University of Kent

Kent Academic Repository

Madigan, Daniel J., Stoeber, Joachim and Passfield, Louis (2015) *Perfectionism and burnout in junior athletes: A three-month longitudinal study.* Journal of Sport and Exercise Psychology, 37 (3). pp. 305-315. ISSN 0895-2779.

Downloaded from

https://kar.kent.ac.uk/48051/ The University of Kent's Academic Repository KAR

The version of record is available from

https://doi.org/10.1123/jsep.2014-0266

This document version

Author's Accepted Manuscript

DOI for this version

Licence for this version

UNSPECIFIED

Additional information

Versions of research works

Versions of Record

If this version is the version of record, it is the same as the published version available on the publisher's web site. Cite as the published version.

Author Accepted Manuscripts

If this document is identified as the Author Accepted Manuscript it is the version after peer review but before type setting, copy editing or publisher branding. Cite as Surname, Initial. (Year) 'Title of article'. To be published in *Title of Journal* , Volume and issue numbers [peer-reviewed accepted version]. Available at: DOI or URL (Accessed: date).

Enquiries

If you have questions about this document contact ResearchSupport@kent.ac.uk. Please include the URL of the record in KAR. If you believe that your, or a third party's rights have been compromised through this document please see our Take Down policy (available from https://www.kent.ac.uk/guides/kar-the-kent-academic-repository#policies).

Madigan, D. J., Stoeber, J., & Passfield, L. (2015). Perfectionism and burnout in junior athletes: A three-month longitudinal study. *Journal of Sport & Exercise Psychology, 37*(3), 305-315. doi: 10.1123/jsep.2014-0266

Perfectionism and Burnout in Junior Athletes:

A Three-Month Longitudinal Study

Daniel J. Madigan

Joachim Stoeber

Louis Passfield

University of Kent

Author Note

Daniel Madigan and Louis Passfield, School of Sport & Exercise Sciences, University of Kent; Joachim Stoeber, School of Psychology, University of Kent.

Correspondence concerning this article should be addressed to Daniel Madigan, School of Sport & Exercise Sciences, University of Kent, Chatham Maritime, Kent ME4 4AG, United Kingdom. Phone: +44-1634-888903; fax: +44-1634-888890; e-mail: dm412@kent.ac.uk

Abstract

Perfectionism in sports has been shown to be associated with burnout in athletes. Whether perfectionism predicts longitudinal changes in athlete burnout, however, is still unclear. Using a two-wave cross-lagged panel design, the present study examined perfectionistic strivings, perfectionistic concerns, and athlete burnout in 101 junior athletes (mean age 17.7 years) over 3 months of active training. When structural equation modeling was employed to test a series of competing models, the best-fitting model showed opposite patterns for perfectionistic strivings and perfectionistic concerns. Whereas perfectionistic concerns predicted increases in athlete burnout over the 3 months, perfectionistic strivings predicted decreases. The present findings suggest that perfectionistic concerns are a risk factor for junior athletes contributing to the development of athlete burnout whereas perfectionistic strivings appear to be a protective factor.

Keywords: perfectionistic strivings, perfectionistic concerns, athlete burnout, junior athletes, longitudinal study

Introduction

Athlete burnout is an extreme form of sport disaffection the symptoms of which include a reduced sense of accomplishment, physical and emotional exhaustion, and sport devaluation (Raedeke & Smith, 2001). Burnout can have serious consequences for athletes, not only negatively impacting motivation and well-being but also resulting in reduced athletic performance and eventual drop-out from sport (Cresswell & Eklund, 2006; Gustafsson, Kenttä, & Hassmén, 2011). Athlete burnout is not just a risk to adult athletes with an established career of sports training and competition. Junior athletes are also at risk (e.g., Gould, Udry, Tuffey, & Loehr, 1996; Hill, Hall, Appleton, & Kozub, 2008; Jowett, Hill, Hall, & Curran, 2013). Consequently, considerable effort in sport and exercise psychology has been devoted to identifying personal and situational factors that contribute to athlete burnout. One personal factor that is supposed to contribute to athlete burnout is perfectionism (e.g., Appleton, Hall, & Hill, 2009; Chen, Kee, Chen, & Tsai, 2008; Gotwals, 2011).

Perfectionism

Perfectionism is a personal disposition characterized by striving for flawlessness and setting exceedingly high standards for performance accompanied by tendencies for overly critical evaluations of one's behavior (Flett & Hewitt, 2002; Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991). Consequently, perfectionism is best conceptualized as a multidimensional

personality disposition (Enns & Cox, 2002). Factor analyses comparing various measures of multidimensional perfectionism have found two underlying dimensions: *perfectionistic strivings* (also called personal standards perfectionism) comprising perfectionist personal standards and a self-oriented striving for perfection and *perfectionistic concerns* (also called evaluative concerns perfectionism) comprising concerns about making mistakes, feelings of discrepancy between one's standards and performance, and fears of negative evaluation and rejection by others if one fails to be perfect (see Stoeber & Otto, 2006, for a review).

The differentiation between perfectionistic strivings and perfectionistic concerns is of key importance when investigating the correlates and consequences of perfectionism because the two dimensions have shown different, sometimes opposite relationships. Whereas perfectionistic concerns consistently show positive relationships with negative processes and outcomes (e.g., maladaptive coping, negative affect), perfectionistic strivings often show negative relationships with negative processes and outcomes and positive relationships with positive processes and outcomes (e.g., adaptive coping, positive affect; see again Stoeber & Otto, 2006). The same differential pattern of relationships has been found for perfectionism in sport. Whereas perfectionistic concerns in athletes are consistently associated with negative processes and outcomes, perfectionistic strivings in athletes are often associated with positive processes and outcomes (or inversely associated with negative processes and outcomes) particularly when the overlap with perfectionistic concerns is controlled for (see Stoeber, 2011, and Gotwals, Stoeber, Dunn, & Stoll, 2012, for reviews).

Perfectionism and Athlete Burnout

Regarding the development of athlete burnout, a number of theoretical models have been proposed (see Cresswell & Eklund, 2006, for a review). Of these, Smith's (1986) cognitive-affective model has received the greatest amount of empirical support. This model suggests that burnout is the product of chronic psychosocial stress. Consequently, personal factors that put athletes at risk of experiencing higher levels or more prolonged episodes of stress may contribute to athletes' developing symptoms of burnout. Because perfectionism is a personal factor that is associated with higher levels of daily stress (e.g., Hewitt & Flett, 1993), perfectionism in sport is regarded a contributing factor to athlete burnout.

