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Review

Advances in the study of perfectionism in sport

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ABSTRACT

Interest in perfectionism in sport psychology has steadily increased over the last twenty-five years. The last 10 years in particular has seen a dramatic increase in research dedicated to the topic. As a result, we have learned a great deal about perfectionism in this domain. However, it is also an area of work in which there has been considerable disagreement on key issues; most notably, the degree to which perfectionism is helpful or a hindrance to athletes. A number of new concepts have recently emerged that may help navigate some of the issues that have historically hampered the study of perfectionism: combined and total unique effects, perfectionistic tipping points, and perfectionistic climate. In this short overview some of the latest advances in this area are introduced, explained, and discussed. Each concept offers interesting opportunities for advancing the study of perfectionism in sport. They also each provide avenues for novel research, as well as impetus to revisit previous research and existing data to yield new insights. Most importantly, the concepts offer the promise of taking us closer to our aim of understanding the effects of perfectionism in sport, and better identifying and supporting athletes at risk to its negative effects.

1. Introduction

The margin for error in sport is so small that even minor mistakes can be extremely costly. A single point might lose you a game, your spot on the team, or even a place on the podium. It is understandable, then, why many associate sporting successes with the drive for perfection. However, whether perfectionism is a hallmark feature of elite athletes or an impediment to their motivation, performance, and wellbeing is a long-standing debate (see Hall, 2006). Some researchers have emphasised how a fixation with perfection can undermine athlete health and their ability to perform (e.g., Flett & Hewitt, 2005). Others have suggested perfectionism may play a more positive role in the healthy pursuit of excellence (e.g., Stoeber, 2011) or observed that it is a characteristic common among the most successful athletes (e.g., Rees et al., 2016). A number of recent conceptual advances relating to how best to study perfectionism offer the opportunity to resolve these and other disagreements. The aim of this short overview is to highlight some of these key advances: combined and total unique effects, perfectionistic tipping points, and perfectionistic climate. It starts with a brief summary of the study of multidimensional perfectionism, identifies the origins of some of the current confusion and disagreement, and then describes each concept and the potential insight they offer.

Before proceeding, though, I would like to acknowledge that the advances being made in this area are, of course, the result of the efforts of many researchers. The content of this article is underpinned by our shared endeavours. However, because the particular focus is on advances that mainly come from the recent work of myself and close collaborators, there is a danger that readers conclude that these are the only, or most important, recent advances. There are many other interesting advances in this fast-moving area of research (e.g., Gaudreau, 2019). In addition, there is also a danger that readers view this account as definitive in regards to the key issues raised. Again, in an area that includes many important debates, other researchers might offer alternative perspectives. To mitigate such dangers, alongside the current article, I encourage readers to seek out the recent and historical writings of those who have made major contributions to this area – Dunn (2023), Flett and Hewitt (2023), Gaudreau et al. (2023), Hall (2016), and Stoeber (2014) are all good examples. Due to historical differences in opinion on some key issues, this area of research can appear fractious to those unfamiliar with it. However, there is now considerably more consensus between researchers on previously divisive issues and one thing we all agree on is that perfectionism explains a great deal about the

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experiences of athletes.

2. Basis for advancement: multidimensional perfectionism

Perfectionism has a long history outside of sport psychology. Drawing on his practice as a psychiatrist, Burns (1980) provided one of the earliest descriptions when he identified perfectionists as individuals who "strain compulsively and unremittingly toward impossible goals and who measure their own worth entirely in terms of productivity and accomplishment" (Burns, 1980, p. 34). Burns's description is a useful starting point for a discussion of advances in the study of perfectionism in sport for several reasons. His description succinctly outlines both the type of obsessive achievement striving that many view as characterising perfectionism in sport and, critically, identifies the source of that behaviour – a need to redeem a deficient sense of self. Much of the disagreement in sport on the effects of perfectionism stem from difficultly weighing these two elements of perfectionism against one another, and considering any possible benefits, inadvertent or otherwise, of the achievement striving element. Particularly relevant to sport psychologists, too, his description also alludes to a significant challenge in deciphering the nature of such a complex trait in sport as it is a context in which doing the seemingly "impossible" is fabled and advocating to aim lower is contrarian. In keeping with the perspective, resistance to changing views on perfectionism is readily evident in the accounts of both athletes and those who work with them (e.g., Hill et al., 2015; Klockare et al., 2022; Watson, 2024).

In attempting to understand the effects of perfectionism in sport and other contexts, perfectionism is normally studied as a multidimensional construct. The conceptualisation of perfectionism as a multidimensional trait is among the most significant developments in the history of perfectionism research. Thanks to the pioneering work of researchers and practitioners such as Flett, Hewitt, and Frost, most researchers (but not all) view perfectionism as including an array of personal and interpersonal dimensions that reflect the many ways a need for perfection can manifest. This includes how standards can be imposed on the self or others (self-oriented perfectionism and other oriented perfectionism), and be perceived to be imposed by others (socially prescribed perfectionism) (Hewitt & Flett, 1991). It also includes separating personal standards from the evaluative dimensions (e.g., concern over mistakes and doubts about actions) that distinguish perfectionism from other similar traits (Frost et al., 1990). These multidimensional approaches have subsequently been adopted and adapted by researchers in sport to good effect (e.g., Dunn et al., 2006; Hill et al., 2016; Stoeber et al., 2008) and underpin most of the research in this area.

