Profiles of Temperament and Perfectionism in High Ability College Students

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Author Note Kathryn L. Fletcher https://orcid.org/0000-0002-7898-5589 We have no conflicts or interests to disclose. Correspondence concerning this article should be addressed to Kathryn L. Fletcher, 2000 Riverside Dr., Muncie, IN 47306. Email: klfletcher@bsu.edu

Article

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Abstract

Different physical, mental, and motivational outcomes for perfectionistic strivings and perfectionistic concerns indicate that individuals have different experiences of perfectionism. Although research has focused on parenting practices as a factor related to these differences, little research has examined the impact of temperamental differences on perfectionism. In the current study, 434 high ability undergraduate students completed perfectionism, adult temperament, and personality measures. Latent class analysis that examined the patterns among the relationships between self-oriented perfectionism, socially prescribed perfectionism, and four dimensions of adult temperament (negative affect, effortful control, extraversion, orienting sensitivity) revealed three distinct subgroups. Although the largest subgroup demonstrated patterns consistent with prior research on perfectionism (e.g., perfectionism associated with negative affect), two other subgroups revealed separate patterns that were inconsistent with prior research (e.g., one subgroup had negative relationships between negative affect and both types of perfectionism). Our results demonstrate that temperament may play an important role in explaining the heterogeneity among perfectionists.

Keywords: *perfectionism • self-oriented • socially prescribed • temperament • negative affect • effortful control • extraversion • orienting sensitivity*

Perfectionism is a multidimensional construct, with two predominant components of exceedingly high personal standards for oneself and hypersensitivity to criticism (perfectionistic strivings) and mistakes, feelings of being overwhelmed by failure, and disappointing others (perfectionistic concerns) (Blatt, 1995; Flett et al., 2002; Stoeber & Otto, 2006). Perfectionistic concerns have been linked to a host of negative psychological and behavioral outcomes such as depression, social anxiety, and suicidality (Flett & Hewitt, 2022; Hewitt et al., 2017; Curran & Hill, 2019), to name a few, as well as poor physical health outcomes (Sirois & Molnar, 2016; Molnar et al., 2020). In contrast to the empirical evidence that perfectionism concerns are detrimental to physical and mental health, perfectionistic strivings have been linked to positive outcomes such as achievement and well-being, leading to the controversial view that perfectionistic strivings are a positive form of perfectionism (Stoeber & Otto, 2006). Challenging the view of perfectionism as positive, however, is a growing body of research reporting that individuals with perfectionistic strivings experience higher level of depression, anxiety, and stress than non-perfectionists (Smith et al., 2016). Corresponding to rising rates of depression and anxiety among college students, rates of perfectionism have also risen over the last three decades (Curran & Hill, 2019). Given the poor physical and mental health outcomes associated with perfectionism and its increasing incidence, it is crucial to investigate how perfectionism develops to understand how to prevent it.

Researchers that have hypothesized about causes related to the rise in perfectionism have focused on parenting (Curran & Hill, 2019), yet this hypothesis is controversial (Soenens & Vansteenkiste, 2019). The focus on parenting as contributing to the development of perfectionism is largely due to the extensive body of research and theory in this area. Five theoretical models of parenting have been proposed that have hypothesized different developmental pathways for perfectionism (Flett et al., 2002; Flett & Hewitt, 2022). In general, these theoretical models represent different ways that parents approach and react to their children's efforts and achievements in different domains (e.g., academics, sports, arts). In addition, Flett and Hewitt (2022) proposed key factors that they argue will influence how strongly children internalize external pressures and expectations that lead to the development of perfectionism:

1) Openness to socialization
2) Exposure and willingness to model others perfectionistic behaviors
3) Emphasis on high achievement within families

4) Has the potential to achieve perfection in at least one domain
5) "Has a temperament characterized by extreme persistence and some degree of fearfulness" (Flett & Hewitt, 2022, p. 143).

Based on these key factors for the integrative model of perfectionism, multiple pathways led to the development of perfectionism, resulting in individual differences among perfectionists. According to Flett and Hewitt (2022), "There is substantial heterogeneity among perfectionists; thus, two people could have comparable patterns and levels of perfectionism but differ markedly in the etiology of these patterns and levels of perfectionism (Flett & Hewitt, 2022; p. 131)."

Although parenting practices contribute to differences among perfectionists, understanding the role of temperament to help explain the heterogeneity among perfectionists has been largely overlooked (Flett & Hewitt, 2022). Temperament refers to innate, biological behavioral tendencies with underlying neurological substrates that regulate affect, attention, and motor activity (Rothbart et al., 2000). Stable individual differences among children on dimensions of temperament such as negative emotionality, effortful control, and surgency, evolve over time into broad personality traits such as negative affect, conscientiousness, and extraversion (for reviews, see DeYoung & Allen, 2019; Shiner & DeYoung, 2013). Despite this developmental pathway, historically the fields of personality psychology and developmental psychology have been separated: personality researchers study adults and developmental researchers study children's temperament (McAdams et al., 2019). This separation is also evident in research on perfectionism. Because examining perfectionism grew out of clinical psychology, research has focused on adults and there is a substantial body of research on personality and perfectionism (Stoeber et al., 2018). Yet only two studies have examined perfectionism and temperament in adults (Kobori et al., 2005; Leung et al., 2019). Across studies, temperament traits of harm avoidance and persistence related to different types of perfectionism:

1) perfectionistic striving had a positive relationship to persistence, and
2) perfectionistic concerns were related to low persistence and high harm avoidance (Kobori et al., 2005; Leung et al., 2019).

Although much more research is needed, temperament may help explain how individuals develop different types and/or levels of perfectionism, contributing to differences among physical and behavioral outcomes for perfectionists.

To contribute to an understanding of how temperament influences perfectionism, the current study explored relationships between temperament and per-

fectionism in a sample of high ability undergraduate students. High ability undergraduates were selected given perfectionism is a common characteristic associated with this population (Miller & Speirs Neumeister, 2017; Rinn et al., 2020; Speirs Neumeister, 2018). Moreover, one of the key factors for the development of perfectionism was having the skills and talents to achieving perfection in at least one domain (Flett & Hewitt, 2022). The perceived ability to achieve perfection in different domains (i.e., sports, arts, academics) varies, but our contention is that high ability college students might achieve perfection in the academic domain. At least in the United States, one or two students at colleges and universities at graduation ceremonies are recognized for their perfect grade point average of 4.0. Through this grading system, students may perceive that academic achievement can be "perfect." For this reason, high ability students were recruited from the honors college at a midwestern university to examine the relationship between temperament and perfectionism. Given the limited research on temperament and perfectionism, this exploratory study examined individual differences among high ability students based on relationships between temperament and perfectionism.

Perfectionism

Perfectionism is characterized as personality traits involving unrealistic and exceedingly high personal standards, hypersensitivity to criticism and mistakes, feeling of being overwhelmed by failure and rigid all-or-none thinking (Blatt, 1995; Flett et al., 2002; Stoeber & Otto, 2006). Researchers generally agree that perfectionism is conceptualized as a multidimensional construct (Hewitt & Flett, 1991; Frost et al., 1990; Slaney et al., 2001). Given that Hewitt and Flett (1991) focused on the origin of perfectionism, this multi-dimentional model is conceptualized as three different types: self-oriented perfectionism (those holding unrealistic expectations for themselves); socially prescribed perfectionism (those perceiving that others have unrealistic expectations for them, regardless of the accuracy of their perceptions); and other-oriented perfectionism (those holding unrealistic expectations for others). The second multidimensional perfectionism scale, developed by Frost et al. (1990), tapped six different dimensions of the construct: personal standards, concern over mistakes, parental expectations, parental criticism, doubting actions, and organization. Within the field of counseling psychology, the Almost Perfect Scale-Revised (Slaney et al., 2001) was developed, with a three-factor measure of perfectionism including high standards, discrepancy, and order. The high standards subscale measures the extreme nature of the personal standards that individuals with perfectionism set for themselves. The discrepancy subscale measures the negative aspect of

perfectionism that centers on the perception that the high personal standards are not being met. Finally, the order subscale measures orderliness as a defining feature of perfectionism.

