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Multidimensional Perfectionism and Burnout: A Meta-Analysis

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Abstract

A meta-analysis is provided of research examining the relationship between multidimensional perfectionism and burnout. In doing so, relationships before and after controlling for the relationship between dimensions of perfectionism were examined along with whether relationships were moderated by domain (work, sport, or education). A literature search yielded 43 studies (N = 9838) and 663 effect sizes. Meta-analysis using random-effects models revealed that perfectionistic strivings had small negative or non-significant relationships with overall burnout and symptoms of burnout. By contrast, perfectionistic concerns displayed medium-to-large and medium positive relationships with overall burnout and symptoms of burnout. After controlling for the relationship between dimensions of perfectionism, "pure" perfectionistic strivings displayed notably larger negative relationships. In terms of moderation, in some cases perfectionistic strivings were less adaptive and perfectionistic concerns more maladaptive in the work domain. Future research should examine explanatory mechanisms, adopt longitudinal designs, and develop interventions to reduce perfectionistic concerns fuelled burnout.

Keywords: motivation, performance, sport, work, education

Multidimensional Perfectionism and Burnout: A Meta-Analysis

Motivation can go awry so that high levels of dedication to a previously enjoyed activity can result in burnout (Gould, 1996). Burnout is a psychosocial syndrome that is associated with motivational, performance, and psychological difficulties. Due to its adverse consequences, a large amount of research has been dedicated to identifying antecedents of burnout (e.g., Alarcon, 2011; Purvanova & Muros, 2010; Swider & Zimmerman, 2010). Recently, perfectionism has received considerable attention in this regard. The current study provides a systematic review of research examining the perfectionism-burnout relationship in the form of a meta-analysis. In doing so, we summarize the relationship between two main dimensions of perfectionism (viz. strivings and concerns) and burnout. In addition, we also examine these relationships before and after controlling for the relationship between dimensions of perfectionism (i.e., "pure" perfectionistic strivings and "pure" perfectionistic concerns) and whether these relationships differ depending on the domain in which they are assessed (work, sport, or education).

Burnout and its development

Contemporary understanding of burnout owes much to the work of Maslach and Jackson (e.g., Maslach, 1976; Maslach & Jackson, 1981a; Maslach & Jackson, 1981b). Although other models of burnout exist, Maslach and Jackson's model is the most influential and the most widely adopted when examining burnout. Maslach and Jackson describe burnout as having three core symptoms. The first core symptom is the depletion of emotional resources (emotional exhaustion). This symptom has been described as general feelings of being overextended by demands being placed on the individual. The second core symptom is the development of an impersonal or cynical attitude (depersonalization or cynicism). This symptom is an interpersonal dimension of burnout that captures indifference or detachment from others. The final symptom is

an evaluation of personal competence, accomplishment, or efficacy (personal accomplishment or professional efficacy). Lower levels of this symptom are indicative of higher burnout. Scores on this element are therefore often reversed to obtain a measure of *reduced* competence or accomplishment.

Burnout is thought to manifest in a range of domains. In the work domain and service jobs, these symptoms refer specifically to interactions with recipients of service, care, treatment, or instruction. In non-service jobs, the symptoms refer to work activities more generally. The same symptoms in work are also noted in education but are anchored in experiences of school and university (Schaufeli, Martinez, Marques-Pinto, Salanova, & Bakker, 2002). In sport, the symptoms are similar but have been adapted to capture the unique characteristics of the sport domain (Raedeke, 1997; Raedeke & Smith, 2001). Specifically, the exhaustion symptom includes an additional physical element and the depersonalisation symptom is replaced with devaluation - a loss of interest or value in participation. This latter adaptation was based on an attempt to identify an equivalent symptom of devaluation in a group that are recipients of care (i.e., athletes), rather than providers of care (Raedeke & Smith, 2001). In this sense, although not equivalent, the two symptoms are analogues of each other and have been highly correlated when measured concurrently (Cresswell & Eklund, 2007a)[1].

Examination of burnout is considered an important area of enquiry as it is a syndrome that is associated with substantial human suffering and carries considerable financial costs for organisations. In terms of the personal consequences of burnout, research suggests it contributes to diminished physical and mental health (Maslach, 2001). Indeed, the consequences of burnout can be so severe that initial work in this area centered on discriminating between burnout and depression (Freudenberger, 1974). From an organisational perspective, burnout is associated

with decreased motivation and poorer performance, a finding evident in all domains (Bakker, Van Emmerik & Van Riet, 2008; Cresswell & Eklund, 2007b; Yang, 2004). Consequently, associated monetary costs to employers in the work domain are noteworthy, as are the equivalent costs in education and sport domains in the form of lost investment and revenue associated with talent development and unfulfilled potential (Feigley, 1984).

Burnout is understood to arise primarily as the result of stress-related processes (Maslach, Schaufeli, & Leiter, 2001). In accord, when seeking to explain burnout, particular emphasis is placed on emotional and situational demands along with the resources available to cope with those demands. As described by Maslach (1982) and similarly by others (e.g., Leiter, 1993), the three symptoms of burnout are considered to be the result of the imbalance between demands and resources. Demands (e.g., high workload) influence the potential for exhaustion whereas resources (e.g., high social support) play a protective role in terms of accomplishment and depersonalization. In terms of the progression of burnout, over time, increasing demands and investment are thought to culminate in an overload of resources. Exhaustion develops first and, in an attempt to cope with exhaustion, a sense of depersonalization then develops. A reduced sense of accomplishment follows, or can arise in tandem, when the first two symptoms interfere with effectiveness and perceptions of personal resources (Leiter & Ashforth, 1996).

A large amount of research has been dedicated to examining the antecedents of burnout in work, sport, and education domains. In the work domain, a number of meta-analytical studies have identified influential demographic (e.g., Purvanova & Muros, 2010), situational (e.g., Alarcon, 2011), and personality factors (e.g., Swider & Zimmerman, 2010). This research suggests, for example, that conscientiousness is associated with lower levels of burnout whereas neuroticism is associated with higher levels of burnout. Although research is less extensive in

sport and education, systematic and narrative reviews have identified similar antecedents (e.g., anxiety, stress, coping; Goodger, Gorely, Lavallee, & Harwood, 2007; Walburg, 2014). Moreover, mirroring research in the work domain, research has also found that burnout is associated with similar personality characteristics among athletes and students such as neuroticism (e.g., Jiang, Huang & Chen, 2012). One notable omission from these reviews and recent meta-analytical studies (e.g., Alarcon, Eschleman, & Bowling, 2009; Swider & Zimmerman, 2010; Ng, Sorensen, & Eby, 2006) is consideration of perfectionism.

Multidimensional perfectionism

Broadly defined, perfectionism is a combination of exceedingly high standards and a preoccupation with extreme self-critical evaluation (Frost, Marten, Lahart, & Rosenblate, 1990). Current understanding of perfectionism is that it is a multidimensional trait or disposition that includes a range of dimensions that collectively capture two higher-order dimensions, perfectionistic strivings and perfectionistic concerns. Perfectionistic strivings are “aspects of perfectionism associated with self-oriented striving for perfection and the setting of very high personal performance standards" whereas perfectionistic concerns are “aspects associated with concerns over making mistakes, fear of negative social evaluation, feelings of discrepancy between one’s expectations and performance, and negative reactions to imperfection” (Gotwals, Stoeber, Dunn, & Stoll, 2012, p.264). These two broad dimensions of perfectionism provide a useful heuristic in an area of enquiry that can be quite disparate in terms of conceptual approaches and measurement. It is also noteworthy that this approach is supported by factor analytical studies (e.g., Bieling, Israeli, & Antony, 2004) and is being increasingly adopted when examining perfectionism and reviewing perfectionism research (e.g., Gotwals, et al., 2012).

In terms of research examining the effects of perfectionism, perfectionistic strivings and

concerns have proven useful predictors of cognitive (e.g., attributions), affective (e.g., anxiety), and behavioural (e.g., performance) outcomes in work, sport, and education domains (see Gotwals et al., 2012; Stoeber, 2011; Stoeber & Otto, 2006, for reviews). In addition, research has also begun to accumulate that suggests perfectionism can have a heavy toll in terms of health-related outcomes, including general physical ill-health, fatigue, and even early mortality (Dittner, Rimes, & Thorpe, 2011; Fry & Debats, 2009; Molnar, Sadava, Flett & Colautti, 2012). Against this backdrop, research has found that perfectionistic strivings are typically associated with few maladaptive outcomes and in some instances are associated with adaptive outcomes. This is particularly the case when the relationship between perfectionistic strivings and perfectionistic concerns are controlled for (see Gotwals et al., 2012). Some of the desirable correlates of perfectionistic strivings include positive emotional experiences, active coping strategies, and greater performance (e.g., Dunkley, Sanislow, Grilo, & McGlashan, 2006; A. P. Hill, Stoeber, Brown & Appleton, 2014; Stoeber & Childs, 2010). By contrast, perfectionistic concerns are associated with an array of maladaptive outcomes. These include almost the converse of perfectionistic strivings and, notably, antecedents of burnout such as greater threat appraisals, anxiety, and avoidant coping (e.g., Dunkley, Zuroff & Blankstein, 2003; A. P. Hill, Hall & Appleton, 2010; Stoeber, & Childs, 2010).

