatory coping strategies, which occupy effortful processing, and involuntary automatic processing of negative information. The termination of the 'cognitive battle' will be when

the automatic processing of negative information becomes as strong as the effortful processing of positive information. As a consequence, the compensatory preference of positive information breaks down, and this 'cognitive decomposition' increases the risk of a new episode of clinical depression.

Preliminary Results from an Empirical Study

Researchers on cognitive vulnerability to depression have devoted limited attention to understanding how previously depressed individuals react to and cope with situations that remind them of their previous experience of depression. In order to increase such knowledge, we compared preferences for positive and negative self-referent information in previously depressed individuals with those in never depressed and clinically depressed individuals. First, we examined their listening preferences when choosing between acoustically presented positive and negative self-statements. Since we intended to achieve a better understanding of the cognitive processes responsible for the actual performances in the three groups, we also gathered information about the individuals' self-reported preferences for the self-statements, how they reported their mood changes during the procedure and the degree to which they reported dysphoric symptoms and dysfunctional attitudes, in general. It should be mentioned that the study was not explicitly designed to test each step of the cognitive battle model. In fact, the results from the present study have contributed to the development of the model.

Some hypotheses were derived from previous research on depression as reviewed above: (a) we predicted a positive correlation between dysphoric symptoms and dysfunctional attitudes for individuals who had experienced a depressive episode, but not for individuals who had not; (b) we predicted for *the clinically depressed* individuals an overall absence of a preference for positive self-statements that correlated negatively with dysfunctional attitudes and dysphoric symptoms. For *the never depressed* individuals we predicted an overall preference for positive self-statements that was uncorrelated with dysfunctional attitudes and dysphoric symptoms. For *the previously depressed* individuals, as an entire group, we predicted an overall preference for positive self-statements. However, from the cognitive battle model, we predicted that previously depressed individuals with high levels of dysfunctional attitudes

