Est. 1841 | YORK ST JOHN UNIVERSITY

Madigan, Daniel J. (2019) A meta-analysis of perfectionism and academic achievement. Educational Psychology Review, 31 (4). pp. 967-989.

Downloaded from: https://ray.yorksj.ac.uk/id/eprint/3797/

The version presented here may differ from the published version or version of record. If you intend to cite from the work you are advised to consult the publisher's version: https://link.springer.com/article/10.1007/s10648-019-09484-2

Research at York St John (RaY) is an institutional repository. It supports the principles of open access by making the research outputs of the University available in digital form. Copyright of the items stored in RaY reside with the authors and/or other copyright owners. Users may access full text items free of charge, and may download a copy for private study or non-commercial research. For further reuse terms, see licence terms governing individual outputs. Institutional Repositories Policy Statement

RaY

Research at the University of York St John

For more information please contact RaY at ray@yorksj.ac.uk

Madigan, D. J. (in press). A meta-analysis of perfectionism and academic achievement. *Educational Psychology Review*.

A Meta-Analysis of Perfectionism and Academic Achievement

Daniel J. Madigan

York St John University, UK

Author Note

Daniel J. Madigan, York St John University, Lord Mayor's Walk, York, UK.

Correspondence concerning this article should be addressed to Daniel J. Madigan, e-mail: d.madigan@yorksj.ac.uk

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 = 8,901) 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 & Maassen van de Brink, 2007; Roth & Clarke, 1998) and it is associated with greater societal prosperity (Organisation for Economic Cooperation and Development, 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 endeavors 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 & 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 & Bean, 2006).

The predictors of academic achievement are complex. At their broadest, predictors can be divided into three categories: organizational 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 & Paunonen, 2007; McAdams & 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, Marten, Lahart, & Rosenblate, 1990). However, perfectionism has various aspects, and there are different dimensions of perfectionism with different characteristics. As such, perfectionism is best conceptualized as a multidimensional trait (see Enns & 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 & Otto, 2006). This higher-order model is often adopted when meta-analysing research on perfectionism (e.g., Hill & Curran, 2016; Limburg, Watson, Hagger, & Egan, 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 & Curran, 2016), whereas perfectionistic strivings are more ambivalent in that, they can show positive relationships with adaptive outcomes (e.g., academic engagement; Damian, Stoeber, Negru-Subtirica, & Băban, 2017) and maladaptive outcomes (e.g., workaholism; Stoeber & Damian, 2016). The associations that perfectionistic strivings shows with positive characteristics is particularly evident when the overlap with perfectionistic concerns is controlled for and perfectionistic strivings' unique relationships are examined (see Stoeber & 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 & Curran, 2016). This same pattern of relationships has also been shown in relation to procrastination (k = 43; Sirois, Molnar, & Hirsch, 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, Damian, & Madigan, 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 is 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 & 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 is 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, Mallinson-Howard, & Jowett, 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., 2015). Because female students' experiences may differ from those of male students (e.g., Spencer, Steele, & Quinn, 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 computerized 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: “perfection”* (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 1,089 studies. As well as the standardized search, an exploratory search was conducted on GoogleScholar 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 Figure 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, corresponding authors of the articles were contacted to retrieve this data. Six corresponding authors were contacted and one responded to the request within three 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 & Curran, 2016), recommendations from researchers in this area (e.g., Stoeber, 2011), and evidence from factor analytic studies (e.g., Bieling et al., 2004; Cox, Enns, & Clara, 2002; Frost, Heimberg, Holt, Mattia, & Neubauer, 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 Frost et al.'s (1990) Multidimensional Perfectionism Scale, 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, Hewitt, Boucher, Davidson, & Munro, 2001), the striving for perfection subscale (self-oriented striving for perfection) from the Multidimensional Inventory of Perfectionism in Sport[1] (Stoeber, Otto, & Stoll, 2006), the high standards subscale (striving for exceedingly high standards) from the revised Almost Perfect Scale (Slaney, Rice, Mobley, Trippi, & Ashby, 2001), and the striving for excellence (self-oriented striving for excellence) subscale from the Perfectionism Inventory (R. W. 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), 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

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

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 generalization beyond the present set of studies to future studies (Schmidt, Oh, & Hayes, 2009). The analyses were conducted using Comprehensive Meta-Analysis software (Version 3.3; Borenstein, Hedges, Higgins, & Rothstein, 2005).

Because correlation coefficients have a problematic standard error when weighted cumulative effects are derived (Lipsey & 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 Bosco, Aguinis, Sigh, Field, and Pierce's (2015) recommendations 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 & Wilson, 2001).

Of the 37 studies, fourteen 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-analyzes. This effect size was the average of the reported effect sizes (providing fourteen independent effect sizes). This is a commonly used strategy to ensure that effect sizes used in the analyzes are independent and avoids artificial inflation of sample size, distortion of standard error estimates, and overrepresentation of studies that include multiple effect sizes (Lipsey & 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 residualized 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 & Curran, 2016). The formula provided by Cohen, Cohen, West and Aitkin (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 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 centered around the heterogeneity

explained by any categorization 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 & 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, Smith, Schneider, & Minder, 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 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 perfectionism 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 imperfection subscale also showed larger positive effects than the composite perfectionistic concerns and socially prescribed perfectionism subscales.