Among some of the key insights of work using a multidimensional approach in sport has been the realisation that the effects of perfectionism, unhelpful or otherwise, really do depend on the dimensions that are being studied. This was illustrated in sport psychology research from the outset by Frost and Henderson (1991). In using the Frost-Multidimensional Perfectionism Scale (Frost et al., 1990) for the first time in sport, they found that among female college varsity athletes personal standards and concern over mistakes subscales were related to worry and difficultly concentrating before competition whereas concern over mistakes and doubts about action subscales were related to negative reactions to mistakes during competition. In addition, personal standards and concern over mistakes were distinguishable in the strength of their relationships with a failure orientation towards sport (a focus on failure and mistakes) and a success orientation towards sport (a focus on success and accomplishment). While it is a modest study by contemporary standards in regards to sample size and sophistication, it was ground-breaking in formally introducing multidimensional perfectionism to sport psychology and illustrating that we can expect different effects depending on the dimension of perfectionism.

An important subsequent development that followed the conceptualisation of perfectionism as multidimensional was the emergence of a two-factor model of perfectionism. It is also key to the advances offered shortly. The two-factor model is based on the findings that measures of perfectionism, regardless of content, typically include indicators of two higher-order factors: perfectionistic strivings (PS) and perfectionistic concerns (PC). These factors have been described in various ways mainly in reference to their constituent measures but can broadly be considered to be reflective of an internalised pressure to strive for perfection (PS) and being overly concerned with the implications of imperfection (PC) (Hill et al., 2024). There have been a number of studies that have examined the two-factor model of perfectionism outside of sport (e.g., Bieling et al., 2004). While there have been subtle differences between these studies, overall, the findings are supportive of the model. Submitting the three instruments developed specifically to measure perfectionism in sport (Sport-Multidimensional Perfectionism Scale-2, Gotwals & Dunn, 2009; Multidimensional Perfectionism Inventory, Stoeber et al., 2006; Perfect Performance Scale-Sport, Hill et al., 2016) to the same type of analysis also confirms the existence of the two-factors (Hill et al., 2024). On the basis of this type of work, when studying perfectionism researchers and practitioners now routinely seek to compare dimensions indicative of PS, on one hand, and PC, on the other hand (e.g., Limburg et al., 2017).

While a multidimensional approach has been invaluable for research and practice, it has not been without its problems. It has inadvertently contributed to conceptual confusion and uncertainty regarding the effects of perfectionism. In particular, it has led to the tendency to draw conclusions about individual dimensions of perfectionism without due regard to their conceptual and statistical relationship to other dimensions. This is especially the case in regard to research juxtaposing PS with PC which, in revealing opposing effects, may be misconstrued as providing evidence for the benefits of perfectionism. Whether striving for perfection is helpful for athlete performance is interesting, for example, but whether it is or not does not take into account the concurrent influence of its counterpart, negative reactions to imperfection (Stoeber et al., 2008). So, while we may be able to identify benefits of some dimensions of perfectionism, and the pitfalls of others, this does not mean perfectionism, overall, would be advisable, or unadvisable, for athletes. This brings us to the first recent advance and new perfectionism concept.

3. Combined and total unique effects of perfectionism

The first advance in this area has been in the availability of new ways to determine the combined or total effect of PS and PC. The examination of *total scores* of multidimensional measures of perfectionism has been examined for a long time (see Frost et al., 1990). However, as total scores hide the contribution of individual dimensions, they have typically been considered misleading and are therefore discouraged (Stoeber et al., 2020). There are also other issues to contend with. As you would expect, PS and PC are typically positively correlated. The degree of correlation varies but estimates in sport suggest that it can be quite large (e.g., $r = .66$, Hill et al., 2018). However, PS and PC also often have opposite relations with the same outcomes. Based on meta-analytical evidence (Hill et al., 2018), PC is typically problematic with positive correlations with outcomes usually considered undesirable (e.g., fear of failure) and negative correlations with outcomes usually considered desirable (e.g., enjoyment) for athletes. By contrast, PS is much more ambiguous with a mix of correlations with these types of outcomes (e.g., higher anxiety, self-criticism, and depressive symptoms, as well as higher self-confidence, enjoyment, and athletic performance). Given that when an athlete exhibits higher PS they are more likely to exhibit higher PC, this situation makes it difficult to ascertain whether perfectionism is overall, neutral, helpful, or a hindrance for athletes (or otherwise "adaptive" or "maladaptive").

