Anxiety and performance in young table tennis players

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Abstract

The Multidimensional theory suggests that cognitive and somatic anxiety influence performance differently. According to this approach, players displaying higher cognitive anxiety or extreme scores (too high or too low) on somatic anxiety or lower self-confidence prior to the game perform more poorly. However, previous research has argued that the relationship between anxiety and performance also depends on the characteristics of the task. Thus, it has been suggested that there are optimal levels of anxiety for each type of motor skill, which leads to higher performance. Generally, tasks demanding high physical effort are facilitated by high levels of anxiety while tasks demanding accuracy are better accomplished when anxiety is relatively low. In the case of table tennis, it is possible to suggest that it demands both high physical effort and accuracy; therefore this study was conducted to investigate the relationship between pre-competitive state anxiety and performance in table tennis players. Thirty-six young table tennis players (12-13 yrs.) volunteered to participate in this study, completing the Competitive State Anxiety Inventory for Children (CSAI-2C) 30 minutes prior to their first match in a regional competition. The results indicated that cognitive and somatic state anxiety and self-confidence do not allow us to make assumptions regarding performance as it was suggested by multidimensional theory. It seems that the characteristics of table tennis and individual differences influence athletes' performances more than the levels of anxiety themselves. Thus, athletes with different levels of anxiety may perform well if they adapt their personal characteristics to their styles of playing.

Keywords: anxiety, sport performance, young athletes, table tennis.

Introduction

It has been recognized for many years that psychological factors play an important role in competition. In this way, the relationship between anxiety and athletic performance is widely studied. One of the explanations for this relationship is the multidimensional theory (Liebert and Morris, 1967). This theory suggests that anxiety consists of two subcomponents: cognitive and somatic, and they should influence performance differently. The cognitive anxiety is defined as the mental component of anxiety and in sport it is commonly manifested by negative expectations of performing a task and thus negative self-evaluation. According to Martens *et al.* (1990) there is a negative linear relationship between cognitive anxiety and performance.

The somatic anxiety refers to the physiological elements of the anxiety (Martens *et al*. 1990). It is reflected in such responses as rapid heart rate, shortness of breath, clammy hands, butterflies in the stomach, and tense muscles. Martens *et al.* (1990) suggest that somatic anxiety has an inverted-U shaped relationship with performance, in a curvilinear fashion, with lower and higher levels of somatic anxiety being detrimental to performance.

Although the authors did not proposed the self-confidence as a subcomponent of anxiety, they included it in their studies of the relationship between anxiety and performance, referring to the self perceptions of confidence. Martens *et al*. (1990) proposed a linear relationship for self-confidence.

Craft *et al.* (2003) did a meta-analysis considering the multidimensional approach to the study of anxiety-performance relationship and its most employed instrument: the Competitive State Anxiety Inventory – CSAI-2. The authors suggest that the findings of the studies of anxiety have been inconsistent. In addition, LeUnes and Nation (2002) suggest that the multidimensional relationship between state anxiety and sport performance is complex and need further investigation.

In addition, previous research has argued that the relationship between anxiety and performance also depends on the characteristics of the task. For example, Oxendine (1970) considered that there are ideal levels for the optimal functioning for best performance and have accounted for variations in motor requirements, e.g. tasks requiring fine muscle coordination, precise motor control, steadiness and concentration are performed best at low levels of anxiety or physiological arousal. These results were confirmed by studies of Weinberg and Genuchi (1980) with golf players and Hall and

Purvis (1980) with bowlers when the athletes had their best performance with low levels of anxiety.

On the other hand, gross motor activities involving strength and physical effort should be facilitated by higher levels of anxiety, such as in the study of Parfitt *et al.* (1995) with the Sargent jump task in basketball and volleyball players. For this particular task, the increase of somatic anxiety affected the height of jumping positively as well as by Wilson and Raglin (1997) with track and field athletes who were benefited by high levels of anxiety.

