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Mushquash, Aislin R. (2017) Are perfectionistic concerns an  
antecedent of or a consequence of binge eating, or both? A short-  
term four-wave longitudinal study of undergraduate women. *Eating  
Behaviors*, 26. pp. 23-26.

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Smith, M.M., Sherry, S.B., Gautreau, C.M., Stewart, S.H., Saklofske, D.H., & Mushquash, A.R. (in press). Are perfectionistic concerns an antecedent of or a consequence of binge eating, or both? A short-term four-wave longitudinal study of undergraduate women. *Eating Behaviors*.

Are perfectionistic concerns an antecedent of or a consequence of binge eating, or both?

A Short-Term Four-Wave Longitudinal Study of Undergraduate Women

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3500 WORDS (excluding title page)

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## Abstract

The perfectionism model of binge eating (PMOBE) posits perfectionistic concerns are a vulnerability factor for binge eating. And evidence indicates perfectionistic concerns and binge eating correlate positively. Yet the direction of this relationship is unclear. In particular, it is unclear if perfectionistic concerns represent an antecedent of binge eating (a vulnerability effect with perfectionistic concerns predicting increases in binge eating), a consequence of binge eating (a complication effect with binge eating predicting increases in perfectionistic concerns), or both (reciprocal relations with perfectionistic concerns predicting increases in binge eating and vice versa). To address these questions, we studied 200 undergraduate women using a 4-week, 4-wave cross-lagged design. Consistent with the PMOBE, perfectionistic concerns predicted increased binge eating (vulnerability effect). Conversely, binge eating did not predict increased perfectionistic concerns (complication effect). Findings support the long-held theory that perfectionistic concerns are part of the premorbid personality of women vulnerable to binge eating.

*Keywords:* perfectionism, binge eating, longitudinal, cross-lagged analysis

## 1. Introduction

Binge eating—rapidly and uncontrollably eating large amounts of food in a short period of time—is a common, costly, and impairing problem (Wonderlich, Gordon, Mitchell, Crosby, & Engel, 2009). It can lead to weight gain, obesity, and related medical conditions such as type 2 diabetes (Bulik, Sullivan, & Kendler, 2002). Binge eating is also tied to smoking and excessive drinking (Keel, Baxter, Heatherton, & Joiner, 2007; Rush, Becker, & Curry, 2009). Moreover, binge eating typically peaks for women during university, with evidence suggesting approximately 32% of female undergraduates' binge eat (Keel, Baxter, Heatherton, & Joiner, 2007). Accordingly, researchers and clinicians are increasingly interested in testing explanatory models to inform prevention and intervention efforts.

Although there are numerous reasons why female undergraduates' binge eat, perfectionism has been theorized to play a role. Sherry and Hall's (2009) perfectionism model of binge eating (PMOBE) asserts socially-based pressures to be perfect (perfectionistic concerns) confer vulnerability for binge eating. Likewise, evidence indicates people with higher perfectionistic concerns binge eat more than people with lower perfectionistic concerns (e.g., Mushquash & Sherry, 2013). And yet, whether perfectionistic concerns are an antecedent of binge eating, a consequence of binge eating, or both is unclear. We addressed this ambiguity by testing a reciprocal relations model in a sample of 200 female undergraduates, using a 4-week, 4-wave cross-lagged design.

### *1.1. Perfectionism*

Perfectionism refers to a dispositional tendency to rigidly strive for flawlessness, set excessively high personal standards, and experience overly negative reactions to perceived setbacks and failures (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991).

Extensive evidence suggests the majority of common variance among lower-order perfectionism dimensions is accounted for by two higher-order factors: perfectionistic strivings and perfectionistic concerns (Stoeber & Otto, 2006). Perfectionistic strivings encompass a family of traits incorporating the tendency to demand perfection of oneself (self-oriented perfectionism; Hewitt & Flett, 1991) and the propensity to hold unrealistically high personal expectations (personal standards; Frost et al., 1990). Perfectionistic concerns comprise a constellation of traits involving the tendency to perceive others as demanding perfection (socially prescribed perfectionism; Hewitt & Flett, 1991), have overly negative reactions to perceived failures (concerns over mistakes; Frost et al., 1990), and doubts about performance abilities (doubts about actions; Frost et al., 1990). Given evidence suggesting perfectionistic concerns are uniquely important to binge eating (Sherry & Hall, 2009), we focused solely on perfectionistic concerns.

