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Perfectionism and Attitudes Towards Doping in Junior Athletes

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Abstract

1
2 Recent theory and research suggest that perfectionism is a personal factor contributing to
3 athletes' vulnerability to doping (using banned substances/drugs to enhance sporting
4 performance). So far, however, no study has examined what aspects of perfectionism suggest a
5 vulnerability in junior athletes. Employing a cross-sectional design, this study examined
6 perfectionism and attitudes towards doping in 129 male junior athletes (mean age 17.3 years)
7 differentiating four aspects of perfectionism: perfectionistic strivings, perfectionistic concerns,
8 parental pressure to be perfect, and coach pressure to be perfect. In the bivariate correlations,
9 only parental pressure showed a positive relationship with positive doping attitudes. In a multiple
10 regression analysis controlling for the overlap between the four aspects, perfectionistic strivings
11 additionally showed a negative relationship. Moreover, a structural equation model examining the
12 relationships between all variables suggested that coach pressure had a negative indirect effect on
13 attitudes towards doping via perfectionistic strivings. The findings indicate that perceived
14 parental pressure to be perfect may be a factor contributing to junior athletes' vulnerability to
15 doping, whereas perfectionistic strivings may be a protective factor.

16 *Keywords:* perfectionism; attitudes towards doping; sport; junior athletes; performance
17 enhancing substances; performance enhancing drugs

Perfectionism and Attitudes Towards Doping in Junior Athletes

Introduction

In sports, the term “doping” refers to the use of substances and drugs enhancing an athlete’s performance that are banned by the World Anti-Doping Agency (WADA). Despite rising awareness of doping, more frequent controls, and serious disciplinary consequences for athletes who are caught, doping is still regarded a widespread and pervasive problem in competitive sports (Morente-Sánchez & Zabala, 2013). Consequently, there has been an increasing interest in sport psychology and the sports sciences to understand the factors making athletes vulnerable to doping (Allen, Taylor, Dimeo, Dixon, & Robinson, 2015; Petróczi & Strauss, 2015). According to the life-cycle model of performance enhancement (Petróczi & Aidman, 2008), there are not only systemic factors (e.g., doping culture) contributing to the problems. Personal factors also play an important role. One such factor that was recently suggested to increase athletes’ vulnerability to doping is perfectionism (Bahrami, Yousefi, Kaviani, & Ariapooran, 2014; Flett & Hewitt, 2014; Zucchetti, Candela, & Villosio, 2015).

Perfectionism in sport is a multidimensional characteristic comprising four aspects: perfectionistic strivings, perfectionistic concerns, parental pressure to be perfect, and coach pressure to be perfect (Anshel & Eom, 2003; Dunn, Causgrove Dunn, et al., 2006; Stoeber, Otto, & Stoll, 2006). Perfectionistic strivings capture athletes’ self-oriented striving for perfection and their setting of exceedingly high personal standards of performance. In contrast, perfectionistic concerns capture athletes’ concerns over making mistakes, feelings of discrepancy between one’s expectations and performance, and negative reactions to imperfection. Parental pressure to be perfect captures athletes’ perceptions that their parents expect them to be perfect and would criticise them if they failed to deliver. Coach pressure to be perfect is the same as parental pressure, except that it is the coach who is perceived as expecting perfection and being critical.

1 Why is perfectionism seen as a vulnerability factor increasing athletes' risk of doping?

2 According to a recent review on the perils of perfectionism in sports (Flett & Hewitt, 2014), all
3 aspects of perfectionism may facilitate the tendency for perfectionists under pressure to use
4 substances in order to gain a competitive advantage. This, however, may not be the only reason
5 why perfectionism may be associated with doping. According to Petróczi (2013), it is important
6 to distinguish between internal and external rewards in the doping mindset because doping may
7 be used for different goals: to maximise athletic potential (be as good as possible) or maximise
8 the chance to win (outperform others). (In addition, there may be aesthetic reasons, for example,
9 in bodybuilders [Pederson, 2010]). Perfectionism in sport has been shown to be related to both of
10 these goals (Stoeber, Stoll, Pescheck, & Otto, 2008). Consequently, perfectionism may play an
11 important role in understanding individual differences contributing to doping.

