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Perfectionism and Attitudes Towards Doping in Athletes:

A Continuously Cumulating Meta-Analysis and Test of the 2 × 2 Model

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Abstract

Perfectionism may promote engagement in illegal and unacceptable behaviours such as doping. To examine this idea, in the present study, we had two aims. First, we re-examined the relationship between perfectionism and attitudes towards doping and, in doing so, conducted a continuously cumulating meta-analysis. Second, we extended our understanding of this relationship by providing the first test of the 2 × 2 model of perfectionism in context of doping. A sample of 181 university athletes (mean age 18.5 years) completed measures of perfectionism (evaluative concerns perfectionism [ECP] and personal standards perfectionism [PSP]) and attitudes toward doping. A continuously cumulating meta-analysis based on five studies (including the present study; N = 952) indicated that ECP showed a significant small-to-medium positive relationship with attitudes towards doping (r^+ = .21), whereas PSP showed a nonsignificant small positive relationship with attitudes towards doping (r^+ = .07). In addition, moderated regression analysis provided support for two hypotheses of the 2 × 2 model. Specifically, pure ECP (high ECP, low PSP) was associated with more favourable attitudes towards doping than mixed perfectionism (high ECP, high PSP) and non-perfectionism (low ECP, low PSP). The present findings suggest that ECP is a significant positive predictor of attitudes towards doping and that athletes who exhibit a combination of high ECP and low PSP are the most likely to be at risk of doping. Consequently, a focus on reducing ECP may be a valuable addition to anti-doping education programmes.

Keywords: perfectionistic strivings, perfectionistic concerns, doping, athletes, sport

Introduction

Athletes of all levels face substantial pressures to perform (e.g., Fletcher, Hanton, & Mellalieu, 2006). In response, athletes understandably search for ways of gaining a competitive advantage, no matter how marginal. This search includes legal behaviours such as the integration of novel training techniques, cutting edge technologies, and dietary manipulation. But, for some athletes, this search may also include illegal behaviours such as doping. Despite increased awareness of the implications of doping and rigorous testing procedures, recent evidence suggests that athletes are still engaging in doping behaviours (Ulrich et al., 2018). There are numerous personal, social, and environmental reasons why an athlete may dope (Ntoumanis, Ng, Barkoukis, & Backhouse, 2014). Recent work has highlighted the relevance of personality in this regard (e.g., Madigan, Stoeber, & Passfield, 2016). In the present study, we therefore sought to further our understanding of the role of perfectionism by conducting a continuously cumulating meta-analysis of the relationship between perfectionism and attitudes towards doping and providing the first test of the interactive effects of dimensions of perfectionism on attitudes towards doping.

Doping

Doping is defined as the use of a substance (e.g., anabolic androgenic steroids) or method (e.g., blood doping) that is prohibited by the World Anti-Doping Agency (WADA, 2015). Doping is banned because it contravenes open and fair competition (White Paper on Sport, 2007). There are also additional health risks associated with doping that make its prohibition justifiable. For example, anabolic androgenic steroid use is linked with increased risk of liver damage, heart failure (Bird, Goebel, Burke, & Greaves, 2016), and even suicide (Lindqvist et al., 2013). Importantly, doping is not isolated to elite athletes with evidence suggesting that this is also an issue among amateur, adolescent, and university athletes (e.g., Nicholls et al., 2017). It is not surprising, then, that researchers have called for an increased

focus on education aimed at discouraging athletes from all sports, levels, and ages from doping (e.g., Backhouse, Patterson, & McKenna, 2012).

To be most effective, anti-doping education needs to target factors that demonstrably increase or decrease the likelihood of doping (Elbe & Barkoukis, 2017). In this regard, an athlete's attitude towards doping may be particularly important. Attitudes towards doping comprise beliefs that the use of banned substances or methods for performance enhancement is necessary and socially acceptable (Petróczi & Aidman, 2009). Recent meta-analytic evidence attests to the importance of attitudes in predicting doping intentions and behaviours, suggesting that more favourable attitudes may increase the likelihood of an individual engaging in doping (Ntoumanis et al., 2014). As a consequence, understanding the factors that shape an athlete's attitude towards doping may be useful in identifying the extent to which an athlete is at risk of doping (and thus help inform anti-doping education).