### *1.2. Clarifying perfectionistic concerns relationship with binge eating*

Sherry and Hall's (2009) perfectionism model of binge eating (PMOBE) views people with high perfectionistic concerns as actively creating conditions in their daily lives that are conducive to binge eating (e.g., restricting their diet). Consistent with the PMOBE, Boone, Soenens, Vansteekiste, and Braet (2012) found that experimentally inducing perfectionistic concerns caused undergraduates higher levels of restraint and binge eating 24 hours following the manipulation. Likewise, Short, Mushquash, and Sherry (2013) demonstrated that doubts about actions, a core component of perfectionistic concerns, predicted increased binge eating in a sample of undergraduates. Thus, although not tested directly, prior findings align with the PMOBE (Boone et al., 2012; Short et al., 2013). Even so, alternatives to the PMOBE are rarely, if ever, tested.

Indeed, Heatherton and Baumeister's (1991) escape theory asserts binge eating provides temporary relief from aversive self-awareness by shifting attention away from higher level abstract thinking to the immediate environment. And, according to the escape model, following a binge, upon return of self-awareness, emotional distress increases. It is thus plausible that, contrary to the PMOBE, binge eating may predispose perfectionistic concerns. To illustrate, consider that binge eating is tied to weight gain (Bulik et al., 2002), which could augment a subjective sense of falling short of other's body ideals (i.e., perfectionistic concerns). Alternatively, consider that undergraduate women prone to binge eating typically try to resist future binges and experience intense regret following a binge, which might also foster perfectionistic concerns. Yet, such complication effects, with binge eating predicting perfectionistic concerns but not the reverse, have not been tested. Moreover, focusing exclusively on unidirectional relationships negates the possibility that perfectionistic concerns and binge eating might represent a vicious bidirectional cycle. Still, no study has explored potential reciprocal relations between perfectionistic concerns and binge eating. As such, it is currently unclear whether perfectionistic concerns are an antecedent of binge eating (i.e., perfectionistic concerns predicting increases in binge eating), a consequence of binge eating (i.e., binge eating predicting increases in perfectionistic concerns), or both (i.e., perfectionistic concerns predicting increases in binge eating and vice versa).

### *1.3. The present study*

Understanding the directionality of perfectionistic concerns' relationship with binge eating is vital to assessing, treating, and preventing binge eating. And yet, the direction of this relationship is unclear. Our study addressed this gap by integrating vulnerability effects (perfectionistic concerns predicting binge eating) and complication effects (binge eating

predicting perfectionistic concerns) into a reciprocal relations model (see Figure 1). We evaluated this model in 200 undergraduate women, using a 4-week, 4-wave cross-lagged design. Perfectionistic concerns and binge eating were measured as latent variables. Based on past research (e.g., Mushquash & Sherry, 2013), we expected first-order auto-regressive paths for perfectionistic concerns (capturing inter-individual stability) to show the highest stability, and first-order auto-regressive paths for binge eating to show a relatively lower level of stability (vs. perfectionistic concerns). As well, building on theory (Sherry & Hall, 2009) and evidence (Boone et al., 2012; Short et al., 2013), we hypothesized perfectionistic concerns would predict increased binge eating over time. Furthermore, we tested if binge eating predicted increased perfectionistic concerns over time; as our study is the first to test this potential complication effect, we considered this test exploratory.

## **2. Method**

### *2.1. Participants*

A sample of 200 undergraduate women was recruited from the Department of Psychology's subject pool. Participants averaged 19.9 years of age ( $SD = 3.02$ ) and were primarily of European descent (88.0%). Our sample is comparable with other undergraduate samples (e.g., Mushquash & Sherry, 2013).

### *2.2. Measures*

#### *2.2.1. Perfectionistic concerns*

Perfectionistic concerns were measured as a latent variable using the following indicators: the 5-item short form of Hewitt and Flett's (1991) Multidimensional Perfectionism Scale's socially prescribed perfectionism subscale (FMPS-SPP; e.g., "My family expects me to be perfect"), the 5-item short form of Frost, Marten, Lahart, and Rosenblate's (1990)

Multidimensional Perfectionism Scale's concern over mistakes subscale (FMPS-COM; e.g., "The fewer mistakes I make, the more people will like me"), and the 4-item short form of the FMPS doubts about actions subscale (FMPS-DAA; e.g., "I have doubts about the simple everyday things I do"). Participants responded to HFMPs-SPP using a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Participants responded to the FMPS-COM and FMPS-DAA using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Research supports the internal consistency and validity of these subscales in undergraduate samples (Sherry et al., 2013). Alpha's showed good reliabilities in the present study (i.e., .82-.91; see Supplementary Table 1).

