



Eating disorder and obsessive–compulsive symptoms in a sample of bulimic women: Perfectionism as a mediating factor

Rebecca A. Bernert^a, Kiara R. Timpano^b, Carol B. Peterson^c, Scott J. Crow^c, Anna M. Bardone-Cone^d, Daniel le Grange^e, Marjorie Klein^f, Ross D. Crosby^{g,h}, James E. Mitchell^{g,h}, Stephen A. Wonderlich^{g,h}, Thomas E. Joiner^{i,*}

^aStanford University, Stanford CA, USA

^bUniversity of Miami, Coral Gables, FL, USA

^cUniversity of Minnesota, Minneapolis, MN, USA

^dUniversity of North Carolina, Chapel Hill, USA

^eUniversity of Chicago, Chicago, IL, USA

^fUniversity of Wisconsin, Madison, WI, USA

^gNeuropsychiatric Research Institute, Fargo, ND, USA

^hUniversity of North Dakota School of Medicine, Grand Forks, ND, USA

ⁱFlorida State University, Tallahassee, FL, USA

ARTICLE INFO

Article history:

Received 27 April 2012

Received in revised form 18 August 2012

Accepted 29 August 2012

Available online 25 September 2012

Keywords:

Bulimia nervosa

Obsessive–compulsive symptoms

Perfectionism

ABSTRACT

The present study aimed to investigate whether perfectionism mediates the association between obsessive–compulsive (OC) and eating disorder (ED) symptoms. Analyses were conducted using data collected among a national sample of eating disordered women diagnosed with BN or a subclinical variant of BN ($N = 204$). Each participant completed a series of self-report inventories on perfectionism, as well as OC, ED, and depressive symptoms. Higher ED symptoms were significantly associated with greater levels of perfectionism ($p < .01$) and OC symptoms ($p < .05$). As hypothesized, perfectionism significantly mediated the relationship between ED and OC symptoms, controlling for depression. Findings indicate that perfectionism may be considered a shared etiological or phenomenological factor in ED and OC symptoms.

© 2012 Elsevier Ltd. All rights reserved.

1. Introduction

High rates of comorbidity exists between eating disorders (ED), such as anorexia nervosa (AN) and bulimia nervosa (BN), and obsessive–compulsive disorder (OCD) (Jordan et al., 2003; Milos, Spindler, Ruggiero, Klughofer, & Schnyder, 2002; Pigott et al., 1991; Speranza et al., 2001). Among those with OCD, a lifetime or concurrent ED diagnosis is commonly observed (Bogetto, Venturello, Albert, Maina, & Ravizza, 1999; Lochner et al., 2004), and multiple studies reveal elevated obsessive–compulsive symptoms among adolescents and adults suffering from an ED (Cassidy, Allsopp, & Williams, 1999; Halmi et al., 2000). Halmi et al. (2000) reported that up to 79.1% of AN patients endorsed lifetime obsessions and compulsions (OC), and the Price Foundation Collaborative Genetics Study (Kaye et al., 2004) identified OCD as the most common anxiety disorder diagnosed among those with AN and BN. Additionally, up to 40% of those with BN and 10–60% of those with AN appear to

suffer from OCD, independent of food-related obsessions and compulsions (Godart, Flament, Perdereau, Jemmet, & Strober, 2002).

Some investigators have proposed that the association between OCD and ED can be accounted for by shared phenomenological features. In AN and BN, for example, pervasive food- and weight-related thoughts have been described as obsessional, and such cognitions are often associated with ritualized eating behaviors (Pigott et al., 1991). Moreover, the act of purging appears to possess anxiety-reducing properties akin to the neutralizing aspects of compulsions in OCD (Formea & Burns, 1995; Kaye, Gwirtsman, George, & Weiss, 1986). Some have thus theorized that eating disorders may exist along an obsessive–compulsive spectrum (Bienvenu et al., 2000; Hollander & Wong, 1995; McElroy, Phillips, & Keck, 1994). In this way, ED may be considered a variant of OCD in phenotype (Bellodi et al., 2001; Speranza et al., 2001). A family study indicates that AN and BN are significantly more prevalent among those with OCD and their first-degree relatives compared to both unaffected control probands and relatives of controls (Bienvenu et al., 2000). Bellodi et al. (2001) furthermore demonstrated that the prevalence of OCD was significantly higher among relatives of ED probands (AN and BN) compared to relatives of controls (9.69% versus 0%).

* Corresponding author. Address: Florida State University, Department of Psychology, Tallahassee, FL 32306-1270, USA. Tel.: +1 850 644 1454; fax: +1 850 645 7518.

E-mail address: joiner@psy.fsu.edu (T.E. Joiner).