A number of researchers have argued that the two dimensions of perfectionism (perfectionistic concerns, in particular) are likely to be important antecedents of burnout (e.g., Gould, 1996; Stoeber & Rennert, 2008; Zhang, Gan, & Cham, 2007). This is partly because of the influential role perfectionism is thought to play in stress-related processes. Specifically, perfectionistic concerns encapsulate a rigid self-evaluative style whereby individuals perceive their environment in dichotomous, all-or-nothing terms, overgeneralise negative events, ruminate

about past failures, and have a strong need for self-validation (Hewitt & Flett, 1996, 2002). In terms of appraisal processes that govern stress, external expectations and criticism are perceived to be high and a sense of self-worth under constant threat. Subsequently, ineffective avoidant coping strategies are employed that ensure negative emotional experiences persist. As such, perfectionistic concerns are associated with considerable strain that render individuals vulnerable to the accrual of stress and subsequent burnout. In summarizing current understanding of the perfectionism-burnout relationship, then, it is the harsh self-evaluative processes central to perfectionistic concerns that are understood to fuel the perfectionism-burnout relationship, rather than perfectionistic strivings.

In an attempt to identify factors that contribute to burnout and ill-health in work and sport, the first empirical studies to examine relationships between perfectionism and burnout in these domains appeared at a similar time nearly 20 years ago (Fry, 1995; Gould, Tuffey, Udry, & Loehr, 1996). However, the majority of research examining the perfectionism-burnout relationship has been conducted in the last 5 years. Most of the studies have taken place in work and sport domains but studies have also recently begun to emerge in an education domain. Generally, this research has found perfectionistic strivings to be typically unrelated or negatively related to burnout symptoms (e.g., Caliskan, Arikan & Saatci, 2014; A. P. Hill, Hall, Appleton & Kozub, 2008; Shih, 2012). By contrast, perfectionistic concerns have been found to be typically positively related to burnout symptoms (e.g., A. P. Hill, 2013; Li, Hou, Chi, Liu & Hager, 2014; Stoeber & Childs, 2010). While evidence of the relationship between dimensions of perfectionism and burnout has gathered across multiple domains, to date there has been no attempt to summarize this research in a systematic manner or examine sources of variability in the findings of studies. Consequently, the first purpose of the current study was to summarize

research that has examined the relationship between dimensions of perfectionism and burnout across these domains in the form of a meta-analytical review. Unlike in narrative and other general systematic reviews, in this case a quantitative summary of these relationships and test of their statistical significance can be provided.

Accounting for the correlation between dimensions of perfectionism

The second purpose of the study was to examine the perfectionism-burnout relationships using semi-partial correlations. In two major review papers in the area of perfectionism (Gotwals et al., 2012; Stoeber & Otto, 2006), both bivariate and partial correlations were examined. This is because the two dimensions of perfectionism are typically correlated and this can obscure the relationship between each dimension of perfectionism and their various outcomes (Stoeber & Otto, 2006). This issue is especially relevant in terms of perfectionistic strivings. This is because perfectionistic strivings are more equivocal in terms of their correlates and has displayed positive relationships with both adaptive and maladaptive outcomes, including burnout. A clearer picture has been found to emerge once the relationships between perfectionistic strivings and perfectionistic concerns are controlled and pure perfectionistic strivings and pure perfectionistic concerns are examined (see Gotwals et al., 2012; Stoeber & Otto, 2006). Although some caution has recently been called for in terms of using partialling to identify the effects of the two dimensions of perfectionism (see A. P. Hill, 2014), examination of their partialled effects remains useful when assessing the degree to which the outcomes associated with each dimension are due to unique or shared variance. In this way, examination of semi-partial correlations between dimensions of perfectionism and burnout is warranted.

Moderation of the perfectionism-burnout relationship

One of the advantages of meta-analysis is that it allows for exploration of variability

between studies in terms of the relationships observed and the identification of possible moderating factors (Hunter & Schmidt, 2004). This is important in context of perfectionism-burnout research as there is some evidence of variability in the relationships between dimensions of perfectionism and symptoms of burnout between domains. For example, there have been occasions when perfectionisitic strivings has been unrelated, positively related, and negatively related to exhaustion in work, education, and sport (Appleton & A. P. Hill, 2012; Shih, 2012; Taris et al., 2010). Therefore, in order to begin to explore possible sources of this variability, the final purpose of the current study was to examine whether the domain in which the perfectionism-burnout relationships were assessed is a potential moderator of the observed relationships (work, sport, or education).

There are a number of noteworthy similarities and differences between work, sport, and education. All three domains are achievement contexts characterized by potentially high performance demands and interpersonal competition. However, they also differ in important ways. Sport, for example, is unique insomuch as flawless performance can be necessary for success so perfectionism is considered by some to be desirable and is often overtly encouraged (e.g., Gould, Dieffenbach, & Moffett, 2002). In addition, as a more freely-chosen activity, there is some evidence that sport is characterized by higher levels of intrinsic motivation (the antithesis of burnout) than work or education (Vallerand, 2004). In this regard, work is the most distinct domain as, comparatively, external motives are high (i.e., financial remuneration), the potential for ‘entrapment’ is high (work is necessary for one’s livelihood) and, unlike sport or education, work is the domain in which individuals are most likely to be responsible for providing care, instruction, and service for others – a feature considered to be one of the main driving forces behind burnout (Maslach et al., 2001). Along these lines, education is similar to sport in that

students are recipients of care and not providers or care (contributing to less burnout) but is also similar to work in that education can be compulsory (contributing to more burnout).

In support of the possibility that domain moderates relationships between perfectionism and burnout, it is noted that research has found that burnout is related to job and workplace characteristics with some vocations more vulnerable to burnout than others (e.g., nurses and teachers; Maslach, et al., 2001). Moreover, there is some evidence that the context moderates other stress-related processes and antecedent-burnout relationships. Shin et al. (2014), for example, found that the relationship between coping strategies and symptoms of burnout depended on occupation, with some coping strategies (emotion-focused and problem focused) being especially strong predictors of some burnout symptoms among nurses in comparison to teachers and service employees. In this regard, while the general influence of perfectionistic strivings and concerns on stress-related processes are likely to be evident across domains, in relation to burnout, their influence may be in part dependant on the features of that domain. Again, on this issue, there is evidence that in regards to work, perfectionistic strivings may be less adaptive and perfectionistic concerns more maladaptive as they both appear to energise compulsive work behaviour (see Stoeber & Damian, in press, for a review).

The present study

In summary, the first purpose of the current study was to provide a meta-analytical review of research examining the relationship between two dimensions of perfectionism (viz. strivings and concerns) and burnout (viz. overall burnout, exhaustion, reduced personal accomplishment, and depersonalization). The second purpose was to re-examine these relationships after controlling for the relationship between the two dimensions of perfectionism (semi-partial correlations). The final purpose was to examine whether the relationships differed

depending on the domain in which it was assessed (work, sport, or education). It was hypothesized that (i) perfectionistic strivings would be negatively related to burnout, (ii) perfectionistic concerns would be positively related to burnout, (iii) when the relationship between the two dimensions of perfectionism are controlled for, pure perfectionistic strivings would display stronger, more negative, relationships with burnout and pure perfectionistic concerns would display stronger, more positive, relationships with burnout, and, finally, (iv) perfectionistic strivings would be less adaptive and perfectionistic concerns more maladaptive in work than in other domains. For perfectionistic strivings this equates to a weaker, less negative, or possibly positive, relationship with burnout and for perfectionistic concerns this equates to a stronger, more positive, relationship with burnout.

Method

Literature search

A computerized literature search was conducted using the databases PsycINFO/PsycARTICLES, MEDLINE/SPORTDiscuss, and ProQuest Dissertations & Theses (American & International and United Kingdom & Ireland). The search terms were "perfection"* (for perfectionism, perfectionist, and perfectionistic) and "burnout". The search date was between January, 1990, (the year the first article on multidimensional perfectionism was published) and April, 2014. No other restrictions were placed on the searches. This search yielded 263 studies. Once duplicates were removed and abstracts screened for relevance (i.e., studies that examined the relationship between perfectionism and burnout), 57 studies remained.

