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The importance of distinguishing between the different eating disorders (sub)types when assessing emotion regulation strategies



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ABSTRACT

People with eating disorders (ED) have difficulties regulating their emotions adaptively. Little is known about differences and similarities between different types of ED and how these regulation difficulties relate to other emotional problems. The present study examines maladaptive (suppression) and adaptive (cognitive reappraisal) emotion regulation strategies in women with different ED and relationships with anxiety and depression levels. In 32 women with AN restrictive subtype (ANR), 32 with AN binge-purge subtype (ANBP), 30 with bulimia nervosa (BN), 29 with binge eating disorder (BED), and 64 healthy women, the ERQ (emotion regulation) as well as STAI-T (anxiety), BDI-SF (depression), and EDDS (eating pathology) were administered. Women across different ED subtypes were inclined to suppress emotions and lacked the capacity to reappraise emotions (except women with ANBP). Correlational relations of suppression and reappraisal with anxiety and depression levels differed across ED groups. Emotion regulation problems were found across ED subtypes. However, the types of emotion regulation problems, and the effect of coexisting other emotional problems such as anxiety and depression may differ across ED subtypes. These findings illustrate the importance to of considering ED subtypes in emotion regulation research rather than consider ED as a whole.

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1. Introduction

Emotions play an important role in the course and treatment of individuals with eating disorders (ED). Individuals with ED particularly experience difficulties regulating their emotions, as they do not seem able to use adaptive emotion regulation strategies (e.g., Harrison et al., 2010; Svaldi et al., 2012). It is even suggested that pathological eating behavior may result from maladaptive emotion regulation (Smyth et al., 2007; Danner et al., 2012; Racine and Wildes, 2013).

Research has shown that individuals with ED are inclined to use maladaptive emotion regulation strategies (in particular emotion suppression). The more they employ these maladaptive strategies, the more severe their ED symptoms seem to be (Forbush and Watson, 2006; Aldao et al., 2010; Harrison et al., 2010). Recent studies also suggest that individuals with ED lack access to more adaptive emotion regulation strategies (Aldao et al., 2010; Danner et al., 2012; Svaldi et al., 2012). This inability to regulate emotions adaptively makes them use emotion regulation

strategies that they do have access to, leading to highly inefficient consequences/behavior, such as bingeing or other disordered eating, hoping to alleviate their negative feelings (Heatherton and Baumeister, 1991). Thus, difficulties in emotion regulation might include the presence of maladaptive strategies, the lack of adaptive strategies, or both.

A prototypical example of a maladaptive emotion regulation strategy is the suppression or inhibition of emotions (Gross and John, 2003). It is regarded as a maladaptive strategy, because it decreases the expression of emotions rather than the experience of emotions (e.g., Gross and Levenson, 1997; Gross, 2002). Another downside is that it comes at a certain cost: it involves more physiological arousal and is more demanding than not regulating emotions at all. A prototypical adaptive emotion regulation strategy that is commonly used in daily life is cognitive reappraisal (Richards and Gross, 2000; Gross and John, 2003). It entails changing the way a situation is construed, aiming to decrease its emotional impact. It is regarded an adaptive strategy, as it reduces the negative experience resulting from the emotion without additional costs. It often occurs before an emotional situation and once the situation occurs, its emotional impact reduces.

In conclusion, individuals with ED therefore suffer from both maladaptive emotion regulation and a lack of adaptive emotion regulation strategies. Until now most studies, however, focus on

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only one or two patient groups, such as anorexia nervosa (AN) and bulimia nervosa (BN) (e.g., [Forbush and Watson, 2006](#); [Harrison et al., 2010](#); [Racine and Wildes, 2013](#)), while not much is known about similarity and differences in emotion regulation between different types of ED. Furthermore, relationships with emotional problems such as depression and anxiety, have remained understudied as well. Since mood and anxiety disorders are highly comorbid across ED subtypes (e.g., [Blinder et al., 2006](#); [Hudson et al., 2007](#); [Salbach-Andrae et al., 2008](#)), it is important to gain further understanding of emotion regulation difficulties and relationships with ED pathology. Individuals with ED who experience (severe) symptoms of anxiety and depression may carry a stronger burden by lacking adaptive emotion regulation strategies as they also need to deal with these additional emotions.