A differential pattern of relationships for perfectionistic strivings and perfectionistic concerns has been found when investigating perfectionism and athlete burnout (Appleton et al., 2009; Chen et al., 2008; Gould et al., 1996). Hill et al. (2008), for example, examined

perfectionism and athlete burnout in junior soccer players using self-oriented perfectionism and socially prescribed perfectionism,[1] which have been used as indicators of perfectionistic strivings and perfectionistic concerns (cf. Stoeber & Otto, 2006). Hill et al. (2008) found only perfectionistic concerns to show a positive relationship with burnout. In contrast, perfectionistic strivings showed a negative relationship with burnout once the overlap with perfectionistic concerns was controlled for. The same pattern of relationships has been found in multi-sport samples of junior athletes. Jowett et al. (2013), for example, examined junior athletes using the same indicators as Hill et al. (2008) of perfectionistic strivings and concerns. They too found only perfectionistic concerns to show a positive relationship with burnout whereas perfectionistic strivings showed a negative relationship once the overlap with perfectionistic concerns was controlled for (see also Appleton et al., 2009; Appleton & Hill, 2012).

Limitations of Previous Research

The studies on perfectionism and athlete burnout have provided important insights into the differential relationships that perfectionistic strivings and perfectionistic concerns show with burnout. In addition, the studies have suggested a number of possible explanations why perfectionistic concerns, but not strivings show positive relationships with athlete burnout. However, the studies have the limitation that they all employed cross-sectional designs and thus cannot provide evidence regarding the temporal (and possibly causal) relationships between perfectionism and athlete burnout. Consequently, there have been calls to examine the perfectionism–burnout relationship in athletes longitudinally (e.g., Cresswell & Eklund, 2006; Hill, Hall, Appleton, & Murray, 2010) to answer the important question of whether perfectionistic concerns are only a correlate of athlete burnout or whether perfectionistic concerns lead to increased burnout.

So far, only one study (Chen, Kee, & Tsai, 2009) has investigated the perfectionism–burnout relationship in athletes employing a longitudinal design. Examining perfectionism and burnout in junior athletes from schools over three months, the study used striving for perfection and negative reactions to imperfection as indicators of perfectionistic strivings and perfectionistic concerns (cf. Stoeber, Otto, Pescheck, Becker, & Stoll, 2007; Stoeber, Stoll, Salmi, & Tiikkaja,

[1]Self-oriented perfectionism is an internally motivated form of perfectionism focused on high personal standards of performance whereas socially prescribed perfectionism is an externally motivated form of perfectionism focused on concerns about how others evaluate one's performance (Hewitt & Flett, 1991).

2009). The two perfectionism dimensions showed the expected cross-sectional relationships: Perfectionistic concerns showed positive correlations with two symptoms of athlete burnout (reduced sense of accomplishment, sport devaluation) while perfectionistic strivings showed negative correlations with all three symptoms (reduced sense of accomplishment, sport devaluation, physical and emotional exhaustion). Neither perfectionistic concerns nor perfectionistic strivings predicted changes in burnout across the three-month interval when a conventional level of significance ($p < .05$) was applied. However, when marginally significant effects ($p < .10$) were taken into account, perfectionistic strivings predicted longitudinal decreases in physical and emotional exhaustion.

Although Chen et al.'s (2009) study—providing the first longitudinal investigation of the perfectionism–burnout relationship in athletes—made a significant novel contribution to the literature on perfectionism and athlete burnout, their findings are surprising given that longitudinal research investigating burnout in a work domain has found that perfectionistic concerns and doubts about actions—an aspect of perfectionism closely related to perfectionistic concerns—predicted increases in job burnout over time (Childs & Stoeber, 2012; Flaxman et al., 2012). We think that Chen et al.'s (2009) study had two limitations. First, data collection took place during the school summer holidays when junior athletes were not involved in active training. This is important because, according to Smith's (1986) cognitive-affective model, athlete burnout is a product of chronic stress, and research has shown consistent positive relationships between training load, perceived stress, and athlete burnout (see Goodger, Gorely, Lavallee, & Harwood, 2007, for a review). If junior athletes were on holiday, it can be expected that they had a lower training load and thus experienced less stress and risk of burnout than during term time. Consequently, results may be different if junior athletes are examined during the school term when they are in active training.

Second, Chen et al.'s (2009) study measured athlete burnout at the beginning and at the end of the three-month interval, but perfectionism only at the beginning. Hence the study could not examine the question of possible reciprocal pathways in the perfectionism–burnout relationship (viz. whether athlete burnout predicts longitudinal changes in perfectionistic strivings or concerns). According to a developmental analysis of perfectionism (Flett, Hewitt, Oliver, & Macdonald, 2002), one key factor in the development of perfectionism is social expectation (see also Damian, Stoeber, Negru, & Băban, 2013). If junior athletes display symptoms of burnout this may affect the expectations of significant others (parents, coaches, teammates) which may in

turn affect junior athletes' perfectionism. In what direction, however, is unclear. On the one hand, junior athletes may perceive others to have lower expectations which, according to the social expectations model, should lead to reduced perfectionism. On the other hand, junior athletes who are experiencing symptoms of burnout may worry more about their performance, leading to increased perfectionistic concerns, or compensate for reduced personal accomplishment with increased perfectionistic strivings. The latter mechanism may explain why, in a longitudinal study of perfectionism in employees and job burnout (Houkes, Winants, & Twellar, 2008) reduced personal accomplishment predicted increases in perfectionism over time. Houkes et al., however, used a unidimensional measure of perfectionism. Consequently, it is unclear what aspect of multidimensional perfectionism may have been responsible for this increase.

The Present Study

Against this background, the aim of the present study was to expand on Chen et al.'s (2009) study and—using the same three-month, two-wave longitudinal design—reinvestigate the perfectionism–burnout relationship over a period when junior athletes are in active training. Moreover, the present study used a full cross-lagged design to explore possible reciprocal relationships of athlete burnout on perfectionism. Else, the present study followed Chen et al. (2009) and recruited academy athletes (see participants section for details) in line with other studies that recruited junior athletes from similar settings (e.g., Hill, Hall, & Appleton, 2010; Jowett et al., 2013).