Following the computerized literature search, the reference lists of the articles identified were inspected with the aim of identifying other articles. In addition, the corresponding authors of the articles identified were contacted to enquire about the possession of any unpublished data

(e.g., conference papers or data from unpublished studies). Thirty-three corresponding authors were contacted and 14 authors responded to our request 4 weeks after the initial email (our stated deadline). This resulted in the inclusion of 5 additional data sets (Ho, Appleton, Cumming, & Duda, n.d, n.d.); Jowett, Hill, & Hall, n.d, n.d; Stensrud, Kristiansen & Abrahamsen, n.d). On the 4th July, 2014, we ended all search strategies and instigated data reduction and analysis. In total, the search strategies resulted in the identification of 62 studies/data sets that were further assessed using the inclusion criteria below.

Inclusion criteria

Studies were included in the meta-analysis if they: (a) measured perfectionism and burnout using self-report scales that yielded quantitative values; (b) measured perfectionism in a multidimensional manner (as opposed to a unidimensional manner); (c) adopted Maslach and Jackson's approach to measuring symptoms of burnout (viz. MBI-Human Services Survey, MBI-Educators Survey, Maslach, & Jackson, 1981b, 1996; MBI-General Survey, Schaufeli, Leiter, Maslach, & Jackson, 1996; MBI-Student Survey, Schaufeli, Martinez, Marques-Pinto, Salanova, & Bakker, 2002; Athlete Burnout Questionnaire; Raedeke & Smith, 2001); (c) included an effect size (e.g., correlation coefficient), sufficient information for computation or estimation of an effect size, or this information was obtained from the corresponding author when not included in the original publication; (d) were published in English; (e) were a published journal article, thesis/dissertation, conference presentation or data provided directly from authors; and (f) included a sample that was not replicated elsewhere (e.g., included in both a journal article and a thesis/dissertation). When this was the case, only the most complete and recent account of the sample/data was used. The implementation of the criteria resulted in the final inclusion of 43 studies/data sets reporting 310 effect sizes capturing the relationship

between perfectionism and burnout.

Recorded variables

A coding sheet was completed for each study included in the meta-analysis. It included: (a) publication information (authors/year), (b) domain (work, sport, or education), (c) number of participants, (d) instrument used to measure perfectionism and indicators of perfectionistic strivings and concerns, (e) bivariate correlations between dimensions of perfectionism, and (f) bivariate correlations between dimensions of perfectionism and symptoms of burnout[2]. Indicators of perfectionistic strivings were the personal standards subscale from either Frost et al.'s (1990) Multidimensional Perfectionism Scale or its sport adaptations (Sport-MPS and Sport-MPS 2; Dunn et al., 2006; Gotwals & Dunn, 2009), the self-oriented perfectionism subscale 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 from the Multidimensional Inventory of Perfectionism in Sports (Stoeber, Otto, & Stoll, 2006), the high standards subscale from the revised Almost Perfect Scale (Slaney, Rice, Mobley, Trippi, & Ashby, 2001), and the striving for excellence subscale from the Perfectionism Inventory (R. W. Hill et al., 2004). Indicators of perfectionistic concerns were the concerns over mistakes, doubts about action, socially prescribed perfectionism, negative reactions to imperfection, and discrepancy subscales from the same instruments identified above. These indicators were selected based on the typical practice of researchers examining perfectionism, recommendations of those in this area (e.g., Stoeber, 2011), and factor analytical evidence (e.g., Bieling et al., 2004; Cox, Enns, & Clara, 2002; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Information was coded independently by the two authors. Both are regular contributors to research in the areas of perfectionism and/or burnout. In comparing the

information recorded, the agreement rate was 90% (information provided directly from authors after the initial literature search was not independently coded). Disagreement was resolved by revisiting the articles and coming to a consensus. Coded information for each study is presented in Table 1.

Meta-analytical procedures

The meta-analyzes were guided by Lipsey and Wilson (2001) and conducted using Comprehensive Meta-Analysis software (Version 3.3; Borenstein, Hedges, Higgins, & Rothstein, 2005). In deriving effect sizes and confidence intervals, random-effects models were used. Random-effects models assume variation in effect sizes between studies is due to both sampling error and true random variance arising from differences between studies in terms of their procedures and settings (as opposed to only sampling error stipulated in a fixed effect model). In comparison to fixed-effects models, then, random-effects models are generally considered to be preferable and allow generalization beyond the set of studies examined to future studies (Schmidt, Oh, & Hayes, 2009).

Analyzes were based on Fisher's Z transform. Fisher's Z transform is interpreted in a similar manner to a correlation coefficient and ranges from $-\infty$ to $+\infty$ with higher values indicative of a stronger relationship. In the context of meta-analysis, Fisher's Z transform is preferable to correlation coefficients as the latter has a problematic standard error when deriving weighted cumulative effects (Lipsey & Wilson, 2001). For ease of interpretation, correlation coefficients are reported alongside 95% confidence intervals. Cohen's (1992) recommendations for small, medium, and large effect sizes were then used to guide interpretation of effects (r = .10, .30, and .50). Statistical significance is indicated by the 95% confidence intervals excluding zero (p <.05). In all cases, the contributions of individual effect sizes to mean effect sizes were

weighted using the reciprocal of their sampling variance. This ensured that studies with larger sample sizes, and subsequent greater precision in estimating effect sizes, were more influential in determining the mean effect size (Rosenberg, Adams, & Gurevitch, 2007).

Of the 43 studies, 17 included multiple effect sizes[3]. This was for a number of reasons. In 13 studies, correlations between multiple indicators of perfectionistic strivings or concerns and symptoms of burnout were reported (e.g., correlations of both self-oriented perfectionism and personal standards with burnout symptoms). In three studies, correlations were reported examining relationships between dimensions of perfectionism and symptoms of burnout at two or more time points. Finally, in one study, multiple correlations were reported based on a second analysis of a subset of the initial sample. 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 226 independent effect sizes). This is a commonly used strategy to ensure that effect sizes 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).

In order to meta-analyze the relationship between perfectionism and overall burnout we used a formula provided by Ghiselli, Campbell, and Zedeck (1981, pp.163-164). This entailed using the correlations among the measured variables to estimate the correlation between the two dimensions of perfectionism and a burnout composite (‘overall burnout’). This strategy is often used in meta-analyzes to examine composites (e.g., Berry, Ones, & Sackett, 2007) and has been used in other meta-analyzes to examine burnout specifically (e.g., Clark, Michel, Zhdanova, Pui, & Baltes, in press). This procedure produced 132 additional effect sizes that were meta-analyzed in the same manner as the other effect sizes.

To examine the perfectionism-burnout relationships after controlling for the relationship between the two dimensions of perfectionism, semi-partial correlations were calculated. Semi-partial correlations capture the unique relationships between dimensions of perfectionism and burnout symptoms. To do so, dimensions of perfectionism are residualized based on their relationship with each other and then correlated with burnout scores (new pure perfectionistic strivings and pure perfectionistic concerns are created but burnout symptoms remain unchanged). Each semi-partial correlation was calculated using the formula provided by Cohen, Cohen, West and Aitkin (2003, pp.73-74). This procedure produced 268 semi-partial correlations. When added to the 37 bivariate correlations between perfectionistic strivings and perfectionistic concerns, this resulted in a further 305 that were meta-analyzed.

In order to assess moderation, heterogeneity of effect sizes was assessed. The total heterogeneity of the weighted mean effect sizes (Q_T) provides an indication of whether the variance evident in the weighted mean effect size exceeds that would be expected by sampling error (i.e., whether the weighted mean effect size is an adequate or inadequate representation of the distribution of effects). When stipulating a categorical structure to the data, constituents of the total heterogeneity (Q_T), heterogeneity explained by the categorization (Q_B) and the residual error heterogeneity Q_W), can be examined. Statistically significant heterogeneity explained by the categorization (Q_B) indicates that there are differences between categories in terms of their effects sizes and provides a strong basis for inferring moderation. Specific differences were examined via comparison of 95% confidence intervals for effect sizes.

Moderation was also assessed by calculating the degree of inconsistency in the observed relationship across studies (I^2). As described by Higgins and colleagues (Higgins, Thompson, Deeks, & Altman, 2003; Higgins & Thompson, 2002), this index is interpreted as the percentage

of total variation across studies due to "true" heterogeneity rather than sampling error: 100% x $(Q_T - df)/ Q_T$. As I^2 increases, the level of true heterogeneity increases (0% to 100%). Values of 25%, 50%, and 75% have been identified as low, medium and high levels of heterogeneity (Higgins & Thompson, 2002). This index is a useful adjunct when assessing moderation because unlike the total heterogeneity of each cumulative effect size (Q_T) it is not adversely influenced by the number of studies included in the analyzes. It can also be compared across meta-analyzes that include a different number of studies, type of study, and outcome (Higgins et al., 2003).

