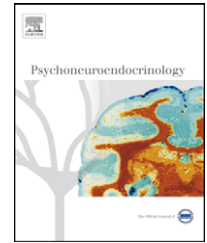




available at www.sciencedirect.com



journal homepage: www.elsevier.com/locate/psyneuen



Psychophysiological stress in tennis players during the first single match of a tournament

Edith Filaire^{a,*}, Deborah Alix^b, Claude Ferrand^d, Michel Verger^c

^a *Laboratoire Activités Motrices et Adaptations Psychophysologiques, UFRSTAPS Université d'Orléans, 2 Allée du Château, 45062 Orléans, France*

^b *Centre de Recherches en Sciences du Sport, Université d'Orsay, France*

^c *UFRSTAPS Clermont-Ferrand, Campus des Cézeaux, 63170 Aubière, France*

^d *Laboratoire CRIS, UFRSTAPS Université, Lyon 1, France*

Received 16 July 2008; received in revised form 27 August 2008; accepted 29 August 2008

KEYWORDS

Tennis;
Anxiety;
Cortisol;
Gender;
Winner;
Loser

Summary The purpose of this investigation was to study the physiological and psychological states of 16 tennis players (8 males, 8 females) during the day of the first match of a tennis tournament and their relation to performance. Athletes completed the Competitive State Anxiety Inventory-2, including both intensity and direction subscales prior to the first match and collected saliva for cortisol analysis on several occasions: during a resting day (baseline values) and prior to and after both competitions.

Results showed the males and females have different responses in the CSAI-2 subcomponents. Somatic anxiety was significantly higher (+23%; $p < .05$) in females compared to males whereas self-confidence was significantly higher in males (+34%; $p < .05$). Winners had significantly lower cognitive anxiety and higher Self-confidence scores than losers. Somatic anxiety was significantly higher in the losers. Our results showed a cortisol response to competition, which was especially characterized by an anticipatory rise. Males had the same pattern of cortisol responses than females, even if the cortisol concentrations were significantly higher in females the day of the competition. According to the outcome, significant differences between winners and losers cortisol concentrations were observed whatever the hour of taking (except in the evening), cortisol concentrations being the highest at the loser's. The measurement of cortisol at the same time that self-report psychological indicators would provide an approach to examine changes in anxiety, and its relationship to performance.

© 2008 Elsevier Ltd. All rights reserved.

1. Introduction

The physiological response to stress, or arousal, is conceptualised as an individual's psychological and physiological

autonomic system activation varying on a continuum from deep sleep to extreme excitement (Gould and Krane, 1992). Whereas heart rate responds rapidly and non-specifically to perceived threats, most neuroendocrine effectors respond to specific stimuli, often with longer time courses. One such system is the hypothalamic–pituitary–adrenocortical axis (HPAA), which releases the steroid hormone cortisol from

* Corresponding author. Tel.: +33 238417178.

E-mail address: edith.filaire@univ-orleans.fr (E. Filaire).

the adrenal cortex. Cortisol plays a central role in the physiological and behavioural response to a physical challenge or psychological stressor. Its wide-ranging effects include actions on the immune system, stimulating glucose metabolism, and altering mood, memory, and behavioural response to threatening circumstances (Erickson et al., 2003). The HPA axis is stimulated in anticipation of, or in response to a wide range of psychological stressors (Gaab et al., 2005). This is especially relevant in situations inducing ego-involvement, novelty and unpredictability, leading to negative affective states (Buchanan et al., 1999). Moreover, positive affective states seem to lower cortisol secretion (Frankenhaeuser, 1978). Stress, as indexed by cortisol is important both in preparing for competition as well as assessing resilience to stress created by the opponent (Kivlighan et al., 2005). Mild increases in cortisol prepare individuals for action and lower cortisol concentrations may indicate more resilience to stressful situations (Stansbury and Gunnar, 1994; Levine, 2000). While there are some exceptions (Filaire and Lac, 2000), the majority of studies detect an anticipatory rise in cortisol concentrations. Increase in this hormone appears to be important in preparing for mental and physical demands, and may affect performance (Salvador et al., 2003). However, extreme elevations in cortisol lead to poor performance because it interferes with some cognitive processes (Erickson et al., 2003). To our knowledge, few studies have examined hormone changes and performance during an event, and the data are controversial. In fact, in a study of women rugby players, there is the suggestion that winners may have lower cortisol than losers (Bateup et al., 2002). In contact sports, Elias (1981) noted significantly greater cortisol increases in winners than in losers after wrestling bouts whereas Passelergue et al. (1995) reported non-significant differences between losers' and winner's concentrations of cortisol during a real wrestling competition. Moreover, numerous studies have suggested that males demonstrate greater levels of cortisol reactivity in response to stressor than do females; however, the vast majority of these studies have been performed using laboratory stressors (Weekes et al., 2008).

