

The Perfectionism Model of Binge Eating: Testing Unique Contributions, Mediating Mechanisms, and Cross-Cultural Similarities Using a Daily Diary Methodology

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The perfectionism model of binge eating (PMOBE) is an integrative model explaining the link between perfectionism and binge eating. This model proposes socially prescribed perfectionism confers risk for binge eating by generating exposure to 4 putative binge triggers: interpersonal discrepancies, low interpersonal esteem, depressive affect, and dietary restraint. The present study addresses important gaps in knowledge by testing if these 4 binge triggers uniquely predict changes in binge eating on a daily basis and if daily variations in each binge trigger mediate the link between socially prescribed perfectionism and daily binge eating. Analyses also tested if proposed mediational models generalized across Asian and European Canadians. The PMOBE was tested in 566 undergraduate women using a 7-day daily diary methodology. Depressive affect predicted binge eating, whereas anxious affect did not. Each binge trigger uniquely contributed to binge eating on a daily basis. All binge triggers except for dietary restraint mediated the relationship between socially prescribed perfectionism and change in daily binge eating. Results suggested cross-cultural similarities, with the PMOBE applying to both Asian and European Canadian women. The present study advances understanding of the personality traits and the contextual conditions accompanying binge eating and provides an important step toward improving treatments for people suffering from eating binges and associated negative consequences.

Keywords: perfectionism, social maladjustment, depressive affect, dietary restraint, binge eating

Perfectionism is a putative risk factor for disordered eating (Bardone-Cone et al., 2007). Although most research in this area focuses on anorexia and bulimia (Lampard, Byrne, McLean, & Fursland, 2012), recent studies also link perfectionism to binge eating (Cain, Bardone-Cone, Abramson, Vohs, & Joiner, 2008; Fitzsimmons-Craft, Bardone-Cone, Brownstone, & Harney, 2012;

Pearson & Gleaves, 2006; Pratt, Telch, Labouvie, Wilson, & Agras, 2001). Binge eating (i.e., rapidly and uncontrollably eating a large amount of food in a short period of time) is related to depression, anxiety, obesity, and poor response to weight loss treatment (Spoor et al., 2006). Among undergraduates, binge eating is linked with drinking problems, binge drinking, negative mood, self-injury, and weight gain (Dunn, Neighbors, Fossos, & Larimer, 2009; Rush, Becker, & Curry, 2009). Individual differences in binge eating may be understood as lying on a continuous dimension, with people differing in frequency and in intensity; both clinical and subclinical levels of binge eating entail negative consequences (Mackinnon et al., 2011). Drawing upon this evidence, we adopted a dimensional conceptualization of binge eating.

Various models of perfectionism exist (e.g., Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991; Slaney, Rice, Mobley, Trippi, & Ashby, 2001), with evidence suggesting perfectionism is best understood as a multidimensional construct (Sherry, Hewitt, Besser, McGee, & Flett, 2004). The distinction between self-oriented perfectionism (i.e., ceaselessly demanding perfection of oneself) and socially prescribed perfectionism (i.e., perceiving others are demanding perfection of oneself) is readily

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observed in perfectionism research (Hewitt & Flett, 1991). Theory and evidence suggest self-oriented and socially prescribed perfectionism play differential roles in eating disorder symptoms (Sherry et al., 2004). Several studies found stronger links between self-oriented perfectionism and anorexic symptoms (Shafran, Lee, Payne, & Fairburn, 2006), whereas socially prescribed perfectionism is linked to a wider range of eating disorder symptoms, including binge eating and purging (Pearson & Gleaves, 2006; Pratt et al., 2001). Drawing on this evidence, the present study focused on socially prescribed perfectionism.

The Perfectionism Model of Binge Eating (PMOBE)

Until recently, theoretical models linking perfectionism to disordered eating focused on moderating variables and ignored mediating variables. One well-supported moderation model explaining when binge eating is likely to occur is the three-factor interactive model (Bardone, Vohs, Abramson, Heatherton, & Joiner, 2000; Bardone-Cone et al., 2006). According to this model, people high in perfectionism who see themselves as overweight and have low self-efficacy in achieving their standards are at risk for binge eating. Although such moderational models identify the parameters within which perfectionism should contribute to binge eating, they do not fully identify the mechanisms by which perfectionism should cause binge eating to occur (i.e., they do not specify mediational pathways).

