



A Meta-Analysis of Perfectionism and Academic Achievement

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Abstract

Over the past two decades, many studies have examined the relationship between perfectionism and academic achievement. However, these studies have yet to be systematically collated and meta-analysed. The purpose of the present study was to do so. A literature search returned 37 studies ($N = 8901$) and 156 effect sizes. Random-effects meta-analyses indicated that perfectionistic strivings showed a significant small to medium positive relationship with academic achievement ($r^+ = .24$), whereas perfectionistic concerns showed a significant small negative relationship with academic achievement ($r^+ = -.08$). One moderator of these relationships was the instrument that was used to measure perfectionism. This was particularly the case for perfectionistic concerns. The findings suggest that the relationship between perfectionism and academic achievement is complex with perfectionistic strivings potentially aiding and perfectionistic concerns potentially hindering students' academic achievement.

Keywords Perfectionistic strivings · Perfectionistic concerns · Performance · Education · School · College · University

Introduction

Whether it be either as an end in itself, or as a means to other ends, few people refute the benefits of education. Higher academic achievement is linked to numerous positive outcomes at an individual level such as personal health and wealth (e.g. Groot and Maassen van den Brink 2007; Roth and Clarke 1998) and it is associated with greater societal prosperity (OECD 2016). Academic achievement, therefore, is important not only for individuals but for organisations and society as a whole. Not unexpectedly, then, educators have invested substantial time, effort and resources in determining the best means to ensure that students succeed. These

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endeavours owe a great deal to research examining the predictors of academic achievement. With the present study, the aim was to ascertain whether perfectionism is one such predictor.

Academic Achievement

Academic achievement can be measured in various ways. In the present study, the focus was on ways that indicate the extent to which an individual has accomplished a specific goal within school, high school and college (see Schneider and Preckel 2017). These ways include individual test performance (e.g. end of term exams), class performance (e.g. grades) and performance across classes (e.g. grade point average, GPA). These were the focus because they are the most commonly used measures of academic achievement in both research and practice. They also have the additional advantage of providing reliable estimates both across classes and over time (e.g. Bacon and Bean 2006).

The predictors of academic achievement are complex. At their broadest, predictors can be divided into three categories: organisational features of learning institutions, the interaction between learners and their learning context and individual differences (see Hattie 2008). With this in mind, a wide range of variables have the potential to influence achievement. For example, research has found factors such as feedback, homework, teacher clarity, intelligence and motivation to positively predict academic achievement. By contrast, summer vacations, moving schools, procrastination, anxiety and stress negatively predict academic achievement (see Hattie 2008).

Researchers in educational psychology posit that personality factors may be particularly important. Personality reflects consistent individual differences in thoughts, feelings and behaviours. Accordingly, personality traits capture the likelihood that behaviour consistent with those traits is expressed in any given situation. Personality traits will therefore increase the likelihood of aptitudes, attitudes and behaviours that are conducive to better (or worse) achievement. These will include broad patterns of behaviour such as general diligence, motivational orientations and perseverance and also specific patterns of behaviour such as time spent on relevant tasks, beliefs about the causes of success and failure and the suppression of competing activities (O'Connor and Paunonen 2007; McAdams and Pals 2007).

Numerous studies have investigated the relationships personality factors show with achievement (see Richardson et al. 2012, for a review). One example is the five-factor model of personality (i.e. openness, conscientiousness, extraversion, agreeableness and neuroticism). Poropat (2009) performed a meta-analysis of studies ($k = 138$) examining the five-factor personality traits and academic achievement (focused on grades and GPA). All five traits were found to predict academic achievement. The size of these correlations ranged from small to medium, with conscientiousness (comprising dependability and a will to achieve) showing the strongest positive correlation of the five factors (see also Richardson et al. 2012 and Vedel 2014).

Perfectionism

One additional personality factor that may predict variance in academic achievement is perfectionism. Perfectionism is a personality trait characterised by striving for flawlessness and setting exceedingly high standards of performance accompanied by tendencies for overly critical evaluations of one's behaviour (Frost et al. 1990). However, perfectionism has various aspects, and there are different dimensions of perfectionism with different characteristics. As such, perfectionism is best conceptualised as a multidimensional trait (see Enns and Cox 2002,

for a review). Factor analytic studies have provided support for two higher-order dimensions: perfectionistic strivings that capture personal standards and a self-oriented striving for perfection and perfectionistic concerns that capture concern over mistakes, feelings of discrepancy between one's expectations and performance and negative reactions to imperfection (Gotwals et al. 2012; Stoeber and Otto 2006). This higher-order model is often adopted when meta-analysing research on perfectionism (e.g. Hill and Curran 2016; Limburg et al. 2017; Smith et al. 2018).

Perfectionism has been associated with numerous motivational, cognitive, affective and behavioural outcomes (see Stoeber 2018). In this regard, differentiating perfectionistic strivings and perfectionistic concerns is important because they show different and sometimes opposite patterns of relationships with various outcomes. Specifically, perfectionistic concerns show consistent positive relationships with maladaptive outcomes (e.g. academic burnout; Hill and Curran 2016), whereas perfectionistic strivings are more ambivalent in that they can show positive relationships with adaptive outcomes (e.g. academic engagement; Damian et al. 2017a, 2017b) and maladaptive outcomes (e.g. workaholism; Stoeber and Damian 2016). The associations that perfectionistic strivings show with positive characteristics are particularly evident when the overlap with perfectionistic concerns is controlled for and perfectionistic strivings' unique relationships are examined (see Stoeber and Gaudreau 2017 for further details).

Many meta-analyses on perfectionism have been published in recent years. These have primarily focused on maladaptive outcomes. For example, Limburg et al. (2017) conducted a meta-analysis of the relationships between perfectionism and psychopathology ($k = 284$). They found that perfectionistic concerns showed positive relationships with numerous psychopathological outcomes (e.g. depression, obsessive–compulsive disorder, suicidal ideation). Perfectionistic strivings also showed positive relationships with several of these outcomes (albeit to a smaller degree). In addition, in a meta-analysis of the relationships between perfectionism and burnout ($k = 43$), perfectionistic concerns showed a positive relationship with burnout symptoms, whereas perfectionistic strivings showed a negative relationship (Hill and Curran 2016). This same pattern of relationships has also been shown in relation to procrastination ($k = 43$; Sirois et al. 2017). As can be seen, meta-analytic summaries of research clearly show that perfectionism has something to say in relation to maladaptive outcomes, but what about adaptive outcomes such as achievement?

