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Perfectionism and Training Distress in Junior Athletes:

A Longitudinal Investigation

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Abstract

1   Perfectionistic athletes may train harder and for longer than non-perfectionistic athletes, leaving

2   them susceptible to elevated levels of training distress. So far, however, no study has

3   investigated the relationships between perfectionism and training distress, a key indicator of

4   overtraining syndrome. Furthermore, no study has determined psychological predictors of

5   overtraining syndrome. Using a two-wave design, the present study examined perfectionistic

6   strivings, perfectionistic concerns, and training distress in 141 junior athletes (mean age 17.3

7   years, range 16-19 years) over 3 months of active training. Multiple regression analyses were

8   employed to test cross-sectional and longitudinal relationships between perfectionism and

9   training distress. In all analyses, perfectionism emerged as a significant predictor, but strivings

10   and concerns showed differential relationships. When the cross-sectional relationships were

11   regarded, perfectionistic concerns positively predicted training distress ($p < .01$), whereas

12   perfectionistic strivings negatively predicted training distress ($p < .001$). When the longitudinal

13   relationships were regarded, only perfectionistic concerns predicted increases in training distress

14   ($p < .05$), whereas perfectionistic strivings did not ($p > .05$). The findings suggest that sports

15   scientists who wish to identify athletes at risk of overtraining syndrome may monitor athletes'

16   perfectionistic concerns as a possible risk factor.

17   *Keywords:* perfectionistic strivings, perfectionistic concerns, training distress,

18   overtraining, junior athletes, longitudinal study

19

Perfectionism and Training Distress in Junior Athletes:

A Longitudinal Investigation

To succeed in competitive sports, athletes are required to participate in intensive training regimes. However, excessive training accompanied by inadequate rest can result in overtraining syndrome (Meeusen et al., 2013). Sports scientists have investigated ways to monitor athletes' training responses with the aim of identifying at-risk athletes and intervening to prevent overtraining syndrome. One psychological marker of overtraining syndrome that sport scientists have identified is training distress (Kenttä, Hassmén, & Raglin, 2001; Meeusen et al., 2013; Raglin & Morgan, 1994) which focuses on training-related mood disturbance. Consequently, researchers have sought to determine factors that may predispose athletes to training distress. One such factor may be perfectionism, as perfectionistic athletes may train harder and for longer than non-perfectionistic athletes (Flett & Hewitt, 2014). In support of this suggestion, case studies have shown that athletes who overtrained were characterised by exhibiting a high level of perfectionism (Gould, Tuffey, Udry, & Loehr, 1997; Krane, Greenleaf, & Snow, 1997). In addition, there is evidence that perfectionism is related to associated syndromes such as athlete burnout and compulsive exercise (Hill & Curran, in press; Hill, Robson, & Stamp, 2015; Madigan, Stoeber, & Passfield, 2015). So far, however, the relationships between perfectionism in athletes and training distress have not been investigated. Furthermore, previous research has yet to identify any psychological predictors of training distress. Therefore, the aim of the present study was to provide a first investigation of perfectionism and training distress in junior athletes.

Perfectionism

Perfectionism is a personality disposition characterised by striving for flawlessness and setting exceedingly high standards of performance accompanied by tendencies for overly critical

1   evaluations of one's behaviour (Flett & Hewitt, 2002). However, perfectionism has various

2   aspects, and there are different dimensions of perfectionism with different characteristics.

3   Consequently, perfectionism is best conceptualized as a multidimensional disposition (Frost,

4   Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991; see Enns & Cox, 2002, for a review).

5   Factor analyses comparing various measures of multidimensional perfectionism have provided

6   support for two higher-order dimensions: *perfectionistic strivings* capturing perfectionist

7   personal standards and a self-oriented striving for perfection and *perfectionistic concerns*

8   capturing concerns about making mistakes, feelings of discrepancy between one's standards and

9   performance, and fears of negative evaluation and rejection by others if one fails to be perfect

10   (see Stoeber & Otto, 2006, for a review).

