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Are Perfectionistic Strivings in Sport Adaptive? A Systematic Review of Confirmatory,
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Abstract

A controversial issue in sport perfectionism research concerns the degree to which athletes' perfectionistic tendencies are adaptive or maladaptive. Insight into this issue can be obtained by distinguishing between two perfectionism dimensions: perfectionistic strivings and perfectionistic concerns. Past narrative reviews concede that perfectionistic concerns are maladaptive in sport, but offer contrasting conclusions about whether athletes' perfectionistic strivings are adaptive or maladaptive (see Flett & Hewitt, 2005; Hall, 2006; Stoeber, 2011). To address this discrepancy, this review systematically documented, categorized, and quantitatively analyzed 201 correlations from 31 studies on perfectionism in athletes. When bivariate correlations were regarded, the proportion of evidence associating perfectionistic strivings with adaptive characteristics in sport was slightly greater than the proportion of evidence associating the dimension with maladaptive characteristics in sport. When partial correlations were regarded (i.e., correlations that controlled for overlap with perfectionistic concerns), a clear majority of evidence associated perfectionistic strivings with adaptive characteristics and only a small minority associated it with maladaptive characteristics. Across both instances, though, considerable evidence (as represented by nonsignificant correlations) associated perfectionistic strivings with neither adaptive nor maladaptive characteristics. Collectively, these findings suggest that perfectionistic strivings among athletes are predominantly adaptive, occasionally neutral, and rarely maladaptive. However, this trend is only apparent when the negative influence of perfectionistic concerns is controlled. Implications of these findings on future research directions and applied sport psychology practice are discussed.

Keywords: perfectionism; athletes; sport; review; suppression; healthy; unhealthy

Are Perfectionistic Strivings in Sport Adaptive? A Systematic Review of Confirmatory,
Contradictory, and Mixed Evidence

Perfectionism has been long recognized by sport psychology researchers as a personality trait that plays an important role in the cognitive, affective, and behavioral functioning of athletes across a variety of sport settings (e.g., Dunn, Causgrove Dunn, & Syrotuik, 2002; Hall, Kerr, & Matthews, 1998; Hardy, Jones, & Gould, 1996). For example, empirical research has shown links between athletes' perfectionist orientations and competitive anxiety in high-school cross-country runners (Hall et al., 1998), burnout among junior tennis players (Gould, Udry, Tuffey, & Loher, 1996), attitudinal body image in figure skaters (Dunn, Craft, Causgrove Dunn, & Gotwals, 2011), race performances of adult triathletes (Stoeber, Uphill, & Hotham, 2009), and even the gold-medal successes of Olympic athletes (Gould, Dieffenbach, & Moffett, 2002). Although the last decade has seen a proliferation of research examining perfectionism in sport, a controversial—and as yet unresolved—debate exists among sport perfectionism researchers. This debate focuses on whether perfectionism is a primarily maladaptive personality disposition in sport (e.g., Flett & Hewitt, 2005; Hall, 2006) or whether perfectionism also has adaptive aspects for athletes (e.g., Dunn et al., 2002; Gould et al., 2002; Stoeber, Uphill, & Hotham, 2009).

The aforementioned debate between maladaptive versus adaptive aspects of perfectionism is not limited to the sport psychology literature, but also reflects an ongoing area of contention in the general psychology literature (see Owens & Slade, 2008; Sherry, Hewitt, Sherry, Flett, & Graham, 2010). Given that perfectionism has been shown to be a domain-specific construct (Dunn, Gotwals, & Causgrove Dunn, 2005)—whereby levels of perfectionism often vary for individuals across different achievement domains—addressing issues surrounding adaptive aspects of perfectionism in sport may have important implications for researchers and psychologists studying similar questions in other achievement domains such as workplace (e.g.,

Sherry et al., 2010), classroom (e.g., Bieling, Israeli, Smith, & Antony, 2003), or performing-arts settings (e.g., Stoeber & Eismann, 2007).

Stoeber (2011) contends that one way to address this controversial issue within sport is to distinguish athletes' levels across two overarching perfectionism dimensions: *perfectionistic strivings* and *perfectionistic concerns* (also labeled, respectively, *personal standards perfectionism* and *evaluative concerns perfectionism*; Gaudreau & Thompson, 2010; Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000). Perfectionistic strivings capture those aspects of perfectionism associated with a self-oriented striving for perfection and the setting of very high personal performance standards. In contrast, perfectionistic concerns capture those aspects of perfectionism associated with concerns over making mistakes, fear of negative social evaluation, feelings of discrepancy between one's expectations and performance, and negative reactions to imperfection (see Stoeber & Otto, 2006). Why might the differentiation between these two dimensions help to resolve the ongoing debate over whether perfectionism can be both maladaptive and adaptive in sport? Results from Stoeber and Otto's (2006) review of the general perfectionism literature may provide an answer.

Stoeber & Otto's (2006) Review

Stoeber and Otto (2006) reviewed 15 studies within the general perfectionism literature that reported bivariate correlations between perfectionistic strivings, perfectionistic concerns, and (a) characteristics, processes, or outcomes regarded as being adaptive, healthy, or facilitative (e.g., conscientiousness, active coping, positive affect) or (b) characteristics, processes, or outcomes regarded as maladaptive, unhealthy, or debilitating (e.g., neuroticism, avoidant coping, negative affect).¹ Analysis and classification of these correlations demonstrated that the two perfectionism dimensions—while showing significant overlap—displayed different and, at times, opposing patterns of relationships with adaptive and maladaptive characteristics.

Across all 15 studies in Stoeber and Otto's (2006) review, perfectionistic concerns showed only positive correlations with maladaptive characteristics and negative correlations with adaptive characteristics. Such results demonstrate that perfectionistic concerns are solely maladaptive. When perfectionistic strivings were considered, the pattern of correlations was quite different: in only four of the 15 studies did perfectionistic strivings demonstrate the same pattern of correlations as perfectionistic concerns. In one study, perfectionistic strivings showed no significant correlations, and in four studies, perfectionistic strivings showed a "mixed pattern" of correlations (i.e., positive and negative correlations with adaptive and maladaptive characteristics). In six studies, however, perfectionistic strivings showed only positive correlations with adaptive characteristics and negative correlations with maladaptive characteristics. The latter results provided evidence that perfectionistic strivings are adaptive.

In further examination, Stoeber and Otto (2006) found that the nine studies indicating that perfectionistic strivings were maladaptive, mixed, or undifferentiated also tended to report high correlations between perfectionistic strivings and perfectionistic concerns ($.45 \leq r_s \leq .70$). In contrast, the six studies providing evidence that perfectionist strivings were adaptive tended to report small to moderate correlations between perfectionistic strivings and perfectionistic concerns ($.10 \leq r_s \leq .28$). Consequently, Stoeber and Otto hypothesized that the overlap between the two dimensions was largely responsible for the evidence that related perfectionistic strivings to higher levels of maladaptive characteristics and lower levels of adaptive characteristics.

To investigate this hypothesis, Stoeber and Otto (2006) calculated partial correlations between perfectionistic strivings and each adaptive/maladaptive characteristic while controlling for the overlap with perfectionistic concerns. When the pattern of partial correlations was examined, the results provided strong support for the authors' hypothesis. In none of the 15 studies did perfectionistic strivings show only positive correlations with maladaptive

characteristics and negative correlations with adaptive characteristics. In two studies perfectionistic strivings showed nonsignificant correlations, and in three studies perfectionistic strivings showed a mixed pattern of correlations. Most notably, however, in 10 of the 15 studies, perfectionistic strivings showed only positive correlations with adaptive characteristics and negative correlations with maladaptive characteristics. Stoeber and Otto concluded that perfectionistic strivings are primarily adaptive, but that this finding may only be apparent when the negative influence of perfectionistic concerns is controlled during analysis.

Since Stoeber and Otto's (2006) review was published, a number of studies in the general psychology literature have replicated their findings demonstrating that when the overlap between perfectionistic strivings and perfectionistic concerns is controlled, perfectionistic strivings show mostly positive correlations with adaptive characteristics and negative correlations with maladaptive characteristics (e.g., R. W. Hill, Huelsman, & Araujo, 2010; Powers, Koestner, Zuroff, Milyavskaya, & Gorin, 2011; Stoeber & Eismann, 2007). Consequently, R. W. Hill et al. (2010) suggested that perfectionistic concerns often act as a suppressor variable (Smith, Ager, & Williams, 1992) in the relationships between perfectionistic strivings and adaptive versus maladaptive characteristics. In other words, perfectionistic concerns appear to suppress correlations that associate perfectionistic strivings with adaptive characteristics while at the same time inflate correlations that relate perfectionistic strivings to maladaptive characteristics.

