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BRIEF REPORT

The Impact of Alexithymia on Emotion Dysregulation in Anorexia Nervosa and Bulimia Nervosa over Time

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Abstract

Research supports that anorexia nervosa-restricting subtype (AN-R) and bulimia nervosa (BN) are associated with emotion regulation difficulties and alexithymia. However, the impact of diagnosis on the relationship between these constructs is less well understood. The purpose of the present study was to examine whether eating disorder diagnosis moderated the association between admission alexithymia and emotion regulation through discharge. Adult patients with AN-R ($n = 54$) and BN ($n = 60$) completed assessments at treatment admission and discharge from a partial hospital program. Eating disorder diagnosis moderated the association between admission alexithymia levels and change in global emotion dysregulation, impulse control difficulties and access to emotion regulation strategies. At higher levels of admission alexithymia, there were no differences between AN-R and BN on emotion dysregulation, whereas at lower levels of alexithymia, AN-R patients demonstrated lower levels of emotion dysregulation. Results imply that difficulties with alexithymia appear to have a greater impact on emotion dysregulation for AN-R patients. Copyright © 2017 John Wiley & Sons, Ltd and Eating Disorders Association.

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Keywords

alexithymia; emotion regulation; eating disorders; anorexia nervosa; bulimia nervosa

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Introduction

Disturbances in emotion regulation play an important role in theoretical models of eating disorders (EDs), with growing empirical support (Haynos & Fruzzetti, 2011; Wisniewski & Kelly, 2003; Wonderlich et al., 2014). Both anorexia nervosa (AN) and bulimia nervosa (BN) are characterized by elevated negative emotionality and difficulties regulating emotions (Lavender et al., 2015), with consistent findings showing greater emotion regulation difficulties in AN and BN compared with controls (Gilboa-Schechtman, Avnon, Zubery, & Jeczmien, 2006; Harrison, Sullivan, Tchanturia, & Treasure, 2010). This is in line with the high rates of co-occurring mood and anxiety disorders in EDs (Kaye, Bulik, Thornton, Barbarich, & Masters, 2004). Notably, in AN, global emotion regulation difficulties do not appear to improve with weight restoration alone (Haynos, Roberto, Martinez, Attia, & Fruzzetti, 2014), with variable improvements reported with recovery (Brockmeyer et al., 2012; Harrison et al., 2010), suggesting these deficits may persist after remittance of ED symptoms. Moreover, studies have not established consistent differences in global or overall emotion dysregulation between AN and BN diagnostic groups (Lavender et al., 2015), highlighting the potential transdiagnostic nature of negative emotionality in EDs.

While both AN and BN exhibit comparable global difficulties with emotion regulation, differences in *dimensions* of emotion regulation may contribute to their distinct clinical and temperamental presentations. Individuals with BN and AN-binge/purge subtype (AN-BP) have been shown to have increased negative urgency, higher impulsivity, greater novelty seeking and greater rates of comorbid substance use disorders compared with individuals with AN-restricting subtype (AN-R; Brockmeyer et al., 2014; Cassin & von Ranson, 2005; Farstad, McGeown, & von Ranson, 2016; Keel, Brown, Holland, & Bodell, 2012), suggesting BN and AN-BP may generally be characterized by an undercontrolled and behaviourally disinhibited temperament. In contrast, AN-R is characterized by a more overcontrolled, anxious, reward insensitive and rigid temperament (Cassin & von Ranson, 2005; Harrison et al., 2010; Kaye et al., 2004). Relatedly, individuals with AN-R demonstrate more consistent difficulties with emotional awareness and clarity compared to those with BN (Lavender et al., 2015). Given these distinctive temperamental profiles, it is possible that different factors contribute to emotion dysregulation across diagnoses.

