

**RESEARCH ARTICLE**

# Psychological need frustration as a transdiagnostic process in associations of self-critical perfectionism with depressive symptoms and eating pathology

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**Abstract**

**Objective** The identification of transdiagnostic risk factors and processes that explain the comorbidity between depressive symptoms and eating disorder symptoms is critical. We examined the mediating role of the frustration of adolescents' psychological needs for autonomy, competence, and relatedness in the association between self-critical perfectionism, depressive symptoms and eating disorder symptoms.

**Method** A cross-sectional study ( $N = 248$ ; 58% female, mean age = 14 years) and a two-wave longitudinal study ( $N = 608$ ; 59% female; mean age = 16 years) were conducted.

**Results** At the level of inter-individual differences and intra-individual change, self-critical perfectionism was a robust predictor of both symptoms. After introducing need frustration as an underlying mechanism, the relation between self-critical perfectionism and the two types of symptoms, as well as the relation between the symptoms themselves, decreased.

**Conclusions** Need frustration represents a transdiagnostic vulnerability process that helps to explain why self-critical perfectionism relates to depressive symptoms and eating disorder symptoms.

**KEYWORDS**

adolescence, depressive symptoms, eating disorder symptoms, self-critical perfectionism, self-determination theory, transdiagnostic model

## 1 | INTRODUCTION

Many studies have demonstrated high levels of comorbidity between depressive symptoms and eating disorder symptoms (ranges from 12% to 84%) in both community (e.g., Lewinshon, Striegel-Moore, & Seeley, 2000; Santos, Richards, & Bleckley, 2007) and clinical samples (e.g., Braun, Sunday, & Halmi, 1994). This high degree of comorbidity between psychiatric disorders has spurred the development of transdiagnostic models. The goal of such models is to identify risk factors and explanatory processes that are relevant across different types of psychopathology and that may serve to explain comorbidity between different types of psychopathology (Mansell, Harvey, Watkins, & Shafran, 2008). The identification of transdiagnostic risk factors and explanatory processes is important because individuals with psychiatric comorbidity have a poorer prognosis, are less responsive to treatment, and have a higher risk of relapse (Newman, Moffitt, Caspi, & Silva, 1998). Furthermore, the development of transdiagnostic models is relevant to clinical practice because it could inform the development of a universal intervention seeking to reduce the co-occurrence of different symptomatology by targeting common risk factors and underlying processes (Nehmy & Wade, 2015).

Although self-critical perfectionism has been proposed as a viable transdiagnostic risk factor (Egan, Wade, & Shafran, 2011), the current study is among the first to formally test this. Moving beyond the question of transdiagnostic vulnerability, we also examined psychological need frustration, as conceived within self-determination theory (SDT, Deci & Ryan, 2008; Vansteenkiste & Ryan, 2013), as a transdiagnostic underlying process (i.e., a mediator which accounts for the relation between self-critical perfectionism and different symptomatology). This transdiagnostic model was tested at both the level of inter-individual differences (i.e., differences between people) and at the level of intra-individual change (i.e., variability within people across time). We aimed to provide a dynamic picture of the role of self-critical perfectionism (i.e., as a risk factor) and need frustration (i.e., as an underlying process) in the co-occurrence of depressive symptoms and eating pathology.

### 1.1 | Self-critical perfectionism as a transdiagnostic risk factor

Research suggests that perfectionism is a potential transdiagnostic vulnerability factor as it increases the risk for different types of psychopathology, including eating disorders and depression (Egan et al., 2011; Shafran & Mansell, 2001). Self-critical perfectionism, in particular, is a robust predictor of several types of psychopathology (Bardone-Cone et al., 2007). Individuals scoring high on self-critical perfectionism engage in harsh self-scrutiny and self-evaluation, easily interpret mistakes as failure (Van der Kaap-Deeder et al., 2016), express doubts about their performance, and are highly concerned with others' evaluation (Blatt, 2004; Frost, Marten, Lahart, & Rosenblate, 1990). Self-critical perfectionism is distinct from "personal standards perfectionism," which refers to the setting of perfectionist standards per se and is considered a less-maladaptive feature of perfectionism (Dunkley, Blankstein, Masheb, & Grilo, 2006).

Several cross-sectional studies in both community and clinical samples found self-critical perfectionism to relate to both eating disorder symptoms and depressive symptoms (Bardone-Cone et al., 2007; Limburg, Watson, Hagger, & Egan, 2017). While personal standards perfectionism is also typically correlated with both types of symptoms (Bardone-Cone et al., 2007; Boone, Soenens, Braet, & Goossens, 2010), self-critical perfectionism has been shown to display more robust associations with these symptoms (Dunkley et al., 2006; Limburg et al., 2017). Longitudinal studies in non-clinical populations showed that self-critical perfectionism predicts increases in symptoms of both eating pathology (Boone, Vansteenkiste, van der Kaap-Deeder, Soenens, & Verstuyl, 2014) and depression (Sherry, Gautreau, Mushquash, Sherry, & Allen, 2014) across time. Further, self-critical perfectionism has been shown to be elevated in clinical patients with eating disorders and depression compared with controls (e.g., Dunkley, Sanislow, Grilo, & McGlashan, 2009; Soenens et al., 2008).