The PMOBE (Sherry & Hall, 2009) was developed to fill this gap in knowledge. This model asserts socially prescribed perfectionism confers risk for binge eating by generating exposure to four putative binge triggers: interpersonal discrepancies, low interpersonal esteem, depressive affect, and dietary restraint. Specifically, people high in socially prescribed perfectionism believe that others demand nothing short of perfection from them, rendering them prone to viewing themselves as falling short of other peoples' expectations (i.e., interpersonal discrepancies). Their feelings of interpersonal self-esteem are also low as their sense of worth in the social domain is experienced as contingent upon meeting unobtainable expectations from demanding others. Interpersonal discrepancies and low interpersonal esteem are two aversive social states believed to trigger binge eating (Heatherton & Baumeister, 1991). People high in socially prescribed perfectionism think in a rigid, extreme manner and feel criticized and pressured by others, contributing to frequent periods of depressive affect (Mushquash & Sherry, 2013). Depressive affect is another widely discussed antecedent of binge eating (Skinner, Haines, Austin, & Field, 2012). People high in socially prescribed perfectionism may also restrict their eating in severe and inflexible ways in an attempt to win approval and avoid criticism by attaining a socially desirable, slender body (Jarry, Polivy, Herman, Arrowood, & Pliner, 2006). Dietary restraint is believed to precipitate binge eating (Herman & Polivy, 2004).

The PMOBE also asserts binge eating serves important functions for socially prescribed perfectionists: to escape aversive social states, to reduce (or to sooth) feelings of depressive affect, and to compensate for hypocaloric states arising from dietary restraint. Put differently, binge eating helps socially prescribed perfectionists to escape from, deal with, or compensate for binge triggers. Overall then, the PMOBE proposes paths between an underlying personality trait (i.e., socially prescribed perfectionism)

and four associated contextual conditions (i.e., binge triggers) that explain why people high in socially prescribed perfectionism binge eat.

Needed Advances in Research on Perfectionism and Binge Eating

The PMOBE, as tested by Sherry and Hall (2009), received promising empirical support. However, the initial test of the PMOBE failed to take into account important considerations. First, although Sherry and Hall (2009) measured binge triggers and binge eating over 7 days, they aggregated these values across all 7 days in their analyses, thereby failing to account for daily variability. Aggregating values, in essence, equated Sherry and Hall's (2009) study to a cross-sectional design, despite their use of a daily diary design. Few perfectionism studies involve daily diary designs, which provide a more rigorous test of the perfectionism-disordered eating connection than cross-sectional designs (Bardone-Cone et al., 2007). Daily diary studies are needed to understand temporal relations between variables and to increase the strength of inferences from mediational analyses by reducing temporal confounding.

Second, and relatedly, controlling for preexisting levels of binge eating in repeated measures designs is important, as doing so provides a more stringent test of perfectionism as a risk factor for binge eating. Sherry and Hall (2009) did not control for baseline levels of binge eating in their original test of the PMOBE, reflecting a serious limitation that is also observed in numerous other studies of perfectionism and binge eating (e.g., Pearson & Gleaves, 2006). Consequently, little is presently known about whether perfectionism and related triggers of binge eating (e.g., dietary restraint) actually predict change in binge eating over time.

Finally, Sherry and Hall (2009) studied depressive affect, but did not consider other negative affective states in testing the PMOBE. Evidence suggests depressive and anxious affect are distinct constructs that may be differentially related to binge eating (Ghahramanlou-Holloway, Wenzel, Lou, & Beck, 2007). Anxiety is associated with, and may even trigger, binge eating (Fitzsimmons-Craft et al., 2012; Saules et al., 2009; Vanderlinden, Grave, Vandereycken, & Noorduyn, 2001). Isnard et al. (2003) found having high levels of both depression and anxiety differentiates binge eaters from nonbinge eaters. On the other hand, other studies found that, although depression and anxiety were both correlated with binge eating, only depression uniquely contributed to binge eating (McCabe & Vincent, 2003; Mitchell & Mazzeo, 2009). In the present study, we widened our examination of negative affective states to include anxious affect.

Objectives and Hypotheses

We addressed the above needed advances by examining perfectionism in relation to daily binge triggers and daily binge eating. Our study focused on three main goals. First, Sherry and Hall's (2009) study indicated all four binge triggers were overlapping and that, when aggregated across time, not all triggers (e.g., depressive affect) uniquely predicted binge eating. We first wanted to better understand the role of negative affect by testing if depressive affect, anxious affect, or both uniquely contributed to binge eating. As there was too little evidence to inform specific hypotheses,

these analyses were considered exploratory. Our study then tested whether, when examined on a daily basis and controlling for previous day's level of binge eating, each binge trigger uniquely predicted change in daily binge eating, or whether a trigger's contribution is better accounted for by its association with other triggers. Consistent with the PMOBE, we hypothesized each binge trigger would contribute uniquely to increases in daily binge eating.

Second, we tested if binge triggers explain why people high in socially prescribed perfectionism engage in daily binge eating. We hypothesized daily variations in these four binge triggers would mediate the link between socially prescribed perfectionism and daily binge eating.