12 If perfectionism is a personal factor increasing athletes' vulnerability to doping, one should
13 expect athletes high in perfectionism to have more positive attitudes towards doping compared to
14 athletes low in perfectionism. Positive attitudes towards doping comprise beliefs that the use of
15 banned substances for performance enhancement is necessary (e.g., "Doping is necessary to be
16 competitive") or socially acceptable (e.g., "Doping is not cheating since everyone does it";
17 Petróczi & Aidman, 2009). Positive attitudes towards doping are key in psychological research
18 on doping because they have been shown to influence whether or not an athlete will use banned
19 substances or not (Gradidge, Coopoo, & Constantinou, 2010; Morente-Sánchez & Zabala, 2013;
20 Petróczi & Aidman, 2009). Consequently, in the absence of objective information on doping,
21 positive attitudes towards doping are sometimes regarded a proxy for doping behaviour because
22 they predict intention to dope (Morente-Sánchez & Zabala, 2013; Ntoumanis, Ng, Barkoukis, &
23 Backhouse, 2014).

24 **Previous Research**

1 So far, only two studies have investigated the relationships between perfectionism in sport
2 and attitudes towards doping. The first study (Bahrami et al., 2014) examined bodybuilders. To
3 measure attitudes towards doping, it used the Performance Enhancement Attitude Scale (Petróczi
4 & Aidman, 2009) which is a unidimensional measure capturing positive attitudes towards doping.
5 To measure perfectionism, it used the Sport Multidimensional Perfectionism Scale (Dunn,
6 Causgrove Dunn, et al., 2006) which is a multidimensional measure of perfectionism in sport
7 differentiating perfectionistic strivings, perfectionistic concerns, parental pressure to be perfect,
8 and coach pressure to be perfect. When bivariate correlations were examined, results showed that
9 perfectionistic strivings and perfectionistic concerns showed positive correlations with positive
10 attitudes towards doping whereas parental and coach pressure showed nonsignificant correlations.

11 The second study (Zucchetti et al., 2015) examined athletes attending a sports medicine
12 centre. To measure attitudes towards doping, it also used the Performance Enhancement Attitude
13 Scale. To measure perfectionism in sport, it used the Perfectionism in Sport Scale (Anshel &
14 Eom, 2003). Like the Sport Multidimensional Perfectionism Scale, the Perfectionism in Sport
15 Scale differentiates perfectionistic strivings, perfectionistic concerns, parental pressure to be
16 perfect, and coach pressure to be perfect, but Zucchetti et al. (2015) only examined overall
17 perfectionism combining the four aspects. When overall perfectionism was entered in a multiple
18 regression analysis (together with various social factors and other personal factors including self-
19 confidence, motivation, and life satisfaction) to predict positive attitudes towards doping, overall
20 perfectionism emerged as a positive predictor.

21 The two studies make an important contribution to research on personal factors in doping as
22 they provide the first empirical evidence that perfectionism in sports represents a vulnerability
23 factor for doping. The studies, however, left some open questions. Regarding Zucchetti et al.'s
24 (2015) study, it is unclear what aspects of perfectionism were driving the positive effect that

1 overall perfectionism had in the multiple regression predicting positive attitudes towards doping.
2 Moreover, Zucchetti et al. (2015) did not report bivariate correlations so it is unclear if the effect
3 of overall perfectionism was influenced by the other predictor variables that were simultaneously
4 entered in the regression analysis (Cohen, Cohen, West, & Aiken, 2003). Regarding Bahrami et
5 al.'s (2014) study, it is unclear how representative their findings are of perfectionism in sport.
6 The reason is that bodybuilding is a sport in which doping seems to be widely practiced and may
7 form an acceptable part of the sport's culture (Pedersen, 2010; Santos, da Rocha, & da Silva,
8 2011). One indication of that is that the bodybuilders in the study by Bahrami et al. (2014) had an
9 average Performance Enhancement Attitude Scale score of 50.09 ($SD = 4.58$) which was
10 considerably higher and showed less variance than the average Performance Enhancement
11 Attitude Scale scores that Petróczi and Aidman (2009) found in the various athletes samples used
12 in the Performance Enhancement Attitude Scale's validation studies ($30.86 \leq Ms \leq 44.68$; $7.39 \leq$
13 $SDs \leq 13.02$). Finally, both studies investigated adult athletes. Bahrami et al.'s (2014)
14 bodybuilders were on average 27.1 years old, and Zucchetti et al.'s (2015) athletes 31.5 years.
15 This is relevant because the life-cycle model of performance enhancement (Petróczi & Altman,
16 2008) suggests that factors which predict engagement in doping practices may be different at
17 different career stages. Moreover, no study has yet investigated the relationships of perfectionism
18 and positive attitudes towards doping in junior athletes. This, however, would be important
19 because anti-doping programmes may have the greatest impact on athletes that are in an early
20 stage of their sporting careers (Morente-Sánchez & Zabala, 2013; Ntoumanis et al., 2014).
21 Furthermore, perfectionism has previously been associated with negative behaviour in junior
22 athletes, for example, need thwarting and athlete burnout (Jowett, Hill, Hall, & Curran, 2013;
23 Mallinson & Hill, 2011).