---

[2]For a discussion of partialling in relation to perfectionism, see Stoeber and Gaudreau (2017), in particular, Table 2, Page 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 Supplementary Material for the findings of these analyses.

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 (β = .001, 95% CI [-.001, .002]) or concerns (β = .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, Sutton, & Borenstein, 2006 for further details). Overall, the analyses provided little 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

[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 nonsignificant. These findings can be found in the Supplementary Material.

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 8,901 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 is associated with better performance in education. It is also in line with 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 of 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 is a very complex and often contradictory dimension that relates to both adaptive and maladaptive outcomes (cf. Stoeber & 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 shares 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, Stoeber, Culley, Passfield, & Hill, 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 is conceptualized 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 et al., 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 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 and colleagues (2017b) is a welcome exception. Their study adopted a three-wave longitudinal design over a period of nine 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 was a positive predictor of academic achievement over time, whereas perfectionistic concerns was 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 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 & 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 generalize 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, Kuiper, & Grasman, 2015).

with work performance (Sherry et al., 2010). Accordingly, more research is needed in other contexts before conclusions about the generalizability 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 to plan, 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, Hall, Duda, & Appleton, 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 & 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 context of academic achievement (Kljajic, Gaudreau, & Franche, 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).

References

References marked with an asterisk indicate studies included in the meta-analysis.

Adler, A. (1956). The neurotic disposition. In H. L. Ansbacher & R. R. Ansbacher (Eds.), *The individual psychology of Alfred Adler* (pp. 239–262). New York: Harper.

Bacon, D. R., & Bean, B. (2006). GPA in research studies: An invaluable but neglected opportunity. *Journal of Marketing Education, 28,* 35-42.

Bieling, P. J., Israeli, A. L., & Antony, M. M. (2004). Is perfectionism good, bad, or both? Examining models of the perfectionism construct. *Personality and Individual Differences, 36,* 1373-1385.

*Bieling, P. J., Israeli, A., Smith, J., & Antony, M. M. (2003). Making the grade: The behavioural consequences of perfectionism in the classroom. *Personality and Individual Differences, 35,* 163-178.

*Blankstein, K. R., & Winkworth, G. R. (2004). Dimensions of perfectionism and levels of attributions for grades: Relations with dysphoria and academic performance. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 22,* 267-295.

*Bong, M., Hwang, A., Noh, A., & Kim, S. I. (2014). Perfectionism and motivation of adolescents in academic contexts. *Journal of Educational Psychology, 106,* 711-729.

Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2005). *Comprehensive meta-analysis* (Version 3.3). Emglewood, NJ: Biostat.

Bosco, F. A., Aguinis, H., Singh, K., Field, J. G., & Pierce, C. A. (2015). Correlational effect size benchmarks. *Journal of Applied Psychology, 100,* 431.

*Brown, E. J., Heimberg, R. G., Frost, R. O., Makris, G. S., Juster, H. R., & Leung, A. W. (1999). Relationship of perfectionism to affect, expectations, attributions and performance in the classroom. *Journal of Social and Clinical Psychology, 18,* 98-120.

Burke, R. J. (2000). Workaholism in organizations: psychological and physical well-being

consequences. *Stress Medicine, 16,* 11-16.

*Burnam, A., Komarraju, M., Hamel, R., & Nadler, D. R. (2014). Do adaptive perfectionism and self-determined motivation reduce academic procrastination? *Learning and Individual Differences, 36,* 165-172.

Burns, D. (1980). *The perfectionist's script for self-defeat.* Psychology Today, 14, 34–52.

Castro, M., Expósito-Casas, E., López-Martín, E., Lizasoain, L., Navarro-Asencio, E., & Gaviria, J. L. (2015). Parental involvement on student academic achievement: A meta-analysis. *Educational Research Review*, *14*, 33-46.

*Castro, J. R., & Rice, K. G. (2003). Perfectionism and ethnicity: Implications for depressive symptoms and self-reported academic achievement. *Cultural Diversity and Ethnic Minority Psychology*, *9*, 64.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155-159.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed). Hillsdale: Erlbaum

Cox, B. J., Enns, M. W., & Clara, I. P. (2002). The multidimensional structure of perfectionism in clinically distressed and college student samples. *Psychological Assessment, 14*, 365-373.

Cumming, G., & Finch, S. (2005). Inference by eye: Confidence intervals and how to read pictures of data. *American Psychologist, 60*, 170–180.

*Damian, L. E., Stoeber, J., Negru, O., & Băban, A. (2014). Perfectionism and achievement goal orientations in adolescent school students. *Psychology in the Schools, 51*, 960-971.

Damian, L. E., Stoeber, J., Negru-Subtirica, O., & Băban, A. (2017a). Perfectionism and school engagement: A three-wave longitudinal study. *Personality and Individual Differences, 105*, 179-184.

*Damian, L. E., Stoeber, J., Negru-Subtirica, O., & Băban, A. (2017b). On the development

of perfectionism: The longitudinal role of academic achievement and academic efficacy. *Journal of Personality, 85*, 565-577.