Perfectionism and Academic Achievement

Perfectionism and performance have long been intertwined. Early theoretical work suggested that perfectionism was exclusively associated with psychopathological outcomes (e.g. Hollender 1965). As such, the debilitating cognitions, emotions and behaviours that provided the basis for psychopathology were argued to be antithetical to better performance. However, others provided descriptions of how perfectionism may, in certain circumstances, underscore better performance. These descriptions focus on the motivational qualities of perfectionism such as meticulousness (Missildine 1963), persistence (Hollender 1965) and the need to demonstrate superiority (Adler 1956). Indeed, Burns (1980) lists effort and the possible production of fine work as the only advantage of perfectionism. In reconciling the two perspectives, Missildine (1963) aptly described perfectionists as viewing themselves as “successful failures”. On one hand, in some aspects of their lives, they may come to be regarded as high achievers. On the other hand, they experience significant psychological anguish when they make mistakes or when they perceive themselves to have failed.

From a theoretical perspective, both dimensions of perfectionism could be associated with academic achievement. Exceptionally high standards are a defining feature of perfectionism that are encapsulated by perfectionistic strivings. These personally determined exceptionally high standards relate to motivational factors that will direct, energise and regulate behaviours that are conducive to better performance (e.g. Stoeber et al. 2018). For example, there will be circumstances when individuals high in perfectionistic strivings are more engaged and are more likely to persevere, both of which may positively influence behaviours determining achievement. These standards may also mean that more time is spent on relevant tasks, providing some further means for better performance. Consequently, perfectionistic strivings are most likely of the two broad dimensions of perfectionism to be positively associated with academic achievement, at least when the relationship with perfectionistic concerns is controlled.

Perfectionistic concerns, too, may be associated with important processes that will affect achievement. Perfectionistic concerns are comprised of overly critical evaluations and concerns about making mistakes. Such evaluations are associated with maladaptive cognitions such as worry, rumination and anxiety that may stifle productive behaviour (e.g. Hewitt and Flett 1991). In some regards, the behaviours associated with perfectionistic concerns are reflective of learned helplessness whereby individuals experience overwhelming feelings of external pressure and a lack of control. Consequently, individuals high in perfectionistic concerns may be more concerned about avoiding mistakes than they are about learning. Finally, individuals high in perfectionistic concerns may spend less time on relevant activities and instead procrastinate as a means to avoid facing possible failure. Therefore, it is perfectionistic concerns that are likely to be negatively associated with academic achievement.

Existing Research

The most recent review of research examining the relationship between perfectionism and performance was conducted by Stoeber (2012). The review explored performance in education, sport and a range of other domains (e.g. music competitions) with the aim of determining whether perfectionism was associated with better or worse performance. On the basis of the correlations exhibited by perfectionistic strivings and perfectionistic concerns with indicators of academic achievement (e.g. GPA), Stoeber (2012) established that the majority of studies ($k = 18$ out of 26) examining the relationship between perfectionism and academic achievement showed perfectionistic strivings to be positively related to academic achievement. However, the relationship between perfectionistic concerns and academic achievement was unclear. Specifically, while some studies ($k = 7$) showed small negative relations, most studies showed no relation ($k = 15$). Based on this review, Stoeber (2012) concluded that perfectionistic strivings were associated with higher academic achievement, while perfectionistic concerns were ambiguous. These findings have been further corroborated in a recent meta-analysis of perfectionism in sport in which perfectionistic strivings showed a positive relationship with sport performance and perfectionistic concerns showed no relation ($k = 6$; Hill et al. 2018).

Whereas the review by Stoeber (2012) provided the first synthesis of the extant literature examining perfectionism and academic achievement, it did not examine if the findings of the studies were statistically significant, nor were effect sizes weighted based on their variance. This is important because without an analysis of the weighted size and significance of these relations, the extent to which perfectionism is related to academic achievement is unclear. In addition, an examination of the individual studies reviewed by Stoeber (2012) suggests the findings are inconsistent for both dimensions. Here, then, more accurate estimations of these relationships may be provided by meta-analyses of the combined weighted effect sizes.

Moderators

Meta-analyses have the additional advantage of allowing an examination of possible moderating factors; that is, an examination of study characteristics that explain why there may be systematic differences in effect sizes across studies. Once again, Stoeber (2012) did not conduct such analyses. Several factors could moderate the relationship between perfectionism and academic achievement. The first is the instrument that is used to measure perfectionism. Within the numerous models of perfectionism, there are differences in how the two higher-order dimensions of perfectionism are conceptualised. For example, the self-oriented perfectionism subscale focuses on internal pressures to be perfect, whereas the personal standards subscale focuses on extremely high standards for performance. There may therefore be differences in how these dimensions manifest in educational contexts. Indeed, previous research has found that the instrument used to measure perfectionism moderates the relationships between perfectionism and procrastination and psychopathology (Limburg et al. 2017; Sirois et al. 2017). Consequently, the instrument used may act as a moderator of the perfectionism–academic achievement relationship.

The next moderating factor is gender. In this regard, female students have been shown to report higher levels of perfectionism than male students have. More specifically, female students may be more likely to have higher levels of perfectionistic concerns (e.g. Rice et al. 2013a). Because female students' experiences may differ from those of male students (e.g. Spencer et al. 1999), it is possible that the effects of perfectionism for female students will be different (and maybe worse) than for male students. As such, gender was examined as a moderator in the present study.

The final possible moderating factor examined in the present study is academic level. In this regard, Poropat (2009) hypothesised that the influence of personality on academic achievement would reduce with increasing levels of education. He argued that this was because of an increased variety of learning environments and activities as students progress through the educational system. Support for this hypothesis was provided by Poropat (2009) in relation to the five-factor model (for all factors except conscientiousness). Consequently, perfectionism may manifest in a different manner depending on the educational environment students find themselves in (i.e. primary, secondary, tertiary). Meta-analyses will help shed light on these unexplored moderating factors.

The Present Study

Based on the preceding discussion, the present study aimed to provide a first meta-analysis of research examining the relationship between perfectionism and academic achievement. Based on the theoretical assertions articulated above and the findings of previous research, it was hypothesised that perfectionistic strivings would be positively related to academic achievement. However, because theory and the findings of previous research are contradictory, there was no clear expectation for perfectionistic concerns.