One potential construct that may differentially relate to emotion dysregulation across diagnoses is alexithymia, or the inability to identify or describe one's emotional state (Lesser, 1981). Alexithymia has been associated with and implicated in a variety

of psychiatric populations, including EDs (Westwood, Kerr-Gaffney, Stahl, & Tchanturia, 2017). Individuals across ED diagnoses, including AN-R and BN, exhibit higher levels of alexithymia compared with non-ED controls, characterized by greater difficulties with identifying feelings, describing feelings and distinguishing feelings from bodily sensations of emotion (Gramaglia et al., 2016). In a recent meta-analysis, Westwood et al. (2017) demonstrated that individuals with AN and BN demonstrated comparably large differences in alexithymia compared with healthy controls (AN-R $d = 1.18$, AN-BP $d = 1.25$, BN $d = 1.26$). Thus, these deficits appear to be transdiagnostic across AN and BN presentations.

This raises the intriguing hypothesis that individuals with alexithymia may have greater difficulty regulating their emotions due to their limited ability to express, identify and understand their emotions (Lesser, 1981). Consistent with this notion, alexithymia has also been associated with poor mood regulation (Spence & Courbasson, 2012) and altered activation in brain circuitry associated with emotion regulation (van der Velde et al., 2013). Further, one of the most commonly used measures of emotion dysregulation, the Difficulties with Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), includes subscales that measure difficulties with emotional awareness and clarity, raising the possibility that elevations on these subscales might drive/confound reports of elevated emotion dysregulation in AN. More specifically, we were interested in examining the role of alexithymia on change in emotion regulation over time, as this relationship would have greater treatment implications by revealing whether alexithymia might not only contribute to but also interfere with the resolution of emotion regulation difficulties. Thus, the aim of the present study was to examine whether ED diagnosis (AN-R vs. BN) moderates the association between alexithymia at treatment admission and change in emotion dysregulation at discharge. Due to the potential for shared symptoms and temperament between AN-BP and both AN-R and BN, as well as limited availability of data from individuals with AN-BP, we excluded AN-BP from this initial study. Based on previous research (Lavender et al., 2015), we hypothesized that alexithymia would have a greater impact on emotion dysregulation for patients with AN-R compared with BN.

Materials and methods

Participants & procedures

Data came from 114 patients (female $n = 107$) who completed assessments as part of their treatment at the UCSD ED Partial Hospital Treatment Program (PHP; see Supporting Information for description of the program). To ensure a representative clinical sample, inclusion criteria for the present study were broad and included all patients who were admitted to PHP, met criteria for broadly defined AN-R or BN diagnoses and agreed to participate. Patients within the present study were classified into broadly defined AN-R ($n = 54$) or BN ($n = 60$) diagnoses by staff psychiatrists using an unstandardized semi-structured interview upon admission. Broadly defined AN-R diagnoses were made for patients who either met full criteria for DSM-5 AN-R or all of the criteria for AN except that body mass index (BMI) at admission was above 18.5 (e.g. either AN in partial remission or atypical AN). Broadly defined BN diagnoses included those who met full criteria for BN and BN of low frequency/duration. Groups did not differ on gender, length of stay, race, ethnicity, admission diagnosis of an anxiety disorder or antidepressant, atypical antipsychotic or anxiolytic medications (Table 1). The AN-R group was significantly younger, had a lower BMI, were less likely to be on mood stabilizers and less likely to have a mood disorder at admission compared with BN. The average age of the sample was 25.64 years ($SD = 9.10$) and the majority of participants were Caucasian, non-Hispanic.

Participants provided written informed consent before completing self-report surveys online within 14 days of admission and discharge. Study procedures were approved by the Institutional Review Board.

Measures

Toronto Alexithymia Scale

The Toronto Alexithymia Scale (TAS; Bagby, Parker, & Taylor, 1994) is a 20-item instrument that yields a total score and three subscales: Difficulty Identifying Feelings, Difficulty Describing Feelings and Externally Oriented Thinking. The TAS has demonstrated strong psychometric properties (Bagby, Parker, & Taylor, 1994) and Cronbach's alpha within the present study was acceptable ($\alpha = .85$).