In order to assess publication bias (the 'file-drawer' problem) we adopted a number of strategies. We examined Rosenthal's (1979) fail-safe number (fail-safe *N*) for each effect size. The fail-safe number indicates the number of non-significant, unpublished, or missing studies with a mean effect size of zero that would need to exist in order to change the statistical significance of the observed effect size to a non-significant level (here, $p = .05$). Rosenthal recommended that the fail-safe number should be greater than $5k + 10$, where k equals the number of observed effect sizes. We also inspected funnel plots (a scatterplot of effect sizes against the reciprocal of its standard error) and used Egger's test of regression intercept to quantify the bias captured by the funnel plots by regressing effect size on the reciprocal of its standard error (Egger, Smith, Schneider, & Minder, 1997). In the absence of publication bias, Egger's regression intercept does not differ significantly from zero (i.e., its two-tailed 95% confidence interval includes zero). We also used Duval and Tweedie's (2000) "trim and fill" method to correct any asymmetry evident in the funnel plot by imputing studies to give a symmetrical distribution and provide publication bias adjusted estimates of effect sizes. Finally, we conducted an additional moderator analyzes that compared effects based on whether studies were obtained from published or unpublished sources (peer-reviewed publications vs

thesis/dissertations, conference presentations, or data sets provided by authors).

Results

Overall effect sizes

The weighted mean effect sizes between dimensions of perfectionism, overall burnout, and symptoms of burnout are reported in Table 2. Perfectionistic strivings displayed a small negative relationship with overall burnout, reduced personal accomplishment, and depersonalization, and a non-significant relationship with exhaustion. Perfectionistic concerns displayed a medium-to-large positive relationship with overall burnout and medium positive relationships with all symptoms of burnout.

Perfectionistic strivings and perfectionistic concerns displayed a medium positive relationship with each other. When controlling for the relationships between the two dimensions by analyzing semi-partial correlations, a slightly different pattern of effects emerged. Pure perfectionistic strivings displayed small, or small-to-moderate, negative relationships with overall burnout and all burnout symptoms. Pure perfectionistic concerns displayed a similar pattern of medium-to-large or medium positive relationships to those observed for perfectionistic concerns.

Assessment of total heterogeneity across studies indicated that variability in the weighted mean effects exceeded that associated with sampling error. The percentage of total variation across studies due to true heterogeneity was either medium or high. This suggests that variability among the effect sizes is also due to additional sources and alludes to the possible influence of moderating factors.

Moderator analyzes

Results of the comparison of effect sizes between domains are presented in Table 3.

Perfectionistic strivings. For the relationship between perfectionistic strivings and overall burnout, the weighted mean effect size for studies in sport and education differed significantly from in work. Notably, unlike in sport and education, the relationship in work was not statistically significant. When examining the symptoms, the weighted mean effect size for perfectionistic strivings and reduced personal accomplishment was significantly larger in education in comparison to work and sport. Again, the relationship in work was not statistically significant. The weighted mean effect sizes for the relationship between perfectionistic strivings and the other two symptoms were significantly smaller in work in comparison to sport and education. In regards to exhaustion, although similar in size, unlike in sport and education, the relationship was positive in work. In regards to depersonalization, unlike in the other domains, its relationship with perfectionistic strivings was smaller and non-significant in work.

Pure perfectionistic strivings. A slightly different pattern emerged when analyzing the semi-partial correlation coefficients. For the relationship between pure perfectionistic strivings and overall burnout, none of the weighted mean effect sizes differed significantly from each other. Differences in the weighted mean effect sizes for the relationship between pure perfectionistic strivings and reduced personal accomplishment across domains were the same as when examining bivariate correlations (i.e., education differed from sport and work). The weighted mean effect size for pure perfectionistic strivings and exhaustion was significantly smaller in work in comparison to education (but no longer sport) and for devaluation was significantly smaller in work in comparison to sport (but no longer education).

Perfectionistic concerns and pure perfectionistic concerns. For the relationship between perfectionistic concerns and overall burnout, the weighted mean effect size for studies in work was significantly larger than in sport and education. When examining the symptoms, the

weighted mean effect size for perfectionistic concerns and reduced personal accomplishment was significantly lower in education than in sport. The weighted mean effect size for perfectionistic concerns and exhaustion was significantly higher in work in comparison to sport. This was also the case in terms of the mean effect size for perfectionistic concerns and devaluation. When analyzing pure perfectionistic concerns, in all cases, the initially observed differences in the weighted mean effect sizes described above were non-significant.

Perfectionistic concerns-perfectionistic strivings. Given the differences before and after controlling for the relationship between the two dimensions of perfectionism in terms of moderation, a supplementary analysis was conducted to examine whether the relationship between perfectionistic concerns and strivings also differed between domains. This analysis revealed that the weighted mean effect size for the relationship between perfectionistic strivings and concerns did not differ between studies in work, sport, and education. All relationships were medium, or medium-to-large, and positive.

Heterogeneity. Examination of the total variation across studies due to true heterogeneity (I^2) revealed that despite statistically significant between study variability (Q_B), the amount of true variability was typically very low ($I^2 < 25\%$),. Noteworthy true heterogeneity ($I^2 > 25\%$), and support for moderation, was evident for four relationships: perfectionistic strivings-exhaustion, perfectionistic strivings-depersonalization, perfectionistic concerns-overall burnout, and perfectionistic concerns-depersonalization.

Publication bias

In the overall analyzes and moderation analyzes, the fail-safe numbers and Egger's regression intercept provided mixed evidence of publication bias. Specifically, in seven cases fail-safe numbers did not exceed the recommended thresholds but, in all cases, Egger's

regression intercept included zero. Examination of whether publication status served as a moderating factor provided a clearer picture and evidence of publication bias in a few cases. Specifically, the relationships of pure perfectionistic concerns-total burnout (Q_B = 4.88, *df* =1, *p* <.05, I^2 = 7.25%, r^+ = .46 [.41, .51] vs r^+ =.37 [.31, .43]) and pure perfectionistic concerns-exhaustion (Q_B = 4.42, *df* =1, I^2 = 11.58%, *p* <.05, r^+ = .30 [.26, .34] vs r^+ =.24 [.18, .28]) were larger in published sources than unpublished sources. Marginally statistically significant effects (*p* <.10) were also found for perfectionistic strivings-total burnout (Q_B = 3.17, *df* =1, *p* <.10, I^2 = 4.01%, r^+ = -.20 [-.29, -.11] vs r^+ = -.01 [-.20, .17]), perfectionistic strivings-reduced personal accomplishment Q_B = 2.98, *df* =1, *p* <.10, I^2 = 0.0%, r^+ = -.20 [-.29, -.12] vs r^+ = -.08 [-.19, .03]), and pure perfectionistic strivings-reduced personal accomplishment (Q_B = 3.30, *df* =1, *p* <.10, I^2 = 0.00%, r^+ = -.31 [-.37, -.24] vs r^+ = -.20 [-.30, -.10]). Again, in these cases relationships were larger in published sources than in unpublished sources. For perfectionistic strivings-total burnout and pure perfectionistic concerns-total burnout, the publication bias adjusted (trim and fill) effect sizes may offer more accurate estimates of these relationships. This is not the case for the other relationships as trim and fill effect sizes included imputed values in the opposite direction (i.e., imputed effects were larger, not smaller, than the average effect size).

Discussion

This study provided the first meta-analysis of the relationship between perfectionism and burnout. We examined the relationship between two dimensions of perfectionism (viz. strivings and concerns) and burnout using both bivariate and semi-partial correlations (i.e., controlling for correlations among dimensions of perfectionism). We also examined whether the relationships were moderated by the domain in which they were assessed (work, sport, or education). It was hypothesized that (i) perfectionistic strivings would be negatively related to burnout, (ii)

perfectionistic concerns would be positively related to burnout, (iii) when the relationship between the two dimensions of perfectionism are controlled for, pure perfectionistic strivings would display stronger, more negative, relationships with burnout and pure perfectionistic concerns would display stronger, more positive, relationships with burnout, and, finally, (iv) perfectionistic strivings would be less adaptive and perfectionistic concerns more maladaptive in work than in other domains. The first hypothesis was supported for overall burnout and two of the three symptoms of burnout (reduced personal accomplishment and devaluation). The second hypothesis was fully supported. The third hypothesis was generally supported but was more apparent for pure perfectionistic strivings. The fourth hypothesis was supported for four relationships (perfectionistic strivings-exhaustion, perfectionistic strivings-depersonalization, perfectionistic concerns-overall burnout, and perfectionistic concerns-depersonalization).