Method

Literature Search

To begin with, an extensive computerised literature search was conducted using the following databases: PsycINFO, MEDLINE, Education Abstracts and ProQuest

Dissertations & Theses (American & International and United Kingdom & Ireland). The following search terms were used: “perfectionism”* (for perfectionism, perfectionist and perfectionistic) and “academic OR education OR university OR college OR school” and “grade OR GPA OR exam OR performance OR achievement” (see Poropat 2009). The search date was between January 1990 (the year the first article on multidimensional perfectionism was published) and March 2018. Overall, the search returned 1089 studies. Aside from a standardised search, an exploratory search was conducted on Google Scholar and by scanning the reference lists of relevant reviews, book chapters and journal articles. After removing duplicates and screening abstracts for relevance, 45 articles remained. These were assessed further using the inclusion criteria below. See Fig. 1 for an overview of this process.

Inclusion Criteria

As regards criteria for the meta-analysis, studies were included if they (a) measured perfectionism and academic achievement using scales that yielded quantitative values; (b) measured multidimensional perfectionism; (c) measured either GPA, grades or exam performance; (d) included an effect size, sufficient information for estimation of an effect size or this information was obtained from the corresponding author; (e) were published in English; (f) were a published journal article, thesis/dissertation or conference presentation; and (g) included a sample that was unique (e.g. not included in both a journal article and a thesis/dissertation). In such instances, only the most complete and recent account of the data was used. When data were missing, the corresponding authors of the articles were contacted to retrieve this data. Six corresponding authors were contacted and one responded to the request within 3 weeks (the stated deadline). These criteria resulted in the final inclusion of 37 studies reporting 96 effect sizes capturing the relationship between perfectionism and academic achievement. Of these, 36 studies adopted a cross-sectional design and one study adopted a longitudinal design.

Recorded Variables

Next, a coding sheet was completed for each study. The coding sheet included (a) publication information (authors/year), (b) instructional environment (primary, secondary or tertiary), (c) sample size, (d) students’ age, (e) the percentage of the sample that were female, (f) instrument used to measure perfectionism and indicators of perfectionistic strivings and concerns, (g) measure of academic achievement (GPA, grades or exam), (h) whether achievement was measured objectively or via self-report, (i) bivariate correlations between dimensions of perfectionism and (j) bivariate correlations between dimensions of perfectionism and academic achievement. Following previous meta-analyses on perfectionism (e.g. Hill and Curran 2016), recommendations from researchers in this area (e.g. Stoeberl 2011) and evidence from factor analytic studies (e.g. Bieling et al. 2004; Cox et al. 2002; Frost et al. 1993), the following indicators of perfectionistic strivings and perfectionistic concerns were used. For perfectionistic strivings, these were the personal standards subscale (exceedingly high standards of performance) from the Multidimensional Perfectionism Scale of Frost et al. (1990), the self-oriented perfectionism subscale (requiring perfection from oneself) from Hewitt and Flett’s (1991) Multidimensional Perfectionism Scale or Child and Adolescent Perfectionism Scale (Flett et al. 2001), the

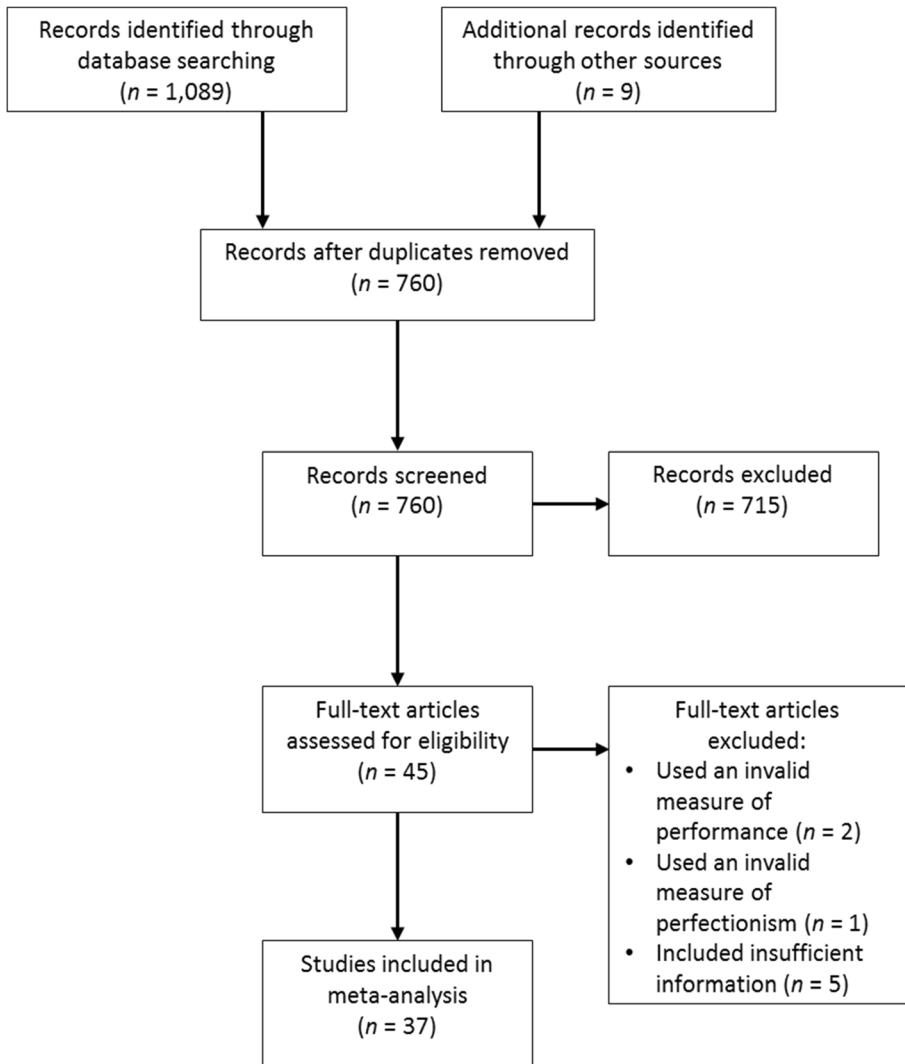


Fig. 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram illustrating study selection

striving for perfection subscale (self-oriented striving for perfection) from the Multidimensional Inventory of Perfectionism in Sport¹ (Stoeber et al. 2006), the high standards subscale (striving for exceedingly high standards) from the revised Almost Perfect Scale (Slaney et al. 2001) and the striving for excellence (self-oriented striving for excellence) subscale from the Perfectionism Inventory (Hill et al. 2004). For perfectionistic concerns, these were the concerns over mistakes (fear about making mistakes and the negative consequences that mistakes have for self-evaluation), doubts about action (a tendency towards indecisiveness related to an uncertainty about doing the right thing), socially prescribed perfectionism (perceiving others as demanding perfection from oneself),

¹ See Stoeber and Rambow (2007) for details of how this scale was contextualised for use in education.

negative reactions to imperfection (negative reactions when everything does not go perfectly) and discrepancy (the perception that persons have that they are not meeting their own high standards) subscales from the same instruments identified above. The first author coded this information and a graduate student double coded this information. Table 1 presents the coded information for each study.