Related to table tennis, Ripoll and Fleurance (1988) described a task which involved complex, precise perceptual and motor skills. In addition, Ripoll and Latiri (1997) suggested that besides spatial precision, table tennis requires temporal precision. Thus, it is possible to suggest that it demands both high physical effort (velocity) and precision (accuracy).

Therefore, the purpose of this study was to investigate the relationship between pre-competitive state anxiety and performance in young table tennis players.

Method

Participants

Thirty-six young table tennis players (18 females and 18 males), all members of the São Paulo Table Tennis Federation (Brazil), volunteered to participate (age: M = 12.28, SD = 0.74). All participants in the study were currently competing at regional level. Subjects were assured confidentiality regarding the data collected and their personal identity.

Instrument

All players completed an inventory about their personal states of anxiety prior to one São Paulo State Federation Tournament. A short description of the instrument follows.

The Children's form of the Competitive State Anxiety Inventory-2C (CSAI-2C; Stadulis *et al*. 2002) was employed to measure the intensity of pre-game cognitive anxiety, somatic anxiety and also self-confidence, with five items in each subscale. The response scale asked the participant to rate the intensity with which each symptom was being experienced on a continuum from 1 (*not at all*) to 4 (*very much so*). On each scale, anxiety level is expressed by a numerical grading system from 5 to 20.

Procedure

Participants, their parents, and coaches were contacted and informed of the nature of the study in a practice day in their respective clubs, and invited to take part in the investigation. A suitable time and venue for the collection of the data was then arranged. All participants were asked to complete CSAI-2C on the competition day, within thirty minutes before their first game at São Paulo State Federation Ranking Championship. All questionnaires were administered by the lead researcher.

Results

The participants of the study were divided into two groups, considering their results in their first game: 18 athletes – 'winners', 18 athletes – 'losers'. Each group was made out of 9 boys and 9 girls. To compare anxiety levels between the two groups, the Mann-Whitney test was used.

Regarding cognitive state anxiety, Mann-Whitney test indicated that there were no differences between 'winners' and 'losers' in pre-game ($Z = -0.239$, $p = .815$). It means that cognitive state anxiety was not a predictor of performance for these table tennis players.

In the same way, Mann-Whitney test indicated that there were no differences between 'winners' and 'losers' players in somatic state anxiety in pre-game situation ($Z = -0.720$, $p = .481$), as well as in self-confidence levels ($Z = -0.032$, $p = .988$).

Conclusions

The multidimensional theory hypothesis that low levels of cognitive anxiety, moderate somatic anxiety and high self confidence were necessary for optimal performance. The lack of supporting evidence for this theory could be explained by the following reasons. Firstly, considering the task, table tennis could be considered as a hybrid task. Even though it demands spatial and temporal precision, it needs power and velocity to perform well. Thus, athletes with high or low levels of anxiety might get optimal performance, as long as they could control it properly.

Secondly, because table tennis allows athletes to use their own styles of playing with their physical and mental capabilities, there is no relationship among anxiety components and performance. Thus, athletes with different levels of anxiety may perform well if they adapt their personal characteristics to their styles of playing.

For example, one athlete with a high level of anxiety could get a great performance playing faster than another one with a lower anxiety level. Therefore, maybe there are no optimal levels of anxiety for table tennis in general but for each athlete in particular.

Finally, it was noted in this study that there were no ideal levels of anxiety for the table tennis task, as in the study of Morgan *et al.* (1987) which did not find any correlation between Personality traits or states and performance. We agree with the authors suggesting that it is important to establish the individual zone of optimal functioning (Hanin, 2000; Kamata *et al.*, 2002) before employing psychological interventions. In addition to that, it is essential to identify when this optimal zone should be reached during the tournament (important moments). Maybe in short duration activities this zone could be arranged in pre-game situation, but in long duration activities (all day long or some days), perhaps the most important moment could be only in the final phase. Therefore, it is crucial for athletes to learn to identify their individual zones of optimal functioning related to anxiety levels and develop coping strategies for these situations by themselves, because many times the coach or the psychologist cannot intervene on specific sport settings.

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