Based on previous theory and empirical evidence from cross-sectional studies on perfectionism and athlete burnout (and the longitudinal studies showing perfectionistic concerns to predict increases in job burnout; Childs & Stoeber, 2012; Flaxman et al., 2012), we expected perfectionistic concerns to predict longitudinal increases in burnout. We also expected perfectionistic strivings to predict longitudinal changes in athlete burnout, but there were competing expectations as to the direction of the effect. On the one hand, perfectionistic strivings have shown negative relationships with athlete burnout in cross-sectional studies. Furthermore, Chen et al. (2009) found perfectionistic strivings to predict longitudinal decreases in exhaustion. Consequently, it could be expected that perfectionistic strivings would predict longitudinal decreases in athlete burnout. On the other hand, researchers have cautioned that perfectionistic strivings—while having positive effects in the short term, for example, in competitions (Stoeber, Uphill, & Hotham, 2009)—may have detrimental effects on athletes' long-term development (Hall, 2006; Hall, Hill, & Appleton, 2012). Consequently, it could also be expected that

perfectionistic strivings would predict longitudinal increases in athlete burnout.

Method

Participants

A sample of 103 junior athletes (82 male, 21 female) was recruited at two sports academies (68 from one academy, 35 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 selected based on their ability (competitive performance in trials to enter the academy) and regularly compete at a regional, national, or international level. Participants' mean age was 17.7 years (SD = 0.8; range = 16-19 years). Participants were involved in different sports (47 in soccer, 26 in rugby, 13 in basketball, 8 in athletics, and 9 in other sports [e.g., cycling, squash]) and trained on average 10.6 hours per week (SD = 5.2). Two participants, however, did not complete the measures on both occasions and so were excluded from the analyses, resulting in a final sample size of N = 101 (80 male, 21 female).

Procedure

The study was approved by the university's ethics committee. Informed consent was obtained from all participants. In addition, parental consent was obtained from participants below the age of 18 (as per the ethics committee's recommendation). Questionnaires were distributed during training in the presence of the first author. Participants were administered all measures twice separated by three months, once in January (Time 1 [T1]) and then again in April 2014 (Time 2 [T2]). During this period, all participants were in regular seasonal training and competition with the exception of those involved in athletics who were in pre-seasonal training. The three-month interval was considered sufficient because previous research has shown that this time interval allows researchers to capture changes in athlete burnout during periods of active training (e.g., Martinent, Decret, Guillet-Descas, & Isoard-Gautheur, 2014; see also Cresswell & Eklund, 2005). Furthermore, it was the same interval used by Chen et al. (2009).

Measures

Perfectionism. To measure perfectionism, we used the 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 et al., 2007). To measure perfectionistic strivings, we used two indicators: the

MIPS subscale capturing striving for perfection (5 items; e.g. "I strive to be as perfect as possible") and the SMPS subscale capturing personal standards (7 items; e.g. "I have extremely high goals for myself in my sport"), and then standardized the scale scores before combining them to measure perfectionistic strivings (cf. Dunkley, Zuroff, & Blankstein, 2003). To measure perfectionistic concerns, we also used two indicators, the SMPS subscale capturing concerns over mistakes (8 items; e.g., "People will probably think less of me if I make mistakes in competition") and MIPS subscale capturing negative reactions to imperfection (5 items; e.g., "I feel extremely stressed if everything does not go perfectly"), and again standardized the scale scores before combining them to measure perfectionistic concerns. The four subscales have demonstrated reliability and validity in numerous studies (e.g., Chen et al., 2009; Dunn et al., 2006; Stoeber, Uphill, & Hotham, 2009). Moreover, both are reliable and valid indicators of perfectionistic strivings and perfectionistic concerns (e.g., Gotwals et al., 2012; Stoeber, Stoll, et al., 2009). Participants were asked to indicate to what degree each statement characterized their attitudes in their sport responding on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Athlete burnout. To measure burnout, we used the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The ABQ comprises three subscales capturing the key symptoms of athlete burnout: reduced sense of accomplishment (5 items; e.g., "I am not achieving much in my sport"), physical and emotional exhaustion (5 items; e.g., "I am exhausted by the mental and physical demands of my sport"), and devaluation (5 items; e.g., "I'm not into my sport like I used to be"). The subscales were combined to create a total score of athlete burnout (e.g., Hill, 2013). The ABQ is the most widely-used measure of athlete burnout and has demonstrated reliability and validity in numerous studies (e.g. Cresswell & Eklund, 2005; Lemyre, Roberts, & Stray-Gundersen, 2007; Lonsdale & Hodge, 2011). With no particular time frame specified, participants were asked how often they experienced the symptoms described in the statements responding on a scale from 1 (*almost never*) to 5 (*almost always*).

Results

Preliminary Analyses

First, we inspected the data for missing values. Because very few item responses were missing (i = 8), missing responses were replaced with the mean of the item responses of the corresponding scale (ipsatized item replacement; Graham, Cumsille, & Elek-Fisk, 2003). Next we computed Cronbach's alphas for our variables (see Table 1) which were all satisfactory except for athlete burnout at T1 (alpha = .68) which was acceptable. Next, following

recommendations by Tabachnick and Fidell (2007), participants' data were screened for multivariate outliers regarding the six variables included in the analyses (cf. Table 1). No participant showed a Mahalanobis distance larger than the critical value of $\chi^2(6) = 22.46$, $p < .001$. Finally, we conducted two Box's *M* tests to examine if the variance–covariance matrices showed any differences between academies or gender. Because Box's *M* is highly sensitive to even minor differences, it is tested against a $p < .001$ significance level (Tabachnick & Fidell, 2007). Both tests were nonsignificant at the $p < .001$ significance level with Fs < 1.72, ps > .022. Therefore, all further analyses were collapsed across academies and gender.

Descriptive Statistics and Correlations

The sample reported low-to-moderate levels of burnout at both time points (Table 1). This is in line with previous cross-sectional research (e.g., Hill, 2013: $M = 2.16$; Jowett et al., 2013: $M = 2.13$).[2] We then inspected the bivariate correlations between all variables (see again Table 1). All correlations were in line with previous findings from cross-sectional studies except that perfectionistic concerns did not show significant correlations with athlete burnout. As regards longitudinal correlations, Chen et al. (2009) reported similar negative correlations between T1 striving for perfection and all T1 and T2 symptoms of burnout (except T1 exhaustion, which was only marginally significant), but found negative correlations between T1 negative reactions to imperfection and T1 reduced sense of accomplishment and T1 and T2 devaluation.