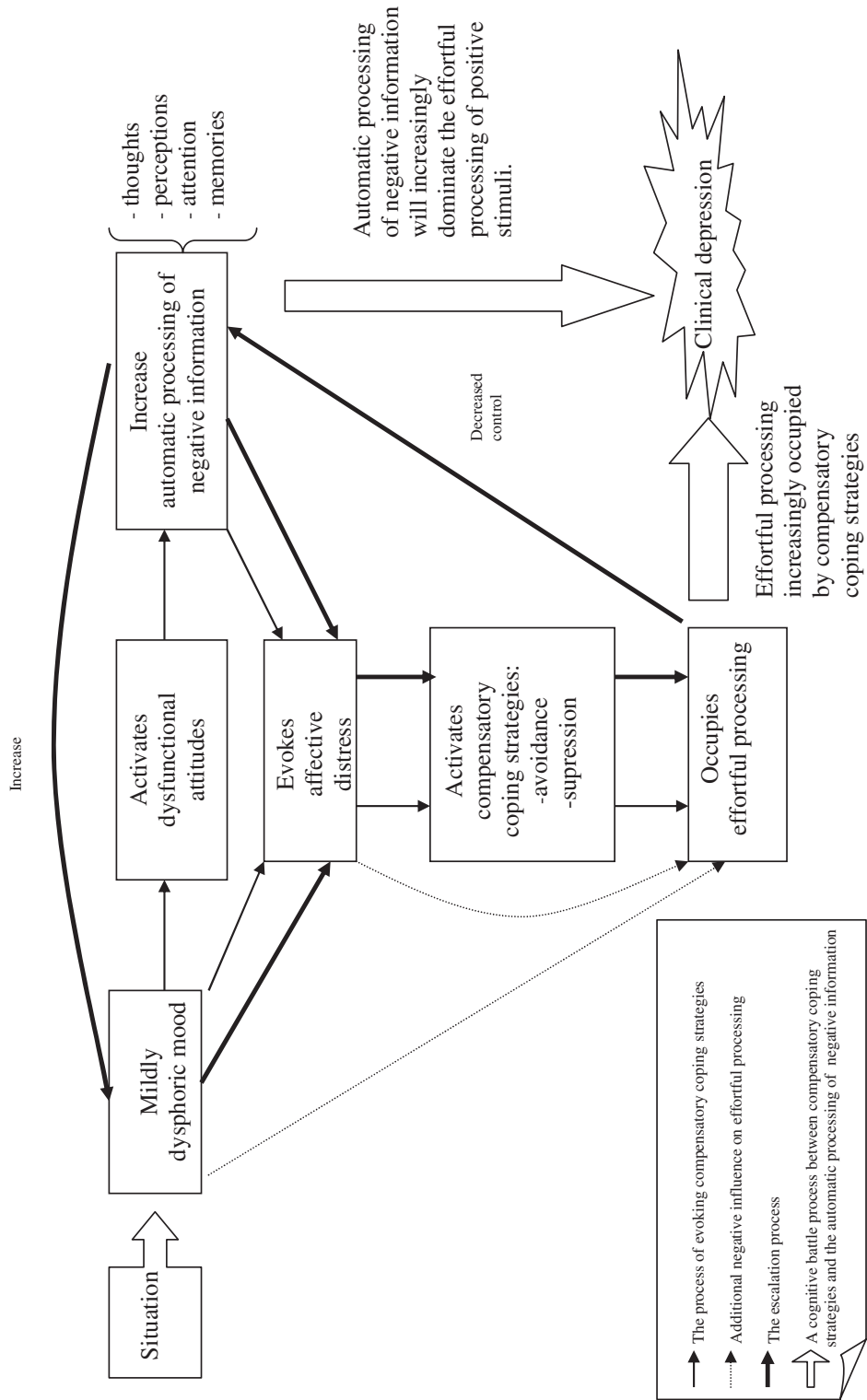


Figure 1. The cognitive battle model

would differ in their preference for positive self-statements depending on their levels of dysphoric symptoms.

METHOD

Participants

To recruit subjects, the Beck Depression Inventory (Beck, Rush, Shaw, & Emery, 1979) and the Previous Depression Questionnaire (PDQ; Wang, unpublished manuscript) were administered to approximately 800 undergraduate students at the University of Tromsø, Norway, and to approximately 600 patients consulting their general practitioner, also in Tromsø. About 340 (43%) students and 180 (30%) patients returned the questionnaire by mail. From this sample, subjects were invited to participate if they had a BDI score above 16 (clinically depressed), or scored below 16 and met the requirements for previous depression on the PDQ. In addition, a random sample was selected among those who had a BDI score between 0 and 9 (normal range), and who did not meet the criteria for previous depression on the PDQ. This selection resulted in a total sample of 184 participants (84 patients and 100 students).

These subjects were diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders (*DSM-IV*; American Psychiatric Association, 1994), using the 'The Structured Clinical Interview for *DSM-IV*, Axis I disorders' (SCID-CV) (First, Spitzer, Gibbon, & Williams, 1997). The SCID-CV section relating to mood disorder was used for the inclusion of subjects, and the SCID-CV section related to psychotic symptoms was used to exclude individuals with such symptoms. Thus, the final group assignment was made according to *DSM-IV* (American Psychiatric Association, 1994) criteria and not in accordance with the classification by Beck and Steer (1987) for normal range, mild, moderate and severe depression accordant to the BDI score. Based on information from the interviews, 30 individuals were excluded from the study because they either failed to meet the full criteria for a current or a previous depression, or their previous depression was more than five years ago, or because they had psychotic or hypomanic symptoms. In addition, five individuals dropped out the study before completion. The final sample consisted of 61 clinically depressed (CD) (36 patients and 25 students; $M = 30.8$ years, $SD = 10$), 42 previously depressed (PD) (17 patients and 25 students; $M = 27.0$ years, $SD = 8$) and 46 never

depressed (ND) (18 patients and 28 students; $M = 26.9$ years, $SD = 9$) individuals. Nine of the CDs and one of the PDs were on antidepressive medication. One of the CDs and one of the PDs were on neuroleptics. None of the participants was an inpatient and thus they were not severely depressed. For the PDs the mean period since the last major depressive episode was 1.7 years ($SD = 14.84$).

The SCID interviews were administered by four *DSM-IV* interviewers who had been individually trained by a highly qualified supervisor in the administration of the SCID. All the SCID interviews were audio-taped. Subsequently, 30 of these interviews, 10 from each group, were randomly sampled for reliability testing. The inter-rater agreement (kappa) between two raters for each group (ND, PD, CD) was 0.9. When the kappa was calculated for rating subjects who had never experienced a depressive episode (i.e. ND) and those who had (i.e. PD and CD), the agreement was total, i.e. 1.0, indicating a highly satisfactory reliability of the group assignments.

The Regional Committee for Medical Research Ethics had approved the study. The participants gave written informed consent, and were paid NOK 100 (EUR 8) per hour for their participation. They were treated in accordance with the 'Ethical Principles of Psychologists and Code of Conduct' (American Psychological Association, 1992).

Measures

The Beck Depression Inventory (BDI; Beck et al., 1979) is a widely used 21-item self-report symptom scale assessing a variety of affective, behavioural, cognitive, and somatic symptoms indicating dysphoric states or clinical depression. Beck and Steer (1987) have categorized BDI scores as follows: normal range, 0–9; mild–moderate depression, 10–18; moderate–severe depression, 19–29; serious depression, 30–63. They also recommended a cut-off point for clinical depression at 16. Psychometric properties of the BDI have been documented by Beck, Steer, and Garbin (1988). The BDI was administered in the initial screening to select potentially participants to the study (BDI₁), and also later to measure dysphoric symptoms on the two separate days of assessment (BDI₂ and BDI₃).

The Previous Depression Questionnaire (PDQ; Wang, unpublished manuscript) was developed to, in the initial screening, identify currently non-depressed individuals who had previously been depressed and to identify individuals who had

never experienced a depressive episode. The PDQ was constructed using DSM-IV criteria for a past major depressive episode.

