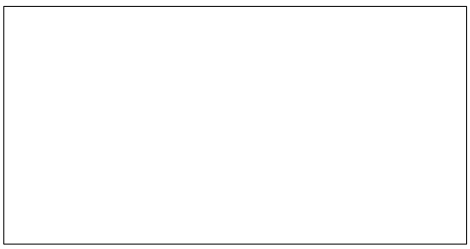

Perfectionism and athlete engagement: A multi-sample test of the 2 × 2 model of perfectionism

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Abstract

Few studies have examined how perfectionism relates to athlete engagement. In addition, the studies that do exist have focused on the main effects of dimensions of perfectionism as opposed to their interactive effects. The first purpose of the study was therefore to examine the interactive effects of dimensions of perfectionism in predicting athlete engagement and, in doing so, test the hypotheses of the 2 × 2 model of perfectionism. The second purpose of the study was to examine whether support for the 2 × 2 model depended on the instrument used to measure perfectionism. Three samples of junior and adult athletes from various sports (total $N = 730$) completed a measures of perfectionism indicative of personal standards perfectionism (PSP) and evaluative concerns perfectionism (ECP) (HF-Multidimensional Perfectionism Scale, Cox, Enns, & Clara, 2002; Sport-Multidimensional Perfectionism Scale-2, Gotwals, Dunn, Causgrove Dunn, & Gamache, 2011; Multidimensional Inventory of Perfectionism for Sport, Stoeber et al. 2007), as well as a measure of athlete engagement (Athlete Engagement Questionnaire, Lonsdale, Hodge & Jackson, 2007). Moderated regression analyses provided support for the hypotheses of the 2 × 2 model for some facets of engagement but not others. Generally, pure PSP (high PSP/low ECP) was associated with the highest levels of athlete engagement and pure ECP (low PSP/high ECP) was associated with the lowest levels of athlete engagement. Support for the 2 × 2 model also differed depending on the instrument used to measure perfectionism. Overall, the findings suggest that the 2 × 2 model may explain differences between athletes in levels of engagement. However, these differences will depend on which indicators of PSP and ECP are examined.

Keywords: vigor; dedication; confidence; enthusiasm; sport

Introduction

The study of motivation and performance among athletes requires consideration of both optimal functioning and suboptimal functioning (Diener, 2003). However, mirroring other areas of psychology, sport psychology has historically focused more on the latter (Gould, 2002). One area of research where this trend is evident is the study of athlete burnout at the expense of studying its conceptual opposite, athlete engagement. As described by Lonsdale, Hodge and Jackson (2007a, 2007b), athlete engagement is a persistent, positive, cognitive-affective experience. It is characterized by the presence of confidence (a belief in one's ability to attain a high level of performance and desired goals), dedication (a desire to invest effort and time towards achieving personally important goals), vigour (a sense of physical and mental liveliness) and enthusiasm (feelings of high levels of excitement and enjoyment). Rather than studying concepts that only provide the basis for reducing negative experiences, athlete engagement provides a framework to study and promote positive experiences in sport (Hodge, Lonsdale, & Rose, 2009).

Regarding how athlete engagement develops, Lonsdale et al. (2007b) argued that Self-Determination Theory (SDT) offers one useful explanation. Self-Determination Theory is an organismic approach to studying human behaviour (Deci & Ryan, 2017). One of the main tenets of the theory is that satisfaction of basic psychological needs for autonomy (volition, choice, and self-directness), competence (perceptions of effectiveness), and relatedness (a sense of belonging or connection to others) provide the basis for positive psychological outcomes, more internalised and optimal motivation, and well-being (Deci & Ryan, 2002). By contrast, the thwarting of basic psychological needs provides the basis for negative psychological outcomes, more externalised and suboptimal motivation, and ill-being. From this perspective, athlete engagement can be viewed as generalised well-being

associated with need satisfaction and the presence of more internalised, optimal, motivation (Lonsdale et al., 2007b).

Perfectionism

Researchers have begun to examine the role of perfectionism in the development of athlete engagement (e.g., Jowett, Hill, Hall, & Curran, 2016). Perfectionism is a personality trait of excessively high standards accompanied by overly critical evaluation (Frost et al., 1990). There are several models and instruments available to measure perfectionism. The three most popular in sport have been developed by Dunn et al. (2006; Gotwals & Dunn, 2009), Stoeber, Otto, Pescheck, Becker, and Stoll (2007), and Hewitt and Flett (1991). Dunn et al. (2006) adapted a model from outside of sport by Frost et al (1990) that included high personal standards and an array of other dimensions, notably, "overconcern" for errors and mistakes, doubts about the quality of performance, and perceived pressures from others. Stoeber et al.'s (2007) proposed a model with only two dimensions. Like Dunn et al., the first dimension focused on high personal standards, specifically, striving for perfection. The other dimension focused on extreme negative reactions when perfection is not obtained – feelings of stress, depression, anger, frustration, and dissatisfaction (Stoeber et al., 2007). The final model by Hewitt and Flett (1991) is more distinct from the other two approaches because it focused on sources of perfectionistic standards and critical evaluation that can be imposed by the self (self-oriented perfectionism), imposed by others (socially prescribed perfectionism) or imposed on others (other-oriented perfectionism).

In order to integrate these different models and instruments, researchers have also studied perfectionism via two higher-order factors. The first higher-order factor is personal standards perfectionism (PSP), also referred to as perfectionistic strivings, and entails a personal commitment to exacting standards with elements of stringent self and other-evaluation. This factor is measured using a collection of the lower-order dimensions from the

different models of perfectionism and can include high personal standards, striving for perfection, and self-oriented perfectionism (Dunn et al., 2009; Hewitt & Flett, 1991; Stoeber et al., 2007). The second higher-order factor is evaluative concerns perfectionism (ECP), also referred to as perfectionistic concerns, and entails beliefs that others are imposing perfectionistic standards on the self and engage in harsh self-evaluation. Like PSP, ECP is measured using a collection of lower-order dimensions that can include concern over mistakes, negative reactions to imperfection, and socially prescribed perfectionism (Dunn et al., 2009; Hewitt & Flett, 1991; Stoeber et al., 2007).

Initial research in sport focused on studying the two higher-order dimensions and their subdimensions independently. Studying them in this way involved examining the two dimensions separately and often in a manner that focused on their unique effects (see Hill, Mallinson-Howard, & Jowett, 2018, for a review). More recently researchers have begun to examine the interactive effects of PSP and ECP. That is, how the presence of combinations of high and low levels of the two dimensions may increase or decrease their effects on various outcomes (e.g., self-worth, enjoyment, friendship quality; Mallinson, Hill, Hall, & Gotwals, 2014). In doing so, this research has typically adopted the 2 × 2 model of perfectionism (Gaudreau & Thompson, 2010). The 2 × 2 model is based on the notion that PSP and ECP coexist to varying degrees within each individual. Moreover, different subtypes or within-person combinations of perfectionism can be differentiated and correspond with different aetiologies, motivational processes, and outcomes.

As described by Gaudreau and Thompson (2010), there are four within-person combinations of perfectionism in the 2 × 2 model. The first within-person combination is non-perfectionism (low PSP/low ECP) and reflects neither perceived social pressure nor personal orientation towards perfectionistic standards. The second within-person combination is pure PSP (high PSP/low ECP) and reflects a uniquely personal and internally regulated

orientation towards perfectionistic standards. The third within-person combination is pure ECP (low PSP/high ECP) and reflects a uniquely social orientation and externally regulated pressure towards perfectionistic standards. The final within-person combination is mixed perfectionism (high PSP/high ECP) and reflects both personal and social, internally and externally regulated, orientations towards perfectionistic standards.

