Perfectionistic strivings and perfectionistic concerns interact to predict negative emotionality: Support for the tripartite model of perfectionism in Canadian and Chinese university students ☆

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ABSTRACT

For most individuals, perfectionistic strivings and perfectionistic concerns coexist to varying degrees. While there is agreement that within-person combinations of perfectionistic strivings and perfectionistic concerns produce meaningful "subtypes", the number and characterization of these within-person combinations is still debated. The two most prominent person-centered perfectionism models (the tripartite model and the 2×2 model) offer differing characterizations of how perfectionistic strivings effects perfectionistic concerns' relationship with psychological outcomes. According to the 2×2 model, perfectionistic strivings buffers against the negative effects of perfectionistic concerns. The 2×2 model thus claims the most deleterious within-person combination of perfectionistic strivings and perfectionistic concerns is low strivings and high concerns. In contrast, according to the tripartite model, perfectionistic strivings exacerbates the maladaptive effects of perfectionistic concerns. The tripartite model thus claims the most maladaptive within-person combination of perfectionistic strivings and perfectionistic concerns is high strivings and high concerns. The present study tested these competing claims in a group of English speaking Canadians and a group of Mandarin speaking Chinese. Results support the tripartite model of perfectionism.

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1. Introduction

Perfectionism refers to a propensity to set high standards, strive for flawlessness, and experience dissatisfaction with anything falling short of perfection (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991; Stoeber & Otto, 2006). There is a general consensus that perfectionism is best understood as a multidimensional personality trait (Hewitt, Flett, Besser, Sherry, & McGee, 2003) comprised of two higher-order factors (Dunkley, Zuroff, & Blankstein, 2003; Smith, Saklofske, & Nordstokke, 2013; Stoeber & Otto, 2006): perfectionistic strivings (ceaselessly and rigidly demanding perfection of the self) and perfectionistic concerns (nagging self-doubts, excessive concerns over others expectations, and overly negative reactions to perceived failures). There is also a general consensus that perfectionistic strivings and perfectionistic

concerns produce meaningful within-person "subtypes[1]" of perfectionism (Gaudreau & Thompson, 2010; Stoeber & Otto, 2006). However, the number and characterization of these within-person combinations of perfectionistic strivings and concerns is still debated with the two most prominent person-centered perfectionism models, the tripartite model of perfectionism (Rice & Ashby, 2007; Stoeber, 2012; Stoeber & Otto, 2006) and the 2×2 model of perfectionism (Gaudreau, 2013; Gaudreau & Thompson, 2010), offering differing models of how perfectionistic strivings effects the association between perfectionistic concerns and psychological outcomes.

1.1. Overview of the 2×2 and tripartite model of perfectionism

The 2×2 model of perfectionism (Gaudreau & Thompson, 2010) claims the interaction between perfectionistic strivings

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[1] We concur with Stoeber (2012) that the 2×2 model's use of "subtypes" is conceptually inappropriate and promotes improper statistical analysis. Thus, for the remainder of our article, we will use "within-person combinations" in place of "subtypes".

and perfectionistic concerns differentiates four dispositional within-person combinations of perfectionism: (a) non-perfectionism (low perfectionistic strivings and low perfectionistic concerns), (b) pure personal standards perfectionism (high perfectionistic strivings and low perfectionistic concerns), (c) pure evaluative concerns perfectionism (low perfectionistic strivings and high perfectionistic concerns), and (d) mixed profile perfectionism (high perfectionistic strivings and high perfectionistic concerns). As Stoeber (2012) notes, the cornerstone of the 2 × 2 model is its assertion that mixed profile perfectionism is related to 'better' outcomes than pure evaluative concerns perfectionism.

In contrast, the tripartite model of perfectionism (Rice & Ashby, 2007; Stoeber & Otto, 2006) claims the interaction between perfectionistic strivings and perfectionistic concerns differentiates three dispositional within-person combinations of perfectionism: (a) healthy perfectionism (high perfectionistic strivings and low perfectionistic concerns), (b) unhealthy perfectionism (high perfectionistic strivings and high perfectionistic concerns), and (c) non-perfectionism (low perfectionistic strivings). According to this model, perfectionistic strivings are only adaptive in the presence of low perfectionistic concerns. In the presence of high perfectionistic concerns, perfectionistic strivings are maladaptive. That is, the tripartite model contends that maladaptive perfectionism is related to worse outcomes than non-perfectionism (Stoeber, 2012).