Open Questions

Unfortunately, Stoeber and Otto's (2006) review did not include any studies that examined perfectionism among athletes. Additionally, apart from some of Stoeber and colleagues' own investigations (Stoll, Lau, & Stoeber, 2008; Stoeber, Otto, Pescheck, Becker, & Stoll, 2007; Stoeber, Stoll, Pescheck, & Otto, 2008), sport perfectionism research has rarely controlled for perfectionistic concerns when investigating relationships that perfectionistic

strivings have with adaptive and maladaptive characteristics (for exceptions, see Gaudreau & Antl, 2008; Gotwals & Dunn, 2009; A. P. Hill, Hall, & Appleton, 2010). Given that perfectionistic concerns may suppress evidence that perfectionistic strivings are adaptive (R. W. Hill et al., 2010), these omissions may have inadvertently helped fuel controversy over whether perfectionism can be both maladaptive and adaptive in sport.

Three previous narrative reviews (i.e., Flett & Hewitt, 2005; Hall, 2006; Stoeber, 2011) have directly addressed whether perfectionism is adaptive or maladaptive in sport. These reviews are valuable in that they draw attention to the insight that can be gained by exploring athletes' perfectionistic tendencies. However, in light of the information presented herein, an additional review of the sport perfectionism literature would be beneficial for several reasons. First, the three narrative reviews present qualitative summaries of evidence obtained from self-selected studies. Given that the concept of adaptive perfectionism is highly controversial among theorists, practitioners, and researchers (Flett & Hewitt, 2006; Owens & Slade, 2008), a systematic approach to the selection of studies and the quantitative analysis of findings would be prudent.

Second, the three narrative reviews come to the same general conclusion that perfectionistic concerns are maladaptive in sport, but differ in conclusions drawn about perfectionistic strivings. For example, Flett and Hewitt (2005) conclude that central facets of perfectionistic strivings (e.g., self-oriented perfectionism) are maladaptive in sport. In contrast, both Hall (2006) and Stoeber (2011) conclude that perfectionistic strivings (or facets thereof) are adaptive in sport, but only when perfectionistic concerns are absent or controlled. Additional evidence is necessary to support, refute, or refine these discrepant conclusions.

Third, the three narrative reviews do not clearly demonstrate the degree to which perfectionistic concerns acts as a suppressor variable. For example, Stoeber (2011) reviewed findings from 16 studies to examine the degree to which perfectionistic strivings and

perfectionistic concerns were associated with adaptive and maladaptive characteristics in sport. However, for only two studies (Hall et al., 1998; Stoeber et al., 2007) did Stoeber compare the findings obtained prior to controlling for the perfectionistic strivings–concerns overlap with those obtained after controlling for the overlap. As a result, the vast majority of findings reviewed by Stoeber (2011) did not clearly demonstrate the degree to which perfectionistic concerns may suppress positive relationships that perfectionistic strivings have with adaptive characteristics in sport, and inflate the positive relationships that perfectionistic strivings have with maladaptive characteristics in sport.

The Present Review

The present review specifically addressed these three concerns by applying Stoeber and Otto's (2006) methods and analyses to a review of the sport perfectionism literature. More specifically, the purpose of this review was to systematically examine the degree to which perfectionistic strivings in athletes are associated with adaptive versus maladaptive characteristics when bivariate correlations are regarded, and when partial correlations that control for the overlap between perfectionistic strivings and perfectionistic concerns are regarded.

By adopting Stoeber and Otto's (2006) general strategy, this review also inherits the strategy's limitations. Specifically, such "vote-counting approaches" to research synthesis can be associated with low power and may underestimate effects (Hedges & Olkin, 1980; Light & Smith, 1971). To avoid these issues, meta-analytic techniques that quantitatively combine and statistically compare correlations from multiple studies are usually recommended (Glass, McGaw & Smith, 1981). However, such techniques were deemed inappropriate in this instance given that this review aimed to investigate relationships between athletes' perfectionistic strivings and a wide range of adaptive/maladaptive characteristics (e.g., achievement goals,

extraversion, body weight satisfaction). Combining such diverse characteristics into one quantitative statistic would be highly questionable (Johnson & Boynton, 2008; Sharpe, 1997). Consequently, we regarded Stoeber and Otto's general strategy as an appropriate means to provide a simple quantitative answer to this review's primary research question.

There are, however, several differences between this review and Stoeber and Otto (2006). First, this review included only studies that examined perfectionism in athletes. Second, this review focused solely on perfectionistic strivings because the three narrative reviews of the sport perfectionism literature (Flett & Hewitt, 2005; Hall, 2006; Stoeber, 2011) came to different conclusions regarding whether this dimension was primarily adaptive or maladaptive in sport (whereas there was consensus between all three reviews that perfectionistic concerns are maladaptive). Third, Stoeber and Otto's review only included studies that represented perfectionistic strivings and perfectionistic concerns through composite scores created by combining two or more subscales from multidimensional perfectionism instruments. Such an inclusion criterion made sense given the popularity of this composite approach in the general perfectionism literature (e.g., Dunkley et al., 2000; Dunkley, Berg, & Zuroff, 2012; Page, Bruch, & Haase, 2008). In contrast, only a few studies from the sport perfectionism literature have used combinations of subscales to represent perfectionistic strivings and perfectionistic concerns among athletes (e.g., Kaye, Conroy, & Fifer, 2008; Stoeber, Stoll, Salmi, & Tiikkaja, 2009). Instead, most perfectionism studies in sport have followed a single-indicator approach using single subscales to capture the core aspects of each dimension (Stoeber, 2011; see also Table 1). As a result, this review broadened Stoeber and Otto's inclusion criterion and included all studies that used multidimensional perfectionism instruments containing subscales suitable as single-indicator measures of perfectionistic strivings and perfectionistic concerns.

Fourth, Stoeber and Otto (2006) used common sense to classify characteristics as being

adaptive or maladaptive and included only characteristics where they deemed this classification to be obvious (e.g., classifying general negative affect as maladaptive). However, there are many characteristics where this classification is not obvious when considered within sport contexts (e.g., negative affect after failure in a major competition; see Sagar & Stoeber, 2009). As a result, this review used a systematic independent rating process to classify characteristics as adaptive or maladaptive within sport. Doing so allowed for independent review of all of the characteristics examined in the sport perfectionism literature and provided an objective procedure for determining whether each was adaptive or maladaptive.

Fifth, this review investigated the degree to which perfectionistic strivings are associated with adaptive or maladaptive characteristics among athletes by counting and comparing studies as did Stoeber and Otto (2006), but also by counting and comparing the individual correlations reported within each study. Stoeber and Otto's study-level analysis is appropriate because it is in line with the statistical assumption of independent observations (i.e., correlations from one study are not influenced by correlations from another). However, this strategy is limited in that it provides a very general account of relationships between perfectionistic strivings and adaptive/maladaptive characteristics. This review's correlation-level analysis, although not based on independent observations (i.e., multiple correlations produced from the same sample are not independent), should complement the study-level analysis by providing a more detailed account of the empirical evidence relevant to the primary research question.

In line with Stoeber and Otto's (2006) review, we expected that the study-level analysis and the correlation-level analysis would produce mixed results when bivariate correlations between perfectionistic strivings and adaptive and maladaptive characteristics were considered. However, when partial correlations were considered (i.e., correlations that controlled for perfectionistic concerns), we expected more studies—and more individual correlations across

those studies—to positively relate perfectionistic strivings to adaptive characteristics (and to negatively relate the dimension to maladaptive characteristics) than to negatively relate perfectionistic strivings to adaptive characteristics (and to positively relate the dimension to maladaptive characteristics). In other words, we hypothesized that both analyses would produce more evidence supporting the notion that perfectionistic strivings are adaptive in sport when partial correlations (instead of bivariate correlations) were considered.