Given this evidence, self-critical perfectionism has been proposed as a possible transdiagnostic risk factor (Egan et al., 2011) as it tends to predispose individuals for a broad variety of (mainly internalizing) psychopathologies. Consistent with the notion of *multifinality* (Nolen-Hoeksema & Watkins, 2011), self-critical perfectionism seems

to be a transdiagnostic risk factor leading to multiple disorders. However, to formally test whether self-critical perfectionism accounts for the co-occurrence between depressive symptoms and eating pathology, research needs to examine whether their association decreases when modeling self-critical perfectionism as their common predictor (Nolen-Hoeksema & Watkins, 2011). To the best of our knowledge, no study has formally tested this.

This study also aimed to take research on the transdiagnostic role of self-critical perfectionism one step further by examining a possible transdiagnostic explanatory (i.e., mediating) process. In doing so, we respond to recent calls to identify intervening processes which help to understand why transdiagnostic factors predict different psychopathologies. Nolen-Hoeksema and Watkins (2011, p. 591) noted that “more work is needed to specify the mechanisms that link more distal transdiagnostic factors to the disorders they predict.” On the basis of SDT (Deci & Ryan, 2000), we forward the possibility that basic psychological need frustration may be a transdiagnostic intervening mechanism.

## 1.2 | Psychological need frustration as a transdiagnostic process

According to SDT (Deci & Ryan, 2000), a macro-theory of motivation and well-being, people have three basic psychological needs that are universally important for one's psychological growth, integrity, and social development: The needs for autonomy, relatedness, and competence. The need for autonomy refers to the need to experience a sense of volition and choice in one's activities. The need for relatedness reflects the need to feel loved and cared for by significant others. The need for competence reflects the need to feel capable of achieving desired goals. While the satisfaction of these needs leads to positive development and psychological growth, the active frustration of these same needs undermines the growth process leaving individuals prone to ill-being and psychopathology. Autonomy frustration involves feeling pressured to think, feel or act a certain way. Relatedness frustration refers to feeling rejected and socially isolated. Competence frustration involves experiencing feelings of failure and inadequacy (Chen et al., 2015).

Theoretically, need frustration is relevant to both depressive symptoms and eating pathology (Ryan, Deci, & Vansteenkiste, 2016). Within SDT, it is argued that need frustration has a direct emotional cost, which can manifest in internalizing distress (e.g., depressive symptoms; Chen et al., 2015; Vansteenkiste & Ryan, 2013). Need frustration is also said to elicit compensatory attempts to restore thwarted needs (Deci & Ryan, 2000; Ryan et al., 2016). Compensatory attempts to cope with need frustration can take various forms, including loss of self-control or engagement in rigid behavioral patterns (Ryan et al., 2016; Vansteenkiste & Ryan, 2013). Within the context of eating pathology, loss of self-control can manifest in binge eating and engagement in rigid behavior can manifest in a relentless striving for thinness (Verstuyf, Patrick, Vansteenkiste, & Teixeira, 2012). Although binge eating and drive for thinness may seem to be two very different types of eating pathology, from an SDT perspective, they may serve a common underlying function (i.e., to cope with need frustration). While binge eating may lead to a temporary alleviation of the distress resulting from need frustration, drive for thinness may provide individuals with a momentary sense of control. However, the advantages of these behaviors are short-lived and may contribute to further need frustration (Verstuyf et al., 2012).

Accordingly, a number of studies have demonstrated relations between need frustration and internalizing problems and disordered eating among adolescents. Mabbe, Soenens, Vansteenkiste, and Van Leeuwen (2016) found that need frustration related to mother-rated internalizing problems. In a sample of older adolescent athletes, Bartholomew, Ntoumanis, Ryan, Bosch, and Thogersen-Ntoumani (2011) found that need frustration related to both depressive symptoms and disordered eating. A longitudinal study (Boone et al., 2014) further showed that need frustration predicted increases in binge eating symptoms in healthy adolescent boys and girls. Finally, a diary study (Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013) found that daily need frustration related to daily fluctuations in binge eating symptoms in adolescent girls, indicating that both processes are intertwined in the day.

Given that need frustration is associated with both depressive symptoms and eating pathology, it may be a transdiagnostic mechanism which helps to explain why self-critical perfectionism relates to both symptomatology. Indeed, there are several theoretical reasons why self-critical perfectionism may engender need frustration. According to Luyten and Blatt (2016), self-critical perfectionism is a broad personality characteristic which yields its effects through mid-level motivational experiences (i.e., basic psychological needs). People high in self-critical perfectionism are typically driven by controlled regulation and hinge their self-esteem on their own achievement (Shafran, Cooper, &

Fairburn, 2002), thereby pressuring themselves, which may lead to autonomy frustration. Competence frustration may result from setting excessively high standards, having a harsh self-critical attitude, and feeling that performance falls short of expectations (Sagar & Stoeber, 2009). Furthermore, because self-critical people often compare their performance with others and have a competitive attitude, they tend to keep people at a distance (Habke & Flynn, 2002), which may lead to relatedness frustration. A longitudinal study (Boone et al., 2014) provided support for this reasoning by showing that increases in self-critical perfectionism across a 6-month period contributed to an increase in need frustration. Because need frustration, in turn, is likely to relate to a variety of psychopathological symptoms, we anticipate that the transdiagnostic role of self-critical perfectionism in depressive symptoms and eating pathology may be accounted for (at least in part) by need frustration.