Several models have been developed to identify the factors that influence an athlete's attitudes towards doping. These include the Theory of Planned Behaviour, the Life-Cycle Model of Performance Enhancement, the Sport Drug Control Model, the Determinant Model, and the Integrative Theoretical Model (see Lazuras et al., 2015). Across these models, doping is considered to be an intentional and goal directed behaviour with various personal (e.g., moral appraisals) and social (e.g., reference group opinion) antecedents that determine attitudes towards doping and, ultimately, doping behaviour. To date, several of these antecedents have been tested. This research has revealed support for the importance of factors such as morality, motivational orientations, and threat appraisals as predictors of athletes' attitudes towards doping (e.g., Jalleh, Donovan, & Jobling, 2014).

Alongside this research, there is growing evidence to suggest that personality traits are particularly important in deriving attitudes towards doping. Personality reflects a stable pattern of thoughts, feelings, and behaviours that differentiates one athlete from another with

traits capturing the likelihood that certain thoughts, beliefs, and attitudes are expressed by an athlete in any given situation. In this way, personality may be integral in forming and maintaining doping-related attitudes. Research supports this claim. For example, the Dark Triad constellation of personality (Machiavellianism, narcissism, and psychopathy) has recently been shown to be a positive predictor of attitudes towards doping in athletes (Nicholls, Madigan, Backhouse, & Levy, 2017). In explaining this particular relationship, Nicholls et al. (2017) argued that the Dark Triad may imbue a way of viewing the world in which individuals more comfortably adopt questionable behavioural strategies such as lying, risk taking, and cheating. We might expect other personality traits, such as perfectionism, to do the same.

Perfectionism and Doping

Perfectionism is broadly defined as a multidimensional personality characteristic that is comprised of high personal standards and overly critical evaluations of behaviour (Frost, Marten, Lahart, & Rosenblate, 1990). In the past forty years, numerous models and measures of perfectionism have been developed (see Hill, 2016 for a review). Factor analytic studies have determined there are similarities between these models and that these similarities can be captured by two higher-order dimensions of perfectionism (Stoeber & Otto, 2006). The first of these dimensions is labelled personal standards perfectionism (PSP; also known as perfectionistic strivings) and comprises very high (or unrealistic) personal standards and a self-oriented striving for perfection. The second dimension is labelled evaluative concerns perfectionism (ECP; also known as perfectionistic concerns) and comprises concerns over mistakes, negative reactions to imperfection, fear of negative social evaluation, and feelings of discrepancy between one's expectations and performance (see Gotwals, Stoeber, Dunn, & Stoll, 2012).

Perfectionism has recently been implicated in an athlete's decision of whether to dope

or not. Specifically, Flett and Hewitt (2016) suggest that perfectionism may give rise to a win-at-all-costs mentality that is more likely to result in what they refer to as “dark striving”. That is, under extreme pressures to be perfect, perfectionistic athletes may engage in behaviours that are illegal and unacceptable (e.g., doping) as a means to achieve success and gain a competitive advantage. It is reasonable to assume, then, that breaking the rules by taking banned substances may be a specific behaviour that perfectionistic athletes are willing to engage in to ensure they win. Accordingly, we may expect perfectionistic athletes to be more accepting and to have more favourable attitudes towards doping.

To date, six studies have examined the relationship between perfectionism and attitudes towards doping in athletes (Bae, Yoon, Kang, & Kim, 2017; Bahrami, Yousefi, Kaviani, & Ariapooran, 2014; Ismaili, Yousefi,, & Sobhani, 2013; Madigan, Stoeber, & Passfield, 2016; Sas-Nowosielski & Budzisz, 2017; Zucchetti, Candela, & Villosio, 2015). These studies have provided some support for the notion that perfectionism is relevant to doping. In this regard, however, evidence for the role of PSP is mixed, with some studies finding PSP to be a positive predictor of attitudes towards doping (e.g., Bahrami et al., 2014) whereas other studies have found the opposite (e.g., Madigan et al., 2016). In addition, although in some studies ECP has emerged as a significant positive predictor of attitudes towards doping, an examination of other studies suggests there are instances when ECP is a nonsignificant predictor (e.g., Madigan et al., 2016). As a result, the relationship between both dimensions of perfectionism and attitudes towards doping is currently unclear.

