Burnout, stress and recovery as predictors of performance: a longitudinal study among youth international table tennis players

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Abstract: This study was designed to test among elite youth table tennis players if stress, recovery and burnout scores could influence variability of athletes' future performances. A longitudinal design with self-reported questionnaires has been used. Results showed that stress, recovery and burnout were significantly related to future performance (next month) of youth elite players, reduced sense of accomplishment (burnout) being the strongest performance's predictor. Training and diagnostic implications of the present results are discussed.

Keywords: Stress, performance, recovery, burnout, youth elite table tennis players, longitudinal.

1. INTRODUCTION

Top performances are only achieved by athletes who can recover fast during training process and deal optimally with the changes between stress, recovery, and upcoming stress [1]. Among elite athletes, it is not bad to be high on stress, as long as the individual knows how to recover optimally [1, 2]. Chronic exposure to stress associated with insufficient recovery cause burnout, leading to detrimental consequences such as difficulties in motivation, poorer coping behavior, drastically performance decrements and/or dropout of sport [2]. Youth elite athletes seem particularly vulnerable to burnout because of the high demands they must cope in their everyday life (e.g., overloaded with practice and training time, pressure to win by significant others) [3].

Assessing regularly individual recovery-stress state and burnout scores of players might thus have value for monitoring training and predicting performance. However, the prevalence of correlational studies and the absence of longitudinal approaches in the literature [3] have prevented the exploration of causality between burnout, stress, recovery and performance.

The purpose of this study was thus to test if stress, recovery and burnout scores gathered à T1 predict performance levels of the youth international table tennis players at T2 (one month after T1).

2. METHODS

Participants

Twenty boys (M age = 15.38 years, SD = 1.84) and 25 girls (M age = 14.15, SD = 1.99) youth international table tennis players (M training per week = 22.52 hours, SD = 4.11) voluntarily participated in this study. Participants completed 2 to 4 times (27 athletes 3 times and 14 athletes 4 times) questionnaires at time 1 (T1) and time 2 (T2) (i.e., interval of one month between T1 and T2), resulting in 142 subjects.

Measures

The French REcovery STress Questionnaire for athletes (RESTQ-Sport, 1) provides a picture of current recovery-stress state. It includes general dimensions concerning stress (i.e., general stress, emotional stress, social stress, fatigue, lack of energy, conflicts/pressure, and somatic complaints) and recovery (i.e., success, somatic relaxation, general well-being, sleep quality). In addition, it also includes specific dimensions which aim at addressing more details of the stress and recovery processes from a physical (somatic), emotional, behavioral and social perspective [1]. Sport specific stress dimensions are disturbed breaks, emotional exhaustion and fitness/ injury whereas sport specific recovery dimensions are fitness/being in shape, personal accomplishment, self-efficacy and self-regulation. For the stress dimension, for example, items include: ''I felt physically bad" or ''I felt under pressure". For the recovery dimension, for example, items include: ''I felt physically fit" or ''I felt at ease". The French version used in the present study consisted of 71 items (17 scales of 4 items plus the conflicts/pressure scale which contains 3 items). A Likert-type scale was used with values ranging from 0 (never) to 6 (always) indicating how often the respondent participated in various activities during the preceding three days and nights. Alpha coefficients varied from 0.65 to 0.86 (except for the success subscale, $\alpha = 0.56$), indicating acceptable reliability.

The French version of the Athletes Burnout Questionnaire [4] was used to assess athlete burnout. It contains three subscales of 5 items measuring reduced sense of accomplishment (e.g., "It seems that no matter what I do, I don't perform as well as I should"), sport devaluation (e.g., "I have negative feelings towards sport") and emotional/physical exhaustion (e.g., "I am exhausted by the mental and physical demands of my sport"). A Likert-type scale was used with values ranging from 1 (almost never) to 5 (most of the time). Alpha coefficients varied from 0.71 to 0.90, indicating acceptable reliability.

Finally, participants completed a single item assessing the subjective performance's level of the past month. A Likert-type scale was used with values ranging from 1 (very low performance level) to 10 (very high performance level).

Procedure

Following ethics approval from the institutional research ethics board, coaches from each team were contacted to obtain permission to approach their athletes for participation in the study. The athletes' participation was voluntary (i.e., written informed consent obtained from each individual prior to data collection). In addition, the athletes' anonymity was also ensured. At T1, participants completed the RESTQ-Sport and the ABQ individually or in group (maximum of 15 athletes). At T2, participants completed a single item assessing the subjective performance's level of the past month.

Statistical Analyses

In order to assess whether stress, recovery and burnout are related to future performance, we first performed simple correlations between performance at T2 and stress, recovery and burnout à T1. Second, we performed a series of multiple regression analyses (standardized scores of stress, recovery, burnout and performance were used) in which (a) only RESTQ-Sport (stress and recovery) scores were entered in the regression, (b) only ABQ scores (burnout) were entered in the regression, and (c) both RESTQ-Sport and ABQ scores were entered in the regression.

3. RESULTS

Simple correlations

Four stress (general stress, r = -0.26; fatigue, r = -0.19; conflicts/pressure, r = -0.27; lack of energy, r = -0.24), two recovery (general well-being, r = 0.23; self-efficacy, r = 0.29) and one burnout variables (reduced sense of accomplishment, r = -0.51) were significantly ($p < 0.05$) correlated with performance.

Multiple regressions

When RESTQ-Sport scores were entered in the regression, fatigue ($\beta = -0.27$, $p = 0.05$), being in shape ($\beta = -0.29$, $p = 0.02$) and self-efficacy ($\beta = 0.24$, $p = 0.09$) were reliable predictors of performance ($F_{(18,123)} = 2.30$; $p < 0.005$, $R^{2\ adjusted} = 0.14$).

When ABQ scores were entered in the regression, reduced sense of accomplishment ($\beta = -0.55$, $p < 0.001$) was the only reliable predictor of performance ($F_{(3,138)} = 17.36$; $p < 0.001$, $R^{2\ adjusted} = 0.26$).

When both RESTQ-Sport and ABQ scores were entered simultaneously in the regression, reduced sense of accomplishment ($\beta = -0.45$, $p < 0.001$), being in shape ($\beta = -0.22$, $p=0.07$) and fatigue ($\beta = -0.24$, $p = 0.08$) were reliable predictors of performance ($F_{(21,120)} = 3.24$; $p < 0.001$, $R^{2\ adjusted} = 0.25$).

4. DISCUSSION

Burnout subscales were better predictors of performance than stress and recovery subscales (26% of variance explained versus 14% of variance explained).

It is possible that stress and recovery influenced performance indirectly through burnout, stress and recovery being more distal predictor of performance whereas burnout being more proximal predictor of performance. It is also possible that conceptualization of performance (i.e., mean performance during one month) would had favoured burnout variables, which were more stable through time than stress and recovery variables.

In conclusion, stress, recovery and burnout were significantly related to future performance, reduced accomplishment (burnout) being the strongest performance's predictor. Results also suggest that the monitoring of changes in burnout, stress and recovery could be a useful way to discover early signs of performance decrease [1, 2, 4]. This could allow sport psychologists to develop appropriate interventions (e.g., goal settings, self-talk, cognitive restructuration) designed to prevent the apparition of burnout on youth elite athletes.

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