### 1.3 | The present study

Our first aim was to examine whether self-critical perfectionism would function as a transdiagnostic risk factor accounting (at least partially) for the co-occurrence between depressive and eating disorder symptoms in a non-clinical adolescent sample. We focused on adolescence because the post-pubertal years are a crucial time of vulnerability for the development of clinical symptoms (Mendle, 2014). Demonstrating the role of self-critical perfectionism in comorbidity entails examining whether the initial association between the different types of psychopathology is reduced when modeling self-critical perfectionism as their common predictor (Nolen-Hoeksema & Watkins, 2011). Second, we aimed to examine whether need frustration represents a transdiagnostic explanatory mechanism in this association. We addressed this by examining whether (a) the indirect associations between self-critical perfectionism and the two types of psychopathology (i.e., depressive and eating disorder symptoms) through need frustration are significant and (b) the association between depressive symptoms and eating pathology is reduced further when introducing need frustration as an intervening variable (Nolen-Hoeksema & Watkins, 2011).

In addressing these research questions, we examined the hypothesized associations at the level of inter-individual differences and at the level of intra-individual change. This is important because mediation refers to dynamic processes that change across time (Selig & Preacher, 2009). Particularly in adolescence, personality (Klimstra, 2013), need-based experiences (Van der Kaap-Deeder, Vansteenkiste, Soenens, & Mabbe, 2017), and symptoms of psychopathology (Larson, Moneta, Richards, & Wilson, 2002) are highly susceptible to change. This raises the question of whether need frustration plays a role at (a) the between-person level (i.e., accounting for between-person differences in self-critical perfectionism and symptoms,) and (b) the within-person level (i.e., accounting for associations between intra-individual change in self-criticism and intra-individual change in symptoms). While Study 1 is a cross-sectional study (examining relationships at the between-person level), Study 2 is a two-wave longitudinal study which allows for the examination of the hypothesized associations at the level of intra-individual change using latent change models.

## 2 | STUDY 1

### 2.1 | Method

#### 2.1.1 | Participants and procedure

Participants were 284 Belgian adolescent boys (42%) and girls (58%) with a mean age of 14.1 years ( $SD = .94$ ; age range = 12–16 years). All participants were Caucasian and came from a middle-class background. All participants were enrolled in secondary education with 52% following a general academic track, 17% following a technical track, 4% following a vocational track and 1% following an artistic track (26% of the participants did not fill out their education). Eighty-nine percent of the adolescents came from a two-parent household.

Approval to conduct this study was obtained from the local ethics committee of Ghent University. Adolescents were invited to fill in a questionnaire by bachelor students in psychology. Parents and adolescents were informed about

the study by letter and were both asked to fill out an informed consent form. All participants were made aware that participation was voluntary and that confidentiality was guaranteed.

### 2.1.2 | Measures

#### Body mass index

All participants reported their weight and height. Body mass index (BMI) was calculated as weight (in kg)/height<sup>2</sup> (in m). Because it is advised to correct for age and gender when using BMI for adolescents (Roelants, Hauspie, & Hoppenbrouwers, 2009), we used the adjusted BMI ([actual BMI/percentile 50 of BMI for age and gender] × 100). In our sample, the mean adjusted BMI was 95.95 ( $SD = 13.07$ ). Six percent of participants were overweight (i.e., adjusted BMI ≥ 120%), 78% were normal weight, and 16% were underweight (i.e., adjusted BMI ≤ 85%).

#### Self-critical perfectionism

Self-critical perfectionism was measured using the “Concern over Mistakes” (CM; nine items) and “Doubts about Actions” (DA; four items) subscales of the Frost Multidimensional Perfectionism Scale (F-MPS; Frost et al., 1990). Items were rated on a 5-point Likert scale, varying from 1 (*totally disagree*) to 5 (*totally agree*). We selected this measure because the subscales for CM and DA have been identified as strong indicators of self-critical perfectionism and of intra-individual self-critical perfectionism in particular (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000), and have displayed good validity among adolescents (Soenens, Vansteenkiste, Luyten, Duriez, & Goossens, 2005).

#### Psychological need frustration

Psychological need frustration was assessed using the frustration items from the Basic Psychological Need Satisfaction and Need frustration Scale (BPNSNFS; Chen et al., 2015). The BPNSNFS has shown good validity in past research among adolescents (e.g., Mabbe et al., 2016) and cross-culturally (Chen et al., 2015). This scale consists of 12 items which tap into the frustration of the three psychological needs: Autonomy (4 items), competence (4 items), and relatedness (4 items). The items are rated on a 5-point Likert scale ranging from (*totally disagree*) to (*totally agree*).

#### Depressive symptoms

The Children Depression Inventory (CDI; Kovacs, 1985; Timbremont & Braet, 2002) was used to measure depressive symptoms. For each of the 27 items, participants chose one of the three responses that best described their current feelings, cognitions, and behavior. The CDI has good reliability and validity (Kovacs, 1985).

#### Eating disorder symptoms

Symptoms of eating disorders were measured using the Eating Disorder Inventory II (Garner, 1991). Three scales assessed eating pathology: (1) Drive for Thinness (7 items) which assesses preoccupation with weight and dieting, (2) Bulimic Symptoms (6 items) which measures the tendency to think about and to engage in periods of uncontrollable eating, and (3) Body Dissatisfaction (9 items) which measures dissatisfaction with specific parts of the body. All scales were rated on a 6-point Likert-type scale, ranging from 1 (*never*) to 6 (*always*). The scale has good psychometric properties (Garner, 1991). In line with previous research (e.g., Cole-Detke & Kobab, 1996), the three eating disorder scales were aggregated into a composite score of eating disorder symptoms.