Multidimensional perfectionism and burnout

The findings suggest that perfectionistic strivings may offer, at least to a small degree, some protection to the development of burnout. This is consistent with the notion that burnout has little to do with strivings. Rather it is the evaluative tendencies that can accompany strivings which is more influential. This is illustrated by perfectionistic concerns which displayed a medium-to-large positive relationship with overall burnout and medium positive relationships with each symptom of burnout. As described earlier, perfectionistic concerns capture self-evaluative tendencies that render individuals vulnerable to the accrual of stress. Elsewhere, this has been made evident in research highlighting the association between perfectionistic concerns, threat appraisals, anxiety, and avoidant coping (e.g., A.P. Hill et al., 2010; Rice, Vergara, & Mirela, 2006; Stoeber & Rennert, 2008). Here, the findings allude to the more severe consequences that might arise when the stress associated with perfectionistic concerns continues

unabated. Overall, then, there is a marked difference between the two dimensions of perfectionism in terms of propensity for burnout evident across domains.

Turning to the semi-partial correlations, as expected, when the correlation between the two dimensions of perfectionism was controlled, perfectionistic strivings were comparatively more adaptive. Notably, the relationships evident for perfectionistic strivings were stronger and also included an inverse association with exhaustion. This is a trend evident elsewhere in more general reviews for other outcomes (e.g., Gotwals et al., 2012; Stoeber & Otto, 2006). For perfectionistic concerns, although there were some marginal changes, by comparison, the effects of pure perfectionistic concerns were largely the same. This indicates that the relationship between the two dimensions appears more influential in terms of determining the effects of perfectionistic strivings than the reverse (Stoeber & Damian, in press). This is something that researchers must be mindful of when examining the differential effects of the two dimensions of perfectionism in future studies.

More generally, the relationships between perfectionistic concerns and burnout symptoms found here are similar in size to related personality characteristics such as conscientiousness and neuroticism (see Swider & Zimmerman, 2010). Previous research comparing perfectionism with the broader Big Five personality traits has found that dimensions of perfectionism capture unique features of personality and explain additional variability in various criterion variables (e.g., compulsivity and depression; Dunkley et al., 2006; Sherry, Hewitt, Flett, Lee-Baggley, & Hall, 2007). With this in mind, the findings here suggest that perfectionism warrants consideration alongside other such individual-level antecedents of burnout. Perfectionistic concerns, in particular, may be an important component of a personality profile that renders individuals prone to burnout (Swider & Zimmerman, 2010). In order to assess this possibility, future studies are

required that examine the relative and incremental predictive ability of perfectionistic concerns and other personality characteristics identified in previous meta-analyzes focused on burnout.

Perfectionism-burnout relationship across domains

In terms of moderation, there were four instances where notable between-study heterogeneity was evident. These indicated that perfectionistic strivings were less adaptive in terms of exhaustion and depersonalization and perfectionistic concerns were more problematic in terms of overall burnout and depersonalization in work than in sport and education domains. There are a number of possible reasons why the work environment may alter these relationships in this manner. In the case of perfectionistic strivings, it is possible that factors which would otherwise offset exhaustion in sport and education are absent, or exist to a lesser degree, in work. These might include factors that have previously been found to interact with perfectionistic strivings such as personal control (Mor et al., 1995), social support (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000), and positive future thinking (O'Connor, O'Connor, O'Connor, Smallwood, & Miles, 2004) which we might speculate are less forthcoming in work than in education and sport. Given the ubiquity of external motives in the workplace, it is also possible that when perfectionistic strivings take place in the service of such motives, any safeguard from a sense of personal detachment or cynicism may be diminished relative to sport or education domains which are typically lower in these motives (Vallerand, 2004).

In the case of perfectionistic concerns, similar processes may be in operation as described for perfectionistic strivings in terms of depersonalization. In addition, it is also possible that because the work domain holds the greatest potential for entrapment (i.e., quitting and not attending are perhaps easier in other domains), the relationship between perfectionistic concerns and detachment or cynicism may be exacerbated in lieu of the ability to behaviourally withdraw.

This is consistent with the notion that depersonalization may be a dysfunctional coping strategy aimed at distancing one's self from an adverse work environment (Maslach, 1982). More generally, it is possible that because perfect performance can be more ambiguous in work than in sport and education, opportunities for a sense of achievement are less forthcoming in work. This may exacerbate the perfectionistic concerns-burnout relationship by providing less opportunity for respite against the worries, anxieties, and rumination associated with these dimensions of perfectionism (Hewitt & Flett, 2002; Hewitt & Flett, 1996). Future studies are required to examine these possibilities and further test the moderating influence of domain on perfectionism.

In considering the differences across domains, one must also be mindful of alternative explanations. For example, studies in sport exclusively used domain-specific measures. Although designed to be comparable, the three symptoms of athlete burnout are not exactly the same as those used in work and education. Most apparent is the potential discrepancy between depersonalization and devaluation where some of the differences observed here were evident. As such, the differences between sport and the other domains for this particular symptom may be attributable to differences in the operationalization of burnout between domains, as opposed to the domains themselves. However, this does not explain why differences were also evident between work and education where measures are much more similar. Therefore, much like the domain in which self-worth is staked has an influence on the degree of maladjustment associated with contingent self-worth (see Crocker & Wolfe, 2001), it is likely that the domain in which perfectionism is exhibited will also influence its effects.

Other avenues for future research

The review highlights a number of avenues for future research. Having now accrued strong evidence of the relationships between dimensions of perfectionism and burnout, research

that identifies explanatory factors is a priority. There are surprisingly few studies that have examined mediating factors, for example. Coping has been the most commonly examined with the few studies which have been conducted producing consistent support for its mediating role in work and sport (Chang, 2012; A.P. Hill et al., 2010; Li et al., 2014). Avoidant strategies such as suppression, denial, and disengagement appear especially important in explaining the perfectionistic concerns-burnout relationship and allude to how perfectionistic concerns appear to disarm those who exhibit it when attempting to cope with stress. Other potentially important explanatory mechanisms include those that have been examined in some domains but not others, such as stress (D'Souza, Egan, & Rees, 2011) and over-commitment (Philp, Egan, & Kane, 2012). In addition, factors associated with perfectionism and burnout, such as perfectionistic cognitions (A. P. Hill & Appleton, 2011), and factors that mediate similar relationships in these domains, such as resilience (Klibert et al., 2014) and social support (Molnar et al., 2012), may also be important. These variables are good candidates for further examination across domains.

In examining possible mediating factors, longitudinal designs would be an advantage and are ultimately necessary in order to test mediation appropriately and help establish causality. Unfortunately, there are too few longitudinal studies in this area. As a consequence, little is known about the dynamics of the perfectionism-burnout relationship, how it might unfold over time, and what underlying processes explain any interplay. The two exceptions in the work domain are encouraging in that they attest to the predictive ability of perfectionism on burnout over time (Childs & Stoeber, 2012; Flaxman et al., 2012). In both cases, perfectionistic concerns predicted changes in burnout symptoms. Findings are less encouraging in sport where the only study to date to examine the perfectionism-burnout relationship longitudinally found a marginal relationship between perfectionistic strivings and exhaustion over time ($p < .10$) and no other

significant relationships (Chen, Kee, & Tsai, 2009). Whether the findings of Chen et al. are a peculiarity or reflect genuine null effects is an issue that requires particular attention. However, generally, longitudinal research in each of the three domains is sorely needed.

Additional research in education is also required. Perfectionism is highly relevant in an education domain and predicts various outcomes, including motivation, performance, and wellbeing among students (e.g., Fletcher & Neumeister, 2012; Noble, Ashby, & Gnilka, 2014; Stoeber, Haskew, & Scott, 2015). Similarly, schools and universities are places of challenge and stress, therefore burnout is also an important phenomenon in an education domain (see Walburg, 2014, for a review). However, despite the apparent relevance of both, far fewer studies have examined the perfectionism-burnout relationship in education than in other domains. So to more firmly establish the relationship between perfectionism and burnout, additional research is required in this domain. Beyond this, researchers should draw upon research in work and sport, as well as the unique features of the education domain (e.g., teacher characteristics, classroom structure), in order to further identify explanatory mechanisms.