Structural Equation Modeling

To examine whether perfectionism predicted longitudinal changes in athlete burnout, and vice-versa, we employed structural equation modeling (SEM) with manifest variables to test and compare a series of competing cross-lagged models (Kline, 2005). Because Mardia's coefficient was 9.25 with a critical ratio of 4.74 ($p < .001$) indicating significant deviations of the data from multivariate normality, we employed Mplus 7.0 (Muthén & Muthén, 1998-2012) using robust maximum likelihood estimation to test these models, with the accompanying mean-adjusted chi-square test statistic that is robust to non-normality (Satorra & Bentler, 1994). To ensure an accurate evaluation of model fit, we chose the following fit indices that minimize the impact of sample size: comparative fit index (CFI) and Tucker-Lewis Index (TLI [also known as non-

[2]Chen et al. (2009) used a 6-point scale (instead of the usual 5-point scale) when measuring burnout, so the mean levels of burnout in the present study are not directly comparable to the levels reported by Chen et al.

normed fit index, NNFI]; see Kline, 2005). Because it is recommended to examine a range of incremental and absolute fit indices (e.g., Hu & Bentler, 1999; MacCallum & Austin, 2000), we additionally included the standardized root mean square residual (SRMR), Akaike information criterion (AIC), and Bayesian information criterion (BIC). Lower values of AIC and BIC indicate better model fit (with BIC penalizing the number of parameters included in the model more strongly than AIC; Burnham & Anderson, 2002). Regarding the other indices, we used the following cut-off values (in parentheses) as benchmarks for acceptable model fit (CFI > .90, TLI > .90, SRMR < .10; Marsh, Hau, & Wen, 2004) and good model fit (CFI > .95, TLI > .95, SRMR < .08; Marsh et al., 2004).

We then tested five competing models which included different relationships between perfectionism and athlete burnout (see Nordin-Bates, Hill, Cumming, Aujla, & Redding, 2014, for a recent example of this approach). Additionally, this approach has been applied in studies with a small sample size (e.g., $N = 85$; Zacher & de Lange, 2011). Model 1 included stability coefficients only (perfectionistic strivings T1 → perfectionistic strivings T2, perfectionistic concerns T1 → perfectionistic concerns T2, athlete burnout T1 → athlete burnout T2) and served as a baseline model. Model 2 additionally included cross-lagged paths from perfectionism to burnout (perfectionistic strivings T1 → athlete burnout T2, perfectionistic concerns T1 → athlete burnout T2) whereas Model 3 included cross-lagged paths from burnout to perfectionism (athlete burnout T1 → perfectionistic strivings T2, athlete burnout T1→ perfectionistic concerns T2). Combining Models 2 and 3, Model 4, included all cross-lagged paths between perfectionism and burnout and constrained paths to be equal. Finally, Model 5 also included all cross-lagged paths, but did not constrain paths to be equal. To compare the fit of the nested models, we used Satorra-Bentler chi-square difference tests (Satorra & Bentler, 2001).

Results of Structural Equation Modeling

The fit indices and model comparisons are reported in Table 2. Model 1 provided adequate fit to the data. It also revealed high stability of perfectionism (perfectionistic strivings T1 → perfectionistic strivings T2: $\beta = .63$; perfectionistic concerns T1 → perfectionistic concerns T2: $\beta = .68$, both *p*s < .001) and athlete burnout (athlete burnout T1 → athlete burnout T2: $\beta = .78$, $p < .001$) over time. Model 2 provided support for the influence of perfectionism on burnout (perfectionistic strivings T1 → athlete burnout T2: $\beta = –.36$; perfectionistic concerns T1 → athlete burnout T2: $\beta = .28$, both *p*s < .001). In addition, this model provided better fit than Model

1. Model 3 provided no support for the influence of burnout on perfectionism (athlete burnout T1 → perfectionistic strivings T2: β = .09: athlete burnout T1→ perfectionistic concerns T2: β = –.06, both *p*s > .05) and did not provide better fit than Model 1.

To assess the equivalence of the cross-lagged effects, Model 4 was compared to Model 5. Model 5 provided a better fit based on the Satorra-Bentler chi-square difference test, indicating that the cross-lagged effects were not equivalent. Model 5 also provided better fit than Model 1. Model 5 had a nonsignificant chi-square, had the lowest AIC and, although it did not provide a better fit than Model 2 based on the Satorra-Bentler chi-square difference test, provided significantly better fit than Models 3 and 4. We think that this model is also more realistic (i.e., the effect of burnout on perfectionism is unlikely to be zero) and consequently we considered Model 5 providing the best fit (see Figure 1).

When the path coefficients of Model 5 were inspected, they indicated that both perfectionistic concerns and perfectionistic strivings predicted longitudinal changes in athlete burnout, but in opposite directions (see Figure 1). Whereas perfectionistic concerns predicted longitudinal increases in burnout (β = .28, $p < .001$), perfectionistic strivings predicted longitudinal decreases (β = –.37, $p < .001$). Athlete burnout, in contrast, did not predict significant changes in perfectionism. Neither the path from burnout to perfectionistic strivings nor the path from burnout to perfectionistic concerns were significant (see again Figure 1). Note that this finding corresponds with the results from the model tests and model comparisons in Table 2 where Model 3 (including cross-lagged paths from burnout to perfectionism) did not provide a better fit than the baseline model. Hence, the model comparisons supported only our expectation that perfectionism predicted longitudinal changes in athlete burnout, but not for reciprocal effects.

Discussion

The aim of the present study was to investigate the perfectionism–burnout relationship using a full cross-lagged design with two measurement points examining academy athletes over a three-month period of active training. Employing structural equation modeling with manifest variables to test a series of competing models, the study found that perfectionism predicted longitudinal changes in athlete burnout with perfectionistic strivings and perfectionistic concerns having opposite effects. Whereas perfectionistic concerns predicted longitudinal increases in athlete burnout, perfectionistic strivings predicted longitudinal decreases. In contrast, the study

found no support for reciprocal effects of athlete burnout predicting longitudinal changes in perfectionistic strivings or perfectionistic concerns.

The findings suggest that perfectionism and athlete burnout are not merely correlates. Instead, perfectionism appears to be a factor contributing to the development of athlete burnout. It is important to note however, that this applies only to the perfectionistic concerns and not the perfectionistic strivings dimension of perfectionism because the latter appears to be a protective factor against athletes developing burnout. The opposing longitudinal effects found for perfectionistic strivings and perfectionistic concerns dovetail with previous findings from cross-sectional studies. These previous studies show only perfectionistic concerns to be positively correlated with athlete burnout whereas perfectionistic strivings often show negative correlations, particularly when the overlap with perfectionistic concerns is controlled for.