*De Cuyper, K., Pieters, G., Claes, L., Vandromme, H., & Hermans, D. (2013). Indirect measurement of perfectionism: Construct and predictive validity. *Journal of Social and Clinical Psychology, 32*, 844-858.

Dunkley, D. M., Lewkowski, M., Lee, I. A., Preacher, K. J., Zuroff, D. C., Berg, J. L., ... & Westreich, R. (2017). Daily stress, coping, and negative and positive affect in depression: Complex trigger and maintenance patterns. *Behavior Therapy, 48*, 349-365.

Duval, S. J., & Tweedie, R. L. (2000). A nonparametric "trim and fill" method of accounting for publication bias in meta-analysis. *Journal of the American Statistical Association, 95*, 89– 98.

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal, 315*, 629–634.

*Elion, A. A., Wang, K. T., Slaney, R. B., & French, B. H. (2012). Perfectionism in African American students: Relationship to racial identity, GPA, self-esteem, and depression. *Cultural Diversity and Ethnic Minority Psychology, 18*, 118.

Enns, M. W., & Cox, B. J. (2002). The nature and assessment of perfectionism: A critical analysis. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 33-62). Washington, DC: American Psychological Association.

*Eum, K., & Rice, K. G. (2011). Test anxiety, perfectionism, goal orientation, and academic performance. *Anxiety, Stress, & Coping, 24*, 167-178.

Fan, H., Xu, J., Cai, Z., He, J., & Fan, X. (2017). Homework and students' achievement in math and science: A 30-year meta-analysis, 1986–2015. *Educational Research Review, 20*, 35-54.

*Flett, G. L., Blankstein, K. R., & Hewitt, P. L. (2009). Perfectionism, performance, and state

positive affect and negative affect after a classroom test. *Canadian Journal of School Psychology, 24*, 4-18.

Flett, G. L., & Hewitt, P. L. (2002). Perfectionism and maladjustment: An overview of theoretical, definitional, and treatment issues. In P. L. Hewitt & G. L. Flett (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 5-31). Washington, DC: American Psychological Association.

Flett, G.L., Hewitt, P.L., Boucher, D., Davidson, L., & Munro, Y. (2001). *The Child-Adolescent Perfectionism Scale: Development, validation, and association with adjustment*. Unpublished Manuscript.

*Fong, R. W., & Yuen, M. (2009). Associations among measures of perfectionism, self-concept and academic achievement identified in primary school students in Hong Kong. *Gifted and Talented International*, *24*, 147-154.

Frost, R. O., Heimberg, R. G., Holt, C. S., Mattia, J. I., & Neubauer, A. L. (1993). A comparison of two measures of perfectionism. *Personality and Individual Differences, 14*, 119-126.

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

Gaudreau, P., & Thompson, A. (2010). Testing a 2 × 2 model of dispositional perfectionism. *Personality and Individual Differences*, *48*, 532-537.

Gotwals, J. K., Stoeber, J., Dunn, J. G. H., & Stoll, O. (2012). Are perfectionistic strivings in sport adaptive? A systematic review of confirmatory, contradictory, and mixed evidence. *Canadian Psychology, 53*, 263-279.

Groot, W., & Maassen van den Brink, H. (2007). The health effects of education. *Economics of Education Review, 26*, 186-200.

*Grzegorek, J. L., Slaney, R. B., Franze, S., & Rice, K. G. (2004). Self-criticism,

dependency, self-esteem, and grade point average satisfaction among clusters of perfectionists and nonperfectionists. *Journal of Counseling Psychology, 51,* 192.

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods, 20,* 102-116.

*Harvey, B. C., Moore, A. M., & Koestner, R. (2017). Distinguishing self-oriented perfectionism-striving and self-oriented perfectionism-critical in school-aged children: Divergent patterns of perceived parenting, personal affect and school performance. *Personality and Individual Differences, 113,* 136-141.

Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement.* New York, NY: Routledge.

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,* 456-470.

Hewitt, P. L., & Flett, G. L. (1993). Dimensions of perfectionism, daily stress, and depression: A test of the specific vulnerability hypothesis. *Journal of Abnormal Psychology, 102*, 58-65.

Hewitt, P. L., & Flett, G. L. (2002). Perfectionism and stress in psychopathology. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 255-284). Washington, DC: American Psychological Association.

Higgins, J. P., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine, 21*, 1539-1558.

Higgins, J., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyzes. *British Medical Journal, 327*, 557-560.

Hill, A. P., & Curran, T. (2016). Multidimensional perfectionism and burnout: A meta-analysis. *Personality and Social Psychology Review, 20,* 269-288.

Hill, A. P., Hall, H. K., Duda, J. L., & Appleton, P. R. (2011). The cognitive, affective and behavioural responses of self-oriented perfectionists following successive failure on a muscular endurance task. *International Journal of Sport and Exercise Psychology, 9,* 189-207.

Hill, A. P., Mallinson-Howard, S. H., & Jowett, G. E. (2018). Multidimensional perfectionism in sport: A meta-analytical review. *Sport, Exercise, and Performance Psychology, 7,* 235-270.