Only a few studies have compared individuals across different ED subtypes in terms of emotion regulation strategies. One study showed that women with AN and BN reported more emotion inhibition than control women. However, women with BN reported higher levels of emotional inhibition than women with AN ([Forbush and Watson, 2006](#)). Another study by [Harrison et al. \(2010\)](#), reported similar findings on all subscales of the Difficulties in Emotion Regulation Scale, a scale assessing emotional arousal, awareness, understanding, acceptance of emotions and the ability to act in desired ways regardless of an individual's emotional state ([Gratz and Roemer, 2004](#)). [Svaldi et al. \(2012\)](#) examined emotion regulation strategies in a community sample of people with ED and compared women with AN, BN and BED to other psychiatric diagnostic groups (major depressive disorder and borderline personality disorder) and a healthy control group. They used a variety of instruments to assess emotion regulation difficulties. All ED groups reported to use less adaptive and more maladaptive emotion regulation strategies compared to healthy controls. Furthermore, this study showed positive relationships with eating disorder severity.

However, it remains unclear to what extent restrictive (ANR) and binge-purge (ANBP) subtypes differ, as the existing research on emotion regulation difficulties is scarce and just a few studies distinguished between these subtypes. Yet, such distinction may be pivotal as several studies indicated important characteristic differences between these subtypes (see [Peat et al., 2009](#)). Differences in self-regulatory behavior between ANR and ANBP have also been reported. For example, ANBP patients have less inhibitory control than ANR patients and healthy control participants as is suggested by the higher number of errors on a Go/No Go task ([Bruce et al., 2003](#); [Rosval et al., 2006](#)), and ANBP has been linked to impulsivity such as motor impulsiveness, inattention, reward responsiveness, and impulsive behaviors such as stealing and self injury ([Waxman, 2009](#)). These finding could not be replicated within the ANR group. Comorbid substance use disorder was found more often to be more often present in ANBP (26.7%) than in ANR patients (1.4%; [Salbach-Andrae et al., 2008](#)). Furthermore, individuals with ANBP, and not ANR, seem to share several features with BN as they both have a more impulsive personality, stronger emotional eating tendencies and specifically seem to act more impulsively in response to negative emotions ([Vervaeke et al., 2004](#); [Claes et al., 2005](#)), tendencies that are regarded as regulation strategies to reduce the experience of negative affect. Consequently, individuals with ANBP may resemble individuals with BN in the use of emotion regulation strategies more strongly than they resemble individuals with ANR.

More direct evidence stems from a recent study in AN patients that found direct relations between impulse control difficulties when upset and both objective binge eating and purging behavior in AN patients ([Racine and Wildes, 2013](#)). Findings suggest important differences in the use of emotion regulation between the AN subtypes. In line with these results, an other study

examining cognitive reappraisal in restrictive (ANR) and binge-purge type patients (ANBP and BN) patients showed that the binge-purging group scored lower on cognitive reappraisal in comparison to ANR ([Danner et al., 2012](#)). On the other hand, limited use of cognitive reappraisal was related to depressive symptoms in the restricting group, indicating that emotion and mood issues seem to be related to emotion regulation problems in all types of disordered eating, albeit that the specific relationship may differ between ED (sub)diagnoses. This may have important implications for treatment of individuals with ED.

The first purpose of the present study is to compare the use of maladaptive (suppression) and adaptive (cognitive reappraisal) emotion regulation strategies in women with AN, BN and BED, and to replicate the findings of [Svaldi et al. \(2012\)](#) in a clinical sample (women currently in treatment for their ED). The second purpose is to extend these findings by distinguishing between ANR and ANBP and to examine the correlational relations between the use of adaptive and maladaptive emotion regulation strategies and clinical characteristic directly related to these strategies including levels of anxiety and depression within each subgroup (rather than only across the whole ED group as was done in [Svaldi et al. \(2012\)](#)).