Meta-Analytical Procedures

When conducting the meta-analyses, the recommendations of Lipsey and Wilson (2001) were followed. Random-effects models were used to derive effect sizes and confidence intervals. Random-effects models allow generalisation beyond the present set of studies to future studies (Schmidt et al. 2009). The analyses were conducted using Comprehensive Meta-Analysis software (Version 3.3; Borenstein et al. 2005).

Because correlation coefficients have a problematic standard error when weighted cumulative effects are derived (Lipsey and Wilson 2001), the analyses were based on Fisher's Z scale. To aid interpretation, Fisher's Z scale scores were converted back to correlation coefficients, which are reported along with their 95% confidence intervals. Effects were interpreted based on Cohen's (1992) recommendations for small ($r = .10$), medium ($r = .30$) and large ($r = .50$) effects. In addition, effect sizes were also interpreted based on the recommendations of Bosco et al. (2015) to compare effect sizes to typical relationships found within the literature. An effect is significant ($p < .05$) if its 95% confidence intervals do not include zero. Following Hattie (2008), Cohen's d was also calculated. For all meta-analyses, the contributions of individual effect sizes to mean effect sizes were weighted using the reciprocal of their sampling variance (Lipsey and Wilson 2001).

Of the 37 studies, 14 included multiple effect sizes. This was for several reasons. In ten studies, correlations were reported between multiple indicators of perfectionistic strivings or concerns and academic achievement (e.g. correlations of both self-oriented perfectionism and personal standards with academic achievement). In three studies, correlations were reported between multiple measures of achievement (e.g. two separate exams). In one study, correlations were reported examining relationships between dimensions of perfectionism and academic achievement at three time points. In each of these instances, only one effect size was included in the meta-analyses. This effect size was the average of the reported effect sizes (providing 14 independent effect sizes). This is a commonly used strategy to ensure that effect sizes used in the analyses are independent and avoid artificial inflation of sample size, distortion of standard error estimates and overrepresentation of studies that include multiple effect sizes (Lipsey and Wilson 2001).

Next, to control for the overlap between perfectionism dimensions, semi-partial correlations were calculated. Semi-partial correlations capture the unique relationships between dimensions of perfectionism and academic achievement. In doing so, dimensions of perfectionism are residualised based on their relationship with each other and then correlated with academic achievement (new residual perfectionistic strivings and residual perfectionistic concerns are created but academic achievement remains unchanged; see Hill and Curran 2016). The formula provided by Cohen et al. (2003), pp.73–74) was used to calculate these semi-partial correlations. This procedure produced 60 semi-partial correlations.

Moderation was assessed by exploring the heterogeneity of the effect sizes. To do so, the total heterogeneity of the weighted mean effect sizes (Q^T) was examined which provides an indication of whether the variance of the weighted mean effect size is greater than that which

Table 1 Characteristics of studies included in the meta-analysis

Study	Sample				Measurement				Effect sizes					
	Domain	N	Age	%Female	Instrument	PS	PC	Achievement	Ach. measure	PS-PC	PS-PS	RPS-PC	RPC-A	
Bieging et al. (2003)	Tertiary	198	22	75.25	FMPS, HMPS	SOP/OOP/PS/OR	SP/CM/PC/PE/DA	Exam	O	.45	.14	-.05	.16	-.11
Blankstein and Winkworth (2004), sample 1	Tertiary	200	-	100	HMPS	SOP	SPP	Grade	O	-	.09	-.02	-	-
Blankstein and Winkworth (2004), sample 2	Tertiary	100	-	0	HMPS	SOP	SPP	Grade	O	-	.16	-.16	-	-
Bong et al. (2014)	Secondary	304	-	48.68	HMPS	SOP	SPP	Exam ^a	O	.56	.23	.13	.16	.00
Brown et al. (1999)	Tertiary	90	-	100	FMPS	PSian	CM	GPA	SR	.54	.30	-	-	-
Burnam et al. (2014)	Tertiary	393	21	48	FMPS	PSian	CM/DA ^b	GPA	SR	.43	.17	.02	.16	-.05
Castro and Rice (2003), sample 1	Tertiary	59	20.86	67.79	FMPS	PSian	CM/DA	GPA	SR	-	.26	-.30	-	-
Castro and Rice (2003), sample 2	Tertiary	65	20.95	86.15	FMPS	PSian	CM/DA	GPA	SR	-	.24	-.08	-	-
Castro and Rice (2003), sample 3	Tertiary	65	20.28	80	FMPS	PSian	CM/DA	GPA	SR	-	.07	.17	-	-
Damian et al. (2014)	Secondary	584	17.1	58.22	CAPS	SOP	SPP	GPA	SR	.43	.19	-.08	.23	-.16
Damian et al. (2017b)	Secondary	386	-	-	CAPS	SOP	SPP	GPA ^c	SR	.62	.31	.10	.25	-.10
De Cuyper et al. (2013)	Tertiary	50	-	-	HMPS	SOP/OOP/PSian	SPP/CM/DA/PE/PCr	GPA	O	-	.10	-.03	-	-
Elion et al. (2012)	Tertiary	219	21.45	47.95	AFS-R	S	D	GPA	SR	.00	.17	-.20	.17	-.20
Eum and Rice (2011)	Tertiary	96	19.08	62	AFS-R	S	D	GPA	SR	.11	.17	-.17	.19	-.19
Flett et al. (2009)	Tertiary	92	22.20	100	HMPS	SOP	SPP	Exam	O	-	.16	-.27	-	-
Fong and Yuen (2009)	Primary	331 ^d	-	51.40	AFS-R	S	D	Exam	O	.15	.31	-.32	.38	-.39
Grzegorek et al. (2004)	Tertiary	273	19.87	73.62	AFS-R	S	D	GPA	SR	.05	.32	-.09	.33	-.11
Harvey et al. (2017)	Primary	203	9.83	56.7	CAPS	SOP ^e	-	Grade	O	-	.22	-	-	-

Table 1 (continued)