## 2.2 | Plan of analyses

Structural equation models (SEM) with latent variables were tested using Mplus 7 to examine the main hypotheses. There were 7% missing values in the data. Little's MCAR test was non-significant indicating that the data was likely to be missing completely at random (normed chi-square = .75). Full information maximum likelihood (FIML) was used to estimate these missing values in SEM (Little & Rubin, 1987). Background variables (age, gender, and adjusted BMI) were controlled for in all models. Model fit was evaluated using the following indices: The chi squared test, the

comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). An acceptable fit was indicated by  $\chi^2/df$  ratio of 2 or below, CFI values of .90 or above, RMSEA values of .06 or below, and SRMR values of .08 or below (Kline, 2005).

For self-critical perfectionism to be a transdiagnostic risk factor, the following conditions should be met: (1) Self-critical perfectionism should predict both types of symptoms, and (2) the association between both symptomatologies should decrease (fully or partially) after adding self-critical perfectionism as a predictor. Second, for need frustration to appear as a transdiagnostic mediator, two additional conditions should be met: (3) The initial association between self-critical perfectionism and the symptoms should be reduced or disappear and (4) the association between both symptoms should be further reduced. We tested these conditions by estimating two models, with one model including only self-critical perfectionism as a direct predictor of both depressive symptoms and eating pathology symptoms, and with one model additionally including need frustration as an intervening variable in associations between self-critical perfectionism and both symptomatologies.

### 2.2.1 | Results and brief discussion

Cronbach's alpha, means, standard deviations, and correlations among the study variables are available in Supporting Information.

#### Measurement model

In the SEM model, each latent variable was represented by three parcels. To create the parcels, we used the item-to-construct balance technique (Little, Cunningham, Shahar, & Widaman, 2002).<sup>1</sup> Reliability coefficients of the parcels ranged from .74 to .93 and were all significant ( $p < .001$ ). Estimation of the measurement model which consisted of four latent variables represented by 12 parcels in total indicated an excellent fit (CFI = .99; RMSEA = .031, SRMR = .03,  $\chi^2/df$  ratio = 61.43/48 = 1.28).

#### Correlation between latent constructs: Depressive symptoms and eating disorder symptoms

We began by examining the association between the latent constructs representing depressive symptoms and eating disorder symptoms. This model had an excellent fit (CFI = .99; RMSEA = .04, SRMR = .03,  $\chi^2/df$  ratio = 11.95/8 = 1.49) and showed depressive and eating disorder symptoms to be highly correlated ( $r = .50$ ;  $p < .001$ ).

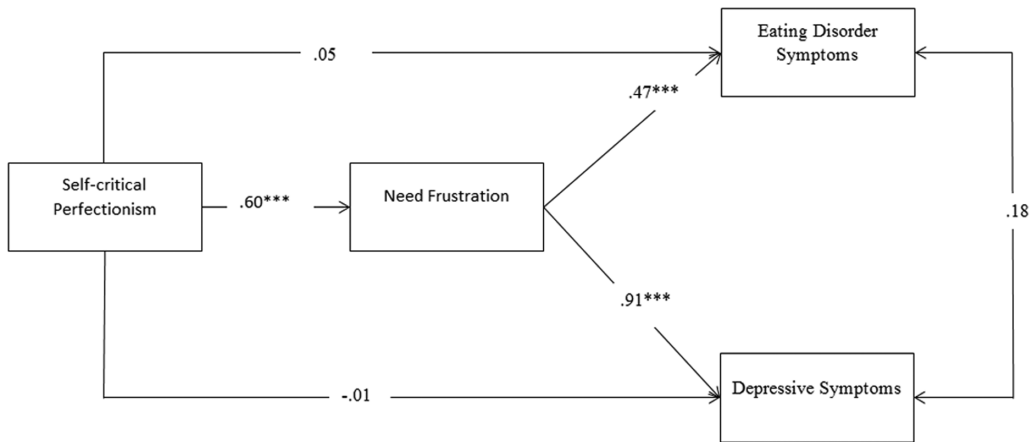
### 2.2.2 | Primary analyses

#### Self-critical perfectionism as a transdiagnostic risk factor

In a first structural model, paths were added between self-critical perfectionism, depressive symptoms and eating disorder symptoms. The fit of the model was excellent (CFI = .99; RMSEA = .04, SRMR = .03,  $\chi^2/df$  ratio = 60.9/42 = 1.45) and indicated that self-critical perfectionism was positively related to both eating disorder symptoms ( $\beta = .34$ ,  $p < .001$ ) and depressive symptoms ( $\beta = .45$ ,  $p < .001$ ). By adding self-critical perfectionism to the model, the correlation between depressive and eating disorder symptoms decreased slightly ( $r = .42$ ,  $p < .001$ ).

#### Need frustration as a transdiagnostic process

A full mediation model was tested by introducing need frustration as an intervening variable in the relation between self-critical perfectionism and both types of symptoms (see Figure 1). This model, CFI = .98; RMSEA = .04, SRMR = .03,  $\chi^2/df$  ratio = 114.48/75 = 1.53, indicated that self-critical perfectionism related positively to need frustration, and that need frustration in turn related positively to depressive symptoms and eating disorder symptoms. A partial mediation model was then tested by adding direct paths between self-critical perfectionism and both symptomatologies. The fit of the partial mediation model was not significantly better than the full mediation model,  $\Delta\chi^2(2) = 3.08$ ,  $ns$ , indicating that the association between self-critical perfectionism and both symptomatologies was fully mediated by need frustration. The indirect associations between self-critical perfectionism and eating disorder symptoms ( $\beta = .28$ ,  $p < .001$ ; CI 95% [.18; .39]) and depressive symptoms ( $\beta = .55$ ,  $p < .001$ ; CI 95% [.41; .69]) via need frustration were both



**FIGURE 1** Final structural mode of self-critical perfectionism, psychological need frustration, eating disorder symptoms, and depressive symptoms. Coefficients shown are standardized path coefficients  
 Note. Age, gender, and adjusted BMI were included as covariates in the model.  $***p < .001$

significant. Importantly, after adding need frustration as a mediator, the correlation between depressive symptoms and eating disorder symptoms became non-significant ( $r = .18, p > .05$ ).