11   Differentiating between perfectionistic strivings and perfectionistic concerns is important

12   when investigating perfectionism in sports because the two dimensions show different, and often

13   opposite, patterns of relationships with psychological processes and outcomes. Perfectionistic

14   concerns are consistently associated with negative processes and outcomes (e.g., maladaptive

15   coping, negative affect), whereas perfectionistic strivings are often associated with positive

16   processes and outcomes (e.g., adaptive coping, positive affect) or inversely with negative

17   processes and outcomes. The latter is particularly evident when the overlap between

18   perfectionistic strivings and concerns is controlled for (Gotwals, Stoeber, Dunn, & Stoll, 2012;

19   Stoeber, 2011). In this case "pure perfectionistic strivings" are identified (i.e., as perfectionistic

20   strivings with the negative influence of perfectionistic concerns partialled out; Hill & Curran, in

21   press). Pure perfectionistic strivings are usually more adaptive than perfectionistic strivings

22   because they lack those aspects common to both perfectionistic strivings and concerns (e.g., self-

23   criticism, conditional self-acceptance; Hill, 2014).

Training Distress

Excessive training accompanied by inadequate recovery (and possible non-training stressors) can result in an overtraining syndrome which is characterised by a sport-specific decrease in performance that can persist for weeks and sometimes months (Meeusen et al., 2013). Whereas there is no single diagnostic tool to identify athletes suffering from overtraining syndrome, monitoring training responses allows for early identification of at-risk athletes and may give practitioners a chance to reduce the negative consequences of excessive training. There are numerous indicators of training responses associated with overtraining syndrome including biochemical, physiological, immunological, and psychological indicators which all have limitations (Meeusen et al., 2013). A recent systematic review, however, suggests that psychological indicators capturing athletes' subjective responses to training can help identify athletes at risk of overtraining syndrome and do so more effectively than physiological indicators (Saw, Main, & Gastin, in press).

In particular, measures of training distress have shown promise in capturing athletes' subjective responses to training (Meeusen et al., 2013). One such measure is the Training Distress Scale (TDS; Raglin & Morgan, 1994). The TDS is a widely used mood-based measure of training distress and is derived from the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971), which has itself been found to be an effective tool in assessing training stress and overtraining syndrome risk. Moreover, depression is one of the more serious outcomes of overtraining syndrome and training distress is derived largely from POMS depression items (Armstrong & VanHeest, 2002). Although the POMS has shown a dose-response relationship with training load (Raglin & Wilson, 2000), the TDS has shown to be more accurate in identifying overtrained athletes (Kenttä et al., 2001; Raglin & Morgan, 1984). Still, despite

attempts (e.g., Raglin & Wilson, 2000), no study has identified psychological factors that

longitudinally predispose athletes to greater risk of developing an overtraining syndrome, and

this information would provide a very useful (and currently missing) diagnostic tool for

preventing the development of the overtraining syndrome in athletes.

The Present Study

Against this background, the aim of the present study was to provide a first investigation

of the relationships between perfectionism and training distress in athletes examining cross-

sectional and longitudinal relationships between perfectionistic strivings, perfectionistic

concerns, and training distress. Based on previous theory and empirical evidence from cross-

sectional studies on perfectionism and compulsive exercise (e.g., Hill et al., 2015), we

hypothesised that perfectionism would predict training distress. In this, however, we expected

only perfectionistic concerns to be a positive predictor, whereas we expected perfectionistic

strivings to be either a negative predictor or to show nonsignificant relationships. Based on

previous theory and empirical evidence from a longitudinal study on perfectionism and burnout

(Madigan et al., 2015), we further expected perfectionism to predict longitudinal changes in

training distress, but expected only perfectionistic concerns to be a positive predictor.

Method

Participants

A sample of 141 junior athletes (125 male, 16 female) was recruited at two sports

academies (92 from one academy, 49 from the other) to participate in the present study. Sports

academies are part of the United Kingdom's further education system. Their main purpose is to

recruit and develop promising junior athletes by providing them with a professional coaching

environment while they study alongside their sporting commitments. Academy athletes are

1 selected based on their ability (competitive performance in trials to enter the academy) and

2 regularly compete at a regional, national, or international level. Participants' mean age was 17.3

3 years ($SD = 0.8$; range = 16-19 years). Participants were involved in a range of sports (60 in

4 soccer, 36 in rugby, 18 in basketball, 14 in athletics, and 13 in other sports [e.g., cycling,

5 squash]) and trained on average 9.6 hours per week ($SD = 5.6$).

