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Loneliness mediates the relationship between emotion dysregulation and bulimia nervosa/binge eating disorder psychopathology in a clinical sample

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Abstract

Emotion dysregulation has been linked to binge eating disorder (BED) and bulimia nervosa (BN) although the mechanisms by which it affects BN/BED psychopathology are unclear. This study tested loneliness as a mediator between emotion dysregulation and BN/BED psychopathology. A treatment-seeking sample of 107 women with BN or BED was assessed for loneliness (UCLA Loneliness Scale), emotion dysregulation (Difficulties in Emotion Regulation Scale), and BN/BED psychopathology (Eating Disorder Examination) before treatment. Hierarchical linear regressions and bootstrapping mediation models were run. Greater overall emotion dysregulation was

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associated with greater BN/BED psychopathology, mediated by loneliness (95 % CI 0.03, 0.09). Emotion dysregulation, however, did not mediate between loneliness and BN/BED psychopathology (95 % CI -0.01, 0.01). Targeting loneliness may effectively treat emotional aspects of BN/BED in women.

Keywords

Loneliness; Emotion regulation; Bulimia; Binge eating; Statistical analysis

Introduction

Emotion dysregulation is a breakdown in how individuals experience and express their emotions [1] associated with affect regulation [1] and binge eating [2]. Binge eating is symptomatic of bulimia nervosa (BN) and binge eating disorder (BED) [3], and associated with greater negative affect in these disorders [4, 5]. Several theories conceptualize binge eating as an ineffective response to negative affect [6].

While emotion dysregulation has been identified as a risk factor for binge eating, there is little research on the psychological mechanisms by which it influences BN and BED [7]. One possible mechanism, loneliness, is associated with BN [8], BED [9], and emotion regulation [10].

Two possibilities from the literature characterize the interaction of loneliness, emotion dysregulation, and BN/BED psychopathology. First, as loneliness has mediated interpersonal/emotional dependency and body dissatisfaction [11], it may mediate between emotion dysregulation and BN/BED psychopathology. Alternatively, emotion dysregulation may mediate between loneliness and BN/BED psychopathology. One study induced social exclusion in undergraduates and observed increased cookie consumption [12].

We aimed to compare these theories. We tested loneliness as a mediator between emotion dysregulation and BN/BED psychopathology in a BN/BED sample. We compared this to a model in which emotion dysregulation mediates between loneliness and BN/BED psychopathology. A mediator explains how one variable affects another through an indirect pathway. We tested the hypotheses:

1. Loneliness mediates the relationship between emotion dysregulation and BN/BED psychopathology,
2. Emotion dysregulation mediates the relationship between loneliness and BN/BED psychopathology.

Materials and methods

This cross-sectional study tested loneliness as a mediator of emotion dysregulation and BN/BED psychopathology, and emotion dysregulation as a mediator of loneliness and BN/BED psychopathology. Participants enrolled in a treatment trial for binge eating at a Midwestern university hospital between 2008 and 2010. All participants provided written

consent and underwent in-person interviews. Before treatment, participants completed questionnaires assessing emotion dysregulation, loneliness, and BN/BED psychopathology. This protocol was approved by the local Institutional Review Board.

Participants

Participants were 107 consecutively enrolled women with diagnosed BN ($n = 48$) or BED ($n = 59$). The mean age was 35.2 years ($SD = 12.5$); the mean body mass index (BMI) was 30.7 ($SD = 11.1$). Of the sample, 69.2 % were Caucasian, 12.1 % were African-American, 12.1 % were Hispanic, 2.8 % were Asian-American, and 3.7 % self-identified as other. The median personal income was \$25,000–\$29,999. The majority of the sample (71.0 %) was not married. Two eligible male participants were excluded because their analysis would be underpowered.

Measures

Difficulties in Emotion Regulation Scale (DERS) [13] is a 36-item self-report measure of emotion dysregulation. Participants rate items on a 5-point Likert scale from 1 (almost never) to 5 (almost always) producing a total score and six subscales: Nonacceptance, Goals, Impulsivity, Awareness, Strategies, and Clarity. Cronbach's alpha was greater than .80 for all scales.

UCLA Loneliness Scale (version 3) [14] is a 20-item self-report measure of loneliness. Participants rate items on a 4-point Likert scale from 1 (never) to 4 (always), resulting in a global score. In this sample, Cronbach's alpha was .94.

Eating Disorder Examination—14th Edition (EDE) [15] is a structured interview designed to assess the type and frequency of eating disorder symptoms, resulting in a global score. In this sample, Cronbach's alpha was 0.91.

A demographics questionnaire gathered participant-reported age, ethnicity, personal income, and marital status.