Method

Literature Search and Selection of Studies

To find empirical studies on perfectionism in sport, we used two electronic databases, PsycINFO® and SPORTDiscus™, searching for peer-reviewed journal articles published in English that had the word stem “perfection*” in the abstract and either the word stem “sport*” or “athlet*” in the abstract or the word stem “sport*” in the journal title. In the search, we included all articles from 1990 (the year the first article on multidimensional perfectionism was published: Frost, Marten, Lahart, & Rosenblate, 1990) to June 10, 2010 (the last database update we considered in our search before proceeding to our analyses). Overall, we found 116 journal articles that met these search criteria.²

For each study, we set three criteria for inclusion in the review. First, to ensure that the study captured perfectionism in sport, the study had to investigate a sample of people actively engaged in sports who could broadly be classified as “athletes” (i.e., persons trained or skilled in exercises, sports, or games requiring physical strength, agility, or stamina; Merriam-Webster, 2011). Therefore we included only studies with (a) athletes, (b) students enrolled in physical activity classes, and (c) students majoring in physical education/sport science. Second, the study had to report bivariate correlations between subscales representing core aspects of perfectionistic strivings and perfectionistic concerns so that partial correlations could be calculated. Third, the

study had to report bivariate correlations between subscales representing core aspects of perfectionistic strivings/concerns and at least one characteristic consensually classified as adaptive or maladaptive (see the following section). As presented in Table 1, 31 studies (published in 26 articles) met these inclusion criteria. The studies collectively comprised 7201 participants and included bivariate correlations with 98 adaptive or maladaptive characteristic.³

Classification of Adaptive and Maladaptive Characteristics

To determine what characteristics were primarily adaptive and maladaptive, the first author constructed a questionnaire that briefly described each characteristic through definitions, sample items, and information on item-response formats (as necessary).⁴ The four authors of this review—each having an established record of peer-reviewed publications on perfectionism in sport and documented expertise in sport psychology—served as judges and independently rated each characteristic as being “primarily adaptive/healthy/facilitative” within sport contexts, “primarily maladaptive/unhealthy/debilitative” within sport contexts, or “unclear” (if it was unclear whether the characteristic was adaptive or maladaptive in sport contexts).

A substantial level of agreement among the four judges was obtained as indicated by a Fleiss’ kappa of .75 (Fleiss, 1971; Landis & Koch, 1977). Overall, 84 of the 98 characteristics showed high levels of agreement among the four raters: 69 characteristics showed complete agreement among all judges, and 15 showed agreement between three of the four judges (with the fourth judge rating the characteristic as unclear). Consequently, these 84 characteristics were included in the subsequent analyses without further discussion.

The remaining 14 characteristics showed various levels of disagreement among the judges. At least two of the four judges provided an “unclear” rating on 9 of the 14 characteristics: achievement goal–performance approach, body mass index, dietary restraint/dieting behavior, exercise dependence–exercise to control weight, exercise for appearance and attractiveness,

external attributions after failure, internal attributions after failure, negative affect after failure, and social desirability. In addition, one characteristic (i.e., body esteem attribution) was rated as unclear by one judge while the three other judges provided divergent ratings. Consequently, these ten characteristics were excluded from the subsequent analyses.

Finally, four characteristics—achievement goal—ego, validation-seeking, body weight satisfaction, and exercise dependence—exercising for social reasons—received the same rating by three of the judges but an opposite rating by the fourth judge. All of these disagreements were resolved through qualitative discourse (Miles & Huberman, 1994) resulting in the discrepant judge agreeing to the other judges' categorization (i.e., consensual agreement among all four judges). As a result, these four characteristics were included in the subsequent analyses.

Overall, 88 characteristics were included in the final analyses (of which 47 were classified as adaptive and 41 were classified as maladaptive). As presented in Table 1, this resulted in a database comprising 31 studies and containing 201 bivariate correlations for analysis of which 92 were between perfectionistic strivings and an adaptive characteristic and 109 were between perfectionistic strivings and a maladaptive characteristic.

Analytic Strategy

In line with Stoeber and Otto (2006), the first step in this review's analytic strategy was to transform the catalogued bivariate correlations between core aspects of perfectionistic strivings and the adaptive/maladaptive characteristics into partial correlations that controlled for the influence of core aspects of perfectionistic concerns. The standard formula for computing partial correlations from bivariate correlations was employed (see Hays, 1973, Formula 16.20.3). All correlations were subsequently examined for statistical significance ($p < .05$).

The bivariate and partial correlations then served as the basis for two parallel sets of analyses. The first analytic set mirrored the process utilized in Stoeber and Otto's (2006) review

of the general perfectionism literature in which studies served as units of analysis. That is, each study listed in Table 1 was categorized as (a) representing “supportive evidence” (i.e., all of the study’s significant correlations were either positive correlations with adaptive characteristics or negative correlations with maladaptive characteristics), (b) representing “contrary evidence” (i.e., all the study’s significant correlations were either positive correlations with maladaptive characteristics or negative correlations with adaptive characteristics), (c) representing “mixed evidence” (i.e., the study contained positive and negative correlations with adaptive and maladaptive characteristics), or (d) “nonsignificant” (all of the study’s correlations were nonsignificant; $p \geq .05$). This study-level categorization was conducted twice: once with the bivariate correlations and then again with the partial correlations.

The second analytic set expanded upon the process utilized in Stoeber and Otto’s (2006) review by using correlations (as opposed to studies) as units of analysis. That is, each correlation between perfectionistic strivings and an adaptive or maladaptive characteristic was categorized as (a) representing “supportive evidence” (i.e., a significant positive correlation with an adaptive characteristic or a significant negative correlation with a maladaptive characteristic), (b) representing “contrary evidence” (i.e., a significant positive correlation with a maladaptive characteristic or a significant negative correlation with an adaptive characteristic), or (c) “nonsignificant” (i.e., the correlation was nonsignificant; $p \geq .05$). As in the study-level analysis, this correlation-level categorization was conducted twice: once with the bivariate correlations and then again with the partial correlations. Table 1 presents each correlation’s classification.

Results

Study-Level Analysis

The study-level analysis was initially conducted with studies categorized according to their catalogued bivariate correlations. In this analysis, 7 of the 31 studies (22.6%) represented

supportive evidence, 4 (12.9%) represented contrary evidence, 17 (54.8%) represented mixed evidence, and 3 (9.7%) were nonsignificant. To justify exploring the degree to which overlap with perfectionistic concerns influenced this evidence, the relationships between perfectionistic strivings and perfectionistic concerns reported across the 31 reviewed studies were examined. The mean value of these correlations was .43 ($SD = .18$, range = $-.16$ to $.64$) and, as seen in Table 1, each was positive and statistically significant except two: $r = .03$ (Ferrand, Magnan, Rouveix, & Filaire, 2007) and $r = -.16$ (A. P. Hill, Hall, Appleton, & Kozub, 2008). The general magnitude and direction of these correlations indicate considerable overlap between the two perfectionism dimensions. As a result, the study-level analysis was repeated, but with the studies categorized using partial correlations that controlled for perfectionistic concerns. Results showed that 20 of the 31 studies (64.5%) represented supportive evidence, 2 (6.4%) represented contrary evidence, 8 (25.8%) represented mixed evidence, and 1 study (3.2%) was nonsignificant.

Comparing study categorizations based on bivariate and partial correlations. To further illustrate the impact of controlling for the overlap between perfectionistic strivings and perfectionistic concerns, we investigated changes in studies' evidentiary meaning when bivariate correlations versus partial correlations served as the basis for categorization. Results showed that 14 of the 31 studies (45.2%) changed categorization when the partial correlations, instead of the bivariate correlations, were considered. Moreover, there was a clear trend in these changes in that 13 of the 14 studies (92.8%) changed from contrary evidence, mixed evidence, or nonsignificant to supportive evidence. Hence, the number of studies categorized as providing supportive evidence increased from 7 to 20 (a 185.7% increase), while the number of studies categorized as providing contrary evidence or mixed evidence decreased from 4 to 2 (a 50.0% decrease) and from 17 to 8 (a 52.9% decrease), respectively.

Correlation-Level Analysis

In line with the study-level analysis, the first step in the correlation-level analysis was to categorize the bivariate correlations between perfectionistic strivings and the characteristics (see Table 1). Results showed that 74 of the 201 bivariate correlations (36.8%) represented supportive evidence, 52 (25.9%) represented contrary evidence, and 75 (37.3%) were nonsignificant. Again paralleling the study-level analysis, this categorization was repeated with the partial correlations that controlled for perfectionistic concerns serving as the unit of analysis. Results showed that 107 of the 201 partial correlations (53.2%) represented supportive evidence, 17 (8.4%) represented contrary evidence, and 77 (38.3%) were nonsignificant.