The hypotheses are that all women with ED will show stronger emotion suppression and will lack the tendency to reappraise their emotions compared to healthy control women. Regarding differences between the (sub)types, in line with our previous study in which women displaying binge-purging behaviors had lower cognitive reappraisal scores than the restricting group ([Danner et al., 2012](#)), we expect reappraisal scores to be lower in women with ANBP and BN. In accordance with the findings of [Svaldi et al. \(2012\)](#), no group differences are expected regarding suppression scores. Previous work reported on relations between emotion regulation and affective problems (e.g. depression level) and it is therefore expected that higher anxiety and depression levels will be related to more dysfunctional emotion regulation.

2. Method

2.1. Participants

One hundred and eighty-seven women participated in this study: 32 women with a diagnosis of AN restrictive subtype (ANR) or eating disorders not otherwise specified (EDNOS) clinically referred to as ANR, 32 women with AN binge-purge subtype (ANBP) or EDNOS clinically referred to as ANBP, 30 women with BN, 29 women with EDNOS-BED subtype, and 64 control women without a history of any psychiatric disorder including ED. All participants were 18 years of age or older (with an age range of 18 to 62 years, Mean=28.31, S.D.=10.61), were fairly educated (most participants completed advanced education (at least bachelor level or applied sciences) or were at present receiving advanced education. Participants were asked to report their highest completed level of education with 1="primary school" to 7="university"; Mean=5.51, S.D.=1.37) and had on average a normal BMI, although this differed strongly (12.27–47.32 kg/m²) as can be expected in women with different types of ED. See also [Table 1](#).

Women with ED were recruited from three specialized clinics for ED and from individual therapists in The Netherlands, and they were at the time of this study all in treatment for their ED. On average, their illness duration was 17.89 years (S.D.=5.59) and the age of onset was 10.41 years (S.D.=9.12). Their diagnoses were determined according to DSM-IV criteria as ascertained by ED experts (all medical doctors or psychologists specialized in ED).

Sixty-four healthy controls were recruited from Utrecht University and from the community. Prior to participation, they were screened by telephone using the Mini International Neuropsychiatric Interview (MINI), an abbreviated psychiatric structured interview (see also [van Vliet and de Beurs, 2007](#)) to preclude any psychiatric disorder (anxiety disorder, substance abuse) and in particular all ED. Second, Eating Disorders Diagnostic Scale diagnosis scores (EDDS, see Instruments) were calculated and, where necessary, used to exclude healthy controls who showed sub- or full threshold ED.

Since this study was part of a larger study, participants were further excluded if they were on antidepressant medication. Ten healthy control women (showing sub- or full threshold ED diagnoses or reported loss of control eating behavior on the EDDS) and two BED women (on antidepressant medication) were excluded,

Table 1

Mean (and S.D.) for the control ANR, ANBP, BN, and BED groups regarding demographics (age in years and highest completed level of education), clinical characteristics (BMI in kg/m², eating disorders symptomatology (EDDS symptoms), depression (BDI-SF), illness duration and age of onset of eating disorder), trait anxiety (STAI-T), and emotion suppression and cognitive reappraisal.