1.2. The 2 × 2 and tripartite model of perfectionism: convergence and divergence

The two most prominent person-centered models of perfectionism overlap considerably. The 2 × 2 models "pure personal standards perfectionism" coincides with the tripartite models "healthy perfectionism" (Stoeber, 2012). Both "pure personal standards perfectionism" and "healthy perfectionism" refer to a combination of high perfectionistic strivings and low perfectionistic concerns. In addition, both the 2 × 2 model and the tripartite model view high perfectionistic strivings and low perfectionistic concerns as the most "adaptive" within-person combination of perfectionistic strivings and concerns (Gaudreau & Thompson, 2010; Stoeber & Otto, 2006).

Despite this overlap, there are fundamental differences between the 2 × 2 model and the tripartite model in how combinations of high and low perfectionistic concerns in the presence of low perfectionistic strivings are characterized. The tripartite model does not differentiate the combination of high perfectionistic concerns with low perfectionistic strivings from the combination of low perfectionistic concerns with low perfectionistic strivings. The tripartite model considers both combinations as indicative of "non-perfectionism". In contrast, the 2 × 2 model regards the combination of low perfectionistic strivings with high perfectionistic concerns as "pure evaluative concerns perfectionism" and the combination of low perfectionistic strivings with low perfectionistic concerns as "non-perfectionism". This differentiation is key to the distinction between the 2 × 2 and the tripartite models of perfectionism.

According to the 2 × 2 model, low perfectionistic strivings with high perfectionistic concerns is the most maladaptive within-person combination of perfectionistic strivings and concerns (Douilliez & Lefevre, 2011). In contrast, the tripartite model characterizes high perfectionistic strivings and high perfectionistic concerns as the most maladaptive within-person combination of perfectionistic strivings and concerns. As noted by Stoeber (2012), the fundamental difference between the 2 × 2 model and the tripartite model stems from how perfectionistic strivings are characterized as influencing the relationship between perfectionistic concerns and psychological outcomes. Specifically, the 2 × 2

model conceptualizes perfectionistic strivings as a buffer against the maladaptive effects of perfectionistic concerns (Douilliez & Lefevre, 2011). Thus, the 2 × 2 model characterizes the combination of high perfectionistic strivings with high perfectionistic concerns as related to less "maladaptive" outcomes than the combination of low perfectionistic strivings with high perfectionistic concerns. Conversely, the tripartite model conceptualizes perfectionistic strivings as exacerbating the maladaptive effects of perfectionistic concerns (Stoeber & Otto, 2006). Thus, according to the tripartite model, the combination of high perfectionistic strivings with high perfectionistic concerns is associated with greater negative outcomes than the combination of low perfectionistic strivings and high perfectionistic concerns.

1.3. Objectives and hypothesis

The aim of the present research was to test the 2 × 2 and tripartite model of perfectionism through a rigorous investigation of the effect of perfectionistic strivings on the relationship between perfectionistic concerns and a latent measure of negative emotionality (depression, anxiety, and stress) in English speaking Canadian and Mandarin speaking Chinese university students. If evidence is found that perfectionistic strivings buffers against the effect of perfectionistic concerns on negative emotionality in both the Canadian and the Chinese groups, it would provide strong support for the 2 × 2 model of perfectionism. Conversely, if evidence is found that perfectionistic strivings exacerbates the effect of perfectionistic concerns on negative emotionality in both the Canadian and Chinese groups, it would provide strong support for the tripartite model of perfectionism.

Based on past support for the tripartite model (Gilman, Ashby, Sverko, Florell, & Varjas, 2005; Parker, 1997; Rice & Slaney, 2002; Stoeber & Otto, 2006) we hypothesized that, in both the Canadian and the Chinese groups, perfectionistic strivings will moderate the effect of perfectionistic concerns on negative emotionality such that perfectionistic concerns will be more negatively consequential for individuals with high perfectionistic strivings than low perfectionistic strivings.

2. Method

2.1. Participants

1006 Undergraduates (425 Canadian; 581 Chinese) participated. Canadian participants (316 women; 109 men) averaged 18.77 years of age (SD = 4.04) and were recruited from a large university in central Canada. Chinese participants (412 women; 169 men) averaged 20.56 years of age (SD = 1.43) and were recruited form a large university in Beijing, China.