Study	Sample				Measurement				Effect sizes								
	Domain	N	Age	%Female	Instrument	PS	PC	Achievement measure	Ach. measure	PS-		PC-		RPS-		RPC-	
										A	A	A	A	A	A		
Kawamura et al. (2002), sample 1	Tertiary	89	–	100	FMPS	PStan	CM/DA	GPA	SR	–	.55	.06	–	–	–	–	–
Kawamura et al. (2002), sample 2	Tertiary	56	–	0	FMPS	PStan	CM/DA	GPA	SR	–	.19	–.05	–	–	–	–	–
Kawamura et al. (2002), sample 3	Tertiary	117	–	100	FMPS	PStan	CM/DA	GPA	SR	–	.34	–.08	–	–	–	–	–
Kawamura et al. (2002), sample 4	Tertiary	75	–	0	FMPS	PStan	CM/DA	GPA	SR	–	.31	.06	–	–	–	–	–
Kljajic et al. (2017)	Tertiary	312	19.17	72.1	HMFS-SF	SOP	SPP	GPA	O	.47	.19	–.17	.27	–.26	–	–	–
Leenaars and Lester (2006), sample 1	Tertiary	30	–	–	APS-R	S	D	GPA	SR	–	.24	–.20	–	–	–	–	–
Leenaars and Lester (2006), sample 2	Tertiary	117	23.2	71.79	APS-R	S	D	GPA	SR	–	.20	–.17	–	–	–	–	–
Mobley et al. (2005)	Tertiary	248	19.94	68.9	APS-R	S	D	GPA	SR	–.16	.10	–.15	.08	–.13	–	–	–
Nounopoulos et al. (2006)	Primary	166	12.59	57.22	APS-R	S	D	GPA	SR	–.09	.31	–.26	.30	–.24	–	–	–
Pulford and Sohal (2006)	Tertiary	124	19	80.70	FMPS	PStan	CM/DA	GPA	O	.63	.15	.08	.10	–.01	–	–	–
Rice and Ashby (2007)	Tertiary	310	–	–	APS-R	S	D	GPA	SR	–.04	.16	–.15	.16	–.15	–	–	–
Rice et al. (2013a), sample 1	Tertiary	232	–	100	APS-R	S	D	GPA	O	–.15	.18	–.18	.15	–.15	–	–	–
Rice et al. (2013a), sample 2	Tertiary	215	–	0	APS-R	S	D	GPA	O	–.02	.21	–.09	.21	–.09	–	–	–
Rice et al. (2013b), sample 1	Tertiary	175	18.77	100	APS-R	–	D	GPA ^f	O	–	–	–.08	–	–	–	–	–
	Tertiary	119	18.77	0	APS-R	–	D	GPA	O	–	–	–.07	–	–	–	–	–

Table 1 (continued)

Study	Sample				Measurement				Effect sizes					
	Domain	N	Age	%Female	Instrument	PS	PC	Achievement measure	Ach.	PS-		RPC-		
										PC	A	A	A	
Rice et al. (2013b), sample 2	Tertiary	100	–	–	APS-R	S	D	GPA	SR	-.15	.34	-.22	.31	-.18
Sevlever and Rice (2010), sample 1	Tertiary	75	–	–	APS-R	S	D	GPA	SR	-.23	.02	-.07	.00	-.07
Sevlever and Rice (2010), sample 2	Secondary	141	15.74	60.99	APS-R	S	D	GPA	O	.06	.34	-.20	.36	-.23
Shaunnessy et al. (2011), sample 1	Secondary	178	15.74	73.03	APS-R	S	D	GPA	O	.03	.43	-.13	.44	-.15
Shaunnessy et al. (2011), sample 2	Secondary	169	13.07	37	FMPS	PS ^{tan}	CM	Grade	O	.44	.18	-.06	.21	-.14
Slaney et al. (2001), sample 1	Tertiary	173	19.23	51.45	APS-R	S/SOP ^g	D/SPP	GPA	SR	.21	.33	-.13	.36	-.21
Slaney et al. (2001), sample 2	Tertiary	174	20.42	69.54	APS-R	S/SOP/PS ^{tan} ^h	D/SPP/CM/DA	GPA	SR	.29	.20	-.14	.24	-.20
Stoerber and Eismann (2007)	Secondary	146	16.2	59.59	MIPS	SP	NRI	Grade	SR	.66	.42	.14	.33	-.15
Stoerber et al. (2015)	Tertiary	100	19.9	89	HMPS	SOP	SPP	Exam	O	.45	.22	-.12	.28	-.22
Stoerber and Rambow (2007)	Secondary	121	14.6	59	MIPS	SP	NRI	Grade	SR	.65	.37	.21	.24	-.03
Stomelli et al. (2009)	Primary	223	–	56.23	CAPS	SOP	SPP	Exam ⁱ	O	.56	-.02	-.05	–	–
Vandiver and Worrell (2002), sample 1	Secondary	161	13.14	47.2	APS-R	S	D	GPA	SR	–	.32	-.26	–	–
Vandiver and Worrell (2002), sample 2	Secondary	181	13.23	56.4	APS-R	S	D	GPA	SR	–	.33	-.19	–	–

Table 1 (continued)

Study	Sample	Measurement				Effect sizes									
		Domain	N	Age	%Female	Instrument	PS	PC	Achievement measure	PS-PC	PS-A	PC-A	RPC-A		
Vansteenkiste et al. (2010)	Secondary	190	–	46		FMPS	PSStan	CM/DA	Exam	O	.62	.13	–.08	.18	–.16
Verner-Filion and Gaudreau (2010)	Tertiary	198	19.18	86		HMPFS-SF	SOP	SPP	GPA	SR	.50	.33	–.02	.34	–.20
Wang (2012)	Tertiary	348	19.75	51.15		APS-R	S	D	Grade	SR	.36	.30	–.04	.31	–.16
Wicher et al. (2007)	Tertiary	130	25.96	92.6		HMPFS	SOP	SPP	Exam ^j	O	.75	.28	.17	.15	–.04

FMPS = Multidimensional Perfectionism Scale (Frost et al. 1990); HMPFS = Multidimensional Perfectionism Scale (Hewitt and Flett 1991); HMPFS-SF = Short Form of the Multidimensional Perfectionism Scale (Cox et al. 2002); CAPS = Child and Adolescent Perfectionism Scale (Flett et al. 2001); MIPFS = Multidimensional Inventory of Perfectionism in Sport (Stoeber et al. 2006); APS-R = Almost Perfect Scale-Revised (Slaney et al. 2001); PS = perfectionistic strivings; PSStan = personal standards; SOP = self-oriented perfectionism; SP = striving for perfection; PC = perfectionistic concerns; CM = concern over mistakes; DA = doubts about actions; SPP = socially prescribed perfectionism; NRI = negative reactions to imperfection; D = discrepancy; GPA = grade point average; O = objective measure of achievement; SR = self-report measure of achievement; PS-PC = correlation between perfectionistic strivings and perfectionistic concerns; PS-A = correlation between perfectionistic strivings and achievement; PC-A = correlation between perfectionistic concerns and achievement; RPS-A = correlation between residual perfectionistic strivings and achievement; RPC-A = correlation between residual perfectionistic concerns and achievement