The Dysfunctional Attitude Scale (Form A) (DAS; Weissman & Beck, 1978) is a 40-item self-report inventory designed to measure the presence of dysfunctional attitudes that may relate to cognitive vulnerability to depression (Oliver & Baumgart, 1985). Examples of DAS items are 'My value as a person depends greatly on what others think of me' or 'One can get pleasure from an activity regardless of the end result'; i.e., the content of these statements concerns the need for approval, dependency, perfectionism performance standards and rigid ideas about the world. Participants respond using a seven-point scale ranging from totally agree, through neutral, to totally disagree. Scores on the DAS can range from 40 to 280, with higher scores indicating more dysfunctional attitudes. Scores above 125 are considered as high. Psychometric properties of the DAS have been documented by Chioqueta and Stiles (2004b), Dobson and Breiter (1983) and Oliver and Baumgart (1985).

The Depression Adjective Check List (Form E) (DACL; Lubin, 1965) contains 34 non-overlapping adjectives that has been shown to be a valid and reliable self-report measure of transient mood (Lubin, Hornstra, & Love, 1974). The DACL was administered to the participants four times through the first assessment day to determine whether their moods changed, and whether the listening preference task, described below, had any impact on mood. Due to the rationale behind the questionnaire to measure rapid mood changes, the participants were explicitly instructed to 'quickly check off all the adjectives that describe how you are feeling right now'.

The Post-Experimental Questionnaire (PEQ; Crowson & Cromwell, 1995) was developed to measure self-reported preferences for positive and negative self-statements. Six specific questions were asked to assess the participants' impressions after the listening preference task described below. The items included (1) retrospective and (2) prospective self-reported preferences for one of the two tapes, (3) to what degree the tapes reflected how the participant was feeling just then and (4) how the participant usually felt. These four questions were answered with 'yes' and 'no', and if 'yes' 'positive' or 'negative'. The two last questions had a response format of a five-point Likert scale where the subjects rated to what degree the two different tapes affected the participant's feelings in

(5) a positive or (6) a negative direction. The following five points were included: 1, very sad/very happy; 2, sad/happy; 3, neutral; 4, somewhat sad/somewhat happy, and 5, not at all sad/not at all happy.

Equipment and Materials—Behavioural Preferences for Positive and Negative Self-Statements

Two Sony Walkman cassette players were wired together into an integrated circuit assembly connected to a portable computer. The computer recorded the elapsed time a participant listened to a particular recorder. The volume was preset to a sound level corresponding to a conversation in a quiet room. Participants used a switch to change from one tape to the other. The participant sat at a table not facing the technical equipment. This was an adapted version of Crowson's Auditory Forced Choice Device (Crowson & Cromwell, 1995), which allowed the participants to select freely which of two taped self-statements they preferred to listen to.

The two audiotapes contained the items of the Automatic Thought Questionnaire—Negative (ATQ-N; Hollon & Kendall, 1980), and the Automatic Thought Questionnaire—Positive (ATQ-P; Ingram & Wisnicki, 1988), respectively. ATQ-N items consist of negative self-statements characterizing depressive thoughts (e.g. 'I'm no good', 'I'm a failure', 'I can't finish anything'). ATQ-P was designed to assess positive self-statements (e.g. 'My future looks bright', 'Life is exciting', 'I have many good qualities'). Both ATQ-N and ATQ-P include 30 statements each. The ATQ-N has recently been shown to be a useful measure of frequency of automatic negative thoughts in both clinical and non-clinical populations (Chioqueta & Stiles, 2004a).

A male Norwegian speaker produced the oral version of the two tapes. The 30 statements on each tape were read as identically to the Crowson's English version as possible. Each statement was read clearly with the same vocal quality, phrasing and inflection. According to their content, the two sets of material differed slightly in affective tone. The negative set was spoken somewhat sadly, and the positive set somewhat cheerfully. The sequence of the 30 statements was looped repeatedly to make a 20 minute recording of each statement series. Norsk Lydskole A/S produced the tapes.

Table 1. One-way ANOVAs for effects of never depressed ($n = 46$), previously depressed ($n = 42$) and clinically depressed ($n = 61$) individuals on three measurement points with the BDI, the DAS and four measurement points with the DACL

Variable	Never depressed ($n = 46$)		Previously depressed ($n = 42$)		Clinically depressed ($n = 61$)		F
	M	(SD)	M	(SD)	M	(SD)	
BDI ₁	1.76	(1.73)	11.17	(5.74)	22.38	(9.88)	112.21***
BDI ₂	1.63	(1.66)	7.43	(4.82)	18.98	(7.52)	137.17***
BDI ₃	1.13	(1.68)	6.40	(4.05)	15.70	(8.50)	83.15***
DAS	93.85	(21.36)	116.64	(30.40)	133.63	(38.25)	20.64***
DACL1	7.87	(2.68)	10.86	(3.30)	16.13	(4.30)	73.08***
DACL2	7.93	(2.98)	10.79	(4.16)	15.34	(4.32)	49.00***
DACL3	8.30	(2.64)	10.62	(3.75)	13.61	(4.16)	28.43***
DACL4	8.67	(2.57)	10.88	(3.70)	14.57	(3.89)	39.37***

*** $p < 0.001$.

BDI₁ = when screened for participation; BDI₂ = the first day of testing; BDI₃ = the second day of testing. Follow-up t -tests indicate that all three groups differ significantly from each other.