One approach to this issue has been to examine the independent effects of PS and PC. This approach has two forms. The first is when the relationship between PS and PC is statistically controlled and then their residualised versions are correlated with an outcome variable. The

second is when the relationship between PS and PC is statistically controlled, and so is their relationship with the outcome variables. The first form is evident in work deploying multiple regression and structural equation modelling (beta values and semi-partial correlations). The second form has mainly been employed in reviews and meta-analyses in the area (partial correlations; Gotwals et al., 2016; Hill et al., 2018). On one hand, this approach can help identify the unique contribution of PS and PC, and which of the two is most relevant for particular outcomes. On the other hand, this approach can pose conceptual and interpretation challenges. In particular, to what degree valid conclusions can be drawn about PS (or PC) based on their residualised counterparts (see Hill, 2014; Stoeber & Gaudreau, 2017).

Stoeber et al. (2020) offered a novel solution to this problem. This was to calculate the "combined effect" of PS and PC ($2*[\beta_{PS} + \beta_{PC}]$). This involves comparing a "non-perfectionism" subtype (low PS/low PC) with a "mixed perfectionism" subtype (high PS/high PC). The difference between them is expressed as a standardised mean difference (Cohen's *d*). The combined effect is a useful way to study perfectionism as a multidimensional characteristic and ascertain its overall effect. It certainly helps derive a much clearer answer to the question of whether perfectionism is, overall, helpful or a hindrance for athletes. The use of the combined effect was illustrated by Stoeber et al. (2020) using a meta-analysis of perfectionism and burnout in sport, work, and education. Based on the aggregate effects from 34 studies, they showed that while PS is typically negatively related to burnout ($r^{+} = -.14$) and PC is typically positively related to burnout ($r^{+} = .41$), overall, perfectionism had a combined effect of $d = .41$. That is, we can expect those high in both PS and PC to report higher levels of burnout than those low in both PS and PC by almost half a standard deviation.

A second solution to the problem was proposed by Hill et al. (2021) in the form of a total unique effect (TUE) of perfectionism ($\beta_{PS} + \beta_{PC}$). TUE is the total unique contribution of PS and PC based on their relationships with a particular outcome. Note that the TUE is not a "total" score of PS and PC, and the two scores for PS and PC are not simply added together. This would be problematic as the contribution of PS and PC would be weighted equally if this was the case. Rather, for TUE, they are weighted by their beta values or unique contribution. The comparative strength and direction of the effect of PS and PC determines the overall (or net) effect. TUE is a standardised change score that reflects the total change in the outcome variable following a one standardised unit increase in *both* PS and PC. A standard error is derived along with confidence intervals to help determine the precision of the estimate and statistical significance, and relative weights analysis is used to calculate the contributions of PS and PC to variance explained in the outcome variable.

In proposing TUE, the findings of six previous meta-analyses were revisited and TUE was calculated for each (Hill et al., 2021). It was shown that, overall, perfectionism was related to higher work engagement and academic achievement. Perfectionism was, though, also related to higher workaholism, test anxiety, burnout, depression, anxiety disorders, eating disorders, OCD, and suicidal ideation. This profile is remarkably similar to the classic descriptions of perfectionism and illustrates its complexity. Notably, these effects appear consistent with what we might expect given the core features identified by Burns (1980) and when achievement striving is an act of reparation for deep-seated feeling of worthlessness. The foresight of other early theorists and practitioners appears remarkable who have also described perfectionism in similar terms and emphasised an inner restlessness for self-validation as key to understanding perfectionistic behaviour (see Ellis, 1958, Horney, 1946; Missidine, 1963). It has taken a substantial amount of empirical research and meta-analytical work to have confirmed many of their observations on perfectionism.

For the purpose of the present paper, I have provided a catalogue of TUE and combined effects of perfectionism in sport in Table 1 using a new web-based tool that will allow others to do the same in their own work (Hill, 2025). The effects provided in Table 1 are derived from the only meta-analytical review of perfectionism in sport (Hill et al., 2018). The results show that we can expect perfectionistic athletes to be highly

Table 1
Total unique effects and combined effects of perfectionism in sport.

