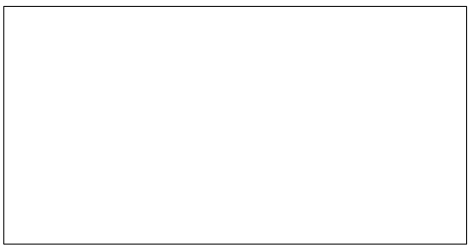

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Multidimensional perfectionism and sport performance: a systematic review and meta-analysis

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ABSTRACT

Evidence regarding the perfectionism-performance relationship in sport is inconsistent, leading to an ongoing debate about whether perfectionism helps or hinders athletes in achieving their best performance. To address this, we provide a systematic review and meta-analysis of research examining the relationship between multidimensional perfectionism and sport performance. A literature search returned 31 studies with 46 samples (N = 6,102). A systematic review of this literature suggests that research varies methodologically, with mixed findings for perfectionistic strivings (PS) and perfectionistic concerns (PC). The meta-analysis found that perfectionistic strivings were positively related to sport performance (r^+ = .21; CI = .15, .26), while perfectionistic concerns were unrelated (r^+ = .03; CI = –.02, .08). Total unique effect revealed that, overall, perfectionism was positively associated with sport performance (TUE = .17; CI = .13, .22), with perfectionistic strivings being primarily responsible for the effect. Moderation analyses showed that the relationship between perfectionistic strivings and sport performance was stronger in older athletes. Evidence for a perfectionistic tipping point was also found showing that PS only predicts better performance when PC is low. We suggest that the interplay between PS and PC is key to understanding this relationship further.

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KEYWORDS
Perfectionistic strivings; sport performance; total unique effect; moderation; perfectionistic tipping points

Introduction

Performance matters in sport. Perhaps it matters more than anything else, particularly at the highest levels of competition. Understanding what separates the best performers from those who fall short is, then, understandably a major focus for coaches, athletes, and sport psychologists. It is not always clear whether some attributes are helpful or a hinderance to athletes and their performance. The drive for perfection, for example, seems to be common to many athletes and engrained in sport itself (Hill et al., 2015). However, it is also something that many have suggested could carry significant costs, including a failure to realise one's full potential and perform to one's best (e.g. Flett & Hewitt, 2005). Surprisingly, while a considerable amount of research has examined how perfectionism affects

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the motivation and wellbeing of athletes, its relationship with performance has received far less attention. The aim of the present study is to conduct the first systematic review and meta-analysis of research examining perfectionism and sport performance. In doing so, we provide a better empirical basis to inform the work of researchers and practitioners, and help reveal the complexities of this relationship.

Sport performance

Defining sport performance is more complex than it may first appear. This is because it involves a complex combination of physical, physiological, and perceptual-cognitive motor components (e.g. Régnier et al., 1993). Sport performance also depends on the specific context and, in an objective sense, differs between sports (Piggott et al., 2020). Consequently, it is difficult to offer a single definition that fully encompasses all types of sport performance (Portenga et al., 2017). However, according to Aoyagi and Portenga (2010), common to successful sport performance is the requirement for athletes to acquire and master knowledge, skills, and abilities, in addition to consistently and reliably deploying these attributes during competition. With this in mind, in context of the present study, we considered sport performance to be an athlete's ability to effectively execute specific knowledge, abilities, and skills during a particular sport or sport-related setting.

Sport performance is, though, ultimately an issue of measurement. There are a number of ways research measures sport performance. For example, subjective indicators of sport performance can be used and include self-rating (e.g. 'how well did you perform?') and coach assessments (e.g. 'how well did your athlete/team perform?'). This approach might be useful when comparing performance between different sports (e.g. Arnold et al., 2018). However, mainly, researchers are interested in objective assessment of sport performance that include match outcomes, competition times, and points scored. These are the most commonly used indicators of performance in sport psychology research (Schweizer et al., 2020) and the ones that, in a practical sense, count most in regards to discerning whether any particular factors are beneficial or detrimental to sport performance (e.g. Moore et al., 2012).

Among factors considered important to performance in sport psychology is the personality of the athlete (Allen et al., 2013). Personality refers to the engrained patterns of feeling, thinking, and behaving that result from an individual's psychological traits (Pervin et al., 2005). Personality traits are responsible for consistent and enduring patterns of behaviour over time that may be advantageous (or not) to athletes in a performance situation. A common approach to personality research is the use of the five-factor model that studies the effects of openness, conscientiousness, extraversion, agreeableness and neuroticism (McCrae & John, 1992). Being more conscientious is positively related to the quality of preparation before sport competition and being more neurotic is negatively related to a sense of control in stressful situations (Kaiseler et al., 2012; Woodman et al., 2010). As such one trait appears useful for athletes and the other less so. These types of effects are well established in meta-analytical work inside of sport and other performance contexts such as education, work, and military (Barrick et al., 2001; Campbell et al., 2009; Poropat, 2009). There are likely many other personality factors linked to performance, and in the present study we are interested in examining the role of a specific performance related trait – perfectionism.

Multidimensional perfectionism

Perfectionism is a personality characteristic that comprises excessively high personal standards which are accompanied by overly critical evaluations of personal performance (Frost et al., 1990). As perfectionism has various personal and interpersonal features, it is best considered multidimensional (e.g. Enns & Cox, 2002). Factor-analytical studies have examined the underlying structure of existing instruments and in doing so, provided the basis for two higher-order dimensions of perfectionism: Perfectionistic Strivings (PS) and Perfectionistic Concerns (PC; Stoeber & Otto, 2006). In recent work of this kind in sport, PS has been described as an internal pressure to strive for perfection and is typically measured using self-oriented striving for perfection and the setting of very high personal performance standards (Hill et al., 2024). By contrast, PC has been described as being overly concerned with the implications of imperfection and is typically measured using concerns over making mistakes, socially prescribed perfection, and negative reactions to imperfection.

The most common approach to studying multidimensional perfectionism is an independent effect approach. This approach separates effects of the higher-order dimensions in an unpartialled or partialled manner. Examining partialled effects can be useful because the approach takes into account that the two dimensions are correlated and so allows consideration of the unique contribution of each to an outcome variable (see Hill et al., 2020). By doing so, some authors argue that PS may bring certain benefits, while PC poses risks to athletes (e.g. Stoeber, 2014). However, some of the disagreement in this area of research relate to how conclusions often differ when the focus of research is on the unpartialled effects (e.g. PS) versus the partialled effects (e.g. PS having controlled for its relationship with PC). The effects are often different and sometimes conflated (see Hill, 2014). With this in mind, researchers routinely report both unpartialled and partialled effects so to provide more nuanced findings and valid conclusions (e.g. Hill et al., 2018).

When seeking to understand the overall consequences of perfectionism in athletes, though, additional approaches are needed. It can be confusing when one dimension of perfectionism has desirable effects and the other undesirable effects. In this regard, recent research introduced the concept of combined and total unique effects (TUE) to ascertain whether the overall effect of perfectionism is adaptive, maladaptive, or neutral in relation to a criterion variable (Hill et al., 2021). TUE provides an indication of the change in the criterion variable in units of standard deviation as both PS and PC increase. This approach has proved useful for other outcomes such as academic achievement (Hill et al., 2021). In this regard, PS showed a positive relationship and PC displayed a negative relationship (Madigan, 2019). TUE indicates that, overall, there is a small positive relationship between perfectionism and academic achievement when the effects of PS and PC are weighed against each other. With this in mind, the overall effect of perfectionism on sport performance is important in the present study.

Perfectionism and sport performance

How exactly perfectionism affects sports performance has been subject to considerable debate among researchers. On the one hand, there are those who argue perfectionism serves as a defining characteristic of exceptional athletes such as those who might be

considered 'super-elite' (e.g. Gould et al., 2002). On the other hand, there are others who claim that perfectionism more likely confers risk to motivation and well-being and will ultimately impair performance (e.g. Flett & Hewitt, 2005). Consequently, whether perfectionism should be encouraged or avoided in context of sport performance, or in athletes more broadly, remains unclear. This issue is particularly challenging for researchers, practitioners, and coaches when educating athletes about perfectionism.

This debate is currently anchored in a small and mixed body of empirical research. This includes an initial narrative review by Stoeber (2011) that included three samples and concluded that PS was positively related to sport performance and PC was unrelated to sport performance, as well as a further systematic review by Gotwals et al.'s (2012) who provided effect sizes and statistical significances of the relationships from the three studies. A subsequent review by Madigan and colleagues (2018a) included an additional three samples from sport and argued that the lack of research and mixed findings made drawing firm conclusions on sport performance difficult. The clearest picture so far, though, has been provided by Hill et al. (2018) in a meta-analytical review which synthesised effect sizes derived from all six studies. They found that PS had a significant positive relationship with sport performance ($r^+ = .23$), while PC was unrelated to sport performance ($r^+ = .06$). When controlling for the overlap between PS and PC, a similar relationship emerged for PS $r^+ = .23$, but a negative, yet nonsignificant, relationship was now found between PC and performance ($r^+ = -.10$).

Extending previous research

The present review aims to build on existing research in three key ways. First, whether perfectionism is beneficial or detrimental to sport performance remains a hot topic. Flett and Hewitt (2020) recently reaffirmed their stance that perfectionistic athletes carry significant vulnerabilities that will ultimately impair performance. They argued, in particular, that self-oriented perfectionism (a facet of PS) embodies unrealistically high performance standards (e.g. attainment of perfection), cognitive distortion (e.g. all or none thinking), and stress sensitivity (e.g. Hewitt & Flett, 1993). Therefore, in their view, it is difficult to see how these attributes would help athletes in their efforts to perform their best. With more research conducted since the last meta-analytical review, many using different samples, sports, and measures, there is an opportunity to revisit this issue, re-estimate effects, and provide a clearer approach to addressing the nature of the relationship between PS and sport performance, in particular.

Second, in keeping with the notion that the relative effects of PS and PC are important in regards to the effects of perfectionism, we aim to provide the first estimate of the total unique effect of perfectionism on sport performance. In the same way this approach has proven useful outside of sport when reconciling opposing effects of PS and PC (Hill et al., 2021), given observed effects so far, it may do the same for sport performance. In addition, we believe while it is useful to know the effects of PS and PC, researchers and practitioners will find it most useful to know what, overall, the likely effects of perfectionism may be on sport performance. If the relative effect of PS outweighs the relative effect of PC, the notion that perfectionism may be beneficial for sport performance is strengthened whereas, if the opposite is the case, then we may find more evidence for the possibility that, overall, perfectionism is problematic.

Thirdly, no previous reviews have explored possible moderating factors of the perfectionism-performance relationship. This is important because there is some evidence of variability in the relationship across studies. For example, studies found that there is a positive relationship between PS and performance (e.g. Stoeber et al., 2009), a negative relationship (e.g. Anshel & Mansouri, 2005), and no relationship (e.g. Hill et al., 2011). Similarly, with respect to PC, studies have found that there is a negative relationship between PC and performance (e.g. Thompson et al., 2011) and no relationship (e.g. Stoll et al., 2008). Factors such as age, gender, type of sport (team vs individual), type of sample (adolescent vs student-athlete vs adult), perfectionism instruments/subscales have been examined in previous meta-analyses, with some evidence that effects depend on these factors. This includes previous meta-analyses in sport in relation to other criterion variables (Hill et al., 2018) and in other achievement contexts, such as education (Madigan, 2019). Recent research has also found that the effects of PS and PC on sport performance may depend on each other (e.g. Waleriańczyk, 2023). Examining the aforementioned moderating factors here in an exploratory fashion may help identify the source of some of the inconsistent findings in this area.

The present study

The aim of the present study was to provide a systematic review and meta-analysis of research examining the relationships between multidimensional perfectionism and sport performance. In doing so, we investigated (a) the relationship between PS and PC with sport performance, (b) the total unique effect of perfectionism on sport performance, and (c) moderating factors that explain heterogeneity in effect sizes across studies. Despite existing evidence for a link between PS and performance, we refrained from preregistering hypotheses due to general uncertainty and lack of consensus on its effects.

Method

Protocol and pre-registration

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses-Protocol template (PRISMA-P; Moher et al., 2015) was used to preregister the protocol for this review before conducting the search (Kim et al., 2023). We have also followed the most recent PRISMA guidelines throughout (Page et al., 2021). We deviated from the preregistered protocol in the following ways (1) by including measures of subjective performance (rather than solely objective performance) and (2) by including additional moderating factors (sport type, sample type, study quality, levels of PC). Otherwise, the study was conducted as preregistered.