Overall, this first cross-sectional study provided convincing evidence that self-critical perfectionism and need frustration represent, respectively, a transdiagnostic risk factor and a transdiagnostic process. Similar to past work, self-critical perfectionism related to both depressive and eating disorder symptoms. By modeling self-critical perfectionism as a predictor of both types of symptoms, the relation among them decreased slightly. After introducing need frustration as a mediator, two noteworthy findings emerged. First, the initial significant association between self-critical perfectionism and both symptomatology dropped to non-significance and, second, the association between both symptomatology also fell below significance. This suggests that need frustration helps to understand why self-critical perfectionism relates to both symptomatology and why both relate to each other.

### 3 | STUDY 2

Study 1 investigated the co-occurrence of symptoms of depression and eating pathology and the role of between-person differences in self-critical perfectionism and need frustration at one point in time. Yet, for self-critical perfectionism and need frustration to serve as transdiagnostic factors, they not only need to explain why both symptoms co-occur at one point in time; they also need to be implied in the changes in both symptoms across time. Using a two-wave design spanning 6 months, we sought to examine two critical issues.

First, we tested whether changes in self-critical perfectionism would relate to changes in depressive and eating disorder symptoms (i.e., Condition 1) and whether introducing changes in self-critical perfectionism as a transdiagnostic risk factor would reduce the strength of the observed co-variation between changes in depressive symptoms and eating disorder symptoms across time (i.e., Condition 2). Second, we examined need frustration as a transdiagnostic process by examining whether the hypothesized covariation between self-critical perfectionism and both types of symptoms would be accounted by changes in need frustration (i.e., Condition 3) and more importantly, whether the introduction of changes in need frustration would diminish the covariation between changes in both symptoms (i.e., Condition 4). We hypothesized that changes in need frustration would (partially) explain why symptoms of depression and eating pathology occur in tandem across time.

## 4 | METHOD

### 4.1 | Participants and procedure

Participants were 608 adolescent boys (41%) and girls (59%) attending secondary school (academic track) in Belgium. All participants were Caucasian and came from a middle-class background. Eighty-one percent came from a two-parent household. The mean age of the participants was 16.19 ( $SD = .79$ ) during the initial assessment. The second assessment took place 6 months later. A total of 477 participants took part in all measurement waves.

The study procedure was approved by Ghent university's ethics committee. Parents gave passive informed consent and adolescents provided active informed consent. At both assessments, questionnaires were completed during a regular class.

### 4.2 | Measures

Similar to Study 1, we measured Adjusted BMI (self-reported), self-critical perfectionism, need frustration, depressive symptoms, and eating disorder symptoms. All measures were administered at both measurement waves, with a 6-month time interval. Reliabilities of all measures at both waves were good, ranging from .86 to .96.

### 4.3 | Plan of analyses

To examine intra-individual change, latent change models (LCMs) were tested to investigate the relation between absolute changes in self-critical perfectionism, depressive symptoms, and eating disorder symptoms across measurement moments. To test the LCMs, Mplus7 with maximum likelihood as estimator was used. LCMs estimate intra-individual change across two waves, using latent variables for intercept (i.e., level) and slope (i.e., change over time) (Beyers & Goossens, 2008). Variance in the slope indicates inter-individual differences in intra-individual change over time. When slopes are correlated, this means that within-person changes in one variable co-occur with changes in the other variable.

Each latent change model consisted of a longitudinal measurement model defining the latent variables (i.e., self-critical perfectionism, need frustration, eating disorder symptoms, and depressive symptoms) at both time points by their respective indicators and a structural model which defined level and change factors for each latent variable and further specified how these levels and changes were interrelated (Hertzog, Dixon, Huitsch, & MacDonald, 2003). Covariances among the residuals of the same indicators over time were specified (Sorbom, 1975). Background variables (i.e., age, gender, and adjusted BMI), the level of each variable and the correlation between levels were controlled for in all models. In the longitudinal measurement model, each latent variable was represented by two parcels. Parcels were created using the item-to-construct balance technique (Little et al., 2002).