6 **Procedure**

7   The study was approved by the university's ethics committee. Informed consent was

8 obtained from all participants. In addition, parental consent was obtained from participants

9 below the age of 18 (as per the ethics committee's recommendation). Questionnaires were

10 distributed during training in the presence of the first author, or athletes completed an online

11 version of the questionnaire. Participants were administered all measures twice separated by

12 three months, once in October (Time 1) and then again in January (Time 2). During this period,

13 all participants were in regular seasonal training and competition with the exception of those

14 involved in athletics who were in pre-seasonal training. Furthermore, a three-month period has

15 been found sufficient in longitudinal research on perfectionism and athlete burnout (Madigan et

16 al., 2015).

17 **Measures**

18   **Perfectionism.** To measure perfectionism, we followed a multi-measure approach

19 (Stoeber & Madigan, in press) and used four subscales from two multidimensional measures of

20 perfectionism in sport: the Sport Multidimensional Perfectionism Scale (Dunn et al., 2006) and

21 the Multidimensional Inventory of Perfectionism in Sport (Stoeber, Otto, Pescheck, Becker, &

22 Stoll, 2007). To measure perfectionistic strivings, we used two indicators: the 7-item Sport

23 Multidimensional Perfectionism Scale subscale capturing personal standards (e.g. "I have

1   extremely high goals for myself in my sport"; $M = 3.35$, $SD = 0.71$) and the 5-item

2   Multidimensional Inventory of Perfectionism in Sport subscale capturing striving for perfection

3   ("I strive to be as perfect as possible"; $M = 3.21$, $SD = 0.79$), and then standardised the scale

4   scores before combining them to measure perfectionistic strivings (cf. Dunkley, Zuroff, &

5   Blankstein, 2003). To measure perfectionistic concerns, we also used two indicators, the 8-item

6   Sport Multidimensional Perfectionism Scale subscale capturing concerns over mistakes ("People

7   will probably think less of me if I make mistakes in competition"; $M = 2.89$, $SD = 0.77$) and the

8   5-item Multidimensional Inventory of Perfectionism in Sport subscale capturing negative

9   reactions to imperfection ("I feel extremely stressed if everything does not go perfectly"; $M =$

10   2.89, $SD = 0.83$), and again standardised the scale scores before combining them to measure

11   perfectionistic concerns. The four subscales have demonstrated reliability and validity in

12   previous studies (e.g., Madigan, Stoeber, & Passfield, in press; Stoeber, Stoll, Salmi, & Tiikkaja,

13   2009). Moreover, both are reliable and valid indicators of perfectionistic strivings and

14   perfectionistic concerns (e.g., Gotwals et al., 2012; Stoeber & Madigan, in press). Participants

15   were asked to indicate to what degree each statement characterised their attitudes in their sport

16   responding on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

17   **Training Distress.** To measure training distress, we used the Training Distress Scale

18   (TDS; Raglin & Morgan, 1994). The TDS is comprised of ten items, seven items capturing

19   training distress (e.g., "worthless", "miserable", "bad tempered") and three filler items (e.g.,

20   "helpful") which are ignored when calculating TDS scores. The TDS has demonstrated

21   reliability and validity in numerous studies (e.g., Kenttä et al., 2001; Raglin & Morgan, 1994).

22   Participants were asked to indicate how often within the last week ("During training last week, I

23   felt…") they had been feeling as described in each item responding on a scale from 1 (*not been*

1 *feeling this way*) to 5 (*been feeling extremely like this*).

2 **Data Screening**

3 First, we inspected the data for missing values. Because very few item responses were

4 missing ($i = 12$), missing responses were replaced with the mean of the item responses of the

5 corresponding scale (ipsatised item replacement; Graham, Cumsille, & Elek-Fisk, 2003). Next

6 we computed Cronbach's alphas for our variables which were all satisfactory (see Table 1).

7 Following recommendations by Tabachnick and Fidell (2007), data were screened for

8 multivariate outliers. One participant showed a Mahalanobis distance larger than the critical

9 value of $\chi^2(4) = 18.47$, $p < .001$, and was excluded from further analyses. Finally, we conducted

10 two Box's *M* tests to examine if the variance–covariance matrices showed any differences

11 between academies or gender. Both tests were nonsignificant with Fs < 1.14, ps $> .21$ despite the

12 test being so sensitive to minor differences that the recommended significance level for this test

13 is $p < .001$ (Tabachnick & Fidell, 2007). Therefore, all further analyses were collapsed across

14 academies and gender. Because 35 participants did not complete the measures on both

15 occasions, the final cross-sectional sample size was $N = 140$ (124 male, 16 female) and the final

16 longitudinal sample size was $N = 106$ (90 male, 16 female).