Difficulties in Emotion Regulation Scale

The Difficulties in Emotion Regulation Scale (DERS) is a 36-item self-report measure that assesses emotion dysregulation across six major domains: non-acceptance of emotional responses (Non-acceptance), difficulties engaging in goal directed behaviour (Goals), impulse control difficulties (Impulse), lack of emotional awareness (Awareness), limited access to emotion regulation strategies (Strategies) and lack of emotional clarity (Clarity). Higher scores on the DERS indicate greater difficulties with emotion regulation. The DERS has demonstrated solid psychometric properties (Gratz & Roemer, 2004) and the internal consistency across subscales over time in this sample was acceptable (admission $\alpha = .86$–$.95$; discharge $\alpha = .88$–$.95$).

Data analyses

Data were analysed using IBM Statistical Package for the Social Sciences (SPSS, Version 23). Separate linear regression models were run to determine whether diagnosis (AN-R = 1; BN = 2) moderated the association between alexithymia (TAS Total[1]) at admission and emotion dysregulation at discharge (DERS Total/subscale scores), controlling for values of the DERS admission variables, age, admission BMI and admission comorbid mood disorder. Predictor variables were centred prior to inclusion in regression models. Tolerance values were above accepted minimums (all values $> .40$), mitigating concerns regarding multicollinearity. Significant interactions were probed to examine the effect of diagnosis at 1 *SD* above/below the mean of admission alexithymia levels.

[1]TAS Total scores were used for parsimony; however, regression models were also run for all three TAS subscales and the pattern of results remained unchanged.

Table 1 Demographic differences between broadly defined diagnostic groups at admission

	AN-R $n = 54$	BN $n = 60$		
	M (*SD*)	M (*SD*)	*F*(1,112)	*p*
Age	23.83 (8.45)	27.27 (9.42)	4.17	.04
BMI	17.87 (1.96)	24.79 (5.63)	73.63	<.001
Length of stay	100.07 (51.96)	95.85 (58.84)	0.16	.69
Gender	n(%)	n(%)	χ^2	*p*
Male	4 (7.4%)	3 (5.0%)	0.29	.59
Female	50 (92.6%)	57 (95.0%)		
Race				
Caucasian	41 (78.8%)	40 (66.7%)	2.30	.32
Asian	3 (5.8%)	4 (6.7%)		
Other	8 (15.4%)	16 (26.7%)		
Ethnicity				
Hispanic/Latino	10 (20.0%)	14 (23.3%)	0.18	.67
Non-Hispanic/Latino	40 (80.0%)	46 (76.7%)		
Medication at admission				
Antidepressant	42 (77.8%)	49 (81.7%)	0.27	.61
Atypical antipsychotic	13 (24.1%)	13 (21.7%)	0.09	.76
Mood stabilizer	6 (11.1%)	16 (26.7%)	4.42	.04
Anxiolytic	3 (5.6%)	6 (10.0%)	0.28	.60
Comorbid diagnoses at admission				
Mood disorder	32 (61.5%)	49 (81.7%)	5.64	.02
Anxiety disorder	43 (81.1%)	44 (75.9%)	0.45	.50
Admission TAS				
TAS total	55.12 (12.07)	56.36 (13.39)	0.26	.61
TAS difficulty identifying feelings	20.79 (6.63)	21.38 (6.28)	0.23	.63
TAS difficulty describing feelings	15.38 (3.96)	16.08 (4.39)	0.77	.38
TAS externally oriented thinking	20.79 (6.63)	21.35 (6.27)	0.21	.65
Admission DERS total and subscale scores				
DERS total	103.42 (26.93)	117.49 (24.20)	8.41	.005
DERS non-acceptance	17.11 (5.95)	19.73 (6.57)	4.78	.03
DERS goals	16.93 (5.14)	18.69 (4.16)	3.98	.05
DERS impulse	14.27 (5.54)	18.68 (5.48)	17.70	<.001
DERS awareness	18.39 (5.81)	19.48 (5.34)	1.06	.31
DERS strategies	22.34 (8.23)	26.12 (7.00)	6.85	.01
DERS clarity	14.22 (4.57)	14.72 (4.53)	0.34	.56
Discharge DERS Total and subscale scores				
DERS total	86.03 (23.01)	98.39 (23.32)	7.78	.01
DERS non-acceptance	14.06 (5.35)	17.17 (6.02)	7.98	.01
DERS goals	14.18 (5.01)	15.57 (4.19)	2.52	.12
DERS impulse	11.54 (5.33)	14.44 (4.30)	9.98	.002
DERS awareness	15.72 (5.20)	17.17 (5.60)	1.95	.17
DERS strategies	18.25 (6.94)	21.78 (6.48)	7.57	.01
DERS clarity	12.22 (4.23)	12.25 (4.18)	0.01	.96