## 5 | RESULTS AND BRIEF DISCUSSION

### 5.1 | Missing data

Sample attrition was examined by logistic regression analysis. Adolescents who participated in both waves were dummy-coded as 1 (retention) and those who participated once were coded as 0 (drop-out). We examined sample attrition in two steps: First, demographic variables (i.e., age, gender, and adjusted BMI) were entered in Step 1 to predict sample attrition. In Step 2, Time 1 measures of self-critical perfectionism, need frustration, depressive symptoms and eating disorder symptoms were added. Block chi-square for Step 1 was significant  $\chi^2(3) = 9.47, p < .05$ . Only age added significantly to the prediction of attrition (Wald(1) = 8.28,  $p < .01$ ;  $\exp(\beta) = .62$ ). Older participants were less likely to participate in both waves. In Step 2, the chi-square of the second block was not significant  $\chi^2(4) = 6.15, p > .05$ , indicating that the study variables did not contribute significantly to the prediction of drop-out beyond the demographic



**TABLE 1** Parameter estimates and fit indices of the univariate latent change models

Variable	Level		Change T1 to T2			Fit Indices		
	M	s <sup>2</sup>	M	s <sup>2</sup>	Range	RMSEA	CFI	SRMR
Self-critical perfectionism	3.39***	.42***	-.01	.29***	-1.96 to 1.46	.05	.99	.01
Need frustration	2.10***	.40***	-.01	.23***	-1.24 to .97	.03	.99	.03
Depressive symptoms	0.84***	.21***	-.09***	.15***	-1.32 to .84	.05	.99	.03
Eating disorder symptoms	2.76***	1.06***	0.02	.30***	-1.78 to 1.74	.05	.99	.02

Note. T1 = Time 1, T2 = Time 2; RMSEA = Root-mean-square error of approximation; CFI = Comparative fit index; SRMR = Standardized root-mean-square residual; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**TABLE 2** Correlations between the level and change of all study variables from Study 2

	1	2	3	4	5	6	7	8
<i>Self-critical perfectionism</i>								
1. Level	–							
2. Change	-.42***	–						
<i>Need frustration</i>								
3. Level	.65***	-.07	–					
4. Change	-.19**	.31***	-.44***	–				
<i>Depression</i>								
5. Level	.40***	-.02	.75***	-.26***	–			
6. Change	-.09	.18**	-.26***	.55***	-.43***	–		
<i>Eating Disorder</i>								
7. Level	.37***	-.03	.45***	-.17**	.49***	-.07	–	
8. Change	-.16**	.35***	-.11	.38***	-.18**	.37***	-.35***	–

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

variables. Thus, the substantive study variables were unrelated to sample attrition. Little's MCAR test (normed  $\chi^2 = .99$ ), indicated that the data were likely to be missing completely at random. Full information maximum likelihood (FIML) was used to estimate missing values in SEM (Little & Rubin, 1987).

### 5.1.1 | Preliminary analyses

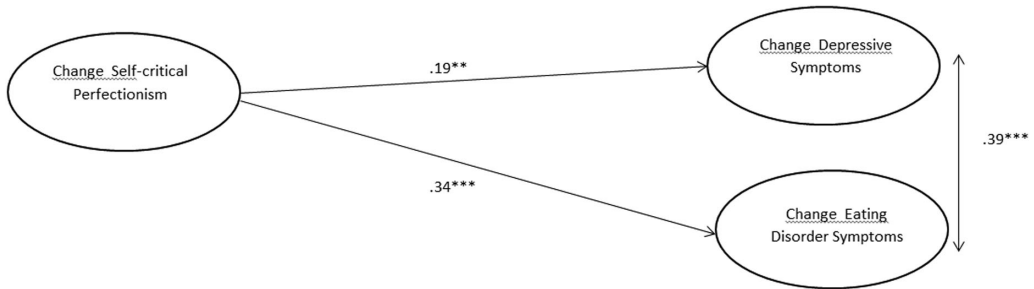
The means, standard deviations, and zero-order correlations of all measures at both time points are available in Supporting Information.

#### Univariate LCMs

Univariate LCMs were estimated for all study variables. Table 1 provides an overview of the parameter estimates and fit indices for each model. Only depressive symptoms displayed significant mean level change, indicating that on average participants reported decreases in depressive symptoms from T1 to T2.

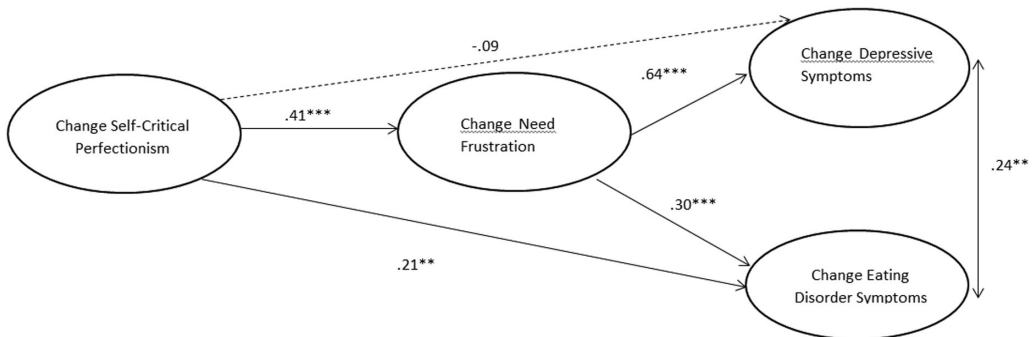
#### Correlated change between all variables

All changes were interrelated (see Table 2) suggesting that changes in self-critical perfectionism, need frustration and both symptoms occurred in tandem. Similarly, changes in need frustration and both symptomatologies were positively correlated, indicating that both variables shifted in tandem from T1 to T2.