Four accompanying hypotheses are used to test the 2 × 2 model. The first hypothesis is multipronged and states that based on a comparison of pure PSP and non-perfectionism, pure PSP is associated with (H1a) better adjustment, (H1b) worse adjustment, or (H1c) the same adjustment. The second hypothesis states that, as pure ECP is the most externally or socially regulated, it should be the most detrimental within-person combination as illustrated via comparison to non-perfectionism (Gaudreau & Verner-Fillon, 2012). The third hypothesis states that, as a partially internalised within-person combination of perfectionism, mixed perfectionism should be associated with better adjustment when compared to pure ECP. This hypothesis also reflects the assumption that the presence of high PSP will buffer the presence of higher ECP. Finally, the fourth hypothesis states that mixed perfectionism is associated with poorer adjustment when compared to pure personal standards perfectionism, which is an internally regulated within-person combination of perfectionism.

Hill and Madigan (2017) recently conducted a review of studies that examined the 2 × 2 model in sport, exercise and dance. Of the nine studies reviewed, five were in athletes. These studies examined a range of criterion variables including cognitive appraisals, affect, coping, vitality, life satisfaction, burnout, enjoyment, physical self-worth, and friendship quality. Across all nine studies, based on effect size estimates H1a was supported 81% of the time and contradicted 19% of the time (H1b). H2 was supported 91% of the time and unsupported 9% of the time. H3 was supported 77% of the time and unsupported 23% of the time. And, H4 was supported 91% of the time and unsupported 9% of the time. In other

words, although not without exception, the hypotheses of the 2 × 2 model tended to be supported and within-person combinations were identifiable in a manner reflecting the specific configurations of ECP and PSP most of the time. The 2 × 2 model therefore appears to be a useful framework that can be used to distinguish between perfectionistic athletes in regard to their experiences in sport.

Perfectionism and Athlete Engagement

There are two main reasons to expect within-person combinations of perfectionism to differ in regard to athlete engagement. First, all four within-person combinations of perfectionism have motivational underpinnings that vary in degrees of internalisation and corresponding propensities for functional outcomes (Deci & Ryan, 2008). This notion mirrors current understanding of athlete engagement in a manner that one would expect internally regulated within-person combinations of perfectionism (e.g., pure PSP) to be more likely to promote athlete engagement than externally regulated within-person combinations of perfectionism (e.g., pure ECP). Second, research findings suggest that propensity for different functional outcomes of the four within-person combinations of perfectionism extends to antecedents of athlete engagement, notably, psychological need fulfilment (Mallinson & Hill, 2011). Specifically, the presence of high ECP has been found to undermine psychological needs of autonomy, competence and relatedness (possibly because it includes perceptions of external pressure and criticism from others). By contrast, when ECP is controlled for, the presence of high PSP has been found to satisfy psychological needs of autonomy, competence, and relatedness (possibly because of a greater sense of control and agency it encompasses).

Researchers have yet to directly examine the 2 × 2 model in regard to athlete engagement. However, there is indirect evidence that can be drawn upon to hypothesise about the likely relationships. For example, research has examined the 2 × 2 model in relation to

concepts similar to athlete engagement such as vitality (Gaudreau & Verner-Fillion, 2012), positive affect (Crocker et al., 2014), and enjoyment (Mallinson et al., 2014). Research has also examined the conceptual opposite of athlete engagement, athlete burnout (Hill, 2014). The most direct evidence available has been provided by the only study in sport to examine the relationship between perfectionism and athlete engagement (Jowett et al., 2016). Although this study did not test the hypotheses of the 2 × 2 model, the findings of this study can be interpreted retrospectively using the 2 × 2 model (see Gaudreau, 2012). When this is done, support is found for hypotheses H1a and H3, but not H2 and H4. That is, pure PSP was associated with higher engagement than non-perfectionism and mixed perfectionism was associated with higher engagement than pure ECP. Building on this research, and testing the hypotheses of the 2 × 2 model in relation to athlete engagement directly, is the first purpose of the current study.

Different Indicators

A further issue worth investigating is whether different subdimensions or indicators of PSP and ECP influence the relationship between within-person combinations of perfectionism and athlete engagement. This is the case because researchers regularly use different indicators of perfectionism in research and doing so may produce different findings. On one hand, indicators of the same higher-order dimension might be expected to perform similarly. This tendency has been described as functional homogeneity by Gaudreau (2016) and is one of the assumptions of the higher-order model. On the other hand, dimensions of perfectionism can vary widely in their content. This variability is especially evident for ECP that can include dimensions that focus on the self (e.g., concerns of mistakes, “If I fail in competition, I feel like a failure as a person”) or on others (e.g., coach pressure, “Only outstanding performance in competition is good enough for my coach”). As such, when

different indicators of ECP and PSP are used, we might expect the within-person combinations of perfectionism to display different relationships with outcome variables.

Evidence for this possibility was recently been provided by a meta-analytical study in sport. It was found that the instrument used to measure perfectionism moderated the relationship between perfectionism and variables such as motivation regulation, goal orientation, and performance (Hill et al., 2018). Some indicators of PSP and ECP, then, have different relationships depending on the instrument used and the outcome variable examined. There is also evidence that alludes to similar effects for athlete engagement from research that has tested the 2 × 2 model in sport. Specifically, comparison of the findings of research that has examined the opposite of athlete engagement, athlete burnout, has indicated that support for the 2 × 2 model and its four hypotheses may depend, at least partly, on the instrument used to measure perfectionism (see Hill, 2013 vs Madigan, Stoeber, & Passfield, 2016).

The Present Study

Researchers have yet to examine the 2 x 2 model in relation to athlete engagement. Therefore, the first purpose of the present study was to examine the interactive effects of perfectionism on athlete engagement. In doing so, the hypotheses of the 2 × 2 model of perfectionism were tested. The first hypothesis was that pure PSP would be associated with higher athlete engagement (H1a). The second hypothesis was that pure ECP perfectionism would be associated with the lowest level of athlete engagement (H2). The third hypothesis was that mixed perfectionism would be associated with higher athlete engagement than pure ECP (H3). The fourth hypothesis was that mixed perfectionism would be associated with lower athlete engagement than pure PSP (H4). In addition, as researchers have recently found that the use of different indicators of PSP and ECP can influence the degree of support for the hypotheses of the 2 × 2 model, the second purpose of the present study was to test whether

this was the case in regard to athlete engagement. We offer no hypotheses in this regard as this part of the study was considered exploratory.

Method

Participants

Sample one were 297 junior swimmers (*M* age 15.16 yrs, *SD* = 1.93; 127 males and 159 females) recruited from recreational clubs. They reported that they trained and competed on average for 5.54 hrs per week (*SD* = 2.78 hrs) and had been competing for 4.14 years (*SD* = 2.50 years).

Sample two were 222 junior athletes (*M* age 16.01 yrs, *SD* = 2.68; 98 males and 124 females) recruited from various sports that included football (*n* = 61), rugby (*n* = 47) cricket (*n* = 17), swimming (*n* = 62), synchronised swimming (*n* = 20), diving (*n* = 14), and golf (*n* = 1). They reported that they trained and competed on average for 9.51 hrs per week (*SD* = 4.54 hrs) and had been competing for 7.21 years (*SD* = 3.53 years). Sample two has been used previously in a published piece of research (Blinded for Peer Review).

Sample three were 211 adult athletes (*M* age 18.9 yrs, *SD* = 1.38; 139 males and 72 females) was recruited from university teams and sports clubs in a range of sports that included football (*n* = 123), triathlon (*n* = 11), rugby (*n* = 10), netball (*n* = 9), hockey (*n* = 7), cricket (*n* = 6), and other sports (e.g., basketball, athletics; *n* = 45). They reported that they trained and competed on average for 8.42 hours per week (SD = 6.23) and had been competing for 8.79 years (*SD* = 4.52 years).