Third, there is interest in studying eating disorder symptoms and their correlates cross-culturally. Research suggests Asians experience eating disorder symptoms, including binge eating, at rates comparable with Europeans (Franko, Becker, Thomas, & Herzog, 2007; Reslan & Saules, 2013). Asian culture emphasizes upholding traditional gender roles and preserving social harmony, which includes meeting demanding expectations from parents and maintaining a thin physique (Jackson, Keel, & Lee, 2006). Women of Asian descent may also internalize Western cultural ideals, including the thin beauty ideal. These factors may make women of Asian descent vulnerable to elevated levels of socially prescribed perfectionism and to putative triggers of binge eating (e.g., interpersonal discrepancies). Congruent with earlier research (Franko et al., 2007), we hypothesized binge triggers would mediate the link between socially prescribed perfectionism and daily binge eating in both Asian Canadian and European Canadian women.

Method

Participants and Procedures

All participants were recruited from participant pools of undergraduates enrolled in psychology courses at two large Canadian universities. Participants received course credit; undergraduates at one university also received \$5. A total of 572 women participated, with six women excluded from the final sample (see below). The mean age of participants in the final sample was 19.53 years of age ($SD = 2.60$). Roughly half of participants (46.1%) were in first year of university. Most participants (90.8%) were either Asian Canadian ($N = 257$) or European Canadian ($N = 257$). The mean body mass index reported by participants was 21.06 ($SD = 2.94$). Our study was approved by the Research Ethics Board of both universities.

We conducted a 7-day daily diary study involving two phases. In Phase 1, participants completed personality scales in the lab. They were also instructed on proper daily diary completion for Phase 2, which began the next day. In Phase 2, participants completed an Internet-based structured daily diary once per day for 7 consecutive days.

All women completed Phase 1, and six women were excluded from Phase 2. Of these, two women reported situations affecting their eating (e.g., dental surgery); two women provided all seven daily reports in 1 day; and two other women did not provide any Phase 2 data. The final sample involved 566 women. Participants were asked to complete their diaries every night just before bed. Study participants received daily e-mail reminders to complete

their diary; reports were date and time stamped by an Internet server. Diary reports completed between 7:00 p.m. and 4:00 a.m. were retained for analysis. Of the 3,901 daily diary entries received, 3,509 (90.0%) were returned in a timely manner and retained for analysis. Of a possible total of seven daily reports per participant, an average of 6.20 ($SD = 1.14$) were returned. Response rates were high across all diary days, ranging from 94.5% on Day 1 to 85.7% on Day 5.

Measures

In Phase 1 and 2, constructs were assessed using three indicators, except for interpersonal discrepancies (two indicators) and interpersonal esteem (two indicators). Other studies have adopted a similar approach (e.g., Dunkley, Zuroff, & Blankstein, 2003; Mushquash & Sherry, 2012). Using multiple indicators reduces reliance on the potentially idiosyncratic properties of any one measure (Kline, 2005). Confirmatory factor analyses (CFA), presented in Sherry and Hall (2009), tested and supported our contention that a given set of measures coheres together. For example, CFA indicated that a short form of the depression subscale of McNair, Lorr, and Droppleman's (1992) Profile of Mood States (POMS), a short form of Form G of Lubin's (1965) Depression Adjective Checklist (DACL), and a short form of Form E of Lubin's (1965) DAACL represent valid indicators of the same, underlying construct (i.e., depressive affect).

Phase 1 Measures

Socially prescribed perfectionism was measured using the socially prescribed perfectionism subscale (15 items; $\alpha = .85$) from Hewitt and Flett's (1991) Multidimensional Perfectionism Scale, a modified version of the socially prescribed perfectionism subscale (four items; $\alpha = .67$) from Garner, Olmstead, and Polivy's (1983) Eating Disorder Inventory perfectionism subscale, and a modified version of the revised parental perceptions subscale (five items; $\alpha = .75$) from Cox, Enns, and Clara's (2002) factor analysis of Frost et al.'s (1990) Multidimensional Perfectionism Scale. Research supports the reliability and validity of these measures (Cox et al., 2002). All reported coefficient alphas are based on data from the present study. An extensive description of Phase 1 measures appears in Sherry and Hall (2009). For all measures, higher scores represent higher levels of a construct.

Phase 2 Measures

A 24-hr timeframe was specified for Phase 2 measures, as is commonly done in diary studies (Mushquash & Sherry, 2012). Measures were slightly modified to fit this time-frame. As in past diary studies (Mushquash & Sherry, 2012), scales that were considered too long for Phase 2 were shortened. Brief descriptions of Phase 2 measures appear below. These measures (except for anxious affect measures) are described in detail by Sherry and Hall (2009).

Interpersonal discrepancies. Interpersonal discrepancies were measured using the interpersonal discrepancies subscale (five items; $\alpha = .95$) of Flett and Hewitt's (2013) Multidimensional Discrepancy Inventory and a modified version of Slaney et al.'s (2001) Almost Perfect Scale-Revised (APS-R). For each APS-R

intrapersonal discrepancy item (e.g., “My performance did not meet my standards,” a corresponding interpersonal discrepancies item (e.g., “My performance did not meet others’ standards”) was generated, resulting in the APS-R interpersonal discrepancies subscale (four items; $\alpha = .98$). Evidence supports the reliability and validity of these measures (Mushquash & Sherry, 2013).