Eligibility criteria

Primary studies were included if they: (a) measured perfectionism using established self-report scales that yielded quantitative values; (b) measured perfectionism in a multidimensional manner (as opposed to a unidimensional manner); (c) assessed sport-related performances in a subjective and/or objective manner that yielded quantitative values

(e.g. time, score); (d) are published in English; and (e) are a published journal article, unpublished journal article (e.g. conference presentation), or thesis/dissertation.

Search strategy

A search was performed with the following databases: PsycINFO, PsycARTICLES, MEDLINE, SPORTDiscuss and ProQuest Dissertations & Theses (UK & Ireland and international). The following search terms were used: 'Perfection* (for PERFECTIONism, PERFECTIONist, and PERFECTIONistic)' AND 'Sport' or 'Physical' or 'Athlet* (for ATHLETes and ATHLETic)' or 'Compet* (for COMPETition, COMPETe and COMPETitive)' or 'Train* (for TRAINing)' AND 'Performance' or 'Skill' or 'Time' or 'Score' or 'Task'. The search date was between January 1990 and June 2023, which represents the timeframe from the year the first article on multidimensional perfectionism was published to the start of the electronic search in this review. To maximise the search strategy, backward (i.e. reference lists of eligible studies) and forward (i.e. articles that cited the eligible studies using Google Scholar) citation chasing were conducted.

Screening

Two authors executed the screening process independently through a two-step process. In the first step, the two authors evaluated the title and abstract against the eligibility criteria to decide which studies to retain for the second inspection. In the second step, the two reviewers individually reviewed the full text of the included studies in the first step. Disagreements were resolved through discussion, with the third author consulted in cases where agreement could not be made.

Data extraction

Data extraction from primary studies was conducted by the first author. Recorded variables in a coding sheet included: (a) publication information (authors/year), (b) sample size, (c) gender (% of female), (d) age (including mean and range), (e) study design/analyses, (f) performance measure, (g) performance task, (h) the instrument of multidimensional perfectionism, (i) perfectionism sub-scales used to measure perfectionistic concerns and perfectionistic strivings, (j) the bivariate correlations between dimensions of perfectionism (PS/PC), (k) the bivariate correlations between dimensions of perfectionism (PS/PC) and sport performance measurement. In cases where information was unavailable to compute effect sizes, the corresponding authors of the included articles were contacted to obtain it. All information was coded by the first author and verified by the second.

Quality assessment

The present study assessed study quality using 18 items from The Appraisal Instrument (Genaidy et al., 2007), The Quality Index (Downs & Black, 1998), and The Evaluation of Research Articles Checklist (DuRant, 1994). The items are shown in the supplemental material A. A standardised quality assessment has yet to be established for laboratory-

based and observational studies (Payne et al., 2019), and so we followed recent reviews in this area that have used this tool (e.g. Brimmell et al., 2022; Harris et al., 2023; Payne et al., 2019). Items were scored yes (1) or no/unknown (0) and total scores ranged from 0 to 18 points. Total item scores are presented as both a percentage and absolute score. The first author completed the quality assessment, and the second author verified it for accuracy and consistency.

Meta-analysis

The meta-analysis was performed using Meta-Essentials (Suurmond et al., 2017). Random-effects models were used to derive effect sizes and confidence intervals because they allow us to generalise conclusions based on the mean effect size from this review into future studies (Schmidt et al., 2009). This analysis is commonly used in sport and exercise psychology meta-analyses (Hagger, 2006).

Correlation coefficients (r) were extracted from primary studies and used as the effect size metric. However, because the correlation coefficient has a problematic standard error when deriving weighted cumulative effects (Lipsey & Wilson, 2001), Fisher's Z transformed correlation coefficients were used to calculate effect sizes. Then Fisher's Z scores were converted back to correlation coefficients (denoted as r^+, weighted averaged correlation) along with their 95% confidence intervals. Cohen's (1992) recommendations for small ($r = .10$), medium ($r = .30$), and large ($r = .50$) were used to interpret the effect size. Statistical significance was indicated by the 95% confidence intervals excluding zero ($p < .05$). To calculate the meta-analytic effect sizes, the individual effect sizes were given weights based on the reciprocal of their sampling variance (Lipsey & Wilson, 2001). In instances where multiple effect sizes were reported, we derived one average effect size from each study. This strategy is commonly used to ensure that effect sizes used in meta-analyses are independent and avoid artificial inflation of sample size, distortion of standard error estimates, and overrepresentation of studies that include multiple effect sizes (Lipsey & Wilson, 2001).

Partial correlations were used to examine the relationship after controlling for the overlap between the two dimensions of perfectionism. Partial correlations capture the unique relationship between dimensions of perfectionism and sport performance (e.g. Hill et al., 2018). Partial correlations were calculated using Cohen et al. (2003, p. 74, eq. 3.3.11) equation and R code (Hill, 2024).

The total unique effect (TUE) of perfectionism on sport performance was calculated using the method proposed by Hill et al. (2021). Standardised regression coefficients were used to determine the TUE. For the statistical significance of the total unique effect, 95% confidence interval were used. TUE was accompanied by relative weights analysis to determine which of the two dimensions of perfectionism make the largest contribution to explained variances in any given outcome. Relative weights of each predictor (PS and PC) were calculated using an R-based web tool: https://relativeimportance.davidson.edu/ (Tonidandel & LeBreton, 2015).

For the moderation analyses, heterogeneity of effect sizes was assessed by examining the total heterogeneity of mean effect sizes (Q_T) and the degree of inconsistency in the observed relationship across studies (I^2) (Higgins & Thompson, 2002). Q_T indicates whether the variance of the weighted mean effect size is greater than that

which would be expected from sampling error. If Q_T is not statistically significant, this indicates that effect sizes from individual studies do not deviate much from the mean effect size, so the degree of heterogeneity across studies is likely to be low. I^2 offers an additional measure of the proportion of the overall variance resulting from true heterogeneity, rather than randomness. Cut-off values for I^2 of 25, 50 and 75% are indicative of low, medium, and high levels of heterogeneity (Higgins & Thompson, 2002). As I^2 increases, the level of true heterogeneity increases (0%−100%). We assessed that substantial heterogeneity exists if Q_T is statistically significant and I^2 is higher than 25%.

Subgroup analyses were performed in cases where substantial heterogeneity was found. For categorical variables (instruments/subscales, sport types, sample types), these analyses were conducted by Q_B and 95% confidence interval. Q_B indicates the total heterogeneity explained by any categorisation in the data. If Q_B is statistically significant, it indicates that there are differences between perfectionism instruments/subscales or sport types or sample types in terms of their effect size. Specific differences were examined by comparing the overlap between 95% confidence intervals for effect sizes. For continuous variables (age, percentage female, study quality), separate meta-regressions were performed to calculate unstandardised (B) and standardised regression coefficients (β) and 95% confidence intervals. If the CI does not include zero, it indicates that gender or age or study quality significantly moderate the PS and PC relationships with sport performance.

Publication bias were assessed using Rosenthal's Fail-safe number, Egger's test, and the Trim-and-fill method (Duval & Tweedie, 2000; Egger et al., 1997; Rosenthal, 1979). The fail-safe number should be greater than $5k + 10$ (where k equals the number of effect sizes; Rosenthal, 1979). If the 95% confidence interval of Egger's regression coefficient includes zero, no publication bias is present in the data. The trim-fill method was employed to correct any asymmetry in the distribution of studies and provide effect sizes that are adjusted for publication bias.

Results

Search results

The initial search was performed in June 2023 and, in a second round, updated in December 2024. The initial search yielded a total 1,040 items. After removing duplicates, 809 items remained. The title and abstract screening were then performed, leading to the exclusion of 783 items. The full texts of the remaining 26 items were acquired and evaluated for eligibility, resulting in the exclusion of 3 items that did not meet the inclusion criteria. The reasons of these exclusions were (i) one thesis overlapped with a journal article, (ii) one dissertation was irrelevant, and (iii) one paper did not use multidimensional perfectionism. The same process was repeated for Database 2, resulting in 6 items after excluding 4 studies that did not measure sport performance. Two studies were found through additional methods (google scholar = 1, preprint = 1) and were also included in the final dataset. Consequently, the final total of 31 studies were included and 46 samples including 4 unpublished datasets were used in the present review. A detailed overview of this process is shown in Figure 1.

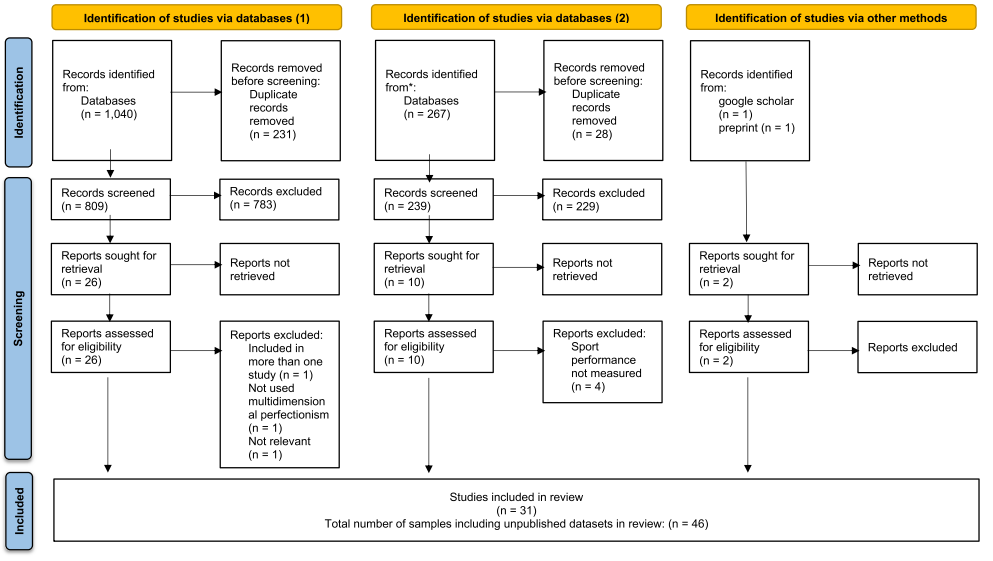

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram illustrating study selection.

Quality assessment

Study quality scores for the 31 studies ranged from 55.56% to 94.44% ($M = 79.57$, SD = 9.87; see Table 1). For studies that measured objective performance, they ranged from 66.67% to 94.44% ($M = 82.22$, SD = 8.02). Sixteen studies were very high (score between 81% and 100%), fourteen studies were high (score between 61% and 80%), and one study was medium (score between 41% and 60%) in methodological quality (Payne et al., 2019). In all studies, lowest scoring (under 80%) items included representative sample (item 6), sample size calculation (item 7), clear description of performance task (item 9), reporting of exact *p* values (item 12) and applicability of findings to other populations (item 16).

Study characteristics

Publication trend

An overview of study characteristics is presented in Table 2. Six studies were conducted between 1991 and 2010, thirteen studies between 2011 and 2020, and twelve studies between 2021 and 2024. Of the 31 studies, most studies were peer-reviewed papers ($k = 26$), one was a preprint article (Waleriańczyk, 2024) and four were doctoral thesis (Bradham, 2000; Castro, 2003; Melendez, 2021; Winder, 2017).

Study design

Of the 31 studies, fourteen studies adopted a cross-sectional design. Ten studies used prospective design (measuring performance four times = 1; three times = 1; at each six classes = 1; two races = 1; four-day races = 1; over a season = 5). Four studies used longitudinal design (at pre-test and follow-up = 1; at the beginning and the end of

Table 1. Quality assessment scores.