24 **The Present Study**

1 Participants were involved in different sports (58 in soccer, 37 in rugby, 18 in basketball, 5 in
2 athletics, and 12 in other sports [e.g., tennis, squash]) and trained on average 9.7 hours per week
3 ($SD = 5.7$). The study was approved by the ethics committee of our university. Informed consent
4 was obtained from all participants. In addition, parental consent was obtained from participants
5 below the age of 18.

6 **Measures**

7 **Perfectionism.** To measure perfectionism, we used four subscales from two
8 multidimensional measures of perfectionism in sport: the Sport Multidimensional Perfectionism
9 Scale (Dunn, Causgrove Dunn, et al., 2006) and the Multidimensional Inventory of Perfectionism
10 in Sport (Stoeber et al., 2006). To measure perfectionistic strivings, we used two indicators—the
11 Multidimensional Inventory of Perfectionism in Sport subscale capturing striving for perfection
12 (5 items; e.g. “I strive to be as perfect as possible”) and the Sport Multidimensional Perfectionism
13 Scale subscale capturing personal standards (7 items; e.g. “I have extremely high goals for myself
14 in my sport”)—and then standardised the scale scores before combining them to a measure of
15 perfectionistic strivings (Dunkley, Zuroff, & Blankstein, 2003). To measure perfectionistic
16 concerns, we also used two indicators—the Sport Multidimensional Perfectionism Scale subscale
17 capturing concerns over mistakes (8 items; e.g., “People will probably think less of me if I make
18 mistakes in competition”) and the Multidimensional Inventory of Perfectionism in Sport subscale
19 capturing negative reactions to imperfection (5 items; e.g., “I feel extremely stressed if
20 everything does not go perfectly”)—and again standardised the scale scores before combining
21 them to one measure of perfectionistic concerns. To measure perceived pressure to be perfect
22 differentiating parental pressure and coach pressure, we used the Multidimensional Inventory of
23 Perfectionism in Sport subscales capturing parental pressure to be perfect (8 items; e.g., “My
24 parents expect my performance to be perfect”) and coach pressure to be perfect (8 items; e.g.,

1 “My coach expects my performance to be perfect”; see Appendix). All subscales have
2 demonstrated reliability and validity in previous studies (Dunn, Causgrove Dunn, et al., 2006;
3 Stoeber, Otto, Pescheck, Becker, & Stoll, 2007). Participants were asked to indicate to what
4 degree each statement characterised their attitudes in their sport responding on a scale from 1
5 (*strongly disagree*) to 5 (*strongly agree*).

6 **Positive attitudes towards doping.** To measure positive attitudes towards doping, we used
7 the Performance Enhancement Attitude Scale (Petróczi & Aidman, 2009) which is comprised of
8 17 items capturing attitudes towards doping (e.g., “Doping is necessary to be competitive,”
9 “Doping is not cheating since everyone does it”). The Performance Enhancement Attitude Scale
10 has demonstrated validity and reliability in previous studies (Petróczi & Aidman, 2009; Zucchetti
11 et al., 2015). Each item was preceded by the phrase “My opinion regarding sport in general is that
12 ...,” and participants responded on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). This
13 scale was used (instead of the original 6-point scale) to allow our findings to be directly
14 comparable to those of Zucchetti et al. (2015) who used the same 5-point scale. In addition, it had
15 the advantage of not confusing junior athletes with different response formats.

16 **Data Screening**

17 First, we inspected the data for missing values. Because very few item responses were
18 missing ($i = 16$), missing responses were replaced with the mean of the item responses of the
19 corresponding scale (ipsatised item replacement; Graham, Cumsille, & Elek-Fisk, 2003). Next,
20 we examined the scales scores’ reliability by computing Cronbach’s alphas. All scores showed
21 satisfactory reliability (Table 1). Finally, we screened the data for multivariate outliers. One
22 participant showed a Mahalanobis distance larger than the critical value of $\chi^2(5) = 20.52, p < .001$
23 and was removed from the further analyses, resulting in a final sample of $N = 129$.

24

Results

1 **Analytic Strategy**

2 To examine the relationships between perfectionism and positive attitudes towards doping,
3 we followed the model in Figure 1. In doing so, we first examined the bivariate correlations
4 between all variables. Next, we computed a series of multiple regressions to investigate how the
5 four aspects of perfectionism predicted positive attitudes towards doping when examined
6 simultaneously (Model 1), how parental and coach pressure predicted perfectionistic strivings
7 (Model 2), and how parental and coach pressure predicted perfectionistic concerns (Model 3).
8 Finally, based on the findings from Models 1-3, we used structural equation modelling (SEM) to
9 combine and test the relationships suggested by Models 1-3 in one structural model.