17 **Results**

18 **Bivariate Correlations**

19 Next, we inspected the bivariate correlations between all variables (see Table 1). As in

20 previous research (e.g., Madigan et al., in press), the dimensions of perfectionism showed a

21 significant positive correlation with each other. Furthermore, training distress at Time 1 showed

22 a significant positive correlation with training distress at Time 2. Perfectionistic concerns

23 showed significant positive correlations with training distress at Time 1 and Time 2, whereas

1   perfectionistic strivings showed no significant correlations with training distress at either time

2   point.

3   **Multiple Regression Analyses**

4   We then conducted two multiple regression analyses (see Table 2). The first regression

5   analysis investigated the cross-sectional relationships between perfectionism and training

6   distress to examine the unique relationships of the two perfectionism dimensions by controlling

7   for their overlap. For this, we entered perfectionistic strivings and perfectionistic concerns

8   simultaneously into the regression. Results showed that the model explained 11% of the variance

9   in training distress ($R^2 = .114$, $p < .001$) and the perfectionism dimensions showed opposite

10   relationships with training distress: Perfectionistic concerns positively predicted training distress

11   ($\beta = .39$, $p < .001$), whereas perfectionistic strivings negatively predicted training distress ($\beta = -$

12   $.28$, $p < .01$).

13   The second regression analysis investigated the longitudinal relationship between

14   perfectionism and training distress. First, we controlled for baseline levels of training distress by

15   entering training distress at Time 1 in Step 1. We then entered the two perfectionism dimensions

16   simultaneously in Step 2. Results showed that perfectionistic concerns predicted residual

17   increases in training distress over time, whereas perfectionistic strivings emerged as a

18   nonsignificant predictor.

19   **Discussion**

20   The aim of the present study was to investigate the relationships between perfectionism in

21   athletes and training distress differentiating perfectionistic strivings and perfectionistic concerns.

22   Providing a first investigation of both cross-sectional and longitudinal relationships, we found

23   perfectionism to be significantly related to training distress, but the two dimensions of

1   perfectionism showed different relationships with training distress. When the cross-sectional

2   relationships were regarded, perfectionistic concerns positively predicted training distress,

3   whereas perfectionistic strivings negatively predicted training distress. When the longitudinal

4   relationships were regarded, only perfectionistic concerns positively predicted residual increases

5   in training distress, whereas perfectionistic strivings was as a nonsignificant predictor.

6   This is the first study to show that perfectionism is related to training distress in athletes.

7   The finding that perfectionistic concerns in athletes show positive cross-sectional and

8   longitudinal relationships with training distress is in agreement with case studies indicating that

9   athletes who overtrain are characterised by high levels of perfectionism (Gould et al., 1997;

10   Krane et al., 1997). They are also in agreement with findings from research on perfectionism and

11   compulsive exercise, showing perfectionistic athletes to have higher levels of compulsion to

12   exercise (Hill et al., 2015). More importantly, the present findings suggest that perfectionism

13   may be a factor contributing to the development of training distress in athletes. As training

14   distress is a psychological marker of overtraining syndrome, perfectionistic athletes may be

15   susceptible to the negative consequences of this syndrome. However, only perfectionistic

16   concerns appear to be a risk factor, not perfectionistic strivings.

17   Differently from perfectionistic concerns, perfectionistic strivings showed a negative

18   cross-sectional relationship with training distress. This dovetails with previous research on

19   perfectionism in sport suggesting that the strivings dimension of perfectionism often shows

20   positive relationships with processes and outcomes that can be considered adaptive or, as in the

21   present study, negative relationships with processes and outcomes that can be considered

22   maladaptive (for details, see Gotwals et al., 2012; Stoeber, 2011). Note, however, that

23   perfectionistic strivings showed a negative relationship with training distress only in the cross-

sectional analyses, but not in the longitudinal analyses. This finding suggests that perfectionistic

strivings may not have a protective effect for athletes in regard to training distress, and it

highlights the importance of using longitudinal designs when investigating the relationships of

perfectionism in sport. Note, however, that differences in findings could be explained by the

larger sample size and consequently improved statistical power for our cross-sectional analyses

enabling us to detect smaller effects. Furthermore, we note that the negative cross-sectional

relationship with training distress only emerged after controlling for the overlap with

perfectionistic concerns, suggesting that the relationship only holds for "pure perfectionistic

strivings," that is, perfectionistic strivings with the negative influence of perfectionistic concerns

partialled out (Hill & Curran, in press).