Criterion variables	N	*r*(PS Y)	*r*(PC Y)	*r*(PS PC)	TUE [95 % CI]	RW PS (%)	RW PC (%)	Combined effect (*d*)
Task orientation	2877	.15	−.07	.36	.06 [-.00, .12]	.03 (71.91)	.01 (28.09)	.12
Ego orientation	2877	.22	.22	.36	.32 [.27, .38]	.04 (50.00)	.04 (50.00)	.64
Task climate	2548	.06	−.10	.38	.04 [-.02, .11]	.01 (34.92)	.01 (65.08)	.08
Ego climate	2548	.20	.42	.38	.45 [.39, .51]	.02 (11.75)	.16 (88.25)	.90
Mastery-approach	2007	.39	.09	.44	.33 [.26, .40]	.15 (94.90)	.01 (5.10)	.36
Performance-approach	2211	.42	.36	.43	.55 [.48, .61]	.13 (60.84)	.08 (39.16)	1.10
Mastery-avoidance	2007	.19	.38	.44	.40 [.33, .47]	.02 (12.67)	.13 (87.33)	.80
Performance-avoidance	2211	.09	.35	.43	.31 [.24, .37]	.01 (4.96)	.12 (95.04)	.62
Intrinsic motivation	1493	.37	.01	.43	.27 [.19, .35]	.15 (91.66)	.01 (8.34)	.54
Identified regulation	1070	.21	.09	.29	.23 [.14, .33]	.04 (89.98)	.01 (10.02)	.46
Introjected regulation	1070	.25	.40	.29	.50 [.42, .59]	.04 (22.86)	.14 (77.14)	1.00
External regulation	1493	.24	.40	.43	.45 [.37, .53]	.03 (19.10)	.13 (80.9)	.90
Amotivation	1070	−.07	.30	.29	−.29 [-.38, −.20]	.02 (13.61)	.10 (86.39)	−.58
Fear of failure	2166	.16	.47	.32	.48 [.42, .54]	.01 (5.82)	.21 (94.18)	.96
Perceived athletic ability	1185	.26	−.06	.45	.14 [.04, .23]	.09 (79.94	.02 (20.06)	.28
Self-esteem	1402	.11	−.40	.38	−.21 [-.29, .13]	.05 (19.22)	.19 (80.78)	−.42
Self-confidence	1300	.16	−.24	.47	−.05 [-.14, .04]	.06 (39.55)	.09 (60.45)	−.10
Trait anxiety	210	.18	.45	.57	.40 [.17, .64]	.02 (9.72)	.19 (90.28)	.80
Cognitive anxiety	820	.14	.49	.55	.41 [.29, .52]	.02 (8.26)	.24 (91.74)	.82
Somatic anxiety	1286	.09	.32	.57	.26 [.16, .36]	.01 (9.02)	.10 (90.98)	.52
Positive affect	1531	.20	−.08	.41	.09 [.00, .17]	.05 (73.48)	.02 (26.52)	.18
Negative affect	1740	.10	.27	.39	.27 [.19, .34]	.01 (6.88)	.07 (93.12)	.54
Self-criticism	651	.35	.48	.14	.73 [.63, .82]	.10 (32.71)	.21 (67.29)	1.46
Worry	809	.15	.39	.53	.35 [.23, .47]	.01 (8.61)	.14 (91.39)	.70
Rumination	933	.12	.45	.33	.43 [.34, .52]	.01 (3.76)	.20 (96.24)	.86
Depressive symptoms	963	.17	.42	.35	.44 [.34, .53]	.01 (8.33)	.16 (91.67)	.88
Enjoyment	834	.20	−.06	.53	.09 [-.03, .21]	.06 (73.24)	.02 (26.76)	.18
Satisfaction (goal progress)	684	.04	−.23	.30	−.15 [-.26, −.03]	.01 (11.11)	.06 (88.89)	−.30
Athletic performance	684	.23	.06	.45	.20 [.07, .33]	.05 (94.60)	.00 (5.40)	.40

Note. N = Number of participants (when PS and PC correlations are based on different N, average N is used); PS = Perfectionistic strivings. PC = Perfectionistic concerns; Y = Dependent variable; *r* = bivariate correlation; TUE = Total unique effect; RW = Relative weight (variance explained in dependent variable); 95 % CI = 95 % confidence intervals; d = Cohen's d (effect size).

motivated, typically more ego-oriented, and inclined to view the achievement climate as such, too, and be much more self-critical, fearful, anxious, and depressed than their less perfectionistic counterparts. However, mirroring work on educational achievement, there is also evidence that they may also perform better (at least relative to their peers lower in perfectionism but not necessarily their own potential). This latter finding rings true with accounts of many elite athletes identifying themselves as perfectionists and could be viewed as vindication for those who have argued that there may be at least some benefits for being perfectionistic in sport (e.g., Rees et al., 2016).

There are, though, a few reasons to be cautious when considering the possibility that perfectionism is associated with better athletic performance. First, there are few studies of this relationship in real-world contexts with athletes (versus contrived tasks and students). Second, as shown here for the first time, the total unique effect of perfectionism on performance is much smaller than its effect on fear of failure, anxiety, self-criticism, and depression, all of which we would expect to have some direct and indirect bearing on whether an athlete performs to their best. Third, there is emerging evidence that this relationship is not straightforward. Recent studies have found evidence of curvilinear effects of PS, for example, that are suggestive of *both* beneficial and adverse relationship with performance in track and field athletes (Nordin-Bates, Madigan, Hill, & Olsson, 2024). There is also research that shows perfectionism can negatively influence athletic performance, effort, and emotional experiences under conditions of achievement difficulty (e.g., Curran & Hill, 2018). One important explanation for the complex relationship is how PS and PC act on each other, bringing us to the second recent advancement and new area of research.