One way to address these inconsistences is to utilise meta-analyses. These analyses allow for an examination of whether observed effects across studies are collectively statistically significant and meaningful. This is important because taking into account the weighted size and significance of these effects provides a more accurate estimate of effects than single studies. A relatively recent extension to this approach is continuously cumulating

meta-analysis (Braver, Thoemmes, & Rosenthal, 2014). Whereas standard meta-analysis is generally considered to be retrospective (i.e., a summary of the studies that exist), continuously cumulating meta-analysis applies the exact same meta-analytic approach but does so in a continuing manner by adding new estimates of the effect after each and every new test of the relationship (e.g., after the present data is collected). This approach allows us to provide the most up-to-date estimate of effects that is based on *all* existing research. In doing so, we also update the confidence intervals associated with the effect which simultaneously provides for a more accurate estimate. Adopting this cumulative meta-analytical approach will provide an understanding of how well all the studies that have been conducted thus far (including the present study) support conclusions in regard to the relationships between perfectionism and attitudes towards doping.

The 2 × 2 Model of Perfectionism and Doping

Research on the relationships between perfectionism and attitudes towards doping has so far focused exclusively on independent effects of dimensions of perfectionism. The 2 × 2 model of perfectionism provides a framework to test differences in within-person combinations of the two higher-order dimensions (Gaudreau & Thompson, 2010) and, as such, allows us to examine the interactive effects of dimensions of perfectionism. The model differentiates four within-person combinations of PSP and ECP: pure PSP (high PSP, low ECP), pure ECP (low PSP, high ECP), mixed perfectionism (high PSP, high ECP), and non-perfectionism (low PSP, low ECP). Furthermore, the 2 × 2 model proposes a series of hypotheses regarding differences between the within-person combinations. Hypothesis 1a states that pure PSP is associated with better outcomes than non-perfectionism, whereas Hypothesis 1b states that it is associated with worse outcomes[1]; Hypothesis 2 states that pure

[1]The 2 × 2 model comprises the further hypothesis that pure personal standards

ECP is associated with the worst outcomes of the four, tested through a comparison to non-perfectionism; Hypothesis 3 states that mixed perfectionism is associated with better outcomes than pure ECP; and Hypothesis 4 states that pure PSP is associated with better outcomes than mixed perfectionism.

Hill and Madigan (2017) recently reviewed the findings of existing research that had examined the 2 × 2 model within sport, dance, and exercise. Research included a range of different samples (e.g., dancers, coaches, and soccer players) and criterion variables (e.g., affect, motivation, and burnout). Across studies, it was found that Hypotheses 1a, 2, 3, and 4 were supported over 75% of the time. Based on these findings, Hill and Madigan concluded that the 2 × 2 model has proven useful in differentiating between the experiences of perfectionistic athletes and is currently the preferred means of examining combinations of the two higher-order dimensions in sport. The 2 × 2 model may therefore also provide an important framework to understand how different combinations of PSP and ECP relate to attitudes towards doping.

In addition to providing the first empirical test of the interactive effects of perfectionism on attitudes towards doping, testing the 2 × 2 model in context of doping is important from a theoretical perspective. Flett and Hewitt (2016) submit that the primary driver of dark striving is the experience of extreme pressure to be perfect. This extreme pressure could be referring to extreme self-imposed pressure to strive for and attain very high

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perfectionism does not differ from non-perfectionism (Hypothesis 1c). However, since this is a null hypothesis it was not considered in the present study as it cannot be included in the null hypothesis significance testing framework (see Stoeber, 2012). In addition, interested readers are directly to a recent review for further discussion pertaining to these hypotheses (Hill & Madigan, 2017).

(or unrealistic) personal standards (i.e., pure PSP), extreme pressure to avoid negative social evaluations and concerns associated with failure (i.e., pure ECP), or perhaps a combination of these forms of pressure (i.e., mixed perfectionism). However, currently, it is unclear which pressures are most important. Examining the four within-person combinations proposed by the 2 × 2 model will provide us with further insight into this issue and which forms of perfectionistic pressure are more important.