Interpersonal esteem. Interpersonal esteem was measured using a short form of the social self-esteem subscale (four items; $\alpha = .94$) of Janis and Field’s (1959) Feelings of Inadequacy Scale and a short form of the social self-esteem subscale (four items; $\alpha = .92$) of Heatherton and Polivy’s (1991) State Self-Esteem Scale. Research supports the reliability and validity of these measures (Mackinnon et al., 2011).

Depressive affect. Depressive affect was measured using a short form of the depression subscale (four items; $\alpha = .93$) of McNair et al.’s (1992) POMS, a short form of Form G (four items; $\alpha = .92$) of Lubin’s (1965) DACL, and a short form of Form E (four items; $\alpha = .95$) of Lubin’s (1965) DACL. Studies support the reliability and validity of these scales (Mushquash & Sherry, 2012).

Anxious affect. Anxious affect was measured using a short form of the anxiety subscale (four items; $\alpha = .86$) of McNair et al.’s (1992) POMS, a short form of the cognitive worry subscale (CWS; four items; $\alpha = .88$), and a short form of the autonomic emotional subscale (AES; four items; $\alpha = .76$). The CWS and the AES form the State Anxiety Scale of the Endler Multidimensional Anxiety Scales (Endler, Parker, Bagby, & Cox, 1991). The original CWS and AES contain 10 items each, but for our study, only the four highest loading items for each subscale (identified in Endler et al.’s, 1991 factor analysis) were used. The item tense and the response format of the CWS and the AES items were revised to match our 24-hr timeframe and to be consistent with the response format from the POMS and the DACL. POMS, CWS, and AES items were rated on a 5-point scale (0 = *not at all*; 4 = *extremely*). Research supports the reliability and validity of these measures (Bourgeois, LeUnes, & Meyers, 2010).

Dietary restraint. Dietary restraint was measured using a short form of van Strien, Frijters, Bergers, and Dafaes’ (1986) Dutch Restrained Eating Scale (four items; $\alpha = .94$), the abstaining from eating subscale (three items; $\alpha = .94$) of Stice, Killen, Hayward, and Taylor’s (1998) Dietary Intent Scale, and a short form of the restraint subscale (four items; $\alpha = .97$) of Stunkard and Messick’s (1985) Three-Factor Eating Questionnaire. Evidence

supports the reliability and validity of these measures (Stice, 1998).

Binge eating. Binge eating was measured using a modified version of the binge eating subscale (nine items; $\alpha = .92$) created by Lowe, Gleaves, and Murphy-Eberenz (1998) from the Bulimia Test–Revised (Thelen, Farmer, Wonderlich, & Smith, 1991). Binge eating was also assessed using four items measuring binge eating from Garner et al.’s (1983) Eating Disorder Inventory bulimia subscale ($\alpha = .90$) and seven items from the binge eating subscale of Stice, Telch, and Rizvi’s (2000) Eating Disorder Diagnostic Scale ($\alpha = .95$). Research supports the reliability and validity of these measures (Bardone-Cone, 2007).

Results

Bivariate Correlations

Variables were formed by standardizing and by summing their respective manifest indicators before analyses. When computing bivariate correlations, daily variables were aggregated over 7 days. Bivariate correlations among all variables other than anxious affect were reported in Sherry and Hall (2009). In the present study, we also found anxious affect was significantly ($p < .001$) and moderately to strongly correlated with all variables of the PMOBE.

Multilevel Modeling

We used HLM 6.04 software with maximum likelihood estimation for multilevel modeling. Level 1 models tested if daily binge triggers covaried with daily binge eating. Whereas Level 2 models tested if Level 1 coefficients (i.e., intercepts and slopes) covaried with the between-persons variable of socially prescribed perfectionism.

Intraclass correlation coefficients assessed the relative proportion of between-persons and within-person variance. These coefficients were significant (see Table 1), suggesting significant within-person daily variation was available for modeling.