Design and Procedures

A cross-sectional, questionnaire-based, design was employed in the current study using a mix of purposeful (athletes) and convenience sampling (local clubs willing to allow us to distribute questionnaires) was used. Local sports clubs were contacted with information regarding the study. Questionnaires were then distributed to participants in paper-and-pencil

format. Participants typically completed questionnaires at training sessions. Some completed the questionnaires at home and returned them via post. Coaches and parents were sometimes present when the questionnaires were distributed but questionnaires were completed independently by the participants. Questionnaires were completed once by participants. Three instruments were included in the questionnaires to measure perfectionism. The brief version of Hewitt and Flett's (1991) Multidimensional Perfectionism Scale (HF-MPS, Cox, Enns, & Clara, 2002), Dunn et al.'s Sport-Multidimensional Perfectionism Scale-2 (S-MPS-2; Gotwals et al., 2009) and Stoeber et al.'s (2007) Multidimensional Inventory of Perfectionism in Sport (MIPS). In sample one we compared HF-MPS and MIPS; in sample two we compared HF-MPS and S-MPS-2; and in sample three we compared MIPS and S-MPS-2. In doing so, we were able to examine all possible comparisons of the three most popular instruments used to measure perfectionism in sport across three independent samples: HF-MPS vs MIPS, HF-MPS vs S-MPS-2, and MIPS vs S-MPS-2. Ethical approval was granted for the research from an institutional review board. In all cases, participants provided consent based upon an information sheet/consent form prior to taking part in the study. Parental/guardian consent was gained when participants were under 18 years old.

Instruments

Multidimensional Perfectionism Scale-Brief (HF-MPS). The brief version of the Multidimensional Perfectionism Scale (Hewitt & Flett, 1991) includes three subscales, two of which were used in the current study to assess self-oriented perfectionism (SOP; 5-items, e.g., "I set very high standards for myself") and socially prescribed perfectionism (SPP; 5-items, e.g., "My family expects me to be perfect"). Athletes respond on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The instructions of the instrument were adapted to focus athletes on sport when completing the scale as opposed to their general life ("The following items ask you to think about when you are practicing or playing your sport").

Evidence for the validity and reliability of the scores of this instrument has been provided by Cox et al. (2002) via assessment of factor structure and internal reliability. The shortened subscales are also strongly related to the original subscales (Cox et al., 2002).

Multidimensional Inventory of Perfectionism in Sport (MIPS). The MIPS includes two subscales that assess striving for perfection (SP; 5-items, e.g., "I strive to be as perfect as possible") and negative reactions to imperfection (NRI; 5-items, e.g., "I feel extremely stressed if everything does not go perfectly"). Both were used in the current study. Athletes respond to items on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Evidence for the validity and reliability of the scores of this instrument has been provided by Madigan (2016) via assessment of factorial structure and internal consistency.

Sport-Multidimensional Perfectionism Scale-2 (S-MPS-2). The S-MPS-2 is a domain specific adaption of Frost et al.'s (1990) Multidimensional Perfectionism Scale and includes six subscales (Dunn et al., 2006; Gotwals et al., 2009). Two subscales were used in the current study to assess personal standards (PS; 7-items, e.g., "I have extremely high goals for myself in my sport") and concern over mistakes (COM; 8-items, e.g., "If I fail in competition, I feel like a failure in person"). Athletes respond to items on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Evidence for the validity and reliability of the scores of this instrument has been provided Dunn and colleagues (Dunn et al., 2006; Gotwals et al., 2009) via assessment of factorial structure and internal consistency.

Athlete Engagement Questionnaire (AEQ). Athlete engagement was measured using the AEQ (Lonsdale, Hodge & Jackson, 2007b). This instrument includes four subscales that assess confidence (4-items, e.g., "I believe I am capable of accomplishing my goals in sport."); dedication (4-items, e.g., "I am dedicated to achieving my goals in sport."); vigour (4-items, e.g., "I feel energised when I participate in my sport.") and enthusiasm (4-items, e.g., "I am enthusiastic about my sport."). Items are measured on a 5-point Likert scale (1 =

almost never to 7 = *almost always*). Evidence for the validity and reliability of this instrument has been provided by Lonsdale et al. (2007b) via assessment of factorial structure and internal consistency.

Analytical strategy

The 2 × 2 model was tested following the guidelines provided by Gaudreau (2012; Gaudreau & Thompson, 2010). Each dimension of athlete engagement was regressed on dimensions of perfectionism (e.g., PS and CM) and their interaction. Dimensions of perfectionism were centered and entered as a predictor block (Step 1) followed by a predictor block that included the two dimensions of perfectionism and their interaction term (Step 2). As per the recommendation of Gaudreau (2012), when the interaction term was not statistically significant, a multiple regression was conducted that included only dimensions of perfectionism (uncentered) and was interpreted. In each case, predicted values of athlete engagement that corresponded with each within-person combinations were calculated. In the absence of a significant interaction term, hypotheses were interpreted using the operational framework provided by Gaudreau (2012). In the presence of a significant interaction term, two sets of simple slopes were calculated to enable comparison of the predicted values and test the hypotheses: PSP and athlete engagement at low (–1 SD; hypothesis 1) and high (+1 SD; hypothesis 3) ECP, and ECP and athlete engagement at low (–1 SD; hypothesis 2) and high (+1 SD; hypothesis 4) PSP. Estimates of regression coefficients are accompanied by 95% percentile bootstrapped confidence intervals (based on 1000 resamples) as they are considered very robust under various conditions relating to the assumptions of regression analyses (Williams, Grajales, & Kurkiewicz, 2013). All analyses were conducted using SPSS (version 24) and PROCESS macro (version 3.3; Hayes, 2013).

Results

Preliminary Analysis

All three samples were assessed for missing values. For sample one, three participants were removed due to a large amount of missing data (>5%). Thereafter, 19 participants had missing data for one item (15 unique patterns). Missing values were replaced by the mean of available responses for that individual on the variable (ipsatised item replacement, which is considered a reasonable and practical solution when missing data at item level is low, Graham, Cumsille, & Elek-Fisk, 2003). Two participants were removed as univariate outliers (z-score 3.29) and five as multivariate outliers, χ^2 (8) = 26.13, p <.001 For sample two, two participants had missing data larger than 5%. Thereafter, 32 participants had missing data for one item (10 unique patterns) and 3 participants had missing data for 2 items (3 unique patterns). Missing values were replaced by ipsatised item replacement. Six were removed as univariate outliers (z-score 3.29) and two removed as multivariate outliers, χ^2 (8) = 26.13, p < .001. For sample three, three participants were removed due to a large amount of missing data (>5%). Thereafter, 13 participants had missing data for one item. Again, missing values were replaced by ipsatised item replacement. No participants were removed as univariate outliers and five participants were removed as multivariate outliers, χ^2 (8) = 24.32, p < .001.

Descriptive Statistics and Bivariate Correlations

Descriptive statistics and bivariate correlations are displayed in Table 1. Mean levels of indicators of PSP were typically higher than indicators of ECP. Levels of engagement were similar across samples. In all cases, indicators of PSP and ECP were positively correlated with each other. Indicators of ECP were either unrelated or negatively related to athlete engagement. By contrast, indicators of PSP were typically positively related to athlete engagement. Two notable exceptions in this regard are found in sample one where the relationships for one indicator of PSP (striving for perfection) was mixed (positive and negative relationships) and in sample three where one indicator of ECP (negative reactions to imperfection) was positively related to engagement (dedication).

Moderated Hierarchical Regressions

Sample one (HF-MPS vs MIPS)

Confidence. For HF-MPS, there was no significant interaction term when predicting confidence. Excluding the interaction term, the model was statistically significant, F (2, 283) = 27.80, $p < .001$, R^2 = 16.4%. SOP (B = 0.27, 95% CI = 0.19 to 0.35, t = 7.42, $p < .001$) and SPP (B = -0.08, 95% CI = -0.14 to -0.02, -t =-2.67, p = .008) significantly predicted confidence. This pattern of effects provides support for H1a and all other hypotheses.