BMI, body mass index; AN-R, anorexia nervosa, restricting subtype; BN, bulimia nervosa; TAS, Toronto Alexithymia Scale; DERS, difficulties in emotion regulation scale; Total, DERS Total score; Non-acceptance, DERS non-acceptance of emotional responses; Goals, DERS difficulties engaging in goal directed behaviour; Impulse, DERS impulse control difficulties; Strategies, DERS limited access to emotion regulation strategies; Awareness, DERS lack of emotional awareness; Clarity, DERS lack of emotional clarity.

Results

Table 1 presents means differences in admission TAS scores and admission and discharge DERS scores across diagnoses. Patterns of group differences were maintained across admission and discharge, with BN patients having significantly higher admission and discharge DERS Total, Non-acceptance, Impulse and Strategies scores compared with AN-R patients. There were no significant differences between AN-R and BN groups on admission TAS Total and subscale scores, and admission and discharge DERS Goals, Awareness or Clarity scores.

Difficulties in emotion regulation scale total

The overall regression model significantly predicted change in DERS Total scores over time [$F(7104) = 4.34$, $p < .001$; Table 2]. Higher admission DERS Total scores were associated with higher discharge DERS scores. There was also a significant diagnosis by admission TAS interaction. For AN-R, greater TAS scores at admission predicted higher discharge DERS Total ($\beta = .39$, $p = .02$). In contrast, for BN, there was no significant association between alexithymia and emotion dysregulation ($\beta = -.08$, $p = .55$). Further, at high levels of admission alexithymia, there was no effect of diagnosis on discharge DERS Total ($\beta = -.04$, $p = .80$); however, at low levels of admission alexithymia, the AN-R group had lower discharge DERS Total scores compared with BN ($\beta = .42$, $p = .004$).

Difficulties in emotion regulation scale impulsivity

The overall regression model significantly predicted change in DERS Impulsivity scores over time [$F(7104) = 6.00$, $p < .001$; Table 2]. Higher admission DERS Impulsivity was associated with higher discharge DERS Impulsivity. There was also a significant interaction between diagnosis and admission TAS scores, such that at high levels of admission alexithymia, there was no effect of diagnosis on discharge DERS Impulsivity ($\beta = -.04$, $p = .80$); however, at low levels of admission alexithymia, having a diagnosis of AN-R was associated with lower discharge DERS Impulsivity ($\beta = .47$, $p = .001$). For AN-R, there was no association between admission TAS scores and discharge DERS Impulsivity ($\beta = .24$, $p = .09$), while for BN, higher admission TAS scores were associated with lower discharge DERS Impulsivity ($\beta = -.27$, $p = .02$).

Difficulties in emotion regulation scale strategies

The overall regression model significantly predicted change in DERS Strategies scores over time [$F(7104) = 4.60$, $p < .001$; Table 2]. Higher admission DERS Strategies predicted higher discharge DERS Strategies. There was a significant interaction between diagnosis and admission TAS score, such that at high levels of admission alexithymia, there was no effect of diagnosis on discharge DERS Strategies ($\beta = -.04$, $p = .80$); however, at low levels of admission alexithymia, AN-R patients had lower discharge DERS Strategies ($\beta = .39$, $p = .008$). The association between admission TAS and discharge DERS Strategies for AN-R ($\beta = .24$, $p = .13$) and BN ($\beta = -.20$, $p = .11$) were not significant.