Following Raudenbush and Bryk (2002), Level 1 variables were person-mean-centered (i.e., centered around the person’s own mean), whereas Level 2 variables were grand-mean-centered (i.e., centered around the group’s overall mean). As variance components for slopes of daily variables were significant ($p < .001$), Level 1 coefficients were modeled as random effects where inter-

Table 1
Percentages of Between-Persons and Within-Person Variance and Intraclass Correlation Coefficients for Daily Variables

Variables	% of between-persons variance	% of within-person variance	Intraclass correlation coefficient
Daily interpersonal discrepancies	52.2%	47.8%	.52
Daily interpersonal esteem	69.5%	30.5%	.70
Daily depressive affect	55.4%	44.6%	.55
Daily anxious affect	59.4%	40.6%	.59
Daily dietary restraint	74.9%	25.1%	.75
Daily binge eating	62.4%	37.6%	.62

Note. Percentages and intraclass correlation coefficients are based on 3,509 diary responses from 566 participants. All intraclass correlation coefficients were $p < .001$.

cepts and slopes varied across persons. In predicting daily binge eating, multilevel analyses controlled for previous day's binge eating, resulting in a focus on change in binge eating across days. This strategy helps protect against autocorrelation (Raudenbush & Bryk, 2002).¹ Controlling for previous day's binge eating resulted in a possible six daily reports per person (rather than seven) and a total of 2,974 daily reports (rather than 3,509). All demographics were initially included as covariates. However, as only time in Canada (which was intended to capture level of acculturation) significantly ($p < .01$) predicted daily variables, other demographics were dropped. Although not a significant predictor, body mass index was included in analyses because research suggests it is a potentially important covariate (Mushquash & Sherry, 2013).

Multilevel Regression Analyses

To test the unique contribution of daily binge triggers in predicting change in daily binge eating, two multilevel regression analyses were performed. First, a multilevel regression analysis was conducted to test if daily depressive and anxious affect uniquely predicted change in daily binge eating. Daily depressive affect, $B = 0.20$, $SE = 0.07$, $p < .01$, but not daily anxious affect, $B = 0.12$, $SE = 0.09$, $p > .05$, significantly and uniquely contributed to change in daily binge eating. Second, a multilevel regression analysis was performed with all daily binge triggers entered simultaneously (see Table 2). Consistent with our hypotheses, daily interpersonal discrepancies, daily interpersonal esteem, daily dietary restraint, and daily depressive affect all made unique, significant contributions to change in daily binge eating. However, contrary to our hypotheses, daily dietary restraint was inversely related to change in daily binge eating.

Multilevel Mediation Analyses

We tested if the relationship between socially prescribed perfectionism and daily binge eating was explained by daily binge triggers. Mediation was tested via the framework proposed by Baron and Kenny (1986) and subsequently applied to multilevel modeling by others (Krull & MacKinnon, 2001). In this approach, a mediator is said to explain part (or all) of the link between a predictor and a criterion when (a) the link between the predictor and the criterion is significant (Path C in Table 3); (b) the link between the predictor and the mediator is significant (Path A in

Table 3); (c) the link between the mediator and the criterion is significant (Path B in Table 3); (d) the link between the mediator and the criterion is significant when controlling for the influence of the predictor (Path B' in Table 3); (e) the strength of the link between the predictor and the criterion significantly decreases after taking into account the influence of the mediator (Path C' in Table 3). Sobel's (1982) test was used to determine if the indirect effect of the predictor on the criterion via the mediator was significantly different from zero. Sobel's (1982) test included an adjustment for our multilevel data (Krull & MacKinnon, 1999).

Four multilevel mediational models were tested (see Table 3). Daily interpersonal discrepancies, daily interpersonal esteem, daily depressive affect, and daily dietary restraint were tested as mediators of the socially prescribed perfectionism-daily binge eating link. As hypothesized, daily interpersonal discrepancies, daily interpersonal esteem, and daily depressive affect partially mediated the relationship between socially prescribed perfectionism and change in daily binge eating. Daily dietary restraint was unrelated to change in daily binge eating and therefore did not mediate the socially prescribed perfectionism-daily binge eating link (see Table 3). Finally, as Table 3 shows, Sobel's (1982) test suggested daily interpersonal discrepancies, daily interpersonal esteem, and daily depressive affect significantly mediated the socially prescribed perfectionism-binge eating relation. Daily binge triggers mediated between 15.5% and 20.3% of the total effect of socially prescribed perfectionism on daily binge eating.²

Generalizability

Two-way interaction terms were used to test if multilevel mediational analyses generalized across ethnic groups. A predictor variable representing ethnicity (with Asians coded as 1 and Europeans coded as 0) and an interaction term involving ethnicity were added to multilevel mediational analyses in Table 3. To illustrate, the equation testing if Path C (i.e., socially prescribed perfectionism to daily binge eating) generalized across ethnic groups included the following predictors: time in Canada, body mass index,

¹ A first-order autocorrelated error structure is common in multilevel modeling. For example, binge eating on one day (T1) and binge eating on the next day (T1+1) may be related within the same person. Schwartz and Stone (1998) assert "an estimated autocorrelation near zero" (p. 11) suggests problematic autocorrelation is not present. In our study, the following pattern of within-person, first-order autocorrelation was found: interpersonal discrepancies (-.04), interpersonal esteem (.04), depressive affect (.03), anxious affect (.02), dietary restraint (.06), and binge eating (.06). Thus, no evidence of problematic autocorrelation was observed.