	Control Mean (S.D.)	ANR Mean (S.D.)	ANBP Mean (S.D.)	BN Mean (S.D.)	BED Mean (S.D.)	F	p	η^2
Age	28.09 (11.82)	23.09 (6.51)	27.41 (9.25)	25.37 (6.15)	38.48 (10.68)	11.43	< 0.001	0.21
Education	5.87 (1.07)	5.31 (1.69)	5.66 (1.18)	5.47 (1.36)	4.93 (1.51)	3.60	0.038	0.06
Age of onset ED	n.a.	17.72 (4.68)	17.34 (4.18)	16.46 (4.38)	20.32 (8.40)	2.20	0.092	0.06
Illness duration	n.a.	5.53 (4.86)	10.86 (10.10)	8.57 (5.44)	19.91 (9.15)	16.52	< 0.001	0.32
BMI	21.98 (2.54)	17.23 (1.80)	16.98 (1.94)	23.44 (3.29)	37.45 (5.10)	223.99	< 0.001	0.84
EDDS symptoms	8.26 (5.96)	28.66 (9.66)	46.16 (17.23)	47.57 (16.95)	31.93 (9.84)	74.28	< 0.001	0.63
BDI-SF	1.70 (2.25)	17.16 (8.10)	18.16 (6.68)	13.07 (7.20)	9.34 (5.62)	54.52	< 0.001	0.56
STAI-T	3.12 (0.31)	4.23 (0.51)	4.30 (0.47)	4.17 (0.46)	3.84 (0.47)	56.48	< 0.001	0.57
Suppression	2.74 (1.03)	4.57 (1.13)	4.43 (1.40)	3.59 (1.17)	3.55 (1.37)	13.88	< 0.001	0.25
Cognitive reappraisal	4.72 (1.12)	4.02 (1.13)	4.18 (1.05)	3.52 (1.44)	3.88 (1.30)	5.34	< 0.001	0.11

Note. ANR = anorexia nervosa restrictive subtype; ANBP = anorexia nervosa binge purge subtype; BN = bulimia nervosa; BED = binge eating disorder; BMI = body mass index; EDDS = Eating Disorders Diagnostic Scale; BDI-SF = Beck depression inventory-short form; STAI-T = State Trait Anxiety Scale-trait subscale.

resulting in the inclusion of 175 women in the analyses. Ethical approval for this study was obtained from the Medical Ethical Committee (METC) of the University Medical Center Utrecht (protocol numbers NL33536.041.10 and NL21460.041.08) and the local scientific research committee of Altrecht Mental Health Institute (CWO; protocol number 2011-45/oz1117).

2.2. Measures

2.2.1. Emotion suppression and cognitive reappraisal

The Dutch translation (Kooie, 2004) of the Emotion Regulation Questionnaire (ERQ; Gross and John, 2003) was used to measure individual differences in the use of expressive suppression and cognitive reappraisal as emotion regulation strategies. It contains 10 items (e.g., "I control my emotions by not expressing them" to measure expressive suppression and "I control my emotions by changing the way I think about the situation I'm in" to measure cognitive reappraisal). Items are presented as statements and participants indicate how much they agree on 7-point Likert scales ranging from 1 'strongly disagree' to 7 'strongly agree'. The ERQ shows good reliability and convergent as well as discriminant validity (Gross and John, 2003). Cronbach's alpha in the present study was .80 for the suppression subscale and .87 for the reappraisal subscale.

2.2.2. Depressive symptoms

The Beck Depression Inventory short form (BDI-SF; Beck et al., 1996) is a widely used self-report inventory for measuring the severity of depression. The validity of the short form has been established and is good (Furlanetto et al., 2005). The BDI-SF contains 13 questions, each answer being scored on a scale value of 0 to 3. Higher total scores indicate more severe depressive symptoms. Cronbach's alpha was .94.

2.2.3. Trait anxiety

To measure trait anxiety, the trait anxiety subscale (STAI-T) of the State-Trait Anxiety Inventory (STAI-T; Spielberger, 1983) was used. It contains 20 items scored on 4-point Likert scales. A higher score indicates greater anxiety. The Cotan appraisal (Evers et al., 2000) of the Dutch version of the STAI is 'good' for its reliability and 'sufficient' for its construct and criterion validity. Cronbach's alpha was .95 for the STAI-T.

2.2.4. Eating disorder symptomatology

The Dutch version of the Eating Disorders Diagnostic Scale (EDDS; Stice et al., 2000; Krabbenborg et al., 2012) was used to measure overall level of eating pathology. The EDDS contains 22 items that generates a continuous ED symptom composite that reflects the participant's overall level of eating pathology and assesses DSM-IV symptoms for all three ED. The EDDS is therefore a brief measure to diagnose AN, BN and BED, and these scores were used to determine sub- and full threshold ED in the control group. The symptom composite was used to determine the overall level of eating pathology in all participants. Cronbach's alpha was .86.