DERS non-acceptance, goals, awareness and clarity

For DERS Non-acceptance, Goals, Awareness and Clarity, the overall regression models significantly predicted change in DERS

Table 2 Summary of regression analyses predicting DERS scores at discharge

	Discharge total		Discharge non-acceptance		Discharge goals		Discharge impulse		Discharge strategies		Discharge awareness		Discharge clarity	
	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*
Admission DERS subscale*	.24	**.05**	.34	**.002**	.48	**<.001**	.40	**<.001**	.35	**.001**	.55	**<.001**	.32	**.02**
Age	.12	.20	.02	.82	.13	.16	.10	.25	.08	.40	.13	.11	.05	.54
Admission co-Mood disorder	.04	.64	−.03	.78	.09	.35	.01	.95	.09	.35	−.07	.40	.07	.43
Admission BMI	−.06	.60	.01	.94	−.16	.17	−.13	.27	−.08	.53	−.05	.62	.05	.67
Diagnosis	.19	.10	.19	.11	.10	.36	.22	.06	.18	.13	.10	.31	−.08	.43
Admission TAS	.14	.23	.04	.71	−.16	.08	−.03	.75	.01	.95	.08	.46	.28	**.03**
Diagnosis × TAS	−.23	**.01**	−.11	.24	−.09	.33	−.25	**.004**	−.22	**.02**	−.11	.18	−.16	.06
R square	.238		.203		.268		.302		.249		.397		.346	

*To control for baseline effects, the corresponding DERS subscale at baseline was entered into the model (e.g. for the Total DERS model, admission DERS scores were entered in as a predictor). Bolded values for significant results are added for emphasis. BMI, body mass index; Co-mood disorder, comorbid mood disorder; TAS, Toronto Alexithymia Scale. DERS, difficulties in emotion regulation scale; Total, DERS total score; Non-acceptance, DERS non-acceptance of emotional responses; Goals, DERS difficulties engaging in goal directed behaviour; Impulse, DERS impulse control difficulties; Strategies, DERS limited access to emotion regulation strategies; Awareness, DERS lack of emotional awareness; Clarity, DERS lack of emotional clarity.

over time [F(7104) range = 3.50–9.13, *p-values* < .002; Table 2]. Across models, higher initial DERS scores were associated with higher discharge DERS scores. For DERS Clarity, higher admission TAS scores were associated with higher discharge DERS Clarity.

Discussion

The present study examined whether ED diagnosis moderated the association between alexithymia and emotion dysregulation from admission to discharge in a sample of adults in a PHP clinic. Results supported significant interactions between alexithymia levels and diagnosis on global emotion dysregulation, impulse control difficulties and access to emotion regulation strategies. Consistent with our hypothesis, results support that alexithymia had a greater impact on emotion dysregulation for AN-R, compared with BN, patients. Specifically, at higher levels of admission alexithymia, there were no differences between AN-R and BN on emotion dysregulation, whereas at lower levels of alexithymia, AN-R patients demonstrated lower levels of emotion dysregulation.

Mean differences between AN-R and BN at admission and discharge are consistent with prior research demonstrating increased levels of emotion dysregulation in patients who binge and purge and higher levels of negative urgency in BN patients, compared with AN-R (Brockmeyer et al., 2014; Farstad et al., 2016). The similar functioning of the TAS and DERS Awareness and Clarity subscales support the convergence between the construct of alexithymia as measured by the TAS and DERS. Relatedly, the lack of significant differences across time between AN-R and BN patients on TAS scores and DERS Awareness and Clarity are in contrast to previous research demonstrating higher levels of alexithymia in AN-R compared with BN; rather, results support the relevance of alexithymia as a transdiagnostic associated feature of EDs (Westwood et al., 2017).