### 2.2.2. Binge eating

Binge eating was measured as a latent variable using the following indicators: Thelen, Farmer, Wonderlich, and Smith's (1991) 9-item Bulimia Test-Revised (BULIT-R) binge eating subscale (e.g., "I ate a lot of food when I wasn't even hungry"), Garner, Olmstead, and Polivy's (1983) 4-item Eating Disorder Inventory Bulimia Scale (EDIB; e.g., "I stuffed myself with food"), and Stice, Telch, and Rizvi's (2000) 7-item Eating Disorder Diagnostic Scale (EDDS) binge eating subscale (e.g., "There were times when I ate much more rapidly than normal"). Participants responded to the BULIT-R using a 5-point scale from 1 (*no symptoms*) to 5 (*severe symptoms*). Participants responded to the EDIB and the EDDS using a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Research supports the reliability and factorial validity of these subscales (Sherry & Hall, 2009). Alpha's indicated good reliabilities in our study (.84-.92; see Supplementary Table 1).

### 2.3. Procedure



Participants were recruited using the participant subject pool. Participants first came to the lab and completed measures of perfectionistic concerns and binge eating. Next, participants returned to the lab at three subsequent time points and completed identical measures. On average, 7.0 days elapsed between each measurement occasion. Participants were compensated \$10 and three credit points towards a psychology course following Wave 4. Of the 200 participants that completed Wave 1, 99.0% completed Wave 2, 94.5% completed Wave 3, and 95.5% completed Wave 4.

#### 2.4. Data analytic strategy

Confirmatory factor analysis and structural equation modeling were conducted using AMOS 7.0. All analyses employed maximum likelihood estimation. As well, for all models, residuals for the same indicator measured at different times were allowed to correlate across the four measurement occasions (Little, 2013). Following Cheung and Rensvold (2002), CFI was used for nested-model comparisons; these authors found CFI differences ( $\Delta$ CFI) of less than .01 provided strong support that two nested-models do not differ significantly. In addition, the following approximate fit indices were used for model evaluation: the comparative fit index (CFI), the incremental fit index (IFI), and the root-mean-square error of approximation (RMSEA). CFI and IFI values in the range of .95 or above suggest good model fit and values between .90 and .95 suggest acceptable model fit (Hu & Bentler, 1998). The RMSEA is an indicator of the level of misfit per degrees of freedom, with values of .08 or below being acceptable and values of .05 or less indicating good model fit (Little, 2013).

Prior to structural equation modeling, we used a confirmatory factor analysis framework to test whether perfectionistic concerns' and binge eating's indicators were factorially invariant across measurement occasions. Specifically, we first evaluated a configural model, with no

constraints placed on any parameters. Next, we examined factorial invariance by making each corresponding factor loading mathematically equivalent and using  $\Delta\text{CFI}$  to determine whether this resulted in a significant decrement in fit.

A structural equation modeling framework was then used to evaluate latent construct relations, as well as the stability of perfectionistic concerns and binge eating across time. Specifically, we compared the fit of two models, again using  $\Delta\text{CFI}$ , to determine whether variation exists in auto-regressive paths and cross-lagged paths across measurement occasions (excluding Time 1). First, we evaluated the fit of the baseline structural model with freely estimated autoregressive paths and cross-lagged paths for latent parameters across time. Subsequently, we evaluated latent construct relations by constraining corresponding auto-regressive paths and cross-lagged paths to equality (Little, 2013).

### **3. Results**

#### *3.1. Missing data*

Missing data rates were low (2.88%). Little's (1988) MCAR test revealed data were missing completely at random ( $\chi^2(122) = 132.89, p > .05$ ). Participants who dropped out were not significantly different ( $p > .05$ ) on any of the study variables from participants who completed all four waves. Thus, missing data were dealt with using full information maximum likelihood estimation.