Procedure

Participants were tested individually in a quiet, comfortable clinical laboratory at the university. Before the SCID interview, the participants answered the DACL₁ followed by the BDI₂. For the individuals who did not meet the group criteria, participation in the study was terminated after the SCID interview, and they were paid and debriefed. Those selected to participate in the main study continued by completing two questionnaires about hope and expectancies for future events (not reported on in the present paper), the DACL₂ and finally the listening preference task.

Participants were informed that they could freely choose to listen to one of the two tapes. They were told that the tapes 'contained the kind of statements people sometimes say to themselves during the day', and were advised that their task was simply to 'choose which tape you want to listen to, but feel free to switch as often or as little as you like'. After ten minutes the tapes would stop and they were asked to fill out a questionnaire about the tonal quality of the tapes, whose results are not reported in the present paper. Then, a new 10 minute period of listening followed, but in contrast to the first listening period the participants now got the positive statements when they pulled the switch to the left and the negative statements when they pulled the switch to the right. After this, the participants were asked to complete a second questionnaire about tonal quality.

After completing the listening preference task, participants were asked to answer the DACL₃, the PEQ, two questionnaires about recalling the statements on the tapes (not reported on in the present

paper) and finally the DACL₄. On a second testing day, the participants completed the BDI₃ and the DAS together with a visual attention task and some other questionnaires (not reported on in the present paper). All participants were debriefed in detail.

RESULTS

Dysphoric Symptoms and Dysfunctional Attitudes

Table 1 presents for the three groups the mean value of BDI (on the three test occasions) and the DAS means. The three groups differed significantly from each other on all four measures. As predicted, the results showed a significant positive correlation between dysphoric symptoms (BDI₃) and dysfunctional attitudes in PDs ($r = 0.44$, $p < 0.004$) and in CDs ($r = 0.46$, $p < 0.0001$), but not in NDs ($r = 0.21$, $p > 0.05$).

Behavioural Preferences for Positive and Negative Self-Statements

A 3 (CD/PD/ND) \times 2 (test session) mixed analysis of variance (ANOVA) was performed on the mean listening time for the positive tape.¹ As predicted, the group main effect was significant, $F(2, 144) = 12.72$, $p < 0.0001$. The CDs preferred to listen to the positive tape less than the NDs and less than the

¹ Each of the two test sessions lasted 600 seconds. Because the ATQ-P and the ATQ-N listening time add to a constant, only the ATQ-P was used in the statistical analyses.

PDs, as shown by contrasts (CDs versus NDs, $t(144) = 4.18, p < 0.0001$; CDs versus PDs, $t(144) = 3.81, p < 0.0001$; PDs versus NDs, $t(144) = 0.27, p > 0.05$). Out of the total 1200 seconds listening time, the CDs preferred to listen to the positive tape for a mean of 658 seconds ($SD = 236$). This represented 54.8% of total listening time and was less than the NDs (69.5%, $M = 834, SD = 187$) and less than the PDs (68.5%, $M = 822, SD = 206$). The main effect of test session and the interaction between the factors were not significant.

To determine how listening time to positive self-statements was associated with dysfunctional attitudes and dysphoric symptoms, correlations were computed for each group. As predicted, for the CDs a significant negative correlation was obtained for dysfunctional attitudes ($r = -0.38, p < 0.003$), and a trend for dysphoric symptoms ($r = -0.23, p < 0.08$). Also as predicted, for the NDs no significant correlation was obtained. For the PDs, only a trend was found of a negative correlation between listening time to positive self-statements and dysfunctional attitudes ($r = -0.26, p < 0.09$). According to the cognitive battle model, however, we had predicted that previously depressed individuals, depending on their levels of dysfunctional attitudes and dysphoric symptoms, would show different behaviour preferences for positive and negative self-statements. In order to explore this hypothesis, we divided the PDs and the NDs into subgroups depending on the level of dysfunctional attitudes ($DAS \leq 125$ or $DAS > 125$, i.e., high scores above 125) and dysphoric symptoms ($BDI_2 \leq 9$ or $BDI_2 > 9$, i.e., normal range below 9). The mean listening time to the positive tape was calculated for each subgroup (Table 2). Although sub-sample sizes are rather small, some potentially interesting

results were obtained: While the NDs, independently of the level of dysfunctional attitudes, seemed to prefer positive self-statements, this did not prove valid for the PDs. Instead, the PDs tended to show less preference for positive self-statements when they had high levels of dysfunctional attitudes, but in the normal range of dysphoric symptoms ($M = 667.97$). On the contrary, when the PDs had high levels of dysfunctional attitudes and had dysphoric symptoms ($M = 819.94$), they showed more preference for positive self-statements ($t(17) = 1.86, p < 0.08$). This higher preference for positive self-statements in PDs, in combination with high levels of dysfunctional attitudes and dysphoric mood, is inconsistent both with results of previous studies and with the present study; i.e., higher levels of dysfunctional attitudes and dysphoric symptoms in vulnerable individuals should have led to less preference for positive self-statements. However, the results are consistent with predictions derived from the cognitive battle model.