The Present Study

Against this background, the present study had two aims. First, we re-examined the relationship between perfectionism and attitudes towards doping and in doing so we used the present study's data to conduct a continuously cumulating meta-analysis (Braver et al., 2014). We hypothesised that both dimensions of perfectionism would show positive meta-analytic correlations with attitudes towards doping. Second, we extended our understanding of this relationship by providing the first test of the 2 × 2 model of perfectionism in relation to doping in sport. Based on the 2 × 2 model and on the theoretical principles of dark striving, we made an explicit choice to test Hypothesis 1b (i.e., we expected that pure PSP would be associated with more favourable attitudes than non-perfectionism). Thereafter, we tested the 2 × 2 model's hypotheses with no adjustments.

Method

Participants and Procedure

A sample of 181 competitive athletes (125 male, 56 female) was recruited at training/practice from university teams and sports clubs to participate in the present study. Participants' mean age was 18.5 years (*SD* = 0.83; Range = 18 – 24 years). Participants were involved in a range of sports (87 in soccer, 29 in rugby, 17 in basketball, 19 in athletics, 29 in other sports [e.g., tennis]) and trained on average 9.53 hours per week (*SD* = 4.51). A university ethics committee approved the study. Informed consent was obtained from all

participants.

Measures

Perfectionism. To measure perfectionism, we utilised a multi-measure approach (Stoeber & Madigan, 2016) and employed four subscales from two multidimensional measures of perfectionism in sport: the Sport Multidimensional Perfectionism Scale (SMPS; Dunn et al., 2006) and the Multidimensional Inventory of Perfectionism in Sport (MIPS; Stoeber, Otto, Pescheck, Becker, & Stoll, 2007). To measure PSP we used two indicators: the 7-item SMPS subscale capturing personal standards (e.g. "I have extremely high goals for myself in my sport") and the 5-item MIPS subscale capturing striving for perfection ("I strive to be as perfect as possible"), and then standardised the scale scores before combining them to measure personal standards perfectionism (cf. Madigan, Stoeber, & Passfield, 2015). To measure ECP we also used two indicators, the 8-item SMPS subscale capturing concern over mistakes ("People will probably think less of me if I make mistakes in competition") and the 5-item MIPS subscale capturing negative reactions to imperfection ("I feel extremely stressed if everything does not go perfectly"), and again standardised the scale scores before combining them to measure evaluative concerns perfectionism. The four subscales have demonstrated reliability and validity in previous studies (e.g., Madigan, 2016). In addition, both are reliable and valid indicators of PSP and ECP (e.g., Stoeber & Madigan, 2016). Participants were asked to indicate to what degree each statement characterised their attitudes in their sport responding on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Attitudes Towards Doping. To measure attitudes towards doping, we used the Short-Performance Enhancement Attitude Scale (Nicholls, Madigan, & Levy, 2016; Petróczi & Aidman, 2009), which comprises 8 items capturing attitudes towards doping (e.g. "Doping is necessary to be competitive"). The Short-Performance Enhancement Attitude Scale has demonstrated validity and reliability in previous studies (Nicholls et al., 2016). Each item

was preceded by the phrase “My opinion regarding sport in general is that ...”, and participants responded on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Data Screening

First, we inspected the data for missing values. Because very few item responses were missing (i = 11), missing responses were replaced with the mean of the item responses of the corresponding scale (ipsatised item replacement; Graham, Cumsille, & Elek-Fisk, 2003). Next, we computed Cronbach’s alphas for our variables which were all satisfactory (see Table 1). Following recommendations by Tabachnick and Fidell (2007), data were screened for multivariate outliers. No participant showed a Mahalanobis distance larger than the critical value of χ^2 (3) = 16.27, $p < .001$. Finally, we conducted two Box’s M tests to examine if the variance-covariance matrices showed any difference between gender and sport type (team versus individual). Both tests were nonsignificant (Fs < 1.34, ps > .23) so all further analyses were collapsed across gender and sport type.

Results

Descriptive Statistics and Correlations

First, we inspected the correlations between all variables (see Table 1). PSP and ECP showed a significant large positive intercorrelation. PSP showed a nonsignificant small negative correlation with attitudes towards doping. ECP showed a significant small positive correlation with attitudes towards doping.