For MIPS, there was no significant interaction term when predicting confidence. Excluding the interaction term, the model was statistically significant, F (2, 283) = 5.08, p = .010, R^2 = 3.5%. Neither SP (B = 0.02, 95% CI = -0.11 to 0.16, t =0.31, p = .754) or NRI (B =-.11, 95% CI = -0.23 to 0.00, t = -1.89, p = .060) uniquely predicted confidence. This pattern of effects provides support for H1c and none of the other hypotheses.

Dedication. For HF-MPS, there was no significant interaction term when predicting dedication. Excluding the interaction term, the model was statistically significant, F (2, 283) = 32.21, $p < .001$, R^2 = 18.5%. SOP (B = 0.30, 95% CI = 0.22 to 0.39, t = 7.98, $p < .001$) and SPP (B = -0.09, 95% CI = -0.16 to -0.02, t = -2.82, p = .005) significantly predicted dedication. This pattern of effects provides support for H1a and all other hypotheses.

For MIPS, there was no significant interaction term when predicting dedication. Excluding the interaction term, the model was statistically significant, F (2, 283) = 3.10, p = .047, R^2 = 2.1%. Neither SP (B = 0.04, 95% CI = -0.11 to 0.19, t =0.07, p = .565) or NRI (B =-.11, 95% CI = -0.25 to 0.04, t = -1.73, p = .085) uniquely predicted confidence. This pattern of effects provides support for H1c and none of the other hypotheses.

Vigour. For HF-MPS, there was no significant interaction term when predicting vigour. Excluding the interaction term, the model was statistically significant, F (2, 283) = 7.10, p = .001, R^2 = 4.8%. SOP significantly predicted vigour (B = 0.17, 95% CI = 0.07 to

0.26, $t = 3.65$, $p < .001$) but ECP did not (B = -0.03, 95% CI = -0.11 to 0.05, $t = -0.80$, $p = .426$). This pattern of effects provides support for H1a and H3.

For MIPS, there was no significant interaction term when predicting vigour. Excluding the interaction term, the model was statistically significant, F (2, 283) = 7.14, $p = .001$, $R^2 = 4.8\%$. PSP did not significantly predict vigour (B = 0.07, 95% CI = -0.07 to 0.22, $t = 0.98$, $p = .33$) but ECP did (B = -.19, 95% CI = -0.32 to -0.06, $t = -2.70$, $p = .007$). This pattern of effects provides support for H1c, H2 and H4.

Enthusiasm. For HF-MPS, there was no significant interaction term when predicting enthusiasm. Excluding the interaction term, the model was statistically significant, F (2, 283) = 3.35, $p = .037$, $R^2 = 2.3\%$. SOP (B = 0.12, 95% CI = 0.03 to 0.21, $t = 2.50$, $p = .013$) predicted enthusiasm but SPP did not (B = -0.07, 95% CI = -0.15 to 0.02, $t = -1.72$, $p = .086$). This pattern of effects provides support for H1a and H3.

For MIPS, there was no significant interaction term when predicting enthusiasm. Excluding the interaction term, the model was statistically significant, F (2, 283) = 14.14, $p < .001$, $R^2 = 9.1\%$. PSP did not significantly predict vigour (B =0.06, 95% CI = -0.09 to 0.23, $t = 0.81$, $p = .418$) but ECP did (B = -.25, 95% CI = -0.37 to -0.11, t =-3.98, $p = .001$). This pattern of effects provides support for H1c, H2 and H4.

Sample two (HF-MPS vs S-MPS-2)

Confidence. For HF-MPS, there was no significant interaction term when predicting confidence. Excluding the interaction term, the model was statistically significant, F (2, 209) = 16.49, $p < .001$, $R^2 = 13.6\%$. SOP (B = 0.31, 95% CI = 0.20 to 0.42, t =5.74, $p < .001$) predicted confidence but SPP did not (B =-0.07, 95% CI = -0.16 to 0.02, $t = -1.49$, $p = .138$). This pattern of effects provides support for H1a and H3.

For S-MPS-2, there was no significant interaction term when predicting confidence. Excluding the interaction term, the model was statistically significant, F (2, 209) = 19.63, $p >$

.001, R^2 = 15.8%. Both PS (B = 0.50, 95% CI = 0.35 to 0.65, *t* =6.20, *p* > .001) and CM (B = -0.21, 95% CI = -0.37 to -0.06, *t* = -2.89, *p* = .004) predicted confidence. This pattern of effects provides support for H1a and all other hypotheses.

Dedication. For HF-MPS, there was a significant interaction term when predicting dedication, initial R^2 = .25, *F* (3, 208) = 23.51, R^2 change =.03, *F* (2, 208) = 7.72, *p* = .006, interaction B = 0.13, 95% CI = 0.02 to 0.21, *t* = 2.78, *p* =.006. Examination of simple slopes revealed that SOP at low SPP was significant (B = .22, 95% CI = 0.09 to 0.35, *t* = 3.34, *p* =.001; supporting H1a), SOP at high SPP was significant (B = .47, 95% CI = 0.35 to 0.59, *t* = 7.55, *p* <.001; supporting H3), SPP at low SOP was significant (B = -.22, 95% CI = -0.32 to -0.11, *t* = -4.07, *p* <.001; supporting H2), and SPP at high SPP was not significant (B = -.003, 95% CI = -0.11 to 0.11, *t* = -0.58, *p* =.954; rejecting H4).

For S-MPS-2, there was no significant interaction term when predicting dedication. Excluding the interaction term, the model was statistically significant, *F* (2, 209) = 32.39, *p* < .001, R^2 = 23.7%. Both PS (B = 0.53, 95% CI = 0.39 to 0.67, *t* =7.80, *p* > .001) and CM (B =-0.18, 95% CI = 0.31 to -0.04, *t* = -2.93, *p* = .004) predicted confidence. This pattern of effects provides support for H1a and all other hypotheses.

Vigour. For HF-MPS, there was no significant interaction term when predicting vigour. Excluding the interaction term, the model was statistically significant, *F* (2, 209) = 7.91, *p* < .001, R^2 = 7.0%. SOP significantly predicted vigour (B = 0.23, 95% CI = 0.11 to 0.35, *t* = 3.96, *p* < .001) but ECP did not (B = -0.06, 95% CI = -0.16 to 0.04, *t* = -1.17, *p* = .242). This pattern of effects provides support for H1a and H3.

For S-MPS-2, there was no significant interaction term when predicting vigour. Excluding the interaction term, the model was statistically significant, *F* (2, 283) = 7.63, *p* = .001, R^2 = 6.8%. PS (B = 0.34, 95% CI = 0.15 to 0.53, *t* =3.87, *p* > .001) significantly

predicted vigour but CM (B = -0.15, 95% CI = -0.31 to 0.03, t = -1.85, p = .066) did not. This pattern of effects provides support for H1a and H3.

Enthusiasm. For HF-MPS, there was a significant interaction term when predicting enthusiasm, initial R^2 = .08, F (3, 208) = 5.67, R^2 change =.02, F (2, 208) = 4.76, p = .030, interaction B = 0.12, 95% CI = 0.01 to 0.21, t = 2.18, p =.030). Examination of simple slopes revealed that SOP at low SPP was not significant (B = 0.08, 95% CI = -0.09 to 0.20, t = 0.77, p =.444; supporting H1c), SOP at high SPP was significant (B = 0.28, 95% CI = 0.14 to 0.42, t = 3.98, p <.001; supporting H3), SPP at low SOP was significant (B = -.16, 95% CI = -0.28 to -0.04, t = -2.55, p =.012; supporting H2), and SPP at high SPP was not significant (B =0.04, 95% CI = -0.09 to 0.16, t = 0.58, p =.560; rejecting H4).