Self-Reported Preferences for Positive and Negative Self-Statements

Self-reported retrospective preference (question 1) for the positive tape was high among the NDs (89.1%) and the PDs (78.6%), while only 54.1% of the CDs preferred to listen to the positive tape. In the CD group, self-reported retrospective preference for the negative tape was higher (24.6%) than among PDs (4.8%), whereas only one of the NDs preferred to listen to the negative tape. While only 10.9% of the NDs did not respond to the question about preference, more participants in the PD

Table 2. Mean and standard deviations for total listening time to ATQ-P when the PDs and the NDs were divided into subgroups as a function of the BDI_2 and the DAS

	ATQ-P		BDI_2		DAS	
	M	SD	M	SD	M	SD
$BDI_2 \leq 9$ and $DAS \leq 125$						
PD ($n = 19$):	893.72	204.18	3.89	2.56	91.21	15.04
ND ($n = 42$):	821.86	189.45	1.40	1.55	89.55	16.37
$BDI_2 \leq 9$ and $DAS > 125$						
PD ($n = 10$):	667.97	154.04	6.50	1.58	147.20	13.03
ND ($n = 4$):	963.88	118.76	4.00	0.82	139.00	14.26
$BDI_2 > 9$ and $DAS \leq 125$						
PD ($n = 4$):	874.35	190.10	13.50	2.38	100.25	10.87
$BDI_2 > 9$ and $DAS > 125$						
PD ($n = 9$):	819.94	201.30	13.22	3.56	143.67	18.25

group (16.6%) and in the CD group (21.3%) did not. This higher non-responsiveness among CDs and PDs may be interpreted as a stronger ambivalence for the respective tapes.

When asked which tape they would prefer to listen to for a whole 10 minutes period (prospective preference; question 2), the ND group was entirely uniform in its pattern of responses: while 100% of the NDs preferred the positive tape, 90.5% of the PDs and only 68.9% of the CDs did so. Self-reported prospective preference for the negative tape showed the opposite pattern of responses: one in the ND group, 7.1% in the PD group and 29.5% in the CD group would prefer to listen to the negative tape. Only one participant in the PD group and one participant in the CD group did not answer this question.

When asked whether one of the two recordings reflected how they were feeling right then (question 3), 91.3% of the NDs, 71.4% of the PDs and 27.9% of the CDs chose the positive tape. Again, the opposite pattern was seen for the negative tape, with only 2.2% of the NDs and 9.5% of the PDs choosing the negative tape, compared with 42.6% of the CDs. These patterns correspond well to the group to which they belonged. Also, a larger proportion of CDs (29.5%), as opposed to NDs (6.5%) and PDs (19.0%), did not answer this question.

When asked whether one of the two recordings reflected how they usually felt (question 4), the largest variance was found among the PDs; 42.9% of the participants in this group chose the positive tape, and 21.4% chose the negative tape. As many as 35.7% did not respond to the question. Among the NDs and the CDs, the variation was smaller, but again the opposite pattern of responding was found; while 87% of the NDs and 16.4% of the CDs chose the positive tape, only 2.2% of the NDs and as many as 62.3% of the CDs chose the negative tape. A total of 10.9% of the NDs and 21.3% of the CDs did not respond to the question.

On a five-point Likert scale, participants rated their affective response to the content of each tape (questions 5 and 6) and a one-way ANOVA was carried out for each tape. Results showed a significant inter-group difference in rating the positive tape ($F(2, 145) = 3.15, p < 0.046$), and the negative tape ($F(2, 145) = 12.41, p < 0.0001$). As shown by contrasts, for the negative tape, the NDs ($M = 3.50, SD = 1.15$) and the PDs ($M = 3.07, SD = 1.21$) did not differ from each other ($t(145) = 1.71, p < 0.089$), whereas the CDs ($M = 2.39, SD = 1.13$) rated the negative tape as producing more negative affect than did both the other groups ($t(145) = 4.89, p <$

0.0001 for the NDs, s and $t(145) = 2.90, p < 0.004$ for the PDs). Concerning the positive tape; the NDs ($M = 2.91, SD = 1.11$) and the PDs ($M = 2.83, SD = 1.34$) did not differ from each other ($t(145) = 0.33, p < 0.740$), whereas the CDs ($M = 3.36, SD = 1.10$) rated the positive tape as producing significantly less positive affect than the PDs ($t(145) = -2.24, p < 0.026$), and close to significantly less positive affect than the NDs ($t(145) = -1.95, p < 0.053$).