10 **Main Analyses**

11 **Bivariate Correlations.** When the bivariate correlations were examined (Table 1), all
12 aspects of perfectionism showed positive intercorrelations indicating significant overlap.
13 Moreover, parental pressure to be perfect showed a positive correlation with positive attitudes
14 towards doping.

15 **Multiple Regressions.** When multiple regressions were conducted predicting positive
16 attitudes towards doping simultaneously taking the four aspects of perfectionism into account
17 (Table 2, Model 1), parental pressure to be perfect emerged as a positive predictor as was
18 expected from the bivariate correlations. In addition, perfectionistic strivings emerged as a
19 negative predictor. Once the overlap with the other aspects of perfectionism was controlled for,
20 perfectionistic strivings showed an inverse relationship with positive attitudes towards doping.

21 Next we examined how parental and coach pressure predicted perfectionistic strivings and
22 perfectionistic concerns (Table 2, Models 2-3). In both models, only coach pressure emerged as a
23 positive predictor. Once the overlap between the two aspects of pressure to be perfect was
24 controlled for, only coach pressure showed positive relationships with perfectionistic strivings

1 and perfectionistic concerns.

2 **Structural Equation Modelling (SEM).** Finally, we tested a structural model combining
3 the significant relationships from Models 1-3 into one structural model employing SEM with
4 manifest variables (Figure 1). To estimate the model, we used Mplus 7.0 (Muthén & Muthén,
5 1998-2012) and robust maximum likelihood estimation. To evaluate model fit, it is recommended
6 to examine a range of incremental and absolute fit indices in addition to the χ^2 statistic (Hu &
7 Bentler, 1999; MacCallum & Austin, 2000). Consequently, we also examined the comparative fit
8 index (CFI), Tucker-Lewis Index (TLI [also known as non-normed fit index, NNFI]), root mean
9 square error of approximation (RMSEA), and standardised root mean square residual (SRMR).
10 Whereas there is no established “golden rule” for model fit regarding these indices (Marsh, Hau,
11 & Wen, 2004), we used the following cut-off values (in parentheses) as benchmarks for
12 acceptable model fit (CFI > .90, TLI > .90, RMSEA < .08, SRMR < .10) and good model fit (CFI
13 > .95, TLI > .95, RMSEA < .06, SRMR < .08; Marsh et al., 2004).

14 The structural model provided a good fit to the data. The Satorra-Bentler $\chi^2 = 0.39$ ($df = 2$)
15 was nonsignificant indicating a good model fit as did all the other fit indices (CFI = 1.00, TFI =
16 1.00, RMSEA = .00 [90% CI = .00-.10], SRMR = .01). The TLI is a non-normed index and can
17 exceed 1.00 (in the present model TLI was 1.06) in which case it is conventionally reported as
18 1.00 (McDonald & Ho, 2002). As Figure 2 shows, parental pressure had a direct positive effect
19 on positive attitudes towards doping. Moreover, coach pressure positively predicted
20 perfectionistic strivings, and perfectionistic strivings negatively predicted positive attitudes
21 towards doping. Thus, coach pressure had an indirect negative effect on positive attitudes towards
22 doping, meaning that coach pressure positively predicted perfectionistic strivings which in turn
23 negatively predicted positive attitudes towards doping.

24 **Additional Analyses**

1 Because previous research suggests that type of sport may affect positive attitudes towards
2 doping, we repeated all analyses controlling for type of sport (differentiating speed and power
3 sports vs. motor-skills demanding sports; Alaranta et al., 2006). The results remained the same
4 indicating that type of sport did not affect the relationships between perfectionism and doping
5 attitudes in the present sample.

6 **Discussion**

7 The aim of the present study was to examine the relationships between multidimensional
8 perfectionism in sport and positive attitudes towards doping in junior athletes. Differentiating
9 four aspects of perfectionism in sport—perfectionistic strivings, perfectionistic concerns, parental
10 pressure to be perfect, and coach pressure to be perfect—the study found a positive correlation
11 between parental pressure to be perfect and positive attitudes towards doping. Junior athletes who
12 thought that their parents expected them to be perfect had more positive attitudes towards doping
13 than junior athletes who did not think their parents had such expectations. Moreover, when
14 multiple regressions were computed controlling for the overlap between the four aspects of
15 perfectionism, perfectionistic strivings showed a negative relationship with positive attitudes
16 towards doping. Furthermore, the multiple regressions found that coach pressure positively
17 predicted perfectionistic strivings and concerns in junior athletes. Parental pressure had no effect
18 once the overlap with coach pressure was controlled for. Finally, when the significant effects
19 from the multiple regressions were examined in a structural equation model, parental pressure
20 had a direct positive effect on positive attitudes towards doping whereas coach pressure—via
21 perfectionistic strivings—had an indirect negative effect.