^a Average across two exams (English and Math)

^b In all instances, when both concerns over mistakes and doubts about action were reported, correlations were averaged across the two

^c Average correlations across three time points

^d Sample was selected based on high and low scorers on an exam. Samples were combined for correlations

^e Correlation was the average of SOP-striving and SOP-critical

^f Correlation was an average over underrepresented and proportional subgroups

^g Perfectionistic strivings–achievement correlations are averages of S and SOP, perfectionistic concerns–achievement correlations are averages of D and SPP

^h Perfectionistic strivings–achievement correlations are averages of S and SOP and PS, perfectionistic concerns–achievement correlations are averages of D and SPP and CM and DA

ⁱ Average across two exams (Reading and Math)

^j Average across two exams (Midterm and Final)

would be expected from sampling error. Heterogeneity was also assessed by calculating the degree of inconsistency in the observed relationship across studies (I^2). Higgins and Thompson (2002) suggest that values of 25, 50 and 75% are indicative of low, medium and high levels of heterogeneity. Where substantial heterogeneity existed, subgroup analyses were performed. These analyses centred around the heterogeneity explained by any categorisation in the data (Q^B). When Q^B is statistically significant, there are differences between categories in terms of their effect sizes. Specific differences can be examined by comparing the overlap between 95% confidence intervals for effect sizes (see, e.g. Cumming and Finch 2005). For non-categorical moderators, meta-regression was used to test if the variable was a significant covariate within the meta-regression model.

Lastly, publication bias was assessed. This was done by first examining Rosenthal's (1979) fail-safe number. This number should be greater than $5k + 10$ (where k equals the number of effect sizes; Rosenthal 1979). Then, Egger's regression intercept that regresses the effect size on the reciprocal of its standard error was used (Egger et al. 1997). If no publication bias is present, the 95% confidence interval of Egger's regression coefficient includes zero. Finally, Duval and Tweedie's (2000) "trim and fill" method was employed to correct any asymmetry in the distribution of studies and provide effect sizes that were adjusted for publication bias.

Results

Overall Effect Sizes

The meta-analysed effect sizes for the relationship between perfectionistic strivings and concerns and academic achievement are presented in Table 2. Perfectionistic strivings showed a small to medium positive relationship with academic achievement ($r^+ = .24$; 95% confidence interval = .21, .27; 80% credibility interval = .10, .34), whereas perfectionistic concerns showed a small negative relationship with academic achievement ($r^+ = -.08$; 95% confidence interval = -.12, -.05; 80% credibility interval = -.22, .10). Perfectionistic strivings showed a medium positive overlap with perfectionistic concerns ($r^+ = .32$; 95% confidence interval = .21, .41). When controlling for the overlap between perfectionistic strivings and concerns, residual perfectionistic strivings showed a small to medium positive relationship with academic achievement ($r^+ = .24$; 95% confidence interval = .21, .27)², whereas residual perfectionistic concerns showed a small negative relationship with academic achievement ($r^+ = -.15$; 95% confidence interval = -.19, -.12).³

Moderator Analyses

An examination of the total heterogeneity of the weighted mean effects suggested that there was substantial moderation. To explore this further, moderation analyses were conducted on the instrument that was used to measure perfectionism, academic level and gender. Based on the overlap of 95% confidence intervals, subgroup analyses suggested that effects were

² For a discussion of partialling in relation to perfectionism, see Stoeber and Gaudreau (2017), in particular, Table 2, p. 382.

³ Analyses were also conducted with mean imputation of the overlap (using the meta-analytic effect size). Effect sizes were not significantly different. Please see the Electronic [Supplementary Material](#) for the findings of these analyses.

Table 2 Meta-analytical relationships between perfectionism and academic achievement across all studies

Predictor variables	<i>k</i>	<i>N</i>	<i>r⁺</i>	95% CI	<i>d</i>	<i>Q^T</i>	<i>I²</i>	Fail-safe <i>N</i>	Egger's intercept	95% CI	<i>k^{IF}</i>	"Trim and fill" estimates <i>r⁺</i> [95% CI]
Perfectionistic strivings	48	8607	.24	.21, .27	.48	97.73***	51.91	5575	.42	-1.02, 1.86	0	.24 [.21, .27]
Perfectionistic concerns	48	8608	-.08	-.12, -.05	-.17	127.71***	63.20	633	-.18	-1.84, 1.49	7	-.06 [-.08, -.04]
Residual perfectionistic strivings	30	6634	.24	.21, .27	.49	59.88*	51.57	2836	-.11	-2.41, 2.18	0	.24 [.21, .27]
Residual perfectionistic concerns	30	6634	-.15	-.19, -.12	-.31	51.48*	43.67	1101	.23	-1.89, 2.36	4	-.17 [-.19, -.15]

k = number of studies; *r⁺* = weighted mean *r*; 95% CI = 95% confidence interval; *d* = Cohen's *d*; *Q^T* = total heterogeneity of the weighted mean effect sizes; *I²* = degree of inconsistency in the observed relationship across studies; *k^{IF}* = number of imputed studies as part of the "trim and fill" method
 p* < .05; **p* < .001

Table 3 Moderation analyses based on subscale used to measure perfectionism

	<i>k</i>	<i>N</i>	<i>r</i> ⁺	95% CI	<i>Q</i> ^B
Perfectionistic strivings subscale					10.83*
Composite perfectionistic strivings	5	798	.21	.14, .28	
Personal standards	12	1492	.24	.16, .31	
Standards	18	3421	.25	.21, .30	
Self-oriented perfectionism	11	2629	.20	.14, .26	
Striving for perfection	2	267	.40	.29, .50	
Perfectionistic concerns subscale					38.13***
Composite perfectionistic concerns	14	1828	-.04	-.09, .01	
Concern over mistakes	1	169	-.06	-.21, .09	
Discrepancy	20	3715	-.16	-.20, -.13	
Socially prescribed perfectionism	11	2629	-.04	-.11, .04	
Negative reactions to imperfection	2	267	.17	.05, .29	