Some researchers have hypothesized that ED and OCD share a common biological basis or etiology (Cavallini, Bertelli, Chiapparino, Riboldi, & Bellodi, 2000; Speranza et al., 2001), including different genetic or temperamental factors. Miguel et al. (2005) noted that shared personality features may guide etiological and genetic investigations of ED and OCD. One such personality factor is perfectionism, which appears to be related to both OC symptoms (Frost & Steketee, 1997; OCCWG, 2003; Tozzi et al., 2004) and ED (Bulik et al., 2003; Halmi et al., 2000). Perfectionism appears to exist prior to the onset of an ED diagnosis (Fairburn, Cooper, Doll, & Welch, 1999; Tarka, Waldon, Graber, Brooks-Gunn, & Strober, 2002), remains significantly elevated during acute illness compared to controls (Bastiani, Rao, Weltzin, & Kaye, 1995; Lilienfeld et al., 2000), and persists at elevated levels up to 3 years after recovery (Kaye et al., 1998; Stein et al., 2002). In nonclinical samples, perfectionism also appears predictive of problematic eating as a main effect (Pearson & Gleaves, 2006) or in interaction with other risk factors (Joiner, Heatherton, Rudd, & Schmidt, 1997b; Vohs et al., 2001). At least one investigation among nonclinical samples of OCD further demonstrates a positive association between perfectionism and OC tendencies (Rheume, Ladouceur, & Freeston, 2000).

These and other studies suggest that perfectionism may be a relatively stable feature, particularly among individuals with ED (Joiner, Heatherton, & Keel, 1997a). Perfectionism is considered a multidimensional personality trait (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991; Pearson & Gleaves, 2006); and although it may be considered both adaptive and maladaptive, the general construct appears to predict overall maladjustment, increased depressive symptoms, and stress (Dunkley, Zuroff, & Blankstein, 2006). Among literature reviews, both adaptive and maladaptive dimensions of perfectionism appear to be elevated in ED, whereas only maladaptive dimensions tend to be elevated in depression and anxiety (Bardone-Cone et al., 2007). As a cognitive style or personality trait, perfectionism may also confer risk for the pathogenesis of ED (AN and BN) and OCD (Cassidy et al., 1999; Obsessive-Compulsive Cognitions Working Group., 2003).

Halmi et al. (2005) investigated whether the prevalence of OCD, obsessive-compulsive personality disorder (OCPD), and perfectionism varied among specific ED subtypes. Among 607 participants, results indicated that perfectionism scores and the rate of comorbid OCD diagnoses did not significantly vary among specific ED subtypes; perfectionism instead appeared highest among ED participants with comorbid OCD and OCPD. These constructs were examined at the diagnostic level only, and the relationship between variables at the symptom level was not specifically examined. Perfectionism was also not evaluated as a potential explanatory factor in the association between ED and OC symptoms.

To our knowledge, no study has examined how perfectionism may mediate the relationship between elevated ED and OC symptoms. Given the high rates of comorbidity between ED and OCD, and their respective associations with perfectionism, we attempted to simultaneously examine the relationship between perfectionism, ED symptoms, and OC symptoms within a single sample. We furthermore examined whether perfectionism statistically mediated the ED-OC association. In a cross-national convenience sample of women with clinically-significant bulimic symptoms, we hypothesized that elevated ED symptoms would independently predict both elevated OC symptoms and greater perfectionism. Next, we hypothesized that greater perfectionism would be associated with elevated OC symptoms, controlling for ED symptoms, and that perfectionism would mediate the link between elevated ED and OC symptoms. Finally, given the high rate of co-occurrence between depression, eating disorders, and OCD, we examined whether the proposed effects existed independent of depression.

2. Materials and methods

2.1. Participants

Two hundred and four females, aged 18–57 years ($M = 25.67$, $SD = 8.85$) were recruited through advertisements in ED clinics and surrounding communities at five national sites (Madison, WI; Minneapolis, MN; Fargo, ND; Chicago, IL; and Columbia, MO) for a study of BN.¹ Inclusion criteria included female sex; age 18–65; and the presence of substantial binge eating and compensatory behaviors. Exclusion criteria included current psychotic disturbances, organic brain syndromes, and illiteracy. Of the 204 women participating in the study, 139 met DSM-IV diagnostic criteria for BN, purging type; four met diagnostic criteria for BN non-purging type; 32 were categorized as subclinical BN (i.e., they showed substantial bulimic symptoms, but did not meet the diagnostic threshold for BN; binge eating and compensatory behaviors were present, but occurred less than twice/week); and 29 participants were categorized as subjective BN (i.e., they displayed purging behavior, but binges did not meet objective binge eating criteria). These diagnostic variations are considered acceptable in light of evidence suggesting that a “threshold” versus “sub-threshold” BN distinction may be unclear. Studies have identified negligible differences on psychopathological indices between individuals who binge or purge at subthreshold versus threshold levels (Crow, Agras, Halmi, Mitchell, & Kraemer, 2002; Fairburn & Harrison, 2003; Le Grange et al., 2006; Lewinsohn, Striegel-Moore, & Seeley, 2000), or whose caloric intake suggests “subjective” versus “objective” binges (Pratt, 1998). The ethnic composition of the sample was: 90.7% Caucasian, 2.5% African American, 1.5% Hispanic, 3.4% Asian, and 2.0% other/unknown.