22 Corroborating the findings of the previous studies on perfectionism and positive attitudes
23 towards doping (Bahrami et al., 2014; Zucchetti et al., 2015), the present findings confirm that
24 perfectionism in sport is a personal factor explaining individual differences in doping attitudes.

1 Moreover, the findings suggest that perfectionism is a factor not only in bodybuilders and older
2 athletes, but also in junior athletes. What aspects of perfectionism play a role, however, seems to
3 differ for junior athletes. Examining bodybuilders, Bahrami et al. (2014) found perfectionistic
4 strivings and perfectionistic concerns to show positive correlations with positive attitudes towards
5 doping (whereas parental and coach pressure showed nonsignificant correlations). Examining
6 junior athletes, we found parental pressure to show a positive correlation (whereas all other
7 aspects showed nonsignificant correlations). What is more, perfectionistic strivings showed a
8 *negative* relationship with positive attitudes towards doping when the overlap with the other
9 aspects was controlled for.

10 How can we explain the different pattern of relationships? First, note that Bahrami et al.'s
11 bodybuilders reported highly positive attitudes towards doping. With an average score of 50.09
12 ($SD = 4.58$) on the Performance Enhancement Attitude Scale, they showed a much higher score
13 than those found in various athlete samples (Petróczi & Aidman, 2009). If doping is a widely
14 accepted practice in bodybuilding ("doping culture"), then athletes who are part of this culture
15 and strive for perfection may have more positive attitudes towards doping than athletes who do
16 not strive for perfection. Additionally, Zucchetti et al. (2015), using the same 5-point scale,
17 reported similar average Performance Enhancement Attitude Scale scores as the present study (M
18 $= 32.3$, $SD = 9.8$). Second, Bahrami et al.'s bodybuilders were on average 27.1 years old and thus
19 significantly older than our junior athletes (mean age 17.3 years). This is relevant because
20 parental pressure to be perfect is more salient in younger athletes (Dunn, Gotwals, Causgrove
21 Dunn, & Syrotuik, 2006) and thus may have an effect on doping attitudes in junior athletes, but
22 not adult athletes. Moreover, according to Petróczi (2013), athletes at different stages of their
23 sporting career have different mindsets. Whereas older athletes' mindsets are geared towards
24 achievement goals that are more performance-oriented making them more vulnerable to doping,

1 younger athletes' mindsets are geared towards achievement goals that are more mastery-oriented
2 making them less vulnerable. Because performance goals and mastery goals are both associated
3 with perfectionistic strivings in athletes (Stoeber et al., 2008), the perfectionistic strivings of
4 Bahrami et al.'s bodybuilders may have been predominantly performance-oriented and thus be
5 positively related to positive doping attitudes. Conversely, the perfectionistic strivings of our
6 junior athletes may have been predominantly mastery-oriented and thus negatively related to
7 positive doping attitudes (Allen et al., 2015).

8 However the negative relationship between perfectionistic strivings and positive attitudes
9 towards doping only emerged when the overlap of perfectionistic strivings with the other aspects
10 of perfectionism was controlled for. Consequently, the finding of perfectionistic strivings
11 predicting less favourable attitudes towards doping needs to be interpreted with caution and may
12 only apply to "pure perfectionistic strivings," that is, perfectionistic strivings with other, negative
13 aspects of perfectionism partialled out (Hill, 2014). Still, the finding is in line with previous
14 findings indicating that perfectionistic strivings in sport are mostly adaptive when the overlap
15 with perfectionistic concerns is controlled for (Gotwals, Stoeber, Dunn, & Stoll, 2012; Stoeber,
16 2011). Moreover, perfectionistic strivings are closely related to the personality trait of
17 conscientiousness (Rice, Ashby, & Slaney, 2007). Consequently, the finding is also in line with
18 previous findings indicating that conscientiousness is a protective factor against doping (Petróczi
19 & Aidman, 2008).