Mood Changes During the Procedure

To determine whether the three groups of participants differed with respect to symptoms of dysphoric mood throughout the first testing day, a one-way analysis of variance with the factor of group was conducted on subjects' DACL scores on the four different points of measurement. The analysis yielded a significant group effect on all four points of measurement. Follow-up contrast tests indicate that the three groups differed significantly from each other on all the four measures; the NDs scored lower than the PDs, who in turn scored lower than the CDs (Table 1).

To determine whether the mood changed through the first day of testing, and to determine whether the listening preference task had any impact on mood, four t -tests within each group were conducted on the subjects' DACL scores between measurement points one and two, measurement points two and three (the listening preference task), measurement points three and four and measurement points one and four.

The analysis showed that the NDs' score was higher at the fourth measurement point than on the first measurement point, $t(45) = -2.85, p < 0.007$, indicating that the NDs felt slightly more dysphoric when departing the first testing day than when arriving. For the CDs, the response pattern was the opposite; the CDs' score was lower at the last measurement point compared to the first measurement point, $t(60) = 2.39, p < 0.02$, indicating that the CDs felt less dysphoric when departing the first testing day than when arriving.

Among the CDs, however, the greatest positive effect was between measurement points two and three, $t(60) = 3.22, p < 0.002$. This may indicate that the listening preference task had a strong positive effect on their mood. A significant difference was also obtained between the third and the fourth measurement points, but in the opposite direction, $t(60) = -2.90, p < 0.005$. A close to significant difference was obtained between measurement points one and two, $t(60) = 1.92, p < 0.06$.

Among the NDs, although a trend showed that the NDs became increasingly more dysphoric as the testing proceeded, no significant difference was found for the remaining three *t*-tests. Among the PDs, no difference was found, indicating the absence of mood changes throughout the whole procedure. This absence of mood changes, as the testing proceeded, may be explained by the use of rigid and inflexible strategies (i.e. denial or suppression) to cope with the upcoming and highly unpleasant negative emotions when reminded of the previous depressive episode.

DISCUSSION

This study was conducted to increase our understanding of how previously depressed individuals react to and cope with situations that remind them of their previous experience of depression, in order to elucidate possible mechanisms involved in recurrent depression. Accordingly, we examined differences between the listening preferences for positive and negative self-statements of never depressed (ND), previously depressed (PD) and clinically depressed (CD) individuals. To achieve a better understanding of the cognitive processes responsible for the actual performances in the three groups, we also obtained information about the subjects' self-reported preferences for the self-statements, how they reported their mood changes during the procedure and their levels of dysphoric symptoms and dysfunctional attitudes.

Different Processing of Self-Referent Information

The present results support the findings of previous studies, demonstrating that information is being processed in a positively biased direction in never-depressed individuals (Crowson & Cromwell, 1995; Pierce et al., 1992). Also, the present results replicate previous findings that such a preference for positive self-referent information is lacking in CDs (Clark & Beck, 1999; Crowson & Cromwell, 1995; Ingram et al., 1998). As concerns the PDs, the results replicate those from other studies, showing a preference for positive self-referent information (Clark & Beck, 1999; Ingram et al., 1998). Possibly, some of the results from our study make it more reasonable to explain the mechanism behind this preference for positive self-statements in PDs as a defensive avoidance of negative information, rather than an attraction to

positive information. First, high levels of dysfunctional attitudes in combination with different levels of dysphoric symptoms led to different cognitive processing of self-statements; i.e., simultaneous high levels of dysfunctional attitudes and the presence of dysphoric symptoms increased the preference for positive self-statements, while high levels of dysfunctional attitudes alone decreased the preference for positive self-statements. These findings support the prediction proposed in the cognitive battle model that, in PDs, an avoidance reaction would occur when the level of dysphoric symptoms increases. Second, we found responses in the PDs that may be interpreted as an immediate denial or suppression of the impact that the experimental procedure actually had on their mood (as measured with DACL). These results, which might be supportive of the cognitive avoidance hypothesis, have to be regarded as preliminary. The sample sizes are small and the results are only marginally significant. However, along with these results, the cognitive battle model may form the basis for future research where each step of the model should be tested. For example, a startle reflex modification design (Norris & Blumenthal, 1996; van den Hout et al., 2000) may be used to explore whether there are differences between cognitive processes responsible for the preference for positive self-statements in NDs and PDs.

Dysphoric Symptoms and Dysfunctional Attitudes

The relatively high degree of dysphoric symptoms and dysfunctional attitudes in the PDs is in contrast with other studies, which have found that dysfunctional attitudes do not persist beyond recovery from the depressive state (Clark and Beck, 1999; Ingram et al., 1998). However, these previous studies have primarily defined depressive states according to scores on different depression inventories such as the BDI, not in terms of clinical diagnoses as provided by a structured clinical interview, such as the SCID. If, as proposed by Miranda and Persons (1988), dysfunctional attitudes persist in vulnerable individuals, but are inaccessible until they become activated by negative mood, then it will be impossible to detect this association as long as the criterion of a previous depression is a BDI score within the normal range. Furthermore, if PDs generally exhibit a higher level of dysphoric symptoms and dysfunctional attitudes than ND individuals, it seems somewhat

unreasonable to include only PDs with a depression level in the normal range. Consequently, the findings in the present study of a positive association between dysphoric symptoms and dysfunctional attitudes in the PDs and the CDs, but not in the NDs, are consistent with previous results by Miranda and Persons (1988), Miranda et al. (1990) and Roberts and Kassel (1996), indicating that mood and cognition are, largely, functionally separate and hence may reflect a causal relationship in depression.