For S-MPS-2, there was no significant interaction term when predicting enthusiasm. Excluding the interaction term, the model was statistically significant, F (2, 209) = 5.51, p = .005, R^2 = 5.0%. PS significantly predicted enthusiasm (B = 0.25, 95% CI = 0.09 to 0.41, t = 3.25, p = .001) but CM did not (B = -0.09, 95% CI = -0.24 to 0.06, t =-1.35, p = .178). This pattern of effects provides support for H1a and H3.

Sample three (MIPS vs S-MPS-2)

Confidence. For MIPS, there was no significant interaction term when predicting confidence. Excluding the interaction term, the model was statistically significant, F (2, 200) = 16.33, p < .001, R^2 = 14.0%. Both SP (B = 0.32, 95% CI = 0.21 to 0.44, t =5.69, p < .001) and NRI significantly predicted self-confidence (B = -0.18, 95% CI = -0.32 to -0.06, t = -2.91, p = .004). This pattern of effects provides support for H1a and all other hypotheses.

For S-MPS-2, there was no significant interaction term when predicting confidence. Excluding the interaction term, the model was statistically significant, F (2, 200) = 31.97, p < .001, R^2 = 24.2%. Both PS (B = 0.42, 95% CI = 0.33 to 0.52, t = 7.99, p < .001) and CM (B

=-0.16, 95% CI = -0.28 to -0.06, t = -3.11, p = .002) significantly predicted confidence. This pattern of effects provides support for H1a and all other hypotheses.

Dedication. For MIPS, there was no significant interaction term when predicting dedication. Excluding the interaction term, the model was statistically significant, F (2, 200) = 16.12, p < .001, R^2 = 20.7%. SP (B = 0.37, 95% CI = 0.27 to 0.48, t =6.61, p < .001) significantly predicted dedication but NRI did not (B =-0.09, 95% CI = -0.19 to 0.01, t = -1.40, p = .163). This pattern of effects provides support for H1a and H3.

For S-MPS-2, there was no significant interaction term when predicting dedication. Excluding the interaction term, the model was statistically significant, F (2, 200) = 56.33, p < .001, R^2 = 36.0%. Both PS (B = 0.52, 95% CI = 0.43 to 0.60, t = 10.45, p < .001) and CM (B =-0.13, 95% CI = -0.23 to -0.05, t = -2.79, p = .006) significantly predicted dedication. This pattern of effects provides support for H1a and all other hypotheses.

Vigour. For MIPS, there was no significant interaction term when predicting vigour. Excluding the interaction term, the model was statistically significant, F (2, 200) = 8.63, p < .001, R^2 = 7.0%. SP significantly predicted vigour (B = 0.28, 95% CI = 0.13 to 0.43, t = 4.03, p < .001) but NRI did not (B = -0.11, 95% CI = -0.25 to 0.05, t = -1.47, p = .142). This pattern of effects provides support for H1a and H3.

For S-MPS-2, there was no significant interaction term when predicting vigour. Excluding the interaction term, the model was statistically significant, F (2, 200) = 22.45, p < .001, R^2 = 18.3%. Both PS (B = 0.42, 95% CI = 0.29 to 0.55, t =6.69, p < .001) and CM (B =-0.16, 95% CI = -0.28 to -0.04, t = -2.57, p = .011) significantly predicted vigour. This pattern of effects provides support for H1a and all other hypotheses.

Enthusiasm. For MIPS, there was no significant interaction term when predicting enthusiasm. Excluding the interaction term, the model was statistically significant, F (2, 200) = 9.39, p < .001, R^2 = 7.0%. SP significantly predicted vigour (B = 0.22, 95% CI = 0.11 to

0.33, $t = 4.13$, $p < .001$) but NRI did not (B = -0.08, 95% CI = -0.19 to 0.04, $t = -1.28$, $p = .203$). This pattern of effects provides support for H1a and H3.

For S-MPS-2, there was no significant interaction term when predicting enthusiasm. Excluding the interaction term, the model was statistically significant, F (2, 200) = 17.97, $p < .001$, $R^2 = 15.2\%$. PS (B = 0.30, 95% CI = 0.20 to 0.40, $t = 5.88$, $p < .001$) significantly predicted enthusiasm but CM did not (B =-0.07, 95% CI = -0.17 to 0.15, $t = -1.47$, $p = .114$). This pattern of effects provides support for H1a and H3.

Discussion

The first purpose of the present study was to examine the interactive effects of perfectionism on athlete engagement and test the hypotheses of the 2 × 2 model of perfectionism. In regard to the findings, the first hypothesis that pure PSP would be associated with higher athlete engagement than non-perfectionism (H1a) was supported 19 times of 24 (79%; H1b was not supported at all and H1c was supported 5 times). The second hypothesis that pure ECP perfectionism would be associated with the lowest level of athlete engagement (H2) was supported 12 times of 24 (50%). The third hypothesis was that mixed perfectionism would be associated with higher athlete engagement than pure ECP (H3) was supported 20 times of 24 (83%). The fourth hypothesis that mixed perfectionism would be associated with lower athlete engagement than pure PSP (H4) was supported 10 times of 24 (42%).

Perfectionism and Athlete Engagement

As evidenced by these findings, overall, there was mixed support across the three samples for the notion that different within-person combinations predict varying degrees of athlete engagement. However, consistent with the 2 × 2 model, typically, pure PSP was associated with the highest levels of athlete engagement and pure ECP was associated with the lowest level of athlete engagement. As such, the findings suggest that there is merit in

differentiating between at least some within-person combinations of perfectionism when considering likely levels of athlete engagement. In this regard, the findings of the current study align with previous examinations of the 2 × 2 model and outcomes similar to engagement, specifically (vitality, positive affect, and enjoyment; Crocker et al., 2014; Gaudreau & Verner-Filion, 2011; Mallinson et al., 2014).

The lower levels of support for hypothesis 2 and hypothesis 4 in comparison to the other two hypotheses is especially noteworthy in regard to the mixed findings. It appears that the presence of high ECP (versus low ECP) is not always sufficient to distinguish between perfectionistic athletes in terms of engagement. However, the presence of high PSP (versus low PSP) is typically sufficient to do so. In other words, the current study is more supportive of the notion that higher PSP may be comparatively more beneficial for athletes in regard to engagement than the notion that higher ECP is comparatively more problematic. Consider the comparison of mixed perfectionism and pure ECP, for example. There was typically no significant difference between the two combinations in athlete engagement despite the discernible levels of ECP. This finding contrasts to the comparison between mixed perfectionism and pure ECP which were typically different in athlete engagement and levels of PSP.

In regard to revisiting the proposed motivational underpinnings of athlete engagement, the relationships between within-person combinations of perfectionism and athlete engagement are, at least to some degree, consistent with the idea that the development of engagement may reflect the presence of optimal versus suboptimal motivation. Specifically, using SDT as an explanatory framework, Lonsdale et al. (2007b) proposed that athlete engagement develops when psychological needs are satisfied and more internalised, optimal, forms of motivation are evident. In the current study, comparing mixed perfectionism (a combination of internally and externally regulated) with pure ECP

(externally regulated) and comparing pure PSP (internally regulated) with non-perfectionism (relative absence of both internal and external regulation). Specifically, we found that athlete engagement was lower when the presence of internal regulation was lower. Thus, the notion that the development of athlete engagement, and the nuances of the perfectionism-engagement relationship, is reflective of underlying motivational quality remains a strong possibility.