20 **Limitations and Future Studies**

21 The present study had a number of limitations. First, as this is the first empirical study
22 investigating the relationships of perfectionism and attitudes towards doping in male junior
23 athletes, future research needs to replicate the findings before firm conclusions can be drawn.
24 Furthermore, the study examined only male athletes. Consequently, future studies need to

1 investigate if the present findings generalise to female athletes. Second, the study employed a
2 cross-sectional design. Future studies will therefore need to examine if the pathways suggested in
3 our structural equation model (Figure 2) replicate when multi-wave longitudinal designs are
4 employed (Cole & Maxwell, 2003). Third, there may be an influence of performance level.
5 Qualitative research suggests that elite athletes may have more positive attitudes towards doping
6 because they are under significantly more pressure to perform (Smith et al., 2010). Therefore,
7 future research should investigate if the current findings replicate in an elite athlete sample.
8 Furthermore, the present sample was mainly from team sports so future research needs to
9 investigate if differences between team and individual sports may affect the present findings.
10 Future research should also control for socially desirable responding (Gucciardi, Jalleh, &
11 Donovan, 2010) and consider examining achievement goals alongside perfectionism (Stoeber et
12 al., 2008) to examine the role that achievement goals play in the perfectionism–doping attitudes
13 relationship. Finally, the present study investigated *perceived* pressure to be perfect, that is, junior
14 athletes’ perceptions that parents and coaches expected them to be perfect. Future studies may
15 profit from including parents and coaches and measure their actual expectations. Anti-doping
16 programmes need to know if it sufficient to target athletes’ perceptions or whether parents’ and
17 coaches’ expectations should also be targeted.

18 **Practical Implications and Conclusion**

19 Despite these limitations, the present study makes a contribution to our understanding of
20 perfectionism in sports and doping because it is the first to examine junior athletes and find
21 perceived parental pressure to be perfect a possible vulnerability factor for doping. In their life-
22 cycle model of performance enhancement, Petróczi and Aidman (2008) argue that deterrence
23 strategies against doping are more successful if they identify factors which pose a particular risk
24 of doping in certain target groups of athletes and their respective career stage. The present

1 findings suggest that, in junior athletes at the early stage of their sporting career, perceived
2 parental pressure to be perfect may pose a risk that anti-doping programmes may want to target.
3 In contrast, the study found no evidence that perfectionistic strivings, perfectionistic concerns,
4 and perceived coach pressure represented vulnerability factors to doping. On the contrary, pure
5 perfectionistic strivings showed a negative relationship with positive doping attitudes suggesting
6 that, in junior athletes, perfectionistic strivings may have a protective element and should not be a
7 prime target for anti-doping programmes.

8

References

- 1
- 2 Alaranta, A., Alaranta, H., Holmila, J., Palmu, P., Pietilä, K., & Helenius, I. (2006). Self-reported
3 attitudes of elite athletes towards doping: Differences between type of sport. *International*
4 *Journal of Sports Medicine*, 27, 842-846.
- 5 Allen, J., Taylor, J., Dimeo, P., Dixon, S., & Robinson, L. (2015). Predicting elite Scottish
6 athletes' attitudes towards doping: Examining the contribution of achievement goals and
7 motivational climate. *Journal of Sports Sciences*, 33, 899-906.
- 8 Anshel, M. H., & Eom, H. J. (2003). Exploring the dimensions of perfectionism in sport.
9 *International Journal of Sport Psychology*, 34, 255-271.
- 10 Bahrami, S., Yousefi, B., Kaviani, E., & Ariapooran, S. (2014). The prevalence of energetic drugs
11 use and the role of perfectionism, sensation seeking and physical self-concept in
12 discriminating bodybuilders with positive and negative attitude toward doping. *International*
13 *Journal of Sports Studies*, 4, 174-180.
- 14 Bloodworth, A. J., Petróczi, A., Bailey, R., Pearce, G., & McNamee, M. J. (2012). Doping and
15 supplementation: The attitudes of talented young athletes. *Scandinavian Journal of Medicine*
16 *& Science in Sports*, 22, 293-301.
- 17 Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation*
18 *analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.
- 19 Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data:
20 Questions and tips in the use of structural equation modeling. *Journal of Abnormal*
21 *Psychology*, 112, 558-577.
- 22 Damian, L. E., Stoeber, J., Negru, O., & Băban, A. (2013). On the development of perfectionism
23 in adolescence: Perceived parental expectations predict longitudinal increases in socially
24 prescribed perfectionism. *Personality and Individual Differences*, 55, 688-693.