**FIGURE 2** Changes in self-critical perfectionism predicting changes in depressive symptoms and changes in eating disorder symptoms

Note. The level of each variable and background variables (i.e., age, gender, and adjusted BMI) were included as covariates in the model. \*\* $p < .01$ , \*\*\* $p < .001$



**FIGURE 3** Changes in self-critical perfectionism predicting changes in depressive symptoms and changes in eating disorder symptoms via changes in need frustration

Note. The level of each variable and background variables (i.e., age, gender, and adjusted BMI) were included as covariates in the model. The broken line is non-significant and the solid lines are significant. \*\* $p < .01$ , \*\*\* $p < .001$

### 5.1.2 | Primary analyses

#### Correlated change between symptomatologies

In the first model (CFI = .99; RMSEA = .05; SRMR = .04), the association between intra-individual changes in depressive symptoms and intra-individual changes in eating disorder symptoms was investigated. Results showed that changes in depressive symptoms positively related to changes in eating disorder symptoms ( $\beta = .43, p < .001$ ), indicating that both developed in tandem.

#### Self-critical perfectionism as a transdiagnostic risk factor

Next, we investigated whether changes in self-critical perfectionism would relate to changes in both eating disorder symptoms and depressive symptoms. Paths were added between the change in self-critical perfectionism and the change in both symptoms (CFI = .98, RMSEA = .06, SRMR = .06). As shown in Figure 2, changes in self-critical perfectionism were positively related to changes in both symptoms. The correlated change between both symptoms was still significant, albeit reduced compared with the previous model ( $\beta = .39, p < .001$ ).

#### Need frustration as a transdiagnostic process

A full mediation model was tested by introducing need frustration as an intervening variable in the relation between the change in self-critical perfectionism and the change in symptoms. Then, a partial mediation model was tested by adding direct paths between self-critical perfectionism and both symptoms, leading to an improved model fit,  $\Delta\chi^2(2) = 17.34, p < .001$ . The final partial mediation model, CFI = .97; RMSEA = .06, SRMR = .06, is displayed in Figure 3. This model

showed that (a) changes in need frustration predicted changes in both symptoms, (b) changes in need frustration partially explained the relation between changes in self-critical perfectionism and changes in eating disorder symptoms and completely accounted for the relation between changes in self-critical perfectionism and changes in depressive symptoms, and (c) the correlated change between depressive symptoms and eating disorder symptoms was further reduced ( $\beta = .24, p < .01$ ). The indirect association between changes in self-critical perfectionism and changes in depressive ( $\beta = .26, p < .001$ ; CI 95% [.17; .36]) and eating disorder symptoms ( $\beta = .12, p < .001$ ; CI 95% [.06; .19]) via changes in need frustration was significant. In addition to the transdiagnostic role of self-critical perfectionism, these findings show that need frustration represents a transdiagnostic mechanism that helps to explain why changes in depressive symptoms evolve in tandem with changes in eating disorder symptoms.

## 6 | DISCUSSION

Many adolescents who are prone to developing depressive symptoms are also vulnerable to increased eating pathology and vice versa (Puccio, Fuller-Tyszkiewicz, Ong, & Krug, 2016). Depressive symptoms and eating disorder symptoms not only co-occur (as shown in Study 1), but they also evolve in tandem (as shown in Study 2). Although a variety of risk factors may be implied in these two types of psychopathology, the question is whether broader transdiagnostic risk factors and processes can help to explain their high comorbidity. The present research sought to examine (a) the role of self-critical perfectionism as a transdiagnostic risk factor and (b) need frustration as a transdiagnostic process that would not only help to explain why self-critical perfectionism relates to both depressive symptoms and eating pathology but would also shed light on why depressive symptoms and eating disorder symptoms co-occur.

The present findings were remarkably consistent. Self-critical perfectionism predicted depressive and eating disorder symptoms at the between and within-person level. Consistent with previous findings, (e.g., Boone et al., 2014; Sherry et al., 2014), this indicates that adolescents who set high standards and engage in harsh self-scrutiny are more likely to report depressive symptoms and eating disorder symptoms. A more novel finding emerged in Study 2 which demonstrated systematic covariation in these variables across time. Increases in self-critical tendencies across a 6-month period were associated with increased vulnerability for eating disorder symptoms, whereas, because there was a mean-level decrease in depressive symptoms across time, adolescents higher in self-critical perfectionism displayed *less of a decrease* in depressive symptoms across time.

A critical issue within this study was whether the observed co-occurrence (Study 1) or co-evolution (Study 2) of both symptoms could be explained by self-critical perfectionism. The observed correlation in Study 1 and the longitudinal covariation in Study 2 was only minimally reduced after introducing self-critical perfectionism as a predictor. Although self-critical perfectionism was significantly associated with (changes in) both symptoms, it could only explain a small part of their co-occurrence. More proximal, intervening processes linked to perfectionism were needed to further explain this co-occurrence.

Need frustration was found to account for a large part of the observed associations between self-critical perfectionism and both symptoms. Consistent with previous work (e.g., Boone et al., 2014; Sherry et al., 2014), findings suggested that need frustration helped to explain why adolescents higher in self-critical perfectionism (Study 1) or those who increased in self-critical perfectionism (Study 2), were more prone to both symptoms. In Study 1 (at the level of between-person differences) need frustration fully explained the association between self-critical perfectionism and both symptoms, whereas in Study 2 (at the level of within-person change) need frustration continued to fully explain the association between self-critical perfectionism and depressive symptoms, but only partially accounted for the association with eating disorder symptoms. This suggests that with regard to eating disorder symptoms other explanatory processes, apart from need frustration, may also be involved. Importantly, the observed association between (or change in) both symptoms was largely accounted for by between-person differences (Study 1) and within-person changes (Study 2) in need frustration across time. After introducing need frustration as a mediator, depressive symptoms and eating disorder symptoms were not (Study 1) or were only minimally (Study 2) related to each other.