Continuously Cumulating Meta-Analysis

Next, we conducted a continuously cumulating meta-analysis of the relationships between perfectionism and attitudes towards doping (Braver et al., 2014). We did so in two steps. First, we provided a meta-analysis of the existing literature. Second, we provided a meta-analysis including the findings from the present study (i.e., continuously cumulating).

A literature search of SportDiscus, PsychInfo, and PsychArticles, using the terms

"perfect*" and "doping" was conducted on 15th March 2019. The search also included an exploratory search via Google Scholar to identify additional studies that the original search may have missed. After duplicates were removed, 27 studies remained. These studies were then assessed based on the inclusion criteria below.

Studies were included if they: (a) measured multidimensional perfectionism; (b) measured attitudes towards doping; (c) included an effect size; (d) were published in English; (e) were a published journal article, thesis/dissertation, or conference presentation; and (f) included a sample that was unique (e.g., not included in both a journal article and a thesis/dissertation). Overall, four studies met these criteria.[2]

To meta-analyse the data, we followed the recommendations of Lipsey and Wilson (2001) and used random effects models in Comprehensive Meta-Analysis software (Version 3.3; Borenstein, Hedges, Higgins, & Rothstein, 2005). We also calculated Cochran's Q and I^2 values to quantify the degree of between study heterogeneity in correlation coefficients. A statistically significant Q is understood to reflect substantial heterogeneity in effect sizes and I^2 proportions of 25%, 50% and 75% represent low, moderate, and high heterogeneity, respectively (Higgins, Thompson, Deeks & Altman, 2003).The findings of these analyses can be found in Table 3.

For Step 1, ECP showed a significant small-to-medium positive relationship with attitudes towards doping (r^+ = .23, 95% CI = .13 to .32), whereas PSP showed a nonsignificant small positive relationship with attitudes towards doping (r^+ = .10, 95% CI = –

[2]Two studies that examined the relationship between perfectionism and attitudes towards doping were not included because of the use of (i) a global perfectionism score and (ii) insufficiently validated measures of perfectionism and attitudes towards doping (Sas-Nowosielski & Budzisz, 2017; Zucchetti et al., 2015).

.18 to .36). Of note, was the substantial heterogeneity of the effect size estimate for PSP ($Q_{[3]} = 39.12$, $p < .001$; $I^2 = 92.33$). For Step 2, which included data from the present study, ECP showed a significant small-to-medium positive relationship with attitudes towards doping ($r^+ = .21$, 95% CI = .13 to .29), whereas PSP showed a nonsignificant small positive relationship with attitudes towards doping ($r^+ = .07$, 95% CI = –.17 to .30). The effect size estimate for PSP still showed substantial heterogeneity ($Q_{[4]} = 49.83$, $p < .001$; $I^2 = 91.97$).

Moderated Regression Analyses

Next, we conducted a moderated regression analysis with PSP and ECP as predictors and attitudes towards doping as the dependent variable (Gaudreau, 2012). In this, PSP and ECP were centred (Cohen, Cohen, West, & Aiken, 2003). The regression analyses comprised two steps. In Step 1, we entered PSP and ECP. In Step 2, we entered the interaction between PSP and ECP (see Table 2).

The results of the moderated regression analysis indicated that PSP was a significant negative predictor of attitudes towards doping. In contrast, ECP was a significant positive predictor of attitudes towards doping. In addition, the two dimensions of perfectionism showed a significant interaction effect.

To examine the interaction effect, we conducted a simple slopes analysis following Aiken and West (1991) and plotted the interaction (Figure 1). We also probed the differences between the four within-person combinations of perfectionism of the 2 × 2 model following the procedures recommended by Gaudreau (2012). First, we examined the slopes of ECP (see Figure 1). Results showed that the slope of ECP was significant at low levels of PSP ($t = 4.85$, $p < .001$, $d = 1.01$), but not at high levels of PSP ($t = 1.53$, $p = .13$, $d = 0.33$). Next, we examined the slopes of PSP. Results showed that the slope of PSP was not significant at low levels of ECP ($t = –1.681$, $p = .10$, $d = 0.31$), but was significant at high levels of ECP ($t = –4.16$, $p < .001$, $d = 0.99$). Taken together, the findings provide support for Hypotheses 2 and