Different Indicators and 2 × 2 model of perfectionism

The second purpose of the present study was to examine the hypotheses of the 2 × 2 model when using different indicators of PSP and ECP. The findings revealed that when testing the 2 × 2 model, different indicators of ECP and PSP produce different findings. This trend was evident in all samples – only on three occasions (of 12 sets of comparisons; 25%) were findings replicated exactly within samples using different instruments. One notable example of how findings differed can be found in sample one for H1 and H3. In sample one, H1a and H3 were supported when using HF-MPS on all occasions but not on any occasion when using MIPS. In this regard, the expected buffering effect of high PSP was captured only by SOP but not by SP. In a further example, in sample two, interactions were evident when using HF-MPS but not when using S-MPS-2 (dedication and enthusiasm). Specifically, there were no comparative costs of high ECP vs low ECP for dedication when using HF-MPS but there was when using S-MPS-2 (hypothesis 4; pure PSP vs mixed perfectionism). Similarly, in this sample, some of the proposed benefits of pure PSP were not evident for enthusiasm when using HF-MPS but were evident when using S-MPS-2 (hypothesis 1; pure PSP vs non-perfectionism).

These findings have implications for those interested in the 2 × 2 model. Gaudreau and Verner-Fillion (2012) have encouraged the use of different indicators of perfectionism when testing the 2 × 2 model. Our findings indicate that researchers will need to be cautious

when doing so. Different indicators may not be interchangeable, and findings may not generalise between indicators and studies. When one considers the distinctive features of different dimensions of perfectionism this is understandable. For example, self-oriented perfectionism has long been considered more destructive than other subdimensions of perfectionism and indicators of PSP (Flett & Hewitt, 2007). Similarly, one might expect notably different effects when using indicators focused on personal mistakes or personal reactions to imperfection to assess ECP than when using indicators focused on perceived pressures from others. Again, the latter have typically be found to be more debilitating in research (Hill et al., 2018). With this in mind, we encourage researchers to select the most appropriate model and dimensions of perfectionism (e.g., MIPS, HF-MPS, or S-MPS-2) given the phenomena of interest when deciding upon which approach to take when testing the 2 × 2 model of perfectionism.

Practical Implications

The introduction of the concept of engagement to sport was in part motivated by the desire to provide a framework for the promotion of positive sport experiences, rather than simply attempting to reduce negative experiences (Hodge et al., 2009). Based on the proposed antecedents of athlete engagement, Hodge et al. (2009) suggested that practitioners seeking to promote greater engagement in their athletes will need to provide environments that foster psychological need fulfilment and highlighted practical guidelines to help do so (e.g., Mageau & Vallerand, 2003). Since their suggestion, we are not aware of any interventions that have evaluated the effects of this type of intervention on athlete engagement but other similar SDT intervention work has been effective (e.g., Tessier, Sarrazin, & Ntoumanis, 2010). Our findings suggest that perfectionistic athletes will display engagement to varying degrees. In this regard, those athletes who display higher levels of evaluative concerns perfectionism (concern over mistakes, negative reactions to imperfection,

and socially prescribed perfectionism) may display the lowest levels of engagement and therefore benefit most from environments that promote psychological need satisfaction. Moreover, given the focus on establishing an authentic sense of self in a relational context, we speculate that these environments may also be effective in reducing evaluative concerns perfectionism in young athletes directly.

Limitations and Other Future Directions

The study has a number of limitations that require consideration. First, we caution against generalisability to populations outside of the current sample characteristics. There is evidence that the effects of perfectionism may depend on a range of factors including gender, age and sport, for example (Hill et al., 2018). This possibility also means that differences in support for the 2 × 2 model between samples may be in part due to differences in these factors not the instruments (though this possibility does not account for differences found within each sample). Second, the observed effects may also differ across domains (sport vs education; e.g., Hill & Curran, 2016). This possibility, too, will need to be examined in future research. Third, the degree to which differences in support for the 2 × 2 model observed here related specifically to athlete engagement is unclear. Similar tests are required for other outcomes variables, burnout being a logical starting point given that it is considered the conceptual opposite of engagement and the availability of existing data. Finally, in terms of furthering our understanding of the perfectionism-engagement relationship, longitudinal studies are required in the same manner as has begun with research on the 2 × 2 model and athlete burnout (e.g., Madigan et al., 2016).

Conclusion

Evidence continues to emerge that suggests that the 2 × 2 model of perfectionism can be used to differentiate between athletes in regard to their experiences in sport. Here, we found evidence that this is the case, to some degree, in relation to athlete engagement.

However, we also found evidence that support for the 2 × 2 model depended on the indicators of perfectionism examined. Some hypotheses were supported when using some indicators of perfectionism but not supported when using others. Researchers will need to be mindful of this issue when testing the hypotheses of the 2 × 2 model in relation to athlete engagement and other outcomes in future research.

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Table 1 – Descriptive statistics and bivariate correlation coefficients

	M	*SD*	α	1	2	3	4	5	6	7
Sample 1										
1. Striving for perfection	4.53	1.01	.93							
2. Negative reactions to imperfection	4.44	1.07	.91	.86**						
3. Self-oriented perfectionism	5.32	0.97	.83	-.01	-.06					
4. Socially prescribed perfectionism	4.68	1.13	.81	.08	.07	.44**				
5. Confidence	4.10	0.57	.70	-.15*	-.19**	.37**	.04			
6. Dedication	4.18	0.60	.77	-.11	-.14**	.39**	.05	.79**		
7. Vigor	3.89	0.67	.79	.15**	-.21**	.20**	.05	.68**	.63**	
8. Enthusiasm	3.85	0.70	.80	-.23**	-.30**	.10	-.04	.61**	.48**	.81**
Sample 2										
1. Personal standards	3.43	0.67	.81							
2. Concern over mistakes	2.85	0.75	.83	.58**						
3. Self-oriented perfectionism	5.15	0.84	.56	.65**	.40**					
4. Socially prescribed perfectionism	3.29	0.98	.66	.27**	.54**	.21**				
5. Confidence	3.92	0.69	.83	.35**	.06	.36**	-.02			

6. Dedication	4.24	0.61	.80	.45**	.12	.44**	-.08	.72**		
7. Vigor	3.92	0.72	.87	.23**	.03	.25**	-.02	.69**	.70**	
8. Enthusiasm	4.25	0.63	.80	.20**	.05	.21**	-.05	.66**	.69**	.74**
Sample 3										
1. Striving for perfection	3.25	0.91	.88							
2. Negative reactions to imperfection	2.71	0.82	.80	.57**						
3. Personal standards	3.31	0.84	.87	.73**	.49**					
4. Concern over mistakes	2.71	0.87	.86	.47**	.75**	.43**				
5. Confidence	4.23	0.64	.88	.32**	.03	.45**	.02			
6. Dedication	4.32	0.66	.91	.45**	.18**	.58**	.11	.77**		
7. Vigor	4.03	0.75	.88	.26**	.07	.40**	.02	.70**	.71**	
8. Enthusiasm	4.35	0.59	.83	.28**	.09	.38**	.08	.71**	.78**	.81**

Notes. * $p < .05$; ** $p < .01$.

1 *Table 2* – Final main and interaction models for multiple samples and instruments

	Indicator of PS			Indicator of ECP			Interaction effect		
	B	*SE*	β	*B*	*SE*	β	*B*	*SE*	β
Sample 1: HF-MPS									
Confidence									
Step 1	0.27**	0.04	.45	-0.08*	0.03	-.16			
Dedication									
Step 1	0.30**	0.03	.48	-0.09*	0.04	-.17			
Vigour									
Step 1	0.17**	0.05	.24	-0.03	0.04	-.05			
Enthusiasm									
Step 1	0.12*	0.05	.16	-0.07	0.04	-.11			
Sample 1: MIPS									
Confidence									
Step 1	0.02	0.07	.04	-0.11	0.06	-.22			
Dedication									
Step 1	0.04	0.07	.07	-0.11	0.07	-.20			
Vigour									
Step 1	0.07	0.08	.11	-0.19**	0.07	-.31			
Enthusiasm									
Step 1	0.06	0.08	.09	-0.25**	0.07	-.38			
Sample 2: HF-MPS									
Confidence									
Step 1	0.31**	0.05	.38	-0.07	0.05	-.10			
Dedication									
Step 2	0.34**	0.05	.47	-0.11	0.04	-.18	.12*	.05	.17
Vigour									
Step 1	0.23**	0.06	.27	-0.06	0.05	-.08			
Enthusiasm									