2.2. Measures

Perfectionistic concerns, perfectionistic strivings, and negative emotionality, were measured as latent variables, each with three manifest indicators (see Fig. 1). Scales used in the Chinese sample were translated into Mandarin following the procedure outlined by Hambleton and Lee (2013). Past research supports the reliability and validity of our translated measures (Smith, Saklofske, Yan, & Sherry, 2014).

2.2.1. Perfectionistic concerns
Perfectionistic concerns were measured using three short form subscales developed by Cox, Enns, and Clara (2002) and Hewitt, Habke, Lee-Baggley, Sherry, and Flett (2008): The short form of Hewitt and Flett's (1991) *Multidimensional Perfectionism Scale Socially Prescribed Perfectionism subscale* (HFMPS-SPP), the short
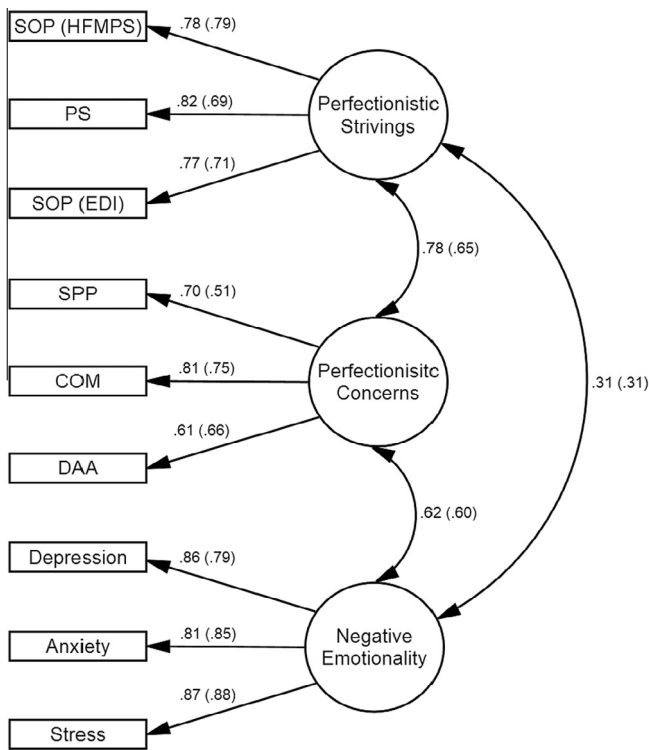
Fig. 1. Measurement model. Ovals represent latent variables. Rectangles represent observed indicators. Factor loadings for Canadian participants are outside parentheses. Factor loadings for Chinese participants are inside parentheses. All estimates are standardized. SOP = self-oriented perfectionism; PS = personal standards; SPP = socially prescribed perfectionism; COM = concern over mistakes; DAA = doubts about actions; HFMPS = Hewitt and Flett's (1991) Multidimensional Perfectionism Scale; EDI = Garner et al.'s (1983) Eating Disorder Inventory.

form of Frost et al.'s (1990) *Multidimensional Perfectionism Scale Concern Over Mistakes subscale* (FMPS-COM), and Frost et al.'s (1990) *Multidimensional Perfectionism Scale Doubts About Actions subscale* (FMPS-DAA). The HFMPS-SPP, FMPS-COM, and FMPS-DAA were selected based on research indicating they measure core interpersonal, cognitive, and behavioral features of perfectionistic concerns (Graham et al., 2010). Research supports the reliability and the validity of these subscales (Graham et al., 2010; Mackinnon & Sherry, 2012).

2.2.2. Perfectionistic strivings

Perfectionistic strivings were measured using three short form subscales developed by Cox et al. (2002) and by Sherry and Hall (2009): The 5-item short form of Hewitt and Flett's (1991) *Multidimensional Perfectionism Scale Self-Oriented Perfectionism subscale* (HFMPS-SOP), the 4-item short form of Frost et al.'s (1990) *Multidimensional Perfectionism Scale Personal Standards subscale* (FMPS-PS), and the 4-item modified form of Garner, Olmstead, and Polivy's (1983) *Eating Disorder Inventory Self-Oriented Perfectionism subscale* (EDI-SOP). Research has supported the use of the HFMPS-SOP, FMPS-PS, and EDI-SOP to measure core interpersonal, cognitive, and behavioral features of perfectionistic strivings (Mackinnon & Sherry, 2012; McGrath et al., 2012) as well as their reliability and the validity (Mackinnon & Sherry, 2012; Sherry, Hewitt, Sherry, Flett, & Graham, 2010).