A final avenue for future research is the need to develop and evaluate interventions aimed at reducing perfectionism driven burnout. While evidence of effective intervention has begun to emerge in both areas (Awa, Plaumann, & Walter, 2010; Lloyd, Schmidt, Khondoker, & Tchanturia, in press), we are not aware of any study to examine an intervention targeting perfectionism with the aim of reducing burnout. As practitioners and researchers consider how best to do so, we draw attention to Flett and Hewitt (2014) who recently discussed the challenges associated with preventing perfectionism and the strategies they consider are likely to be the most successful. Their analysis focuses upon children and adolescents in a school setting however many of the challenges identified (e.g., persistence of perfectionism and unwillingness

to seek help) and strategies described (e.g., attributional retraining, fostering a growth mindset, promoting self-acceptance, and stress management) are applicable in other groups and settings. This includes helping prevent those who report high levels of perfectionistic concerns from burning out in work, sport, or education. We therefore encourage those interested in developing interventions to consider this work and the work of others in this area (see Lloyd et al., in press)

Limitations

The findings should be considered in light of the limitations of the review. In some instances we found evidence of publication bias towards studies with larger effect sizes. Therefore, some caution is required in terms of generalising findings beyond published studies (versus all possible studies). Studies were only included in the meta-analysis if they were published in English with most samples from Western countries. This means that studies from some countries (e.g., Eastern/Asian counties) maybe underrepresented. Again, this has implications for generalizability of the findings and is particularly noteworthy in light of emerging evidence of potential cultural differences in the correlates of perfectionism (e.g., Stoeber, Kobori, & Tanno, 2013). The majority of the studies meta-analyzed employed cross-sectional designs and hence inferences are limited to only possible causal relationships between perfectionism and burnout. We examined higher-order dimensions of perfectionism, rather than individual dimensions. This approach was, in part, selected to maximize the use of studies in this area and provide more reliable estimates of effects. However, in doing so, the nuances of the sub-dimensions of each higher-order factor can be lost. This is an issue that will be worth revisiting when more research adopting different measures has taken place. Finally, a number of relationships were statistically significant but fail-safe numbers indicated that they may reflect publication bias. These relationships should therefore be interpreted tentatively and require

particular attention in future research. Similarly, when assessing moderation, education included a small number of studies (k = 3). The relationships from these studies are more susceptible to reversal by newly conducted studies so again should be considered tentatively.

Conclusions

The current study provides the first meta-analysis of the relationship between perfectionism and burnout. Across all studies, it was found that perfectionistic strivings had small negative or non-significant relationships with overall burnout and symptoms of burnout. By contrast, perfectionistic concerns displayed medium-to-large and medium positive relationships with overall burnout and symptoms of burnout. When controlling for the relationship between dimensions of perfectionism, pure perfectionistic strivings displayed notably larger negative relationships with overall burnout and symptoms of burnout. There was evidence that some of these relationships differed across domains with perfectionistic strivings being less adaptive and perfectionistic concerns more maladaptive in the work domain than in sport or education domains. Overall, the findings suggest that perfectionistic concerns warrant attention when considering vulnerability to burnout.

Footnotes

[1] Herafter, for simplicity, the terms ‘exhaustion’, ‘reduced personal accomplishment’, and ‘depersonalization’ are used to label the three symptoms.

[2] Some additional information was also coded (e.g., mean age of participants, percentage of males and females, and whether measurement of perfectionism was at trait or domain level) coded but is not reported here as it was not central to the purpose of the study and for brevity. This information is available on request.

[3] This does not include a study by Mitchelson and Burns (1998). Mitchelson and Burns used both the Multidimensional Scale (HMPS; Hewitt & Flett, 1991) and the Positive and Negative Perfectionism Scale (PNPS; Terry-Short, Owens, Slade, & Dewey, 1995) however the correlations between the subscales of the PNPS (positive perfectionism and negative perfectionism) and burnout were excluded here because the validity of the PNPS is regarded as questionable (see Egan, Piek, Dyck, & Kane, 2011).

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Table 1 *Characteristics of Studies included in the Meta-Analysis*

	Sample		Measurement			Effect Sizes															
						PS-PC	PS-RA		PS-EX		PS-DE		PS-BO		PC-RA		PC-EX		PC-DE		PC-BO	
Study	Domain	N	Intru.	PS	PC	*r*	*r*	*sr*	*r*	*sr*	*r*	*sr*	*r*	*sr*	*r*	*sr*	*r*	*sr*	*r*	*sr*	*r*	*sr*
Appleton & Hill (2012)	Sport	231	CAPS	SOP	SPP	.23	-.24	-.29	-.03	-.11	-.29	-.34	-.26	-.35	.21	.27	.31	.32	.18	.39	.33	.47
Appleton et al. (2009)	Sport	201	HMPS	SOP	SPP	.24	-.19	-.26	.07	.01	-.17	.25	-.13	.00	.27	.32	.27	.25	.29	.34	.36	.40
Barcza (2012)*	Sport	507	HMPS	SOP	SPP	.34	.04	-.07	.05	-.09	-.11	-.21	-.01	-.17	.32	.31	.38	.36	.27	.31	.44	.45
Caliskan et al. (2014)	Work	342	APS-R	HS	D	.28	-.51	-.51	-.06	-.16	-.08	-.22	-.43	-.59	.00	.16	.33	.35	.42	.44	.49	.63
Chang (2012)	Work	314	FMPS	--	CM/DA	--	--	--	--	--	--	--	--	--	--	--	.23	--	.25	--	--	--
Chen et al. (2009)	Sport	188	MIPS	SP	NRI	.60	-.33	-.28	-.18	-.16	-.34	-.25	-.45	-.37	-.08	.13	-.04	.07	-.15	.06	-.15	.14
Childs & Stoeber (2010)	Work	106	HMPS	SOP	SPP	.49	-.19	-.28	.00	-.15	-.17	-.27	-.20	-.23	.18	.28	.29	.29	.19	.28	.38	.48
Childs & Stoeber (2012)																						
Study 1	Work	69	HMPS	SOP	SPP	.26	-.15	-.22	.04	-.11	.06	-.14	-.02	-.21	.24	.28	.52	.51	.30	.33	.50	.53
Study 2	Work	195	HMPS	SOP	SPP	.48	.09	-.16	.23	.01	.01	-.20	.15	-.16	.48	.44	.46	.36	.40	.40	.60	.52
Comerchero (2008)*	Work	285	APS-R	HS	D	-.09	-.40	-.39	-.06	-.05	-.39	-.38	-.47	-.46	.36	.35	.10	.09	.26	.24	.40	.38
Corrigan (1997)*	Work	508	HMPS	SOP	SPP	.60	.10	-.04	.28	.04	.20	-.02	.35	-.01	.24	.18	.41	.25	.37	.26	.61	.41
Cumming & Duda (2012)	Sport	194	FMPS	PSt	CM/DA	.15	--	--	-.06	-.10	--	--	--	--	--	--	.26	.27	--	--	--	--
Fairlie (2011)*	Work	278	HMPS	SOP	SPP	.47	-.11	-.18	.07	-.06	.05	-.07	.01	-.16	.15	.20	.27	.24	.26	.24	.36	.46
Flaxman et al. (2012)	Work	111	FMPS	--	DA	--	--	--	--	--	--	--	--	--	--	--	.26	--	--	--	--	--
Gotwals (2011)	Sport	117	SMPS-2	PSt	CM/DA	.25	.04	-.07	.02	-.06	-.18	-.24	-.06	-.19	.41	.41	.30	.30	.22	.27	.49	.51
Hill & Appleton (2011)	Sport	202	HMPS	SOP	SPP	.12	-.12	-.17	-.15	-.19	-.45	-.47	-.34	-.40	.35	.38	.30	.32	.14	.22	.38	.45
Hill (2013) ‡	Sport	167	MULT[a]	SOP/PSt	SPP/CM/DA	-.04	-.27	-.27	-.03	-.02	-.19	-.19	-.23	-.22	.18	.18	.21	.21	.18	.18	.27	.27