4. Perfectionistic tipping points

The effects of PS and PC will not always be additive. They will sometimes be interactive. That is, the effects of PS and PC may depend on, or be conditional on, each other. When this is the case, TUE is not appropriate and some other way of conceptualising and analysing their effects is required. This issue is especially important in context of findings relating to PS. It may be that PS is problematic at some levels of PC but less problematic at other levels. Two models have typically been the focus of work attempting to take into account how PS and PC might affect each other – the tripartite model (Parker, 1997) and the 2 × 2 model of perfectionism (Gaudreau & Thompson, 2010). Both models focus on comparing subtypes of PS and PC. However, the two models differ in regards to the number of subtypes they include. The tripartite model includes healthy perfectionism (high PS/low PC), unhealthy perfectionism (high PS/high PC) and non-perfectionism (low PS/low PC). The 2 × 2 model includes pure personal standards perfectionism (high PS/low PC), pure evaluative concerns perfectionism (low PS/high PC), mixed perfectionism (high PS/high PC), and non-perfectionism (low PS/low PC). Both models have their advocates, with empirical research so far appearing to be more supportive of the 2 × 2 model (Hill et al., 2020). However, both models are praiseworthy for their focus on the interplay between PS and PC when practice has typically been to focus on their separate or independent effects.

One weakness that relates to both models is the reliance on discontinuities – an issue discussed by Gotwals and Lizmore (2023). Like most personality traits, perfectionism appears to have a continuum-based structure rather than a typological structure (Broman-Fulks et al., 2008). As such, it is more appropriate to focus on the amount of perfectionism being exhibited, rather than the kind of perfectionism when seeking to understand its effects. The tripartite model has been historically based on the notion that different types of perfectionists exist and researchers have relied on person-centred analyses when testing it making the model somewhat incompatible with this view of perfectionism (see Gotwals & Lizmore, 2023, for a revised model). While the 2 × 2 model does not have the same assumption at a theoretical level, the standard way of testing the model does use arbitrary (albeit common) cut-offs to create and examine differences between subtypes (plus or minus one standard deviation of PS and PC). In this sense, the model also introduces a discontinuity (note this is also the case for the combined effect of perfectionism). If perfectionism exists in all athletes to some degree, we need approaches that permit the study of perfectionism across the entire continuum of scores.

In order to address the issue of discontinuity while also retaining the focus on the interplay between PS and PC, the concept of perfectionistic tipping points (PTP) was recently proposed. PTPs are defined as the level of PC at which the effects of PS change (Hill, 2021). PTPs are points of conceptual, statistical, and practical interest. The conceptual interest relates to the notion that any PTP will correspond with changes to underlying psychological processes that explain the observed effects of PS. In revisiting the issue of performance, for example, two studies have found PTPs in sport. The first study was by Lizmore et al. (2019) who found that, following negative performance feedback, PS was related to better golf putting performance but this benefit disappeared as PC increased (and for one participant the effect eventually became negative). The second study was by Waleriańczyk (2023) who found that the relationship between PS and trail running performance was positive up until a certain point of PC and was unrelated thereafter. In both studies the tipping points were below the mid-point on the response format of PC.

In these instances, we might infer a shift from a "performance conducive state" to a "performance non-conducive state" at some (not very high) level of PC. In searching for possible underlying mechanisms for this shift, we can speculate on a number of possibilities. Focusing on emotional experiences, changes in athlete profiles of mood states (POMS; Morgan, 1985) could be a useful starting point, for example. From this perspective, performance decreases coincide with increases in general mood disturbance (decreases in vigor and increases in tension, fatigue, confusion, anger, and depression). The usefulness of mood states has been the focus of substantial debate, and effects are often small, but are persistent in relation to some of the indicators of mood (see Lochbaum, Zanatta, Kirschling, & May, 2021). Another related possibility is that the shift signals difficulty remaining within a range of emotional experiences related to personal optimal performance (individual zones of optimal functioning, IZOF; Hanin, 1997). This approach offers a more sophisticated and idiosyncratic approach (see Ruiz et al., 2015). Common to both approaches, though, is the notion that *emotional dysregulation* – difficulties in modulating emotions in order to meet individual goals (Gratz & Roemer, 2004) - has a key role in how arousal, attention, information processing, motivation, and coping are compromised when athletes' levels of PC increase.

One revealing recent study relevant to this possibility was conducted by Walerianczyk et al. (2023). In a sample of athletes competing in a cross-country obstacle race, they found that the indirect effect of PS on post-event tense arousal and hedonic tone was moderated by PC. PS predicted higher tense arousal and lower hedonic tone (viz. higher mood disturbance) when PC increased beyond the mean. As this was post-competition mood, rather than pre- or during competition mood, there are limitations to what can be inferred about preceding emotional dysregulation but it is at least indicative. Research showing that, when PC is high, PS is associated with stronger shame and guilt in response to competitive failures among university athletes is also indicative in this regard, too (Curran & Hill, 2018). Finally, while no PTP has been identified for coping as yet, PC is typically unrelated, or negatively related, to emotion-focused coping in athletes which further brings into question the ability to control emotions effectively when needed (e.g., Pacewicz et al., 2018).