- 1 Dunn, J. G. H., Causgrove Dunn, J., Gotwals, J. K., Vallance, J. K. H., Craft, J. M., & Syrotuik,
2 D. G. (2006). Establishing construct validity evidence for the Sport Multidimensional
3 Perfectionism Scale. *Psychology of Sport and Exercise*, 7, 57-79.
- 4 Dunn, J. G., Gotwals, J. K., Causgrove Dunn, J. C., & Syrotuik, D. G. (2006). Examining the
5 relationship between perfectionism and trait anger in competitive sport. *International*
6 *Journal of Sport and Exercise Psychology*, 4, 7-24.
- 7 Dunkley, D. M., Zuroff, D. C., & Blankstein, K. R. (2003). Self-critical perfectionism and daily
8 affect: Dispositional and situational influences on stress and coping. *Journal of Personality*
9 *and Social Psychology*, 84, 234-252.
- 10 Flett, G. L., & Hewitt, P. L. (2014). "The perils of perfectionism in sports" revisited: Toward a
11 broader understanding of the pressure to be perfect and its impact on athletes and dancers.
12 *International Journal of Sport Psychology*, 45, 395-407.
- 13 Gotwals, J. K., Stoeber, J., Dunn, J. G. H., & Stoll, O. (2012). Are perfectionistic strivings in
14 sport adaptive? A systematic review of confirmatory, contradictory, and mixed evidence.
15 *Canadian Psychology*, 53, 263-279.
- 16 Gradidge, P., Coopoo, Y., & Constantinou, D. (2010). Attitudes and perceptions towards
17 performance enhancing substance use in Johannesburg boys high school sport. *South African*
18 *Journal of Sports Medicine*, 22, 32-36.
- 19 Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data. In J.
20 A. Schinka & W. F. Velicer (Eds.), *Handbook of psychology: Research methods in*
21 *psychology* (Vol. 2, pp. 87-114). New York: Wiley.
- 22 Gucciardi, D. F., Jalleh, G., & Donovan, R. J. (2010). Does social desirability influence the
23 relationship between doping attitudes and doping susceptibility in athletes? *Psychology of*
24 *Sport and Exercise*, 11, 479-486.

- 1 Hill, A. P. (2014). Perfectionistic strivings and the perils of partialling. *International Journal of*
2 *Sport and Exercise Psychology*, *12*, 302-315.
- 3 Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis:
4 Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55.
- 5 Jowett, G., Hill, A. P., Hall, H. K., & Curran, T. (2013). Perfectionism and junior athlete burnout:
6 The mediating role of autonomous and controlling motivation. *Sport, Exercise, and*
7 *Performance Psychology*, *2*, 48-61.
- 8 MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in
9 psychological research. *Annual Review of Psychology*, *51*, 201-226.
- 10 Mallinson, S. H. & Hill, A. P. (2011). The relationship between multidimensional perfectionism
11 and psychological need thwarting in junior sports participants. *Psychology of Sport and*
12 *Exercise*, *12*, 676-684.
- 13 Marsh, H. W., Hau, K., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-
14 testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu
15 and Bentler's (1999) findings. *Structural Equation Modeling*, *11*, 320-341.
- 16 McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting statistical equation
17 analyses. *Psychological Methods*, *7*, 64-82.
- 18 Morente-Sánchez, J., & Zabala, M. (2013). Doping in sport: A review of elite athletes' attitudes,
19 beliefs, and knowledge. *Sports Medicine*, *43*, 395-411.
- 20 Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide* (7th ed.). Los Angeles: Muthén
21 & Muthén.
- 22 Ntoumanis, N., Ng, J. Y., Barkoukis, V., & Backhouse, S. (2014). Personal and psychosocial
23 predictors of doping use in physical activity settings: A meta-analysis. *Sports Medicine*, *44*,
24 1603-1624.

- 1 Pedersen, I. K. (2010). Doping and the perfect body expert: Social and cultural indicators of
2 performance-enhancing drug use in Danish gyms. *Sport in Society, 13*, 503-516.
- 3 Petróczi, A. (2013). The doping mindset—Part I: Implications of the functional use theory on
4 mental representations of doping. *Performance Enhancement & Health, 2*, 153-163.
- 5 Petróczi, A., & Aidman, E. (2008). Psychological drivers in doping: The life-cycle model of
6 performance enhancement. *Substance Abuse Treatment, Prevention, and Policy, 3*, 7.
- 7 Petróczi, A., & Aidman, E. (2009). Measuring explicit attitude toward doping: Review of the
8 psychometric properties of the Performance Enhancement Attitude Scale. *Psychology of*
9 *Sport and Exercise, 10*, 390-396.
- 10 Petróczi, A., & Strauss, B. (Eds.). (2015). Performance-enhancement by doping: Sport
11 psychological perspectives [Special section]. *Psychology of Sport and Exercise, 16*, 137-208.
- 12 Rice, K. G., Ashby, J. S., & Slaney, R. B. (2007). Perfectionism and the five-factor model of
13 personality. *Assessment, 14*, 385-398.
- 14 Rice, K. G., Lopez, F. G., & Vergara, D. (2005). Parental/social influences on perfectionism and
15 adult attachment orientations. *Journal of Social and Clinical Psychology, 24*, 580-605.
- 16 Santos, A. M., da Rocha, M. S. P., & da Silva, M. F. (2011). Illicit use and abuse of anabolic-
17 androgenic steroids among Brazilian bodybuilders. *Substance Use & Misuse, 46*, 742-748.
- 18 Smith, A. C. T., Stewart, B., Oliver-Bennetts, S., McDonald, S., Ingerson, L., Anderson, A., ...
19 Graetz, F. (2010). Contextual influences and athlete attitudes to drugs in sport. *Sport*
20 *Management Review, 13*, 181–197.
- 21 Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion,
22 motivation, and performance. *International Review of Sport and Exercise Psychology, 4*,
23 128-145
- 24 Stoeber, J., Otto, K., Pescheck, E., Becker, C., & Stoll, O. (2007). Perfectionism and competitive