When all three measures were factor analyzed, a maladaptive perfectionism factor (doubts about actions, concern over mistakes, socially prescribed and discrepancy) and an adaptive perfectionism factor (personal standards, self-oriented perfectionism and high standards) emerged (Rice et al., 2005; Suddarth & Slaney, 2001). The labels of adaptive perfectionism and maladaptive perfectionism proved controversial due to the disputed notion that perfectionism is adaptive (Flett & Hewitt, 2006). To avoid these controversial terms, perfectionistic strivings (self-oriented perfectionism, personal standards and order, and high standards and order) and perfectionistic concerns (socially prescribed perfectionism, concern over mistakes, doubts about actions, discrepancy) have been largely adopted by perfectionism researchers (Stoeber & Otto, 2006). The terms perfectionistic strivings and perfectionistic concerns will be used to review the existing literature on perfectionism, temperament, and personality.

Temperament and Personality

Although there are multiple theoretical models of temperament, the model of adult temperament based on research from infancy to adulthood proposed by Evans and Rothbart (2007; 2009) formed the basis for the current study. Rothbart et al. (2000) define temperament as having two components: reactivity that is driven by physiological responses to patterns of stimuli and self-regulation that is driven by neurological and behavioral efforts to control one's reactivity. To capture these two components, Evans and Rothbart (2007, 2009) designed a measure of adult temperament including subscales related to sensation, perception, and self-regulation. Initial work on their measure of adult temperament revealed a five-factor solution (Evans & Rothbart, 2007): negative affect, effortful control, extraversion, affiliativeness, and orienting sensitivity.

Examining the validity of their adult temperament scale, Evans and Rothbart (2007) examined the relationship between their adult temperament subscales and the Big Five measure of personality (for a review see John et al., 2008). The Five-Factor model of personality is based on self-report measures of how individuals describe their cognitive, affective, and behavioral tendencies using specific traits or facets (Costa & McCrae, 1992, 1995). Five domains (extraversion, agreeableness, conscientiousness, neuroticism, and openness/intellect) were revealed using factor analysis of self-report and/or peer report ratings on specific facets (Costa & McCrae, 1992). Extraversion describes individuals who are excitable, talkative, social, and emotionally expressive. Agreeableness describes individuals who are trusting,

exhibit prosocial behaviors and are kind and compassionate toward others. Conscientiousness describes individuals who devote high levels of attention to details in their work, have high levels of effortful control, and display goal directed behaviors. Neuroticism describes individuals who frequently display negative affect, unstable moods, and are lower in emotional control. Openness describes individuals who are high in curiosity, creativity, and imagination.

Dimensions of the Big Five personality measure correlated with the Evans and Rothbart (2007) model of adult temperament:

1) Negative affect correlated with neuroticism
2) Orienting sensitivity correlated with openness
3) Extraversion correlated with extraversion
4) Affilliativeness correlated with agreeableness
5) Effortful control correlated with conscientiousness

Convergence between the Evans and Rothbart model of adult temperament and the Big Five personality model indicated substantial overlap among dimensions of temperament and personality. Reviewing research on children's temperament and the dimensions of the Big Five personality model, Shiner & DeYoung (2013) outlined empirical research supporting conceptual overlap between temperament and personality. Developmental research supported conceptual connections between positive emotionality/extraversion; negative emotionality / neuroticism; and effortful control / conscientiousness. In summary, empirical support exists for the connections between temperament and personality dimensions of negative affect / neuroticism; effortful control / conscientiousness; and extraversion/ extraversion.

Big Five Model of Personality and Perfectionism

There is an extensive research literature on perfectionism and personality, especially in relation to the Big Five personality traits (Basirion et al., 2013; Cruce et al., 2012; DeCuyper et al., 2015; Egan et al., 2015; Rice et al., 2007; Stoeber et al., 2009; Ulu & Tezer, 2010). As such, our review of the literature will be focused on overlapping dimensions of temperament and personality dimensions: 1) negative affect / neuroticism, 2) effortful control / conscientiousness, and 3) extraversion/ extraversion.

Reviewing research on the Big Five personality dimensions and perfectionism (i.e., self-oriented and socially prescribed), Stoeber et al. (2018) concluded that empirical research supported:

1) positive associations between socially prescribed perfectionism and neuroticism
2) negative associations between socially prescribed perfectionism and extraversion, and
3) positive associations between self-oriented perfectionism and conscientiousness.

Relationships between self-oriented perfectionism and socially prescribed perfectionism and openness and agreeableness were mixed (Stoeber et al., 2018). This narrative review on the Hewitt and Flett (1991) measures of perfectionism was largely supported with results from a meta-analysis of 77 studies (*N* = 24,789) examining other measures of perfectionism across studies (Smith et al., 2019). Neuroticism had strong positive relationships with dimensions of perfectionistic concerns (doubts about actions, concern over mistakes, discrepancy, socially prescribed perfectionism) and a smaller positive relationship with dimensions of perfectionistic strivings (self-oriented perfectionism, personal standards). In contrast, conscientiousness had strong positive relationships with dimensions of perfectionistic strivings (self-oriented perfectionism, personal standards, high standards) and negative relationships with dimensions of perfectionistic concerns (doubts about actions, concern over mistakes, discrepancy, socially prescribed perfectionism). Findings were less consistent for agreeableness, extraversion, and openness. However, consistent with the narrative review (Stoeber et al., 2018), Extraversion had negative relationships with dimensions of perfectionistic concerns (doubts about actions, concern over mistakes, socially prescribed perfectionism). Although different statistical techniques were employed, Smith et al. (2019) meta-analysis results are consistent with the main findings reported in a meta-analysis on perfectionism and the Big Five personality dimensions published the same year by Stricker et al. (2019). In short, perfectionistic concerns were strongly positively associated with Neuroticism and perfectionistic strivings were strongly positively associated with Conscientiousness.

Temperament and Perfectionism

Despite the wealth of research on personality and perfectionism and its conceptual overlap with adult temperament (e.g., Evans & Rothbart, 2007), there has been much less research on adult temperament and perfectionism (Flett & Hewitt, 2022). Only two studies have examined perfectionism and temperament in adults using the Temperament and Character Inventory (Cloninger et al., 1994). In one of these studies, perfectionistic striving had a negative relationship to novelty seeking (i.e., enjoyment of novel situations and tasks) and a positive relationship to persistence, which is associated with effortful control (Kobori et al., 2005). In contrast, perfectionistic concerns were related to low persistence and high harm avoidance (Kobori et al., 2005). In another study using the Temperament and Character Inventory (Cloninger et al., 1994) that examined different temperament profiles in medical students, two profiles emerged: 1) low to medium levels of harm avoidance and high to very high levels of persistence, self-directedness, and cooperativeness, and 2) medium to high levels of harm avoidance and high levels of

persistence, self-directedness, and cooperativeness. Medical students with the profile characterized by low to medium levels of harm avoidance had lower scores on perfectionistic concerns (i.e., concern over mistakes) and higher scores on perfectionistic strivings (i.e., personal standards) compared to the medical students with the profile of medium to high levels of harm avoidance (Leung et al., 2019). For high ability students such as medical students, aspects of temperament appear to play a role in experiencing different types of perfectionism.