Study	Items																		Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Raw	%
Anshel and Mansouri (2005)	1	1	1	1	1	0	0	1	1	1	1	1	0	1	1	0	1	1	14	77.78
Bradham (2000)	1	1	1	1	1	0	1	1	0	1	1	0	1	1	1	1	1	1	15	83.33
Castro (2003)	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	16	88.89
De Maria et al. (2023)	1	1	1	1	1	0	1	1	0	1	1	0	0	1	1	0	1	1	13	72.22
Fawver et al. (2020)	1	1	1	1	1	0	0	1	0	1	1	1	0	1	1	1	1	1	14	77.78
Fleming and Dorsch (2024)	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	16	88.89
Frost and Henderson (1991)	1	1	1	1	0	0	0	0	0	1	0	0	1	1	1	0	1	1	10	55.56
Gaudreau et al. (2019)	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	15	83.33
Haraldsen et al. (2020)	0	1	1	1	1	0	0	1	0	1	1	0	1	1	1	0	1	1	12	66.67
Hill et al. (2011)	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	15	83.33
Hill et al. (2014)	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	16	88.89
Klämpfl et al. (2013)	1	0	1	1	1	0	0	1	1	1	1	0	0	1	1	0	1	1	12	66.67
Klund and Sæther (2017)	0	1	1	1	1	0	0	1	0	1	0	0	1	1	1	0	1	1	11	61.11
Květon et al. (2021)	1	1	1	1	1	0	0	1	0	1	1	0	1	1	1	0	1	1	13	72.22
Lizmore et al. (2019)	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	15	83.33
Madigan et al. (2018b)	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	1	14	77.78
Mallinson-Howard et al. (2021)	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	15	83.33
Melendez (2021)	1	1	1	1	1	0	0	0	0	1	1	1	0	1	1	1	1	1	13	72.22
Nascimento Junior et al. (2020)	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	16	88.89
Nordin-Bates et al. (2024)	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	15	83.33
Roy et al. (2023)	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	16	88.89
Stoeber et al. (2009)	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	16	88.89
Stoll et al. (2008)	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	0	1	1	13	72.22
Teixeira et al. (2024)	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	16	88.89
Thompson et al. (2011)	1	0	1	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	12	66.67
Van Dyke et al. (2020)	0	1	1	1	1	0	0	1	0	1	1	0	1	1	1	1	1	1	13	72.22
Waleriańczyk (2023)	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	16	88.89
Waleriańczyk (2024)	1	1	1	1	0	1	1	1	0	1	1	0	1	1	1	0	1	1	14	77.78
Waleriańczyk and Stolarski (2021)	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	17	94.44
Waleriańczyk et al. (2022)	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	17	94.44
Winder (2017)	1	1	1	1	1	0	1	1	0	1	0	0	1	1	1	1	1	1	14	77.78
Item score (all studies)	26	29	31	31	30	8	10	27	14	31	28	16	26	31	31	14	31	31	(M) 79.57	
Item percentage %	84	94	100	100	97	26	32	87	45	100	90	52	84	100	100	45	100	100	(SD) 9.87	
Item score (objective performance studies)	22	23	25	25	25	8	9	22	13	25	24	15	21	25	25	14	25	25	(M) 82.22	
Item percentage %	88	92	100	100	100	32	36	88	52	100	96	60	84	100	100	56	100	100	(SD) 8.02	

Note: 1 = yes; 0 = no/unknown.

Table 2. Overview of studies examining the relationship between perfectionism and sport performance.

Study Author (year)	Participants	Design (Analyses)	Measurement			Perf. Meas.	Perf. Type	Effect size (*r*)					Key findings
			Inst	PS	PC			PS Perf	PC Perf	PS PC	RPS Perf	RPC Perf	
Anshel and Mansouri (2005)	30 College athletes (0% females; sport unknown)	Experiment (Partial *t*, *F*)	F-MPS	n/a	n/a	OB: balancing time	Body-balance	-	-	-	-	-	PS and PC were unrelated to performance when athletes received no feedback, but both were associated with impaired performance when athletes received false negative feedback on their performance ($p < .01$).
Bradham (2000) sample 1	104 Intercollegiate basketball players (30.70% females, age = 20.21 ± 1.32; 100% team sport)	Prospective (Regression)	F-MPS	Pst	CM/DA[a]	OB: overall basketball statistic	Basketball	.16	.19	–.04	**.20**	–.07	PS was a significant predictor of overall basketball performance statistics ($r^2 = .043$, $p < .05$).
Bradham (2000) sample 2	132 Intercollegiate baseball players	C/S (Regression)	F-MPS	Pst	CM/DA[a]	CR: athletes' performance	Baseball	.01	.12	–.12	.12	–.12	None of perfectionism significantly predicted baseball performance.
Bradham (2000) sample 3	25 Intercollegiate softball players	Prospective (Regression)	F-MPS	Pst	CM/DA[a]	OB: batting average	Softball	.06	–.29	–.10	–.29	–.09	CM ($\beta = 1.69$, $p < .05$) and DA ($\beta = -1.46$, $p < .05$) predicted batting averages.
Castro (2003)	102 Adolescent athletes (40.20% females; age = 16.28 ± 1.05; 100% team sport)	C/S (Logistic regression)	HF-MPS	SOP	SPP	OB: getting a hit	Mixed[b]	**.22**	.03	–.13	.05	–.11	None of perfectionism significantly predicted hitting performance.
De Maria et al. (2023) sample 1	215 Italian university student-athletes (40.00% females; age = 21.1 ± 2.9; sport unknown)	Longitudinal (SEM)	MIPS	SP	NRI	SR: athletes' overall performance	Mixed[b]	**.34**	–.09	**–.24**	–.01	–.22	PS directly (β = –.18) and indirectly (β = .16) affected perceived performance via psychological needs satisfaction, while PC did not directly predict, but indirectly predict (β = –.10).
De Maria et al. (2023) sample 2	107 Spanish university student-athletes (54.20 females age = 21.4 ± 3.6; sport unknown)	Longitudinal (SEM)	MIPS	SP	NRI	SR: athletes' overall performance	Mixed[b]	**.57**	**.32**	.16	.28	–.03	PS directly (β = .29) and indirectly affected (β = .15) perceived performance via psychological needs satisfaction, while PC did not directly predict, but indirectly predict (β = –.09).

Table 2. Continued.

Study			Measurement					Effect size (*r*)					
Author (year)	Participants	Design (Analyses)	Inst	PS	PC	Perf. Meas.	Perf. Type	PS PC	PS Perf	PC Perf	RPS Perf	RPC Perf	Key findings
Fawver et al. (2020)	169 Adolescent alpine skiers (52.07% females; age = 15.82 ± 1.80; 0% team sport)	Retrospective (Mixed-effect regressions)	SMPS-2	Pst	CM/DA[a]	OB: speed /technical point	Alpine skiing	.09	-	-	-	-	There was PS x Time interaction on speed performance ($\beta = -7.74$, $p = .035$) and on technical performance ($\beta = -5.21$, $p = .047$).
Fleming and Dorsch (2024)	46 University student-athletes (50.00% females; age = 20.12 ± 1.47; 0% team sport)	Prospective (Mixed-effect regressions)	MIPS	SP	NRI	OB: Overall golf score	Golf	**.51**	**.06**	.01	.06	.02	None of the dimensions of perfectionism predicted golf putting performance and the previous performance.
Frost and Henderson (1991)	40 University student-athletes (100% females; 75% team sport)	C/S (Correlation)	F-MPS	Pst	CM/DA[a]	CR: athlete's ability	Mixed[b]	-	–.01	–.26	-	-	Only correlational analysis was performed with regards to performance.
Gaudreau et al. (2019)	97 Adolescent students (45.70% females; age = 11.82 ± 0.73; sport unknown)	Prospective (*P*-MGM)	HF-MPS-sh	SOP	SPP	TR: learning new skills[e]	Gymnastics	**.51**	.14	.01	.16	–.07	Pure PS was related to a better performance trajectory than nonperfectionism (Hypothesis 1a) and mixed perfectionism (Hypothesis 4). Also, pure PC was related to a worse performance trajectory than nonperfectionism (Hypothesis 2) and mixed perfectionism (Hypothesis 3).
Haraldsen et al. (2020)	259 Junior elite athletes (47.10% females; age = 17.31 ± 0.97; 0% team sport)	Longitudinal (GMM)	F-MPS-sh	Pst	CM	SR: perceived performance level	Mixed[b]	**.39**	**.21**	–.03	**.24**	–.12	The distinct growth profiles in each basic need showed that PS did not differ, while PC differed significantly.
Hill et al. (2011)	68 University student-athletes (29.41% female; age = 19.75 ± 1.25; 93% team sport)	Prospective (Repeated measures ANOVA)	HF-MPS	SOP	SPP	OB: distance travelled[c]	Cycling	**.33**	–.04	.02	–.05	.04	There was no significant difference in the distance travelled between the higher and lower self-oriented perfectionism groups in the two trials ($F(1, 64) = 0.01$, $p = .941$; Levene's tests, $F[1, 64] = 1.31$, $p = .258$ and 0.17, $p = .682$).

Table 2. Continued.

Study			Measurement					Effect size (*r*)					
Author (year)	Participants	Design (Analyses)	Inst	PS	PC	Perf. Meas.	Perf. Type	PS PC	PS Perf	PC Perf	RPS Perf	RPC Perf	Key findings
Hill et al. (2014)	231 Adult rowers/36 boats (50.65% females; age = 21.70 ± 3.60; 100% team sport)	Prospective (Two-level latent GCM)	HF-MPS-sh	SOP	SPP	OB: improvement in boat position	Rowing	**.31**	**.14**	.07	.12	.03	Team-oriented perfectionism positively predicted the position of the boat in mid-competition and the linear improvement in position.
Klämpfl et al. (2013)	20 Adult yips-affected golfers (10% females, age; 53.90 ± 13.90; sport unknown), 20 Adult yips-nonaffected golfers (10% females; age = 51.30 ± 14.10; sport unknown)	Experiment (Repeated-measures MANOVAs)	F-MPS	n/a	n/a	OB: golf-putting distance/the number of holed putts	Golf	-	-	-	-	-	There was no group effect for putting performance (F = .82 (2, 37), ηp2 = 0.043), but Group x Conditions interaction effect (F = 5.74 (8, 304), ηp2 = 0.131).
Klund and Sæther (2017)	115 Junior elite footballers (0% females; age = 17.80 ± 0.79; 100% team sport)	C/S (Correlation)	SMPS	Pst	CM	CR: athletes' four aspects of skills	Football	**.45**	**.24**	–.05	**.29**	–.18	Only correlational analysis was performed with regards to performance.
Květon et al. (2021) cross-sectional sample	228 Adolescent athletes (50.00% females; age = 16.35; sport unknown)	C/S (Regression)	SMPS-2	Pst Org	CM DAPP CP	SR: athletes' form	Mixed[b]	**.14**	**.19**	**–.20**	**.22**	**–.23**	PS positively predicted perceived performance (C/S: β = .21; After 3 months: β = .22; After one year: β = .34), while PC negatively predicted (C/S: β = –.22; After 3 months: β = –.24; After one year: β = –.27).
Lizmore et al. (2019)	99 University student-athletes (52.53% females; age = 20.51 ± 1.79; 63% team sport)	C/S (Moderation regression)	SMPS-2 MIPS	Pst SP	CM NRI	OB: golf-putting distance[c]	Golf[d]	**.41**	**.30**	.11	**.28**	–.01	There was PS x PC interaction on T2 putting performance after controlling T1 putting performance (β = .24, p = .004).
Madigan et al. (2018b)	90 Adult basketball players (18.89% females; age = 20.90 ± 4.00; 100% team sport)	C/S (Regression, Mediation regression)	SMPS MIPS	Pst SP	CM NRI	OB: free-throws score	Basketball	**.63**	**.29**	.10	**.29**	–.11	1. PS positively predicted performance (β = .38, p < .01), while PC did not. 2. Other-approach goals mediated the relationship between PS and performance (indirect effect = .12 [95% CI = .02, .26]).

(*Continued*)

Table 2. Continued.