Furthermore, participants were asked about the duration of the illness, ED age of onset, weight and height to calculate BMI, and demographic information.

2.3. Data analyses

All statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 20.0 for Windows. To compare demographics, clinical characteristics and trait anxiety between the groups, Analyses of Variance (ANOVAs) were performed. Differences between the groups in emotion suppression and

cognitive reappraisal were tested while controlling for BMI using ANCOVAs. Further interpretation of the group effects was done using pairwise comparisons with Fisher Least Significant Difference (LSD) method. Finally, Pearson correlations were calculated for exploratory reasons to examine the relations of emotion suppression and cognitive reappraisal with overall level of eating pathology, BMI, depressive symptoms and trait anxiety within each subgroup.

3. Results

3.1. Demographics

Mean (and S.D.) and group effects are displayed in Table 1. There was a main effect of age and highest completed level of education. Parameter estimates showed that women with BED were older than all other groups (p 's < 0.001). Additionally, women with ANR were younger than the control women, $p=0.020$. Regarding level of education, the highest completed level was lower for women with BED than for control women, $p=0.003$, and women with ANBP, $p=0.036$.

3.2. Clinical characteristics

BMI differences were as expected (see also Table 1): Women with BED differed from all groups (p 's < 0.001). Similarly, ANR and ANBP differed from all groups (p 's < 0.001), except from one another, $p=0.75$. Furthermore, although both women with BN and control women had on average a BMI within the healthy range (18–25 kg/m²), control women had a lower BMI than women with BN, $p=0.036$. The overall level of eating pathology also differed between the groups: control women differed, as expected, from all groups (p 's < 0.001). Also between patient groups there were large differences: women with ANR and BED differed from ANBP and BN (p 's < 0.001), but not from one another, $p=0.29$. The overall level of eating pathology was also similar in BN and ANBP, $p=0.65$. There were large group differences regarding depressive symptoms: all patient groups had higher scores than the control women, p 's < 0.001. The ANR and ANBP groups did not differ, $p=0.50$, but both groups reported more depressive symptoms than women with BN, resp. $p=0.007$ and $p=0.001$, and women with BED, p 's < 0.001. Women with BN reported more depressive symptoms than women with BED, $p=0.017$.

3.3. Trait anxiety

Trait anxiety differed between groups (see also Table 1), all groups reported more trait anxiety in comparison to control women, p 's < 0.001. Women with BED reported less trait anxiety

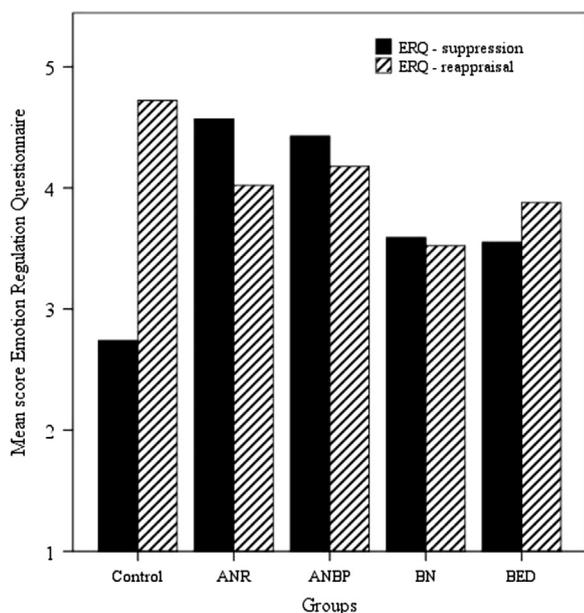


Fig. 1. The mean ERQ score for the subscale suppression (black) and cognitive reappraisal (striped) per group: control women, anorexia nervosa restrictive subtype (ANR), anorexia nervosa binge-purge subtype (ANBP), bulimia nervosa (BN) and binge eating disorder (BED).

than women with ANR, $p=0.001$; ANBP, $p < 0.001$; BN, $p=0.004$. Trait anxiety was similar in ANR, ANBP and BN women.