In-person interview—Advanced graduate assessors trained by E.Y.C. evaluated diagnosis by DSM-IV-TR [3] criteria with the Structured Clinical Interview for DSM-IV [16], administered the EDE, and weighed and measured participants. Diagnosis was determined by the “best estimate procedure” [17].

Analyses

Because age has been associated with greater BN severity [18], and BMI differs between individuals with BN and BED [19], age and BMI were controlled. Given ethnic differences in BN/BED psychopathology [20], ethnicity was controlled and dichotomized into minority/non-minority categories. Personal income was controlled because of its association with loneliness [21]. Marital status was controlled and dichotomized into married/non-married because the latter status may be associated with loneliness [22]. Differences in psychopathological severity [23] prompted us to control for BN/BED diagnosis.

Hierarchical linear regressions were performed for the following relationships based on our hypotheses, controlling for the factors above:

1. Emotion dysregulation (DERS total score) with loneliness (UCLA score) predicting BN/BED psychopathology (EDE global score),
2. Loneliness (UCLA score) with emotion dysregulation (DERS total score) predicting BN/BED psychopathology (EDE global score).

The bootstrapping mediation model [24] was run with 5,000 bootstrap resamples, controlling for the above variables. This model makes no assumptions about sample normality and provides greater statistical power. In this model (Fig. 1), c is the beta weight of the direct effect of emotion dysregulation on BN/BED psychopathology. Similarly, ab is the indirect effect of loneliness on BN/BED psychopathology. Finally, c' is the direct effect of emotion dysregulation on BN/BED psychopathology, controlling for loneliness. This also characterizes the alternate mediation model by switching loneliness and emotion dysregulation. All tests were two-sided with $p < 0.05$ and conducted with PASW 18.0 [25].

Results

Table 1 contains descriptive data of the sample.

Entering control variables in Step 1 of the hierarchical linear regression, emotion dysregulation in Step 2, and loneliness in Step 3 demonstrated significant effects for loneliness, $\beta = 0.54$, $t(98) = 4.90$, $p < 0.01$, and age, $\beta = -0.26$, $t(98) = -2.31$, $p = 0.02$, on BN/BED psychopathology ($R^2 = 0.28$).

Indirect effects were found when loneliness was entered as a mediator between all emotion dysregulation scales and BN/BED psychopathology (95 % CIs between 0.03 and 0.50) (Table 2).

No indirect effects were found when emotion dysregulation scales were entered as mediators between loneliness and BN/BED psychopathology (95 % CI's between -0.01 and 0.01) (Table 3).

Discussion

Our results support the hypothesis that greater total emotion dysregulation is associated with greater BN/BED psychopathology in a female clinical sample and mediated by loneliness. They do not indicate that emotion dysregulation mediates the relationship between loneliness and BN/BED psychopathology.

These results suggest that emotion dysregulation may only exacerbate BN/BED psychopathology for women who are lonely. Emotion regulation deficits may prevent a sense of connectedness, prompting eating disordered thoughts and behaviors to modulate negative affect [26] or redirect thoughts to one's body [2].

Although this is a cross-sectional study, future research should examine these relationships longitudinally. The sample was limited to treatment-seeking female participants, who may

have greater emotion dysregulation and BN/BED psychopathology than non-treatment-seeking peers [27] and thus stronger mediation effects. Future studies could include a control group, males, and adolescents for comparison and generalizability.

This study builds on previous BN/BED research by examining the mediating effects of loneliness, an under-researched construct in the BN/BED literature. The results suggest maintenance pathways of BN and BED for longitudinal research to explore. Clinically, they suggest that loneliness may be an important treatment target for emotional aspects of BN or BED. Cognitive behavior therapy targeting distorted social cognitions may be most effective for this population [28].