Hill, R.W., Huelsman, T.J., Furr, R.M., Kibler, J., Vicente, B.B., & Kennedy, C. (2004). A new measure of perfectionism: The Perfectionism Inventory. *Journal of Personality Assessment, 82,* 80-91.

Hollender, M. H. (1965). Perfectionism. *Comprehensive Psychiatry, 6,* 94-103.

Jansson-Fröjmark, M., & Linton, S. J. (2007). Is perfectionism related to pre-existing and future insomnia? A prospective study. *British Journal of Clinical Psychology, 46,* 119-124.

*Kawamura, K. Y., Frost, R. O., & Harmatz, M. G. (2002). The relationship of perceived parenting styles to perfectionism. *Personality and Individual Differences, 32,* 317-327.

*Kljajic, K., Gaudreau, P., & Franche, V. (2017). An investigation of the 2× 2 model of perfectionism with burnout, engagement, self-regulation, and academic achievement. *Learning and Individual Differences, 57,* 103-113.

*Leenaars, L., & Lester, D. (2006). Perfectionism, depression, and academic performance. *Psychological Reports, 99,* 941-942.

Limburg, K., Watson, H. J., Hagger, M. S., & Egan, S. J. (2017). The relationship between perfectionism and psychopathology: A meta-analysis. *Journal of Clinical Psychology, 73,* 1301-1326.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis.* Thousand Oaks, CA: Sage.

Madigan, D. J., Stoeber, J., Culley, T., Passfield, L., & Hill, A. P. (2018). Perfectionism and training performance: The mediating role of other-approach goals. *European Journal of Sport Science, 18*, 1271-1279.

McAdams, D. P., & Pals, J. L. (2007). The role of theory in personality research. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 3–20). New York, NY: Guilford Press

Missildine, W. H. (1963). *Your inner child of the past*. New York: Simon & Schuster.

*Mobley, M., Slaney, R. B., & Rice, K. G. (2005). Cultural validity of the Almost Perfect Scale--Revised for African American college students. *Journal of Counseling Psychology, 52*, 629.

*Nounopoulos, A., Ashby, J. S., & Gilman, R. (2006). Coping resources, perfectionism, and academic performance among adolescents. *Psychology in the Schools, 43,* 613-622.

OECD. (2016). *Education at a glance 2016: OECD indicators*. Paris: OECD Publishing.

O'Connor, M. C., & Paunonen, S. V. (2007). Big Five personality predictors of post-secondary academic performance. *Personality and Individual Differences, 43,* 971-990.

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin, 135*, 322–338.

*Pulford, B. D., & Sohal, H. (2006). The influence of personality on HE students' confidence in their academic abilities. *Personality and Individual Differences, 41,* 1409-1419.

*Rice, K. G., & Ashby, J. S. (2007). An efficient method for classifying perfectionists. *Journal of Counseling Psychology, 54*, 72.

*Rice, K. G., Lopez, F. G., & Richardson, C. M. (2013). Perfectionism and performance among STEM students. *Journal of Vocational Behavior, 82,* 124-134.

*Rice, K. G., Lopez, F. G., Richardson, C. M., & Stinson, J. M. (2013). Perfectionism

moderates stereotype threat effects on STEM majors' academic performance. *Journal of Counseling Psychology, 60*, 287.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138,* 353–387.

Rimfeld, K., Kovas, Y., Dale, P. S., & Plomin, R. (2016). True grit and genetics: Predicting academic achievement from personality. *Journal of Personality and Social Psychology, 111*, 780.

Rosenthal, R. (1979). The "file drawer problem" and tolerance for null results. *Psychological Bulletin, 86,* 638-641.

Roth, P. L., & Clarke, R. L. (1998). Meta-analyzing the relation between grades and salary. *Journal of Vocational Behavior, 53*, 386-400.

Rothstein, H. R., Sutton, A. J., & Borenstein, M. (2006). *Publication bias in meta-analysis: Prevention, assessment and adjustments*. New York, NY: John Wiley & Sons.

Schmidt, F. L., Oh, I. S., & Hayes, T. L. (2009). Fixed-versus random-effects models in meta-analysis: Model properties and an empirical comparison of differences in results. *British Journal of Mathematical and Statistical Psychology, 62*, 97-128.

Schneider, M., & Preckel, F. (2017). Variables associated with achievement in higher education: A systematic review of meta-analyses. *Psychological Bulletin, 143*, 565.

*Sevlever, M., & Rice, K. G. (2010). Perfectionism, depression, anxiety, and academic performance in premedical students. *Canadian Medical Education Journal, 1*, 96-104.

*Shaunessy, E., Suldo, S. M., & Friedrich, A. (2011). Mean levels and correlates of perfectionism in International Baccalaureate and general education students. *High Ability Studies, 22*, 61-77.

*Shim, S. S., Rubenstein, L. D., & Drapeau, C. W. (2016). When perfectionism is coupled

with low achievement: The effects on academic engagement and help seeking in middle school. *Learning and Individual Differences, 45*, 237-244.

