Are perfectionistic concerns an antecedent of or a consequence of binge eating, or both? A short-term four-wave longitudinal study of undergraduate women

Martin M. Smith [a,*], Simon B. Sherry [b,c], Chantal M. Gautreau [b], Sherry H. Stewart [c,b], Donald H. Saklofske [a], Aislin R. Mushquash [d]

[a] Department of Psychology, The University of Western Ontario, 1151 Richmond Street, London, Ontario N6A 5C2, Canada
[b] Department of Psychology and Neuroscience, Dalhousie University, 1355 Oxford Street, PO BOX 15000, Halifax, Nova Scotia B3H 4R2, Canada
[c] Department of Psychiatry, Dalhousie University, 5909 Veterans Memorial Lane, Halifax, Nova Scotia B3H 2E2, Canada
[d] Department of Psychology, Lakehead University, 955 Oliver Road, Thunder Bay, Ontario P7B 5E1, Canada

ARTICLE INFO

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. However, the direction of this relationship is seldom studied. Accordingly, it is unclear whether 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 longitudinal design. Consistent with the PMOBE, perfectionistic concerns predicted increased binge eating (vulnerability effect). But, 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.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

Binge eating—rapidly and uncontrollably eating large amounts of food in a short period of time—negatively impacts well-being, health, and functioning (Keel, Baxter, Heatherton, & Joiner, 2007; Rush, Becker, & Curry, 2009). Indeed, binge eating can lead to weight gain, obesity, and related medical conditions such as type 2 diabetes (Bulik, Sullivan, & Kendler, 2002). Binge eating is also associated with smoking and hazardous drinking (Keel et al., 2007; Rush et al., 2009). Moreover, binge eating typically peaks for women during university, with evidence suggesting nearly 32% of undergraduate women binge eat (Keel et al., 2007). Accordingly, researchers and clinicians are increasingly interested in testing explanatory models of binge eating to inform prevention and intervention efforts.

Though there are numerous reasons why undergraduate women binge eat, perfectionism is long theorized to play an important role. For instance, 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. And

several cross-sectional studies indicate perfectionistic concerns and binge eating correlate positively (e.g., Mushquash & Sherry, 2013). However, whether perfectionistic concerns are an antecedent of binge eating, a consequence of binge eating, or both is unclear.

1.1. Perfectionism

Perfectionism refers to a dispositional tendency to strive rigidly 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). Evidence suggests the majority of common variance among lower-order perfectionism dimensions are accounted for by two higher-order factors: perfectionistic strivings and perfectionistic concerns (Stoeber & Otto, 2006). Perfectionistic strivings comprise a family of traits involving the tendency to demand perfection of oneself (self-oriented perfectionism; Hewitt & Flett, 1991) and the tendency to hold unrealistically high personal expectations (personal standards; Frost et al., 1990). Perfectionistic concerns comprise a family 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 (e.g., 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 caloric intake). Put differently, in the PMOBE, perfectionistic concerns are seen as conferring vulnerability for binge eating. Consistent with this model, Boone, Soenens, Vansteenkiste, and Braet (2012) found experimentally inducing perfectionistic concerns caused undergraduates to have higher levels of binge eating. Likewise, in a daily diary study, Short, Mushquash, and Sherry (2013) found doubts about actions, a core component of perfectionistic concerns, predicted increased binge eating in undergraduates. Thus, findings are generally consistent with the PMOBE. Even so, longitudinal investigations directly testing whether perfectionistic concerns confer vulnerability for binge eating are scarce.

Heatherton and Baumeister's (1991) escape theory also implicates perfectionism in binge eating. According to this model, binge eating provides temporary relief from aversive self-awareness by shifting attention away from higher level abstract thinking to the immediate environment. Following a binge, upon return of self-awareness, emotional distress and intense self-criticism increases. It is thus plausible that, contrary to the PMOBE, binge eating may increase perfectionistic concerns. In other words, perfectionistic concerns may represent a complication of binge eating. Consider also that binge eating is tied to weight gain (Bulik et al., 2002), which could augment a subjective sense of falling short of others' body image ideals, thereby amplifying perfectionistic concerns. Alternatively, undergraduate women prone to binge eating typically resist future binges and experience intense guilt and self-rebuke following a binge, which may also foster perfectionistic concerns. However, such complication effects, with binge eating predicting perfectionistic concerns (but not the reverse) have not been tested.