2.2. Procedures

Research personnel completed a brief diagnostic phone screen with participants who expressed interest in the study. The phone screen included questions from the Structured Clinical Interview for DSM-IV (SCID) (First, Spitzer, Gibbon, & Williams, 1995) for both BN and AN Eating Disorder modules. Subjects who met current DSM-IV diagnostic criteria for BN or who displayed clinically significant bulimic symptomatology were invited to participate. If a subject was eligible for the study, informed consent was obtained. After entry into the study, an appointment was made in which participants were asked to complete a series of questionnaires, described below. At the completion of assessments, subjects were compensated for their time.

2.3. Measures

2.3.1. Maudsley Obsessive-Compulsive Inventory (Hodgson & Rachman, 1977)

The MOCI is a 30-item, self-report measure of OC symptoms. Overt rituals and obsessions are assessed in a true-false format, yielding one total obsessionality score, along with four subscale scores (Checking, Washing, Doubting, Slowness-Repetition). The scale has demonstrated satisfactory reliability and internal consistency (Rachman & Hodgson, 1981). The MOCI total score was used for primary analyses in the present study.

2.3.2. Eating Disorders Examination—Questionnaire version (Fairburn & Beglin, 1994)

The EDE-Q is a 36-item, self-report measure of disordered eating, which is scored on a 7-point scale. The measure assesses the

¹ Subjects were recruited as part of a larger investigation on genetics and personality traits among BN, reported elsewhere (Wonderlich et al., 2005).

Table 1
Intercorrelations between variables.

		1	2	3
1	MOCI total score	–		
2	FMPS global score	.60**	–	
3	EDE-Q global score	.26**	.30**	–
4	IDS total score	.56**	.53**	.27**

Note: MOCI = Maudsley Obsessive–Compulsive Inventory; EDE-Q = Eating Disorders Examination Questionnaire; FMPS = Frost Multidimensional Perfectionism Scale; IDS = Inventory for Depressive Symptoms.

** $p < .01$.

presence and frequency of behavioral and cognitive symptoms over the past 28 days, yielding a global score along with four subscale scores (Eating Restraint, Eating Concerns, Weight Concerns, and Shape Concerns). Research demonstrates that the EDE-Q is a reliable and valid measure of problematic eating, with good discriminant and concurrent validity compared to the clinician-administered Eating Disorders Examination (Mond, Hay, Rodgers, Owen, & Beumont, 2004; Wilfley, Schwartz, Spurrell, & Fairburn, 1997). The EDE-Q global score was used for primary analyses.

2.3.3. Frost Multidimensional Perfectionism Scale (Frost et al., 1990)

The FMPS is a 35-item questionnaire designed to assess perfectionism. This measure yields a global score, which provides a general index of perfectionism. It also yields six subscale scores (Concern over Mistakes, Personal Standards, Parental Expectations, Parental Criticism, Doubts about Actions, and Organization). The FMPS has demonstrated adequate reliability and validity (Frost et al., 1990). The FMPS total score was used for primary analyses.²

2.3.4. Inventory for depressive symptomatology-self report (Rush et al., 1986)

The IDS-SR is a 30-item rating scale designed to measure the presence and severity of depressive symptoms. Scores range from 0 to 84, with higher scores representing greater symptom severity. Research has demonstrated that the IDS-SR is a valid and reliable measure of depressive symptomatology (Rush, Gullion, Basco, Jarrett, & Trivedi, 1996; Rush et al., 1986).

2.4. Data analytic plan

Hierarchical regression analyses were employed to test study predictions. Given the high rate of depression among those with ED and OCD (Fornaria et al., 1992; Laessle, 1987; Rasmussen & Eisen, 1992; Weissman et al., 1994), IDS total scores were used as a covariate in each analysis; this was expected to provide a more stringent test of the proposed symptom relationships. A Sobel test (Kenny et al., 1998; Preacher & Hayes, 2004) was conducted to determine whether perfectionism mediated the relationship between ED and OC symptoms.

3. Results

3.1. Descriptive statistics

Intercorrelations between measures are presented in Table 1. Descriptive statistics and diagnostic information are displayed in Table 2.

² According to past research (Frost et al., 1990), the MOCI *Doubting Subscale* has overlap with the FMPS-*DA subscale*. For all analyses involving the FMPS and MOCI, we therefore removed the FMPS-*DA subscale* items from the FMPS total score. This data-analytic approach has been suggested elsewhere (Shafran & Mansell, 2001).

