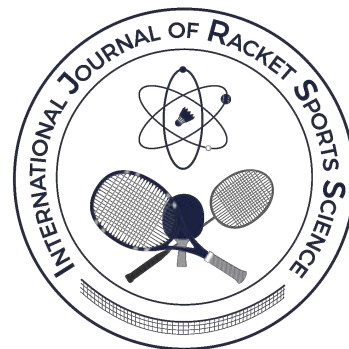


Influence of sport-practice-hours on burnout and coping in table tennis players

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Abstract

The aim of this research was to analyse burnout (estimated by emotional and physical exhaustion) and coping (as estimated by the need to seek support) in relation to the number of sport-practice-hours undertaken by table tennis players of various levels of success. A sample of 180 Spanish table tennis players (mean age = 33.87 years; SD = 16.64; 149 men and 31 women) voluntarily participated in the study and filled out a series of self-report questionnaires. The results revealed that there was a significant difference among table tennis players on emotional and physical exhaustion ($p < 0.01$) with players who practiced more than ten hours reporting higher levels of emotional and physical exhaustion. There was a significant difference in coping behaviour ($p < 0.01$) with players who practiced more than 10 hours reporting the greatest need. Finally, players who played at a higher level (nationally or internationally) had a greater number of hours of training. It is concluded that players and coaches should take account of the time spent in sport-practice should because it can increase burnout levels in table tennis players. Moreover, coping skills could be influenced by sport-practice-hours, but further research should clarify these outcomes.

Keywords: *Burnout, Coping, Training, Mental Skills, Players*

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Cite this article as:

González-García, E., & Martinent, G. (2019). Influence of Sport-practice-hours on Burnout and Coping in Table Tennis Players. *International Journal of Racket Sports Science*, 1(2), 15-23.

Introduction

Table tennis is a sport in which coping and burnout play a crucial role in sport career of players (Kurimay, Pope-Rhodium, & Kondric, 2017; Martinent, Gareau, Lienhart, Nicaise, & Guillet-Descas, 2018; Martinent, Nicolas, Gaudreau, & Campo, 2013). Both variables can modify performance and can change the way that players perceive their execution (Chen, Chang, Hung, Chen, & Hung, 2010). Coping is conceptualised as a set of cognitive and behavioral strategies that can modify player's perception regarding internal and/or external threats, evaluated as exceeding their perceived resources (Lazarus & Folkman, 1984). The coping theorists (Gaudreau & Blondin, 2002; Nicolas, Gaudreau, & Franche, 2011) pointed out that there are three coping dimensions in the context of sport competitions: Task-oriented coping (strategies to face directly the stressful situation) such as logical analysis, imagery/thought control or social support; Disengagement-oriented coping (strategies related with withdraw desire from the process of actively striving towards an stressful situation) such as resignation or venting emotions; And distraction-oriented coping (strategies used to momentarily focus the attention on external and internal stimuli unrelated to the stressful situation) such as distancing or mental distraction. In the field of other sports, Doron and Martinent (2016) proved that task-oriented coping was related with challenge appraisal, positive emotions and performance, meanwhile, disengagement-oriented coping was linked with threat appraisal and negative emotions. In a table tennis study, Martinent and Decret (2015) highlighted among players that task-oriented-coping strategies (strategies focused on task requirements to solve a problem) were shown to be the best coping strategies in relation to stress, burnout and recovery. Therefore, task-oriented coping has shown to be the best way to handle coping in sport in general and in table tennis in particular.