Comparing bivariate and partial correlation categorizations. As a consequence of categorizing the partial correlations, there was a change in the evidentiary meaning assigned to 71 of the 201 correlations. More specifically, 33 of the 71 correlations (46.5%) changed from nonsignificant to supportive, 3 (4.2%) changed from contrary to supportive, 32 (45.1%) changed from contrary to non-significant, and 3 (4.2%) changed from supportive to nonsignificant. Most notably, in no case did the evidentiary meaning of an original categorization change from supportive to contrary when the partial correlation was computed. Stated differently, when the basis of categorization changed from bivariate correlations to partial correlations, the number of correlations categorized as supportive evidence increased from 74 to 107 (a 44.6% increase) and the number of correlations categorized as contrary evidence decreased from 52 to 17 (a 67.3% decrease). The number of nonsignificant correlations remained essentially the same across the two steps of the correlation-level analysis (i.e., 75 nonsignificant bivariate correlations and 77 nonsignificant partial correlations; a 2.6% increase).

Discussion

The aim of the present study was to provide a systematic quantitative review of the sport perfectionism literature to explore the degree to which perfectionistic strivings in athletes are

associated with adaptive versus maladaptive characteristics. For this, we conducted two parallel sets of analyses: a study-level analysis (where studies comprised the units of analysis) and a correlation-level analysis (where correlations reported within studies comprised the units of analysis). To examine how overlap with perfectionistic concerns impacted categorizations, each analysis was conducted twice: once with bivariate correlations and then again with partial correlations that controlled for perfectionistic concerns. In line with expectations, findings from both sets of analyses indicated that athletes' perfectionistic strivings were more likely to be associated with adaptive characteristics, and less likely to be associated with maladaptive characteristics after controlling for perfectionistic concerns. However, both analyses also produced evidence that perfectionistic strivings are, in some instances, neutral or maladaptive.

The present results mirrored the pattern of findings from Stoeber and Otto's (2006) review of the general perfectionism literature. When the bivariate correlations served as the basis for categorization, both the study-level analysis and the correlation-level analysis produced slightly more evidence indicating that perfectionistic strivings are adaptive in sport than evidence that perfectionistic strivings are maladaptive in sport. In the study-level analysis, though, a clear majority of studies provided mixed evidence and associated perfectionistic strivings with both adaptive and maladaptive characteristics in sport. Similarly, the highest proportion of bivariate correlations in the correlation-level analysis provided no clear picture (i.e., the correlations were nonsignificant). As noted by several sport perfectionism researchers (e.g., Dunn, Causgrove Dunn, et al., 2006; Gotwals, Dunn, & Wayment, 2003; Stoeber, 2011), these findings suggest that when perfectionistic concerns are not taken into account, it is difficult to determine the degree to which perfectionistic strivings in sport are adaptive versus maladaptive.

In contrast, when partial correlations served as the basis for categorization, evidence more clearly supported the hypothesis that perfectionistic strivings are adaptive in sport. Both the

study-level analysis and the correlation-level analysis produced relatively large proportions of evidence indicating that perfectionistic strivings are adaptive in sport, and very small proportions of evidence indicating they are maladaptive. The impact of controlling for perfectionistic concerns was further illustrated by documenting changes in categorization that occurred when the partial correlations, instead of the bivariate correlations, were considered. In the study-level analysis, 13 of the 14 of the studies that changed categorization ultimately supported the notion that perfectionistic strivings are adaptive. In the correlation level analysis, there was a substantial increase in the number of correlations indicating that perfectionistic strivings are adaptive in sport and a substantial decrease in the number of correlations indicating that perfectionistic strivings are maladaptive in sport. Collectively, these results suggest not only that perfectionistic strivings are primarily adaptive in sport when perfectionistic concerns are controlled, but that overlap with perfectionistic concerns tends to inflate positive relationships between perfectionistic strivings and maladaptive characteristics, and suppress positive relationships between perfectionistic strivings and adaptive characteristics (R. W. Hill et al., 2010).

The correlation-level analysis also revealed that over one third of the correlations between perfectionistic strivings and the adaptive/maladaptive characteristics were nonsignificant. This substantial proportion of correlations remained stable even after controlling for perfectionistic concerns. Identification of these nonsignificant correlations builds upon past reviews of the sport perfectionism literature by suggesting that, in reference to a considerable number of characteristics, athletes' perfectionistic strivings are neither adaptive (as suggested by Hall, 2006 and Stoeber, 2011) nor maladaptive (see Flett & Hewitt, 2005).

Collectively, findings from this review's analyses indicate that perfectionistic strivings among athletes appear to be predominantly adaptive, occasionally neutral, and rarely maladaptive. However, this trend is only apparent when the negative influence of perfectionistic

concerns is controlled. Such findings indicate that it is important to consider and account for both perfectionistic strivings and perfectionistic concerns when discussing whether perfectionism in sport is adaptive or maladaptive. Indeed, when Gould et al. (2002) indicated that adaptive perfectionism was a key personality characteristic of Olympic champions, the authors appear to have been referring to perfectionistic strivings, not perfectionistic concerns, given that the Olympic champions in the sample had high scores on the F-MPS personal standards subscale (a central facet of perfectionistic strivings; see Table 1) and low scores on F-MPS concern over mistakes subscale (a central facet of perfectionistic concerns). Similarly, in the first study to identify a profile of adaptive perfectionism among youth athletes, Dunn et al. (2002) found that a pattern of Sport-MPS subscale scores—defined by the combination of high personal standards with low concern over mistakes—was related to an adaptive achievement goal orientation. This review's primary finding supports the profiles produced in Gould et al.'s and Dunn et al.'s studies: the majority of evidence from the sport perfectionism literature suggests that perfectionistic strivings are primarily adaptive (or, at worst, neutral) when perfectionistic concerns are controlled.

Benefits of a Systematic and Multifaceted Approach

The current findings highlight several strengths of the methodological and analytic protocols adopted in this review. One such strength is the systematic approach to study selection and analysis. Previous reviews of the sport perfectionism literature (Flett & Hewitt, 2005; Hall, 2006; Stoeber, 2011) selected studies and took a narrative and qualitative approach to interpret findings. In contrast, this review identified studies on perfectionism in sport by searching for relevant terms within two electronic databases and used specific criteria to determine which of the identified studies to actually include. Findings from those selected studies were then catalogued and categorized based on quantitative analysis. As a result, in comparison to previous

reviews, the present review more objectively represents the sport perfectionism literature and more clearly and precisely illustrates the degree to which perfectionistic strivings are associated with adaptive versus maladaptive characteristics in sport.

A second strength of this review is that it adopted a multifaceted approach to analysis, as represented by the study-level and correlation-level analyses. The study-level analysis replicated the approach used in Stoeber and Otto's (2006) review; the correlation-level analysis refined this approach. In both analyses the majority of evidence supported the notion that perfectionistic strivings are adaptive in sport and only a small minority of evidence suggested that perfectionistic strivings are maladaptive in sport. In contrast, the two analyses differed considerably in the degree to which they identified evidence that perfectionistic strivings in sport are neither adaptive nor maladaptive: when partial correlations were considered, the study-level analysis counted only one study as nonsignificant evidence, whereas the correlation-level analysis found a considerable number of nonsignificant correlations. These findings suggest that, in comparison to the study-level analysis, the correlation-level analysis was more sensitive towards detecting diversity in the relationships between perfectionistic strivings and adaptive/maladaptive characteristics in sport. However, the units of analysis within the correlation-level analysis (i.e., individual correlations within each study) were not independent, while those used in the study-level analysis (i.e., individual studies) were independent. Recognition of the contrasting pros and cons of each analysis highlights the benefits of simultaneously implementing both during research synthesis and subsequently examining the degree to which the two approaches identify parallel trends within the reviewed literature.

Future Research Directions

It is important to note that this review produced some evidence contrary to the claim that perfectionistic strivings are adaptive in sport, even after controlling for perfectionistic concerns.