² Socially prescribed perfectionism is proposed to drive the constellation of cognition, affect, and behavior observed in the PMOBE. To be conservative, self-oriented perfectionism was also added as a covariate in our multilevel mediational analyses. Self-oriented perfectionism was measured with the self-oriented perfectionism subscale from Hewitt and Flett's (1991) Multidimensional Perfectionism Scale, a modified version of the self-oriented perfectionism subscale from Garner, Olmstead, and Polivy's (1983) Eating Disorder Inventory perfectionism subscale, and the personal standards subscale from Cox, Enns, and Clara's (2002) factor analysis of Frost et al.'s (1990) Multidimensional Perfectionism Scale. We formed a self-oriented perfectionism variable by standardizing and by summing these manifest indicators. The magnitude and the significance of path coefficients from multilevel analyses were virtually unaltered when self-oriented perfectionism was added as a covariate. Such results suggest a unique role for the variables of the PMOBE beyond self-oriented perfectionism.

Table 2

Multilevel Regression Analyses With Daily Binge Triggers Predicting Daily Binge Eating

Variables	B	SE
Intercept	41.14***	5.42
Demographics		
Time in Canada	-0.40**	0.11
Body mass index	0.34	0.27
Daily interpersonal discrepancies	0.15**	0.05
Daily interpersonal esteem	-0.13*	0.05
Daily depressive affect	0.18**	0.06
Daily dietary restraint	-0.15**	0.05

Note. Multilevel regression analyses were based on 2,974 diary responses from 566 participants.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Multilevel Mediation Analyses Testing Daily Binge Triggers as Mediators of the Socially Prescribed Perfectionism and Daily Binge Eating Relationship

Path	Description of path	<i>B</i>	<i>SE</i>	Sobel (z)	Strength (%)
Daily interpersonal discrepancies as a mediator					
Path C	Socially prescribed perfectionism to daily binge eating	4.23***	0.75	—	—
Path A	Socially prescribed perfectionism to daily interpersonal discrepancies	3.27***	0.30	—	—
Path B	Daily interpersonal discrepancies to daily binge eating	0.26***	0.05	—	—
Path B'	Daily interpersonal discrepancies to daily binge eating controlling for socially prescribed perfectionism	0.26***	0.05	—	—
Path C'	Socially prescribed perfectionism to daily binge eating controlling for daily interpersonal discrepancies	4.12***	0.74	4.88***	20.3
Daily interpersonal esteem as a mediator					
Path C	Socially prescribed perfectionism to daily binge eating	4.23***	0.75	—	—
Path A	Socially prescribed perfectionism to daily interpersonal esteem	-3.87***	0.37	—	—
Path B	Daily interpersonal esteem to daily binge eating	-0.19***	0.05	—	—
Path B'	Daily interpersonal esteem to daily binge eating controlling for socially prescribed perfectionism	-0.19***	0.05	—	—
Path C'	Socially prescribed perfectionism to daily binge eating controlling for daily interpersonal esteem	4.14***	0.75	3.37***	17.6
Daily depressive affect as a mediator					
Path C	Socially prescribed perfectionism to daily binge eating	4.23***	0.75	—	—
Path A	Socially prescribed perfectionism to daily depressive affect	2.33***	0.31	—	—
Path B	Daily depressive affect to daily binge eating	0.27***	0.06	—	—
Path B'	Daily depressive affect to daily binge eating controlling for socially prescribed perfectionism	0.28***	0.06	—	—
Path C'	Socially prescribed perfectionism to daily binge eating controlling for daily depressive affect	4.20***	0.75	4.15***	15.5
Daily dietary restraint as a mediator					
Path C	Socially prescribed perfectionism to daily binge eating	4.23***	0.75	—	—
Path A	Socially prescribed perfectionism to daily dietary restraint	2.75**	0.62	—	—
Path B	Daily dietary restraint to daily binge eating	-0.13	0.05	—	—
Path B'	Daily dietary restraint to daily binge eating controlling for socially prescribed perfectionism	-0.14	0.05	—	—
Path C'	Socially prescribed perfectionism to daily binge eating controlling for daily dietary restraint	4.15***	0.74	2.18	—

Note. Multilevel mediation analyses are based on 2,974 diary responses from 566 participants. *B* = unstandardized coefficient; Strength (%) = the strength of the mediated effect (e.g., daily interpersonal discrepancies mediated 20.3% of the total effect of socially prescribed perfectionism on daily binge eating).