Current study

High ability students often experience perfectionism and perhaps have heightened reactions toward their perfectionistic tendencies (Miller & Speirs Neumeister, 2017; Rinn et al., 2020; Speirs Neumeister, 2018). Adolescents with IQ scores of 120 or higher had higher scores on the person standards subscale (i.e., perfectionistic strivings), yet lower scores on the concerns over mistakes subscale (perfectionistic concerns) (Lavrijsen et al., 2021). Similarly, recent findings from a meta-analysis on intellectual giftedness and perfectionism revealed that gifted students did not differ from non-gifted students on perfectionistic concerns, but there was a small to medium effect size toward higher levels of perfectionistic strivings in gifted students compared to non-gifted students (Stricker et al., 2020). Similar findings were reported in another meta-analysis of perfectionism in gifted students (Ogurlu, 2020). Although the research on the prevalence of perfectionism in gifted populations has been mixed, these studies suggest that gifted students might have elevated levels of perfectionistic strivings.

To examine perfectionism and temperament, latent profile analysis was used to examine a sample of high ability college students to determine if specific subgroups existed based on relationships between temperament and perfectionism. In addition, high ability students match one of the key factors that might enhance perfectionistic tendencies: "has skills and abilities in at least one domain in which achieving perfection is possible" (Flett & Hewitt, 2022, p. 143). According to this factor, high ability students may have strongly internalized external pressures to perform academically. Expanding the research on perfectionism and temperament, this study is the first examination of Evans and Rothbart model of adult temperament in relation to perfectionism. This study investigated whether there were subgroups within the population based upon correlations among perfectionism and temperament. Our decision to examine relationships between perfectionism and temperament dimensions grows out of our interest in how temperament may contribute to individual differences among perfectionists. This approach differs from other research using person-centered approaches to obtain groups based on either temperament dimensions (Leung

et al., 2019) or perfectionism dimensions (Molnar et al., 2020; Stahlberg et al., 2019; Smith et al., 2016) and then test for significant differences on an outcome measure. As such, given the limited research in this area, this study is largely exploratory and will provide initial data to warrant further investigation into how temperament may impact perfectionism.

Methods

Participants and Procedures

High achieving undergraduate students (N = 434) from a mid-sized university participated. This group of students was part of a special honors program at the university, based upon standardized test scores, high school GPA, recommendations, and writing samples. There were 312 female and 112 males, and the sample was 92.2% White/non-Hispanic. The participants had completed varied levels of coursework in college, including freshman (n = 177), sophomores (n = 101), juniors (n = 62), and seniors (n = 79). Two students indicated the "other" category and 13 did not respond. Students reported that 66.2% of mothers and 64% of fathers had a college degree or a graduate or professional degree. The mean age of the students was 19.6 (SD = 1.4) and the maximum age was 23, indicating that there were no non-traditional students in this sample. These respondent characteristics were closely aligned with the demographics of the honors program population.

All aspects of this research were approved through the university Institutional Review Board. Students were recruited through an email requesting their participation in a research study about the psychological aspects of giftedness. All students in the honors program received this email, which contained a link to the survey instrument. Informed consent to participate was indicated by clicking on the survey link. All responses were anonymous. The surveys were completed online during one login session, and approximately 26 percent of all honors program students participated. Participants were entered into a drawing to potentially be selected for a free MP3 player.

Measures

The following measures were included in a larger battery of 12 instruments. Two versions were administered, each containing all of the instruments. The order of instruments was counterbalanced between versions to account for potential survey fatigue. Although the terms perfectionistic strivings and perfectionistic concerns were used in the introduction to summarize the research literature, the terms self-oriented perfectionism (SOP) and socially prescribed perfectionism (SPP) will be used to describe our methods, results and conclusions for the study.

Adult Temperament Questionnaire (ATQ)

The Adult Temperament Questionnaire (Evans & Rothbart, 2007)—short form was used in the current study. The measure included 77 items representing 13 subscales following under four major scales:

1) Negative affect (subscales include fear, sadness, frustration, and discomfort)
2) Extraversion (subscales include sociability, positive affect, and high intensity pleasure)
3) Effortful control (subscales include attention control, inhibitory control and activation control)
4) Orienting sensitivity (subscales include general perceptual sensitivity, affective perceptual sensitivity and associative sensitivity).

Students were asked to rate themselves on statements using a 7-point Likert scale from (1) = extremely untrue of you to (7) = extremely true of you on items such as "I become easily frightened" and "I usually like to talk a lot." Cronbach's alphas for the four main scales ranged from .78 to .84.

Multidimensional Perfectionism Scale (MPS)

The MPS (Hewitt & Flett, 1991) measured perfectionism with a 45-item scale to assess self-oriented, other-oriented, and socially prescribed perfectionism. For the purpose of this study, only the two subscales of self-oriented and socially prescribed perfectionism were used. Participants indicated level of agreement with statements about their perceptions and behaviors related to self-oriented perfectionism ("I strive to be the best at everything I do") and socially prescribed perfectionism ("My family expects me to be perfect") using a 7-point Likert scale, with (1) = strongly disagree to (7) = strongly agree. The self-oriented and socially prescribed subscale scores were calculated from the responses, with higher scores indicating higher levels of perfectionism. Cronbach's alphas for the two subscales were .86 (socially prescribed) and .91 (self-oriented).

The Big Five Inventory

This inventory measures five subscales related to broad personality dimensions: conscientiousness, neuroticism, openness, extraversion, and agreeableness (John et al., 2008). Participants rated their agreement on 44 items related to their personality on a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). Students are asked to rate phrases such as: I see myself as someone who "worries a lot" or "gets nervous easily." For the current study, Cronbach's alphas for the five subscales ranged from .80 to .88.

Data Analysis

To address the goals of the study outlined above, a latent class analysis (LCA) of the structural equation model