2.2.3. Negative emotionality

Negative emotionality was measured using the 21-item short form of the *Depression Anxiety Stress Scales* (DASS-21; Lovibond & Lovibond, 1995). Three 7-item subscales measured depression,

anxiety, and stress. Research supports the reliability and the validity of the DASS-21 (Lovibond & Lovibond, 1995).

2.3. Procedure

The Research Ethic's Board at both universities approved this study. Canadian participants were recruited from the Department of Psychology's participant pool. Participants were directed to an online consent form and questionnaires. Following completion of online measures participants were debriefed. As compensation, Canadian participants were awarded one credit to use towards an introductory psychology course.

The established research protocol at a large university in Beijing China was followed. All Chinese participants completed the translated questionnaires following the same procedure described for the Canadian sample, but without any form of credit as this is not standard procedure in Chinese universities.

2.4. Data analysis

Prior to hypothesis testing, a confirmatory factor analysis framework, analyzed in Mplus6.0., tested if factor loadings differed across participants from Canada (completing English versions of measures) and participants from China (completing Mandarin versions of measures). Establishing an adequate pattern of measurement invariance increases confidence that the same construct of perfectionism is being measured in both the Canadian and Chinese groups. The question of whether constraining intercepts to be equal across groups causes a decrement in fit is outside the scope of the present study and thus scalar invariance was not tested.

For all models, full information maximum likelihood estimation was used. A CFI and a TLI in the range of .95 and a RMSEA in the range of .06 suggest excellent model fit (Byrne, 2012). Moderate model fit is suggested by a CFI and a TLI in the range of .90 and a RMSEA in the range of .10 (Byrne, 2001) Comparative fit index difference tests (ΔCFI) were used for invariance testing rather than chi-square difference tests (ΔX^2) which are overly sensitive to trivial fluctuations and differences in the context of invariance testing (Meade, Johnson, & Braddy, 2008). A ΔCFI $\leqslant$.01 suggests no significant difference between nested models (Byrne, 2012; Kline, 2011).

Assuming an adequate pattern of measurement variance is established, latent moderated structural equation modeling will be used to test our hypothesis that perfectionistic strivings exacerbates the effect of perfectionistic concerns on negative emotionality (see Jose, 2013; Klein & Moosbrugger, 2000). Research suggests latent moderated structural equation modeling is preferable to traditional moderation techniques (e.g., multiple regression) due to its ability to identify and partition error variance (Jose, 2013). Simulation studies indicate latent moderated structural equation modeling provides efficient parameter estimators and unbiased standard errors (Klein & Moosbrugger, 2000). When compared to alternative latent variable interaction modeling approaches (e.g., unconstrained product indicator), latent moderated structural equation modeling provided the most efficient estimate of a latent variable interaction with the highest power (Cham, West, Ma, & Aiken, 2012).

The fit of the overall model containing the latent variable interaction will not be assessed as fit indices are not sensitive to latent interaction effects (Klein & Moosbrugger, 2000). Moreover, there is no agreed upon appropriate saturated and null model for latent variable interactions, rendering fit indices for models with latent variable interactions suspect (Hoyle, 2012). Finally, an interaction term is purely a statistical device and thus model fit information following the inclusion of an interaction term is typically of little concern. Following Klein and Moosbrugger's (2000) recommendation, the significance of the interaction between the two continu-

ous latent variables (perfectionistic concerns and perfectionistic strivings) on the continuous latent outcome variable (negative emotionality) will be tested via a z-test (Klein & Moosbrugger, 2000). If the path coefficient corresponding to the interaction term is statistically significant ($p < .05$), it indicates moderation (a linear relation between perfectionistic concerns and negative emotionality which changes uniformly over levels of perfectionistic strivings). Assuming moderation, the model with the interaction term will be compared to the model without the interaction term using R^2 and AIC values. Burnham and Anderson (2002) recommended if the AIC value for the model with the interaction term is 4 or more units lower than the AIC value for the model without the interaction term, it would provide strong evidence that the model with the interaction term is superior.