** $p < .01$. *** $p < .001$.

previous day's binge eating, socially prescribed perfectionism, ethnicity, and Socially Prescribed Perfectionism \times Ethnicity. No significant two-way interactions were observed for any paths in multilevel mediation analyses ($p > .05$). For example, in analyses with daily interpersonal discrepancies as a mediator, the Path C interaction term (Socially Prescribed Perfectionism \times Ethnicity = Daily Binge Eating) was null, $B = -1.73$, $SE = 1.67$, $p > .05$; the Path A interaction term (socially prescribed perfectionism \times ethnicity = daily interpersonal discrepancies) was null, $B = 0.19$, $SE = 0.67$, $p > .05$; the Path B interaction term (Daily Interpersonal Discrepancies \times Ethnicity = Daily Binge Eating) was null, $B = -0.03$, $SE = 0.10$, $p > .05$; the Path B' interaction term (Daily Interpersonal Discrepancies \times Ethnicity = Daily Binge Eating) was null, $B = -0.04$, $SE = 0.10$, $p > .05$; and, the Path C' interaction term (Socially Prescribed Perfectionism \times Ethnicity = Daily Binge Eating) was null, $B = -1.46$, $SE = 1.64$, $p > .05$. These results are congruent with our hypotheses and suggest path coefficients for multilevel mediation analyses did

not differ across the Asian and the European Canadian women in our study. In sum, four multilevel mediation models were hypothesized and three of these models were supported. These models were also found to generalize across Asian and European Canadian participants.³

Discussion

Our study advances understanding of the personality traits and the contextual conditions accompanying binge eating and addresses gaps in knowledge about the socially prescribed

³ In the PMOBE, binge triggers are proposed to mediate, but not to moderate, the link between socially prescribed perfectionism and binge eating. However, exploratory moderation analyses were conducted. Four moderated multiple regression analyses and four multilevel moderation analyses tested if socially prescribed perfectionism and binge triggers interacted to predict binge eating. No support was found for any of these analyses.

perfectionism-daily binge eating link. We found daily depressive affect, but not daily anxious affect, is the form of negative affect most relevant to daily binge eating. As expected, daily levels of interpersonal discrepancies, low interpersonal esteem, depressive affect, and dietary restraint uniquely contributed to change in daily binge eating, clarifying the daily experiences of people who binge eat. Each binge trigger (except for daily dietary restraint) mediated the link between socially prescribed perfectionism and change in daily binge eating in a manner consistent with hypotheses. These mediational models illuminate how socially prescribed perfectionism sets conditions conducive to daily binge eating. Results also supported our hypotheses by suggesting that mediational models generalized across Asian and European Canadian participants.

Unique Contributions

We found daily depressive affect is more predictive of daily binge eating than daily anxious affect, consistent with past findings (e.g., Mitchell & Mazzeo, 2009). In keeping with our hypotheses and the PMOBE, our results also suggested all four daily binge triggers uniquely contributed to change in daily binge eating. These results differ from Sherry and Hall (2009) who found that, when aggregated over a 7-day period, depressive affect and interpersonal esteem did not uniquely contribute to binge eating. This difference complements a wider literature (Raudenbush & Bryk, 2002) suggesting nomothetic analyses (patterns of behavior between individuals) and idiographic analyses (patterns of behavior within individuals) may differ substantively, and highlights the importance of studying daily processes affecting binge eating.

The inverse relationship between daily dietary restraint and daily binge eating was unexpected and differed from nomothetic studies showing a positive relationship between these variables (Sherry & Hall, 2009; Womble et al., 2001). However, the present study, which focused on daily experiences within individuals, suggests on days when people engage in dietary restraint, they are more successful in curtailing their binge eating. This result is congruent with research suggesting, in the short-term, dietary restraint triggers an urge to binge, but not an actual binge (Engelberg, Gauvin, & Steiger, 2005). Prior research has found an inconsistent relationship between dietary restraint and binge eating (Stice, 2002), suggesting a full understanding of this complex relationship requires additional research.

Mediating Mechanisms

All binge triggers except for daily dietary restraint mediated the relationship between socially prescribed perfectionism and change in daily binge eating, thereby providing support for three of four hypothesized mediational models. These findings go beyond work by Sherry and Hall (2009), which did not predict change in binge eating over time. On a day-to-day basis, people high in socially prescribed perfectionism appear more likely than others to have distressing interpersonal experiences (Hewitt, Flett, Sherry, & Caelian, 2006). Such people believe they are unable to live up to the perfection others demand of them (interpersonal discrepancies) and feel others dislike them (low interpersonal esteem). In this way, socially prescribed perfectionism may be a stable, underlying trait that predisposes people to have negative, unsatisfying relationships (Hewitt et al., 2006). Because they experience their

social world as judgmental and as pressure-filled, people high in socially prescribed perfectionism may not turn to others for social support. Instead, our findings suggest they may turn to food to cope with their distressing experiences, as food is expected to provide comfort and/or escape (Mushquash & Sherry, 2013). As a coping mechanism to deal with the problems generated by socially prescribed perfectionism, binge eating may work in the short-term, but lead to long-term mental and physical problems (Rush et al., 2009).