Hill et al. (2008)	Sport	151	HMPS	SOP	SPP	.16	-.39	-.52	-.25	-.35	-.42	-.53	-.45	-.59	.46	.64	.41	.46	.40	.51	.54	.68
Hill et al. (2010a)	Sport	150	HMPS	SOP	SPP	.26	-.09	-.19	.04	-.03	-.14	-.20	-.11	-.24	.34	.36	.26	.25	.22	.26	.48	.52
Hill et al. (2010b)	Sport	206	HMPS	SOP	SPP	.27	-.17	-.23	-.03	-.13	-.31	-.36	-.24	-.35	.21	.26	.33	.34	.17	.27	.34	.42
Ho et al. (n.d)†																						
Dataset 1	Sport	212	HMPS	SOP	SPP	.37	-.19	-.18	.03	-.03	-.12	-.18	-.12	-.17	-.03	.04	.17	.16	.15	.20	.13	.17
Dataset 2	Sport	205	HMPS	SOP	SPP	.29	-.38	-.43	-.19	-.23	-.40	-.44	-.44	-.50	.15	.28	.12	.18	.12	.26	.18	.32
Jowett et al. (2013)	Sport	211	MULT[a]	SOP/PSt	SPP/CM/DA	.58	-.14	-.32	.05	-.07	-.14	-.31	-.10	-.31	.28	.36	.20	.17	.27	.35	.33	.39
Jowett et al. (n.d)†																						
Dataset 1	Sport	267	MULT[a]	SOP/PSt	SPP/CM/DA	.25	-.21	-.27	-.10	-.16	-.16	-.23	-.22	-.32	.23	.29	.21	.24	.24	.28	.32	.39
Dataset 2	Sport	244	MULT[a]	SOP/PSt	SPP/CM/DA	.15	-.08	-.12	.07	.04	-.19	-.22	-.10	-.15	.24	.25	.20	.19	.16	.19	.30	.31
Kristiansen et al. (2012)	Sport	24	FMPS	PSt	--	.29	-.17	-.22	-.18	-.26	-.37	-.62	-.36	-.55	.17	.22	.15	.21	.53	.59	.43	.51
Lemyre et al. (2008)	Sport	141	FMPS	PSt	CM/DA	.40	-.19	-.32	-.22	-.26	-.15	-.18	-.26	-36	.29	.37	.09	.18	.08	.14	.22	.32
Li et al. (2014)	Work	345	APS-R	HS	D	.36	-.26	-.38	.08	-.06	-.04	-.19	-.12	-.34	.29	.40	.38	.35	.38	.39	.58	.62
Mitchelson & Burns (1998)	Work	67	HMPS	SOP	SPP	--	.19	--	.17	--	-.02	--	--	--	.07	--	.38	--	.40	--	--	--
Ogus (2007)*																						
Study 1	Work	594	HMPS	SOP	SPP	--	-.05	--	.23	--	-.01	--	.11	--	.20	--	.47	--	.30	--	42	--
Study 2	Work	167	HMPS	SOP	SPP	--	.03	--	.20	--	.17	--	.24	--	.10	--	.54	--	.31	--	.58	--
Study 3	Work	298	HMPS	SOP	SPP	--	.27	--	.26	--	.22	--	.51	--	.08	--	.49	--	.27	--	.57	--
Ozbilir (2011)*																						
Study 1	Work	178	MULT[b]	SOP/HS	D	.31	--	--	-.09	-.14	-.26	-.39	--	--	--	--	.17	.20	.34	.44	--	--
Study 2	Work	167	MULT[b]	SOP/HS	D	.13	--	--	.06	.03	-.14	-.19	--	--	--	--	.22	.21	.30	.32	--	--
Schwenke (2013)*	Work	238	APS-R	HS	D	-.06	--	--	-.11	-.09	--	--	--	--	--	--	.35	.35	--	--	--	--
Shih (2012)	Educ.	456	FMPS	PSt	CM/DA	.35	-.52	-.53	-.29	-.36	-.29	-.35	-.49	-.55	.03	.25	.18	.29	.17	.28	.17	.36

Stensrud et al. (n.d)†	Sport	50	FMPS	PSt	CM	.48	.03	-.08	-.22	-.34	-.05	-.28	--	--	.38	.37	.23	.34	.42	.58	--	--
Stoeber & Childs (2010)	Educ.	111	HMPS	SOP	SPP	.43	-.50	-.56	-.07	-.21	-.34	-.43	-.41	-.54	.12	.37	.30	.33	.19	.36	.28	.48
Stoeber & Rennert (2008)	Work	118	MIPS	SP	NRI	.56	-.05	-.29	.07	-.32	-.01	-.22	.00	-.34	.39	.42	.59	.55	.35	.36	.54	.54
Taris et al. (2010)	Work	199	FMPS	PSt	CM	.53	-.07	-.19	.19	.02	.14	.02	.15	-.08	.22	.26	.32	.22	.23	.16	.43	.36
Tashman et al. (2009)	Work	177	PI	SE	CM	.46	.03	-.11	.28	.08	.24	.02	.27	.00	.29	.28	.45	.33	.48	.38	.60	.49
Van Peren et al. (2011)	Work	275	MULT[b]	SOP/HS	SPP/DA	.46	--	--	.16	.01	--	--	--	--	--	--	.32	.25	--	--	--	--
Zhang et al. (2007)	Educ.	482	FMPS	PSt	CM/DA	.15	-.40	-.42	-.07	-.12	-.18	-.22	-.33	-.38	.10	.17	.32	.33	.23	.26	.33	.38

Note. * Thesis/Dissertation, ‡ So to avoid inclusion of aggregate indicators that include dimensions not considered indicators of perfectionistic concerns (viz. parental pressure), effect sizes for this study come from correlation coefficients not reported in the original publication of this study, †Unpublished dataset; Educ. = Education; Intru. = Instrument, CAPS-R = Child and Adolescent Perfectionism Scale (Flett et al., 2001), HMPS = Multidimensional Perfectionism Scale (Hewitt & Flett, 1991), APS-R = Almost Perfect Scale-Revised (Slaney et al., 2001), FMPS = Multidimensional Perfectionism Scale (Frost et al., 1990); SMPS-2 Sport Multidimensional Perfectionism Scale 2 (Gotwals et al., 2010), MULT[a] = Both SMPS-2 and HMPS were used, MULT[b] = Both HMPS and APS-R were used, MIPS = Multidimensional Inventory of Perfectionism in Sport or adaptation (Stoeber, Otto, & Stoll, 2006); PI = Perfectionism Inventory (R. W. Hill et al., 2004); PS = Perfectionistic strivings, SOP = self-oriented perfectionism, HS = High standards, SP = Striving for perfection, PSt = Personal standards, SE = Striving for excellence; PC = Perfectionistic concerns, SPP = Socially prescribed perfectionism, D = Discrepancy, CM = Concern over mistakes, DA = Doubts about action, NRI = Negative reactions to imperfection; RA = Reduced accomplishment; EX = Exhaustion; DE= Depersonalisation/Devaluation, BO = Overall burnout; *r* = bivariate correlation coefficient; *rs* = semi-partial correlation coefficient.

Table 2 *Meta-analytical relationships between perfectionism and burnout across all studies*

Relationship	*k*	*N*	r^+	*95% CI*	Q_T	I^2 (%)	Fail-safe *N*	Egger's intercept	*95% CI*	k^{TF}	"Trim and Fill" estimates r^+ [*95% CI*]
Perfectionistic strivings											
Total burnout	34	8244	-.14*	[-.23, -.04]	672.64**	95.09	1072.0	-2.13	[-7.93, 3.66]	5	-.08 [-.17, .03]
Reduced personal accomplishment	36	8361	-.16*	[-.24, -.09]	399.92**	91.25	1998.0	0.70	[-3.23, 4.64]	6	-.22 [-.29,-.14]
Exhaustion	41	9413	.01	[-.04, .06]	237.68**	83.17	0†	-1.62	[-4.36, 1.23]	6	.05 [-.01, .10]
Depersonalization	38	8706	-.14*	[-.20, -.07]	303.70**	87.82	1272.0	-1.79	[-5.04, 1.45]	8	-.07 [-.13, -.01]
Pure perfectionistic strivings											
Total burnout	31	7035	-.31*	[-.37, -.24]	278.39**	89.22	5190.0	-0.24	[-4.49, 4.01]	0	n/a
Reduced personal accomplishment	32	7085	-.28*	[-.33, -.22]	209.67**	85.21	4211.0	0.57	[-2.82, 3.56]	6	-.32 [.38, -.26]
Exhaustion	37	8137	-.11*	[-.14, -.07]	107.98**	66.66	778.0	-0.76	[-2.96, 1.44]	0	n/a
Depersonalization	34	7430	-.25*	[-.30, -.21]	143.34**	76.98	3914.0	-1.85	[-4.45, 0.75]	1	-.26 [-.31, -.21]
Perfectionistic concerns											
Total burnout	34	8244	.41*	[.36, .45]	225.79**	85.39	2267.0	-0.50	[-3.88, 2.89]	0	n/a

Reduced personal accomplishment	36	8361	.21*	[.16, .26]	193.74**	81.94	2925.0	1.08	[-1.64, 3.80]	5	.17 [.12, .23]
Exhaustion	43	9838	.30*	[.26, .34]	181.69**	76.88	9798.0	-1.10	[-3.41, 1.20]	7	.34 [.29, .38]
Depersonalization	39	9020	.26*	[.22, .30]	115.79**	67.18	5866.0	-0.11	[-2.11, 1.90]	3	.25 [.21, .28]
Pure perfectionistic concerns											
Total burnout	31	7035	.44*	[.39, .48]	144.66**	79.26	1288.0	0.51	[-2.54, 3.57]	8	.39 [.33, .44]
Reduced personal accomplishment	32	7085	.28*	[.24, .32]	99.71**	68.91	4381.0	1.21	[-1.08, 3.51]	0	n/a
Exhaustion	38	8137	.28*	[.25, .31]	77.59**	52.31	6134.0	0.11	[-1.70, 1.92]	8	.31 [.28, .34]
Depersonalization	34	7430	.29*	[.26, .33]	73.72**	55.24	5558.0	0.60	[-1.32, 2.51]	0	n/a
Perfectionistic concerns and strivings	37	8771	.32*	[.26, .38]	342.22**	89.48	7997.0	-0.22	[-4.16, 3.72]	0	n/a