Study			Measurement					Effect size (*r*)					
Author (year)	Participants	Design (Analyses)	Inst	PS	PC	Perf. Meas.	Perf. Type	PS PC	PS Perf	PC Perf	RPS Perf	RPC Perf	Key findings
Mallinson-Howard et al. (2021) sample 1	129 University student-athletes (44.44% females; age = 18.84 ± 1.23; sport unknown)	C/S (Regression, Mini-Meta)	MIPS	SP	NRI	OB: 20 m sprint time	Fitness-test[d]	**.33**	**.24**	–.16	**.31**	**–.26**	PS negatively predicted sprint performance ($\beta = -.17$, $p = .01$), while PC positively predicted ($\beta = .14$, $p = .03$).
Mallinson-Howard et al. (2021) sample 2	136 University student-athletes (41.18% females; age = 19.10 ± 1.58; sport unknown)	C/S (Regression, Mini-Meta)	MIPS	SP	NRI	OB: five agility time	Fitness-test[d]	**.47**	**.24**	.10	**.22**	–.01	PS was a nonsignificant predictor ($\beta = -.10$, $p = .27$) and PC was a nonsignificant predictor.
Mallinson-Howard et al. (2021) sample 3	116 Junior athletes (17.00% females; age = 17.37 ± 0.83; sport unknown)	C/S (Regression, Mini-Meta)	MIPS	SP	NRI	OB: Yo-Yo test level	Fitness-test	**.48**	**.26**	.11	**.24**	–.02	1. PS positively predicted recovery test ($\beta = .26$, $p = .02$) while PC did not. 2. Across three samples, PS showed significantly a small-to medium positive meta-correlation with performance ($r^+ = .24$ [95% CI = .15, .34]), while PC showed nonsignificantly a small negative meta-correlation with performance ($r^+ = -.05$ [95% CI = –.16, .05]).
Melendez (2021)	53 University student -athletes (0% females; 100% team sport)	Prospective (Regression)	HF-MPS	n/a	n/a	OB: overall baseball statistic	Baseball	-	-	-	-	-	There was no relationship between perfectionism, general mental health, and performance [$R^2 = .074$, R^2adj = –.003, F (4, 48) = .955, $p = .441$].
Nascimento Junior et al. (2020) sample 1	29 Adult medal winners (0% females; age = 24.80 ± 4.90; 100% team sport)	C/S (Path analysis)	SMPS-2	Pst Org	CM/DA[a]	OB: total football score	Football	.14	.13	–.01	.13	–.03	Pst significantly showed a positive association with scored goals ($\beta = .17$, $p < .05$) and negative with conceded goals ($\beta = -.23$, $p < .05$), while DA significantly showed a positive association with conceded goals ($\beta = .40$, $p < .05$).
Nascimento Junior et al. (2020) sample 2	111 Adult non-medal winners	C/S (Path analysis)	SMPS-2	Pst Org	CM/DA[a]	OB: total football score	Football	.21	–.08	–.08	–.06	–.06	DA significantly showed a negative association with the number of wins ($\beta = -.22$, $p < .05$) and total score ($\beta = -.20$, $p < .05$).

Nordin-Bates et al. (2024) sample 1	165 Track and field athletes (56.97% females; age = 16.93 ± 1.28; 0% team sport)	C/S (Regression)	PPSS SMPS MIPS	SOP Pst SP	SPP CM NRI	OB: IAAF point[e]	Track/field	**.83**	.07	.06	.04	.00	PS was a positive predictor of performance ($\beta = .12$, $p < .05$) and showed positive increasing non-linear relationship with performance (U-shape).
Nordin-Bates et al. (2024) sample 2	157 Track and field athletes (54.78% females; age = 18.42 ± 3.78; 0% team sport)	C/S (Regression)	PPSS SMPS MIPS	SOP Pst SP	SPP CM NRI	OB: IAAF point[e]	Track/field	**.63**	.14	.00	**.18**	–.11	PS was a negative predictor of performance ($\beta = -.10$, $p < .05$) and showed positive decreasing non-linear relationship with performance (inverted U-shape).
Roy et al. (2023)	32 Adolescent athletes (46.88% females; age = 14.33 ± 0.61; 6% team sport)	Longitudinal (Moderate regression)	SMPS-2	Pst	CM DA	OB: performance improvement[f]	Mixed[b]	**.44**	**.45**	.09	**.46**	–.13	PS moderated the relationships between sport performance improvement and sleep habits (e.g. weekday bedtime), while PC did not moderate any relationship.
Stoeber et al. (2009) sample 1	112 Adult triathlon (22.22% females; age = 36.50 ± 7.60; 0% team sport)	Prospective (Regression, Mediation regression)	SMPS	Pst	CM	OB: race time	Triathlon	**.59**	**.43**	.18	**.41**	–.10	1. PS showed a positive prediction for race performance after controlling seasonal best performance ($\beta = .33$, $p < .01$). 2. The contrast between performance-approach and avoidance goals fully mediated the relationship between PS and performance (95% CI [indirect effect] = .08, .32).
Stoeber et al. (2009) sample 2	321 Adult triathlon (17.11% females; age = 37.20 ± 7.90; 0% team sport)	Prospective (Regression, Mediation regression)	SMPS	Pst	CM	OB: race time	Triathlon	**.64**	**.28**	.05	**.32**	**–.18**	1. PS positively predicted race performance after controlling for seasonal best performance ($\beta = .19$, $p < .01$) and personal best performance ($\beta = .14$, $p < .05$). 2. The contrast between performance-approach and avoidance goals fully mediated the relationship between PS and performance (95% CI [indirect effect] = .03, .18).

(*Continued*)

Table 2. Continued.

Study			Measurement					Effect size (*r*)					
Author (year)	Participants	Design (Analyses)	Inst	PS	PC	Perf. Meas.	Perf. Type	PS PC	PS Perf	PC Perf	RPS Perf	RPC Perf	Key findings
Stoll et al. (2008)	122 Sport science undergraduates (53.00% females; age = 24.40 ± 2.40; sport unknown)	Prospective (Moderation regression)	MIPS	SP	NRI	OB: point scored/ increment point per series[e]	Basketball	**.30**	.17	–.01	**.18**	–.04	There was PS x PC interaction on average performance increment ($\beta = .27$, $p < .01$).
Teixeira et al. (2024)	299 young football players (0% female; age = 15.01 ± 1.48; 100% team sport)	C/S (Path analysis)	MIPS	SP	NRI	OB: The final team point	Football	**.18**	**.14**	**–.14**	**.17**	**–.17**	1. PS positively predicted objective football performance (β = .18, $p < .01$), while PC negatively predicted (β = –.17, $p < .01$). 2. PS positively mediated the relationship between perceived parental involvement and perceived/objective football performance. (indirect effect = .67; $p < .01$).
Thompson et al. (2011)	25 Adult athletes (44.00% females; age = 48.28; 0% team sport)	Longitudinal (Correlation)	F-MPS	Pst	CM/ DA[a]	OB: improvement in best mile time[g]	Running[d]	-	–.30	**–.72**	-	-	Only correlational analysis was performed with regards to performance.
Van Dyke et al. (2020)	244 Intercollegiate gymnasts (100% females; age = 19.46 ± 1.22; 0% team sport)	Prospective (Ward's, *k* mean cluster)	SMPS-2	Pst	CM	OB: bar performance score	Gymnastics	**.47**	**.31**	**.23**	**.24**	.10	Three profiles based on mindfulness and perfectionism scores showed nonsignificant differences in performance (Effect sizes (η_p^2) = .03 to .06).
Waleriańczyk (2023)	167 Adult runners (32.34% females; age = 39.32 ± 9.35; 0% team sport)	C/S (Moderation regression)	PPSSSMPS-2	SOPPst	SPP CM DA	OB: race point compared to the world record	20, 43, 60, 100 km run	**.57**	**.40**	.09	**.43**	**–.18**	1. PS was significantly a positive predictor of performance (β = .38, $p < .001$). 2. The interaction PS x PC was significant for performance (β = –.16, $p < .05$). 3. H1a, H3 and H4 hypothesis based on 2 × 2 model of perfectionism were supported, but H2 was not.
Waleriańczyk (2024) sample 1	145 Adult runners (45.52% females; age = 34.18 ± 9.32; 0% team sport)	C/S (Moderation regression)	PPSSSMPS-2	SOPPst	SPP CM DA	OB: Race time	10k street run	**.63**	**.27**	.01	**.34**	**–.21**	PS was significantly a positive predictor of performance (β = .32, $p < .001$), while PC was a nonsignificant predictor.

Waleriańczyk (2024) sample 2	139 Adult runners (29.50% females; age = 40.09 ± 8.44; 0% team sport)	C/S (Moderation regression)	PPSSSMPS-2	SOPPst	SPP CM DA	OB: Race time	Half-marathon	**.66**	.31	.08	**.34**	**−.17**	PS was significantly a positive predictor of performance (β = .27, $p < .001$), while PC was a nonsignificant predictor.
Waleriańczyk (2024) sample 3	283 Adult runners (18.02% females; age = 38.80 ± 9.80; 0% team sport)	C/S (Moderation regression)	PPSSSMPS-2	SOPPst	SPP CM DA	OB: Race time	Marathon	**.50**	**.22**	**−.13**	**.33**	**−.28**	PS was significantly a positive predictor of performance (β = .39, $p < .001$) and PC was significantly a negative predictor (β = −.31, $p < .001$).
Waleriańczyk and Stolarski (2021) sample 1	332 Adult runners (42.77% females; age = 33.00 ± 8.70; 0% team sport)	C/S (Moderation regression)	PSQ	Pst Exp	DA CM RM	OB: race time	10 K street run	.10	**.31**	.05	**.31**	.02	1. PS was significantly a positive predictor of performance (β = .27, $p < .001$) and anticipated performance (β = .29, $p < .001$) 2. The interaction PS x PC was significant for performance (β = −.06, $p < .002$).
Waleriańczyk and Stolarski (2021) sample 2	133 Adult runners (36.09% females; age = 35.69 ± 9.10; 0% team sport)	C/S (Moderation regression)	PSQ	Pst Exp	DA CM RM	OB: race time	Half-marathon	.19	**.42**	.20	**.40**	.13	PS was significantly a positive predictor of performance (β = .35, $p < .001$) and anticipated performance (β = .37, $p < .001$).
Waleriańczyk et al. (2022)	152 Adult runners (47.37% females; age = 34.71 ± 9.57; 0% team sport)	C/S (Moderation regression)	PSQ	Pst Exp	DA CM RM	OB: race time	10 K street run	.11	**.32**	.12	**.31**	.09	Only correlational analysis was performed with regards to performance.
Winder (2017)	70 Junior gymnasts (100% females; age = 12.24 ± 1.40; 0% team sport)	Prospective (Correlation)	SMPS-2	Pst	CM/DA[a]	OB: gymnast's score	Gymnastics	.24	.07	.02	.07	.00	Only correlational analysis was performed with regards to performance.
Unpublished data	89 University student athletes (48.40% females; age = 20.08 ± 1.43; 0% team sport)	-	MIPSPPSS	SP SOP	NRI SPP	OB: scores in each hole	Golf	.39	.17	.19	.11	.14	-
Unpublished data	60 Adult archers (50.00% females; age = 24.87 ± 7.65; 0% team sport)	-	PPSS SMPS-2	Pst SOP	DA CM SPP	OB: total point	Archery	**.65**	.23	.12	.21	−.05	-
Unpublished data	72 Adult archers (50% females; age = 21.86 ± 1.71; 0% team sport)	-	PPSS SMPS-2	Pst SOP	DA CM SPP	OB: total point	Archery	**.56**	**.28**	.12	**.26**	−.04	-

(*Continued*)

Table 2. Continued.

Study			Measurement					Effect size (*r*)					
Author (year)	Participants	Design (Analyses)	Inst	PS	PC	Perf. Meas.	Perf. Type	PS PC	PS Perf	PC Perf	RPS Perf	RPC Perf	Key findings
Unpublished data	212 Adult swimmers (51.42% females; age = 19.78 ± 1.61; 0% team sport)	–	PPSS	SOP	SPP	OB: swimming time	Swimming	**.41**	.02	–.08	.06	–.10	-

Note: Inst. = Instruments; Perf. = Performance; PS = Perfectionistic strivings; PC = Perfectionistic concerns; RPS = Residual perfectionistic strivings; RPC = Residual perfectionistic concerns; C/S = Cross-sectional; SEM = Structural equation modelling; GCM = Growth curve modelling; GMM = Growth mixture modelling; *P*-MGM = Piecewise multilevel growth modelling; F-MPS = Multidimensional Perfectionism Scale (Frost et al., 1990); F-MPS-sh = the Frost Multidimensional Perfectionism Scale-Brief (Burgess et al., 2016); SMPS = Sport Multidimensional Perfectionism Scale (Dunn et al., 2006); S-MPS-2 = Sport Multidimensional Perfectionism Scale 2 (Gotwals & Dunn, 2009); HF-MPS = Multidimensional Perfectionism Scale (Hewitt & Flett, 1991); HF-MPS-Sh = Short version of Multidimensional Perfectionism Scale (Cox et al., 2002); MIPS = Multidimensional Inventory of Perfectionism in sport / training / competition (Stoeber et al., 2007), PPSS = The Performance Perfectionism Scale-Sport (Hill et al., 2016); PSQ = Perfectionism in Sport Questionnaire in polish version (Waleriańczyk & Stolarski, 2021); SOP = self-oriented perfectionism; SP = Striving for perfection; Pst = Personal standards; Exp = Expectation; Org = Organisation; SPP = Socially prescribed perfectionism; CM = Concern over mistakes; DA = Doubt of action; PP = Parental pressure; CP = Coach pressure; NRI = Negative reactions to imperfection; RM = Rumination evoked by mistakes; OB = Objective measure; CR = Coach's rating; TR = teacher's rating; SR = Self-reported; P = Performance. Bold indicates statistically significant ($p < .05$, two-tailed).