All estimates are based on non-residualised (zero-order) correlations. Self-oriented perfectionism and socially prescribed perfectionism were measured using the Multidimensional Perfectionism Scale (Hewitt and Flett 1991), Short Form of the Multidimensional Perfectionism Scale (Cox et al. 2002) and the Child and Adolescent Perfectionism Scale (Flett et al. 2001)

k = number of studies; *r*⁺ = weighted mean *r*; 95% CI = 95% confidence interval; *Q*^B = heterogeneity explained by any categorisation in the data

p* < .05; **p* < .001

contingent on which instrument was used to measure perfectionism. The results of these analyses are presented in Table 3. The striving for perfection subscale showed larger positive effects ($r^+ = .40$; 95% confidence interval = .29, .50) than both the composite perfectionistic strivings ($r^+ = .21$; 95% confidence interval = .14, .28) and self-oriented perfectionistic subscales ($r^+ = .20$; 95% confidence interval = .14, .26). The discrepancy subscale showed larger negative effects ($r^+ = -.16$; 95% confidence interval = -.20, -.13) than the composite perfectionistic concerns ($r^+ = -.04$; 95% confidence interval = -.09, -.01), socially prescribed perfectionism ($r^+ = -.04$; 95% confidence interval = -.11, .04) and negative reactions to imperfection subscales ($r^+ = .17$; 95% confidence interval = .05, .29). Finally, the negative reactions to the imperfection subscale also showed larger positive effects than the composite perfectionistic concerns and socially prescribed perfectionism subscales. It should be noted, however, that the effects for the striving for perfection and negative reactions to imperfection subscales were derived from two observed effect sizes. No differences in academic level for perfectionistic strivings ($Q^B = 4.32$ [2], $p = .12$) or perfectionistic concerns ($Q^B = 3.37$ [2], $p = .19$) were found. Finally, a meta-regression including gender as a covariate suggested gender did not play a moderating role in either the perfectionistic strivings ($\beta = .001$, 95% CI [-.001, .002]) or concerns ($\beta = .00$, 95% CI [-.001, .002]) relationships with achievement.⁴

Publication Bias

Tests of publication bias examine whether studies with statistically significant results are more likely to be published than non-statistically significant results (the so-called file-drawer problem; see Rothstein et al. 2006 for further details). Overall, the analyses provided little

⁴ Age, the measure of academic achievement, and whether achievement was measured objectively or via self-report were also tested as moderating factors, the findings of which were non-significant. These findings can be found in the [Electronic Supplementary Material](#).

evidence for publication bias (see again Table 2). In all cases, the fail-safe numbers exceeded recommended thresholds. Moreover, all Egger's regression intercept confidence intervals included zero.

Discussion

The aim of the present study was to provide a first meta-analysis of the relationships between perfectionism and academic achievement. The study found that perfectionism was indeed significantly related to academic achievement (GPA, grades and exam performance). However, the two higher-order dimensions—perfectionistic strivings and perfectionistic concerns—showed an opposite pattern of relationships. As hypothesised, perfectionistic strivings showed a significant positive relationship with academic achievement, whereas perfectionistic concerns showed a significant negative relationship. The instrument that was used to measure perfectionism moderated these relationships.

The question of whether perfectionism is related to academic achievement has captured the interest of researchers for many years. The present study hopefully goes some way to providing an answer. The present study offers the first meta-analytic summary of the strength of these relationships. The analyses were based on the findings of 37 studies including 8901 students. The present study therefore provides stronger evidence for the direction and size of these effects than individual studies. With this in mind, specific relationships are now discussed in detail.

Perfectionistic Strivings and Academic Achievement

Perfectionistic strivings showed a positive relationship with academic achievement that is medium to large when compared to those typically found in the literature. This finding is consistent with Stoeber's (2012) conclusion that perfectionistic strivings are associated with better performance in education. It is also in line with the findings for performance in sport (Hill et al. 2018). In addition, this finding highlights that despite variation between individual studies, when all studies are systematically collated and analysed, a clearer picture for perfectionistic strivings and achievement emerges. This picture presents perfectionistic strivings as potentially important for students' achievement. This is also the case when the overlap with perfectionistic concerns is controlled and residual perfectionistic strivings are considered. In this regard, it may be that perfectionistic strivings account for the potential "success" in Missildine's analogy of perfectionists as "successful failures".

The existing meta-analytic literature has focused almost exclusively on maladaptive outcomes (e.g. Limburg et al. 2017), the findings of which illustrate that there are instances when perfectionistic strivings are related to maladaptive outcomes. How do we reconcile the present findings with what is already known regarding perfectionistic strivings? First, it is important to note that the relationships perfectionistic strivings show with maladaptive outcomes are typically smaller than those of perfectionistic concerns. Second, these relationships commonly decrease in size when the overlap with perfectionistic concerns is controlled. Third, there are instances where perfectionistic strivings show negative relationships with maladaptive outcomes (e.g. burnout). As such, the present findings reiterate that perfectionistic strivings are a very complex and often contradictory dimension that relates to both adaptive and maladaptive outcomes (cf. Stoeber and Otto 2006).

Perfectionistic Concerns and Academic Achievement

Contrary to perfectionistic strivings, perfectionistic concerns showed a negative relationship with academic achievement that is small when compared to those typically found in the literature. Notably, the findings here are somewhat at odds with the conclusions of Stoeber (2012) and of the findings of Hill et al. (2018) in sport. In the present context, perfectionistic concerns appear to be less ambiguous. Instead, and in line with theoretical propositions, they appear to be related to worse performance. Furthermore, when residual perfectionistic concerns—perfectionistic concerns minus what is shared with perfectionistic strivings—are examined, the picture is worse for students. The effect of residual perfectionistic concerns is almost double that of its unresidualised counterpart. It appears that perfectionistic concerns are likely detrimental for students' achievement and this dimension of perfectionism may account for the “failure” within Missildine's analogy.

This failure is unsurprising given the many ways in which perfectionistic concerns are potentially detrimental for students. Meta-analytic evidence shows that perfectionistic concerns are related to numerous maladaptive outcomes such as burnout, procrastination, eating disorders, suicide ideation and depression, to name but a few. What is surprising, however, is the size of this effect. In speculating as to why this effect is small, an examination of the overlap with perfectionistic strivings may be relevant. Perfectionistic strivings and perfectionistic concerns are typically highly correlated (as was the case in the present study). Therefore, it may be that perfectionistic concerns share something with perfectionistic strivings; that means, its effects on achievement are buffered. This is supported by the larger negative correlation shown for residual perfectionistic concerns. In addition, and as noted by others, it is quite possible that perfectionistic concerns are negatively related to achievement indirectly, via variables such as fear of failure, worry and anxiety (cf. Madigan et al. 2018). Indeed, based on the various debilitating outcomes associated with perfectionistic concerns, it is difficult not to envisage that they may hinder students' achievement to a greater degree.