One additional explanatory mechanism for PTP for performance that needs to be considered is *motivational dysregulation*. That is, difficulties in controlling the act of initiating and maintaining behaviours conducive to goal achievement (Wolters, 2003). Successful pursuit of goals does not simply require effort and perseverance. Rather, it requires a complex set of skills that, much like the capacity for effective regulation

of emotions, athletes higher in PC are more likely to lack. Wrosch et al.'s (2003) seminal work on the pursuit of unattainable goals and the interplay between goal commitment with goal disengagement and goal reengagement is illustrative of the difficulties we might expect. In their model, the most adaptive self-regulatory response to unattainable goals (such as perfect performance) is to recognise the goal is not achievable, disengage from the goal (to avoid acumination of failure experiences and preserve resources), and identify other alternative, meaningful, and obtainable goals, and pursue those instead. It is apparent that we can expect the process of goal disengagement and goal reengagement to be especially difficult when perfect performance is considered essential to self-worth and, even, the meaning that the act of goal adjustment itself might evoke. From this perspective, PTP for performance could represent a point at which the capacity to regulate goal pursuit effectively drops below some critical point.

Building further on the conceptual underpinning of PTP, of especial note is that PTPs are based on the tenet that it is the level of PC that is ultimately responsible for the effects of perfectionism. That is, while perfection is not an ideal goal - it is unrealistic and unnecessary for most people most of the time - it is PC that signals the degree to which someone feels worthy (following success) or unworthy (following failure) that determines emotional, cognitive and behavioural outcomes. It is the governing factor in the model. It would be unwise to resign PS to providing only descriptive information regarding standards and goals (aiming for "perfection" versus "better than last time" or "excellence") as PS can entail more than goal pursuit (see Hill, 2014). However, in context of the higher-order model, and how variance is partialled between PS and PC in these types of statistical analyses, it is the level of PC that provides the basis for the effects of perfectionism. PTPs can be flipped to make PS the moderator of PC, of course (e.g., Waleriańczyk, 2023), however the positioning of PC as the deciding factor is a theoretical, rather than statistical, decision.

One of the interesting statistical features of PTP is how they can be used to identify different changes in the effects of PS. As with all statistical testing, careful consideration of statistical significance versus practical significance is needed. However, notwithstanding these issues, the technique used to test for PTPs, Johnson and Neyman (1936) technique, offers a useful means of identifying regions of statistical significance. This includes regions that correspond with levels of PC at which the effects of PS become statistically significant or cease to be statistically significant. It also includes regions that correspond with multiple levels of PC within which the effects of PS are statistically significant or not statistically significant. There is emerging evidence of these different types of PTPs in sport psychology research relating to burnout and engagement (e.g., Waleriańczyk et al., 2022), as well as the aforementioned studies on athletic performance and emotional regulation (Curran & Hill, 2018; Walerianczyk et al., 2023). Aligned with broader findings regarding perfectionism, a complex picture is emerging from this research that shows higher levels of PC may both strengthen dedication to sport and create emotional and performance difficulties.

The practical interest of PTPs relates to the potential to use them to identify athletes in need of preventive support or intervention. This predominately entails using levels of PC as a barometer for the risk of likely problems and primarily (but not solely) addressing PC as a means of reducing that risk. Based on existing research on PTP, tentatively, it appears that athletes reporting higher than the mid-point on PC may benefit from support (i.e., 4 on a 1 to 7 Likert scale). However, further studies are needed to help be more precise, provide normative data, and offer information on specific outcome variables, samples, and contexts. In addition, note, too, that the instruments used are research tools not diagnostic tools. The practical utility of PTPs for intervention also remains tied to aforementioned issues of statistical significance versus practical significance, as well as replicability, so is ultimately uncertain at the moment. However, the possible practical utility of PTPs is a strength of the approach and worthy of future attention, and may eventually help form part of criteria for determining whether an intervention for athletes has been effective or not (e.g., has an intervention reduced PC below a level that corresponds to a PTP).

5. Perfectionistic climate

Studying the effects of perfectionism as it manifests in athletes, though, will likely only get us so far in regards to understanding the impact of the need for perfection in sport. To fully understand these effects, we will need to move beyond considering perfectionism solely a quality of the individual. The notion that environments differ in the degree to which perfection is promoted is the starting point for our final advance and the concept of perfectionistic climate. The notion that perfectionism is embedded in social contexts may seem somewhat obvious, particularly in sport where narratives, messages, and imagery often have a strong emphasis on perfection. However, historically, the focus of research has been on perfectionism as a quality of the individual, rather than the social environment. Research in this area has only just begun, with some of the foundations of the conceptualisation of perfectionistic climate laid by Hill and Grugan (2020) and a measure of perfectionistic climate in sport provided by Grugan et al. (2021). Here, additional information on the theoretical underpinnings of the concept and how it can be applied to advance the study of perfectionism in sport is provided.