Burnout is one of the most important variables in dropout of table tennis players (Martinent, Louvet & Decret, 2016) and this variable has shown a relationship with a bulk of negative sport outcomes, such as drop out, decreased performance, lack of

enthusiasm, loss of social cohesion or depressive symptoms (Fletcher, Hanton, & Wagstaff, 2012; Martinent et al., 2018; Nicholls & Polman, 2007). Burnout is the feeling of an emotional syndrome characterized by emotional and physical exhaustion, sport devaluation and reduced sense of accomplishment (Raedeke & Smith, 2001). Moreover, burnout can lead to negative emotions among table tennis players and to poor performance, increasing the risk of withdraw symptoms (Martinent et al., 2018). Even, burnout symptoms can be increased from the beginning of the season to the final competitions and a minimum amount of time is needed to reduce again these levels, despite finishing of training and competitions (Martinent et al., 2016). Also, the engagement level of the players that are in training settings or in professional clubs can result in turn in an increase of burnout levels rather than more amateur players (Martinent, & Decret, 2015). Thus, the degree of engagement and the spent hours in table tennis can be an issue to consider in burnout in players.

Several researchers have shown that sport-practice-hours are related to the attainment of better performance in terms of technical and physical skills (Elferink-Gemser & Vissche, 2012; Ericsson, 1996; Ericsson, Krampe, & Tesch-Römer, 1993; Ford, Coughlan, Hodges, & Williams, 2016). In particular, researchers that follow the theory of deliberate practice highlighted the positive outcomes in sport performance of those that spend more training hours (Ericsson, 1996; Ericsson et al., 1993). Regarding that theory, it stands out that there is a minimal number of hours in order to get a high sport performance level (Elferink-Gemser & Vissche, 2012; Ericsson, 1996; Ericsson et al., 1993; Ford et al., 2016; Hendry, Crocker, Williams, & Hodges, 2019).

Not only can the sport-practice-hours lead to a better performance, but it is also important to take into account their potential effects on a wide variety of outcomes such as motivation, concentration or enjoyment (Campinelli & Gobet, 2011; Casado, Ruiz-Pérez, & Graupera, 2014; Hambrick, Oswald, Altmann, Mainz, Gobet, & Campitelli, 2013). Casado, Ruiz-Pérez, & Graupera (2014) pointed out that the best athletes in terms of sport performance can

practice with more concentration, effort and enjoyment. Consequently, sport-practice-hours is a variable that should be considered in the influence of mental performance in table tennis players. Moreover, as a novelty of this work, practice-hours will be considered as a variable that can modify burnout and also the coping strategy employed by a player in competition. To date, no previous studies have examined the relationship between these variables in table tennis players, even though, knowing that the amount of practice hours is quite demanding in table tennis players.

To sum up, previous studies did not highlight the influence of sport-practice-hours in coping and burnout in table tennis, two important influences on table tennis players' performance which can be influenced by sport-practice-hours (Martinent et al., 2013; Martinent et al., 2018). In line with that, it is noteworthy to mention that this study can shed light for future research opening a new field of development on the way to control burnout and coping and how they are influenced by the sport-practice hours. Moreover, the importance of sport practice-hours to reach success in sporting context has been proved by far in previous works (Campinelli & Gobet, 2011; Casado et al., 2014; Hambrick et al., 2013). Therefore, the aim of this research was to analyse if there were differences in coping and burnout depending on sport practice hours. An hypothesis was established that: the more hours that players practice, the higher will be the burnout symptoms and coping needs.

Methods

Participants

A sample of 180 Spanish table tennis players (mean age = 33.87 years; SD = 16.64; 149 men and 31 women) voluntarily participated in the study. The majority were amateur ($n = 144$) and a minority were professionals ($n = 36$). Furthermore, 165 were federated players and 15 were not associated to federations. Concerning the achievements, 155 reached local success, 137 reached regional success, 78 reached national success and 24 reached international success. Regarding the time of sport practice, 65

players practiced between 0 and 5 hours per week, 71 players practiced between 5 and 10 hours per week, 44 players practiced more than 10 hours per week.

In order to maximise the external validity and generalisability of the study, participants were collected from all around Spain. Hence, the study followed a cross-sectional design.

Variables and instruments

Sociodemographic questionnaire. To measure the sociodemographic variables: gender, age, federated, professional/amateur, successes (local, regional, national and international) and training hours; an *ad hoc* questionnaire with 9 questions was made. The questions were dichotomous in case of: gender (male/female), local/national/regional/international successes (Yes/No), federated (Yes/No), professional; a polytomous in case of practice hours (from 0-5 hours/ from 5 to 10 hours/ more than 10 hours); and one open question for age. Most of the questions were closed-ended in order to be responded to easily.