The present study expands on Chen et al.'s (2009) study—which was first to examine longitudinal relationships between perfectionism and athlete burnout in junior athletes and found perfectionistic strivings to predict marginal decreases in physical and emotional exhaustion—in two ways: First, the present study found perfectionistic strivings to predict significant decreases in total burnout (combining reduced sense of accomplishment, physical and emotional exhaustion, and sport devaluation). Second, the present study also found perfectionistic concerns to predict significant increases in total burnout. As to potential reasons for the difference in findings, we can only speculate. Both studies employed a two-wave design examining changes in athlete burnout over a three-month period, but Chen et al.'s study examined burnout over the summer school holidays when athletes were unlikely to have high training loads. In contrast, the present study examined burnout during term time when junior athletes were in active training. As research has shown positive relationships between training load, perceived stress, and athlete burnout (Goodger et al., 2007), the difference in findings may be due to athletes experiencing greater training stress in the present study compared to Chen et al.'s study. According to the diathesis-stress model of perfectionism (Hewitt & Flett, 1993), this may have resulted in individual differences in athletes' perfectionism having stronger and more pronounced effects in the present study.

The present study's finding that perfectionistic concerns predicted longitudinal increases in athlete burnout was as expected (and dovetails with previous findings from longitudinal studies on perfectionism in employees and job burnout; Childs & Stoeber, 2012; Flaxman et al., 2012). In contrast, the finding that perfectionistic strivings predicted longitudinal decreases in athlete

burnout—while in line with findings from cross-sectional studies—did not meet expectations that perfectionistic strivings may only have positive short-term effects (e.g., boosting performance in a competition), but would have detrimental long-term effects. In this, however, it is important to note that the cross-lagged models we tested controlled for the overlap between perfectionistic strivings and perfectionistic concerns. Consequently, the negative longitudinal effect of perfectionistic strivings on burnout represents an effect of "pure perfectionistic strivings" (i.e., perfectionistic strivings minus the shared variance with perfectionistic concerns). Pure perfectionistic strivings differ from perfectionistic strivings because they lack those aspects of perfectionism that perfectionistic strivings share with perfectionistic concerns (e.g., self-criticism and conditional self-acceptance). Some researchers consider these aspects central to the experience of perfectionism and are therefore skeptical of whether the adaptive effects of pure perfectionistic strivings are relevant to understanding perfectionism (e.g., Hall et al., 2012; Hill, 2014). Whereas we can follow this argument, we think that it is important to investigate the unique relationships of perfectionistic strivings and perfectionistic concerns to better understand the differential relationships that the two dimensions of perfectionism show with respect to how perfectionism predicts individual differences in athletes' motivation, performance, and well-being (cf. Gotwals et al., 2012; Stoeber, 2011).

One possible explanation of the longitudinal effect we found in the present study suggesting that pure perfectionistic strivings predict decreases in burnout is that the athletes of our study who were high in perfectionistic strivings coped better with the pressures of active training than the athletes low in perfectionistic strivings. Hill, Hall, and Appleton's (2010) study investigating perfectionism, coping, and athlete burnout in junior athletes found perfectionistic strivings to correlate positively with problem-focused coping and negatively with avoidant coping. Problem-focused coping in turn showed a negative correlation with burnout whereas avoidant coping showed a positive correlation. These findings suggest that perfectionistic strivings may have a negative effect on burnout because athletes high in perfectionistic strivings apply coping strategies that protect them from burning out (problem-solving coping) instead of coping strategies that increase the risk of burnout (avoidant coping) (see Hill, Hall, & Appleton, 2010, Figure 1). Another possible explanation is that the athletes of our study who were high in perfectionistic strivings felt a greater sense of self-determination regarding their sport involvement and this served as a protective buffer against burnout. Jowett et al. (2013) investigated perfectionism, motivation, and athlete burnout in junior athletes and found

perfectionistic strivings to show a positive correlation with autonomous motivation which was conceptualized as the combination of intrinsic motivation, integrated regulation, and identified regulation (cf. Ryan & Deci, 2000). Autonomous motivation in turn showed a negative correlation with burnout, suggesting that perfectionistic strivings may have a negative effect on burnout because athletes high in perfectionistic strivings are motivated in ways that protect them from burnout (autonomous motivation) and not in ways that increase the risk of burnout (controlled motivation) (see Jowett et al., 2013, Figure 2).

Researchers have also sought to identify possible mediators of the perfectionism–burnout relationship that could explain why perfectionistic concerns show a positive relationship with athlete burnout, but not perfectionistic strivings. One possible mediator is coping. Hill, Hall, and Appleton (2010) found that avoidant coping mediated the relationship between perfectionistic concerns and athlete burnout. Another possible mediator is motivation. Jowett et al. (2013) found that controlled motivation—comprising introjected regulation (behaviors are performed to avoid guilt or anxiety) and external regulation (behaviors are performed to satisfy an external demand) (see Ryan & Deci, 2002, for details)—partially mediated the relationship between perfectionistic concerns and athlete burnout.

Limitations and Future Research

It is important to note that the present study had a number of limitations. First, as the study had 101 athletes the sample was relatively small. Hence the study may have lacked the statistical power to detect smaller effects (e.g., athlete burnout predicting longitudinal changes in perfectionism). Future studies should aim to recruit larger samples and investigate cross-lagged relationships with greater statistical power to replicate the present findings and examine if further longitudinal effects emerge (e.g., reciprocal effects of burnout predicting decreased perfectionistic strivings). Second, future studies need to determine if the present findings replicate if other indicators of perfectionistic strivings and concerns—such as self-oriented and socially prescribed perfectionism (cf. Hill et al., 2008)—are used. Third, the study did not include any variables that could serve as possible mediators explaining why perfectionistic strivings predicted longitudinal decreases in burnout whereas perfectionistic concerns predicted longitudinal increases. Future longitudinal studies should therefore include variables that previous cross-sectional studies indicate to be potential mediators of the perfectionism–burnout relationship such as adaptive versus maladaptive coping (Hill, Hall, & Appleton, 2010) or autonomous versus controlled motivation (Jowett et al., 2013).

Finally, and perhaps most importantly, the present study was a short-term longitudinal study examining the perfectionism–burnout relationship over a three-month interval. Hence, future research using longer time intervals is needed to investigate if the negative effect of perfectionistic strivings (decreasing burnout) is maintained, or if the effect is short-lived and will turn positive (increasing burnout) in the long run. Furthermore, longer time intervals may be needed to find any reciprocal effects of burnout on perfectionism. Previous research on athlete burnout has established that three months are sufficient to examine changes in burnout (e.g., Cresswell & Eklund, 2005), but it is unclear if three months are sufficient to examine changes in perfectionism. Whereas there are studies investigating perfectionism in adolescents that were able to predict longitudinal changes in perfectionism over five to nine months (Damian et al., 2013; Stoeber, Otto, & Dalbert, 2009), three months may have been too short for burnout to effect any changes in junior athletes' perfectionism.