The concept of perfectionistic climate is based on a longstanding interest in sport psychology of how immediate social environments shape achievement related-beliefs and subsequent patterns of motivation. The seminal work of Ames (Ames & Ames, 1984; Ames & Archer, 1988; Ames, 1992), in particular, has been influential in deriving the perfectionistic climate concept. Ames's drew from work on achievement goals (Covington, 1984; Dweck, 1996; Nicholls, 1979) to show how informational cues or instructional demands in an achievement context affect how personal meaning is given to performance outcomes, especially failure. For Ames, whether someone derived a sense of success and satisfaction from comparative ability (a performance goal orientation) or from learning and task mastery (a mastery goal orientation) reflected, to a large degree, features of the achievement context. It was the achievement context that was the origin of the two orientations and, along with the more engrained orientations, was responsible for the distinctive patterns of cognition, emotion, and behaviour indicative of the two orientations in the classroom. In a similar way, the social environment can also be considered to include cues and demands that encourages athletes to adopt perfection as an important achievement standard from which they derive a sense of success.

The prominent reference to the research of Covington (1984; Covington & Omelich, 1979) by Ames in her work on achievement climates is also of especial importance and has informed conceptualisation of a perfectionistic climate. Providing a self-worth perspective on motivation, Covington (1992) describes "overstrivers" as those with both a strong need to strive for success but also avoid failure – a description that closely matches a combination of both a high performance goal orientation and high mastery goal orientation. The similarities between overstrivers and those exhibiting perfectionism has been noted by Flett and Hewitt (2006) and others in sport psychology (e.g., Hall et al., 2012). Overstrivers are individuals who seek to defend their self-worth by succeeding, are hardworking and meticulous, but also harbour strong doubts about their ability, particularly in the face of failure (Martin et al., 2001). Those who are perfectionistic exhibit all of these features. With this in mind, a perfectionistic climate is an environment that encourages overstriving and, critically, conveys related information about the meaning of success (personal worthiness) and failure (personal unworthiness).

With these touchstones in mind, perfectionistic climate is defined as the informational cues and goal structures (i.e., what people are expected to accomplish and how they are to be evaluated) aligned with the view that performances must be perfect and less than perfect performances are unacceptable (Hill & Grugan, 2020). Models of

perfectionism and its development (Flett et al., 2002; Frost et al., 1990; Hewitt et al., 2017), as well as broader theoretical approaches (Ryan & Deci, 2017), are drawn upon to propose five core components of perfectionistic climate: (1) unrealistic expectations that are rigid and exceed what is reasonable or realistic given personal ability or situational constraints; (2) harsh criticism of minor, inconsequential mistakes, despite best effort, personal improvement, or objective success; (3) coercive and controlling behaviour with the intent of promoting perfect performances; (4) withdrawal or manipulation of recognition and appreciation based on performances to elicit feelings of acceptance and avoid feelings of shame or guilt (a specific form of controlling behaviour); and (5) worry and vigilance regarding mistakes and the consequences of not performing perfectly.

In keeping with how other researchers have articulated how perceptions of climates are formed (e.g., Ames & Archer, 1988), the basis for perceptions of a perfectionistic climate in sport is culminative experience and encoding processes whereby athletes interpret and assimilate the behaviours of coaches over time. Coach behaviours may be purposeful or unintentional. It is also worth bearing in mind that informational cues are often ambiguous, inconsistent, and change over time. We can expect this to be evident in an athlete's perceptions of those cues. It is possible for the same cue to be interpreted in a particular way in one context, for instance, and differently in another. We can expect broader contextual information such as past experiences in the sport or experiences with the particular coach to be important in this regard, as well as the characteristics of the athlete themselves. Collectively, all these factors will all have a bearing on how athletes experience the climate and how experiences may differ between athletes. In all, the description of each athlete constructing their own social reality is apt when considering perfectionistic climate.

In regard to assessing perfectionistic climate, measurement of perfectionistic climate can be derived subjectively (via the views of the athletes themselves) and objectively (via observation). We would expect some degree of relationship between the two, but because athlete perceptions of the climate reflect imperfect symbolic coding – misinterpretation and misremembering – of coach behaviour (Bandura, 1977), we should also expect differences. We can also measure perfectionistic climate by soliciting the views of coaches themselves in regards to their own behaviours. Again, we would expect these to correspond with the other forms of measurement to some degree but coaches may not be fully aware of the behaviours they engage in. Indeed, research examining the relationship between coach reported behaviours and athletes' perceptions suggests the correspondence is surprisingly low (e.g., Smith et al., 2016). However, regardless, each of these ways of measuring perfectionistic climate will provide a handle on the degree to which we could consider a perfectionistic climate to be evident and offers a way of studying it. Ultimately, though, it is the subjective experience of the athletes themselves that is most important for understanding its effects.

As for the effects of perfectionistic climate, the behaviours we might observe in athletes who find themselves in a perfectionistic climate will be reflective of the trait itself to some degree. Much like with perfectionism as a trait, we might expect some athletes to respond to these environments with extraordinary dedication and effort, but also be prone to significant motivation, performance, and wellbeing issues for most athletes. An indication of the likely effects is provided by research examining perceptions of perfectionistic pressure from coaches (see Grugan et al., 2023). These included increased apprehensiveness (higher anxiety, worry, and fear), negative responses to failure (anger and negative affect), lower resilience (mental toughness), and higher burnout. These findings lay in contrast to any justification for a perfectionistic, highly demanding, win-at-all-costs, environment in order to harden athletes to the difficulties of high-level competition. Rather, based on these findings, athletes who experience external perfectionistic pressure from coaches appear less prepared, rather than more prepared, for the challenges they will face. We can expect the same when assessing perfectionistic climates.