The Spanish version (Molinero, Salguero, & Márquez, 2010) of the Coping Inventory for Competitive Sport (CICS; Gaudreau & Blondin, 2002) was comprised of 31 items and respondents used a 5-points Likert type scale ranging from 1 (nothing) to 5 (much). It contains 8 factors with the following Cronbach Alpha: resignation (4 items; $\alpha = .77$), relaxation (4 items; $\alpha = .82$), distancing (3 items; $\alpha = .51$), logical analysis (7 items; $\alpha = .67$), seeking support (2 items; $\alpha = .77$), imagery/thought control (5 items; $\alpha = .73$), venting emotions (3 items; $\alpha = .83$) and mental distraction (3 items; $\alpha = .77$).

The Spanish version (Arce, De Francisco, Andrade, Seoane, & Raedeke, 2012) of the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) is made up of three subscales measuring emotional/ physical exhaustion, sport devaluation, and reduced feeling of accomplishment. The scale has 15 items for each dimension with five response options (from 1- almost never to 5 – almost ever). The Cronbach alphas in the present study were .88 for emotional/physical exhaustion, .64 for reduced accomplishment and .67 for sport devaluation.

The Oviedo scale of infrequency response (INF-OV; Fonseca-Pedrero, Lemos-Giráldez, Paino, Villazón-García, & Muñiz, 2009) was used to minimize acquiescence and dishonest participants. This is a 12-item self-report measure with a 5-point Likert-type rating scale format (1 totally disagree; 5 totally agree). Its goal is to detect participants who responded randomly, pseudo-randomly or dishonestly on self-reports (e.g., “The distance between Madrid and Barcelona is greater than between Madrid and New York”). The participants with more than 4 incorrect answers were deleted from the sample. In this study, 10 participants were taken out of the sample.

Procedure

The study followed the international ethical guidelines and anonymity was preserved. Firstly, researchers contacted the Spanish Table Tennis Federation to announce the possibility to participate in the study. Once, the Spanish Federation approved the announcement, they publicised it on their website. Regarding that, the interested players contacted the main researcher and once they claimed their interest in participating, they received the link to access the questionnaire. After participants accessed to the questionnaire (it took 20 min), they signed an informed consent, then, they began to complete the research survey. The data was hosted on the application "Google Drive."

Data Analysis

The data analysis was performed using SPSS 19 version software. The descriptive analysis of average, minimum, maximum, frequencies, percentage and standard deviation were used to describe the sample characteristics. A bivariate correlation was conducted to ensure that there was not collinearity in the study variables. The MANOVA analyses were performed to examine the differences among the variables (Burnout and Coping) across groups of sport-practice-hours. A significant multivariate effect ($p < .05$) was followed by subsequent ANOVAs using post hoc comparisons (Tukey HSD) of group means with Bonferroni adjustment (which means that the significance ($p < .05$) should be divided by the number of cases) to prevent

Type I error. Also, Partial eta squared (η^2) was assessed for providing an index of effect size. Finally, a series of chi-square tests was computed to examine if there were significant relationships between groups of sport-practice-hours and gender.

Results

Table 1 shows the descriptive statistics and bivariate correlations between the study variables. Regarding coping, results revealed: (a) high scores of: Relaxation, Logical Analysis and Thought Control; Medium scores of: (b) Resignation, Distancing, Seeking for Support, Venting Emotions and Mental Distraction. Relating to Burnout, participants reported: (a) medium levels of: Physical and Emotional Exhaustion, Reduce Sense of Accomplishment and Sport Devaluation. The correlations among the study variables did not indicate multicollinearity, as they ranged from $-.23$ to $.57$ (i.e., confidence intervals ($\pm$ two standard errors) for all the correlations supported the discriminant validity insofar as none of the intervals included 1.0).