#### *3.2. Descriptive statistics and bivariate correlations*

Means, standard deviations, and alpha reliabilities are presented in supplementary Table 1; bivariate correlations are presented in supplementary Table 2. Means were within one standard deviation of those from prior studies using undergraduates (e.g., Sherry et al., 2013; Sherry & Hall, 2009), suggesting our means are comparable to earlier research. Perfectionistic concerns'

and binge eating's manifest indicators were significantly correlated with each other across waves, with one exception—socially prescribed perfectionism at Wave 1 did not significantly correlate with the BULIT-R or the EDDS at Time 1, or the EDDS at Wave 3 (see supplementary Table 2). Nonetheless, overall the correlations suggest value in testing our model. Test-retest correlations were strong, ranging from .66 to .91 for perfectionistic concerns indicators and from .72 to .81 for binge eating indicators.

### 3.3. Factorial invariance

The configural model showed good fit:  $\chi^2(188) = 272.64, p < .001, RMSEA = .048$  (90% CI [.04, .06]), CFI = .987, and IFI = .987. Thus, the relation between each indicator and its latent construct had equivalent patterns of fixed and free loadings across the four time points. Additionally, constraining corresponding factor loadings to be equal across measurement occasions did not lead to a significant decrement in fit:  $\Delta CFI = .007$ . Accordingly, this increased confidence that the same constructs were being measured across time. For subsequent analyses, we used the factorially-invariant model as it provided comparable fit and a more parsimonious solution.

### 3.4. Latent construct relations

We evaluated latent construct relations using structural equation modeling. The fit of the baseline structural model (see Figure 1) with freely-estimated autoregressive and cross-lagged paths was acceptable to good:  $\chi^2(212) = 371.24, p < .001, RMSEA = .061$  (90% CI [.05, .07]), CFI = .975, and IFI = .975. Constraining similar autoregressive paths and similar cross-lagged paths to equality across the four waves did not result in a significant decrement in fit:  $\Delta CFI = .000$ . Thus results suggest that equality constraints were empirically justified, and that predictive relations (autoregressive and cross-lagged) between each consecutive time point were

statistically equivalent. Results also revealed autoregressive paths for perfectionistic concerns and binge eating were significant and strongly stable for perfectionistic concerns, and moderately-to-strongly stable for binge eating (see Figure 1). Moreover, as anticipated, perfectionistic concerns predicted significant increases in binge eating. However, binge eating did not predict significant change in perfectionistic concerns (see Figure 1).

#### *4. Discussion*

Binge eating is a cyclical, recurrent, and self-perpetuating behavior that negatively impacts health, well-being, and functioning (Keel et al., 2007; Rush et al., 2009). To break this cycle, it is crucial that we understand binge eating's antecedents. Sherry and Hall's (2009) perfectionism model of binge eating (PMOBE) purports to bring us closer to this goal. In particular, the PMOBE asserts perfectionistic concerns place people at risk for increased binge eating. And, in line with the PMOBE, research indicates perfectionistic concerns and binge eating correlate positively (e.g., Mushquash & Sherry, 2013). However, questions abound regarding directionality. For instance, are perfectionistic concerns an antecedent of binge eating or a consequence of binge eating? Alternatively, might perfectionistic concerns and binge eating represent a vicious bidirectional cycle, such that perfectionistic concerns predict increased binge eating, which in turn predict increased perfectionistic concerns? We attempted to answer these important questions using a four-week, four-wave cross-lagged design.

Consistent with conceptualizations of perfectionistic concerns as a stable trait (Mushquash & Sherry, 2013), findings indicated perfectionistic concerns' autoregressive paths were significant and highly stable. Additionally, in line with research suggesting binge eating is persistent (Mushquash & Sherry, 2013), binge eating's autoregressive paths were significant and moderately-to-strongly stable. Moreover, as hypothesized, perfectionistic concerns conferred risk

for, but were not complicated by, binge eating. Thus, in accordance with the PMOBE, undergraduate women with high perfectionistic concerns appear to think, feel, and behave in ways that engender binge eating. Indeed, given intense perceived social pressures, female undergraduates with high perfectionistic concerns experience a subjective sense of disappointing others (Sherry & Hall, 2009), which in turn might predispose binge eating as a means of escaping painful self-awareness (Heatherton & Baumeister, 1991).

Nonetheless, we found no evidence supporting complication effects (i.e., binge eating predicting perfectionistic concerns, but not the reverse). Likewise, we found no evidence supporting reciprocal relations (i.e., perfectionistic concerns predicting binge eating and vice versa). However, as the first to investigate the directionality of the perfectionistic concerns-binge eating link, we recommend our null findings be interpreted cautiously.