3 but not Hypotheses 1b and 4.[3]

Discussion

The present study had two aims. First, we re-examined the relationship between perfectionism and attitudes towards doping and in doing so we used the present study's data to conduct a continuously cumulating meta-analysis. Second, we extended our understanding of this relationship by providing the first test of the 2 × 2 model of perfectionism in relation to doping. The findings of the continuously cumulating meta-analysis partially supported our hypotheses and indicated that ECP showed a significant small-to-medium positive relationship with attitudes towards doping ($r^+ = .21$), whereas PSP showed a nonsignificant small positive relationship with attitudes towards doping ($r^+ = .07$). In addition, the study provided mixed support for the hypotheses of the 2 × 2 model. Whereas we found support for Hypotheses 2 and 3, we found no support for Hypotheses 1b and 4. As such, the findings revealed that pure ECP was associated with more favourable attitudes towards doping than both non-perfectionism (Hypothesis 2) and mixed perfectionism (Hypothesis 3).

Continuously Cumulating Meta-Analysis

By conducting a continuously cumulating meta-analysis, we provide the most comprehensive test of the perfectionism-attitude towards doping relationship to date. In this regard, the findings highlight the importance of perfectionism for athletes' attitudes towards doping. Resolving inconsistencies in previous research, ECP emerged as a significant positive predictor of attitudes towards doping. Although research examining the relationships

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[3]Whereas the slopes for PSP are not shown in Fig. 1, they are represented by the difference between non-perfectionism and pure PSP (representing the slope for PSP at low levels of ECP) and the difference between pure ECP and mixed perfectionism (representing the slope for PSP at high levels of ECP; see Gaudreau, 2012, Fig. 2).

that ECP shows with other, similar anti-social and unacceptable behaviours is sparser in sport, these findings align with research outside of sport that suggest ECP may be problematic for such behaviours generally. For example, research has found that students higher in ECP are more likely to use substances to enhance academic performance (Stoeber & Hotham, 2016). Consequently, this dimension appears especially important for understanding illicit and unacceptable behaviours and should be central to future research on perfectionism and doping.

The present findings, by contrast, suggest that PSP may be less important in relation to doping. Consistent with the discrepancies in previous research, PSP emerged as a nonsignificant predictor of attitudes towards doping. It was noteworthy that there was substantial heterogeneity in the meta-analytic estimate suggestive of systematic differences across studies. These differences could relate to, for example, the use of different measures of PSP or the use of different samples (e.g., bodybuilders vs. junior athletes). As a consequence, more studies are needed that examine potential moderators of its relationship with doping. In this vein, we note that the concept of perfectionistic reactivity may be particularly important in revealing specific circumstances where PSP is more likely to predispose athletes to unacceptable behaviours (Flett & Hewitt, 2016). For example, it is a possibility that when faced with protracted failure or goal blockage (e.g., injury), athletes high in PSP may be more compelled to engage in illicit behaviours to ensure their extreme self-imposed demands and pressures are met. Testing this assertion is an important direction for future research.

Although commonly used in personality and social psychology (e.g., Braver et al., 2014), the present study represents the first example of continuously cumulating meta-analysis in sport psychology. This approach not only provides the most up-to-date estimate of effects, but also the most accurate estimate. This is exemplified by the narrowing of

confidence intervals that occurred when the present study's data was included in the meta-analysis (see Table 3). Moreover, at some point, the confidence intervals are going to be so narrow that we can be almost certain in our estimate. At which time, it may be unnecessary to further examine these relationships, and instead research effort could be expended on unpicking further complexities (e.g., moderators). This approach is relatively common in medical research where the point at which a treatment reaches clinical efficacy can be determined negating the need for any further substantial investment (see e.g., Lau et al., 1992).