While informative, the effects of a perfectionistic climate will, though, likely be more far reaching than is alluded to by existing work. In particular, we can expect more extreme effects reflective of the oppressive nature of perfectionistic climates and the presence of a sports ethic that normalises personal sacrifice and pursuit of perfection (Fournier et al., 2022). A recent independent review of the environments created in swimming mention perfectionism explicitly as a contributing factor to a narrow and consuming focus on performance and harmful social norms that pushed issues of welfare and safeguarding to the periphery (Swim England, 2024). Similarly, perfectionism is also mentioned in the Whyte Review (Whyte, 2022) investigating abuse in gymnastics where the pursuit of perfection was seen as important to a culture of criticism and a damaging long-term effect on self-esteem. Similar accounts are provided in a small number of qualitative studies that evidence the presence of both perfectionistic standards and the view of coaches as arbitrators of athletes' worthiness (e.g., Stirling, 2012; Lavallee & Robinson, 2007; Reel et al., 2018). In all, many of the harmful effects recounted by athletes in these types of environments may be linked to the degree to which the climate is perfectionistic. We will, though, need to wait for more empirical work to confirm if this is the case.

In addition to helping identify the source of some of the most harmful effects of external perfectionistic pressure, a final way in which the study of perfectionistic climates may advance understanding of perfectionism in sport is in how it permits the study of perfectionism from an interactionist perspective. The notion of state "perfectionistic involvement" (akin to state "goal-involvement" in achievement goal theory) may prove extremely useful for researchers and practitioners (Hill, 2023). Some of the key research in sport psychology examining goal involvement has shown it is relatively easy to induce task or ego-involving states by manipulating informational cues. For ego-involvement, for example, this includes asking participants to outscore competitors, publicly displaying results, and financially rewarding superior performance. Using these types of manipulation, research has shown that goal-involvement predicts differences in a range of outcomes including antisocial and prosocial behaviour (Sage & Kavussanu, 2007), practice (Kavussanu et al., 2009), and performance (Spray et al., 2006). There is some indication outside of sport that perfectionistic involvement can be induced in a similar way (e.g., Boone et al., 2012) but research in sport has yet to do the same. Research of this kind represents one of the forefronts of research and may prove key to understanding how a need for perfection may exert its effects on athletes even when they are not inclined towards perfectionism themselves.

6. Closing remarks

Perfectionism remains a fascinating topic in sport psychology and we continue to move closer towards more fully understanding its effects in this domain. When taken in context of all that has been learned so far, it is evident that perfectionism, overall, can be both a powerful and destructive force in the lives of athletes. Any notable help it may offer athletes, in particular for performance, appear small and questionable in comparison to its other counterproductive effects which will inevitably be exerting their influence concurrently. The classic descriptions of perfectionism by scholars outside of sport remain important and underappreciated touchstones for researchers and practitioners seeking to understand perfectionism in this regard. In many ways, the previous 25 years is characterized by the steady progress towards the development of the conceptual, methodological, and statistical tools needed to verify their accounts.

We do now have a reasonable understanding of the likely independent and separate effects of PS and PC for athletes. However, as illustrated in this overview, in order to develop our understanding further, we need to ensure that dimensions of perfectionism are not examined separately and that their collective and interactive effects are the focus of future work. Indeed, it is difficult to see how research that does not do

so will advance our understanding (something to be considered by researchers and reviewers alike). This need not only be done by examining the total unique effects of perfectionism and perfectionistic tipping points. However, hopefully enough information has been presented here on their potential merits for them to be considered in future research. Similarly, broadening research to include the study of perfectionistic climate offers an important opportunity to study the role of external perfectionistic pressure more broadly. This topic represents one of the newest areas of research and may even prove the most insightful in a domain in which striving for perfection is often considered necessary, reasonable, and laudable.

Many other interesting research areas remain. One of the main priorities is to reconcile the difference between perspectives on perfectionism in sport with prevailing views of the trait outside of sport. In considering the state of perfectionism research in sport psychology over a decade ago, Flett and Hewitt (2014) stated "… our overarching concern is our sense that the current sports, exercise, and dance literature … tends to paint a substantially more positive view of perfectionism than is actually warranted" (p.398). While there has been some progress on this issue, the notion that perfectionism may be beneficial for some athletes persists. It is a notion that is even evident in work aimed at promoting a greater focus on athlete mental health where it has been suggested that perfectionism may be "functional in some elite sport settings but less so in life" (Henriksen et al., 2020, p. 555). Sport does indeed provide a unique domain in which to study perfectionism. However, there is a danger that its relationship with athletic performance is overstated and misunderstood whilst its relationship with athlete mental health is underappreciated and understudied. As we begin the next 25 years of research, sport psychology must promote a more critical understanding of the trait that befits its complexity and pervasiveness in sport.

Data availability statement

Secondary data was used in this review from published and publicly available sources.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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