Focusing exclusively on unidirectional relationships also negates the possibility that perfectionistic concerns and binge eating may involve a vicious, bidirectional cycle. And no study has explored possible reciprocal relations between perfectionistic concerns and binge eating. As such, it is currently unclear if perfectionistic concerns are an antecedent of binge eating (perfectionistic concerns predicting increases in binge eating), a consequence of binge eating (binge eating predicting increases in

perfectionistic concerns), or both (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 testing the model shown in Fig. 1. We tested this model in 200 undergraduate women using a 4-week, 4-wave cross-lagged longitudinal design. We measured perfectionistic concerns and binge eating as latent variables given that latent variables provide more accurate estimates that are less influenced by the idiosyncratic properties of individual scales (Little, 2013). Additionally, in line with Sherry and Hall (2009), we operationalized binge eating as distinct from negative affect. This is important as perfectionistic concerns and negative affect overlap moderately (Stoeber & Otto, 2006).

Based on past work (Mushquash & Sherry, 2013), we expected auto-regressive (adjacent) paths for perfectionistic concerns, capturing inter-individual stability, to show the highest temporal stability. And we expected auto-regressive paths for binge eating to show relatively lower temporal stability compared to perfectionistic concerns. Building on theory (Sherry & Hall, 2009) and evidence (Boone et al., 2012), we also hypothesized perfectionistic concerns would predict increased binge eating over time. And we tested if binge eating predicted increased perfectionistic concerns over time; we considered this test exploratory as our study is the first to investigate this potential complication effect.

2. Method

2.1. Participants

A sample of 200 undergraduate women was recruited from Dalhousie University's Department of Psychology participant pool. Participants averaged 19.9 years of age ($SD = 3.0$) and were primarily of European descent (88.0%).

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 (HFMPS-SPP; e.g., "My family expects me to be perfect"),
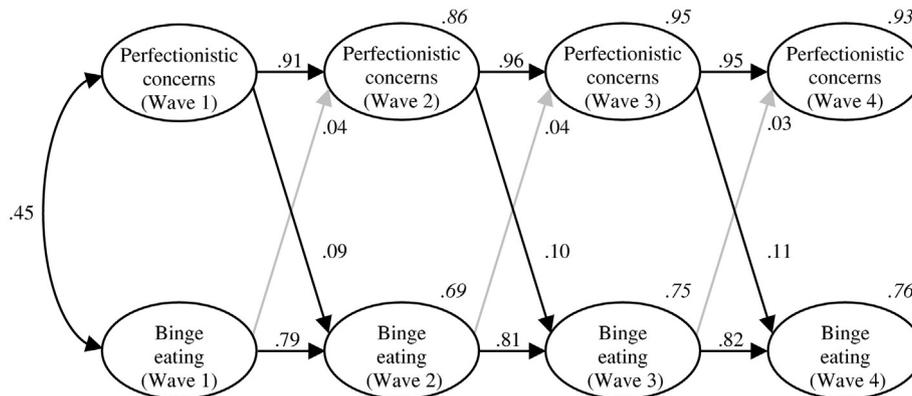
Fig. 1. Hypothesized model showing cross-lagged structural analyses with paths constrained to equality across waves. Ovals represent latent variables. Horizontal arrows represent autoregressive paths; diagonal arrows represent cross-lagged paths. Double-headed black arrows represent significant correlations ($p < .05$); 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.

the 5-item short form of Frost et al.'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 from 1 (strongly disagree) to 7 (strongly agree). Participants responded to the FMPS-COM and FMPS-DAA using a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). Research supports the reliability and validity of these subscales in undergraduates (Sherry et al., 2013). Alpha's showed good reliabilities in our study (.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 validity of these subscales (Sherry & Hall, 2009). Alpha's indicated good reliabilities in our study (.84–.92; see Supplementary Table 1).