The present study also suggests people high in socially prescribed perfectionism are prone to experiencing depressive affect on a daily basis (see Mushquash & Sherry, 2012, 2013 for similar results). A preoccupation with others' lofty expectations appears depressogenic. Although numerous studies show a link between socially prescribed perfectionism and depressive affect (Mackinnon et al., 2011), our study extends this literature by suggesting socially prescribed perfectionists may attempt to escape or to regulate depressive affect via binge eating.

Our study also intersects with a wider literature suggesting perfectionism may undermine adaptive forms of self-control. Hofmann, Baumeister, Forster, and Vohs (2012) characterized perfectionists as "highly motivated persons (a.k.a. tortured souls) who experience powerful impulses that frequently clash with their goals and values" (p. 1332). Our results may be understood as providing one specific illustration of Hofmann et al.'s (2012) general point. Socially prescribed perfectionists experience interpersonal problems and depressive feelings that contribute to binge eating—an out-of-control, self-defeating behavior that is painfully different from the ultrathin, "perfect" person socially prescribed perfectionists aspire to be.

Cross-Cultural Similarities

Our study also found support for the generalizability of the PMOBE across Asian and European Canadian participants. This finding adds to a growing body of evidence suggesting women of Asian descent living in Western cultures share many of the same risk factors for disordered eating experienced by women of European descent living in Western cultures (Franko et al., 2007). Consistent with our results, Shaw, Ramirez, Trost, Randall, and Stice (2004) found low self-esteem and depressive affect were risk factors for eating problems in both Asian and European American participants. That said, a more finely grained analysis of ethnic identity is needed. Culturally related variables (e.g., religious beliefs) may be more important than group membership (e.g., Asian vs. European Canadian) in assessing for differences between cultures.

Clinical Implications

The relationship between daily binge triggers and daily binge eating in our study differed from Sherry and Hall (2009), who aggregated participant responses over a week. These differences suggest the potential utility of incorporating daily diaries into assessment and treatment protocols. Weekly reporting may miss subtleties in binge triggers (e.g., shifts in mood), and daily reporting may better reveal patterns in emotions, cognitions, and behaviors.

Our study also lends theoretical support for choosing interventions when treating more complex binge eating clients who per-

ceive others in their social world as demanding perfection from them. This personality trait, which our data suggest at least partly drives binge eating, may be a useful treatment target. Studies indicate a wider version of cognitive behavior therapy for eating disorders (Fairburn et al., 2009), which addresses problems such as perfectionism, leads to better results than a treatment with a narrower focus on just eating disorders symptoms.

Finally, our study provides theoretical support for interpersonal therapy as one treatment choice when working with binge eaters. Socially prescribed perfectionism is an interpersonal trait that predisposes people to interpersonal problems, which may then lead to binge eating. The PMOBE therefore provides greater specificity about the characterological and the interpersonal context in which binge eating occurs. As such, the PMOBE provides a theoretical basis to examine a client's social history and current social functioning during assessment and treatment.

Limitations and Future Directions

Our study's use of once-per-day, end-of-day reporting decreases, but does not eliminate, recall bias. Future research could use different sampling approaches, such as ecological momentary assessment (i.e., assessment in real time during a person's daily life) using portable electronic devices. In addition, it is unknown how the variables of the PMOBE may play out over longer time periods (e.g., 18 months). Multiwave longitudinal studies could test if the variables of the PMOBE predict the onset of binge-eating disorder. Modified versions of scales were also used in our study. Less is known about the psychometric properties of these modified scales. Concerns also exist about whether daily diary designs lead to reactance (i.e., changes in behavior as a result of being monitored). Evidence suggests, however, reactance is not a major issue in daily diary studies of disordered eating (Stein & Corte, 2003).

Our use of an undergraduate sample precludes generalization of our results to clinical populations. A replication of findings with a clinical sample is needed. Finally, as a main focus of the PMOBE is the social environment, future studies should more directly assess participants' social environment. Many social interactions are decoded and encoded as humans make meaning of their social environment. People high in socially prescribed perfectionism may misconstrue benign or even supportive social interactions and believe others are demanding perfection from them. However, our study design precluded a distinction between actual and perceived demands. Future research could address this issue by collecting informant reports from significant others.

Concluding Remarks

Our study supports the PMOBE and advances our understanding of the perfectionism–binge eating link. Daily depressive affect was more predictive of change in daily binge eating than daily anxious affect, and all four binge triggers contributed uniquely to binge eating on a daily basis. Daily interpersonal discrepancies, daily low interpersonal esteem, and daily depressive affect also mediated the link between socially prescribed perfectionism and changes in daily binge eating. These findings help explain how an underlying personality trait (i.e., socially prescribed perfectionism) leads to binge eating by exposing people to distressing experiences

as they go about their daily lives. Our findings also support the generalizability of the PMOBE across both Asian and European Canadian women.

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