The 2 × 2 Model of Perfectionism and Doping

Building on previous research that has focused exclusively on main effects, we also examined the interactive effects of PSP and ECP, and tested the hypotheses of the 2 × 2 model of perfectionism. The findings provide us with a more nuanced understanding of these relationships by showing that when high ECP is accompanied by low levels of PSP (as opposed to high levels) athletes have more favourable attitudes towards doping. As to the reasons for this finding, we think that the differing features of the two dimensions is key. ECP contains many elements that may drive unacceptable behaviours including external pressures, concerns over mistakes, and negative reactions to imperfection. However, PSP is much more ambiguous and, based on the observed effects here, seemingly may contain some elements that may be useful in preventing doping behaviours such as if the extremely high personal standards are applied to moral behaviours (e.g., moral perfectionism; Ring & Hurst, 2019).

Flett and Hewitt (2016) posit that perfectionists' behaviours are driven by extreme pressures to be perfect. Our findings provide further information on which pressures may be most important in regards to promoting dark striving. Specifically, our findings imply that it is external pressure to avoid negative social evaluations and concerns associated with failure

(i.e., ECP) that may be most important. It is possible that because athletes high in ECP are motivated by a strong need to gain approval from others over which they have little control, ego-investment in the goals is perceived to be higher, and they respond with behaviours that may be harmful to themselves. In this sense, the pressures arising from ECP place a "dark demand" on athletes to win by any means necessary including by engaging in doping.

Practical Implications

Taken together, our findings suggest that it is essential for policy and practice to take perfectionism into account. In this regard, we have two suggestions. These suggestions are based on two main ways that athletes' decisions can be influenced. First, organisations can help coaches to create environments that reduce perceived demands and expectations on athletes. In this regard, and in line with the suggestions of others (e.g., Ntoumanis, Barkoukis, Gucciardi, & Chan, 2017), interventions aimed at helping coaches create a more autonomy supportive/mastery-based motivational climate may reduce these pressures. Similarly, such interventions could also aim to reduce pressures from parents and teammates (see also Madigan et al., 2016). Second, we think that athletes high in ECP would benefit from tailored educational programmes. That is, educational programmes directly accounting for an irrational world view that others expect them to be perfect while concurrently aiming to reduce ECP. This combination likely has the best chance of decreasing favourability towards doping in those athletes high in ECP.

Limitations and Future Research

The present study has several limitations. First, whereas the evidence regarding socially desirable responding and self-report doping measures is mixed (e.g., Lazuras, Barkoukis, & Tsorbatzoudis, 2015), future research examining the perfectionism-doping relationship should include a measure of social desirability to determine whether it has any moderating effect. Second, there has been debate with regards to the theoretical and

psychometric properties of the PEAS (see e.g., Nicholls et al., 2016). Future studies should therefore examine its factor structure in more detail. In addition, future research examining perfectionism and doping should aim to use measures other than attitudes (e.g., intentions, likelihood, behaviours) to determine if this provides a more nuanced understanding of these relationships. Third, we now have seven cross-sectional studies of the perfectionism-doping relationship but no longitudinal studies. Future research should therefore adopt longitudinal designs to allow for stronger temporal and causal claims to be made. Finally, the present sample was comprised exclusively of university athletes. Therefore, it is unclear if the present findings for the 2 × 2 model will generalise to other populations. Future research is required to examine this possibility.

Conclusion

The present findings suggest that ECP is a significant predictor of attitudes towards doping. In addition, our findings provide some support for the utility of the 2 × 2 model of perfectionism in the context of doping. In this regard, athletes high in ECP but low in PSP are the most likely to be at risk of doping.

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Table 1

Descriptive Statistics, Cronbach's Alphas, Bivariate and Correlations

Variable	1	2	3
1. Personal standards perfectionism			
2. Evaluative concerns perfectionism	.59***		
3. Attitudes towards doping	–.07	.16*	
M	0.00	0.00	14.83
SD	0.93	0.92	7.25
Cronbach's alpha	.84	.83	.90

Note. $N = 181$. *$p < .05$. ***$p < .001$.

Table 2

Multiple Regression Predicting Attitudes Towards Doping

	Attitudes towards doping	
	R^2	*B*
Step 1	.097***	
Personal standards perfectionism		–2.38***
Evaluative concerns perfectionism		3.11***
Step 2	.129***	
Personal standards perfectionism		–2.83***
Evaluative concerns perfectionism		3.04***
Personal standards perfectionism × Evaluative concerns perfectionism		–1.84*

Note. $N = 181$. *$p < .05$. ***$p < .001$.