- 1 anxiety in athletes: Differentiating striving for perfection and negative reactions to
2 imperfection. *Personality and Individual Differences*, 42, 959-969.
- 3 Stoeber, J., Otto, K., & Stoll, O. (2006). *MIPS: Multidimensional Inventory of Perfectionism in*
4 *Sport (English version, November 2006)*. School of Psychology, University of Kent.
- 5 Stoeber, J., Stoll, O., Pescheck, E., & Otto, K. (2008). Perfectionism and achievement goals in
6 athletes: Relations with approach and avoidance orientations in mastery and performance
7 goals. *Psychology of Sport and Exercise*, 9, 102-121.
- 8 Zucchetti, G., Candela, F., & Villosio, C. (2015). Psychological and social correlates of doping
9 attitudes among Italian athletes. *International Journal of Drug Policy*, 26, 162-168.
- 10

Appendix

Parental pressure to be perfect

- 1
- 2
- 3 My parents expect my performance to be perfect.
- 4 My parents criticize everything I do not do perfectly.
- 5 My parents are dissatisfied with me if my performance is not top class.
- 6 My parents expect me to be perfect.
- 7 My parents demand nothing less than perfection of me.
- 8 My parents make extremely high demands of me.
- 9 My parents set extremely high standards for me.
- 10 My parents are disappointed in me if my performance is not perfect.

Coach pressure to be perfect

- 11
- 12 My coach expects my performance to be perfect.
- 13 My coach criticizes everything I do not do perfectly.
- 14 My coach is dissatisfied with me if my performance is not top class.
- 15 My coach expects me to be perfect.
- 16 My coach demands nothing less than perfection of me.
- 17 My coach makes extremely high demands of me.
- 18 My coach sets extremely high standards for me.
- 19 My coach is disappointed in me if my performance is not perfect.

1 Table 1

2 *Descriptive Statistics, Cronbach's Alphas, and Bivariate Correlations*

Variable	1	2	3	4	5
Perfectionism					
1. Perfectionistic strivings					
2. Perfectionistic concerns	.60***				
3. Parental pressure to be perfect	.30**	.31***			
4. Coach pressure to be perfect	.53***	.49***	.50***		
5. Positive attitudes towards doping	-.08	.10	.36***	.10	
<i>M</i>	0.00	0.00	18.25	20.66	34.02
<i>SD</i>	0.91	0.93	8.11	6.40	10.99
Cronbach's alpha	.79	.84	.95	.88	.89

3 *Note.* $N = 129$. All variables are sum scores except perfectionistic strivings and
 4 perfectionistic concerns which are combined standardised scores (see text for details).

5 ** $p < .01$. *** $p < .001$.

1 Table 2
2 *Summary of Multiple Regression Analyses*

	R^2	β
Model 1: DV = positive attitudes towards doping	.181***	
Perfectionistic strivings		-.27*
Perfectionistic concerns		.15
Parental pressure to be perfect		.41***
Coach pressure to be perfect		-.03
Model 2: DV = perfectionistic strivings	.280***	
Parental pressure to be perfect		.05
Coach pressure to be perfect		.50***
Model 3: DV = perfectionistic concerns	.249***	
Parental pressure to be perfect		.09
Coach pressure to be perfect		.45***

3 *Note.* $N = 129$. DV = dependent variable. β = standardised regression
4 weight.

5 * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure Captions

1

2 *Figure 1.* Conceptual model of the relationships between parental and coach pressure to be
3 perfect, perfectionistic strivings and concerns, and positive attitudes towards doping.

4

5 *Figure 2.* Structural equation model of parental and coach pressure to be perfect and
6 perfectionistic strivings predicting positive attitudes towards doping. Paths coefficients are
standardised. $N = 129$. $*p < .05$. $***p < .001$.