Secondly, to know if players belonging to distinct groups of sport-practice-hours reported significantly different scores of coping and burnout a MANOVA analysis was performed (Lambda de Wilks = $.62$; $F = 1.99(42)$; $gl = 314$; $p < .01$; $Eta^2 = .21$). The results (Table 1) revealed that there were differences among table tennis players from distinct groups of sport-practice-hours on emotional and physical exhaustion ($p < .01$). In particular, table tennis players that practiced more than 10 hours reported significantly higher levels of emotional and physical exhaustion than the group that practiced less than 5 hours of training. Results of *post hoc* comparison (Tukey HSD) are presented in Table 2.

Concerning coping strategies, the results (Table 3) showed statistically significant differences in seeking for support ($p < .01$). In particular, table tennis players that practice more than 10 hours reported the highest levels of seeking for social support, showing the Tuckey analysis that were differences between the group that practiced “more than 10 hours” and the group “from 5 to 10 hours”. Results of post hoc comparison (Tukey HSD) are presented in Table 3.

Finally, the results of chi-square tests showed that the distribution of gender ($\chi^2 = .55$; $p > .05$) or federated players ($\chi^2 = 3.90$; $p > .05$) was not significantly different across the three groups of sport-practice-hours). However, national successes ($\chi^2 = 6.04$; $p < .05$), and international successes ($\chi^2 = 6.87$; $p < .05$) significantly differed across the three groups

of sport-practice-hours. As can be expected, the more successful the players are (nationally or internationally), the more hours of training the players had.

Table 1.

Descriptive statistics and correlations among the variables.

	1	2	3	4	5	6	7	8	9	10	11
1.Resignation											
2.Relaxation	-0.15*										
3.Distancing	0.29**	0.25**									
4.Logical Analysis	-0.23**	0.55**	0.27**								
5 Seeking for Support	-0.08	0.48**	0.13	0.34**							
6. Thought Control	-0.23**	0.55**	0.18*	0.57**	0.35**						
7. Venting Emotions	0.43**	-0.01	0.33**	0.09	0.19**	0.08					
8. Mental Distraction	0.40**	0.19**	0.32**	0.14	0.21**	0.22**	0.38**				
9. Physical and Emotional Exhaustion	0.36**	-0.04	0.20**	0.02	0.07	0.04	0.39**	0.28**			
10. Reduce Sense of Accomplishment	0.41**	-0.13	0.10	-0.17*	-0.13	-0.20**	0.26**	0.12	0.20**		
11. Sport Devaluation	0.33**	-0.12	0.18*	-0.15*	-0.13	-0.08	0.21**	0.21**	0.17*	0.44**	
Mean	7.92	13.60	6.93	25.10	6.96	18.05	8.22	6.66	11.96	12.36	10.63
Standard Deviation	3.09	3.25	2.23	3.92	1.98	3.33	2.88	2.55	4.37	3.39	3.87
Skewness	.83	-.12	.36	-.24	-.48	-.35	.21	.81	.39	.36	.57
Kurtosis	.57	-.21	-.19	.31	-.05	-.06	-.60	.75	-.24	.24	-.13

Note. $p < .05^*$; $p < .01^{**}$

Table 2.

Sport-practice-hours and burnout

Variables	(a) Less than 5 hours of training (n=65)	(b) From 5 hours to 10 hours of training (n=71)	(c) More than 10 hours of training (n=44)	F (p)	Eta ₂	Tuckey
Emotional/ Physical Exhaustion	10.81 (3.89)	12 (4.63)	13.59 (4.17)	5.56 (.00)*	.05	c>a
Reduced Accomplishment	12.63 (2.98)	12.59 (3.34)	11.61 (3.96)	1.44 (.23)	.01	-
Sport Devaluation	11.76 (3.55)	10.52 (3.90)	9.15 (3.81)	6.38 (.01)	.06	-

Note. * $p < .016$ (after Bonferroni adjustment)

Table 3.