Note. * $p < .01$. r^{+} = weighted mean *r*. † signifies that the Fail-safe *N* falls below threshold. k^{TF} = Number of imputed studies as part of "Trim and Fill" method. n/a = not applicable

Table 3 *Comparison of effects sizes between sport, work, and education*

Comparison	*k*	*N*	r^+	*95% CI*	Q_B	I^2 (%)	Fail-safe *N*	Egger's intercept	*95% CI*	k^{TF}	"Trim and Fill" estimates r^+ [*95% CI*]
PS and overall burnout					18.46**	0.00					
Sport[a]	17	3424	-.23*	[-.30, -.15]			687	-3.56	[-8.09, 0.97]	1	-.21 [-.28, -.14]
Work[b]	14	3831	.04	[-.13, .21]			14†	-1.74	[-13.07, 9.58]	3	-.06 [-.24, .12]
Education[a]	3	989	-.41*	[-.52 -.29]			141	-0.22	[-76.41, 75.98]	n/a	n/a
PS and reduced personal accomp.					32.35**	11.91					
Sport[a]	18	3474	-.18*	[-.24, -.11]			433	-1.60	[-5.23, -2.03]	0	n/a
Work[a]	15	3898	-.08	[-.20, .04]			85†	0.76	[-6.51, 8.03]	3	-.15 [-.26, -.02]
Education[b]	3	989	-.47*	[-.55, -.38]			191	-1.22	[-60.89, -58.45]	n/a	n/a
PS and exhaustion					19.10**	26.35					
Sport[a]	19	3668	-.06	[-.11, .-01]			33†	-2.30	[-4.91, 0.31]	4	-.01 [-.07 to .03]
Work[b]	19	4756	.11*	[.05, .17]			258	-2.11	[-5.88, 1.67]	0	n/a
Education[a]	3	989	-.15*	[-.31, -.02]			17†	1.94	[-89.26, 93.14]	n/a	n/a

PS and depersonalization					20.68**	31.29					
Sport[a]	18	3474	-.23*	[-.29, -.18]			813	-1.27	[-4.61, 2.07]	0	n/a
Work[b]	17	4243	-.01	[-.10, .08]			0†	-1.45	[-6.59, 3.68]	0	n/a
Education[a]	3	989	-.26*	[-.35, -.16]			49	-2.45	[-47.24, 42.33]	n/a	n/a
Pure PS and overall burnout					5.14	0.00					
Sport[a]	17	3424	-.31*	[-.39, -.22]			1382	-3.20	[-7.92, 1.51]	0	n/a
Work[a]	11	2622	-.25*	[-.35, -.14]			439	0.45	[-9.52, 10.42]	0	n/a
Education[a]	3	989	-.49*	[-.64, -.31]			204	-2.23	[-87.31, 82.84]	n/a	n/a
Pure PS and reduced personal accomp.					10.56*	8.86					
Sport[a]	18	3474	-.25*	[-.31, -.18]			886	-1.55	[-5.01, 1.90]	3	-.28 [-.34, -.21]
Work[a]	11	2622	-.26*	[-.34, -.17]			469	-0.16	[-7.75, 7.43]	1	-.28 [-.38, -.17]
Education[b]	3	989	-.50*	[-.62, -.36]			215	-2.50	[57.47, 52.48]	n/a	n/a
Pure PS and exhaustion					9.35*	16.98					
Sport[ab]	19	3668	-.12*	[-.17, -.07]			229	-1.63	[-4.20, 0.93]	2	-.10 [-.15, -.05]
Work[a]	15	3480	-.06*	[-.11, -.00]			24†	-1.97	[-5.20, 1.27]	4	-.01 [-.07. .04]

Education[b]	3	989	-.24*	[-.34, -.13]			41	0.32	[-101.05, 101.70]	n/a	n/a
Pure PS and depersonalization					8.32*	17.17					
Sport[a]	18	3474	-.30*	[-.35, -.24]			1376	-1.96	[-5.10, 1.18]	1	-.30 [-35, -.25]
Work[b]	13	2967	-.17*	[-.24, -.10]			263	-1.73	[-7.06, 3.61]	1	-.16 [-.23, -.07]
Education[ab]	3	989	-.32*	[-.45, -.19]			77	-3.52	[-57.72, 50.67]	n/a	n/a
PC and total burnout					27.07**	41.85					
Sport[a]	17	3424	.33*	[.28, .39]			1697	-0.30	[-4.37, 3.76]	0	n/a
Work[b]	14	3831	.51*	[.46, .56]			3867	0.12	[-4.31, 4.56]	2	.53 [.48, .58]
Education[a]	3	989	.26*	[.12, .39]			50	0.35	[-67.42, 68.42]	n/a	n/a
PC and reduced personal accomp.					6.34*	12.71					
Sport[a]	18	3474	.25*	[.18, .31]			904	0.25	[-3.50, 4.01]	3	.21 [.15, .28]
Work[ab]	15	3898	.20*	[.13, .28]			526	0.75	[-4.31, 5.81]	0	n/a
Education[b]	3	989	.02	[-.15, .18]			0†	-3.82	[-29.64, 22.00]	n/a	n/a
PC and exhaustion					11.16**	16.30					
Sport[a]	19	3668	.24*	[.18, .29]			974	-1.78	[-4.76, 1.20]	0	n/a
Work[b]	21	5181	.36*	[.31, .41]			3624	-0.30	[-4.00, 3.40]	0	n/a

Education[ab]	3	989	.26*	[.13, .39]			51	0.83	[-58.70, 60.35]	n/a	n/a
PC and depersonalization					17.82**	33.25					
Sport[a]	18	3747	.20*	[.15, .24]			613	0.88	[-2.39, 4.14]	2	.22 [.13, .24]
Work[b]	18	4557	.33*	[.28, .37]			2120	-0.10	[-2.37, 2.17]	0	n/a
Education[ab]	3	989	.20*	[.10, .30]			28	-0.31	[-24.84, 24.23]	n/a	n/a
Pure PC and total burnout					5.46	12.07					
Sport[a]	17	3424	.40*	[.34, .45]			2462	0.60	[-4.12, 5.33]	0	n/a
Work[a]	11	2622	.50*	[.43, .56]			2039	0.17	[-5.49, 5.84]	0	n/a
Education[a]	3	989	.40*	[.26, .52]			126	2.66	[-7.85, 13.16]	n/a	n/a
Pure PC and reduced personal accomp.					0.35	2.45					
Sport[a]	18	3474	.28*	[.22, .33]			1202	-0.29	[-4.02, 3.44]	3	.24 [.18, .31]
Work[a]	11	2622	.29*	[.22, .36]			602	2.33	[-2.11, 6.77]	0	n/a
Education[a]	3	989	.25*	[.12, .38]			43	3.63	[-27.59, 34.85]	n/a	n/a
Pure PC and exhaustion					1.85	3.06					
Sport[a]	19	3668	.26	[.21, .30]			1138	-0.80	[-3.44, 1.83]	5	.30 [.25, .34]

Work[a]	16	2967	.29	[.25, .34]			1256	2.23	[-1.32, 5.78]	0	n/a
Education[a]	3	989	.31	[.21, .41]			77	0.38	[-17.29, 18.05]	n/a	n/a
Pure PC and depersonalization					2.77	8.49					
Sport[a]	18	3474	.27	[.22, .32]			1140	0.75	[-2.20, 3.70]	0	n/a
Work[a]	13	2967	.33	[.28, .38]			1054	0.51	[3.29, 4.31]	0	n/a
Education[a]	3	989	.29	[.19, .39]			63	2.03	[-5.45, 9.51]	n/a	n/a
PC and PS					1.22	0.00					
Sport[a]	19	3668	.29	[.20, .37]			1459	-0.07	[2.22, -4.75]	4	.34 [.26, .41]
Work[a]	15	4114	.36	[.27, .45]			1842	-1.84	[4.34, -11.21]	2	.32 [.20, .44]
Education[a]	3	989	.31	[.08, .51]			63	4.36	[-78.04, 86.76]	n/a	n/a

Note. * $p < .05$ ** $p < .01$. † signifies that the Fail-safe *N* falls below threshold. r^+ = *weighted mean r*. PS = Perfectionistic strivings, PC = Perfectionistic concerns. Pure perfectionistic strivings and pure perfectionistic concerns are residualized versions of the original variables having controlled for the relationship between them. I^2 corresponds with the Q_T from each random effects model. Domains that share the same subscripts (^{abc}) do not differ in their weighted mean effect sizes. "Trim and Fill" method is not used for studies from education due to the low number of studies. n/a = not applicable