References

1. Gross, JJ., Thompson, RA. Emotion regulation: conceptual foundations. In: Gross, JJ., editor. Handbook of emotion regulation. Guilford Press; New York: 2006. p. 3-24.
2. Heatherton TF, Baumeister RF. Binge eating as escape from self-awareness. Psychol Bull. 1991; 110(1):86–108. DOI: 10.1037/0033-2909.110.1.86 [PubMed: 1891520]
3. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4. American Psychiatric Association Press; Washington, DC: 2000. text rev
4. Crosby RD, Wonderlich SA, Engel SG, Simonich H, Smyth J, Mitchell JE. Daily mood patterns and bulimic behaviors in the natural environment. Behav Res Ther. 2009; 47(3):181–188. DOI: 10.1016/j.brat.2008.11.006 [PubMed: 19152874]
5. Schulz S, Laessle RG. Associations of negative affect and eating behaviour in obese women with and without binge eating disorder. Eat Weight Disord. 2010; 15(4):287–293. DOI: 10.1007/BF03325311
6. Haedt-Matt AA, Keel PK. Revisiting the affect regulation model of binge eating: a meta-analysis of studies using ecological momentary assessment. Psychol Bull. 2011; 137(4):660–681. DOI: 10.1037/a0023660 [PubMed: 21574678]
7. Munsch S, Meyer AH, Quartier V, Wilhelm FH. Binge eating in binge eating disorder: a break-down of emotion regulatory processes? Psychiatry Res. 2012; 195(3):118–124. DOI: 10.1016/j.psychres.2011.07.016 [PubMed: 21849214]
8. Coric D, Murstein BI. Bulimia nervosa: prevalence and psychological correlates in a college community. Eat Disord. 1993; 1(1):39–51. DOI: 10.1080/10640269308248265
9. Masheb RM, Grilo CM. Emotional overeating and its associations with eating disorder psychopathology among overweight patients with binge eating disorder. Int J Eat Disord. 2006; 39(2):141–146. DOI: 10.1002/eat.20221 [PubMed: 16231349]
10. Esplen MJ, Garfinkel P, Gallop P. Relationship between self-soothing, aloneness, and evocative memory in bulimia nervosa. Int J Eat Disord. 2000; 27(1):96–100. DOI: 10.1002/(SICI)1098-108X(200001)27:1<96::AID-EAT11>3.0.CO;2-S [PubMed: 10590454]
11. Pritchard ME, Yalch KL. Relationships among loneliness, interpersonal dependency, and disordered eating in young adults. Pers Individ Dif. 2009; 46(3):341–346. DOI: 10.1016/j.paid.2008.10.027
12. Baumeister RF, DeWall CN, Ciarocco NJ, Twenge JM. Social exclusion impairs self-regulation. J Pers Soc Psychol. 2005; 88(4):589–604. DOI: 10.1037/0022-3514.88.4.589 [PubMed: 15796662]
13. Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. J Psychopathol Behav Assess. 2004; 26(1):41–54. DOI: 10.1023/B:JOBA.0000007455.08539.94
14. Russell D. The UCLA Loneliness Scale (version 3): reliability, validity, and factor structure. J Pers Assess. 1996; 66(1):20–40. DOI: 10.1207/s15327752jpa6601_2 [PubMed: 8576833]
15. Fairburn, CF., Cooper, Z. The Eating Disorders Examination. 14. University of Oxford; Oxford: 2000. (Unpublished manuscript)

16. First, MB., Spitzer, RL., Gibbon, M., et al. Structured clinical interview for DSM-IV-TR axis I disorders research version, patient edition with psychotic screen, (SCID-I/P W/PSY SCREEN). Biometrics Research, New York State Psychiatric Institute; New York: 2002.
17. Klein DN, Ouimette PC, Kelly HS, Ferro T, Riso LP. Test-retest reliability of team consensus best-estimate diagnoses of axis I and II disorders in a family study. *Am J Psychiatry*. 1994; 151(7): 1043–1047. [PubMed: 8010362]
18. Sullivan PF, Bulik CM, Carter FA, Joyce PR. Correlates of severity in bulimia nervosa. *Int J Eat Disord*. 1996; 20(3):239–251. DOI: 10.1002/(SICI)1098-108X(199611)20:3<239:AID-EAT3>3.3.CO;2-P [PubMed: 8912036]
19. Santonastaso P, Ferrara S, Favaro A. Differences between binge eating disorder and nonpurging bulimia nervosa. *Int J Eat Disord*. 1999; 25(2):215–218. DOI: 10.1002/(SICI)1098-108X(199903)25:2<215:AID-EAT10>3.3.CO;2-9 [PubMed: 10065398]
20. Regan PC, Cachelin FM. Binge eating and purging in a multi-ethnic community sample. *Int J Eat Disord*. 2006; 39(6):523–526. DOI: 10.1002/eat.20268 [PubMed: 16634050]
21. Hawkley LC, Preacher KJ, Cacioppo JT. Loneliness impairs daytime functioning but not sleep duration. *Health Psychol*. 2010; 29(2):124–129. DOI: 10.1037/a0018646 [PubMed: 20230084]
22. Hawthorne G. Perceived social isolation in a community sample: its prevalence and correlates with aspects of peoples' lives. *Soc Psychiatry Psychiatr Epidemiol*. 2008; 43(2):140–150. DOI: 10.1007/s00127-007-0279-8 [PubMed: 17994175]
23. Núñez-Navarro A, Jiménez-Murcia S, Álvarez-Moya E, et al. Differentiating purging and nonpurging bulimia nervosa and binge eating disorder. *Int J Eat Disord*. 2011; 44(6):488–496. DOI: 10.1002/eat.20823 [PubMed: 20872757]
24. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods*. 2008; 40(3):879–891. DOI: 10.3758/BRM.40.3.879 [PubMed: 18697684]
25. Predictive Analytics SoftWare. PASW Statistics (Version 18) (Software). Predictive Analytics SoftWare; Chicago: 2009.
26. Polivy, J., Herman, CP. Etiology of binge eating: psychological mechanisms. In: Fairburn, CG., Wilson, GT., editors. *Binge eating: nature, assessment, and treatment*. Guilford Press; New York: 1993. p. 173-205.
27. Mond JM, Hay PJ, Darby A, Paxton SJ, Quirk F, Buttner P, Owen C, Rodgers B. Women with bulimic eating disorders: when do they receive treatment for an eating problem? *J Consult Clin Psychol*. 2009; 77(5):835–844. DOI: 10.1037/a0015336 [PubMed: 19803564]
28. Masi CM, Chen H-Y, Hawkley LC, Cacioppo JT. A meta-analysis of interventions to reduce loneliness. *Pers Soc Psychol Rev*. 2011; 15(3):219–266. DOI: 10.1177/1088868310377394 [PubMed: 20716644]