Implications

Given the present findings, practitioners should look at reducing perfectionistic concerns in athletes. There is evidence from clinical studies that cognitive-behavioral interventions and guided self-help can reduce perfectionistic concerns (e.g., Egan et al., 2014; Pleva & Wade, 2007). However, further studies are required to test the efficacy of such interventions in athletes.

Conclusion

Despite these limitations, the present study makes an important contribution to the literature because it is the first longitudinal study providing empirical support (at conventional levels of significance) for the view that perfectionism contributes to athlete burnout. In this, however, the two underlying dimensions of perfectionism—perfectionistic strivings and perfectionistic concerns—appear to have opposite longitudinal effects on athlete burnout when their overlap was controlled for. Only perfectionistic concerns predicted longitudinal increases in burnout indicating that the concerns dimension of perfectionism undermines athletes' well-being. In contrast, perfectionistic strivings predicted longitudinal decreases in burnout, suggesting that athletes who are striving for perfection may be protected from burnout as long as they are not overly concerned about making mistakes and do not show strong negative reactions to imperfection. Regarding athlete burnout, perfectionism in sport thus appears to be a "double-edged sword" (Stoeber, 2014) providing a shield against athlete burnout while at the same time putting athletes at a greater risk of burning out.

References

Appleton, P. R., Hall, H. K., & Hill, A. P. (2009). Relations between multidimensional perfectionism and burnout in junior-elite male athletes. *Psychology of Sport and Exercise, 10,* 457-465. doi: 10.1016/j.psychsport.2008.12.006

Appleton, P. R., & Hill, A. P. (2012). Perfectionism and athlete burnout in junior elite athletes: The mediating role of motivation regulations. *Journal of Clinical Sport Psychology, 6,* 129-145.

Burnham, K. P., & Anderson, D. R. (2002). *Model selection and multimodel inference: A practical information-theoretic approach* (2nd ed.). New York: Springer.

Chen, L. H., Kee, Y. H., Chen, M.-Y., & Tsai, Y.-M. (2008). Relation of perfectionism with athletes' burnout: Further examinations. *Perceptual and Motor Skills, 106,* 811-820. doi: 10.2466/pms.106.3.811-820

Chen, L. H., Kee, Y. H., & Tsai, Y.-M. (2009). An examination of the dual model of perfectionism and adolescent athlete burnout: A short-term longitudinal research. *Social Indicators Research, 91,* 189-201. doi: 10.1007/s11205-008-9277-9

Childs, J. H., & Stoeber, J. (2012). Do you want me to be perfect? Two longitudinal studies on socially prescribed perfectionism, stress and burnout in the workplace. *Work & Stress, 26,* 347-364. doi: 10.1080/02678373.2012.737547

Cresswell, S. L., & Eklund, R. C. (2005). Changes in athlete burnout and motivation over a 12-week league tournament. *Medicine and Science in Sports and Exercise, 37,* 1957-1966.

Cresswell, S. L., & Eklund, R. C. (2006). Changes in athlete burnout over a thirty-week "rugby year". *Journal of Science and Medicine in Sport, 9,* 125-134. doi: 10.1016/j.jsams.2006.03.017

Damian, L. E., Stoeber, J., Negru, O., & Băban, A. (2013). On the development of perfectionism in adolescence: Perceived parental expectations predict longitudinally increases in socially prescribed perfectionism. *Personality and Individual Differences, 55,* 688-693. doi: 10.1016/j.paid.2013.05.021

Dunkley, D. M., Zuroff, D. C., & Blankstein, K. R. (2003). Self-critical perfectionism and daily affect: Dispositional and situational influences on stress and coping. *Journal of Personality and Social Psychology, 84,* 234-252.

Dunn, J. G. H., Causgrove Dunn, J., Gotwals, J. K., Vallance, J. K. H., Craft, J. M., & Syrotuik, D. G. (2006). Establishing construct validity evidence for the Sport Multidimensional Perfectionism Scale. *Psychology of Sport and Exercise, 7,* 57-79. doi: 10.1016/j.psychsport.2005.04.003

Egan, S. J., van Noort, E., Chee, A., Kane, R. T., Hoiles, K. J., Shafran, R., & Wade, T. D. (2014). A randomised controlled trial of face to face versus pure online self-help cognitive behavioural treatment for perfectionism. *Behaviour Research and Therapy, 63,* 107-113. doi: 10.1016/j.brat.2014.09.009

Enns, M. W., & Cox, B. J. (2002). The nature and assessment of perfectionism: A critical analysis. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism* (pp. 33-62). Washington, DC: American Psychological Association. doi: 10.1037/10458-002

Flaxman, P. E., Ménard, J., Bond, F. W., & Kinman, G. (2012). Academics' experiences of a respite from work: Effects of self-critical perfectionism and perseverative cognition on post respite well-being. *Journal of Applied Psychology, 97,* 854-865.

Flett, G. L., & Hewitt, P. L. (2002). Perfectionism and maladjustment: An overview of theoretical, definitional, and treatment issues. In P. L. Hewitt & G. L. Flett (Eds.), *Perfectionism* (pp. 5-31). Washington, DC: American Psychological Association.

Flett, G. L., Hewitt, P. L., Oliver, J. M., & Macdonald, S. (2002). Perfectionism in children and their parents: A developmental analysis. In G. L. Flett, & P. L. Hewitt (Eds.), *Perfectionism* (pp. 89-132). Washington, DC: American Psychological Association.

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449-468. doi: 10.1007/BF01172967

Goodger, K., Gorely, T., Lavallee, D., & Harwood, C. (2007). Burnout in sport: A systematic review. *The Sport Psychologist, 21*, 127-151.

Gotwals, J. K. (2011). Perfectionism and burnout within intercollegiate sport: A person-oriented approach. *The Sport Psychologist, 25*, 489-510.

Gotwals, J. K., Stoeber, J., Dunn, J. G. H., & Stoll, O. (2012). Are perfectionistic strivings in sport adaptive? A systematic review of confirmatory, contradictory, and mixed evidence. *Canadian Psychology, 53*, 263-279.

Gould, D., Udry, E., Tuffey, S., & Loehr, J. (1996). Burnout in competitive junior tennis players: I. A quantitative psychological assessment. *The Sport Psychologist, 10*, 322-340.

Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data. In J. A. Schinka & W. F. Velicer (Eds.), *Handbook of psychology: Research methods in psychology* (Vol. 2, pp. 87-114). New York: Wiley.