Figure 1: Latent variable correlation model for adult temperament and perfectionism
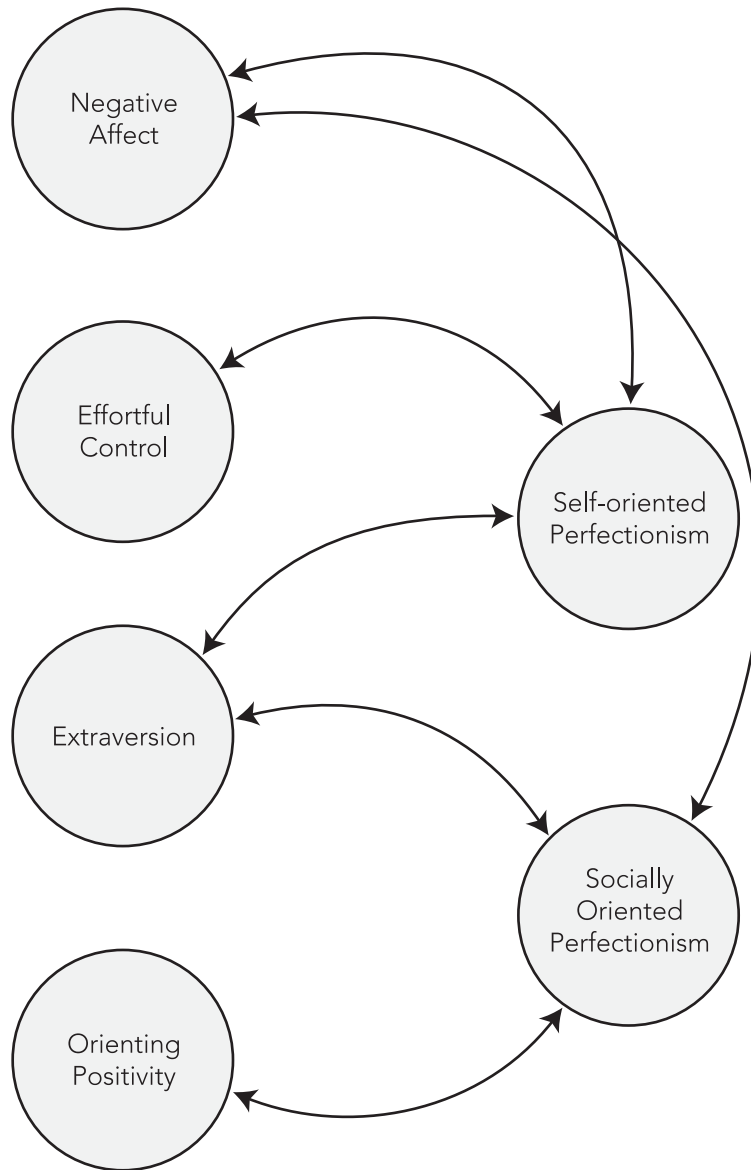
(Figure 1) for perfectionism (MPS) and temperament (ATS) was fit to the data allowing the interfactor correlations among the two traits to vary across latent classes. The candidate models included from 1 to 4 classes and selection of the optimal model was done using the AIC, BIC, and aBIC, with the lowest value being associated with the best fitting model. In addition, the bootstrap likelihood ratio best (BLRT) with 1000 bootstrap samples was used to assess the null hypothesis that k latent classes fit the data better than k-1 latent classes. This number of bootstrap samples was recommended

based on simulation research reported by Nylund et al., (2007). Prior to fitting the LCA, confirmatory factor analysis (CFA) was used to assess the measurement models for MPS and ATS separately. The measurement model for ATS included the items for the 4 factors that appear on the left side of Figure 1 with each being associated only with its hypothesized factor; i.e., no cross-loaded items. Likewise, the measurement model for MPS included the items associated with self-oriented and socially oriented perfectionism with no cross-loadings. The models were fit with the Mplus software

Table 1: Fit indices for measurement models

Model	RMSEA (90% CI)	CFI (90% CI)	TLI (90% CI)
MPS	0.019 (0.018, 0.022)	0.974 (0.907, 0.994)	0.979 (0.973, 0.981)
ATS	0.038 (0.037, 0.039)	0.945 (0.935, 0.954)	0.960 (0.944, 0.968)

Table 2: Fit index values for latent class models

Model	AIC	BIC	aBIC	BLRT
1 class	186033.96	187917.60	186571.92	
2 classes	186009.053	187841.17	186550.38	<0.0001
3 classes	186006.78	187755.00	186399.95	0.0024
4 classes	186017.03	187824.62	186406.10	0.3105

package, version 8.1 (Muthèn & Muthèn, 2021) using the maximum likelihood algorithm. The maximum likelihood estimation assumption of multivariate normality was assessed using Mardia's Test and found to hold for the data. Commonly used statistics, including *RMSEA*, *CFI*, and *TLI*, along with confidence intervals for each, were used to assess the fit of the models to the data. Standard cut-off values were used for these statistics per Kline (2016), with *RMSEA* ≤ 0.05, *CFI* ≥ 0.95, and *TLI* ≥ 0.95 indicating good model fit. If the measurement models were found to adequately fit the data based on these model fit indices, the LCA was then used to address the research goals of the study.

In order to characterize the classes obtained from the LCA, comparisons were made with respect to demographic characteristics (Table 4) and scores on perfectionism, temperament, and the five factor model of personality (FFM). The latent class comparisons for categorical demographics were made using the Chi-square test of association, with the Benjamini-Hochberg correction used to control the Type I error rate across the tests. Multivariate analysis of variance (MANOVA) was used to compare latent class means with respect to perfectionism, temperament, and personality. For statistically significant MANOVA results, discriminant analysis (DA) was used to identify the variables driving the results. Structure coefficients of 0.32 or greater denoted variables deemed to be important in differentiating the groups (Tabachnick & Fidell, 2022).

Results

Measurement Models

As described above, prior to fitting the latent class models to the data, the measurement models for perfectionism and temperament were assessed using *CFA* (Figure 1). The model fit statistics and their 90% confidence intervals appear in Table 1. Acceptable model fit was defined as *RMSEA* of 0.05 or lower, *CFI* of 0.95 or higher, and *TLI* of 0.95 or higher (Kline, 2016). The results in Table 1 show that the measurement models for both perfectionism and temperament yielded acceptable fit to the data. Therefore, it was determined that the latent class analysis could proceed.

Latent Class Analysis

Table 2 includes the model fit statistics for the 1, 2, 3, and 4 class solutions. The results of the BLRT indicated that the 3 class solution fit the data significantly better than did the 2 class solution, whereas the 4 class solution did not yield better fit than the 3 class model. In addition, the AIC, BIC, and aBIC were all minimized for the 3 class solution. Together, these results suggest that the 3 latent class solution was the optimal model. This result means that it is possible to divide the sample into three groups based upon differences in the interfactor correlations.

The correlations among the latent variables appear in Table 3 for the overall sample, and by latent class. In addition, the number of individuals in each class as

Table 3: Latent correlation coefficients for higher level factors

	Negative Affect	Effortful Control	Extraversion	Orienting Positivity
	Overall			
Self-Oriented	0.31*	0.17*	-0.08	0.12*
Socially Prescribed	0.41*	-0.14*	-0.25*	0.13*
	Latent class 1 (*N*=64)			
Self-Oriented	0.164	0.302*	-0.501*	-0.253*
Socially Prescribed	-0.196	0.214	0.076	-0.325*
	Latent class 2 (*N*=50)			
Self-Oriented	-0.494*	0.216*	0.005	0.606*
Socially Prescribed	-0.246*	-0.482*	-0.483*	0.283*
	Latent class 3 (*N*=318)			
Self-Oriented	0.421*	0.145	-0.047	0.137*
Socially Prescribed	0.517*	-0.191*	-0.234*	0.195*

*$p \leq 0.05$

Table 4: Demographic means (standard deviations) by latent class and structure coefficients from discriminant analysis