Sirois, F. M., Molnar, D. S., & Hirsch, J. K. (2017). A Meta-analytic and Conceptual Update on the Associations Between Procrastination and Multidimensional Perfectionism. *European Journal of Personality*, *31*, 137-159.

*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.

Smith, M. M., Sherry, S. B., Chen, S., Saklofske, D. H., Mushquash, C., Flett, G. L., & Hewitt, P. L. (2018). The perniciousness of perfectionism: A meta-analytic review of the perfectionism-suicide relationship. *Journal of Personality*, *86*, 522-542.

Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology, 35*, 4-28.

Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *International Review of Sport and Exercise Psychology, 4,* 128-145.

Stoeber, J. (2012). Perfectionism and performance. In S. M. Murphy (Ed.), *The Oxford handbook of sport and performance psychology* (pp. 294-306). New York: Oxford University Press.

Stoeber, J. (2018). *The Psychology of Perfectionism. Theory, Research, Applications.* London: Routledge.

Stoeber, J., Corr, P. J., Smith, M. M., & Saklofske, D. H. (2018). Perfectionism and personality. In J. Stoeber (Ed.), The psychology of perfectionism: Theory, research, applications. London: Routledge.

Stoeber, J., & Damian, L. E. (2016). Perfectionism in employees: Work engagement,

workaholism, and burnout. In F. M. Sirois & D. S. Molnar (Eds.), *Perfectionism, health, and well-being.* (pp. 265-283). New York, NY: Springer.

Stoeber, J., Damian, L. E., & Madigan, D. J. (2018). Perfectionism: A motivational perspective. In J. Stoeber (Ed.), *The psychology of perfectionism: Theory, research, and applications*. London, UK: Routledge.

*Stoeber, J., & Eismann, U. (2007). Perfectionism in young musicians: Relations with motivation, effort, achievement, and distress. *Personality and Individual Differences, 43*, 2182-2192.

Stoeber, J., & Gaudreau, P. (2017). The advantages of partialling perfectionistic strivings and perfectionistic concerns: Critical issues and recommendations. *Personality and Individual Differences, 104*, 379-386.

*Stoeber, J., Haskew, A. E., & Scott, C. (2015). Perfectionism and exam performance: The mediating effect of task-approach goals. *Personality and Individual Differences, 74,* 171-176.

Stoeber, J., & Madigan, D. J. (2016). Measuring perfectionism in sport, dance, and exercise: Review, critique, recommendations. In A. P. Hill (Ed.), *The psychology of perfectionism in sport, dance and exercise* (pp. 31-56). London: Routledge.

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

Stoeber, J., Otto, K., & Stoll, O. (2006). *Multidimensional Inventory of Perfectionism (MIPS): English version.* Unpublished manuscript.

*Stoeber, J., & Rambow, A. (2007). Perfectionism in adolescent school students: Relations with motivation, achievement, and well-being. *Personality and Individual Differences,* 42, 1379-1389.

*Stornelli, D., Flett, G. L., & Hewitt, P. L. (2009). Perfectionism, achievement, and affect in

children: A comparison of students from gifted, arts, and regular programs. *Canadian Journal of School Psychology, 24*, 267-283.

Shaunessy, E., Suldo, S. M., & Friedrich, A. (2011). Mean levels and correlates of perfectionism in International Baccalaureate and general education students. *High Ability Studies, 22*, 61-77.

Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson.

*Vandiver, B. J., & Worrell, F. C. (2002). The reliability and validity of scores on the Almost Perfect Scale–Revised with academically talented middle school students. *Journal of Secondary Gifted Education, 13*, 108-119.

*Vansteenkiste, M., Smeets, S., Soenens, B., Lens, W., Matos, L., & Deci, E. L. (2010). Autonomous and controlled regulation of performance-approach goals: Their relations to perfectionism and educational outcomes. *Motivation and Emotion, 34*, 333-353.

Vedel, A. (2014). The Big Five and tertiary academic performance: A systematic review and meta-analysis. *Personality and Individual Differences, 71*, 66 –76.

*Verner-Filion, J., & Gaudreau, P. (2010). From perfectionism to academic adjustment: The mediating role of achievement goals. *Personality and Individual Differences, 49*, 181-186.

*Wang, K. T. (2012). Personal and family perfectionism of Taiwanese college students: Relationships with depression, self-esteem, achievement motivation, and academic grades. *International Journal of Psychology, 47*, 305-314.

*Witcher, L. A., Alexander, E. S., Onwuegbuzie, A. J., Collins, K. M., & Witcher, A. E. (2007). The relationship between psychology students' levels of perfectionism and achievement in a graduate-level research methodology course. *Personality and Individual Differences, 43*, 1396-1405.

Table 1.