Moderators

The instrument that was used to measure perfectionism was a significant moderator of the overall meta-analytic effects. In this regard, the findings suggest that it does matter how perfectionistic concerns are conceptualised and measured, but it matters less for perfectionistic strivings. Specifically, the discrepancy subscale appears to be the most relevant to achievement. This subscale captures perceptions that individuals have that they are not meeting their own high standards, and is predicated on the idea that the source of distress is the difference between the standards they set for themselves and their actual performance (Slaney and Ashby 1996). Given its focus on performance, these findings are consistent with the manner in which the scale was developed. In addition, the negative reactions to the imperfection subscale showed an opposite (positive) relationship with achievement when compared to the other measures of perfectionistic concerns. Importantly, the finding for the negative reactions to imperfection subscale was derived from only two studies, making this finding especially tentative. Collectively, these findings imply that researchers need to take care when choosing an instrument to measure achievement-relevant facets of perfectionistic concerns, but do not necessarily need to be as discerning with regard to perfectionistic strivings.

Gender did not moderate the present findings. This suggests that the relationships perfectionism shows with achievement are similar for female and male students. That is,

perfectionism manifests in a consistent manner in relation to achievement for both female and male students. It is therefore unlikely that perfectionism exacerbates the potential negative experiences of female students (e.g. Spencer et al. 1999). This finding is also consistent with previous research examining perfectionism and procrastination (Sirois et al. 2017). Finally, the present findings were not contingent on students' academic level. It would appear, like gender, that perfectionism has a similar effect across primary, secondary and tertiary levels of education. These findings are consistent with Poropat (2009) in relation to conscientiousness, but at odds with the other factors of the five-factor model. As a consequence, educators across all levels need to be aware of the potential role that perfectionism can play in students' achievement.

Limitations and Suggestions for Future Research

A meta-analysis is only as good as the individual studies it is summarising. Accordingly, it is important to be aware that the present study is a summary of predominantly cross-sectional studies (36 out of 37 studies were cross-sectional). It is not possible to claim these as causal relationships. An important avenue for future research, therefore, is to adopt longitudinal designs as a next step to establishing temporal and causal inference between these variables. Here, however, the work of Damian et al. (2017b) is a welcome exception. Their study adopted a three-wave longitudinal design over a period of 9 months. They examined the longitudinal role of perfectionism predicting achievement but also examined reciprocal effects (i.e. achievement predicting perfectionism). The study found that perfectionistic strivings were a positive predictor of academic achievement over time, whereas perfectionistic concerns were not. Interestingly, though, achievement also predicted both perfectionistic strivings and concerns over the study period. These initial findings add another layer of complexity to an already complex relationship and suggest the present findings need to be considered in the context of these possible effects.⁵

As to future longitudinal studies, the following suggestions may be particularly helpful in further unpicking these relationships. First, prospective designs, whereby perfectionism is measured at baseline and achievement is repeatedly measured over a period of months or years, will provide a useful next step in determining how perfectionism predicts fluctuations in achievement (see, e.g. Jansson-Fröjmark and Linton 2007). Second, and in the same vein, diary studies that allow the disaggregation of between- and within-person effects are crucial to progressing our understanding of how perfectionism relates to day-to-day changes in achievement (e.g. Dunkley et al. 2017). Future work adopting such designs would greatly enhance our understanding of perfectionism in education.

The present findings may not generalise beyond the present context. This is because the educational context has some unique features when compared to other contexts. For example, it repeatedly provides students with the opportunity to demonstrate competence (e.g. there is very often another exam to take or piece of coursework to complete). Whereas sport shares some similarities, other contexts, such as the workplace, may be substantially different. For example, at work, specific instances to demonstrate competence may be less clear, and instead, success may likely be judged as part of a continual evaluative process. Whether perfectionism will manifest in a similar manner as found here, and in sport (Hill et al. 2018), in other contexts is yet to be seen but preliminary evidence suggests that perfectionistic strivings may indeed show a different and opposite pattern of relationships

⁵ Note, however, that this study utilised a cross-lagged panel model, the efficacy of which has been the subject of recent debate (e.g. Hamaker et al. 2015).

with work performance (Sherry et al. 2010). Accordingly, more research is needed in other contexts before conclusions about the generalisability of the present findings can be made.

Research in educational contexts may benefit from moving beyond trait perfectionism. In this regard, theory posits two other features of perfectionism, namely, perfectionistic cognitions (automatic thoughts pertaining to the need to be perfect) and perfectionistic self-presentation (showing that one is perfect and hiding any imperfections). There is evidence for the utility of each approach in other contexts; however, as yet, no studies have examined their predictive ability in relation to academic achievement. It will be interesting to see if these facets help us further understanding the role of perfectionism in students' achievement.

Notably, it is currently unclear what happens to individuals high in perfectionistic strivings when things do not go as planned, for example, when they fail an exam. Hewitt and Flett (1993) proposed the notion of perfectionistic reactivity to account for such circumstances. Perfectionistic reactivity suggests that when perfectionistic individuals are exposed to (successive) failure, they are increasingly susceptible to psychological distress and difficulties. In such circumstances, it is likely that the performance benefits associated with perfectionistic strivings will come at some greater cost when things go wrong. Research in other contexts attests to the relevance of these ideas (e.g. Hill et al. 2011); determining if this is similarly the case in academic contexts is an essential avenue for future research.

Finally, future research should examine the combined (or interactive) effects of the two dimensions of perfectionism. One approach that allows researchers to do so is the recently developed 2×2 model of perfectionism (Gaudreau and Thompson 2010). This model allows within-person combinations of the two dimensions to be examined (e.g. high perfectionistic strivings and high perfectionistic concerns). There is preliminary evidence of the utility of this model in the context of academic achievement (Kljajic et al. 2017). The present findings are also largely supportive of this framework. Future research should continue to test the utility of this model to provide us with further understanding of how combinations of perfectionistic strivings and perfectionistic concerns affect students' achievement.

Conclusion

The present study provides the first meta-analytic evidence that perfectionism shows a significant relationship with academic achievement. The findings suggest that the relationship between perfectionism and academic achievement is complex with perfectionistic strivings potentially aiding and perfectionistic concerns potentially hindering students' academic achievement. In this sense, those students high in both perfectionistic strivings and perfectionistic concerns may be best described as "successful failures" (Missildine 1963).

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