In the correlation-level analysis, approximately 8% of all partial correlations represented contrary evidence given that they associated perfectionistic strivings with higher levels of maladaptive characteristics and lower levels of adaptive characteristics. For example, even when the influence of perfectionistic concerns was partialled out, perfectionistic strivings showed a significant positive correlation with anger reactions (Dunn, Gotwals, Causgrove Dunn, & Syrotuik, 2006) and significant negative correlations with body weight satisfaction (Ferrand et al., 2007) and unconditional self-acceptance (Hall, Hill, Appleton, & Kozub, 2009). Higher levels of anger, and lower levels of body weight satisfaction and unconditional self-acceptance, have the potential to be detrimental to the mental well-being of athletes. Therefore, in reference to a small, but non-trivial, number of characteristics, this review also identified some support for the notion that perfectionistic strivings are maladaptive in sport (see Flett & Hewitt, 2005).

Given that this review detected diversity in relationships involving perfectionistic strivings, future research should explore the conditions and contexts that influence when the dimension will be adaptive, maladaptive, or neutral in sport. As emphasized in Gaudreau and Thompson's (2010) 2×2 model of dispositional perfectionism, it is especially important to investigate whether perfectionistic concerns moderate relationships between perfectionistic strivings and adaptive/maladaptive characteristics (see also Gaudreau, 2012; Stoeber, 2012). Only 2 of the 31 studies included in this review—Chen, Kee, Chen, and Tsai (2008) and Stoll et al. (2008)—tested for such effects, with both finding that perfectionistic concerns significantly moderated relationships involving perfectionistic strivings. Chen et al. found that athletes with high levels of perfectionistic strivings reported higher levels of burnout if they also had high levels of perfectionistic concerns. Stoll et al. found that athletes with high levels of perfectionistic strivings had greater performance increments across four series of a basketball task if they also had high levels of perfectionistic concerns. In contrast, athletes with low levels

of perfectionistic strivings tended to improve more across the basketball task if they also had low (versus high) levels of perfectionistic concerns.

Gaudreau and Thompson's (2010) model proposes that the degree to which specific levels of perfectionistic strivings are adaptive or maladaptive depends on concomitant levels of perfectionistic concerns. Chen et al.'s (2008) and Stoll et al.'s (2009) moderation analyses, however, present contrasting evidence of the outcomes of this interaction within sport contexts. In Chen et al.'s study, high levels across both perfectionistic strivings and perfectionistic concerns were positively associated with a maladaptive characteristic in sport (i.e., burnout). In Stoll et al.'s study, the same interaction across the two perfectionism dimensions was positively associated with an adaptive characteristic in sport (i.e., performance improvement). Due to this contrasting evidence, in combination with the relative paucity of sport perfectionism studies that have tested for moderation effects (Flett & Hewitt, 2005), we call for future research that applies Gaudreau and Thompson's (2010) model to sport by investigating whether perfectionistic concerns influence relationships between perfectionistic strivings and characteristics that are adaptive or maladaptive in sport (see Gaudreau & Verner-Filion, 2012).

Applied Implications

The present findings suggest that perfectionistic strivings in sport are primarily adaptive and positively correlated with perfectionistic concerns among athletes. When combined with previous research that has consistently associated perfectionistic concerns with maladaptive characteristics in sport (Flett & Hewitt, 2005; Hall, 2006; Stoeber, 2011), these findings suggest that athletes who have elevated levels of primarily adaptive perfectionistic strivings also tend to have elevated levels of primarily maladaptive perfectionistic concerns (see also Hall, 2006). This presents a difficult challenge to sport psychology practitioners' efforts to enhance perfectionistic athletes' performance and well-being. What follows are several tentative suggestions that may

assist in these efforts. First, it appears imperative to determine the degree to which athletes' perfectionistic tendencies are comprised of perfectionistic strivings versus perfectionistic concerns. Second, interventions should primarily focus on reducing levels of perfectionistic concerns. Third, given that success in high performance sport often requires near-perfect performance (Flett & Hewitt, 2005), reductions in athletes' perfectionistic concerns should probably not come at the cost of reductions in their perfectionistic strivings. This may be easier said than done given the positive relationship that typically exists between the two dimensions. Although partial correlations make it relatively easy for researchers to isolate perfectionistic strivings from perfectionistic concerns, it is likely to be much more difficult for sport psychology practitioners to do the same when working with perfectionistic athletes.

Limitations

This review's results should be considered with several limitations in mind. First, because most studies on perfectionism in sport have failed to use composite scores to measure perfectionistic strivings and perfectionistic concerns, we used single subscale indicators to represent core aspects of the two dimensions. However, it is unlikely that all of these subscales are equally valid measures of perfectionistic strivings/concerns. For example, some researchers propose that subscales representing core aspects of perfectionistic strivings (e.g., Personal Standards from the F-MPS and Self-Oriented Perfectionism from the HF-MPS) are contaminated with aspects of perfectionistic concerns (see DiBartolo, Frost, Chang, LaSota, & Grills, 2004; Stoeber & Childs, 2010). Other subscales, not incorporated into the review, may prove to represent core aspects of athletes' perfectionistic strivings or perfectionistic concerns (e.g., Organization and Doubts About Actions from the revised Sport-MPS; see Gotwals & Dunn, 2009). Because the partial correlations we calculated controlled for overlap between our single subscale indicators, and because there is general consensus that the indicators we chose represent

core facets of perfectionistic strivings/concerns (Stoeber, 2011; Stoeber & Otto, 2006), this limitation probably did not substantially impact the trends identified in this review. However, recognizing the limitation does highlight the need to continually re-examine and, if necessary, revise how athletes' perfectionistic tendencies are assessed and defined in empirical research.

Second, our conclusions are limited to the results of studies that met our selection criteria. These criteria excluded some studies that may have shed light on the degree to which perfectionistic strivings are adaptive versus maladaptive in sport. Prominent and emergent sport perfectionism researchers likely have unpublished studies that fit this description. However, we chose to exclude unpublished studies in an effort to present as objective and systematic a review as possible. Additionally, studies that only reported the results of higher-order correlational analyses (e.g., canonical correlation, regression analyses, structural equation modeling), or that solely followed a person-centered approach (e.g., using median-split procedures or cluster analysis), were excluded. However, our comprehensive literature search found only six studies that reported only the results of higher-order correlational analyses (Anshel & Seipel, 2006; Dunn, Causgrove Dunn, et al., 2006; Gaudreau & Antl, 2008; Gotwals & Dunn, 2009; A. P. Hill, Hall, & Appleton, 2010; Petrie, Greenleaf, Reel, & Carter, 2009) and two studies that solely followed a person-centered approach (Koivula, Hassmén, & Fallby, 2002; Martinent & Ferrand, 2006). Therefore, we are confident that our selection process resulted in an adequate representation of studies upon which valid conclusions can be drawn.

Third, the present findings are limited to correlates of perfectionistic strivings and perfectionistic concerns for which there was a strong level of agreement among the independent judges that the characteristics were adaptive or maladaptive in sport. All variables for which no such agreement was found were excluded from this review. Consequently, the review excluded some characteristics that other expert judges may have regarded as adaptive or maladaptive in

sport. However, because we found no strong agreement for only 10 characteristics, but achieved high agreement for 88 characteristics, we are confident that this review provides an adequate representation of adaptive and maladaptive characteristics in sport.

Finally, the present findings are limited by the analytic strategy of comparing the number of significant correlations categorized as supportive versus contrary evidence as a means of determining the degree to which perfectionistic strivings in sport are adaptive. In addition to limitations regarding low power and underestimation, this vote-counting analytic strategy cannot identify fine-tuned trends imbedded within the data. For example, the present analytic strategy is not able to indicate if perfectionistic strivings in sport are more strongly associated with certain characteristics than others (e.g., somatic vs. cognitive competitive state anxiety) or to quantitatively assess the degree to which other variables (e.g., gender or perfectionism instrument) influenced the documented trends. Meta-analysis, however, can discern such trends. Conducting a meaningful meta-analysis with adequate power, though, requires a body of literature concentrated on investigating similar relationships (Hedges & Pigott, 2001; Johnson & Boynton, 2008). The sport perfectionism literature, although probably too diffuse at the present, may meet this requirement in the near future given that the majority of studies included in this review was published within the last five years.