Characteristics of Studies Included in the Meta-Analysis

	Sample				Measurement					Effect sizes				
Study	Domain	*N*	Age	%Female	Instrument	PS	PC	Achievement	Ach. Measure	PS-PC	PS-A	PC-A	RPS-A	RPC-A
Bieling, Israeli, Smith, & Antony (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 & Winkworth (2004) Sample 1	Tertiary	200	—	100	HMPS	SOP	SPP	Grade	O	—	.09	-.02	—	—
Blankstein & Winkworth (2004) Sample 2	Tertiary	100	—	0	HMPS	SOP	SPP	Grade	O	—	.16	-.16	—	—
Bong, Hwang, Noh, & Kim (2014)	Secondary	304	—	48.68	HMPS	SOP	SPP	Exam[6]	O	.56	.23	.13	.16	.00
Brown et al. (1999)	Tertiary	90	—	100	FMPS	PStan	CM	GPA	SR	.54	.30	—	—	—
Burnam, Komarraju, Hamel, & Nadler (2014)	Tertiary	393	21	48	FMPS	PStan	CM/DA[7]	GPA	SR	.43	.17	.02	.16	-.05
Castro & Rice (2003) Sample 1	Tertiary	59	20.86	67.79	FMPS	PStan	CM/DA	GPA	SR	—	.26	-.30	—	—
Castro & Rice (2003) Sample 2	Tertiary	65	20.95	86.15	FMPS	PStan	CM/DA	GPA	SR	—	.24	-.08	—	—
Castro & Rice (2003) Sample 3	Tertiary	65	20.28	80	FMPS	PStan	CM/DA	GPA	SR	—	.07	.17	—	—
Damian, Stoeber, Negru, & Băban (2014)	Secondary	584	17.1	58.22	CAPS	SOP	SPP	GPA	SR	.43	.19	-.08	.23	-.16
Damian, Stoeber, Negru-Subtirica, & Băban (2017b)	Secondary	386	—	—	CAPS	SOP	SPP	GPA[8]	SR	.62	.31	.10	.25	-.10
De Cuyper, Pieters, Claes, Vandromme,	Tertiary	50	—	—	HMPS FMPS	SOP/OOP/	SPP/CM/DA/	GPA	O	—	.10	-.03	—	—

[6]Average across two exams (English and Math).

[7]In all instances, when both concerns over mistakes and doubts about action were reported, correlations were averaged across the two.

[8]Average correlations across three time points.

& Hermans (2013)						PStan	PE/PCr							
Elion, Wang, Slaney, & French (2012)	Tertiary	219	21.45	47.95	APS-R	S	D	GPA	SR	.00	.17	-.20	.17	-.20
Eum & Rice (2011)	Tertiary	96	19.08	62	APS-R	S	D	GPA	SR	.11	.17	-.17	.19	-.19
Flett, Blankstein, & Hewitt (2009)	Tertiary	92	22.20	100	HMPS	SOP	SPP	Exam	O	—	.16	-.27	—	—
Fong & Yuen (2009)	Primary	331[9]	—	51.40	APS-R	S	D	Exam	O	.15	.31	-.32	.38	-.39
Grzegorek, Slaney, Franze & Rice (2004)	Tertiary	273	19.87	73.62	APS-R	S	D	GPA	SR	.05	.32	-.09	.33	-.11
Harvey, Moore, & Koestner (2017)	Primary	203	9.83	56.7	CAPS	SOP[10]	-	Grade	O	—	.22	—	—	—
Kawamura, Frost, & Harmatz. (2002)	Tertiary	89	—	100	FMPS	PStan	CM/DA	GPA	SR	—	.55	.06	—	—
Sample 1														
Kawamura, Frost, & Harmatz. (2002)	Tertiary	56	—	0	FMPS	PStan	CM/DA	GPA	SR	—	.19	-.05	—	—
Sample 2														
Kawamura, Frost, & Harmatz. (2002)	Tertiary	117	—	100	FMPS	PStan	CM/DA	GPA	SR	—	.34	-.08	—	—
Sample 3														
Kawamura, Frost, & Harmatz. (2002)	Tertiary	75	—	0	FMPS	PStan	CM/DA	GPA	SR	—	.31	.06	—	—
Sample 4														
Kljajic, Gaudreau, & Franche (2017)	Tertiary	312	19.17	72.1	HMPS-SF	SOP	SPP	GPA	O	.47	.19	-.17	.27	-.26
Leenaars & Lester (2006) Sample 1	Tertiary	30	—	—	APS-R	S	D	GPA	SR	—	.24	-.20	—	—
Leenaars & Lester (2006) Sample 2	Tertiary	117	23.2	71.79	APS-R	S	D	GPA	SR	—	.20	-.17	—	—
Mobley, Slaney, & Rice (2005)	Tertiary	248	19.94	68.9	APS-R	S	D	GPA	SR	-.16	.10	-.15	.08	-.13
Nounopoulos, Ashby, & Gilman (2006)	Primary	166	12.59	57.22	APS-R	S	D	GPA	SR	-.09	.31	-.26	.30	-.24
Pulford & Sohal (2006)	Tertiary	124	19	80.70	FMPS	PStan	CM/DA	GPA	O	.63	.15	.08	.10	-.01
Rice & Ashby (2007)	Tertiary	310	—	—	APS-R	S	D	GPA	SR	-.04	.16	-.15	.16	-.15
Rice, Lopez, & Richardson (2013)	Tertiary	232	—	100	APS-R	S	D	GPA	O	-.15	.18	-.18	.15	-.15

[9]Sample was selected based on high and low scorers on an exam. Samples were combined for correlations.