Variable	Class 1	Class 2	Class 3	Overall	Structure coefficient
Self-oriented	75.44 (19.44)	80.67 (16.25)	75.52 (15.98)	75.82 (16.28)	0.92
Socially prescribed	48.87 (15.44)	56.83 (15.10)	55.86 (13.83)	55.41 (14.11)	0.39
Negative Affect	3.48 (0.95)	3.71 (0.68)	4.35 (0.69)	4.24 (0.76)	0.77
Effortful control	4.13 (0.95)	3.81 (0.89)	4.39 (0.75)	4.33 (0.79)	0.23
Extraversion	4.80 (1.00)	4.47 (1.04)	4.44 (0.80)	4.47 (0.83)	-0.02
Orienting positivity	5.22 (0.90)	4.63 (0.87)	4.92 (0.81)	4.95 (0.83)	-0.14
Neuroticism	18.53 (5.79)	20.20 (6.65)	24.79 (6.74)	24.02 (6.92)	0.81
Openness	41.88 (6.05)	41.20 (6.27)	38.56 (6.44)	38.98 (6.47)	-0.46
Conscientiousness	33.94 (7.64)	31.92 (6.03)	34.42 (6.00)	34.23 (6.15)	0.23
Agreeableness	34.56 (7.02)	33.24 (6.85)	33.62 (5.93)	33.67 (6.07)	-0.07
Extraversion	26.28 (7.29)	25.04 (8.49)	24.51 (7.24)	24.68 (7.32)	-0.17

well as the statistical significance ($\alpha=0.05$) are also presented in the table. For the entire sample, self-oriented perfectionism was positively correlated with negative affect, effortful control, and orienting positivity. Socially prescribed perfectionism was also positively correlated with both negative affect and orienting positivity, but negatively correlated with effortful control and extraversion. Based on Cohen's (1988) guidelines, the statistically significant correlation values were in the small range, with the exception of those for negative affect.

The class specific correlations revealed a number of differential patterns across classes. The results for class 3 were the most similar to those for the overall sample, which is to be expected given that this class was the largest of the three. More specifically, the statistically significant correlation values for this class were generally somewhat larger than was true for the overall sample. The correlation between self-oriented perfectionism and effortful control was not statistically significant for class 3, whereas it was for the overall sample. Class 1 was marked by a lack of significant correlations involving negative affect, a moderate positive correlation between self-oriented and effortful control, a large negative correlation between self-oriented and extraversion, and negative correlations between orienting positivity and both perfectionism traits. Finally, class 2 exhibited statistically significant negative correlations between negative affect and both types of perfectionism, and positive correlations between orienting positivity and both perfectionism traits. In addition, this class had moderate negative correlations between socially prescribed perfectionism with both extraversion and effortful control.

As noted in the Methods section, MANOVA was used to compare the latent class means for three different variable sets. First, results of the MANOVA for the two types of perfectionism were statistically significant ($F_{4,808}=2.54$, $p=0.039$, $\eta^2=0.102$). Structure coefficients

obtained from the follow-up DA (Table 5) indicated that self-oriented perfectionism (0.92) was the primary driver of the differences among the latent classes, with socially prescribed perfectionism (0.39) contributing somewhat less to the group differences. A review of the means in Table 4 show that latent class 2 had the highest mean for self-oriented perfectionism, with the means for classes 1 and 3 being very close to one another. In addition, the socially prescribed mean was lowest for latent class 1, with the means of classes 2 and 3 being within 1 point of one another. Approximately 10% of the variance in perfectionism scores was associated with latent class membership.

With respect to the temperament variables, the MANOVA results were statistically significant ($F_{8,596}=9.62$, $p<0.001$, $\eta^2=0.114$). The DA structure coefficients in Table 4 reveal that only negative affect (0.77) drove the statistically significant MANOVA result. None of the other variables exhibited structure coefficients that met the 0.32 standard to be considered important (Tabachnick & Fidell, 2022). An examination of the means shows that class 3 had the highest value, followed by class 2, and with class 1 having the lowest mean negative affect. Approximately 11% of the variance in these variables was associated with latent class membership.

Finally, to support the results of the adult temperament dimensions, results of the MANOVA for the Big Five Inventory means identified a statistically significant difference in means among the three classes ($F_{10,784}=5.04$, $p<0.001$, $\eta^2=0.117$). Latent class accounted for 11.7% of the variance in differences for the set of five measures. The DA structure coefficients (Table 4) revealed that the group differences were primarily driven by neuroticism and openness, with no other variable reaching the standard for being considered further (Tabachnick & Fidell, 2007). Given the means in Table 4, it can be seen that latent class 3 had the highest mean for neuroticism, followed by class

2, with class 1 having the lowest mean. With respect to openness, class 3 had the lowest mean, with classes 1 and 2 having comparable (and higher) means.

Summary of Results

Considering the results together, the following conclusions can be reached with respect to the latent classes. Latent class 3 was the largest and had positive correlations between both self-oriented and socially prescribed perfectionism with negative affect and orienting positivity. In addition, the correlation between socially prescribed perfectionism and both effortful control and extraversion were negative. This group also had the highest mean for negative affect and neuroticism (along with class 2) and the lowest mean openness. Latent class 2 was the smallest and had positive correlations between self-oriented perfectionism and both effortful control and orienting positivity. In contrast, the correlation for socially prescribed perfectionism with negative affect, effortful control, and extraversion were all negative, whereas it had a positive correlation with orienting positivity. Finally, those in latent class 2 had the highest means for both self-oriented and socially prescribed perfectionism, relatively lower means for negative affect and neuroticism, and relatively higher mean openness. Finally, for latent class 1, self-oriented perfectionism was positively correlated with effortful control and negatively correlated with both extraversion and orienting positivity. The correlation between socially prescribed perfectionism and orienting positivity was negative, which differed from the results seen for the other two classes. Those in class 1 had the lowest means for socially prescribed perfectionism, negative affect, and neuroticism. In contrast, they had the highest mean value for openness.

Discussion

Despite the wealth of research on personality and perfectionism, researchers have not fully examined the relationships between perfectionism and temperament. Although Leung et al. (2020) used a person-centered approach to examine temperament profiles in medical students to predict differences in perfectionistic concerns and perfectionistic strivings, our purpose was to examine potential subgroups of high ability undergraduates based on differences in the strength of relationships among perfectionism and temperament dimensions. According to Flett, "There is substantial heterogeneity among perfectionists; thus, two people could have comparable patterns and levels of perfectionism but differ markedly in the etiology of these patterns and levels of perfectionism" (Flett & Hewitt, 2022; p. 131). Theoretical models suggest the etiology of perfectionism involves children's temperament as an important factor. Children's temper-

ament evolves into more stable personality traits, such as perfectionism, through interactions within their environment (Shiner & DeYoung, 2013). Although our results cannot address the etiology of perfectionism, they suggest that temperament, as a construct representing innate biological tendencies, is an important factor that should be further investigated.

To interpret our findings, previous research on temperament, personality and perfectionism and the overlapping constructs of negative affect / neuroticism, effortful control / conscientiousness / persistence, and extraversion/extraversion (Evans & Rothbart, 2007) were examined. Moreover, as opposed to the general terms of perfectionistic strivings and perfectionistic concerns, the specific terms from our perfectionism measure—self-oriented and socially prescribed—will be used to discuss our results. Our results for the overall sample for the relationships between temperament and/or personality and perfectionism dimensions are consistent with patterns found in previous research:

1) self-oriented perfectionism and socially prescribed perfectionism were associated with negative affect (Smith et al., 2019; Sticker et al., 2019);
2) self-oriented perfectionism associated with high effortful control and socially prescribed perfectionism associated with lower effortful control (Kobori et al., 2005; Smith et al., 2019; Sticker et al., 2019); and
3) socially prescribed perfectionism associated with low extraversion (Smith et al., 2019; Stoeber et al., 2018)

Given the positive relationship to negative affect and high effortful control for self-oriented perfectionism in the overall sample, these results may represent the temperament profile of individuals with perfectionistic striving as having "a temperament characterized by extreme persistence and some degree of fearfulness "(Flett & Hewitt, 2022, p. 143). Examining the correlations among the subscale scores for self-oriented perfectionism and socially prescribed perfectionism, this hypothesis was supported: the fear subscale had significant correlations of .34 and .32, for self-oriented perfectionism and socially prescribed perfectionism, respectively, and the activation control subscale (i.e., approaching and attending to a task one would rather avoid) had a significant correlation of .24 for self-oriented perfectionism and no significant relationship to socially prescribed perfectionism. Given these relationships, individuals with self-oriented perfectionism in high ability students may be characterized as having temperaments with high levels of fear and persistence.