Conclusion

Perfectionism in sport is an important topic for both basic research and applied sport psychology because athletes tend to endorse perfectionistic tendencies to a greater degree in sport than in other achievement domains (Dunn et al., 2005). This review demonstrates that, when investigating whether such perfectionistic tendencies are adaptive or maladaptive, researchers need to take into account both perfectionistic strivings and perfectionistic concerns. The reason for this, as evidenced by the present results, is that the degree to which empirical

findings relate perfectionistic strivings to adaptive characteristics appears to depend on whether overlap with perfectionistic concerns is simultaneously controlled. When this overlap is taken into account, athletes' perfectionistic strivings appear to be primarily adaptive, rarely maladaptive, and often neutral. We hope that this review's results will encourage researchers to continue the search for a clearer understanding of when, and in what contexts, athletes' perfectionistic tendencies will be adaptive, and heed ongoing calls from areas of psychological study beyond sport to consider differentiating between adaptive and maladaptive aspects of perfectionism (see Kempke et al., 2011; Owens & Slade, 2008; Ulu & Tezer, 2010).

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Footnotes

¹For the sake of brevity, the term “characteristics” will be used throughout the remainder of the review as a shorthand for “characteristics, processes, and outcomes,” the term “adaptive” as a shorthand for “adaptive, healthy, or facilitative,” and the term “maladaptive” as a shorthand for “maladaptive, unhealthy, or debilitating.”

²The full list of articles is available from the first author upon request..

³There are two instances in which studies appear to be fully or partially based on the same samples: (a) McArdle and Duda (2004) and McArdle and Duda (2008) and (b) Stoeber et al. (2007) and Stoeber and Becker (2008). If these duplicate samples were taken into account, this review would encompass 29 studies and 6931 participants. Like Stoeber and Otto (2006) we did not include studies that used the Positive and Negative Perfectionism Scale (Terry-Short, Glynn Owens, Slade, & Dewey, 1995) to measure perfectionism in sport (e.g., Haase, Prapavessis, & Owens, 1999, 2002) because it is questionable whether the Positive Perfectionism subscale actually captures perfectionistic strivings (Flett & Hewitt, 2006). Moreover, the scale has shown problematic psychometric properties in athlete samples (e.g., Haase & Prapavessis, 2004)

⁴The questionnaire is available from the first author upon request.

Table 1

Summary of Correlations of Perfectionist Strivings with Perfectionistic Concerns and Adaptive (A) and Maladaptive (M) Characteristics, Processes, and Outcomes: Supportive (S) and Contrary (C) Evidence

| Study and sample | Instrument | Perfectionistic | | | <i>r</i> * | Characteristics/processes/outcomes the study examined | Rating | Evidence | | | |
|--------------------------------------------------------------------|------------|-----------------|----------|------------|-----------------------------------------------------|-------------------------------------------------------|-------------|-------------|-----------|-----------|------------|
| | | Strivings | Concerns | | | | | <i>r</i> | <i>pr</i> | <i>Er</i> | <i>Epr</i> |
| Appleton et al. (2009) 201 male youth athletes | HF-MPS | SOP | SPP | .24 | Achievement goal–task | A | .24 | .27 | S | S | |
| | | | | | Athlete satisfaction with goal progress | A | –.06 | –.01 | | | |
| | | | | | Perceived coach satisfaction with goal progress | A | .03 | .09 | | | |
| | | | | | Achievement goal–ego | M | .32 | .31 | C | C | |
| | | | | | Burnout–devaluation of sport participation | M | –.17 | –.26 | S | S | |
| | | | | | Burnout–physical/emotional exhaustion | M | –.07 | –.14 | | S | |
| | | | | | Burnout–reduced sense of accomplishment in sport | M | –.19 | –.27 | S | S | |
| Brannan et al. (2009) 204 female university athletes | F-MPS | PS | COM | .41 | Body part satisfaction | A | .03 | .22 | | S | |
| | | | | | Optimism | A | .09 | .25 | | S | |
| | | | | | Global self-esteem | A | .08 | .32 | | S | |
| | | | | | Exercise for health and fitness | A | .21 | .30 | S | S | |
| | | | | | Exercise for socializing and mood management | A | .25 | .20 | S | S | |
| | | | | | Endorsement of bulimic attitudes | M | .14 | –.04 | C | | |
| Chen et al. (2008) 320 intercollegiate athletes (60% female) | AE-MPS | PS | COM | .18 | Burnout | M | –.28 | –.33 | S | S | |
| Chen et al. (2009) 188 high school athletes (46% female) | MIPS | SP | NRI | .60 | Burnout–devaluation of sport participation (Time 1) | M | –.39 | –.38 | S | S | |
| | | | | | Burnout–devaluation of sport | M | –.29 | –.26 | S | S | |

| | | | | | | | | | | |
|------------------------------|-----------|-----|-----|------------|---------------------------------------------------------------|---|-------------|-------------|---|---|
| | | | | | participation (Time 2) | | | | | |
| | | | | | Burnout–physical/emotional exhaustion (Time 1) | M | -.13 | -.21 | | S |
| | | | | | Burnout–physical/emotional exhaustion (Time 2) | M | -.23 | -.27 | S | S |
| | | | | | Burnout–reduced sense of accomplishment (Time 1) | M | -.43 | -.45 | S | S |
| | | | | | Burnout–reduced sense of accomplishment (Time 2) | M | -.22 | -.25 | S | S |
| Dunn, Gotwals, et al. (2006) | Sport-MPS | PS | COM | .54 | Reactions to mistakes–feel angry | M | .38 | .24 | C | C |
| | | | | | Reactions to mistakes—express anger at someone/something | M | .16 | .08 | | |
| | | | | | Reactions to mistakes—express anger verbally | M | .16 | .06 | | |
| | | | | | Trait anger–angry temperament | M | .16 | .04 | | |
| | | | | | Trait anger–angry reaction | M | .36 | .16 | C | |
| Dunn et al. (2002) | Sport-MPS | PS | COM | .40 | Achievement goal–task | A | .20 | .29 | S | S |
| | | | | | Achievement goal–ego | M | .23 | .15 | C | C |
| Ferrand et al. (2007) | HF-MPS | SOP | SPP | .03 | Body appearance satisfaction | A | -.04 | -.03 | | |
| | | | | | Body weight satisfaction | A | -.43 | -.44 | C | C |
| Gotwals et al. (2003) | F-MPS | PS | COM | .50 | Global self-esteem | A | .09 | .39 | | S |
| | | | | | Perceived athletic competence | A | .00 | .21 | | |
| | | | | | Sport performance satisfaction | A | -.14 | .22 | | S |
| Hall et al. (2009) | HF-MPS | SOP | SPP | .44 | Unconditional self-acceptance | A | -.30 | -.11 | C | C |
| | | | | | Exercise dependence—experience positive rewards when exercise | A | .18 | .14 | S | S |
| | | | | | Exercise dependence—exercise for social reasons | A | .04 | -.09 | | |
| | | | | | Exercise dependence—exercise for physical health reasons | A | .05 | .10 | | |
| | | | | | Self-esteem instability | M | .16 | .02 | C | |
| | | | | | Exercise dependence | M | .25 | .14 | C | C |
| | | | | | Exercise dependence—exercise | M | .01 | .00 | | |

| | | | | | | | | | | |
|---------------------------------------------------|-------|----|-----|------------|--------------------------------------------------------------------------------------|---|------------|------------|---|---|
| | | | | | behavior is rigid, stereotyped, and excessive | | | | | |
| | | | | | Exercise dependence—experience withdrawal symptoms when exercise is missed | M | .29 | .24 | C | C |
| | | | | | Exercise dependence—recognition that exercise dependence is a problem | M | .08 | -.03 | | |
| | | | | | Exercise dependence—recognition that exercise interferes with social and family life | M | .15 | .06 | C | |
| Hall et al. (2007) 246 runners (32% female) | F-MPS | PS | COM | .61 | Achievement goal—task | A | .23 | .24 | S | S |
| | | | | | Perceived ability | A | .30 | .31 | S | S |
| | | | | | Achievement goal—ego | M | .43 | .23 | C | C |
| | | | | | Obligatory exercise | M | .45 | .26 | C | C |
| Hall et al. (1998) 119 runners (62% female) | F-MPS | PS | COM | .62 | Achievement goal—task | A | .24 | .32 | S | S |
| | | | | | Achievement goal—task (30 min before competition) | A | .26 | .37 | S | S |
| | | | | | State self-confidence (1 week before competition) | A | .35 | .33 | S | S |
| | | | | | State self-confidence (2 days before competition) | A | .41 | .40 | S | S |
| | | | | | State self-confidence (1 day before competition) | A | .36 | .38 | S | S |
| | | | | | State self-confidence (30 min before competition) | A | .20 | .22 | S | S |
| | | | | | Perceived ability | A | .33 | .33 | S | S |
| | | | | | Achievement goal—ego | M | .34 | .14 | C | |
| | | | | | Achievement goal—ego (30 min before competition) | M | .16 | .04 | | |
| | | | | | State competitive anxiety—cognitive (1 week before competition) | M | .11 | -.04 | | |
| | | | | | State competitive anxiety—cognitive (2 days before competition) | M | .16 | -.11 | | |
| | | | | | State competitive anxiety—cognitive (1 day before competition) | M | .13 | -.09 | | |
| | | | | | State competitive anxiety—cognitive | M | .19 | .06 | C | |