[10]Correlation was the average of SOP-striving and SOP-critical.

Sample 1														
Rice, Lopez, & Richardson (2013)	Tertiary	215	—	0	APS-R	S	D	GPA	O	-.02	.21	-.09	.21	-.09
Sample 2														
Rice, Lopez, Richardson, & Stinson	Tertiary	175	18.77	100	APS-R	—	D	GPA[11]	O	—	—	-.08	—	—
(2013) Sample 1														
Rice, Lopez, Richardson, & Stinson	Tertiary	119	18.77	0	APS-R	—	D	GPA	O	—	—	-.07	—	—
(2013) Sample 2														
Sevlever & Rice (2010) Sample 1	Tertiary	100	—	—	APS-R	S	D	GPA	SR	-.15	.34	-.22	.31	-.18
Sevlever & Rice (2010) Sample 2	Tertiary	75	—	—	APS-R	S	D	GPA	SR	-.23	.02	-.07	.00	-.07
Shaunessy, Suldo, & Friedrich (2011)	Secondary	141	15.74	60.99	APS-R	S	D	GPA	O	.06	.34	-.20	.36	-.23
Sample 1														
Shaunessy, Suldo, & Friedrich (2011)	Secondary	178	15.74	73.03	APS-R	S	D	GPA	O	.03	.43	-.13	.44	-.15
Sample 2														
Shim, Rubenstein, & Drapeau (2016)	Secondary	169	13.07	37	FMPS	PStan	CM	Grade	O	.44	.18	-.06	.21	-.14
Slaney, Rice, Mobley, Trippi, & Ashby	Tertiary	173	19.23	51.45	APS-R	S/SOP[12]	D/SPP	GPA	SR	.21	.33	-.13	.36	-.21
(2001) Sample 1					HMPS									
Slaney, Rice, Mobley, Trippi, & Ashby	Tertiary	174	20.42	69.54	APS-R	S/SOP/	D/SPP/CM/D	GPA	SR	.29	.20	-.14	.24	-.20
(2001) Sample 2					HMPS	PStan[13]	A							
					FMPS									
Stoeber & Eismann (2007)	Secondary	146	16.2	59.59	MIPS	SP	NRI	Grade	SR	.66	.42	.14	.33	-.15
Stoeber, Haskew, & Scott (2015)	Tertiary	100	19.9	89	HMPS	SOP	SPP	Exam	O	.45	.22	-.12	.28	-.22
Stoeber & Rambow (2007)	Secondary	121	14.6	59	MIPS	SP	NRI	Grade	SR	.65	.37	.21	.24	-.03

[11]Correlation was an average over underrepresented and proportional subgroups.

[12]Perfectionistic strivings-achievement correlations are averages of S and SOP, perfectionistic concerns-achievement correlations are averages of D and SPP.

[13]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.

Stornelli, Flett, & Hewitt (2009)	Primary	223	—	56.23	CAPS	SOP	SPP	Exam[14]	O	.56	-.02	-.05	—	—
Vandiver & Worrell (2002) Sample 1	Secondary	161	13.14	47.2	APS-R	S	D	GPA	SR	—	.32	-.26	—	—
Vandiver & Worrell (2002) Sample 2	Secondary	181	13.23	56.4	APS-R	S	D	GPA	SR	—	.33	-.19	—	—
Vansteenkiste et al. (2010)	Secondary	190	—	46	FMPS	PStan	CM/DA	Exam	O	.62	.13	-.08	.18	-.16
Verner-Filion & Gaudreau (2010)	Tertiary	198	19.18	86	HMPS-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
Witcher, Alexander, Onwuegbuzie, Collins, & Witcher (2007)	Tertiary	130	25.96	92.6	HMPS	SOP	SPP	Exam[15]	O	.75	.28	.17	.15	-.04

Note. FMPS = Multidimensional Perfectionism Scale (Frost et al., 1990), HMPS = Multidimensional Perfectionism Scale (Hewitt & Flett, 1991), HMPS-SF = Short Form of the Multidimensional Perfectionism Scale (Cox et al., 2002), CAPS = Child and Adolescent Perfectionism Scale (Flett et al., 2001), MIPS = Multidimensional Inventory of Perfectionism in Sport (Stoeber et al., 2006), APS-R = Almost Perfect Scale-Revised (Slaney et al., 2001); PS = Perfectionistic strivings, PStan = 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.

[14]Average across two exams (Reading and Math).

[15]Average across two exams (Midterm and Final).

Table 2. *Meta-Analytical Relationships between Perfectionism and Academic Achievement across all Studies*

Predictor variables	*k*	*N*	r^+	95% CI	*d*	Q^T	I^2	Fail-safe N	Egger's intercept	95% CI	k^{TF}	"Trim and Fill" estimates r^+ [95% CI]
Perfectionistic strivings	48	8607	.24	.21, .27	0.48	97.73***	51.91	5575	0.42	-1.02, 1.86	0	.24 [.21, .27]
Perfectionistic concerns	48	8608	−.08	-.12, -.05	-0.17	127.71***	63.20	633	-.18	-1.84, 1.49	7	-.06 [-.08, -.04]
Residual perfectionistic strivings	30	6634	.24	.21, .27	0.49	59.88*	51.57	2836	-0.11	-2.41, 2.18	0	.24 [.21, .27]
Residual perfectionistic concerns	30	6634	−.15	-.19, -.12	-0.31	51.48*	43.67	1101	0.23	-1.89, 2.36	4	-.17 [-.19, -.15]

Note. * $p < .05$. *** $p < .001$. 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. I^2 = degree of inconsistency in the observed relationship across studies. k^{TF} = number of imputed studies as part of "Trim and Fill" method.