2.3. Procedure

Dalhousie's research ethics board approved our 4-week, 4-wave longitudinal study. Participants completed identical questionnaires in the lab across all waves. At wave 1, participants were informed that they were taking part in a study on personality and health, and provided consent. At Wave 4, participants were debriefed and compensated $10 and three credit points towards a psychology course. On average, 7.1 (SD = 0.4) days elapsed between each measurement occasion. We excluded reports provided 2 days before or 2 days after the scheduled assessment. 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 in AMOS 7.0. All analyses employed maximum likelihood estimation. As well, for all models, unexplained variance for the same measures assessed at different waves were correlated (Little, 2013). The following 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 above .95 indicate good model fit and CFI and IFI values between .90 and .95 suggest acceptable model fit (Hu & Bentler, 1998). For the RMSEA, values of .08 or below are acceptable and values of .05 or less suggest good fit (Little, 2013). Following Cheung and Rensvold (2002), CFI was used for model comparisons; these authors found a CFI difference (i.e., ΔCFI) of less than .01 provided strong support that two models do not differ significantly.

We used confirmatory factor analysis to test if perfectionistic concerns' and binge eating's facets were equivalent across waves. We first evaluated the fit of a model, with no constraints placed on any parameters (i.e., a configural model). Next, we examined factorial invariance by making each corresponding factor loading equivalent and using ΔCFI to determine if this led to a significant loss of fit. Structural equation modeling was then used to evaluate relations between perfectionistic concerns and binge eating, as well as assess the temporal stability of

perfectionistic concerns and binge eating. Specifically, we compared the fit of two models, again using ΔCFI, to determine if variation exists in adjacent (autoregressive) paths and non-adjacent (cross-lagged) paths across waves (excluding Wave 1). First, we evaluated the fit of the baseline structural model with freely estimated autoregressive paths and cross-lagged paths. Then we tested latent construct relations by constraining corresponding auto-regressive paths and corresponding cross-lagged paths to equality (Little, 2013).

3. Results

3.1. Missing data

Only 2.9% of data points were missing. 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 different ($p > .05$) on any study variables from participants who completed all four waves. 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. Test-retest correlations were strong, ranging from .66 to .91 for perfectionistic concerns' facets (HFMPS-SPP, FMPS-COM, FMPS-DAA) and from .72 to .81 for binge eating's facets (BULIT-R, EDIB, EDDS). Perfectionistic concerns' and binge eating's facets were also related across waves with one exception—socially prescribed perfectionisms' (HFMPS-SPP) relationship with the BUILT-R at Wave 1, socially prescribed perfectionisms' (HFMPS-SPP) relationship with the EDDS at Wave 1, and socially prescribed perfectionisms' (HFMPS-SPP) relationship with the EDDS at Wave 3, were non-significant (i.e., within the limits of being a random occurrence).

3.3. Factorial invariance

Our 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 measure and its latent construct had equivalent patterns of fixed and free loadings across waves. Moreover, constraining corresponding factor loadings to be equal across waves did not lead to a significant loss of fit: ΔCFI = .007. This suggests the same constructs were being measured across time. Hence, for subsequent analyses, we used the factorially-invariant model as it provided comparable fit and a more parsimonious solution.

3.4. Latent construct relations

The fit of our baseline model (see Fig. 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 corresponding autoregressive paths and corresponding cross-lagged paths to equality did not result in a significant loss of fit: ΔCFI = .000. Thus, results suggest that equality constraints were justified, and that predictive relations (autoregressive and cross-lagged) between each consecutive time point were statistically equivalent. Results also revealed autoregressive paths were significant and strongly stable for perfectionistic concerns across waves, and moderately-to-strongly stable for binge eating across waves. Moreover, as anticipated, perfectionistic concerns predicted increases in binge eating, but binge eating did not predict changes in perfectionistic concerns (see Fig. 1).

4. Discussion

Binge eating is a recurrent behavior that negatively impacts health, well-being, and functioning (Keel et al., 2007; Rush et al., 2009). To break this cycle, it is crucial to understand binge eating's antecedents. Sherry and Hall's (2009) 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 addressed these important questions using a four-week, four-wave cross-lagged longitudinal design.

As anticipated, and consistent with views of perfectionistic concerns as a stable trait (e.g., Mushquash & Sherry, 2013), findings indicated perfectionistic concerns were highly stable across time. And in line with research suggesting binge eating is persistent (Sherry & Hall, 2009), binge eating was moderately-to-strongly stable across time. Moreover, as hypothesized, perfectionistic concerns conferred risk for, but were not complicated by, binge eating. Thus, in accordance with the PMOBE, undergraduate women high in perfectionistic concerns appear to think, feel, relate, and behave in ways that engender binge eating. Indeed, given intense perceived social pressures, undergraduate women who are high in perfectionistic concerns may experience a subjective sense of disappointing others (Sherry & Hall, 2009), which in turn predisposes binge eating as a means of escaping painful self-awareness (Heatherton & Baumeister, 1991).