| | | | | | | | | | | |
|---------------------------------------------|--------|-----|-----|-------------|---------------------------------------------------------------|---|-------------|-------------|---|---|
| | | | | | (30 min before competition) | | | | | |
| | | | | | State competitive anxiety–somatic (1 week before competition) | M | -.11 | -.16 | | |
| | | | | | State competitive anxiety–somatic (2 days before competition) | M | -.16 | -.25 | | S |
| | | | | | State competitive anxiety–somatic (1 day before competition) | M | -.14 | -.28 | | S |
| | | | | | State competitive anxiety–somatic (30 min before competition) | M | -.06 | -.12 | | |
| A. P. Hill et al. (2008) | HF-MPS | SOP | SPP | -.16 | Goal progress satisfaction | A | .33 | .31 | S | S |
| 151 male soccer players | | | | | Perceived coach satisfaction with goal progress | A | .34 | .31 | S | S |
| | | | | | Unconditional self-acceptance | A | -.17 | -.25 | C | C |
| | | | | | Burnout–devaluation of sport participation | M | -.42 | -.39 | S | S |
| | | | | | Burnout–physical/emotional exhaustion | M | -.25 | -.21 | S | S |
| | | | | | Burnout–reduced sense of accomplishment | M | -.39 | -.36 | S | S |
| A. P. Hill, Hall, Appleton, & Murray (2010) | HF-MPS | SOP | SPP | .26 | Growth seeking | A | .31 | .37 | S | S |
| 141 canoe/kayak athletes (43% female) | | | | | Burnout–devaluation of sport participation | M | -.14 | -.21 | | S |
| | | | | | Burnout–physical/emotional exhaustion | M | .04 | -.03 | | |
| | | | | | Burnout–reduced sense of accomplishment | M | -.09 | -.20 | | S |
| | | | | | Validation seeking | M | .21 | .09 | C | |
| Kaye et al. (2008) | HF-MPS | SOP | SPP | .37 | Achievement goal–mastery approach | A | .36 | .41 | S | S |
| 372 physical activity students (40% female) | | | | | Behavioral activation system | A | -.10 | -.17 | C | C |
| | | | | | Extraversion | A | .08 | .16 | | S |
| | | | | | Positive affect | A | .21 | .27 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | .08 | .02 | | |
| | | | | | Achievement goal–performance avoidance | M | .14 | .06 | C | |
| | | | | | Behavioral inhibition system | M | -.19 | -.15 | S | S |

| | | | | | | | | | | |
|----------------------|-------|----|-----|-----|--------------------------------------------|---|------|------|---|---|
| | | | | | Fear of devaluing one's self-estimate | M | .15 | .03 | C | |
| | | | | | Fear of having an uncertain future | M | .09 | -.05 | | |
| | | | | | Fear of important others losing interest | M | .15 | -.02 | C | |
| | | | | | Fear of shame and embarrassment | M | .22 | .08 | C | |
| | | | | | Fear of upsetting important others | M | .14 | -.04 | C | |
| | | | | | Negative affect | M | .20 | .07 | C | |
| | | | | | Neuroticism | M | .11 | -.06 | C | |
| | F-MPS | PS | COM | .34 | Achievement goal–mastery approach | A | .25 | .27 | S | S |
| | | | | | Behavioral activation system | A | -.17 | -.22 | C | C |
| | | | | | Extraversion | A | .07 | .15 | | S |
| | | | | | Positive affect | A | .26 | .33 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | -.01 | -.10 | | |
| | | | | | Achievement goal–performance avoidance | M | .00 | -.10 | | |
| | | | | | Behavioral inhibition system | M | -.11 | -.05 | S | |
| | | | | | Fear of devaluing one's self-estimate | M | .05 | -.13 | | S |
| | | | | | Fear of having an uncertain future | M | .00 | -.15 | | S |
| | | | | | Fear of important others losing interest | M | .19 | .01 | C | |
| | | | | | Fear of shame and embarrassment | M | .15 | -.05 | C | |
| | | | | | Fear of upsetting important others | M | .10 | -.02 | | |
| | | | | | Negative affect | M | .10 | -.05 | | |
| | | | | | Neuroticism | M | -.02 | -.18 | | S |
| Lemyre et al. (2008) | F-MPS | PS | COM | .60 | Achievement goal–task | A | -.15 | -.04 | | |
| 141 nordic skiers | | | | | Perceived ability | A | .23 | .33 | S | S |
| (42% female) | | | | | Perceived goal attainment | A | -.07 | .06 | | |
| | | | | | Perceived motivational climate–mastery | A | .08 | .29 | | S |
| | | | | | Performance satisfaction | A | -.07 | .07 | | |
| | | | | | Achievement goal–ego | M | .31 | .15 | C | |
| | | | | | Burnout | M | -.22 | -.37 | S | S |
| | | | | | Burnout–devaluation of sport participation | M | -.15 | -.19 | | S |
| | | | | | Burnout–physical/emotional exhaustion | M | -.22 | -.32 | S | S |

| | | | | | | | | | | |
|-----------------------------------------|-----------|----|------|------------|-----------------------------------------------------------------|---|-------------|-------------|---|---|
| | | | | | Burnout–reduced sense of accomplishment | M | -.19 | -.40 | S | S |
| | | | | | Perceived motivational climate–performance | M | .19 | -.09 | C | |
| McArdle & Duda (2004) | F-MPS | PS | COM | .38 | Achievement goal–task | A | .22 | .27 | S | S |
| 196 youth athletes (61% female) | | | | | Flexible family power structures, role relationships, and rules | A | .09 | .16 | | S |
| | | | | | Motivation regulation–identified | A | .18 | .16 | S | S |
| | | | | | Motivation regulation–intrinsic | A | .35 | .35 | S | S |
| | | | | | Parental achievement goal emphasis–task | A | .10 | .03 | | |
| | | | | | Achievement goal–ego | M | .32 | .26 | C | C |
| | | | | | Motivation regulation–amotivation | M | -.02 | -.12 | | |
| | | | | | Motivation regulation–external | M | .30 | .19 | C | C |
| | | | | | Motivation regulation–introjected | M | .23 | .12 | C | |
| | | | | | Parental achievement goal emphasis–ego | M | .24 | .26 | C | C |
| McArdle & Duda (2008) | F-MPS | PS | COM | .39 | Global self-esteem | A | .31 | .40 | S | S |
| 196 youth athletes (61% female) | | | | | Self-esteem instability | M | .14 | -.01 | | |
| Ommundsen et al. (2005) | F-MPS | PS | COM+ | .53 | Achievement goal–task | A | .14 | .20 | S | S |
| 1719 soccer players (28% female) | | | | | Friendship quality–companionship | A | -.07 | .13 | C | S |
| | | | | | Friendship quality–loyalty and free discussion | A | .01 | .16 | | S |
| | | | | | Perceived motivational climate–mastery | A | .05 | .12 | S | S |
| | | | | | Perceived social acceptance | A | -.01 | .10 | | S |
| | | | | | Achievement goal–ego | M | .30 | .22 | C | C |
| | | | | | Friendship quality–conflict | M | .04 | -.06 | | S |
| | | | | | Perceived motivational climate–performance | M | .31 | .09 | C | C |
| Sagar & Stoeber (2009) | Sport-MPS | PS | COM | .56 | Positive affect after success | A | .11 | .12 | S | S |
| 388 university athletes (46% female) | | | | | Fear of devaluing one’s self-estimate | M | .21 | -.06 | C | |
| | | | | | Fear of having an uncertain future | M | .31 | .10 | C | |