Table 3. *Moderation Analyses Based on Subscale used to Measure Perfectionism*

	k	*N*	r^+	95% CI	Q^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	

Note. All estimates are based on non-residualized (zero-order) correlations. k = number of studies r^+ = weighted mean r. 95% CI = 95% Confidence Interval. Q^B = heterogeneity explained by any categorization in the data. Self-oriented perfectionism and socially prescribed perfectionism were measured using the Multidimensional Perfectionism Scale (Hewitt & Flett, 1991), Short Form of the Multidimensional Perfectionism Scale (Cox et al., 2002), and the Child and Adolescent Perfectionism Scale (Flett et al., 2001). * $p < .05$. *** $p < .001$.

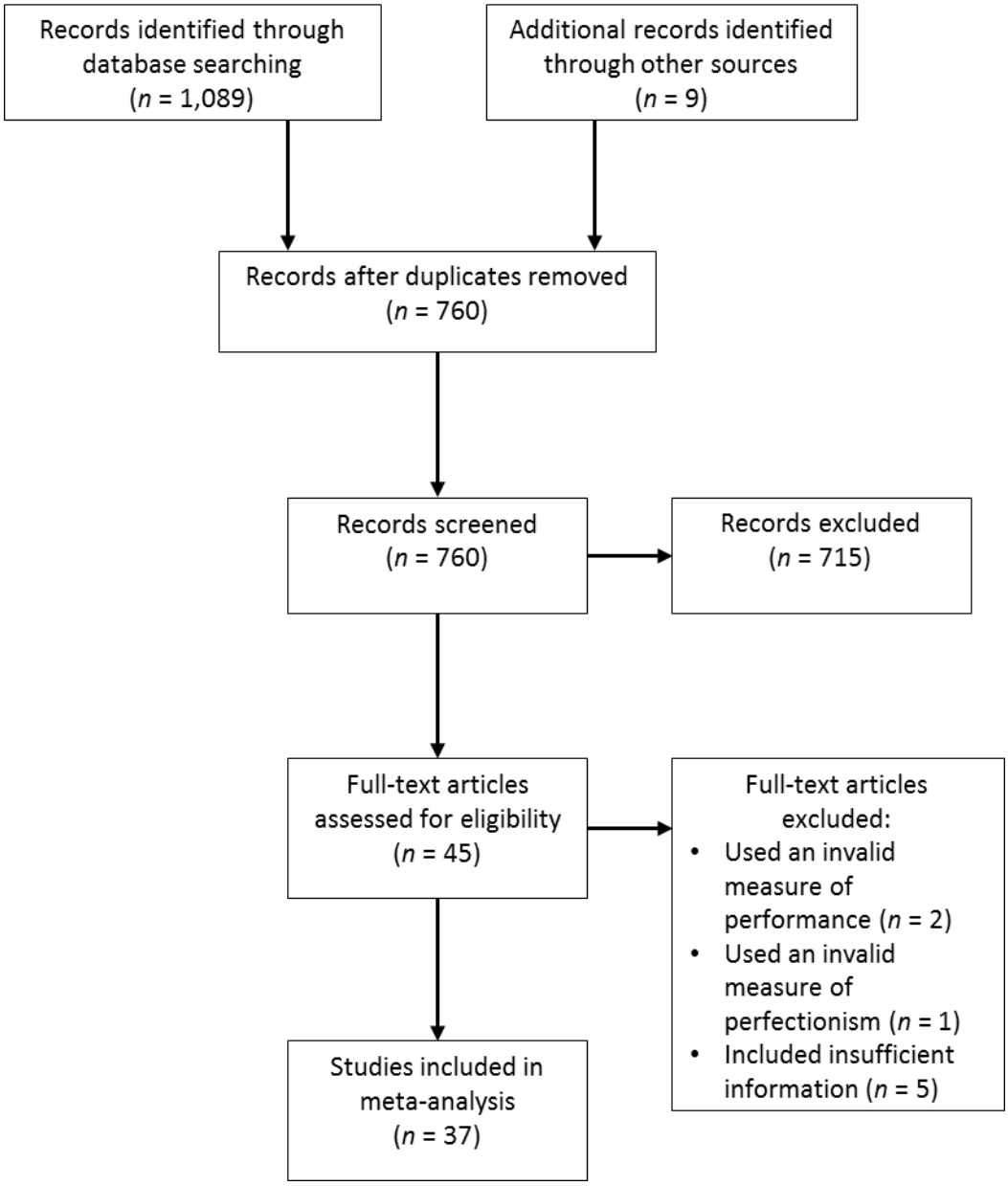

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram illustrating study selection.