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

[b]Mixed sport disciplines (e.g. basketball, tennis, volleyball and etc.)

[c]Trial 1 performance before athletes received false-failure feedback because the performance after the feedback is inconsistent with the performance in other studies without the feedback.

[d]Reverse score.

[e]Averaged effect size.

[f]We put Roy et al. (2023)'s performance data in objective category because it required coaches to report objective time completion (triathlon, swimming, athletics) or specific scores (gymnastics, karate) during competitions.

[g]We put Thompson et al. (2011)'s performance data in objective category because it required for objective time completion.

school = 1; at time 3 = 2). Two studies were conducted as experiments (false-failure feedback conditions vs no feedback = 1; five different pressured conditions = 1). Finally, one study adopted a retrospective design obtaining performance score from previous events.

Participant information

Including unpublished data, the 46 samples consisted of university student-athletes (k = 14), junior/adolescent-athletes (k = 9), adult athletes (k = 19), non-athletes (k = 2) and unspecified (k = 2). The total number of participants was 6,102 (mean age = 25.16 ± 4.26, female % = 38.45%). The participants involved in team sport (27%), individual sport (53%), performing arts (1%) and unspecified sports (19%). In terms of the sport level, 15% of participants are described as competing at the 'school/university' level, 11% at 'elite' level, 6% 'competitive', 6% 'recreational', 4% 'regional', 5% 'national', 1% 'international', 6% 'amateur', and 1% 'semi-professional/professional'. The remaining 45% was unspecified.

Measurement of sport performance

Of the 46 samples, 38 samples obtained objective performance data through websites (k = 13), race organisers (k = 3), match reports (k = 3), experimenters with device (k = 9), and mixed (e.g. website and university information directors; k = 1), self-recorded (k = 1), coach-recorded (k = 1) and unspecified (k = 7). Four samples gathered subjective performance data through a coach/teacher (e.g. rate an athlete's performance). Four samples derived the subjective performance data through self-report (e.g. performance satisfaction).

Measurement of perfectionism

Multidimensional perfectionism was measured using the Frost-Multidimensional Perfectionism Scale (F-MPS; k = 7), Frost Multidimensional Perfectionism Scale-Brief (F-MPS-sh; k = 1), Hewitt and Flett Multidimensional Perfectionism Scale (HF-MPS; k = 3), Short version of Hewitt and Flett Multidimensional Perfectionism Scale (HF-MPS-sh; k = 2), Sport Multidimensional Perfectionism Scale (SMPS; k = 3), Sport Multidimensional Perfectionism Scale 2 (SMPS-2; k = 7), Multidimensional Inventory of Perfectionism in Sport (MIPS; k = 8), Performance Perfectionism Scale-Sport (PPSS; k = 1) and Perfectionism in Sport Questionnaire (PSQ; k = 3). The remaining 11 samples combined subscales from different questionnaires (see Madigan, 2023). They used a combination of PPSS and SMPS-2 (k = 1), PPSS, SMPS, and MIPS (k = 2), SMPS and MIPS (k = 1), SMPS-2 and MIPS (k = 1), MIPS and PPSS (k = 1), and PPSS and SMPS-2 (k = 5). The specific subscales used in each study can be found in Table 2.

Performance type (Supplemental materials B/C for subgroup-analyses of performance type)

Running (k = 8). Eight samples examined the association between perfectionism and running performance (Thompson et al., 2011; Waleriańczyk, 2023, 2024; Waleriańczyk et al., 2022; Waleriańczyk & Stolarski, 2021). A longitudinal study found that PS was unrelated to improvement in mile time and PC was negatively related. Four cross-sectional studies showed that PS was positively related to running time and PC was unrelated. Two of them revealed PS x PC interaction effects on running performance. The remaining

three cross-sectional samples showed that PS positively predicted running time, while PC did not in two samples but negatively predicted the performances in the other sample.

Fitness-based field tests (k = 3). Three samples investigated the perfectionism-field-tests relationship (Mallinson-Howard et al., 2021). The cross-sectional samples found that PS predicted positively 20 m sprint (e.g. reversed) and the recovery test, while PC predicted negatively 20 m sprint. Their mini meta-analyses to synthesise all effect size found that PS positively predicted field-test performance, while PC did not.

Basketball (k = 3). Three samples tested perfectionism-basketball relationship (Bradham, 2000; Madigan et al., 2018b; Stoll et al., 2008). One prospective sample showed that none of perfectionism was related to season performance statistic. Another prospective sample found that PS was positively related to novel shooting task, while PC was unrelated, and also revealed PS x PC interaction effect. One cross-sectional study found the same in free-throw shooting and other-approach goal mediated the PS-performance relationship.

Football (k = 3). Three samples investigated its roles in football performance (Nascimento Junior et al., 2020; Teixeira et al., 2024). Two cross-sectional samples showed that both dimensions were unrelated to total football score. The other cross-sectional sample showed that PS positively predicted team point at the end of season, while PC negatively predicted. It also found that PS mediated the relationship between parental involvement and team performance.

Golf (k = 3). Three samples tested the perfectionism-golf relationship (Fleming & Dorsch, 2024; Klämpfl et al., 2013; Lizmore et al., 2019). A prospective study found that none of perfectionism predicted golf-putting score. An experimental design (e.g. yip-experience vs yip-nonexperience) did not report any effect size but found no difference between the groups in perfectionism score and no group effect for putting performance. A cross-sectional study found that PS positively predicted trial 1 putting performance, whereas PC did not. It also revealed the PS x PC interaction effect on trial 2 performance when controlling trial 1 performance.

Gymnastics (k = 2). Two samples tested its effects on gymnastics performance (Van Dyke et al., 2020; Winder, 2017). A prospective sample showed that both dimensions were positively related to bar performance. The other prospective sample showed that both dimensions were unrelated to overall gymnast's seasonal scores.

Track/field (k = 2). Two samples examined the relationship between perfectionism and track/field performance (Nordin-Bates et al., 2024). They showed that none of perfectionism were related to performance and found that the quadratic function of PS was significant positive (i.e. U-shape in sample 1) and negative (inverted U-shape in sample 2) predictors of the performance.

Triathlon (k = 2). Two samples examined the perfectionism and triathlon relationship (Stoeber et al., 2009). The prospective samples found that PS was positively related to reduced race time, whereas PC was unrelated. They also revealed that performance approach-avoidance contrast mediated the PS-performance relationship.

Miscellaneous (k = 8). Eight samples with a variety of sports tested its roles in their own sport performance (hitting = 1, mixed performances = 1, body-balance = 1, softball = 1, alpine ski = 1, cycling = 1, rowing = 1, baseball = 1) (Anshel & Mansouri, 2005; Bradham, 2000; Castro, 2003; Fawver et al., 2020; Hill et al., 2011, 2014; Melendez, 2021; Roy et al., 2023). A prospective hitting task study showed that none of perfectionism was

related to hitting performance (e.g. hit/no hit). The longitudinal mixed sample (e.g. time completion in athletes and scores in gymnastics) showed that PS was positively related to the performance improvement, while PC was unrelated. The experimental body-balance sample (e.g. negative feedback vs no feedback) did not report any effect size but found that both dimensions were unrelated to balancing when athletes received no feedback, whereas related to impaired performance when received negative feedback. The prospective softball sample revealed that none of perfectionism was related to batting performance. The retrospective alpine-ski sample reported no effect sizes but found PS x time interaction on speed and technical performance. The cross-sectional cycling sample found that none of perfectionism was related to improved distance performance. The prospective rowing sample showed that PS at individual level was positively linked to improvement in boat ranking at team level, whereas PC was unrelated. Finally, the prospective baseball study reported no effect size and found no associations between perfectionism, mental health, and performance.

Unpublished data (k = 4). Four unpublished studies tested perfectionism in contexts of golf ($k = 1$), archery ($k = 2$) and swimming ($k = 1$). Given that these were unpublished, no further information beyond the effect size was reported. All studies reported non-significant association between the two dimensions of perfectionism and performance, except one sample of archers showing that PS was positively related to archery performance.

A mix of subjective performances (k = 8). Eight samples examined the relationship between perfectionism and a mix of subjective performance (e.g. coach/teacher and self) (Bradham, 2000; De Maria et al., 2023; Frost & Henderson, 1991; Gaudreau et al., 2019; Haraldsen et al., 2020; Klund & Sæther, 2017; Květon et al., 2021). A cross-sectional baseball study found that none of perfectionism was related to coach's ratings on athletes' performance. Another cross-sectional sample found that none of perfectionism was associated with coaches' ratings on the athlete's ability. Another cross-sectional football sample found that PS was related to coach's ratings on athletes' ability, while PC was unrelated. Finally, the remaining cross-sectional sample found that PS positively predicted self-rating on athletes' form and PC negatively predicted. A prospective study found that none of perfectionism was related to teacher's rating on learning new skills and that pure PS (high PS and low PC) was associated with a better performance trajectory than nonperfectionism (Low PS and low PC) and mixed perfectionism (High PS and high PC). Two longitudinal samples with Italian and Spanish athletes showed mixed results with PS being unrelated to perceived performance for Italian and positively related for Spanish athletes, and PC being negatively associated with the performance for Italian and unrelated for Spanish athletes. They also found that basic psychological needs satisfaction mediated the effects of both PS and PC on performance. Finally, the other longitudinal sample revealed that PS was positively related to perceived performance level, while PC was unrelated.

Meta-analytic findings

For the meta-analyses, we included only those studies that had measured objective performance. This was because (i) our primary focus was on the relationship between perfectionism and objective performance outcomes and (ii) effect sizes derived from

coach/self-rating measures encompassed different aspects of performance such as performance satisfaction, which made direct comparison challenging.

Overall effect sizes

The mean effect sizes between the dimensions of perfectionism and objective performance are reported in Table 3. PS showed a small to medium positive relationship with sport performance ($r^+ = .21$; 95% CI = .15, .26), whereas PC were unrelated to sport performance ($r^+ = .03$; 95% CI = –.02, .08). There was a medium to large positive relationship between PS and PC ($r^+ = .43$; 95% CI = .35, .50). When controlling for the overlap between the dimensions of perfectionism, residual PS showed a similar pattern ($r^+ = .22$; 95% CI = .17, .27), while residual PC displayed a small negative relationship with sport performance ($r^+ = –.07$; 95% CI = –.11, –.03).

Total unique effect

Results of TUE and RWA can be found in Table 4. The TUE indicated that perfectionism was, overall, positively related to sport performance ($\beta_{PS} = .24$, $\beta_{PC} = –.06$; TUE = .17; 95% CI = .13, .22), with PS making the largest contribution to the total effect ($RW_{PS} = 95.02\%$, $RW_{PC} = 4.98\%$).

Moderation analysis

An examination of the total heterogeneity of the pooled mean effects suggested that there was substantial moderation. To explore this further, moderation analyses were performed. Based on the overlap of 95% confidence intervals, subgroup analyses suggested that instrument/subscales, sport type, and sample type did not moderate the relationship between both dimensions of perfectionism and sport performance (see Table 5). The results of meta-regression of age, percentage female, and study quality were shown in Table 6. Meta-regressions of percentage female and study quality did not moderate the two dimensions of perfectionism and performance relationships. However, we found evidence of age to moderate the relationship between PS and performance, suggesting that the relationship gets stronger when age increases. No effect of age was evident for the PC-performance relationship (see Table 6).

Table 3. Meta-analytical relationships between perfectionism and objective sport performance.

										'Trim and Fill' estimates	
Predictor variables	*k*	*N*	r^+	95% CI	Q^T	I^2	Fail-safe N	Egger's intercept	95% CI	k^{TF}	r^+ [95% CI]
Perfectionistic strivings	34	4617	.21	.15, .26	85.48***	61.39	2238	–1.52	–3.26, .22	0	-
Perfectionistic concerns	34	4617	.03	–.02, .08	69.32***	52.40	4†	–.78	–2.40, .84	0	-
Residual perfectionistic strivings	33	4592	.22	.17, .27	84.06***	61.93	2890	–2.16	–3.88, –.44	3	.26 [.23, .28]
Residual perfectionistic concerns	33	4592	–.07	–.11, –.03	57.42**	44.27	203	–.67	–.91, 2.25	1	–.08 [–.11, –.05]

Note: *k* = number of studies; *N* = number of participants; r^+ = weighted mean r; 95% CI = 95% confidence interval; Q^T = total heterogeneity of the weighted mean effect sizes; I^2 = degree of inconsistency in the observed relationship across studies; † = does not exceed recommended cut-off; k^{TF} = number of imputed studies as part of the trim and fill method; **$p < .01$; ***$p < .001$

Table 4. Total unique effects and relative weights from the meta-analyses.