Gustafsson, H., Kenttä, G., & Hassmén, P. (2011). Athlete burnout: An integrated model and future research directions. *International Review of Sport and Exercise Psychology, 4*, 3-24. doi: 10.1080/1750984X.2010.541927

Hall, H. K. (2006). Perfectionism: A hallmark quality of world class performers, or a psychological impediment to athletic development? In D. Hackfort & G. Tenenbaum (Eds.), *Essential processes for attaining peak performance* (Vol. 1, pp. 178-211). Oxford, UK: Meyer & Meyer.

Hall, H. K., Hill, A. P., & Appleton, P. R. (2012). Perfectionism: A foundation for sporting excellence or an uneasy pathway toward purgatory? In G. C. Roberts & D. C. Treasure (Eds.), *Advances in motivation in sport and exercise* (3rd ed., pp. 129-168). Champaign, IL: Human Kinetics.

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*, 456-470. doi: 10.1037/0022-3514.60.3.456

Hewitt, P. L., & Flett, G. L. (1993). Dimensions of perfectionism, daily stress, and depression: A test of the specific vulnerability hypothesis. *Journal of Abnormal Psychology, 102*, 58-65.

Hill, A. P. (2013). Perfectionism and burnout in junior soccer players: A test of the 2 × 2 model of dispositional perfectionism. *Journal of Sport & Exercise Psychology, 35*, 18-29.

Hill, A. P. (2014). Perfectionistic strivings and the perils of partialling. *International Journal of Sport and Exercise Psychology, 12*, 302-315. doi: 10.1080/1612197X.2014.919602

Hill, A. P., Hall, H. K., & Appleton, P. R. (2010). Perfectionism and athlete burnout in junior elite athletes: The mediating role of coping tendencies. *Anxiety, Stress, & Coping, 23*, 415-430. doi: 10.1080/10615800903330966

Hill, A. P., Hall, H. K., Appleton, P. R., & Kozub, S. A. (2008). Perfectionism and burnout in junior elite soccer players: The mediating influence of unconditional self-acceptance. *Psychology of Sport and Exercise, 9*, 630-644. doi: 10.1016/j.psychsport.2007.09.004

Hill, A. P., Hall, H. K., Appleton, P. R., & Murray, J. J. (2010). Perfectionism and burnout in canoe polo and slalom athletes: The mediating influence of validation and growth-seeking. *The Sport Psychologist, 24*, 16-34.

Houkes, I., Winants, Y. H., & Twellaar, M. (2008). Specific determinants of burnout among male

and female general practitioners: A cross-lagged panel analysis. *Journal of Occupational and Organizational Psychology, 81,* 249-276. doi: 10.1348/096317907X218197

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1-55.

Jowett, G. E., Hill, A. P., Hall, H. K., & Curran, T. (2013). Perfectionism and junior athlete burnout: The mediating role of autonomous and controlled motivation. *Sport, Exercise, and Performance Psychology, 2,* 48-61.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford.

Lemyre, P.-N., Roberts, G. C., & Stray-Gundersen, J. (2007). Motivation, overtraining, and burnout: Can self-determined motivation predict overtraining and burnout in elite athletes? *European Journal of Sport Science, 7,* 115-126. doi: 10.1080/17461390701302607

Lonsdale, C., & Hodge, K. (2011). Temporal ordering of motivational quality and athlete burnout in elite sport. *Medicine and Science in Sports and Exercise, 43,* 913-921. doi: 10.1249/MSS.0b013e3181ff56c6

MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology, 51,* 201-226. doi: 10.1146/annurev.psych.51.1.201

Marsh, H. W., Hau, K., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11,* 320-341. doi: 10.1207/s15328007sem1103_2

Martinent, G., Decret, J.-C., Guillet-Descas, E., & Isoard-Gautheur, S. (2014). A reciprocal effects model of the temporal ordering of motivation and burnout among youth table tennis players in intensive training settings. *Journal of Sports Sciences, 32,* 1648-1658. doi: 10.1080/02640414.2014.912757

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide* (7th ed.). Los Angeles: Muthén & Muthén.

Nordin-Bates, S. M., Hill, A. P., Cumming, J., Aujla, I. J., & Redding, E. (2014). A longitudinal examination of the relationship between perfectionism and motivational climate in dance. *Journal of Sport & Exercise Psychology, 36,* 382-391. doi: 10.1123/jsep.2013-0245

Pleva, J., & Wade, T. D. (2007). Guided self-help versus pure self-help for perfectionism: A randomised controlled trial. *Behaviour Research and Therapy, 45,* 849-861. doi: 10.1016/j.brat.2006.08.009

Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an athlete burnout measure. *Journal of Sport & Exercise Psychology, 23,* 281-306.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68-78.

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variable analysis: Applications for developmental research* (pp. 399-419). Thousand Oaks, CA: Sage.

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66,* 507-514. doi: 10.1007/BF02296192

Smith, R. E. (1986). Toward a cognitive-affective model of athletic burnout. *Journal of Sport Psychology, 8,* 36-50.

Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *International Review of Sport and Exercise Psychology, 4,*

128-145. doi: 10.1080/1750984X.2011.604789
Stoeber, J. (2014). Perfectionism in sport and dance: A double-edged sword. *International Journal of Sport Psychology, 45,* 385-394.
Stoeber, J., & Otto, K. (2006). Positive conceptions of perfectionism: Approaches, evidence, challenges. *Personality and Social Psychology Review, 10,* 295-319. doi: 10.1207/s15327957pspr1004_2
Stoeber, J., Otto, K., & Dalbert, C. (2009). Perfectionism and the Big Five: Conscientiousness predicts longitudinal increases in self-oriented perfectionism. *Personality and Individual Differences, 47,* 363-368. doi: 10.1016/j.paid.2009.04.004
Stoeber, J., Otto, K., Pescheck, E., Becker, C., & Stoll, O. (2007). Perfectionism and competitive anxiety in athletes: Differentiating striving for perfection and negative reactions to imperfection. *Personality and Individual Differences, 42,* 959-969. doi: 10.1016/j.paid.2006.09.006
Stoeber, J., Stoll, O., Salmi, O., & Tiikkaja, J. (2009). Perfectionism and achievement goals in young Finnish ice-hockey players aspiring to make the Under-16 national team. *Journal of Sports Sciences, 27,* 85-94. doi: 10.1080/02640410802448749
Stoeber, J., Uphill, M. A., & Hotham, S. (2009). Predicting race performance in triathlon: The role of perfectionism, achievement goals, and personal goal setting. *Journal of Sport & Exercise Psychology, 31,* 211-245.
Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson.
Zacher, H., & de Lange, A. H. (2011). Relations between chronic regulatory focus and future time perspective: Results of a cross-lagged structural equation model. *Personality and Individual Differences, 50,* 1255-1260. doi: 10.1016/j.paid.2011.02.020

Table 1

Descriptive Statistics, Cronbach's Alphas, and Bivariate Correlations

Variable	1	2	3	4	5	6
Perfectionism T1						
1. Perfectionistic strivings						
2. Perfectionistic concerns	.54***					
Perfectionism T2						
3. Perfectionistic strivings	.71***	.44***				
4. Perfectionistic concerns	.52***	.73***	.71***			
5. Athlete burnout T1	–.31**	.08	–.11	.00		
6. Athlete burnout T2	–.40***	.14	–.20*	.08	.78***	
M	0.00	0.00	0.00	0.00	2.37	2.40
SD	0.93	0.91	0.92	0.94	0.68	0.74
Cronbach's alpha	.85	.80	.82	.86	.68	.76

Note. $N = 101$. T1 = Time 1, T2 = Time 2 (three months later).