Self-Reported Preferences for Self-Statements and Mood Changes During the Procedure

The results from the DACL show that while the NDs were negatively affected and the CDs were positively affected by the procedure, no mood changes were seen in the PDs. For the PDs, this result may be interpreted as contradictory to some of the results from the post-experimental questionnaire. When answering questions about the degree to which the two recordings reflected how they were feeling right then and how they usually felt, the biggest difference between then and usually was obtained in the PDs. This could indicate that the positive tape had a strong positive effect on mood in the PDs. When reporting their affective response to the positive tape, again the strongest positive affective response was found in the PDs. The seemingly contradictory findings may possibly be explained by an important difference between the two self-report questionnaires: While the DACL asks for quick responses, explicitly instructing the subjects not to dwell upon the adjectives, the post-experimental questionnaire asks for preferences and evaluations, forcing the subject to reflect upon their own responses. Accordingly, the DACL is likely to tap more immediate responses than the post-experimental questionnaire, responses that may be more defensive and denying. Given the possibility to reflect upon their behaviour, however, the PDs' response pattern become more complex and in accordance with the explicit listening behaviour. In the NDs and the CDs the responses on the post-experimental questionnaire generally seem to be more in accordance with the DACL responses.

The number of participants who did not respond to the question about self-reported preference for the positive tape was highest in the PDs and the CDs. Furthermore, as many as 35.7% of the PDs did not respond to the question of whether one of the

two recordings reflected how they usually felt. Together, these results may be interpreted as a greater ambivalence for positive and negative self-statements. This finding is similar to results from Wenzlaff et al. (2002), who found that even if formerly dysphoric individuals demonstrated relatively adaptive attitudes they were more uncertain about those beliefs than were the never depressed control group. Furthermore, this attitude uncertainty was related to high levels of thought suppression, which, in turn, were related to previous depression.

Clinical Implications of the Cognitive Battle Model and the Findings from the Study

Central to the cognitive battle model is the suggestion that dysphoric previously depressed individuals will avoid attending to negative self-referent information in an effort to prevent depressive relapse, and that this behaviour is motivated by activation of fear of relapse. As discussed above, the present study was not designed to test each step of the model and the results may only be regarded as a preliminary support of the model. However, both the model and the results may give rise to some ideas about possible clinical interventions to prevent relapse. By mentioning some of them below, we hope that future research may be designed to test them clinically.

From the listening data we know that the PDs with high levels of dysfunctional attitudes, but with dysphoric symptoms in the normal range, listened less to the positive tape than the PDs with simultaneous high levels of dysfunctional attitudes and dysphoric symptoms. According to the cognitive battle model such a decrease in the preference for positive self-referent information in this non-dysphoric group of previously depressed individuals might in turn be responsible for the increase in dysphoric symptoms later, because of lower preference for positive self-referent information. Based on this assumption, one may argue that PDs, depending on their dysphoric state, will profit differently from various relapse preventive treatment. First, PDs without dysphoric symptoms may have to learn to reduce their dysfunctional attitudes, not to engage in sustained rumination and actively to select positive self-referent information. These suggestions may be similarly to traditional cognitive therapy for depression (Beck, 1995). However, as dysphoric symptoms arise, it may be important not to avoid or suppress depressive cognitions, but

rather to explore and reality test them. As the anxiety and the worries of the previous depressive episodes may be responsible for the hypothesized avoidance reactions, and thereby contribute to the escalation of the dysphoric mood, it seems decisive that these worries are explicitly expressed and discussed. Meta-cognitive interventions may be important to bring to consciousness how coping strategies intended to prevent depressive relapse may actually have the opposite effect by increasing the possibility of experiencing a new depression episode. As reviewed above, while several researchers have discussed how rumination may be such a maladaptive coping strategy (Segal et al., 2002; Wells, 2000), avoidance and suppression should also be taken in to account as a focus of intervention. Another challenge to clinical practice may, however, be to reach out to previously depressed individuals who again are starting to experience dysphoric symptoms and depressive cognitions. Our suggestion is that these individuals will avoid therapy because of their fear of being reminded of the previous depressive episode.