3. Results

3.1. Descriptive statistics

Full-information maximum likelihood was used for missing data. Less than 5% of data points were missing. Means, standard deviations, alpha reliabilities, and bivariate correlations appear in Table 1. Alpha reliabilities for the Canadian and Chinese groups were very good ($\alpha \geqslant .80$). Bivariate correlations indicated perfectionistic concerns had a strong positive relation with perfectionistic strivings in both Canadian and Chinese groups. In addition, in both Canadian and Chinese groups, perfectionistic concerns had a strong positive relation with negative emotionality, whereas perfectionistic strivings had a weak positive relation with negative emotionality.

3.2. Factorial invariance

Factorial invariance assessed whether factor loadings (see Fig. 1) differed between the Canadian and the Chinese groups (see Smith et al., 2014). When compared to the unconstrained model, constraining invariance across all loadings resulted in a significant reduction in model fit (ΔCFI = .014; see Model 2D in
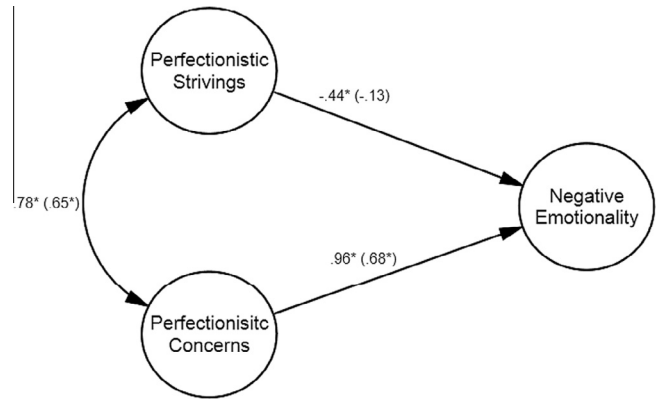

Fig. 2. Main effects model. Ovals represent latent variables. Factor loadings for Canadian participants are outside parentheses. Factor loadings for Chinese participants are inside parentheses. All estimates are standardized. $^*p < .01$.

Table 2). However, subsequent tests indicated all factor loadings, with the exception of the stress subscale, function equivalently across Canadian and Chinese groups.

All standardized factor loadings were substantial and significant ($p < .001$; see Fig. 1). For the Canadian group, factor loadings ranged from .65 to .89; for the Chinese group, factor loadings ranged from .51 to .84. Overall, confirmatory factor analysis suggests the pattern of factorial invariance observed was acceptable.

3.3. Main effects

The fit of the main effects model for the Canadian group (see Fig. 2) was acceptable: X^2 = 171.13, CFI = .923, TLI = .884, RMSEA = .121 (95% CI .104−.138). The fit of the main effects model for the Chinese group (see Fig. 2) was excellent: X^2 = 94.01, CFI = .964, TLI = .946, RMSEA = .072 (95% CI .056−.087).

In the Canadian group, perfectionistic strivings and concerns accounted for 46.4% of the variance in negative emotionality. In the Chinese group, perfectionistic strivings and concerns accounted for 36.9% of the variance in negative emotionality. Much of this variance was due to the independent main effect of perfectionistic concerns on negative emotionality in both the Canadian (standardized β = .96, $p < .001$) and the Chinese (standardized β = .68, $p < .001$) groups. After controlling for shared variance with perfectionistic concerns the contribution of perfectionistic strivings became considerably reduced (relative to bivariate correlations).