Fig. 1.
Conceptual model of loneliness mediating emotion dysregulation and BN/BED psychopathology

Table 1

Descriptive statistics of primary measures

Measure	Mean	SD
Eating Disorder Examination	3.92	1.23
UCLA Loneliness Scale	50.89	11.08
Difficulties in Emotion Regulation Scale total	16.98	4.45
Nonacceptance	2.74	1.15
Goals	3.36	1.04
Impulsivity	2.58	1.05
Awareness	2.98	0.92
Strategies	2.68	0.89
Clarity	2.65	0.84

Table 2

Mediation model summary

Predictor variable	Total effect (<i>c</i>)	SE	<i>p</i>	Direct effect (<i>c'</i>)	SE	<i>p</i>	Indirect effect (<i>ab</i>)	SE	95 % CI
DEERS ^a total score	0.06	0.02	< 0.01 ^{**}	< 0.01	0.02	0.79	0.06	0.02	(0.03; 0.09)
Nonacceptance	0.22	0.08	0.01 [*]	0.06	0.08	0.49	0.16	0.06	(0.07; 0.30)
Goals	0.26	0.10	0.01 [*]	0.10	0.09	0.30	0.16	0.06	(0.06; 0.31)
Impulsivity	0.20	0.09	0.04 [*]	0.05	0.09	0.62	0.15	0.06	(0.06; 0.28)
Awareness	0.07	0.11	0.54	-0.10	0.10	0.30	0.17	0.07	(0.06; 0.32)
Strategies	0.30	0.11	0.01 ^{**}	0.01	0.12	0.93	0.29	0.09	(0.15; 0.50)
Clarity	0.18	0.12	0.12	-0.05	0.11	0.65	0.23	0.08	(0.10; 0.41)

Loneliness as mediator, BN/BED psychopathology as outcome

Controlling for age, BMI, ethnicity, income, marital status, and diagnosis

^{*} $p < 0.05$,^{**} $p < 0.01$ ^a Difficulties in Emotion Regulation Scale [13]

Table 3

Alternate mediation model summary

Mediator variable	Total effect (<i>c</i>)	SE	<i>p</i>	Direct effect (<i>c'</i>)	SE	<i>p</i>	Indirect effect (<i>ab</i>)	SE	95 % CI
DERs ^a total score	0.05	0.01	< 0.01**	0.05	0.01	< 0.01**	< 0.01**	0.01	(-0.01; 0.01)
Nonacceptance	0.05	0.01	< 0.01**	0.05	0.01	< 0.01**	< 0.01**	0.00	(-0.01; 0.01)
Goals	0.05	0.01	< 0.01**	0.05	0.01	< 0.01**	< 0.01**	0.00	(0.00; 0.01)
Impulsivity	0.05	0.01	< 0.01**	0.05	0.01	< 0.01**	< 0.01**	0.00	(-0.01; 0.01)
Awareness	0.05	0.01	< 0.01**	0.05	0.01	< 0.01**	< 0.01**	0.00	(-0.01; 0.00)
Strategies	0.05	0.01	< 0.01**	0.05	0.11	< 0.01**	< 0.01**	0.01	(-0.01; 0.01)
Clarity	0.05	0.01	< 0.01**	0.05	0.01	< 0.01**	< 0.01**	0.00	(-0.01; 0.01)

Loneliness as predictor, BN/BED psychopathology as outcome

Controlling for age, BMI, ethnicity, income, marital status, and diagnosis

* $p < 0.05$,** $p < 0.01$ ^a Difficulties in Emotion Regulation Scale [13]