ID	DV	*k*	*N*	$r_{(PS\text{-}Perf)}$	$r_{(PC\text{-}Perf)}$	$r_{(PS\text{-}PC)}$	β_{PS}	β_{PC}	TUE[95% CI]	RW_{PS}(%)	RW_{PC}(%)	R^2
Multidimensional perfectionism	Objective sport performance	33	4592	.21	.04	.43	.24	−.06	.17[.13, .22]	.05(95.02%)	.00(4.98%)	.05

Note: ID = independent variable; DV = dependent variable; *k* = number of effect sizes; *N* = number of participants; PS = perfectionistic strivings; PC = perfectionistic concerns; $r_{(PS\text{-}Perf;\ PC\text{-}Perf;\ PS\text{-}PC)}$ = correlation between the two variables; β = standardised regression coefficient; TUE = total unique effect ($\beta_{PS} + \beta_{PC}$; units of standard deviations of DV per standard deviation of PS + PC); RW = relative weights.

Table 5. Subgroup analyses of instrument/subscale, sport type, and sample type.

Criterion variable: Objective sport performance	*k*	*N*	r^+	95% CI	Q^B
Perfectionistic strivings					
Instrument/subscale					14.96
Personal standards	8	933	.21	–.00, .40	
Self-oriented perfectionism	4	613	.06	–.06, .18	
Striving for perfection	6	848	.19	.12, .25	
Composite perfectionistic strivings	16	2223	.25	.18, .31	
Sport type					8.45
Team sport	8	991	.10	–.02, .22	
Individual sport	22	3213	.23	.17, .29	
Sample type					6.21
Student athletes	8	851	.18	.04, .32	
Junior/adolescent athletes	5	619	.16	–.01, .33	
Adult athletes	18	2703	.24	.16, .32	
Perfectionistic concerns					
Instrument/subscale					6.89
Concern of mistakes	3	677	.15	–.10, .38	
Socially prescribed perfectionism	4	613	–.02	–.17, .12	
Negative reaction to imperfection	6	848	–.03	–.15, .10	
Composite perfectionistic concerns	21	2749	.04	–.03, .11	
Sport type					4.28
Team sport	8	991	–.04	–.13, .04	
Individual sport	22	3213	.05	–.01, .12	
Sample type					1.73
Student athletes	8	851	.04	–.07, .15	
Junior/adolescent athletes	5	619	–.04	–.19, .11	
Adult athletes	18	2703	.04	–.04, .12	

Note: k = number of studies; $r+=$ weighted mean *r*; 95% CI = 95% confidence interval; QB = heterogeneity explained by categorisation of the data.

Table 6. Meta-regressions of age, percentage female, and study quality.

Criterion variable: Objective sport performance	B	S.E.	β	95% CI
Perfectionistic strivings				
Age	.01	.00	.49**	.00, .01
Percentage female	.02	.11	.04	–.20, .25
Study quality	.69	.46	.25	–.25, 1.63
Perfectionistic concerns				
Age	–.00	.00	–.03	–.01, .00
Percentage female	.15	.10	.25	–.05, .35
Study quality	.46	.41	.19	–.39, 1.30

Note: β = standardised regression weight; *B* = unstandardised regression weight; S.E = standard error; CI = Confidence Interval; $^{**}p < .01$

Ancillary analysis

An ancillary analysis was conducted examining whether levels of PC moderated the PS-performance relationship. This was conducted in response to recent findings that PS may predict performance in sport at lower but not at higher levels of PC (e.g. Waleriańczyk, 2023). In conducting this analysis, mean scores of PC, rescaled to a response format of 1 to 5 to provide a common format for all measures, was used as a predictor in a meta-regression, with the correlation of PS with performance as the criterion variable. Using a random-effects model, mean levels of PC significantly moderated the PS-performance relationship ($B = –.13$, SE = .04, 95% CI [–.21, –.04], $\beta = –.35$, $p < .01$; see Figure 2).

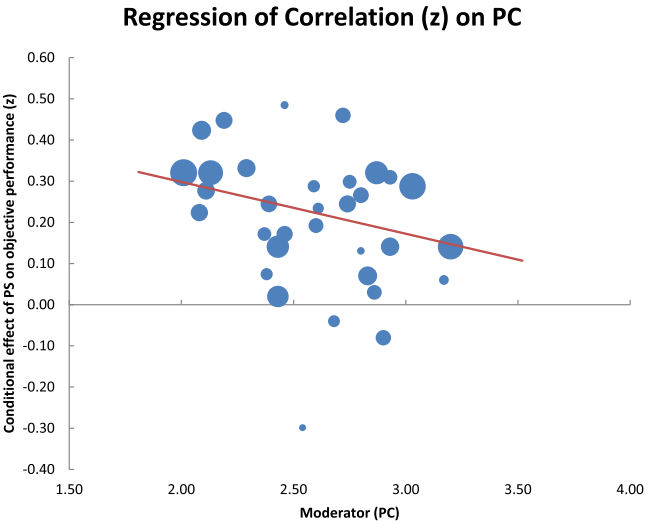

Figure 2. The moderation effect of mean levels of PC on the relationship between PS and sport performance.

Publication bias

Rosenthal's fail-safe numbers and Egger's regression intercept CI provided mixed evidence of publication bias. Specifically, fail-safe numbers exceeded the recommended thresholds in PS and residual PS cases. However, Egger's regression intercept CIs only included zero in PS. For PC, fail-safe numbers did not exceed the recommended threshold, but they did for residual PC. In addition, Egger's regression intercept CIs included zero for both PC and residual PC. The trim and fill estimates provided revised estimates for only partialled effect sizes. However, these estimates did not differ statistically from the original estimates, based on the overlap of the 95% confidence intervals. Taken together, no major publication bias appeared to be in the findings.

Discussion

The aim of the present study was to extend previous work by providing a comprehensive systematic review and meta-analysis of research examining the relationship between perfectionism and sport performance to date. We reviewed 31 studies with 46 samples that provided mixed evidence of the relationship. Perfectionism, overall, displayed a positive relationship with sport performance. Perfectionistic striving was primarily responsible for this effect. Moderation analyses suggested that the relationship between perfectionistic strivings and performance gets stronger as age increases, and that it is moderated by mean levels of perfectionistic concerns. Perfectionistic concerns, however, were unrelated to sport performance in all circumstances.

Key findings from the systematic review

One of the first key issues arising from the systematic review is the difficulty in building a clear picture of the effects of perfectionism, and for whom and when effects exist, due to

the methodological differences between studies. Most studies included young athletes (e.g. adolescent and student athletes) with very few studies including competitive or elite athletes, for example. As such, typical findings are more applicable to the former, rather than the latter. Some studies also included participants who were not athletes but did perform athletic or sport-related tasks (Gaudreau et al., 2019; Stoll et al., 2008). These nuances are important considerations when seeking to generalise findings and determine the relationship between perfectionism and sport performance. In all, in reviewing this work, it is clear that the area would benefit from more systematic lines of enquiry and a wider appreciation of how the sample characteristics and tasks provide important contextual bounds for conclusions regarding this relationship.

Another important issue is that there are very few studies examining the perfectionism and performance relationship over time. Most studies of this kind rely on perceived performance (De Maria et al., 2023; Haraldsen et al., 2020; Květon et al., 2021). This type of work is important as single performances are more likely to be over and underestimated effects. They also do not provide an opportunity to study issues of 'form', 'slumps', and 'responses to difficulties'. The latter is a major consideration for perfectionism which is suggested to provide the basis for pronounced problems under conditions of achievement (see Flett & Hewitt, 2016). A few studies have examined the relationship following failure and have provided some support for these suggestions (e.g. Anshel & Mansouri, 2005; Hill et al., 2011; Lizmore et al., 2019). However, these studies normally include students or student-athletes and contrived sport-related tasks. Similar tests, over time, that focus on the long-term effects on athlete performance in their sports are still an essential avenue for understanding the effects of perfectionism on performance.

One final issue we highlight is that research seeking to identify explanatory factors that account for the perfectionism-performance relationship is largely absent. Some studies have found that perfectionism indirectly affects sport performance via achievement goal orientations (i.e. a belief about performance; Madigan et al., 2018b; Stoeber et al., 2009). So, the desire to outperform others and belief in the ability to do so, in the form of a performance approach goal, appear to be particularly important. There is also evidence that psychological need satisfaction may play a role, presumably, helping to maintain underlying motivation (De Maria et al., 2023). However, beyond these studies, limited progress is being made to empirically illustrate the reasons why perfectionism may be beneficial or detrimental to sport performance. This work is central to better understanding the relationship and resolving debates about its likely effects.

Key findings from the meta-analysis

Turning to the meta-analysis, previous reviews examining the relationship between perfectionism and sport performance were based on very few studies (e.g. $k = 6$;Hill et al., 2018). One surprising finding in our review, then, was the volume of empirical studies now available on this topic. We were able to include 25 more studies ($N = 6{,}102$) than have previously been quantitatively summarised. As a result, we provide more accurate parameter estimates for the relationship between perfectionism and sport performance. In addition, our aggregated estimates are based on a wide range of sports (e.g. basketball and marathon), measures of performance (e.g. shooting score and race time), and athlete types (e.g. adolescent and student-athletes). Where possible, we have also provided

individual estimates that can be built upon over time. The relationship between perfectionism and sport performance has clearly grown in interest, with a much more developed evidence base now available to inform debate, research, and practice.

Previous reviews found that PS was, to varying degrees, related to better performance (Gotwals et al., 2012; Hill et al., 2018; Stoeber, 2011). We have found the same. When considering only objective performance, our meta-analyses shows that PS is a positive predictor of performance with a small-to-medium sized effect. This is also the case when its overlap with PC is controlled (i.e. residual PS). This pattern of findings closely matches a previous meta-analytical review (Hill et al., 2018). As in the previous reviews, we suggest that PS may bring performance benefits to athletes. However, where our findings differ is that we are able to explore the relationship in more detail across different studies. In doing so, it appears that this relationship is more complex than implied by previous work. Our evidence show that PS is less likely to be beneficial for adolescent athletes and, tentatively, this might also be the case when using particular measures (e.g. self-oriented perfectionism) or in team sports. As such, based on existing research, whether we can expect PS to be beneficial for athletes appears to depend on these factors.

Previous work found no direct performance benefits or detriments of PC (Hill et al., 2018; Stoeber, 2011). Consistent with these studies, our meta-analytic results also showed that PC is unrelated to sport performance. This finding is difficult to reconcile with what is known about PC which is a factor associated with major wellbeing and motivation issues that are likely to undermine performance (see Madigan et al., 2018a). One possible explanation for the consistent finding is its overlap with PS. Indeed, this possibility is supported by our findings that showed PC was negatively associated with performance when we partialled out its overlap with PS (i.e. residual PC). As such, the energising effects of needing to be perfect that is entangled with PS may counter some other more detrimental elements of PC. As such, we would expect there to be mechanisms that explain both positive (a desire not to disappoint others) and negative (feelings of hopelessness) effects of PC on performance. Identifying and testing for these different effects is a priority for future work.

Regarding the observed moderating effects, we only found evidence that age moderated the PS-performance relationship. The relationship was stronger in older athletes. Whether this is a function of age or a function of another factor associated with age is unclear. For example, the older samples in the meta-analysis were also those that included the more elite samples. This effect might, therefore, be reflective of any possible utility of striving for perfection at more elite levels. Alternatively, striving for perfection may be more beneficial the longer you stay in sport and the more experienced and able you become. Of note, age was not found to be a moderator of this relationship in the previous meta-analysis of this relationship (Hill et al., 2018). However, the relationship between PS and other key variables included perceived athletic ability (lower for older athletes) and negative affect (lower for older athletes). As such, these and our findings are at least indicative of the potential for PS to function differently based on age or other developmental factors.