3.4. Emotion suppression

A strong main effect of group was found, see Table 1 and Fig. 1. The covariate BMI did not have an effect, $F < 1$. Parameter estimates showed that all ED groups had higher suppression scores in comparison to the control group: ANR, $p < 0.001$; ANBP, $p < 0.001$; BN, $p=0.002$; BED, $p=0.047$. Women with ANR and ANBP reported the strongest suppression of emotions and differed from the BN group, resp. $p=0.016$ and $p=0.048$, but not from one another, $p=0.63$ nor from the women with BED, resp. $p=0.34$ and $p=0.46$. The BN and BED groups also did not differ, $p=0.69$.

3.5. Cognitive reappraisal

A main effect of group was also found for cognitive reappraisal, see Table 1 and Fig. 1. Again, the covariate BMI did not have an effect, $F < 1$. Parameter estimates revealed lower reappraisal scores for the ANR, BN and BED (marginally) groups in comparison to control women, resp. $p=0.034$, $p < 0.001$ and $p=0.064$. Reappraisal scores of women with ANBP were higher than women with BN, $p=0.047$, and not different from control women. Reappraisal scores of women with BED, ANR, and BN did not differ, $p's > .45$.

3.6. Correlations within the subgroups

Significant correlations between emotion suppression and cognitive reappraisal were not found in the total group nor in the subgroups, see also Tables 2a and 2b. Within the control group, suppression was positive related to anxiety and a trend was found in relation to depression. Significant correlations for all women with ED together showed that a stronger tendency to suppress emotions was related to a lower BMI, more depressive symptoms and more trait anxiety. However, examination of the different patient groups revealed no significant correlations with BMI and strongest correlations with depression and anxiety for women with ANR, although a stronger tendency to suppress emotions was not related to trait

Table 2a

Pearson correlations between emotion suppression and cognitive reappraisal, eating disorder symptomatology (EDDS symptom), BMI, depression (BDI-SF) and trait anxiety (STAI-T).

Emotion suppression	Cognitive Reappraisal	EDDS symptoms	BMI	BDI-SF	STAI-T
Control	0.22	-0.05	-0.18	0.24*	0.27**
ANR	0.13	0.11	-0.03	0.59***	0.67***
ANBP	-0.04	0.33*	-0.08	0.52**	0.33*
BN	-0.14	-0.20	-0.17	0.43**	0.39**
BED	0.02	0.37**	0.13	0.43**	0.18
Total patient groups	0.04	0.08	-0.27**	0.55***	0.43***

Note. ANR=anorexia nervosa restrictive subtype; ANBP=anorexia nervosa binge-purge subtype; BN=bulimia nervosa; BED=binge eating disorder; EDDS=Eating Disorders Diagnostic Scale; BMI=body mass index; BDI-SF=Beck depression inventory-short form; STAI-T=State Trait Anxiety Scale-trait subscale.

* $p < 0.10$ (Trend significant).

** $p < 0.05$.

*** $p < 0.001$.

Table 2b

Pearson correlations between cognitive reappraisal and emotion suppression, eating disorder symptomatology (EDDS symptom), BMI, depression (BDI-SF) and trait anxiety (STAI-T).

Cognitive reappraisal	Emotion suppression	EDDS symptoms	BMI	BDI-SF	STAI-T
Control	0.22	-0.22	-0.04	-0.01	-0.29*
ANR	0.13	0.31**	-0.28	-0.13	-0.04
ANBP	-0.04	-0.23	0.10	-0.09	0.12
BN	-0.14	-0.17	-0.07	-0.43*	-0.40*
BED	0.02	-0.32**	0.24	-0.12	-0.34**
Total patient groups	0.04	-0.15	-0.05	-0.14	-0.16**

Note. ANR=anorexia nervosa restrictive subtype; ANBP=anorexia nervosa binge-purge subtype; BN=bulimia nervosa; BED=binge eating disorder; EDDS=Eating Disorders Diagnostic Scale; BMI=body mass index; BDI-SF=Beck depression inventory-short form; STAI-T=State Trait Anxiety Scale-trait subscale.