3.2. Regression analyses

To determine whether ED symptoms would predict higher OC symptoms, MOCI scores were regressed on EDE-Q global scores, controlling for IDS totals. In support of the hypotheses, Regression 1 revealed a significant association between the EDE-Q and MOCI ($\beta = .12$, $t = 2.01$, $p < .05$), such that higher ED symptoms predicted higher OC symptoms. To determine whether EDE-Q scores would predict FMPS perfectionism scores, we regressed FMPS scores on EDE-Q scores, controlling for IDS. Regression 2 demonstrated a significant association between EDE-Q global scores and FMPS global scores ($\beta = .17$, $t = 2.69$, $p < .01$). Consistent with past work, elevated ED symptoms were associated with higher levels of perfectionism. Finally, we regressed MOCI scores on the FMPS, controlling for IDS totals in Step 1 and EDE-Q scores in Step 2 of the regression equation. Regression 3 revealed a significant relationship between FMPS scores and MOCI scores, even after controlling for the variance associated with EDE-Q global scores ($\beta = .36$, $t = 5.95$, $p < .001$). That is, higher levels of perfectionism predicted elevated OC symptoms after controlling for depression and ED symptoms.

3.3. Sobel mediation test

Consistent with Kenny et al. (1998), a Sobel test was conducted to determine whether higher levels of perfectionism significantly explained the observed relationship between ED and OC symptoms. In support of our hypotheses, this Sobel test revealed that higher FMPS global scores significantly mediated the relationship between EDE-Q global scores and MOCI total scores ($Z = 2.45$, $p < .02$; $\beta = .12$ versus $\beta = .05$).

Because conducting mediation analyses with cross-sectional data has inherent limitations, evaluating the significance of competing mediation models, including those where the proposed mediator is reversed with the criterion variable, can increase confidence in the observed effects (Sheets & Braver, 1999). To test a competing mediational model, we examined OC symptoms (MOCI total scores) as a mediator between ED symptoms (EDE-Q global scores) and perfectionism (FMPS global scores). The Sobel test showed that this mediation model was not statistically significant ($Z = 1.91$, $p > .05$).

3.4. Sample size and power

A post hoc power analysis revealed that given the observed effect size for the path coefficients outlined above ($\beta = .12$, $.17$, $.36$), an alpha error probability of .05, and a sample size of 204, the estimated power of our analyses was approximately 99%. This indicates that our analyses had more than sufficient power to detect effects.

4. Discussion

Consistent with past research, our results indicated that ED symptoms were associated with elevated perfectionism and OC symptoms. As hypothesized, perfectionism significantly mediated the relationship between ED and OC symptoms. Notably, given the high rate of co-occurring depressive symptoms in these disorders (Fornaria et al., 1992; Laessle, 1987; Rasmussen & Eisen, 1992; Weissman et al., 1994), all hypothesized effects existed above and beyond depression severity. Follow-up analyses indicated that a competing mediation model was not statistically significant, further supporting the validity of findings.

To our knowledge, this is the first report to show that perfectionism may statistically explain the association between elevated

Table 2
Descriptive statistics and diagnostic information.

	OVERALL		ED SUBCATEGORIES							
			Clinical BN (non purging)		Clinical BN (purging)		Subclinical BN		Subjective BN	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
MOCI Total Score	8.0	(5.4)	8.7	(1.2)	8.1	(5.5)	6.3	(4.0)	9.3	(5.9)
Washing	2.2	(2.1)	2.0	(2.1)	2.3	(2.1)	1.7	(1.9)	2.4	(2.1)
Checking	1.9	(2.1)	2.3	(1.2)	2.0	(2.2)	1.1	(1.4)	2.2	(2.3)
Doubting	3.0	(1.8)	3.0	(2.5)	2.9	(1.8)	2.3	(1.3)	3.7	(1.9)
Slowness-Repetition	2.8	(1.1)	3.0	(0.8)	2.7	(1.1)	3.3	(1.0)	2.6	(1.1)
EDE-Q global score	4.2	(1.9)	4.3	(1.5)	4.3	(2.2)	3.7	(1.1)	4.2	(0.8)
Eating Restraint	3.9	(1.2)	3.8	(1.7)	4.0	(1.1)	3.0	(1.3)	4.1	(1.1)
Eating Concerns	3.5	(1.3)	3.7	(1.6)	3.7	(1.2)	2.9	(1.5)	3.4	(1.1)
Weight Concerns	4.3	(1.2)	4.8	(1.7)	4.3	(1.2)	4.2	(1.4)	4.5	(1.1)
Shape Concerns	4.6	(1.1)	5.1	(1.1)	4.6	(1.1)	4.5	(1.1)	5.0	(0.7)
FMPS global score	120.9	(20.6)	122.2	(25.4)	121.5	(20.4)	115.6	(20.5)	124.1	(21.5)
Concern over Mistakes	31.1	(7.2)	31.0	(9.0)	31.1	(7.2)	29.2	(7.4)	32.0	(6.7)
Personal Standards	26.1	(5.5)	24.2	(4.4)	26.3	(5.3)	24.7	(5.6)	26.5	(6.2)
Parental Expectation	15.5	(4.7)	16.0	(5.3)	15.6	(4.3)	14.7	(5.9)	15.9	(5.3)
Parental Criticism	11.3	(4.4)	13.5	(4.0)	11.3	(4.1)	10.5	(4.8)	11.7	(4.9)
Doubts about Actions	12.8	(3.4)	12.5	(3.6)	12.9	(3.5)	12.1	(3.3)	12.7	(3.4)
Organization	23.6	(4.8)	24.2	(5.6)	23.5	(5.0)	23.5	(3.9)	24.5	(4.5)
IDS total score	29.6	(12.8)	39.0	(12.1)	30.6	(12.8)	25.6	(12.7)	27.5	(12.3)