However, we found no evidence supporting complication effects wherein binge eating predicts perfectionistic concerns. Likewise, we found no evidence supporting reciprocal relations wherein perfectionistic concerns predict binge eating and vice versa. On the one hand, the elapsed time between waves was relatively short, and perfectionistic concerns' auto-regressive paths were highly stable. As such, this may have left little room for binge eating to influence perfectionistic concerns. Alternatively, perfectionistic concerns may be a cause of, rather than a consequence of, or a complication of, binge eating. Nonetheless, as the first study to test 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 is problematic when studying constructs, such as perfectionism and binge eating, that can involve self-presentational bias. Future studies could reduce this potential bias by including informant reports. Additionally, future research might use a longer time lag between waves. As well, future research might consider attempting to replicate our findings using alternative measures of perfectionism (e.g., the Big Three Perfectionism Scale; Smith, Saklofske, Stoeber, & Sherry, 2016).

4.2. Concluding remarks

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

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.eatbeh.2017.01.001.

References

Boone, L., Soenens, B., Vansteenkiste, M., & Braet, C. (2012). Is there a perfectionist in each of us? An experimental study on perfectionism and eating disorder symptoms. *Appetite, 59*, 531–540.

Bulik, C. M., Sullivan, P. F., & Kendler, K. S. (2002). Medical and psychiatric morbidity in obese women with and without binge eating. *International Journal of Eating Disorders, 32*, 72–78.

Cheung, G., & Rensvold, R. (2002). Evaluating goodness-of-fit indices for testing measurement invariance. *Structural Equation Modeling, 9*, 233–255.

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449–468.

Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). The development and validation of a multidimensional eating disorder inventory for anorexia and bulimia. *International Journal of Eating Disorders, 1*, 15–34.

Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin, 110*, 86–108.

Hewitt, P., & Flett, G. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*, 456–470.

Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling. *Psychological Methods, 3*, 424–453.

Keel, P. K., Baxter, M. G., Heatherton, T. F., & Joiner, T. E., Jr. (2007). A 20-year longitudinal study of body weight, dieting, and eating disorder symptoms. *Journal of Abnormal Psychology, 116*, 422–432.

Little, R. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*, 1198–1202.

Little, T. D. (2013). *Longitudinal structural equation modeling.* New York, NY: Guilford.

Mushquash, A. R., & Sherry, S. B. (2013). Testing the perfectionism model of binge eating in mother-daughter dyads: A mixed longitudinal and daily diary study. *Eating Behaviors, 14*, 171–179.

Rush, C. C., Becker, S. J., & Curry, J. F. (2009). Personality factors and styles among college students who binge eat and drink. *Psychology of Addictive Behaviors, 23*, 140–145.

Sherry, S. B., & Hall, P. A. (2009). The perfectionism model of binge eating: Tests of an integrative model. *Journal of Personality and Social Psychology, 96*, 690–709.

Sherry, S. B., Nealis, L., Macneil, M., Stewart, S. H., Sherry, D. L., & Smith, M. (2013). Informant reports add incrementally to the understanding of the perfectionism–depression connection: Evidence from a prospective longitudinal study. *Personality and Individual Differences, 54*, 957–960.

Short, M. M., Mushquash, A. R., & Sherry, S. B. (2013). Perseveration moderates the relationship between perfectionism and binge eating: A multi-method daily diary study. *Eating Behaviors, 14*, 394–396.

Smith, M. M., Saklofske, D. H., Stoeber, J., & Sherry, S. B. (2016). The big three perfectionism scale: A new measure of perfectionism. *Journal of Psychoeducational Assessment, 34*, 670–687.

Stice, E., Telch, C. F., & Rizvi, S. L. (2000). Development and validation of the Eating Disorder Diagnostic Scale: A brief self-report measure of anorexia, bulimia, and binge-eating disorder. *Psychological Assessment, 12*, 123–131.

Stoeber, J., & Otto, K. (2006). Positive conceptions of perfectionism: Approaches, evidence, challenges. *Personality and Social Psychology Review, 10*, 295–319.

Thelen, M. H., Farmer, J. W., Wonderlich, B., & Smith, M. (1991). A revision of the Bulimia Test: The BULIT-R. *Psychological Assessment, 3*, 119–124.