*** $p < 0.001$.

* $p < 0.05$.

** $p < 0.10$ (Trend significant).

anxiety in women with BED. A significant correlation was found between emotion suppression and eating pathology in women with BN and BED: those who were more inclined to suppress emotion, had higher overall levels of eating pathology.

Significant correlations were found between lower cognitive reappraisal scores and higher anxiety levels in all groups except in women with ANR and ANBP. In women with BN less reappraisal was related to more depressive symptoms. In women with ANR lower reappraisal was significantly correlated with lower overall level of eating pathology, while an opposite pattern was found in all other groups (albeit that only the BED group reached trend significance).

4. Discussion

All patient groups, regardless of ED subtype, were inclined to suppress their emotions more strongly than control women. Use of reappraisal also differed between women with ED and control women, with control women being inclined to use more reappraisal than ED patients, but this difference was only small for patients with BED and non-significant for women with ANBP. In addition, all ED groups showed a positive relation between the tendency to suppress emotions and level of depression. The findings are in line with those of Svaldi et al. (2012).

Studies so far (Aldao et al., 2010; Svaldi et al., 2012) examined relationships between emotion regulation difficulties and emotion problems in ED as a whole group, while the results of the present study highlights the importance of distinguishing between ED subtypes.

Since outcomes of the correlational analyses in this study differed in the whole ED group from outcomes within the separate ED groups, this may suggest that there are specific correlational relationships within each separate ED group, that are no longer noticeable when running analyses in a mixed ED group. Possibly then incorrect conclusions will be drawn since an association is assumed that does not hold true for all ED subtypes. For example, correlation analyses in the entire clinical sample suggested that those ED patients with a lower BMI show a tendency to suppress their emotions. Importantly, correlations within each subgroup revealed no specific relations between emotion suppression and BMI. The significant correlation found between BMI and emotion suppression in the whole ED group can be explained by the fact that the group characterized by the lowest BMI (i.e. AN) are those with the highest suppression scores.

The same explanation can be used to understand the relationship between emotion suppression on the one hand and anxiety and depressive symptoms on the other. Strong overall effects were found, but although relations with depressive symptoms were found in each of the separate ED groups (strongest in women with ANR and ANBP), relations with anxiety symptoms were not present in women with BED. Interestingly, women with BED reported more anxiety and depression symptoms than control women, but less than the other ED groups. It is possible that because women with BED were less troubled by anxiety and depression, they were also less inclined to suppress their emotions.

A lack of cognitive reappraisal was also related to clinical characteristics across the various ED groups. These findings differed from those reported by Svaldi et al. (2012) who found that lack of reappraisal was related to more eating pathology and more depressive symptoms for all patients. Although a lack of reappraisal when examined in all ED women together disclosed only a marginal relation with anxiety, testing the correlational relations per group showed distinct patterns for each of the ED groups. Only women with BN reported less reappraisal when experiencing more depressive and anxiety symptoms. This effect was marginal visible in women with BED, but not in women with AN.

The current findings further demonstrate the need to differentiate between the two AN subtypes. Interesting and remarkable are the correlational findings for women with ANBP, because these differ from women with ANR and are similar to women with BED and BN (to a lesser extent): *Less* reappraisal in women with ANBP and BED (and in BN non-significant but in the same direction) was related to a higher overall level of eating pathology, while women with ANR reported *more* reappraisal when suffering from a higher overall level of eating pathology. ANR and ANBP women seem similar at first sight since no group differences were found on any of the variables expect for overall level of eating pathology (which follows from the binge and/or purge behaviors ANBP patients display), different from our previous findings (Danner et al., 2012). However, they do seem to display different behavior when faced with other clinical symptoms such as anxiety. While women with ANBP (similar to BN and BED) are less inclined to reappraise their emotions when their illness state is more severe, women with ANR seem to do the opposite and use more cognitive reappraisal to regulate their emotions when more severely ill.