Note: MOCI = Maudsley Obsessive-Compulsive Inventory; EDE-Q = Eating Disorders Examination Questionnaire; FMPS = Frost Multidimensional Perfectionism Scale; IDS = Inventory for Depressive Symptoms.

ED and OC symptoms. As theorized by others, this finding suggests that perfectionism may serve as a shared personality or cognitive variable in ED and OC symptoms (Cassidy et al., 1999). Previous research taken together with the present findings suggests that perfectionism deserves further study as a shared etiological or phenomenological feature among ED and OC symptoms. Along these lines, at least one adolescent investigation has demonstrated that ED behaviors in youth are associated with both higher OC symptoms and perfectionism scores (Cassidy et al., 1999).

Our findings indicate that perfectionism may represent a clinically important construct to assess in the presence, prevention, and treatment of these disorders (Miguel et al., 2005). Egan, Wade, and Shafran (2011) recently provided an elegant review of perfectionism as transdiagnostic feature, emphasizing its utility and potential importance as a treatment target across disorders. Our findings point to the treatment of perfectionism among BN specifically. At least one recent treatment trial provided support for this among BN and EDNOS. Steele and Wade (2008) showed that cognitive behavioral therapy (CBT) for perfectionism had a therapeutic impact on BN symptomatology, in addition to depression and anxiety symptoms.

Several study limitations should be noted. First, our data were cross-sectional in nature; therefore, causal pathways cannot be established or confirmed. Future studies are warranted to replicate these findings using a prospective study design. Next, our study sample was comprised of women with clinically-significant bulimic symptoms, yet research indicates that perfectionism and OC symptoms are equally high among AN samples (Bulik et al., 2003; Kaye et al., 1998). It will therefore be informative to examine whether perfectionism significantly mediates the relationship between ED and OC symptoms among those with a diagnosis of AN. Future research may also benefit from using an alternative OC measure. Although the MOCI represents a valid and reliable measure of OC phenomena (Hodgson & Rachman, 1977), newer instruments, such as the Obsessive-Compulsive Inventory-Revised (OCI-R) (Foa et al., 2002), have demonstrated enhanced internal reliability and may capture a wider variety of symptoms (i.e., six OC factors, as opposed to four in the MOCI) (Roberts, Lavender, & Tchanturia, 2011). To our knowledge, no study has evaluated these factors using the OCI-R among a BN sample. OCD is a heterogeneous disorder, and it may be that specific symptoms and

symptom dimensions are more strongly associated with ED and perfectionism. Finally, increasing evidence suggests that considerable variation exists in the stability and classification of ED diagnoses (Fairburn & Harrison, 2003; Milos et al., 2002). Preliminary longitudinal research suggests that personality factors may help to predict diagnostic crossover among those with ED (Tozzi et al., 2005). In view of these findings, perfectionism may be a clinically informative etiological personality factor to investigate in the diagnostic stability ED and OCD, and the neurobiology and pathogenesis of these disorders.