In examining the total unique effect of perfectionism, we found that, overall, it was associated with a positive net effect. This finding is similar to the effect of perfectionism on performance outside sport (e.g. academic achievement; see Hill et al., 2021). However, we note some caution in over-interpreting this finding. The TUE explained a very small

amount of variance in performance ($R^2 = 5\%$), especially when compared to other important outcomes such as burnout (25%), suicidal ideation (10%), and depression (16%) (see Hill et al., 2021). We encourage researchers to view our findings in context of the potential for perfectionism to underly significant clinical issues that themselves have implications for athlete performance. Perfectionism, in our view, may provide some small benefits for athletes but can come with much larger costs. These costs may remain hidden, particularly when things are going well, but will ultimately outweigh the benefits when athlete performance is viewed as a developmental issue, taking into account attrition and lost potential.

Further insight into this relationship was provided by an exploratory analysis of the interplay between PS and PC in predicting athlete performance. This approach is in keeping with recent studies in sport that have found PS only predicts better performance at low rather than high levels of PC (e.g. Waleriańczyk, 2023). The term 'perfectionistic tipping point' has been used to describe this phenomenon (Hill, 2021). These are points at which the effects of PS change, becoming negative or positive, at some particular level of PC. So far, perfectionistic tipping points have been identified for other outcomes (e.g. emotional suppression). The existence of a tipping point for sports performance in the current study helps resolve, at least partly, the issue of whether PS is related to better or worse performance. It simply depends – when athletes exhibit lower PC, there is more likely to be performance benefit but, as PC increases, this desirable effect disappears. This finding and its implications warrant further exploration, especially in context of potential intervention strategies.

Recommendations for future research

Our recommendations for future work include prioritising longitudinal studies. The majority of the results were found through cross-sectional approaches, which limit the ability to establish a causal relation between perfectionism and sport performance. Given the small number of longitudinal studies we reviewed that measured perceived performance and were at risk of being underpowered due to small sample size (Roy et al., 2023; Thompson et al., 2011), it remains unclear whether perfectionism predicts performance over time. In addition, recent evidence showed that perfectionism is an outcome of performance rather than an antecedent in academic settings (Endleman et al., 2022). Therefore, future work should employ longitudinal designs to determine whether the relationship is causal and/or reciprocal.

While the present study included a reasonable array of performance outcomes, future research may benefit from the inclusion of competition results such as selection or win/lost. In regard to a specific outcome, selection is particularly important in the career development of competitive sports as de/selection may determine reaching professional levels (Alfermann & Stambulova, 2007). Despite the importance of such a decision, little is known about the perfectionism role in this outcome. Therefore, future research should examine how perfectionism is related to such an outcome, which would provide additional insights into its implication for career development.

Finally, we recognise the importance of distinguishing between setting high standards and perfectionistic standards. Gaudreau and colleagues (2022) proposed the notion of excellencism to account for the issue. They suggest that separating the pursuit of excellence from the pursuit of perfection is crucial for understanding any performance benefits.

Evidence showed that the pursuit of excellence positively predicted, while the pursuit of perfection negatively predicted academic performance (Gaudreau et al., 2022). It may be that the performance benefits associated with PS in sport could similarly be no longer observed when controlling for the component related to excellence. However, no studies have yet tested the idea in sport. Examination of this novel idea would be an important direction for future research.

Conclusion

We provided a systematic review and meta-analytic of research examining the relationship between multidimensional perfectionism and sport performance. Our review suggests that the perfectionism-sport performance relationship is complex, with findings of individual studies mixed across perfectionistic strivings and concerns. We found evidence that perfectionism has, overall, a small positive effect on sport performance. However, the interplay between PS and PC, and how PC erodes the positive relationship between performance and PS appears key to a better understanding in future work.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

References marked with an asterisk indicate studies included in the systematic review

Alfermann, D., & Stambulova, N. (2007). Career transitions and career termination. In G. Tenenbaum, & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 712–733). Wiley. https://doi.org/10.1002/9781118270011.ch32

Allen, M. S., Greenlees, I., & Jones, M. (2013). Personality in sport: A comprehensive review. *International Review of Sport and Exercise Psychology*, *6*(1), 184–208. https://doi.org/10.1080/1750984X.2013.769614

*Anshel, M. H., & Mansouri, H. (2005). Influences of perfectionism on motor performance, affect, and causal attributions in response to critical information feedback. *Journal of Sport Behavior*, *28*(2), 99–124.

Aoyagi, M., & Portenga, S. (2010). The role of positive ethics and virtues in the context of sport and performance psychology service delivery. *Professional Psychology: Research and Practice*, *41*(3), 253–259. https://doi.org/10.1037/a0019483

Arnold, R., Edwards, T., & Rees, T. (2018). Organizational stressors, social support, and implications for subjective performance in high-level sport. *Psychology of Sport and Exercise*, *39*, 204–212. https://doi.org/10.1016/j.psychsport.2018.08.010

Barrick, M. R., Mount, M. K., & Judge, T. A. (2001). Personality and performance at the beginning of the new millennium: What do we know and where do we go next? *International Journal of Selection and Assessment*, *9*(1–2), 9–30. https://doi.org/10.1111/1468-2389.00160

*Bradham, J. W. (2000). *Achievement motivation and perfectionism as predictors of athletic performance*. [Doctoral dissertation, Spalding University]. ProQuest Dissertations and Theses Global.

Brimmell, J., Edwards, E. J., & Vaughan, R. S. (2022). Executive function and visual attention in sport: A systematic review. *International Review of Sport and Exercise Psychology*, *17*(2), 1278–1311. https://doi.org/10.1080/1750984X.2022.2145574

Burgess, A. M., Frost, R. O., & DiBartolo, P. M. (2016). Development and validation of the frost multidimensional perfectionism scale–brief. *Journal of Psychoeducational Assessment*, *34*(*7*), 620–633. https://doi.org/10.1177/0734282916651359

Campbell, J. S., Castaneda, M., & Pulos, S. (2009). Meta-analysis of personality assessments as predictors of military aviation training success. *The International Journal of Aviation Psychology*, *20*(1), 92–109. https://doi.org/10.1080/10508410903415872

*Castro, J. R. (2003). *Attentional distraction and perfectionism: A test of competing models of moderation and mediation in the cognitive anxiety-performance relationship*. [Doctoral dissertation, Michigan State University]. https://d.lib.msu.edu/etd/32973

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. 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*(*3*), 365–373. https://doi.org/10.1037/1040-3590.14.3.365

*De Maria, A., Mallia, L., Tomás, I., Castillo, I., & Zelli, A. (2023). The satisfaction of basic psychological needs mediates the relation between perfectionism and sport performance: A longitudinal cross-national investigation. *International Journal of Sport and Exercise Psychology*, *0*(0), 1–19. https://doi.org/10.1080/1612197X.2023.2235597

Downs, S. H., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology & Community Health*, *52*(6), 377–384. https://doi.org/10.1136/jech.52.6.377

Dunn, J. G. H., Dunn, J. C., Gotwals, J. K., Vallance, J. K. H., Craft, J. M., & Syrotuik, D. G. (2006). Establishing construct validity evidence for the Sport Multidimensional Perfectionism Scale. *Psychology of Sport and Exercise*, *7*(*1*), 57–79. https://doi.org/10.1016/j.psychsport.2005.04.003

DuRant, R. H. (1994). Checklist for the evaluation of research articles. *Journal of Adolescent Health*, *15*(1), 4–8. https://doi.org/10.1016/1054-139x(94)90381-6

Duval, S., & Tweedie, R. (2000). A nonparametric "trim and fill" method of accounting for publication bias in meta-analysis. *Journal of the American Statistical Association*, *95*(449), 89–98. https://doi.org/10.1080/01621459.2000.10473905

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ*, *315*(7109), 629–364. https://doi.org/10.1136/bmj.315.7109.629

Endleman, S., Brittain, H., & Vaillancourt, T. (2022). The longitudinal associations between perfectionism and academic achievement across adolescence. *International Journal of Behavioral Development*, *46*(2), 91–100. https://doi.org/10.1177/01650254211037400

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). American Psychological Association. https://doi.org/10.1037/10458-002

*Fawver, B., Cowan, R. L., DeCouto, B. S., Lohse, K. R., Podlog, L., & Williams, A. M. (2020). Psychological characteristics, sport engagement, and performance in alpine skiers. *Psychology of Sport and Exercise*, *47*, 101616. https://doi.org/10.1016/j.psychsport.2019.101616

*Fleming, D. J. M., & Dorsch, T. E. (2024). "There's no good, it's just satisfactory": Perfectionism, performance, and perfectionistic reactivity in NCAA student-athletes. *International Journal of Sport and Exercise Psychology*, 1–23. https://doi.org/10.1080/1612197X.2024.2410282

Flett, G. L., & Hewitt, P. L. (2005). The perils of perfectionism in sports and exercise. *Current Directions in Psychological Science*, *14*(1), 14–18. https://doi.org/10.1111/j.0963-7214.2005.00326.x

Flett, G. L., & Hewitt, P. L. (2016). Reflections on perfectionism and the pressure to be perfect in athletes, dancers and exercisers. In A. P. Hill (Ed.), *The psychology of perfectionism in sport, dance and exercise* (pp. 296–319). Routledge.

Flett, G. L., & Hewitt, P. L. (2020). Reflections on three decades of research on multidimensional perfectionism: An introduction to the special issue on further advances in the assessment of perfectionism. *Journal of Psychoeducational Assessment*, *38*(1), 3–14. https://doi.org/10.1177/0734282919881928

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

*Frost, R. O., & Henderson, K. J. (1991). Perfectionism and reactions to athletic competition. *Journal of Sport and Exercise Psychology*, *13*(4), 323–335. https://doi.org/10.1123/jsep.13.4.323

Gaudreau, P., Schellenberg, B. J. I., Gareau, A., Kljajic, K., & Manoni-Millar, S. (2022). Because excellencism is more than good enough: On the need to distinguish the pursuit of excellence from the pursuit of perfection. *Journal of Personality and Social Psychology*, *122*(6), 1117–1145. https://doi.org/10.1037/pspp0000411

*Gaudreau, P., Louvet, B., & Kljajic, K. (2019). The performance trajectory of physical education students differs across subtypes of perfectionism: A piecewise growth curve model of the 2 × 2 model of perfectionism. *Sport, Exercise, and Performance Psychology*, *8*(2), 223–237. https://doi.org/10.1037/spy0000138

Genaidy, A. M., LeMasters, G. K., Lockey, J., Succop, P., Deddens, J., Sobeih, T., & Dunning, K. (2007). An epidemiological appraisal instrument – A tool for evaluation of epidemiological studies. *Ergonomics*, *50*(6), 920–960. https://doi.org/10.1080/00140130701237667

Gotwals, J. K., & Dunn, J. G. H. (2009). A multi-method multi-analytic approach to establishing internal construct validity evidence: The sport multidimensional perfectionism scale 2. *Measurement in Physical Education and Exercise Science*, *13*(*2*), 71–92. https://doi.org/10.1080/10913670902812663

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 / Psychologie Canadienne*, *53*(4), 263–279. https://doi.org/10.1037/a0030288

Gould, D., Dieffenbach, K., & Moffett, A. (2002). Psychological characteristics and their development in Olympic champions. *Journal of Applied Sport Psychology*, *14*(3), 172–204. https://doi.org/10.1080/10413200290103482

Hagger, M. S. (2006). Meta-analysis in sport and exercise research: Review, recent developments, and recommendations. *European Journal of Sport Science*, *6*(2), 103–115. https://doi.org/10.1080/17461390500528527

Haraldsen, H. M., Solstad, B. E., Ivarsson, A., Halvari, H., & Abrahamsen, F. E. (2020). Change in basic need frustration in relation to perfectionism, anxiety, and performance in elite junior performers. *Scandinavian Journal of Medicine & Science in Sports*, *30*(4), 754–765. https://doi.org/10.1111/sms.13614

Harris, D. J., Allen, K. L., Vine, S. J., & Wilson, M. R. (2023). A systematic review and meta-analysis of the relationship between flow states and performance. *International Review of Sport and Exercise Psychology*, *16*(1), 693–721. https://doi.org/10.1080/1750984X.2021.1929402

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of personality and social psychology*, *60*(3), 456–470.