While BN patients may exhibit greater overall emotion dysregulation compared with AN-R on average and at low levels of alexithymia, among individuals high in alexithymia, these diagnostic differences disappear. Consistent with our hypothesis, this pattern suggests that difficulties with alexithymia appear to have a greater impact on difficulties with emotion dysregulation for AN-R patients, compared with BN, despite the lower likelihood of having a mood disorder in AN-R. Within the present study, effects for DERS Total scores were largely driven by the DERS Impulse and Strategies subscales. Regarding the latter, ED behaviours in AN-R (e.g. restriction/starvation) and BN (e.g. binge and purge behaviours) appear to function as maladaptive strategies to regulate or compensate for deficits in emotion regulation (Brockmeyer et al., 2012; Kaye, Frank, Bailer, & Henry, 2005). Within the context of an intensive PHP environment, as treatment progresses, patients are less able to rely on ED behaviours as coping strategies. While this is relevant across diagnoses, given that lower BMI in acute AN is associated with fewer perceived difficulties with emotion regulation (Brockmeyer et al., 2012), treatment-related weight gain may particularly exacerbate feelings of dyscontrol for AN-R over time. AN-R patients low in alexithymia may be able to overcome these difficulties by effectively developing tools for regulating their emotions over the course of treatment, even as they gain weight. In contrast, AN-R patients high in alexithymia may have greater difficulty learning new, specific strategies to effectively cope with negative emotions without the use of ED behaviours, which may also contribute to alexithymic AN-R patients feeling out of control of their behaviour.

Strengths of the present study include a relatively large clinical sample of patients in a longitudinal design, increasing the external validity of the results. The inclusion of males also represents a strength, given the underrepresentation of males in alexithymia and ED research. Strengths notwithstanding, there were some limitations that are worth noting. The present study relied on self-report measures; given that patients who experience alexithymia may have difficulty with awareness/insight, results should be replicated using multiple measures of alexithymia and emotion dysregulation. Additionally, depressive symptoms may have influenced patient's TAS scores (Westwood et al., 2017);

while the present study controlled for comorbid diagnoses of depression, this cannot rule out the influence that depressive symptoms may have on the relationship between alexithymia and emotion dysregulation. Further, the present study did not include AN-BP patients due to small sample sizes; however, future research should examine these relationships within this group. While the clinical sample within the present study represents a strength, results may not generalize to patients at other levels of care. Further, we could not assess changes in medication across treatment, which may have contributed to the observed differences between diagnoses. Finally, broadly defined AN-R and BN diagnoses were based on psychiatrist interview, for which the reliability has not been previously established.

Results from the present study have important clinical implications. For emotion-focused ED treatments, understanding that higher alexithymia scores, particularly among AN-R patients, predict greater difficulties with emotion regulation at discharge can help identify potential treatment non-responders prior to treatment initiation. Further, while alexithymia is difficult to treat, research supports emotion-focused treatment modalities can contribute to improved alexithymia levels over time (Pinna, Sanna, & Carpiniello, 2015). To help facilitate this, AN-R patients with high levels of alexithymia at treatment admission may benefit from more targeted focus on treatment strategies that help improve emotion identification and awareness, including Dialectical Behaviour Therapy (DBT; Linehan, Heard, & Armstrong, 1993), Emotion Acceptance Behaviour Therapy (Wildes & Marcus, 2011) or Cognitive Remediation and Emotion Skills Training (Tchanturia, Doris, & Fleming, 2014; Tchanturia, Doris, Mountford, & Fleming, 2015). For example, within the context of DBT, it may be beneficial to particularly focus on the 'DBT model of emotions', which helps patients identify emotions by exploring links between thoughts, physical sensations, action urges, face/body language and actions. This may aid in identifying appropriate strategies to target the specific negative emotions as they occur and thus help improve emotional control/regulation.

In sum, the present study helps to elucidate the relationship between alexithymia and emotion dysregulation among individuals with EDs. This is the first study to our knowledge to demonstrate that alexithymia may have a greater impact on emotion dysregulation in AN-R patients, compared with BN patients, for whom other psychological factors may contribute to emotion dysregulation (Lavender et al., 2014). Given the important role that both alexithymia and emotion regulation play in ED aetiology and maintenance, future research should continue to explore more nuanced associations between these constructs, their neurobiological underpinnings and their relationship to clinical outcomes to elucidate their independent and/or interactive role in EDs. A better understanding of how these constructs interact will help inform our theoretical understanding of emotional functioning in EDs and increase precision to help improve interventions targeting these deadly disorders.

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Supporting information

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