In the Canadian group, the main effect of perfectionistic strivings on negative emotionality indicated the presence of a suppression effect (standardized β = −.44, $p < .001$). That is, after removing shared variance with perfectionistic concerns, perfectionistic strivings switched signs and became negatively (as opposed to positively) related to negative emotionality. In the Chinese group,
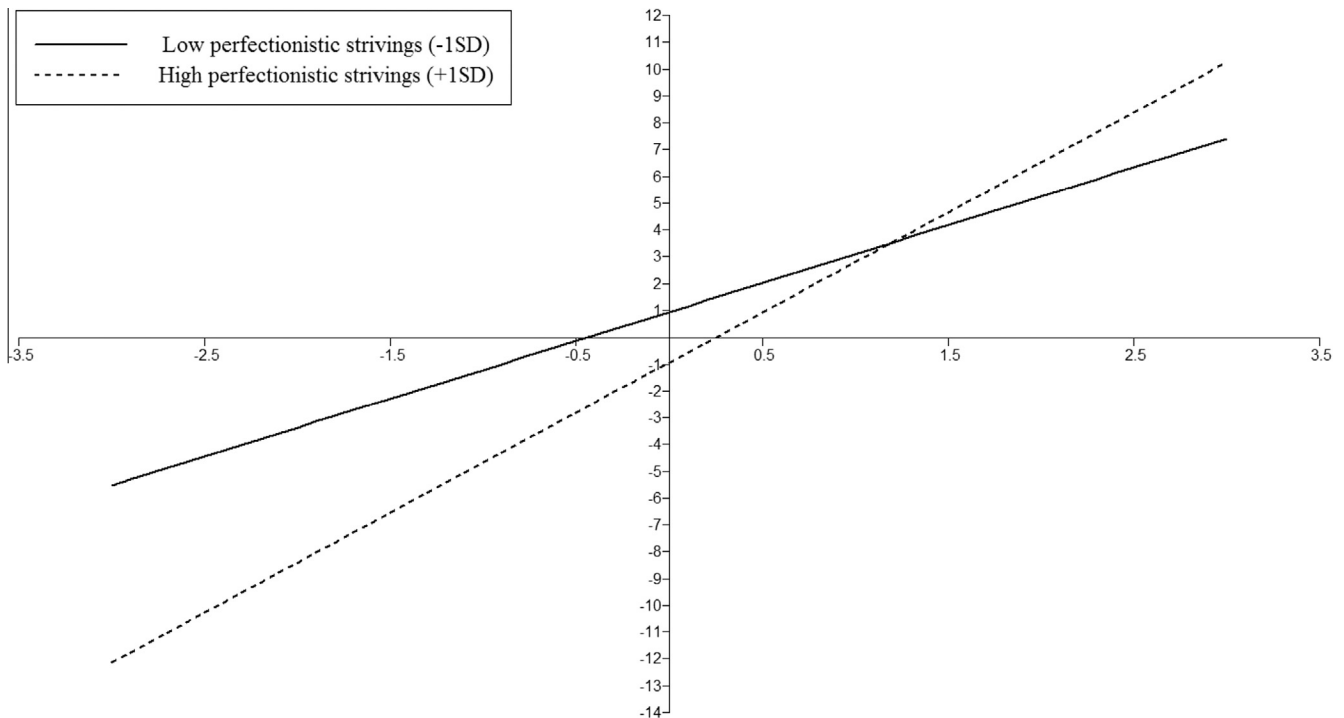
Table 1
Means, standard deviations, alpha reliabilities, and bivariate correlations.

Variable	1	2	3	α	M	SD
1. Perfectionistic strivings	–	.62*	.28*	.91	–	–
2. Perfectionistic concerns	.49*	–	.51*	.89	–	–
3. Negative emotionality	.30*	.44*	–	.93	14.91	10.74
α	.85	.80	.91	–		
M	–	–	12.08		–	
SD	–	–	9.18			–

Note. Statistics for Canadian participants are above the diagonal. Statistics for Chinese participants are below the diagonal. Perfectionistic strivings and perfectionistic concerns have a mean of 0 and standard deviation of 1.
* $p < .01$.

Table 2
Goodness-of-fit statistics for tests of multigroup measurement invariance.

Model	Comparative model	χ^2	df	TLI	CFI	ΔCFI	RMSEA (90% CI)
1. Configural model	–	262.95	48	.914	.943	–	.096 (.085–.108)
2. Measurement model							
Model A: All factor loadings constrained equal across groups	2A versus 1	321.00	54	.905	.929	.014	.101 (.091–.112)
Model B: Factor loadings for only perfectionistic strivings constrained equal	2B versus 1	276.38	50	.913	.940	.003	.097 (.086–.108)
Model C: Model B with factor loading for perfectionistic concerns constrained equal	2C versus 1	283.08	52	.915	.939	.004	.096 (.085–.107)
Model D: Model C with factor loadings for depression and anxiety constrained equal [Selected].	2D versus 1	303.32	53	.910	.934	.009	.099 (.088–.110)

Note: ΔCFI = differences in CFI values between models.