## 6.1 | Limitations and directions for future research

Due to the correlational nature of these findings, future experimental research is needed to examine whether increases in need frustration actually *cause* increases in *both* depressive symptoms and eating pathology among adolescents. A recent study found that Syrian refugees who engaged in need-satisfying activities for 1 week reported reduced depressive symptoms (Weinstein, Khabbaz, & Legate, 2016). Clinical research could build on these findings by investigating whether interventions, such as cognitive behavioral interventions that focus on the reduction of perfectionist concerns (Shafran, Coughtrey, & Kothari, 2016), lead to decreases in both symptoms. Presumably treated clients may encounter less need-frustrating experiences in their lives or learn to cope better with such experiences. Indeed, increased need satisfaction may represent a mechanism for change in existing therapeutic interventions (see Dwyer, Hornsey, Smith, Oei, & Dingle, 2011).

An important avenue for future research is to examine whether these findings generalize to clinical samples and other age groups, including adults. Given the universality of basic psychological needs (e.g., Chen et al., 2015), we would expect this to be the case. Future research could also examine whether the development of depressive and eating disorder symptoms results from the frustration of specific needs (i.e., for autonomy competence and relatedness), or whether the frustration of each need plays a unique contributing role. Similarly, while in this study, we aggregated across different types of eating disorder symptoms, future research would do well to examine comorbidity between depressive symptoms and specific eating disorder symptoms.

While we examined transdiagnostic vulnerability for different types of internalizing psychopathology, theory, and research suggest that both self-critical perfectionism and need frustration are also relevant in the context of externalizing problems, including oppositional defiance, aggression, and norm-breaking behavior (e.g., Blatt, 2004; Joussemet et al., 2008; Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015). Future research is needed to test the present model in the context of externalizing problems.

Finally, future studies could also examine the SDT approach in relation to other need-based approaches to psychopathology such as Grawe's (2007) model. According to Grawe (2007), the satisfaction (vs. thwarting) of four basic psychological needs (i.e., for attachment, orientation and control, pleasure / pain avoidance, and self-enhancement) plays a central role in individuals' vulnerability to psychopathology. Conceptual and empirical work is needed to identify overlap between SDT and Grawe's model of basic psychological needs.

## 6.2 | Conclusion and clinical implications

Our findings show that self-critical perfectionism only plays a modest role in the co-occurrence of depressive and eating symptoms in adolescents. Experiences of need frustration associated with self-critical perfectionism account for a larger portion of this co-occurrence. At both the level of inter-individual differences and within-person change, need frustration (a) accounted for associations between self-critical perfectionism and psychopathology and (b) reduced the covariation between depressive symptoms and eating pathology. This suggests that adolescents high on self-critical perfectionism are prone to different types of internalizing psychopathology because they experience increased need frustration.

These findings point to the potential benefits of incorporating a focus on basic psychological needs into current therapeutic frameworks that target eating disorder and depressive symptoms, such as cognitive behavioral therapy (CBT). While CBT-based treatments (e.g., Riley, Lee, Cooper, Fairburn, & Shafran, 2007) and interventions (e.g., Lloyd, Schmidt, Khondoker, & Tchanturia, 2015) are effective in reducing perfectionism, effects on individuals' symptoms are not always maintained (e.g., Egan & Hine, 2008). Thus, it appears that CBT-based interventions can be strengthened. Our results suggest that, in addition to targeting self-critical perfectionism by identifying unhelpful thought patterns and changing inaccurate beliefs (e.g., Shafran et al., 2016), interventions could also seek to help patients recognize and minimize the occurrence of need-frustrating experiences as well as to identify ways to engage in more need-satisfying activities (e.g., Weinstein et al., 2016).

We are not suggesting that CBT-based interventions for perfectionism should be replaced with a need-based approach. Because self-critical perfectionism elicits need frustration (e.g., Boone et al., 2014), the effects of an

intervention focused solely on need satisfaction are likely to be short-lived if self-critical perfectionistic tendencies are not addressed. We advocate an approach in which self-critical perfectionism and psychological needs are targeted simultaneously. Through an integrated approach, patients may reap even more clinical benefits from a CBT-based intervention. To enhance autonomy satisfaction, clients' high in self-critical perfectionism could be encouraged to discuss the pressure they feel. The main challenge here is that the patient feels able to relinquish the pressures and to examine what s/he really wants (instead of what others want him/her to do). To increase competence satisfaction, the meaning of failure could be discussed. Self-critical individuals experience intense feelings of failure and try to minimize these feelings by working hard and striving for excellence (Shafran et al., 2002). Unless they can see the potential positive aspects of failure (i.e., failure being part of a learning process), the patient will never be willing to be more flexible in their striving. To enhance relatedness satisfaction, patients may be encouraged to invest in their social life. This life domain is often neglected because individuals high in self-critical perfectionism tend to invest in their achievements and are focused on outperforming others. By helping patients to shift this imbalance, they may again experience the positivity of social interactions, which may help them to let go of their perfectionistic strivings or to put them into perspective.

## NOTE

<sup>1</sup> This technique involves performing a 1-factor principal components analysis on the scales for each construct and using the loadings as a guide to assign items to parcels. The three items with the highest loadings are assigned to different parcels first, after which the three items with the next highest loadings are distributed across the different parcels in an inverted order (with the item with the highest loading in the first series of items being matched with the item with the lowest loading in the second series of items). This procedure is repeated until all items in a scale are assigned to a parcel. This technique results in constructs that are equally balanced in terms of their difficulty and discrimination.

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## SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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