Table 3

Results of the continuously cumulating meta-analysis examining the relationship between perfectionism and attitudes towards doping

		Measures			Correlations	
Study	*N*	Instrument	PSP	ECP	PSP-Attitudes	ECP-Attitudes
Bae, Yoon, Kang, & Kim (2017)	198	PSS	PS	COM	–.01	.18
Bahrami, Yousefi, Kaviani, & Ariapooran (2014)	389	SMPS	PS	COM	.40	.30
Ismaili, Yousefi, & Sobhani (2013)	55	SMPS	PS	COM	.04	.32
Madigan, Stoeber, & Passfield (2016)	129	SMPS/MIPS	PS/SP	COM/NRI	–.08	.10
r^+ (95% CI)	771				.10 (–.18 to .36)	.23 (.13 to .32)
The present study	181	SMPS/MIPS	PS/SP	COM/NRI	–.07	.16
Continuously cumulating r^+ (95% CI)	952				.07 (–.17 to .30)	.21 (.13 to .29)

Note. r^+ = inverse variance weighted mean effect size. PSP = Personal standards perfectionism. ECP = Evaluative concerns perfectionism. Attitudes = Attitudes towards doping. CI = Confidence intervals. SMPS = Sport Multidimensional Perfectionism Scale (Dunn et al., 2002), MIPS = Multidimensional Inventory of Perfectionism in Sport (Stoeber et al. 2006), PSS = Perfectionism in Sport Scale (Anshel & Eom, 2003). PS = Personal standards, COM = Concern over mistakes, SP = Striving for perfection, NRI = Negative reactions to imperfection.

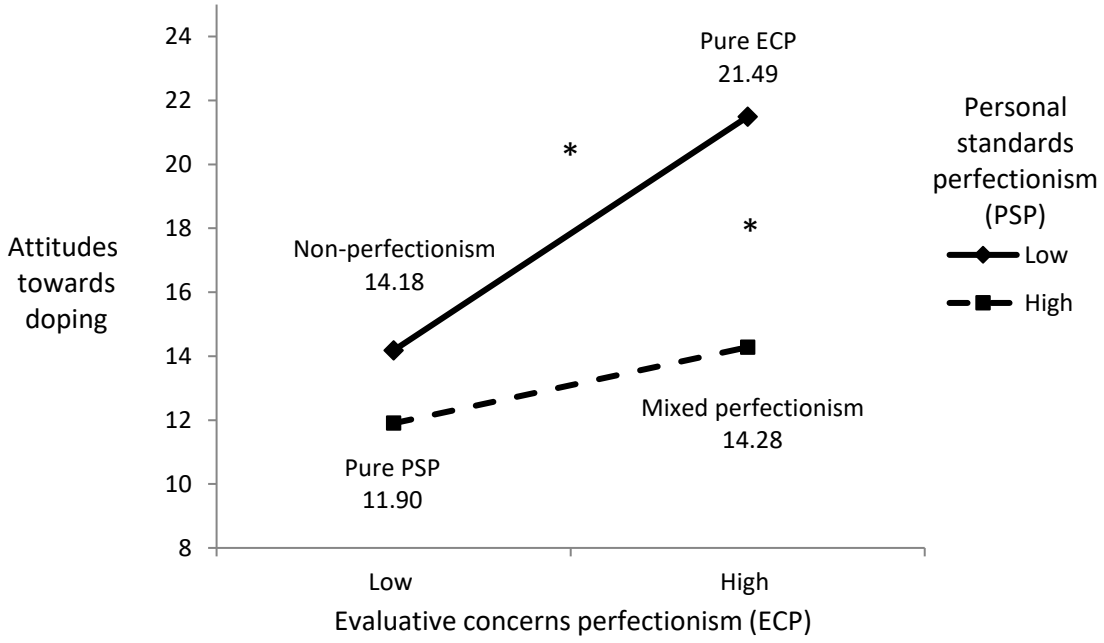

Figure 1. Predicted values of attitudes towards doping across the four within person combinations of perfectionism. *difference between within-person combinations significant at $p < .05$.