Fig. 3. Canada. The effect of perfectionistic concerns on negative emotionality at one standard deviation above and one standard deviation below the zero mean of perfectionistic strivings plotted over the range -3 SD to $+3$ SD. The metric of perfectionistic strivings and perfectionistic concerns have been set by fixing their variance at 1.

after controlling for shared variance with perfectionistic concerns the effect of perfectionistic strivings on negative emotionality became non-significant (standardized $\beta = -.13$, $p > .05$).

3.4. Latent moderation

Significant moderation was observed in the Canadian group (unstandardized $\beta = .03$, $p < .001$). The model with no interaction term had an AIC value of 20101.92 compared to an AIC value of 20083.64 for the model with the interaction term suggesting the model with the interaction term is preferable to the main effects model (ΔAIC = 18.28). The interaction term accounted for 5.3% of the variance in negative emotionality. To facilitate interpretation of the interaction observed in the Canadian group, the effect of perfectionistic concerns on negative emotionality at one standard deviation (SD) above and one SD below the zero mean of perfectionistic strivings was plotted over the range of -3 SD to $+3$ SD (see Fig. 3).

Significant moderation was also observed in the Chinese group (unstandardized $\beta = .03$, $p = .045$). The model with no interaction term (see Fig. 2) had an AIC value of 24342.70 compared to the AIC value of 24336.91 for the model with the interaction term (see Fig. 3). As in the Canadian group, AIC values indicated the model with the interaction term is preferable to the main effects model (ΔAIC = 5.79; Burnham & Anderson, 2002). The interaction term accounted for 3.2% of the variance in negative emotionality. To facilitate interpretation of the interaction observed in the Chinese group, the effect of perfectionistic concerns on negative emotionality at one SD above and one SD below the zero mean of perfectionistic strivings was plotted over the range of -3 SD to $+3$ SD (see Fig. 4).

4. Discussion

The 2×2 model of perfectionism (Gaudreau & Thompson, 2010) claims perfectionistic strivings interact with perfectionistic

concerns such that perfectionistic concerns are more consequential for individuals with low perfectionistic strivings. In contrast, the tripartite model of perfectionism (Rice & Ashby, 2007; Stoeber & Otto, 2006) claims perfectionistic strivings interact with perfectionistic concerns such that perfectionistic concerns are more consequential for individuals with high perfectionistic strivings. As hypothesized, the tripartite model was supported both in the Canadian and the Chinese groups where perfectionistic strivings exacerbated the effect of perfectionistic concerns on negative emotionality.

Whether perfectionistic strivings is considered "adaptive" (e.g., Gaudreau & Thompson, 2010), "maladaptive" (e.g., Flett & Hewitt, 2006), or "benign" (Bieling, Israeli, Smith, & Antony, 2004) is still debated. The present study advances this debate by suggesting that perfectionistic strivings "adaptiveness" is contingent upon the presence of perfectionistic concerns. In the present study, within-person combinations of high perfectionistic concerns ($+1$ SD) and low perfectionistic strivings (-1 SD) was related to lower negative emotionality, whereas the combination of high perfectionistic concerns and high perfectionistic strivings was related to higher negative emotionality (see Figs. 3 and 4). Consequently, findings support the tripartite models conceptualization of "unhealthy perfectionism" (high perfectionistic strivings and high perfectionistic concerns) as more detrimental than "non-perfectionism" (low perfectionistic strivings).