Yet the patterns of perfectionism and temperament in the three subgroups indicate the importance of looking beyond correlations within the overall sample. Given that the results for the overall sample are consistent with previous research, subgroups will be compared to the overall results (see Table 3). Latent class 3, the largest

subgroup, mirrored the patterns found for the overall sample, except for no positive relationship between effortful control and self-oriented perfectionism. Latent class 2 was also similar in the relationships between perfectionism and temperament compared to the overall sample, with one major exception: both self-oriented perfectionism and socially prescribed perfectionism had significant negative relationships to negative affect. Latent class 1 as a subgroup revealed no relationship between perfectionism and negative affect. These findings are inconsistent with a wealth of research that has documented positive relationships between perfectionism, negative affect, and neuroticism (Cruce et al., 2012; DeCuyper et al., 2015; Egan et al., 2015; Rice et al., 2007; Ulu & Tezer, 2010, Stoeber et al., 2018).

Supporting the results of the latent profile analysis, results of the MANOVA indicated that negative affect was the primary driver of the temperamental subgroup differences. In addition, this result was supported with the Big Five dimension of neuroticism which was also a significant dimension related to differences among the three subgroups. The prominent role of negative affect and its relationships with perfectionism in differentiating the subgroups might be due to the different ways that high ability students perceive their neuroticism. According to Shiner (2019), some people may prefer to express their neurotic traits, stating that "…when people who are high on neuroticism want to perform effectively, they prefer to experience worry, and they may even perform better when in a worried state" (p. 143). In a sample of adolescents, Damian et al. (2021) found positive bi-directional effects of perfectionistic concerns and negative affect using cross-lag panel analysis. Thus, perfectionistic concerns may help individuals perceive threats, which leads to higher levels of worry and negative emotions but may also help these individuals avoid threats as a coping mechanism. Differences among high ability students in the three different subgroups may stem from how they perceive their negative affect as supporting their attempts to be perfect or hindering their attempts to be perfect.

There has been no research that has examined the relationship between orienting sensitivity and perfectionism, but the results for the overall sample revealed a positive relationship between orienting sensitivity and both self-oriented perfectionism and socially prescribed perfectionism. Although the means were not significant across the three subgroups for orienting sensitivity, like negative affect, the relationship between perfectionism and orienting sensitivity was different among the three subgroups: negative correlations for latent class 1; large positive correlations for latent class 2; and smaller positive correlations for latent class 3. Given the lack of previous research in orienting sensitivity and perfectionism, it is difficult to interpret this finding. Orienting sensitivity was related to openness in adulthood (Evans & Rothbart,

2007) and openness has been consistently associated with intelligence (Ashton et al., 2000; DeYoung et al., 2005). Yet research on openness and perfectionism have generally failed to find strong significant relationships (Smith et al., 2019; Stricker et al., 2019). However, in the current study, openness, along with neuroticism, significantly contributed to subgroup differences. Given the association with openness and intelligence, the results of different relationships between perfectionism and orienting sensitivity in our study might be related to our sample of honors college students. Moreover, might there be a complex interactive relationship between negative affect and openness for gifted students that alters the experience of being a perfectionist? Future research on orienting sensitivity, openness, and perfectionism will need to replicate our findings of three latent classes within the general population.

Limitations and Future Research

Replications of this research in the general population should also include a more diverse sample of students. One limitation of our research was the majority white student sample with many students reporting that they had parents with college or graduate degrees (i.e., 66.2% of mothers and 64% of fathers). Considering that parental education can be used as a proxy for socioeconomic status (SES), students in the current study likely came from middle- to high-income families. The higher SES, white students included in the current study limits the generalizability of our results. Given the limitations of our sample and the exploratory nature of this study, much more research is needed to determine how temperament impacts the experience and/or development of perfectionism (Flett et al., 2022). Several studies with children and adolescents examining different aspects of temperament and perfectionism have demonstrated significant findings to warrant additional research. Affrunti et al. (2016) examined a self-report measure of perfectionism completed by 7- to 13-year-old children [Children and Adolescent Perfectionism Scale; Flett et al., 1997], the fear subscale of the Temperament in Middle Childhood Questionnaire (Simonds & Rothbart, 2004), and the Behavioral Rating Inventory of Executive Functions (BRIEF; Gioia et al., 2000) completed by parents. Only the interaction of children's fearful temperament and cognitive shift (i.e., the ability to flexibility solve problems and alternate attention) predicted perfectionistic concerns (Affrunti et al., 2016). In a longitudinal study of children ages 7- to 11-years old, children's levels of surgency (e.g., activity level, excitability) predicted a pattern of initial high, then decreasing perfectionistic concerns (Hong et al., 2016), with the facets of impulsivity and high-intensity pleasure as significant predictors for surgency. In another longitudinal study with adolescents, perfection-

istic concerns increased over time with difficulty with emotional regulation, including difficulties controlling impulsive behaviors when distressed (Vois & Damian, 2020). Despite this preliminary work, researchers have focused on different aspects of temperament (e.g., fear, emotional regulation, surgency) and used different samples (children, adolescents) and designs, making it difficult to draw strong conclusions about the impact of temperament on the development of perfectionism.

To fully understand the role of temperament on perfectionism, a large scale, longitudinal study of young children through adolescence is needed to determine how temperament and parenting, which has been the major focus on theoretical and empirical work on the development of perfectionism, may interact over time to evolve into perfectionistic strivings and/or perfectionistic concerns. Within this large-scale study, populations of high ability and typically developing children should be included to determine if intellectual ability alters the developmental pathway toward perfectionistic traits. Future longitudinal studies should also examine other-oriented perfectionism—thoughts and feelings that other people should be perfect—as only self-oriented perfectionism and socially prescribed perfectionism were examined in our study. Low levels of agreeableness have been associated with other-oriented perfectionism (Hill et al., 1997; Smith et al., 2019).

In conclusion, our research has demonstrated that relationships between individuals' temperament and perfectionism show different patterns across subgroups of high ability students. Although the largest subgroup (latent class 3) revealed the same patterns of relationships observed in prior research, latent class 1 ($n = 64$) and latent class 2 ($n = 50$) had unique patterns from latent class 3 and each other. In particular, the relationships between perfectionism and negative affect and perfectionism and orienting sensitivity differed across the three subgroups. Given the significantly different means for negative affect among the three subgroups, negative affect may play an important role in the experience of perfectionistic traits, with variations from low to high negative affect in relation to perfectionism. Temperament may be an important factor as researchers of gifted students examine subgroups with person-centered data analysis and outcomes such as motivation, coping strategies, and psychological constructs (Cross et al., 2018; Mofield & Peters, 2015; Rinn et al., 2020). Most importantly, this exploratory study demonstrated that there is no single temperamental profile associated with perfectionism, and instead, temperament might help explain the heterogeneity among perfectionists.