Conclusion and Directions for Future Research

Several researchers have discussed the possibility that faulty coping strategies such as rumination (Nolen-Hoeksema, 1991; Wells, 2000), and mind-control strategies such as avoidance and suppression (Wenzlaff & Wegner, 2000), may be responsible for the high rate of relapse and recurrence. The cognitive battle model contributes by emphasizing the previous depressive episode as a traumatic life event and how previously depressed individuals *actively* try to cope with this experience. While both the ironic processing hypothesis (Wenzlaff & Wegner, 2000) and the cognitive battle model stress the importance of suppression and avoidance as coping strategies in previously depressed individuals, there are also important differences between the two models. First, according to the ironic processing hypothesis, suppression in cognitively vulnerable individuals who are not currently depressed may explain why they have normal levels of dysfunctional attitudes. By contrast, the cognitive battle model suggests that suppression may actually be the consequence of the activation of dysfunctional attitudes and the increase of dysphoric mood. Furthermore, the cognitive battle model proposes that anxiety about losing control is probably the starting point of the escalation process of dysphoric mood to depres-

sive relapse. According to the ironic processing hypothesis, however, the starting point of the escalation process seems to be dysphoric mood, since it decreases effortful processing and thus the ability to suppress dysfunctional thinking.

The cognitive battle model may also contribute to explain the apparently inconsistent suggestions that vulnerable individuals may be cognitively characterized by two qualitative different coping strategies, i.e. rumination and suppression. To explain this, it is important to take into account that in real life, outside the experimental setting, most negative self-referent information is supposed to be processed as *internal* automatic thoughts, memories and expectancies. The selective attention to negative self-referent information may then be extracted through more subtle, uncontrolled and automatic cognitive processes. The cognitive battle then turns out to be a battle between involuntary and automatically processed negative self-referent information, and the attempt to control this negatively biased processing through coping strategies. For example, possible content of involuntary and automatic processed negative self-statements may be 'I'm doing badly again', 'I am really a failure', 'Now I'm sliding into a new depressive episode', and the attempts to control these negative automatic thoughts through self-instructions such as 'I *must not* think about it!' or 'I *have to* keep on going'. Our suggestion is that such self-instructions are 'rumination about the necessity of avoiding negative information'. Accordingly, rumination and avoidance may be two aspects of the same matter.

When emphasizing how formerly depressed individuals actively cope with the previous experience of depression, their general psychological condition appears relevant. For example, do they worry a lot about the risk of losing control again and going into another depressive episode? Do they feel continuously stressed by trying to avoid such a risk? The findings from the present study of an increased level of dysphoric symptoms in previously depressed individuals, as compared to never depressed individuals, supports the assumption that formerly depressed individuals have problems with their previous depressive experience. This is further substantiated by a study comparing some of the never depressed, previously depressed and clinically depressed individuals who took part in the present study using the Rorschach method (Hartmann, Wang, Berg, & Soether, 2003). These authors found a tendency in previously depressed individuals, as compared to never depressed individuals, towards increased

levels of anxiety, low stress tolerance, low self-esteem, rigid and maladaptive coping strategies and feelings of hopelessness.

However, the most important clinical implications of the cognitive battle model may be that we have to (a) differentiate more clearly between symptoms of dysphoric mood and symptoms of dysfunctional attitudes; (b) differentiate between various coping mechanisms used when confronted with dysphoric symptoms and negative self-referent information; (c) differentiate between PDs with regard to these variables and (d) design different relapse preventive strategies for PDs depending upon their profiles on these mechanisms. Depending upon their affective and dysfunctional attitude profile and their coping style, previously depressed individuals may be regarded as having experienced a 'traumatic life event' (i.e. the depressive episode), which has led to impairment of their information processing and thereby loss of control. Accordingly, our understanding of depressive patients may profit from knowledge accumulated from the treatment of posttraumatic stress disorder. A crucial point in relapse prevention of depression, then, could be, at the end of a depressive episode, to treat this experience as much as the treatment of the depressive symptoms and the presumed causal factors behind these depressive symptoms. This assumption may explain why each depressive episode seems to be a vulnerability factor for experiencing a new episode (Coyne, Flynn, & Pepper, 1999; Solomon et al., 2000), since the individual will be increasingly traumatized by each episode. Another implication may be related to the well known co-morbidity between depression and anxiety, since we expect that depressive symptoms in previously depressed individuals will evoke symptoms of anxiety. Furthermore, it may be hypothesized that symptoms of anxiety will be increasingly more evident and pronounced after each depressive episode, which should be a topic of further research.

Finally, there are several limitations both with the cognitive battle model and with the findings from the study. First, the model was primarily developed on the basis of reviewing theories and previous research on cognitive vulnerability to depression. By doing so, we were aware that little attention had been paid to formerly depressed individuals' experience of the depressive episode itself. Accordingly, the present study was carried out in order to explore and increase such knowledge. The findings gave some support to our model, but must of course be interpreted cau-

tiously due to small sample sizes and marginally significant results. Also, not each step of the model was tested in the present study. Alternative interpretations of the findings may be possible. However, the main intention with this article was not to strictly test the cognitive battle model, but to contribute to generate a basis of hypotheses testing and clinical interventions. Future research will decide whether the cognitive battle model will increase our understanding and treatment of relapse and recurrence in depression.

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