A strength of the study was the replication of our findings in two groups living in very different countries (Canada or China) and completing measures in different languages (English or Mandarin). The generalizability of our findings across North American and Asian culture increases confidence that the observed interaction does not stem from measurement error. Regardless of culture (Canadian or Chinese) or language (English or Mandarin), perfectionistic strivings are only "adaptive" when perfectionistic concerns are concurrently low. In the presence of high perfectionistic concerns, perfectionistic strivings appear "maladaptive".
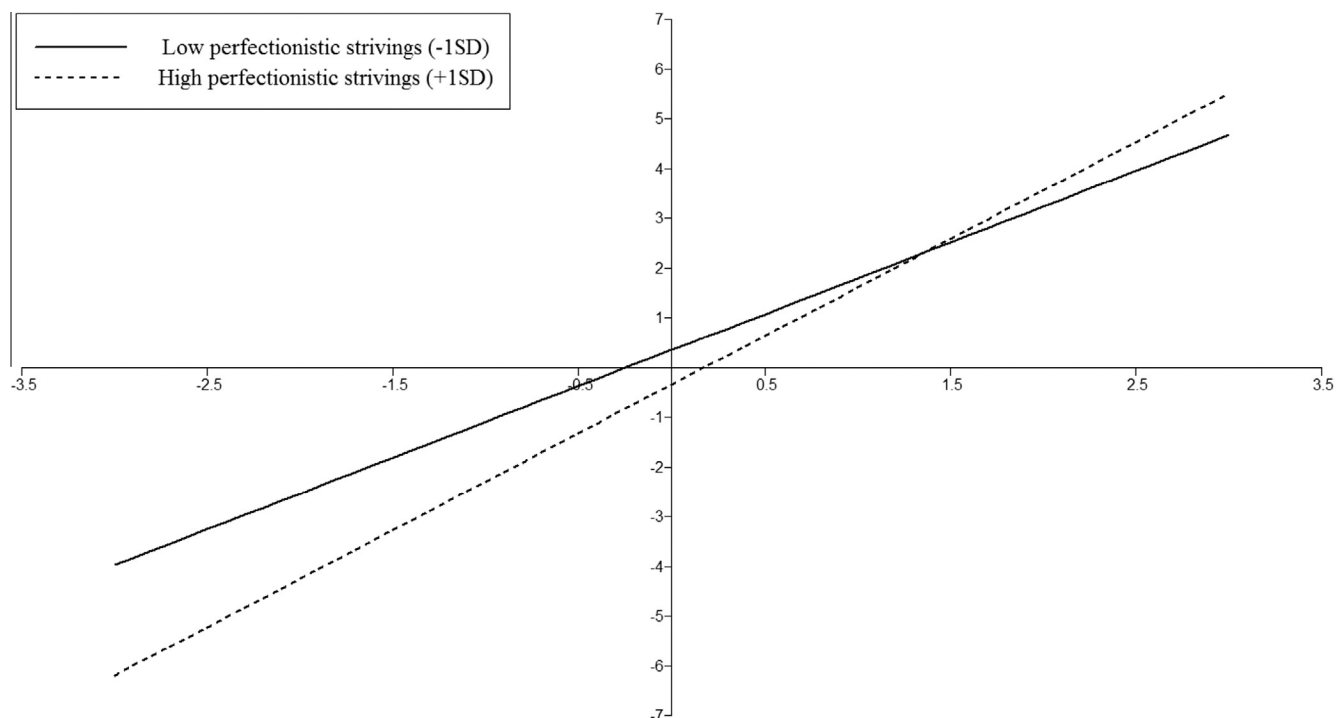
Fig. 4. China. The effect of perfectionistic concerns on negative emotionality at one standard deviation above and one standard deviation below the zero mean of perfectionistic strivings plotted over the range −3 SD to +3 SD. The metric of perfectionistic strivings and perfectionistic concerns have been set by fixing their variance at 1.

4.1. Limitations

This cross-sectional study precludes us from addressing questions of directionality that would require a multi wave longitudinal design. Future research might consider the use of a longitudinal design to determine if the observed interaction between perfectionism dimensions predicts changes in negative emotionality. In addition, future research might consider testing the extent to which findings generalize to other samples based on age, education, and occupation.

4.2. Concluding remarks

Our study provides strong evidence in support of the tripartite model. The combination of high perfectionistic strivings with high perfectionistic concerns (unhealthy perfectionism) was related to higher negative emotionality than the combination of low perfectionistic strivings with high perfectionistic concerns (non-perfectionism). However, perfectionistic strivings exacerbated the maladaptive effects of perfectionistic concerns only when perfectionistic concerns were greater than 1 standard deviation from the mean. When perfectionistic concerns were less than 1 standard deviation from the mean perfectionistic strivings appeared to buffer against the maladaptive effects of perfectionistic concerns, as posit by the 2 × 2 model of perfectionism. The replication of the observed interaction across two groups living in different countries (Canada or China) and speaking different languages (English or Mandarin) increased confidence in the reported findings.

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