These findings are in line with previous research showing a stronger tendency to respond impulsively to negative circumstances in patients with ANBP in comparison to women with ANR (Claes et al., 2005). These impulse control difficulties have been

linked to binge eating and purging behaviors (Racine and Wildes, 2013). Furthermore, it was found that the combination of stronger emotional eating tendencies and limited use of cognitive reappraisal predicted level of eating pathology in women displaying binge-purge behaviors, and not in restrictive women (Danner et al., 2012).

Although the current study is important in terms of emotion regulation and associated negative emotions, it is important to acknowledge some limitations. First, the sample size of the ED groups was still relatively small, approximately 30 patients per patient group. In addition, seeing the number of correlational analyses conducted in this study, it is important that future studies replicate the present findings using larger sample sizes. Since this study was part of a larger study, no patients on antidepressant medication were included potentially resulting in a study population with lower depression scores. However, depression scores in the AN groups were above and in the BN group similar to the clinical cutoff as suggested by Furlanetto et al. (2005) for the BDI-SF. Scores of the BED group were somewhat lower than the clinical cutoff. Second, as this study was conducted using self-report questionnaires, we had to rely on self-evaluations of the participants. Although we used only well-validated questionnaires, future research should use other methods as well, such as experimental paradigms. Of note is that the ERQ (Gross and John, 2003) has not officially been validated in Dutch, although its validity has been shown in other languages and the reliability in other Dutch studies has also been good (e.g. Evers et al., 2010; Danner et al., 2012). Finally, we included all sorts of ED (sub)types, but we did not include a group with atypical ED, the so called EDNOS group. If a participant was diagnosed with EDNOS, but was clinically clearly referred to as for example ANR, we did include the participant. However, the (atypical) EDNOS group does represent an important ED group and prospective studies may want to include such a group considering the fact that not much is known about emotion regulation difficulties in the EDNOS group.

The findings in this study have clinical implications. As mentioned above, it is important to consider ED beyond their primary diagnoses, in particular for AN. Co-occurring psychopathological emotional problems such as anxiety and depression may result from an inadequate regulation of emotions and patients suffering from these symptoms may benefit from a treatment aimed at emotion regulation problems, in particular when displaying binge eating or purging behaviors. Since emotion suppression and cognitive reappraisal did not correlate in any of the groups, dysfunctional emotion regulation and lack of functional emotion regulation are indeed independent factors. Treatment aimed at improving emotion regulation may want to include the use of dysfunctional strategies as well as lack of more functional strategies pending on the problems patients experience.

There are different treatment modules available for individuals with ED that include emotion regulation difficulties such as the enhanced version of Cognitive Behavioral Therapy that incorporates mood intolerance, CBT-E (Fairburn et al., 2009) or recent work on exposure and response prevention as a new treatment approach focused on anxiety in AN (Steinglass et al., 2011). There is also a different CBT like therapy available that specifically aims at emotion regulation difficulties, Cognitive Emotional Behavioural Therapy (CEBT; see also Corstorphine, 2006). The aim of CEBT is to enable ED patients to better comprehend both the expression and experience of emotions in order to be able to successfully recognize and subsequently begin to challenge these emotions.

To conclude, we demonstrated that women with different ED (sub)types have difficulties regulating their emotions. These difficulties consist of the use of maladaptive strategies (emotion suppression) as well as lack of adaptive strategies (cognitive reappraisal). We further highlighted the importance of considering

the specific ED types and in particular, distinguishing between the two AN subtypes. Women with ANBP may resemble women with ANR, for example in the extent of emotion suppression and cognitive reappraisal. However, they also differ from women with ANR and seem more similar to women with binge eating pathology, for example in the extent of emotion regulation display when faced with clinical symptoms such as anxiety.

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