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*(1), 58. https://doi.org/10.1037/0021-843X.102.1.58

Higgins, J. P., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine*, *21*(11), 1539–1558. https://doi.org/10.1002/sim.1186

Hill, A. P. (2014). Perfectionistic strivings and the perils of partialling. *International Journal of Sport and Exercise Psychology*, *12*(4), 302–315. https://doi.org/10.1080/1612197X.2014.919602

Hill, A. P. (2021). Perfectionistic tipping points: Re-probing interactive effects of perfectionism. *Sport, Exercise, and Performance Psychology*, *10*(2), 177–190. https://doi.org/10.1037/spy0000226

Hill, A. P. (2024). *Partial and semi-partial correlation coefficients (R code) (Version 1)*. York St John University. https://doi.org/10.25421/yorksj.25533133.v1

Hill, A. P., Appleton, P. R., & Mallinson, S. H. (2016). Development and initial validation of the performance oerfectionism scale for sport (PPS-S). *Journal of Psychoeducational Assessment*, *34*(*7*), 653–669. https://doi.org/10.1177/0734282916651354

Hill, A. P., Madigan, D. J., Curran, T., Jowett, G. E., & Rumbold, J. L. (2024). Exploring and evaluating the two-factor model of perfectionism in sport. *Journal of Psychoeducational Assessment*, *42*(6), 612–634. https://doi.org/10.1177/07342829241231149

Hill, A. P., Madigan, D. J., & Olamaie, M. (2021). Combined effects, total unique effects and relative weights of perfectionism. *Personality and Individual Differences*, *183*, 111136. https://doi.org/10.1016/j.paid.2021.111136

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*(3), 235–270. https://doi.org/10.1037/spy0000125

Hill, A. P., Mallinson-Howard, S. H., Madigan, D. J., & Jowett, G. E. (2020). Perfectionism in sport, dance, and exercise: An extended review and reanalysis. In G. Tennenbaum, & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 121–157). Wiley. https://doi.org/10.1002/9781119568124.ch7

Hill, A. P., Witcher, C. S. G., Gotwals, J. K., & Leyland, A. F. (2015). A qualitative study of perfectionism among self-identified perfectionists in sport and the performing arts. *Sport, Exercise, and Performance Psychology*, *4*(4), 237–253. https://doi.org/10.1037/spy0000041

*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*(2), 189–207. https://doi.org/10.1080/1612197X.2011.567108

*Hill, A. P., Stoeber, J., Brown, A., & Appleton, P. R. (2014). Team perfectionism and team performance: A prospective study. *Journal of Sport and Exercise Psychology*, *36*(3), 303–315. https://doi.org/10.1123/jsep.2013-0206

Kaiseler, M., Polman, R. C. J., & Nicholls, A. R. (2012). Effects of the Big Five personality dimensions on appraisal coping, and coping effectiveness in sport. *European Journal of Sport Science*, *12*(1), 62–72. https://doi.org/10.1080/17461391.2010.551410

Kim, H., Madigan, D. J., & Hill, A. P. (2023). Multidimensional perfectionism and performance in sport: A systematic review and meta-analysis. *PsychArchives*. https://doi.org/10.23668/psycharchives.12948

*Klämpfl, M. K., Lobinger, B. H., & Raab, M. (2013). How to detect the yips in golf. *Human Movement Science*, *32*(6), 1270–1287. https://doi.org/10.1016/j.humov.2013.04.004

*Klund, F., & Sæther, S. A. (2017). Relationships between perfectionism, training load and elite junior football players' self-assessed and coach-assessed skills. *The Sport Journal*, *20*(1), 1–8.

*Květon, P., Jelínek, M., & Burešová, I. (2021). The role of perfectionism in predicting athlete burnout, training distress, and sports performance: A short-term and long-term longitudinal perspective. *Journal of Sports Sciences*, *39*(17), 1969–1979. https://doi.org/10.1080/02640414.2021.1911415

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

*Lizmore, M. R., Dunn, J. G. H., Causgrove Dunn, J., & Hill, A. P. (2019). Perfectionism and performance following failure in a competitive golf-putting task. *Psychology of Sport and Exercise*, *45*, 101582. https://doi.org/10.1016/j.psychsport.2019.101582

Madigan, D. J. (2019). A meta-analysis of perfectionism and academic achievement. *Educational Psychology Review*, *31*(4), 967–989. https://doi.org/10.1007/s10648-019-09484-2

Madigan, D. J. (2023). Advances in the measurement of perfectionism in sport, dance, and exercise. In A. P. Hill (Ed.), *The psychology of perfectionism in sport, dance and exercise* (pp. 26–50). Routledge.

Madigan, D. J., Hill, A. P., Mallinson-Howard, S. H., Curran, T., & Jowett, G. E. (2018a) Perfectionism and performance in sport, education, and the workplace. *In Oxford research encyclopedia of psychology*. Oxford University Press. https://doi.org/10.1093/acrefore/9780190236557.013.166

*Madigan, D. J., Stoeber, J., Culley, T., Passfield, L., & Hill, A. P. (2018b). Perfectionism and training performance: The mediating role of other-approach goals. *European Journal of Sport Science*, *18*(9), 1271–1279. https://doi.org/10.1080/17461391.2018.1508503

*Mallinson-Howard, S. H., Madigan, D. J., & Jowett, G. E. (2021). A three-sample study of perfectionism and field test performance in athletes. *European Journal of Sport Science*, *21*(7), 1045–1053. https://doi.org/10.1080/17461391.2020.1811777

McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, *60*(2), 175–215. https://doi.org/10.1111/j.1467-6494.1992.tb00970.x

*Melendez, B. (2021). *Perfectionism, general mental health, and performance in college baseball players* [Doctoral dissertation, Regent University]. ProQuest Dissertations and Theses Global.

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., & Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews*, *4*(1), 1. https://doi.org/10.1186/2046-4053-4-1

Moore, L. J., Vine, S. J., Wilson, M. R., & Freeman, P. (2012). The effect of challenge and threat states on performance: An examination of potential mechanisms. *Psychophysiology*, *49*(10), 1417–1425. https://doi.org/10.1111/j.1469-8986.2012.01449.x

*Nascimento Junior, J. R. A., Batista, R. P. R., Silva, A. A., Granja, C. T. L., Fiorese, L., & Fortes, L. S. (2020). Is an athlete's perfectionism associated with the performance of indoor football teams? *Psicologia: Teoria e Prática*, *22*(2), 317–337. https://doi.org/10.5935/1980-6906/psicologia.v22n2p317-337

Nordin-Bates, S., Madigan, D., Hill, A., & Olsson, L. (2024). Perfectionism and performance in sport: Exploring non-linear relationships with track and field athletes. *Psychology of Sport and Exercise*, *70*, 102552. https://doi.org/10.1016/j.psychsport.2023.102552

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*. https://doi.org/10.1136/bmj.n71

Payne, K. L., Wilson, M. R., & Vine, S. J. (2019). A systematic review of the anxiety-attention relationship in far-aiming skills. *International Review of Sport and Exercise Psychology*, *12*(1), 325–355. https://doi.org/10.1080/1750984X.2018.1499796

Pervin, L. A., Cervone, D., & John, O. P. (2005). *Personality: Theory and research*. Wiley.

Piggott, B., Müller, S., Chivers, P., Cripps, A., & Hoyne, G. (2020). Interdisciplinary sport research can better predict competition performance, identify individual differences, and quantify task representation. *Frontiers in Sports and Active Living*, *2*. https://doi.org/10.3389/fspor.2020.00014

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin*, *135*(2), 322–338. https://doi.org/10.1037/a0014996

Portenga, S. T., Aoyagi, M. W., & Cohen, A. B. (2017). Helping to build a profession: A working definition of sport and performance psychology. *Journal of Sport Psychology in Action*, *8*(1), 47–59. https://doi.org/10.1080/21520704.2016.1227413

Régnier, G., Salmela, J., & Russell, S. J. (1993). Talent detection and development in sport. In R. Singer, M. Murphey, & L. K. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 290–313). John Wiley & Sons.

Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin*, *86*(3), 638–641. https://doi.org/10.1037/0033-2909.86.3.638

*Roy, J., Godin, R., Gaudreault, P., & Forest, G. (2023). The relationship between sleep, perfectionistic strivings, perfectionistic concerns, and academic and sports performance in young athletes. *Chronobiology International*, *0*(0), 1–15. https://doi.org/10.1080/07420528.2023.2273828

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*(1), 97–128. https://doi.org/10.1348/000711007X255327

Schweizer, G., Furley, P., Rost, N., & Barth, K. (2020). Reliable measurement in sport psychology: The case of performance outcome measures. *Psychology of Sport and Exercise*, *48*, 101663. https://doi.org/10.1016/j.psychsport.2020.101663

Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *International Review of Sport and Exercise Psychology*, *4*(2), 128–145. https://doi.org/10.1080/1750984X.2011.604789

Stoeber, J. (2014). Perfectionism in sport and dance: A double-edged sword. *International Journal of Sport Psychology*, *45*(4), 385–394.

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

Stoeber, J., Otto, K., Pescheck, E., Becker, C., & Stoll, O. (2007). Perfectionism and competitive anxiety in athletes: Differentiating striving for perfection and negative reactions to imperfection. *Personality and Individual Differences*, *42*(6), 959–969. https://doi.org/10.1016/j.paid.2006.09.006

*Stoeber, J., Uphill, M. A., & Hotham, S. (2009). Predicting race performance in triathlon: The role of perfectionism, achievement goals, and personal goal setting. *Journal of Sport and Exercise Psychology*, *31*(2), 211–245. https://doi.org/10.1123/jsep.31.2.211

*Stoll, O., Lau, A., & Stoeber, J. (2008). Perfectionism and performance in a new basketball training task: Does striving for perfection enhance or undermine performance? *Psychology of Sport and Exercise*, *9*(5), 620–629. https://doi.org/10.1016/j.psychsport.2007.10.001

Suurmond, R., van Rhee, H., & Hak, T. (2017). Introduction, comparison, and validation of Meta-Essentials: A free and simple tool for meta-analysis. *Research Synthesis Methods*, *8*(4), 537–553. https://doi.org/10.1002/jrsm.1260

*Teixeira, M., Morais, C., & Gomes, A. R. (2024). The mediating role of perfectionism in parental involvement and young athletes' performance. *Scientific Reports*, *14*(1), 31969. https://doi.org/10.1038/s41598-024-83620-z

*Thompson, R. W., Kaufman, K. A., De Petrillo, L. A., Glass, C. R., & Arnkoff, D. B. (2011). One year follow-up of mindful sport performance enhancement (MSPE) with archers, golfers, and runners. *Journal of Clinical Sport Psychology*, *5*(2), 99–116. https://doi.org/10.1123/jcsp.5.2.99

Tonidandel, S., & LeBreton, J. M. (2015). RWA web: A free, comprehensive, web-based, and user-friendly tool for relative weight analyses. *Journal of Business and Psychology*, *30*(2), 207–216. https://doi.org/10.1007/s10869-014-9351-z

*Van Dyke, E. D., Metzger, A., & Zizzi, S. J. (2020). Being mindful of perfectionism and performance among collegiate gymnasts: A person-centered approach. *Journal of Clinical Sport Psychology*, *15*(2), 143–161. https://doi.org/10.1123/jcsp.2019-0100

*Waleriańczyk, W. (2023). Perfectionism and performance in a trail running competition: A prospective study of the interactive effects of perfectionism. *Journal of Sports Sciences*, *0*(0), 1–10. https://doi.org/10.1080/02640414.2023.2273090

*Waleriańczyk, W. (2024). Perfectionism, performance and goal-related variables in running competitions – A threesample examination in a systematic self-replication framework [Preprint]. *PsychArchives*. https://doi.org/10.23668/psycharchives.15383

*Waleriańczyk, W., & Stolarski, M. (2021). Personality and sport performance: The role of perfectionism, Big Five traits, and anticipated performance in predicting the results of distance running competitions. *Personality and Individual Differences*, *169*, 109993. https://doi.org/10.1016/j.paid.2020.109993

*Waleriańczyk, W., Stolarski, M., & Matthews, G. (2022). Perfectionism moderates the effects of goal-realization on post-competition mood in Amateur runners. *Journal of Sports Science and Medicine*, *21*(1), 1–12. https://doi.org/10.52082/jssm.2022.1.

*Winder, T. (2017). *Associations between perfectionism, anxiety, and performance in adolescent competitive gymnast*s [Doctoral dissertation, Keiser University]. ProQuest Dissertations and Theses Global.

Woodman, T., Zourbanos, N., Hardy, L., Beattie, S., & McQuillan, A. (2010). Do performance strategies moderate the relationship between personality and training behaviors? An exploratory study. *Journal of Applied Sport Psychology*, *22*(2), 183–197. https://doi.org/10.1080/10413201003664673