Salivary cortisol together with anxiety measures seems to provide a sensitive index of stress, as shown by the relationships between somatic and cognitive anxiety and cortisol (McKay et al., 1997; Filaire et al., 2001a), or by the direction of anxiety components and cortisol (Eubank et al., 1997). Conversely, others studies found no relationship between anxiety intensity and cortisol concentrations before competition (Sight et al., 1999; Thatcher et al., 2004).

Even if anxiety has been described as a negative emotion (Burton and Taylor, 1997), the literature has shown that high level of pre-competitive anxiety can have a favourable effect on performance (Hardy and Parfitt, 1991) and that self-confidence is not always related to good performance (Gould et al., 1987). Recently, Jones and his associates (Jones and Swain, 1995; Jones et al., 1993; Hanton et al., 2008) suggested that the impact of anxiety on performance might be dependent on the athlete's perception of anxiety as facilitative or debilitating. Several studies have provided empirical support for the suggestion that the same level of competitive anxiety intensity may be perceived by some athletes as facilitative and by others as debilitating with reference to their sport performance (Jones and Hanton,

1996; Ntoumanis and Jones, 1998; Hanton et al., 2004). Moreover, it has been shown that females report higher levels of both state and trait anxiety than males in sport contexts (Jones and Hanton, 2001), but the data remain in debate (Terry et al., 1996).

Thus, the purpose of this investigation was to study the physiological and psychological states of tennis players during the day of the first match of a tennis tournament. The Competitive State Anxiety Inventory-2 (CSAI-2, Martens et al., 1990) was utilized based on its ability to assess a number of different psychological states thought to be crucial for proper mental preparation prior to athletic competition. This inventory was employed to determine pre-competition levels of anxiety, self-confidence and stress and their relationship to successful or unsuccessful tennis match outcome. Because it seems that women typically report higher cognitive anxiety and lower self-confidence than men, we examined sex differences in hormone production and cognitive anxiety throughout the course of the competition. We also examined links between cortisol response and pre-competition CSAI-2 measures of perceived anxiety.

2. Methods

2.1. Participants

The sample was composed of 16 regional tennis players (8 males, 8 females) with the following characteristics (mean \pm standard error): males: age 22.2 ± 2.8 years; height 183.2 ± 7.2 cm; mass 72.2 ± 3.0 kg; BMI 21.4 ± 0.9 kg m⁻². Females: age 20.2 ± 1.0 years; height 169.5 ± 4.6 cm; mass 55.2 ± 2.7 kg; BMI 19.2 ± 1.0 kg m⁻². Their mean period of practicing this sport was 10.5 ± 3.2 years.

Prior to data collection, the purpose of this study was explained thoroughly to every athlete and informed consent was obtained from each individual, according to the Declaration of Helsinki.

Participants were not taking any drugs or medication and had no history or endocrine disorders before or during this study. They were familiarized with sampling and survey procedures 1–3 days prior to the actual testing.

2.2. Psychometric assessment

2.2.1. Intensity of anxiety

The CSAI-2 (Martens et al., 1990) was also used 15 min before the competition to estimate the participants' cognitive and somatic anxiety as well as self-confidence. The CSAI-2 consists of 27 items, 9 for each subscale (cognitive anxiety, somatic anxiety and self-confidence). Each item was rated on a 4-point Likert-type scale, producing a score ranging from a low 9 to a high 36 for each subscale. All items were positively stated except the item 14 which was stated as negatively and was, thus, scored reversely in the analyses. Higher scores on cognitive and somatic anxiety indicate higher levels of anxiety, whereas higher scores on the self-confidence subscale correspond to higher levels of self-confidence. Cronbach's alpha coefficients of internal consistency were 0.89 for cognitive, and 0.92 for somatic anxiety and self-confidence.

Download English Version:

<https://daneshyari.com/en/article/336578>

Download Persian Version:

<https://daneshyari.com/article/336578>

[Daneshyari.com](https://daneshyari.com)