References

Affrunti, N.W., Gramszlo, C., & Woodruff-Borden, J. (2016). Executive function moderates the association between fearful temperament and dimensions of perfectionism. *Personality and Individual Differences, 89,* 117-122. https://doi.org/10.1016/j.paid.2015.10.012

Ashton, M. C., Lee, K., Vernon, P. A., & Jang, K. L. (2000). Fluid intelligence, crystallized intelligence, and openness / intellect factor. *Journal of Research in Personality, 34,* 198-207. https://doi.org/10.1006/jrpe.1999.2276

Basirion, Z., Abd Majid, R., & Mohd Jelas, Z. (2013). Relationship between personality and perceived parenting styles with perfectionism among academically gifted students. *Journal of Special Needs Education, 3,* 22-33. Retrieved from https://journal.nase.org.my/index.php/jsne/article/view/51

Blatt, S. J. (1995). The destructiveness of perfectionism: Implications for the treatment of depression. *American Psychologist, 50*(12), 1003-1020. https://doi.org/10.1037//0003-066x.50.12.1003

Cloninger, C. R., Przybeck, T. R., Svrakic, D. M., & Wetzel, R. D. (1994). *The temperament and character inventory (TCI): A guide to its development and use.* St-Louis, MO: Washington University.

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R).* Odessa, FL: Psychological Assessment Resources.

Costa, P., & McCrae, R. (1995). Domains and facets: Hierarchical personality assessment using the Revised NEO Personality Inventory. *Journal of Personality Assessment, 64*(1), 21-50. https://doi.org/10.1207/s15327752jpa6401_2

Cross, T. L., Cross, J. R., Mammadov, S., Ward, T. J., Neumeister, K. S., & Andersen, L. (2018). Psychological heterogeneity among honors college students. *Journal for the Education of the Gifted, 41*(3), 242-272. https://doi.org/10.1177/0162353218781754

Cruce, S.E., Pashak, T.J., Handal, P.J., Munz, D.C., & Gfeller, J.D. (2012). Conscientious perfectionism, self-evaluative perfectionism, and the five-factor model of personality traits. *Personality and Individual Differences, 53,* 268-273. https://doi.org/10.1016/j.paid.2012.03.013

Curran, T., & Hill, A. P. (2019). Perfectionism is increasing over time: A meta-analysis of birth cohort differences from 1989 to 2016. *Psychological Bulletin, 145*(4), 410-429. https://doi.org/10.1037/bul0000138

Damian, L.E., Negru-Subtirica, O., Stoeber, J., & Vois, D. (2021). On the longitudinal interplay between perfectionism and general affect in adolescents. *Journal of Research in Personality, 93,* https://doi.org/10.1016/j.jrp.2021.104102

DeCuyper, K., Claes, L., Hermans, D., Pieters, G., & Smits, D. (2015). Psychometric properties of the Multidimensional Perfectionism Scale of Hewitt in a Dutch-speaking sample: Associations with the big five personality traits. *Journal of Personality Assessment, 97*(2), 182-190. https://doi.org/10.1080/00223891.2014.963591

DeYoung, C. G., & Allen, T. A. (2019). Personality neuroscience: A developmental perspective. In D. P. McAdams, R. L. Shiner, & J. L. Tackett (Eds.), *Handbook of personality development* (pp. 79-105). The Guilford Press.

DeYoung, C. G., Peterson, J. B., & Higgins, D. M. (2005). Sources of Openness/Intellect: Cognitive and neuropsychological correlates of the Fifth Factor of Personality. *Journal of Personality, 73*(4), 825-858. https://doi.org/10.1111/j.1467-6494.2005.00330.x

Egan, S. J., Vinciguerra, T., & Mazzucchelli, T. G. (2015). The role of perfectionism, agreeableness, and neuroticism in predicting dyadic adjustment. *Australian Journal of Psychology, 67*(1), 1-9. https://doi.org/10.1111/ajpy.12038

Evans, D. E., & Rothbart, M. K. (2007). Developing a model for adult temperament. *Journal of Research in Personality, 41*(4), 868-888. https://doi.org/10.1016/j.jrp.2006.11.00

Evans, D. E., & Rothbart, M. K. (2009). A two-factor model of temperament. *Personality and Individual Differences, 47*(6), 565-570.

Flett, G. L., & Hewitt, P. L. (2006). Positive versus negative perfectionism in psychopathology: A comment on Slade and Owens' dual process model. *Behavior Modification, 30*(4), 472-495. https://doi.org/10.1177/01454455062788026

Flett, G. L., & Hewitt, P. L. (2022). Perfectionism in childhood and adolescence: A developmental approach. American Psychological Association. https://doi.org/10.1037/0000289-000

Flett, G. L., Hewitt, P. L., Boucher, D. J., Davidson, L. A., & Munro, Y. (1997). *The Child-Adolescent Perfectionism Scale: Development, validation and association with adjustment.* Unpublished manuscript, York University, Toronto, Ontario, Canada.

Flett, G. L., Hewitt, P. L., Oliver, J. M., & Macdonald, S. (2002). Perfectionism in children and their parents: A developmental analysis. In G.L. Flett & P.L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 89-132). American Psychological Association. https://doi.org/10.1037/10458-004

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive therapy and research, 14*(5), 449-468. https://doi.org/10.1007/BF01172967

Gioia, G. A., Isquith, P. K., Guy, S. C., & Kenworthy, L. (2000). Behavior Rating Inventory of Executive Function. *Child Neuropsychology, 6*, 235-238. http://dx.doi.org/10.1076/chin.6.3.235.3152

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*(3), 456-470. https://doi.org/10.1037//0022-3514.60.3.456

Hewitt, P. L., Flett, G. L., & Mikail, S. F. (2017). *Perfectionism: A relational approach to conceptualization, assessment, and treatment.* The Guilford Press.

Hill, A. P., & Curran, T. (2019). A case for multiple pathways to increasing perfectionism: Reply to Soenens and Vansteenkiste (2019). *Psychological Bulletin, 145*(4), 433-435. https://doi.org/10.1037/bul0000189

Hill, R. W., McIntire, K., & Bacharach, V. R. (1997). Perfectionism and the Big Five factors. *Journal of Social Behavior and Personality, 12*, 257-270.

Hong, R. Y., Lee, S. M., Chang, R. Y., Zhou, Y., Tsai, F., & Tan, S. H. (2016). Developmental trajectories of maladaptive perfectionism in middle childhood. *Journal of Personality.* https://doi.org/10.1111/jopy.12249.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114-158). The Guilford Press.

Kline, R.B. (2011). *Principles and Practice of Structural Equation Modeling.* The Guilford Press.

Kobori, O., Yamagata, S., & Kijima, N. (2005). The relationship of temperament to multidimensional perfectionism trait. *Personality and Individual Differences, 38*(1), 203-211. https://doi.org/10.1016/j.paid.2004.04.003

Lavrijsen, J., Soenens, B., Vansteenkiste, M., & Verschueren, K. (2021). Is intelligence related to perfectionism? Multidimensional perfectionism and parental antecedents among adolescents across varying levels of cognitive ability. *Journal of Personality, 89*(4), 652-671. https://doi.org/10.1111/jopy.12606

Leung, J., Cloninger, C. R., Hong, B. A., Cloninger, K. M., & Eley, D. S. (2019). Temperament and character profiles of medical students associated with tolerance of ambiguity and perfectionism. *PeerJ, 7*, e7109-e7109. https://doi.org/10.7717/peerj.7109

Mardia, K. V. (1980). 9 Tests of unvariate and multivariate normality. *Handbook of Statistics, 1*, 279-320.