#### *4.1. Limitations and future directions*

Our study used a mono-source design, which are problematic when studying personality traits, such as perfectionism, that can involve self-presentational bias. Future studies could reduce this potential bias by including informant reports. Additionally, the elapsed time between waves was relatively short and perfectionistic concerns' auto-regressive paths were highly stable. Consequently, there may have been little room for binge eating to influence perfectionistic concerns. Future research might address this by using a longer time lag between waves.

#### *4.3. Concluding remarks*

Our novel, four-week, four-wave cross-lagged study is the first to test the directionality of perfectionistic concerns' relationship with binge eating. In accordance with prior theory (Sherry & Hall, 2009), our findings suggest perfectionistic concerns are a persistent vulnerability for, but not a complication of, binge eating.

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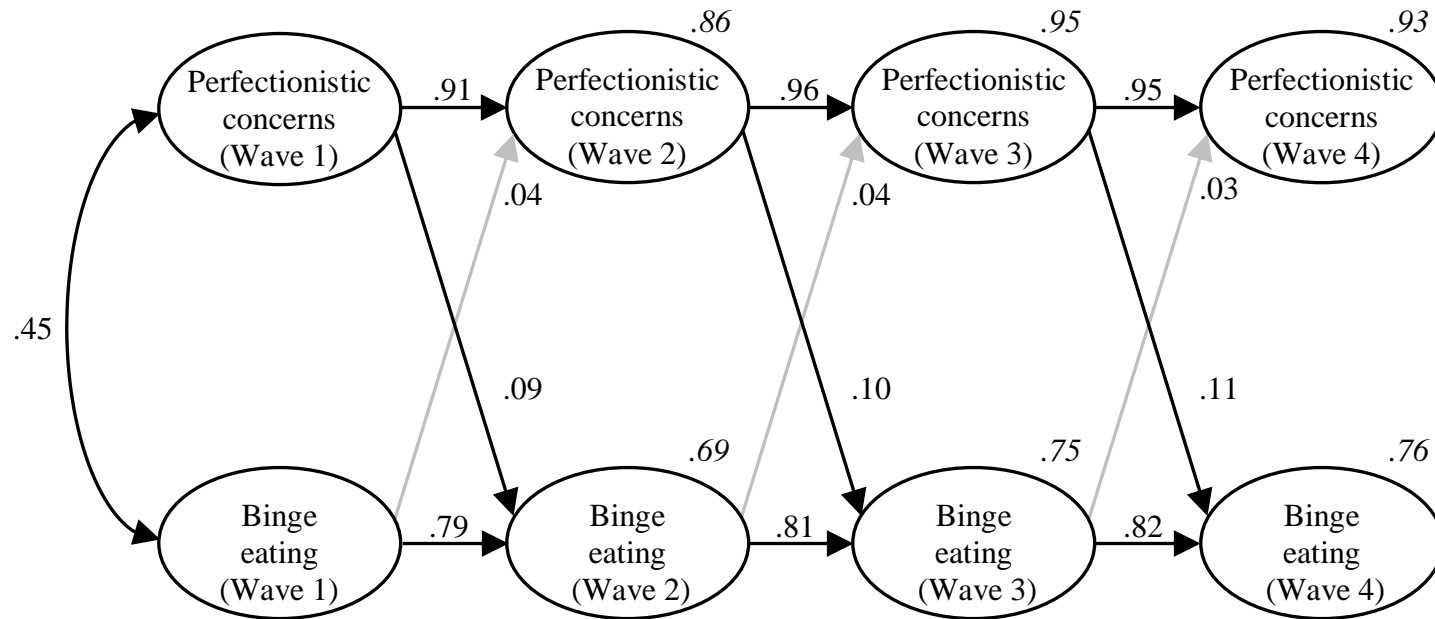
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*Figure 1.* Hypothesized reciprocal relations model showing cross-lagged structural analyses with paths constrained to equality across waves. Ovals represent latent variables. Horizontal arrows represent autoregressive paths; diagonal arrows represent cross-lagged paths. Double-headed black arrows represent significant correlations ( $p < .05$ ); single-headed black arrows represent significant paths ( $p < .05$ ); single headed gray arrows represent non-significant paths ( $p > .05$ ). Path coefficients are standardized. Italicized numbers in the upper right corner of ovals represent the amount of variance explained by associated exogenous variables. Unstandardized path coefficients were constrained to equality; however, standardized path coefficients may still vary slightly. Cross-wave correlated errors were specified a priori. Error terms are not displayed.