References

- Bardone-Cone, A. M., Wonderlich, S. A., Frost, R. O., Bulik, C. M., Mitchell, J. E., Uppala, S., et al. (2007). Perfectionism and eating disorders: Current status and future directions. *Clinical Psychology Review*, 27(3), 384–405.
- Bastiani, A. M., Rao, R., Weltzin, T., & Kaye, W. H. (1995). Perfectionism in anorexia nervosa. *International Journal of Eating Disorders*, 17(2), 147–152.
- Bellodi, L., Cavallini, M. C., Bertelli, S., Chiapparino, D., Riboldi, C., & Smeraldi, E. (2001). Morbidity risk for obsessive-compulsive spectrum disorders in first-degree relatives of patients with eating disorders. *American Journal of Psychiatry*, 158(4), 563–569.
- Bienvenu, O. J., Samuels, J. F., Riddle, M. A., Hoehn-Saric, R., Liang, K., Cullen, B. A. M., et al. (2000). The relationship of obsessive-compulsive disorder to possible spectrum disorders: Results from a family study. *Biological Psychiatry*, 48(4), 287–293.
- Bogetto, F., Venturello, S., Albert, U., Maina, G., & Ravizza, L. (1999). Gender-related clinical differences in obsessive-compulsive disorder. *European Psychiatry*, 14(8), 434–441.
- Bulik, C. M., Tozzi, F., Anderson, C., Mazzeo, S. E., Aggen, S., & Sullivan, P. F. (2003). The relation between eating disorders and components of perfectionism. *American Journal of Psychiatry*, 160(2), 366–368.
- Cassidy, E., Allsopp, M., & Williams, T. (1999). Obsessive-compulsive symptoms at initial presentation of adolescent eating disorders. *European Child & Adolescent Psychiatry*, 8(3), 193.
- Cavallini, M. C., Bertelli, S., Chiapparino, D., Riboldi, S., & Bellodi, L. (2000). Complex segregation analysis of obsessive-compulsive disorder in 141 families of eating disorder probands, with and without obsessive-compulsive disorder. *American Journal of Medical Genetics*, 96(3), 384–391.
- Crow, S. J., Agras, W. S., Halmi, K., Mitchell, J. E., & Kraemer, H. C. (2002). Full syndromal versus subthreshold anorexia nervosa, bulimia nervosa, and binge eating disorder: A multicenter study. *The International Journal of Eating Disorders*, 32(3), 309.
- Dunkley, D. M., Zuroff, D. C., & Blankstein, K. R. (2006). Specific perfectionism components versus self-criticism in predicting maladjustment. *Personality and Individual Differences*, 40(4), 665–676.
- Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical Psychology Review*, 31(2), 203–212.
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *The International Journal of Eating Disorders*, 16(4), 363–370.