McAdams, D. P., Shiner, R. L., & Tackett, J. L. (Eds.). (2019). *Handbook of personality development.* The Guilford Press.

Miller, A. L., & Speirs Neumeister, K. L. (2017). The influence of personality, parenting styles, and perfectionism on performance goal orientation in high ability students. *Journal of Advanced Academics, 28*(4), 313–344. https://doi.org/10.1177/1932202X17730567

Mofield, E. L., & Peters, M. P. (2015). Multidimensional perfectionism within gifted suburban adolescents: An exploration of typology and comparison of samples. *Roeper Review: A Journal on Gifted Education, 37*(2), 97-109.

Molnar, D. S., Sirois, F. M., Flett, G. L., & Sadava, S. (2020). A person-oriented approach to multidimensional perfectionism: Perfectionism profiles in health and well-being. *Journal of Psychoeducational Assessment, 38*(1), 127-142. https://doi.org/10.1177/0734282919877754

Muthén, L. K., & Muthén, B. O. (1998-2013). *Mplus User's Guide.* Seventh Edition. Los Angeles, CA: Muthén & Muthén.

Nylund, K.L., Asparouhov, T., Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling, 14*(4), 535-569. https://doi.org/10.1080/10705510701575396

Ogurlu, U. (2020). Are gifted students perfectionistic? A meta-analysis. *Journal for the Education of the Gifted, 43*(3), 227-251. https://doi.org/10.1177/0162353220933006

Rice, K.G., Ashby, J.S., & Slaney, R.B. (2007). Perfectionism and the five-factor model of personality. *Assessment, 14*(4), 385-398. https://doi.org/10.1177/1073191107303217

Rice, K. G., Lopez, F. G., & Vergara, D. (2005). Parental/Social influences on perfectionism and adult attachment orientations. *Journal of Social and Clinical Psychology, 24*, 580-605. https://doi.org/10.1521/jscp.2005.24.4.580

Rinn, A. N., Soles, K. L., Ferguson, S., & Smith, K. N. (2020). Psychological profiles among high ability undergraduate students. *High Ability Studies, 31*(2), 157–179. https://doi.org/10.1080/13598139.2019.1607721

Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology, 78*(1), 122-135. https://doi.org/10.1037//0022-3514.78.1.122

Rothbart, M. K., Posner, M. I., & Kieras, J. (2006) Temperament, attention, and the development of self-regulation. In K. McCartney, D. Phillips (Eds.), *Blackwell Handbook of Early Childhood Development.* (pp. 338-357). Malden: Blackwell Publishing. https://doi.org/10.1002/9780470757703

Shiner, R. L. (2019). Negative emotionality and neuroticism from childhood through adulthood: A lifespan perspective. In D. P. McAdams, R. L. Shiner, & J. L. Tackett (Eds.), *Handbook of personality development* (pp.137-152). Guilford Press.

Shiner, R. L., & DeYoung, C. G. (2013). The structure of temperament and personality traits: A developmental perspective. In P. Zelazo (Ed.), *Oxford handbook of developmental psychology* (pp. 113-141). Oxford University Press.

Simonds, J., & Rothbart, M. K. (2004, October). *The temperament in middle childhood questionnaire (TMCQ): A computerized self-reported measures of temperament for ages 7-10.* Poster session presented at the Occasional Temperament Conference, Athens, GA.

Sirois, F. M., & Molnar, D. S. (2016). Conceptualizations of perfectionism, health, and well-being: An introductory overview. In F.M. Sirois & D.S. Molnar (Eds.), *Perfectionism, health, and well-being*. Springer International Publishing.

Soenens, B., & Vansteenkiste, M. (2019). Are parents responsible for the rise of perfectionism? comment on Curran and Hill (2019). *Psychological Bulletin, 145*(4), 430-432. https://doi.org/10.1037/bul0000167

Slaney, R.B., Rice, K.G., Mobley, M., Trippi, J., & Ashby, J.S. (2001). The revised Almost Perfect Scale. *Measurement and Evaluation in Counseling and Development, 34*, 130-145. https://doi.org/10.1080/07481756.2002.12069030

Smith, M. M., Sherry, S. B., Vidovic, V., Saklofske, D. H., Stoeber, J., & Benoit, A. (2019). Perfectionism and the five-factor model of personality: A meta-analytic review. *Personality and Social Psychology Review, 23*(4), 367-390. https://doi.org/10.1177/1088868318814973

Smith, M. M., Saklofske, D. H., Yan, G., & Sherry, S. B. (2016). A person-centered perspective on multidimensional perfectionism in Canadian and Chinese university students: A multigroup latent profile analysis. *Journal of Multicultural Counseling and Development, 44*(2), 135-151. https://doi.org/10.1002/jmcd.12042

Speirs Neumeister, K. L. (2018). Perfectionism in gifted students. In J. Stoeber (eds.), *The psychology of perfectionism: Theory, research, applications.* (pp. 68-88). Routledge.

Ståhlberg, J., Tuominen, H., Pulkka, A., & Niemivirta, M. (2019). Maintaining the self? exploring the connections between students' perfectionistic profiles, self-worth contingency, and achievement goal orientations. *Personality and Individual Differences, 151*, 109495. https://doi.org/10.1016/j.paid.2019.07.005

Stoeber, J., & Otto, K. (2006). Positive conceptions of perfectionism: Approaches, evidence, challenges. *Personality and Social Psychology Review, 10*(4), 295-319. http://doi.org/10.1207/s15327957pspr1004_2

Stoeber, J., Otto, K., & Dalbert, C. (2009). Perfectionism and the Big Five: Conscientiousness predicts longitudinal increases in self-oriented perfectionism. *Personality and Individual Differences, 47*(4), 363–368. https://doi.org/10.1016/j.paid.2009.04.004

Stoeber, J., Corr, P. J., Smith, M. M. and Saklofske, D. H. (2018) Perfectionism and personality. In J. Stoeber (eds.), *The psychology of perfectionism: Theory, research, applications* (pp. 68-88). Routledge.

Stricker, J., Buecker, S., Schneider, M., & Preckel, F. (2019). Multidimensional perfectionism and the big five personality traits: A meta-analysis. *European Journal of Personality, 33*(2), 176-196. https://doi.org/10.1002/per.2186

Stricker, J., Buecker, S., Schneider, M., & Preckel, F. (2020). Intellectual giftedness and multidimensional perfectionism: A meta-analytic review. *Educational Psychology Review, 32*(2), 391-414. https://doi.org/10.1007/s10648-019-09504-1

Suddarth, B. H., & Slaney, R. G. (2001). An investigation of the dimensions of perfectionism in college students. *Measurement and Evaluation in Counseling and Development, 34*, 157-165. https://doi.org/10.1080/07481756.2002.12069032

Tabachnick, B.G., & Fidell, L.S. (2007). *Using Multivariate Statistics* (5th ed.). Allyn and Bacon.

Ulu, I. P., & Tezer, E. (2010). Adaptive and maladaptive perfectionism, adult attachment, and Big Five personality traits. *The Journal of Psychology, 144*(4), 327-340. https://doi.org/10.1080/00223981003784032

Vois, D., & Damian, L.E. (2020). Perfectionism and emotion regulation in adolescents: A two-wave longitudinal study. *Personality and Individual Differences, 156*, 109756. https://doi.org/10.1016/j.paid.2019.109756

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