| | | | | | | | | | | |
|--------------------------------------------|--------|----|-----|------------|-------------------------------------------|---|------------|-------------|---|---|
| | | | | | Fear of important others losing interest | M | .23 | -.03 | C | |
| | | | | | Fear of shame and embarrassment | M | .20 | -.12 | C | S |
| | | | | | Fear of upsetting important others | M | .32 | .06 | C | |
| Stoeber & Becker (2008) | MIPS | SP | NRI | .58 | Achievement motive–hope of success | A | .28 | .22 | S | S |
| 74 female soccer players | | | | | General self-serving attributions | A | .05 | .24 | | S |
| | | | | | Internal attributions after success | A | .21 | .31 | S | S |
| | | | | | Achievement motive–fear of failure | M | -.07 | -.20 | | S |
| | | | | | External attributions after success | M | .14 | .01 | | |
| Stoeber et al. (2007) | MIPS | SP | NRI | .63 | Competitive trait self-confidence | A | .15 | .42 | | S |
| 115 university athletes (54% female) | | | | | Competitive trait anxiety–cognitive | M | .20 | -.21 | C | S |
| | | | | | Competitive trait anxiety–somatic | M | .11 | -.22 | | S |
| 74 female soccer players | MIPS | SP | NRI | .58 | Competitive trait self-confidence | A | -.03 | .17 | | |
| | | | | | Competitive trait anxiety–cognitive | M | .20 | -.31 | | S |
| | | | | | Competitive trait anxiety–somatic | M | .17 | -.11 | | |
| 204 high school athletes (36% female) | MIPS | SP | NRI | .35 | Competitive trait self-confidence | A | .18 | .37 | S | S |
| | | | | | Competitive trait anxiety–cognitive | M | .03 | -.22 | | S |
| | | | | | Competitive trait anxiety–somatic | M | .04 | -.19 | | S |
| 142 university athletes (39% female) | MIPS | SP | NRI | .56 | Competitive state self-confidence | A | .02 | .27 | | S |
| | | | | | Competitive state anxiety–cognitive | M | .10 | -.21 | | S |
| | | | | | Competitive state anxiety–somatic | M | .07 | -.13 | | |
| Stoeber et al. (2008) | MIPS-C | SP | NRI | .35 | Achievement goal–mastery | A | .16 | .21 | S | S |
| 204 high school athletes (36% female) | | | | | Achievement goal–performance avoidance | M | .02 | -.14 | | S |
| | MIPS-T | SP | NRI | .41 | Achievement goal–mastery | A | .32 | .37 | S | S |
| | | | | | Achievement goal–performance avoidance | M | .13 | -.03 | | |
| 147 sport science students (39% female) | MIPS-C | SP | NRI | .56 | Achievement goal–mastery approach | A | .49 | .45 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | .21 | -.03 | C | |
| | | | | | Achievement goal–performance avoidance | M | .10 | -.03 | | |
| | MIPS-T | SP | NRI | .53 | Achievement goal–mastery approach | A | .50 | .43 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | .06 | -.10 | | |
| | | | | | Achievement goal–performance | M | .12 | .05 | | |

| | | | | avoidance | | | | | | |
|-------------------------------------------------------------------|-----------|------------|------|------------|-----------------------------------------------|---|------------|-------------|---|---|
| Stoeber, Stoll, et al. (2009) 138 male ice hockey players | MIPS | SP | NRI | .49 | Achievement goal–mastery approach | A | .49 | .45 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | .30 | .08 | C | |
| | | | | | Achievement goal–performance avoidance | M | .23 | .06 | C | |
| | Sport-MPS | PS | COM | .41 | Achievement goal–mastery approach | A | .40 | .33 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | .32 | .14 | C | |
| | | | | | Achievement goal–performance avoidance | M | .26 | .16 | C | |
| Stoeber, Uphill, et al. (2009) 112 triathletes (22% female) | Sport-MPS | PS | COM | .59 | Achievement goal–mastery approach | A | .38 | .38 | S | S |
| | | | | | Previous best performance–cycling | A | .23 | .16 | S | |
| | | | | | Previous best performance–running | A | .22 | .11 | S | |
| | | | | | Previous best performance–swimming | A | .39 | .37 | S | S |
| | | | | | Race performance | A | .43 | .41 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | .24 | –.04 | C | |
| | | | | | Achievement goal–performance avoidance | M | .12 | –.22 | | S |
| 321 triathletes (17% female) | Sport-MPS | PS | COM | .64 | Achievement goal–mastery approach | A | .47 | .38 | S | S |
| | | | | | Expectancy of achieving race outcome goal | A | –.11 | .06 | | |
| | | | | | Expectancy of achieving race performance goal | A | .13 | .25 | S | S |
| | | | | | Personal best performance–cycling | A | .20 | .19 | S | S |
| | | | | | Personal best performance–running | A | .20 | .19 | S | S |
| | | | | | Personal best performance–swimming | A | .21 | .28 | S | S |
| | | | | | Race outcome goal | A | .43 | .42 | S | S |
| | | | | | Race performance | A | .28 | .32 | S | S |
| | | | | | Race performance goal | A | .20 | .23 | S | S |
| | | | | | Seasonal best performance–cycling | A | .18 | .20 | S | S |
| | | | | | Seasonal best performance–running | A | .25 | .26 | S | S |
| | | | | | Seasonal best performance–swimming | A | .26 | .34 | S | S |
| | | | | | Achievement goal–mastery avoidance | M | .35 | .04 | C | |
| Achievement goal–performance avoidance | M | .17 | –.03 | C | | | | | | |
| Stoll et al. (2008) | MIPS-T | SP | NRI | .30 | Average increment in points per series | A | .00 | –.03 | | |

| | | | | | | | | | | |
|--------------------------------------------|-----------|----|-----|------------|--------------------------------------|---|------------|------------|---|---|
| 122 sport science students (53% female) | | | | | Points in basketball task (Series 1) | A | .21 | .27 | S | S |
| | | | | | Points in basketball task (Series 2) | A | .21 | .22 | S | S |
| | | | | | Points in basketball task (Series 3) | A | .13 | .12 | | |
| | | | | | Points in basketball task (Series 4) | A | .24 | .26 | S | S |
| | | | | | Total points in basketball task | A | .25 | .27 | S | S |
| Vallance et al. (2006) | Sport-MPS | PS | COM | .28 | Trait anger–angry reaction | M | .21 | .12 | C | |
| 227 male ice hockey players | | | | | Trait anger–angry temperament | M | .08 | .02 | | |

Note. Study and sample: sample size = sample size used for the analyses (after excluding outliers); % female based on initial sample (before excluding outliers). Instrument: AE-MPS = Anshel-Eom Multidimensional Perfectionism Scale (Anshel & Eom, 2003), F-MPS = Frost Multidimensional Perfectionism Scale (Frost et al., 1990), HF-MPS = Hewitt-Flett Multidimensional Perfectionism Scale (Hewitt & Flett, 1990), MIPS = Multidimensional Inventory of Perfectionism in Sport (MIPS-C = competition version, MIPS-T = training version; Stoeber, Otto, & Stoll, 2006), Sport- MPS = Sport Multidimensional Perfectionism Scale (Dunn et al., 2002; revised version: Gotwals & Dunn, 2009). Perfectionistic strivings: PS = Personal Standards, SOP = Self-Oriented Perfectionism, SP = Striving for Perfection subscale. Perfectionistic concerns: COM = Concern over Mistakes; COM+ = composite of Concern over Mistakes, Doubts about Actions, Parental Expectations, and Parental Criticism; NRI = Negative Reactions to Imperfection; SPP = Socially Prescribed Perfectionism subscale. r^* = bivariate correlation between perfectionistic strivings and perfectionistic concerns. Rating: A = characteristic/process/outcome was categorized as primarily adaptive/healthy/facilitative, M = characteristic/process/outcome was categorized as primarily maladaptive/unhealthy/debilitative. r = bivariate correlation between perfectionistic strivings and characteristic/process/outcome. pr = partial correlation between perfectionistic strivings and characteristic/process/outcome controlling for the influence of perfectionistic concerns. *Er* and *Epr*: S = supportive evidence, C = contrary evidence, blank = bivariate/partial correlation was nonsignificant. Boldfaced correlations are significant at $p < .05$ (two-tailed).