Previously, no study has identified any psychological predictors of overtraining syndrome.

What may explain why perfectionistic concerns are such a predictor? One explanation may be

differences in training load. Athletes high in perfectionistic concerns may have trained more

excessively than athletes low in perfectionistic concerns leading to increased training distress. If

this suggestion is correct, this effect of perfectionistic concerns could be countered through

targeted monitoring and better management of training load by the coach and/or support staff

(Meeusen et al., 2013). Another explanation may be that athletes high in perfectionistic concerns

experienced more non-training stressors than athletes low in perfectionistic concerns. The sport

environment can be highly stressful for athletes, and athletes differ in how they cope with stress.

Research has shown that perfectionistic concerns are associated with maladaptive coping in

sports (Hill, Hall, & Appleton, 2010). Consequently, athletes high in perfectionistic concerns

may have coped less well with the stress associated with high training demands and experienced

greater training distress. An effect of perfectionistic concerns contributing to training distress

1   could be attenuated by helping athletes to better cope with stress (cf. Meeusen et al., 2013; see

2   also Antony & Swinson, 2009).

3   **Limitations and Future Research**

4   The present study had a number of limitations. First, our study focused on a sample

5   comprised exclusively of junior athletes therefore the generalizability of our findings may be

6   limited. However, previous research has shown that junior athletes experience lifetime rates of

7   overtraining syndrome equivalent to adult non-elite athletes. Furthermore, previous research has

8   shown that experiencing overtraining syndrome at a young age may predispose athletes to an

9   increased lifetime risk of developing overtraining syndrome (Raglin, Sawamura, Alexiou,

10 Hassmén, & Kenttä, 2000; Meeusen et al., 2013). Second, the study did not include any

11 mediators, that is, variables that may explain why perfectionistic concerns predicted increases in

12 training distress. Future longitudinal studies on perfectionism may therefore consider designs

13 that include mediators such as training load and coping in addition to perfectionism and training

14 distress (cf. Cole & Maxwell, 2003). Third, we may have found larger effects if we had

15 investigated only those sports that involve high levels of physical conditioning as the risk of

16 overtraining syndrome may be higher in these sports (Kenttä et al., 2001). Finally, the study only

17 examined training distress. Whereas training distress is a key indicator of overtraining

18 syndrome, future research would benefit from including further indicators (cf. Meeusen et al.,

19 2013) to explore whether the relationships we found between perfectionism and training distress

20 replicate with a wider range of indicators for overtraining syndrome.

21 **Conclusion**

22 The present study makes an important contribution to our understanding of the

23 relationships between perfectionism in sport and training distress, being the first to identify both

1   cross-sectional and longitudinal relationships in a large sample of athletes. Even though the

2   effects we found were only small- to medium-sized (Cohen, 1992) and perfectionism explained

3   only a modest percentage of variance in training distress, the present study is the first to identify

4   a psychological predictor of increased training distress. Moreover, even small-sized effects

5   matter as they may accumulate over time (Prentice & Miller, 1992). Consequently, sports

6   scientists monitoring athletes' training responses to identify athletes at risk of overtraining

7   syndrome may want to monitor athletes' perfectionistic concerns as a factor predisposing

8   athletes to experience higher levels of training distress that may further increase over time

9   putting athletes at risk of developing overtraining symptoms.

10

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Table 1

Descriptive Statistics, Cronbach's Alphas, and Bivariate Correlations

Variable	1	2	3	4
1. Perfectionistic strivings				
2. Perfectionistic concerns	.54***			
3. Training distress Time 1	−.07	.24**		
4. Training distress Time 2	.09	.33**	.56***	
M	0.00	0.00	1.89	2.07
SD	0.91	0.93	0.92	0.71
Cronbach's alpha	.79	.85	.90	.77

Note. *N* = 140 for Time 1. *N* = 106 for Time 2. Time 2 = 3 months after Time 1.

**p* < .01. ****p* < .001.

Table 2

Multiple Regression Predicting Longitudinal Changes in Training Distress

	Training distress Time 2	
	ΔR^2	β
Step 1: Training distress Time 1	.319***	
Training distress Time 1		.56***
Step 2: Perfectionism	.046*	
Training distress Time 1		.51***
Perfectionistic strivings		−.02
Perfectionistic concerns		.23*

Note. $N = 106$. Time 2 = 3 months after Time 1.

*p < .05. ***p < .001.