- Fairburn, C. G., Cooper, Z., Doll, H. A., & Welch, S. L. (1999). Risk factors for anorexia nervosa: Three integrated case-control comparisons. *Archives of General Psychiatry*, 56(5), 468–476.
- Fairburn, C. G., & Harrison, P. J. (2003). Eating disorders. *The Lancet (British Edition)*, 361(9355), 407.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. (1995). *Structured clinical interview for the DSM-IV Axis I disorders* (Patient ed., SCID-I/P, version 2).
- Foa, E. B., Huppert, J. D., Lieberg, S., Langner, R., Kichic, R., Hajcak, G., et al. (2002). The obsessive-compulsive inventory: Development and validation of a short-version. *Psychological Assessment*, 14, 485–495.
- Formea, G. M., & Burns, G. L. (1995). Relation between the syndromes of bulimia nervosa and obsessive-compulsive disorder. *Journal of Psychopathology and Behavioral Assessment*, 17(2), 167–176.
- Fornaria, V., Kaplan, M., Sandberg, D., Matthews, M., Skolnick, N., & Katz, J. L. (1992). Depressive and anxiety disorders in anorexia nervosa and bulimia nervosa. *The International Journal of Eating Disorders*, 12, 21–29.
- Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research*, 14(5), 449–468.
- Frost, R. O., & Steketee, G. (1997). Perfectionism in obsessive-compulsive disorder patients. *Behaviour Research and Therapy*, 35(4), 291–296.
- Godart, N. T., Flament, M. F., Perdereau, F., Jeammet, P., & Strober, M. (2002). Comorbidity between eating disorders and anxiety disorders: A review. *International Journal of Eating Disorders*, 32(3), 253–270.
- Halmi, K. A., Sunday, S. R., Strober, M., Kaplan, A., Woodside, D. B., Fichter, M., et al. (2000). Perfectionism in anorexia nervosa: Variation by clinical subtype, obsessiveness, and pathological eating behavior. *American Journal of Psychiatry*, 157(11), 1799–1805.
- Halmi, K. A., Tozzi, F., Thornton, L. M., Crow, S., Fichter, M. M., Kaplan, A. S., et al. (2005). The relation among perfectionism, obsessive-compulsive personality disorder and obsessive-compulsive disorder in individuals with eating disorders. *The International Journal of Eating Disorders*, 38(4), 371–374.
- Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: conceptualization and assessment: A functional approach to concepts and methods. *Journal of Personality and Social Psychology*, 60(4), 456–470.
- Hodgson, R. J., & Rachman, S. (1977). Obsessional-compulsive complaints. *Behaviour Research and Therapy*, 15(5), 389–395.
- Hollander, E., & Wong, C. M. (1995). Obsessive-compulsive spectrum disorders. *The Journal of Clinical Psychiatry*, 4, 53–55.
- Joiner, T. E., Heatherton, T. F., & Keel, P. (1997a). Ten-year stability and predictive utility of five bulimotypic indicators. *American Journal of Psychiatry*, 154, 1133–1138.
- Joiner, T. E., Heatherton, T. F., Rudd, M. D., & Schmidt, N. B. (1997b). Perfectionism, perceived weight status, and bulimic symptoms: Two studies testing a diathesis-stress model. *Journal of Abnormal Psychology*, 106(1), 145–153.
- Jordan, J., Joyce, P. R., Carter, F. A., Horn, J., McIntosh, V. V. W., Luty, S. E., et al. (2003). Anxiety and psychoactive substance use disorder comorbidity in anorexia nervosa or depression. *International Journal of Eating Disorders*, 34(2), 211–219.
- Kaye, W. H., Bulik, C. M., Thornton, L., Barbarich, N., & Masters, K. The Price Foundation Collaborative Group. (2004). Comorbidity of anxiety disorders with anorexia and bulimia nervosa. *American Journal of Psychiatry*, 161(12), 2215–2221.
- Kaye, W. H., Greeno, C. G., Moss, H., Fernstrom, J., Fernstrom, M., Lilienfeld, L. R., et al. (1998). Alterations in serotonin activity and psychiatric symptoms after recovery from bulimia nervosa. *Archives of General Psychiatry*, 55(10), 927–935.
- Kaye, W. H., Gwirtsman, H. E., George, D. T., & Weiss, S. R. (1986). Relationship of mood alterations to bingeing behaviour in bulimia. *British Journal of Psychiatry*, 149, 479–485.
- Kenny, D. A., Kashy, D., Bolger, N., Gilbert, D., Fiske, S., & Lindzey, G. (1998). Data analysis in social psychology. *Handbook of social psychology*. New York: McGraw-Hill.
- Laessle, R. (1987). The major affective disorder in anorexia nervosa and bulimia. *Annals of the New York Academy of Sciences*, 499(1), 324–326.
- Le Grange, D., Binford, R., Peterson, C., Crow, S., Crosby, R., Klein, M., et al. (2006). DSM-IV threshold versus subthreshold bulimia nervosa. *The International Journal of Eating Disorders*, 39(6), 462.
- Lewinsohn, P. M., Striegel-Moore, R., & Seeley, J. R. (2000). Epidemiology and natural course of eating disorders in young women from adolescence to young adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(10), 1284.
- Lilienfeld, L. R., Stein, D., Bulik, C. M., Strober, M., Plotnicov, K., Pollice, C., et al. (2000). Personality traits among currently eating disordered, recovered and never ill first-degree female relatives of bulimic and control women. *Psychological Medicine*, 30(06), 1399–1410.
- Lochner, C., Seedat, S., Hemmings, S., Kinnear, C. J., Corfield, V. A., Niehaus, D. J. H., et al. (2004). Dissociative experiences in obsessive-compulsive disorder and trichotillomania: Clinical and genetic findings. *Comprehensive Psychiatry*, 45(5), 384–391.
- McElroy, S. L., Phillips, K. A., & Keck, P. E. (1994). Obsessive-compulsive spectrum disorder. *Journal of Clinical Psychiatry*, 33–51.