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

Table 2.

Model fit indices and model comparisons

Model (M)	χ^2	Scaling factor	*df*	CFI	TLI	SRMR	AIC	BIC	Model comparisons		
									Comparison	$\Delta\chi^2$	Δdf
M1: stability coefficients only	32.21***	1.07	6	.91	.82	.08	1196.14	1251.05			
M2: perfectionism T1 → athlete burnout T2	10.40*	1.11	4	.98	.93	.07	1177.26	1237.40	M2 vs. M1	23.15***	2
M3: athlete burnout T1 → perfectionism T2	28.65***	1.02	4	.91	.75	.07	1194.87	1255.02	M3 vs. M1	4.48	2
M4: reciprocal effects (constrained equal)	32.86***	1.03	5	.90	.78	.08	1197.58	1255.11	M4 vs. M1	0.49	1
M5: reciprocal effects (unconstrained)	5.47	1.03	2	.99	.93	.05	1175.35	1240.72	M5 vs. M1	26.45***	4
									M5 vs. M2	4.97	2
									M5 vs. M3	23.36***	2
									M5 vs. M4	27.39***	3

Note. N = 101. Scaling factor = Satorra-Bentler χ^2 scaling correction factor, *df* = degrees of freedom, CFI = comparative fit index, TLI = Tucker-Lewis index (also known as non-normed fit index, NNFI), SRMR = standardized root mean square residual, AIC = Akaike information criterion, BIC = Bayesian information criterion. Note that model comparisons are restricted to nested models. All χ^2 difference tests are Satorra-Bentler χ^2 difference tests. T1 = Time 1, T2 = Time 2 (three months later).

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

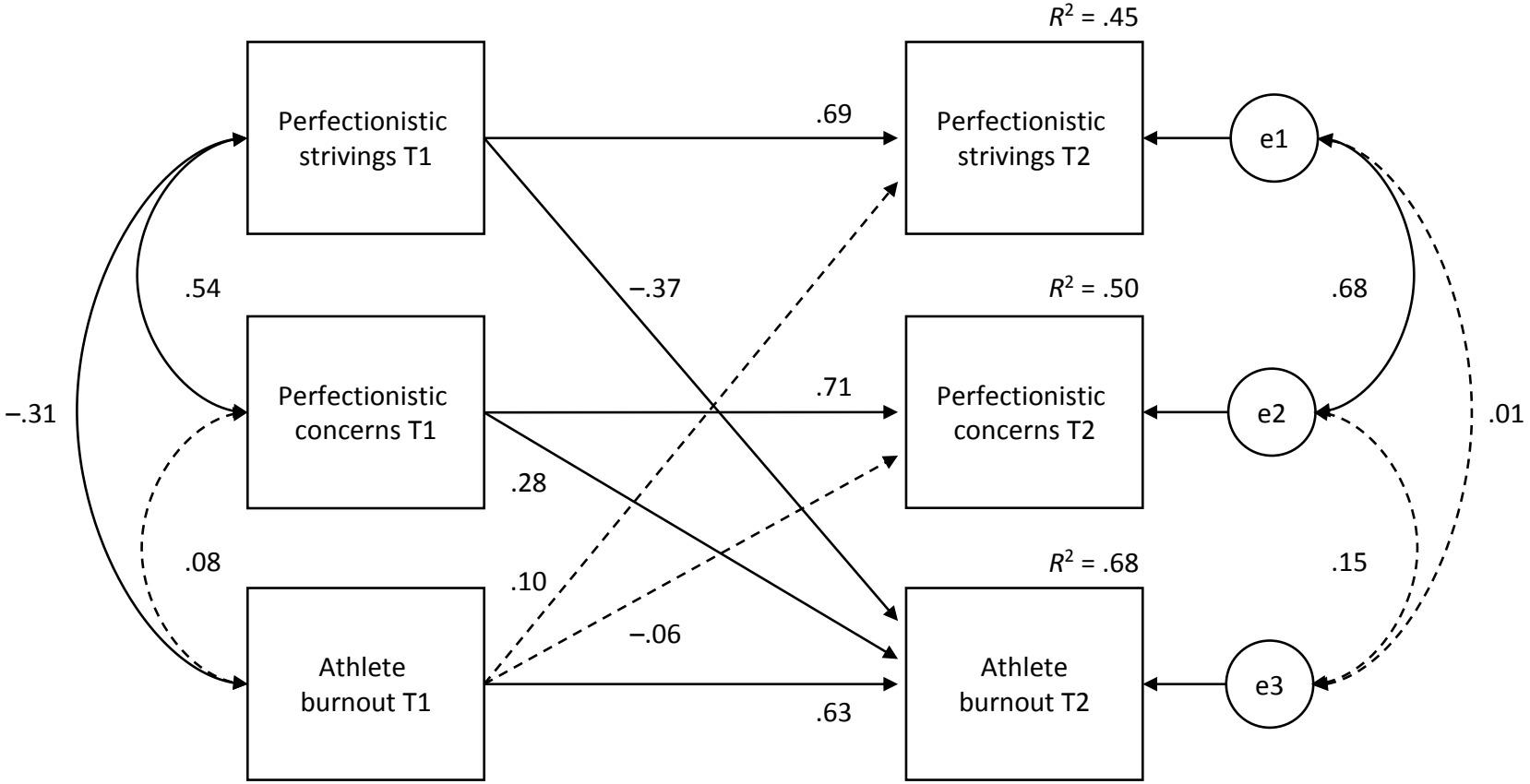

Figure 1. Model 5 (M5: reciprocal effects [unconstrained]). N = 101. All path coefficients are standardized, and nonsignificant paths ($p \geq .05$) are indicated by dashed lines. T1 = Time 1, T2 = Time 2 (three months later).