Step 2	0.17**	0.05	.23	-0.06	0.04	-.10	.12*	.05	.15
Sample 2: S-MPS-2									
Confidence									
Step 1	0.50**	0.08	.48	-0.21**	0.07	-.23			
Dedication									
Step 1	0.53**	0.07	.58	-0.18**	0.06	-.22			
Vigour									
Step 1	0.34**	0.09	.32	-0.15	0.08	-.15			
Enthusiasm									
Step 1	0.09**	0.07	.27	-0.09	0.07	-.11			
Sample 3: MIPS									
Confidence									
Step 1	0.32**	0.06	.46	-0.18**	0.06	-.22			
Dedication									
Step 1	0.37**	0.06	.51	-0.09	0.06	-.11			
Vigour									
Step 1	0.28**	0.07	.33	-0.11	0.08	-.12			
Enthusiasm									
Step 1	0.22**	0.05	.34	-0.08	0.06	-.11			
Sample 3: S-MPS-2									
Confidence									
Step 1	0.42**	0.05	.54	-0.16**	0.05	-.21			
Dedication									
Step 1	0.51**	0.05	.65	-0.13**	0.05	-.17			
Vigour									
Step 1	0.42**	0.06	.47	-0.16*	0.06	-.18			
Enthusiasm									
Step 1	0.30**	0.05	.42	-0.07	0.05	-.11			

Notes. * $p < .05$; ** $p <. 01$. PSP = Personal standards perfectionism. ECP = Evaluative concerns perfectionism. Step 1 = predictor block of PSP and ECP, Step 2 = predictor block of PSP, ECP, and interaction term. When interaction term was not significant ($p <.05$), Step 1 is displayed.

Table 3. *Summary of supported for hypotheses of the 2 × 2 model of perfectionism*

	Hypothesis 1 Pure PSP vs. non-perfectionism	Hypothesis 2 Non-perfectionism vs. Pure ECP	Hypothesis 3 Mixed perfectionism vs. Pure ECP	Hypothesis 4 Pure PSP vs. Mixed perfectionism
Sample 1: HF-MPS / MIPS				
Confidence	H1a / H1c	* / ns	* / ns	* / ns
Dedication	H1a / H1c	* / ns	* / ns	* / ns
Vigour	H1a / H1c	ns / *	* / ns	ns / *
Enthusiasm	H1a / H1c	ns / *	* / ns	ns / *
Sample 2: HF-MPS / S-MPS-2				
Confidence	H1a / H1a	ns / *	* / *	ns / *
Dedication	H1a / H1a	* / *	* / *	ns / *
Vigour	H1a / H1a	ns / ns	* / *	ns / ns
Enthusiasm	H1c / H1a	* / ns	* / *	ns / ns
Sample 3: MIPS / S-MPS-2				
Confidence	H1a / H1a	* / *	* / *	* / *
Dedication	H1a / H1a	ns / *	* / *	ns / *
Vigour	H1a / H1a	ns / *	* / *	ns / *
Enthusiasm	H1a / H1a	ns / ns	* / *	ns / ns

Note. * denotes a significant difference between two subtypes in the predicted direction ($p < .05$) and so the hypothesis is supported; ns denotes a non-significant difference between two subtypes ($p > .05$) and so the hypothesis is unsupported; PSP = personal standards perfectionism; ECP = evaluative concerns perfectionism

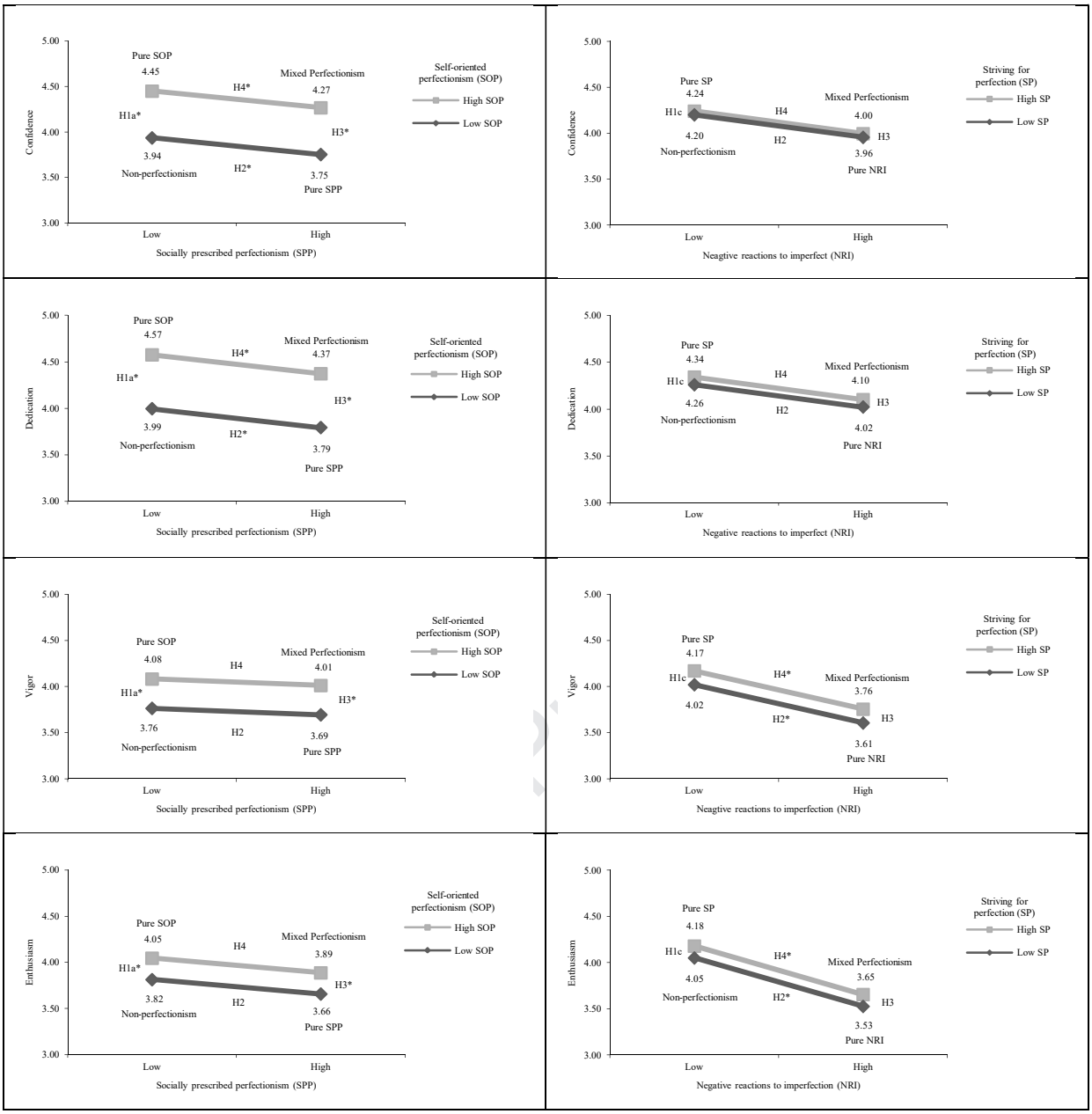

Figure 1. Graphical representation of differences between perfectionism subtypes for Sample 1 (HF-MPS and MIPS).