- Miguel, E. C., Leckman, J. F., Rauch, S., do Rosario-Campos, M. C., Hounie, A. G., Mercadante, M. T., et al. (2005). Obsessive-compulsive disorder phenotypes: Implications for genetic studies. *Molecular Psychiatry*, 10(3), 258–275.
- Milos, G., Spindler, A., Ruggiero, G., Klaghofer, R., & Schnyder, U. (2002). Comorbidity of obsessive-compulsive disorders and the duration of eating disorders. *International Journal of Eating Disorders*, 31(3), 284–289.
- Mond, J. M., Hay, P. J., Rodgers, B., Owen, C., & Beumont, P. J. V. (2004). Validity of the eating disorder examination questionnaire (EDE-Q) in screening for eating disorders in community samples. *Behaviour Research and Therapy*, 42(5), 551.
- Obsessive-Compulsive Cognitions Working Group. (2003). Psychometric validation of the Obsessive Beliefs Questionnaire and the Interpretation of Intrusions Inventory: Part I. *Behaviour Research and Therapy*, 41(8), 863–878.
- Pearson, C. A., & Gleaves, D. H. (2006). The multiple dimensions of perfectionism and their relation with eating disorder features. *Personality and Individual Differences*, 41(2), 225–235.
- Pigott, T. A., Altemus, M., Rubenstein, C. S., Hill, J. L., Bihari, K., L'Heureux, F., et al. (1991). Symptoms of eating disorders in patients with obsessive-compulsive disorder. *American Journal of Psychiatry*, 148(11), 1552–1557.
- Pratt, E. (1998). Does the size of a binge matter? *The International Journal of Eating Disorders*, 24(3), 307–312.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments & Computers*, 36(4), 717.
- Rachman, S., & Hodgson, R. J. (1981). *Obsessions and compulsions* (Vol. 19). Englewood Cliffs, NJ: Prentice-Hall.
- Rasmussen, S. A., & Eisen, J. L. (1992). The epidemiology and differential diagnosis of obsessive-compulsive disorder. *The Journal of Clinical Psychiatry*, 53, 4–10.
- Rheumeu, J., Ladouceur, R., & Freeston, M. H. (2000). The prediction of obsessive-compulsive tendencies: Does perfectionism play a significant role? *Personality and Individual Differences*, 28(3), 583–592.
- Roberts, M., Lavender, A., & Tchanturia, K. (2011). Measuring self-report obsessiveness in anorexia nervosa: Maudsley Obsessive-Compulsive Inventory (MOCI) or obsessive-compulsive inventory-revised (OCI-R)? *European Eating Disorders Review*, 19(6), 501–508.
- Rush, A. J., Giles, D. E., Schlessler, M. A., Fulton, C. L., Weissenburger, J., & Burns, C. (1986). The inventory for depressive symptomatology (IDS): Preliminary findings. *Psychiatry Research*, 18(1), 65–87.
- Rush, A. J., Gullion, C. M., Basco, M. R., Jarrett, R. B., & Trivedi, M. H. (1996). The inventory of depressive symptomatology (IDS): Psychometric properties. *Psychological Medicine*, 26(4), 477–486.
- Shafran, R., & Mansell, W. (2001). Perfectionism and psychopathology: A review of research and treatment. *Clinical Psychology Review*, 21(6), 879–906.
- Sheets, V., & Braver, S. L. (1999). Organizational status and perceived sexual harassment: Detecting the mediators of a null effect. *Personality & Social Psychology Bulletin*, 25(9), 1159.
- Speranza, M., Corcos, M., Godart, N., Loas, G., Guilbaud, O., Jeammet, P., et al. (2001). Obsessive-compulsive disorders in eating disorders. *Eating Behaviors*, 2(3), 193–207.
- Steele, A. L., & Wade, T. D. (2008). A randomised trial investigating guided self-help to reduce perfectionism and its impact on bulimia nervosa: A pilot study. *Behaviour Research and Therapy*, 46(12), 1316–1323.
- Stein, D., Kaye, W. H., Matsunaga, H., Orbach, I., Har-Even, D., Frank, G., et al. (2002). Eating-related concerns, moods and personality traits in recovered bulimia nervosa subjects: A replication study. *International Journal of Eating Disorders*, 32(2), 225–229.
- Tarka, A. R., Waldon, I., Graber, J. A., Brooks-Gunn, J., & Strober, M. (2002). Prospective predictors of the onset of anorexic and bulimic syndromes. *International Journal of Eating Disorders*, 32(3), 282–290.
- Tozzi, F., Aggen, S. H., Neale, B. M., Anderson, C. B., Mazzeo, S. E., Neale, M. C., et al. (2004). The structure of perfectionism: A twin study. *Behavior Genetics*, 34(5), 483–494.
- Tozzi, F., Thornton, L. M., Klump, K. L., Fichter, M. M., Halmi, K. A., Kaplan, A. S., et al. (2005). Symptom fluctuation in eating disorders: Correlates of diagnostic crossover. *The American Journal of Psychiatry*, 162(4), 732.
- Vohs, K., Voelz, Z. R., Pettit, J. W., Bardone, A. M., Katz, J., Abramson, L. Y., et al. (2001). Perfectionism, body dissatisfaction, and self-esteem: An interactive model of bulimic symptom development. *Journal of Social and Clinical Psychology*, 20(4), 476.
- Weissman, M. M., Bland, R. C., Canino, G. J., Greenwald, S., Hwu, H. G., Lee, C. K., et al. (1994). The cross national epidemiology of obsessive-compulsive disorder. *The Journal of Clinical Psychiatry*, 55, 5–10.
- Wilfley, D. E., Schwartz, M. B., Spurrell, E. B., & Fairburn, C. G. (1997). Assessing the specific psychopathology of binge eating disorder patients: Interview or self-report? *Behaviour Research and Therapy*, 35(12), 1151–1159.
- Wonderlich, S. A., Crosby, R. D., Joiner, T. E., Peterson, C. B., Bardone-Cone, A., Klein, M., et al. (2005). Personality subtyping and bulimia nervosa: Psychopathological and genetic correlates. *Psychological Medicine*, 35(5), 649.