Sport-practice-hours and coping

Variables	(a) Less than 5 hours of training (n=65)	(b) From 5 hours to 10 hours of training (n=71)	(c) More than 10 hours of training (n=44)	F (p)	Eta ²	Tuckey
Resignation	7.70 (3.07)	8.26 (3.25)	7.70 (2.88)	.70 (.49)	.01	-
Relaxation	13.23 (3.21)	13.70 (3.48)	13.97 (2.92)	.74 (.47)	.01	-
Distancing	6.89 (2.05)	6.76 (2.26)	7.29 (2.43)	.80 (.45)	.01	-
Logical Analysis	24.63 (3.81)	24.71 (4.14)	26.43 (3.48)	3.42 (.03)	.03	-
Seeking Support	6.78 (1.84)	6.69 (2.09)	7.68 (1.86)	3.94 (.00)*	.04	c>b
Imagery/ Thought Control	17.84 (3.16)	17.98 (3.83)	18.47 (2.66)	.49 (.61)	.01	-
Venting Emotions	7.73 (2.86)	8.28 (2.84)	8.84 (2.93)	1.95 (.14)	.02	-
Mental Distraction	6.44 (2.44)	7.01 (2.94)	6.43 (1.95)	1.08 (.34)	.01	-

Note. * $p < .006$ (after Bonferroni adjustment)

Discussion

The aim of this research was to analyse if there were differences in coping and burnout depending on

sport-practice-hours. Results showed that table tennis players that practice more than ten hours reported the highest levels of emotional and physical exhaustion and also significant differences with the group that practice less than 5 hours. Furthermore,

repetitive tasks can increase burnout syndrome (Demerouti, Bakker, Nachreiner, & Ebbinghaus, 2002). Hence, table tennis players that spend more than ten hours training may be more at risk to experience burnout symptoms. Moreover, significant relationships were found between (national and international) success and number of hours of training. It is not surprising that national and international success players were the one that practice more hours throughout the sample. Consequently, an increase of training hours as well as more success in table tennis players could be linked with greater burnout symptoms.

On the other hand, results showed statistically significant differences in seeking support, in which table tennis players who practice more than ten hours reached the highest levels. These results could be explained because a greater number of training hours can lead to burnout symptoms and in turn need the support (Demerouti et al., 2002; De Orleans, Reis, & Andrade, 2018). Consequently, an increasing number of hours could not improve coping, due to the higher levels of demands that can lead to burnout.

Nevertheless, it is difficult to explain why coping levels are similar between high hours training players (more than ten hours) and low hours training players (less than five hours). Perhaps a minimal amount of training hours is not needed for a greater use of coping strategies in table tennis, following the critics of the deliberate practice theory (Campinelli & Gobet, 2011; Casado et al., 2014; Hambrick et al., 2013). It is also important to keep in mind that in the present study, we assessed the use of coping strategies and not the effectiveness of such coping strategies. In addition, table tennis players that only practice less than five hours do not have a high competition level and they do not require the use of salient coping strategies (De Orleans et al., 2018). As a whole, more research is needed to explain such surprising results regarding coping.

As for limitations of the study, it should be considered that the relatively low number of women in the sample makes comparisons among gender difficult. Another limitation is that this study was

only conducted with Spanish table tennis players. Thus, cultural differences could have influenced the results of the present study.

As for future proposal lines, it would be quite interesting to analyse other variables that could be linked to sport-practice-hours, because the levels of coping were so similar among less than five hours group and more than ten hours group. For example, coaching leadership or team cohesion could be explored in future studies. Moreover, it could also be investigated what are the number of hours that exceed emotional and physical exhaustion levels. This would help coaches to control training loads in order to prevent emotional and physical exhaustion.

As a conclusion, the time of sport-practice-hours should be considered as a variable that might modify mental performance, because it could increase burnout levels in table tennis players. Moreover, coaches should take it into account in order to prevent the prevalence of burnout symptoms among the players practicing the most hours of training per week. Coping could also be influenced by sport-practice-hours even if the pattern of results of the present study is ambiguous regarding this issue. In particular, it is needed to clarify why coping outcomes are similar among the highest practice hours group and the lowest practice hours group. Therefore, future research is needed to clarify the optimal number of hours in terms of mental skills.

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