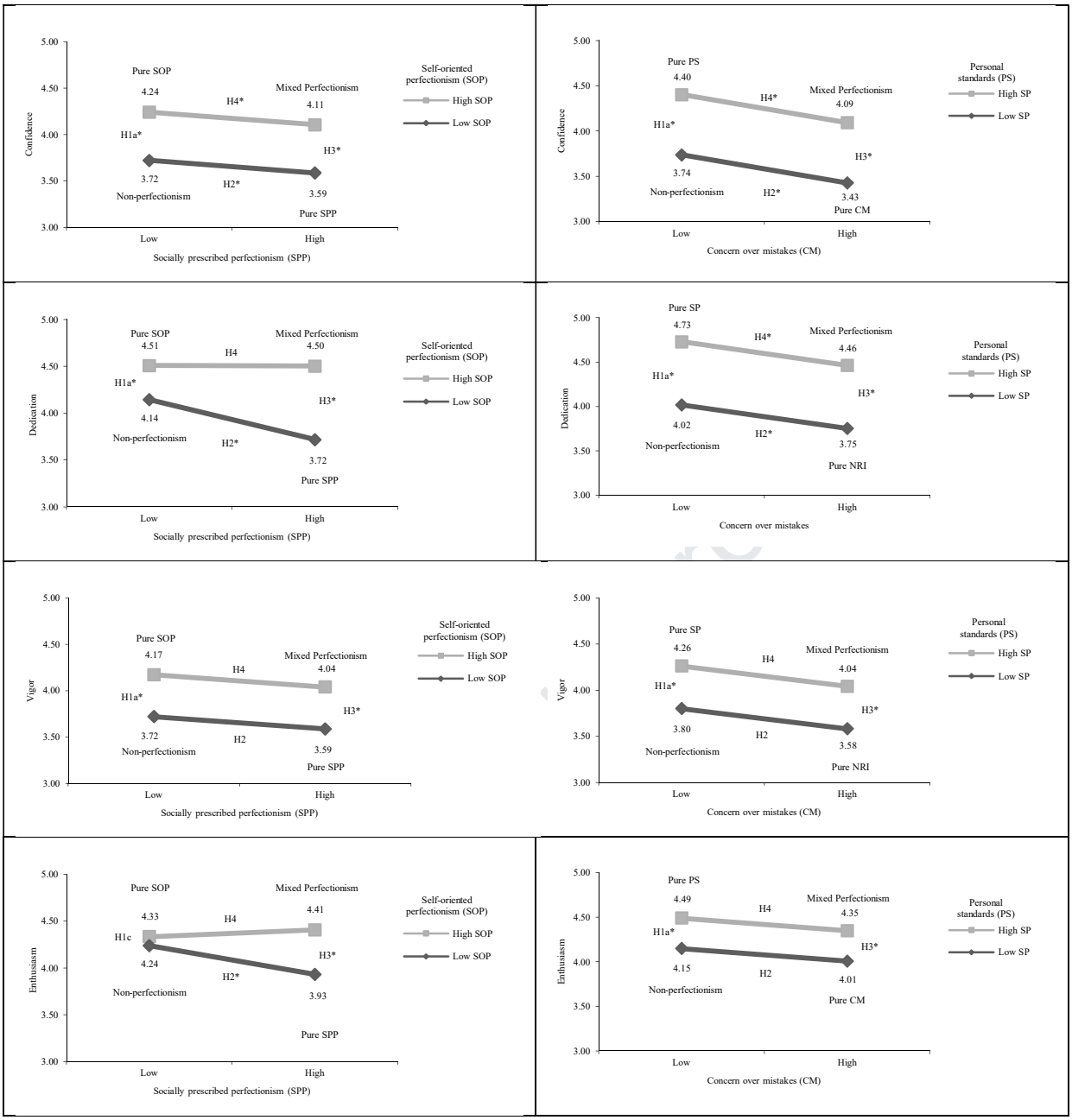

Figure 2. Graphical representation of differences between perfectionism subtypes for Sample 2 (HF-MPS and S-MPS-2).

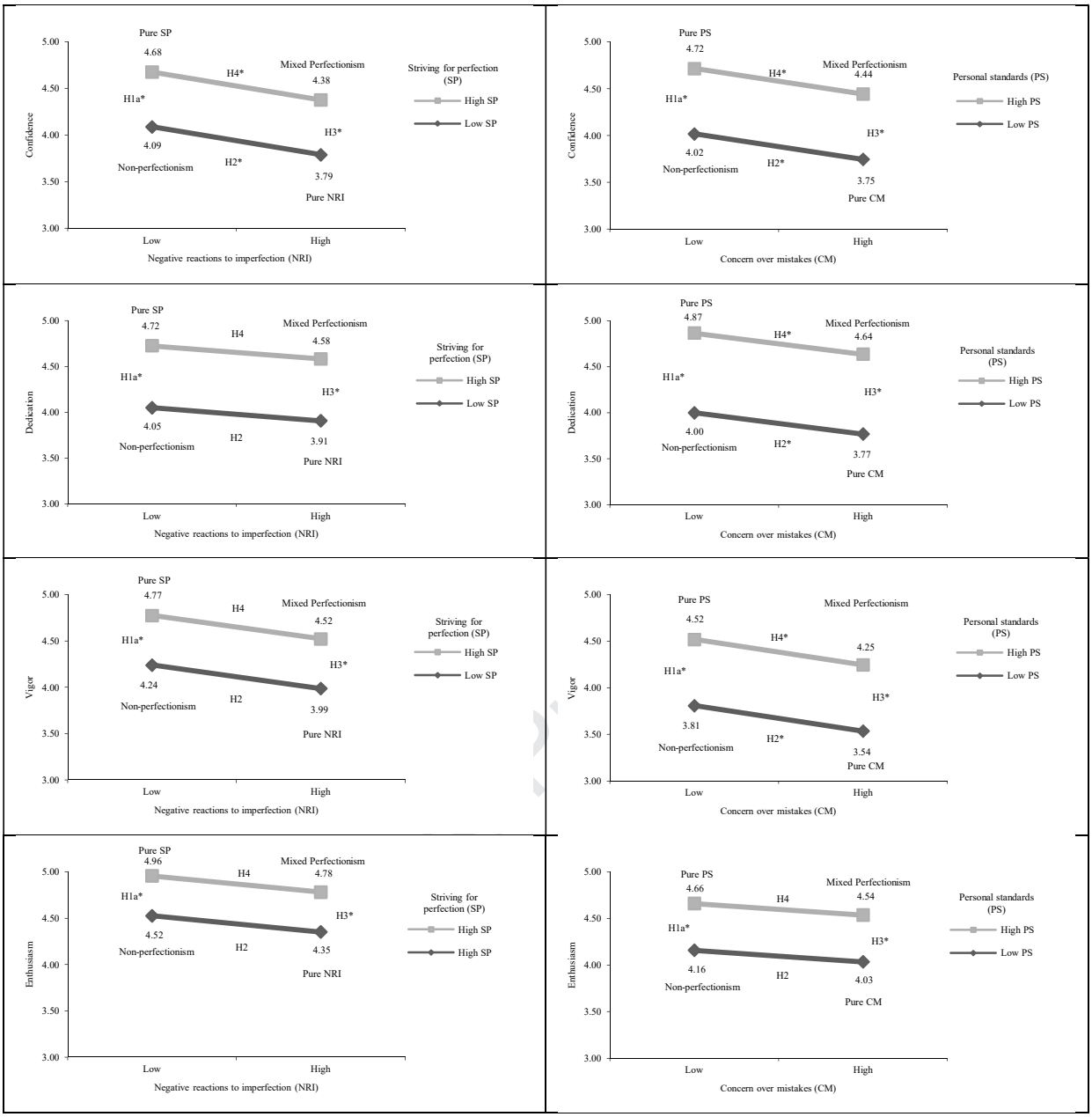

Figure 3. Graphical representation of differences between perfectionism subtypes for Sample 1 (MIPS and S-MPS-2).

Highlights

- Perfectionism subtypes are related to different levels of athlete engagement.
- The relationships depend on the dimension of athlete engagement examined.
- The relationships depend on the instrument used to measure perfectionism.

The authors declare that they have no conflict of interest.