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Tracking mood states and on-going attentional focus in triathletes.

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Summary:

Awareness and self-regulation of attentioncan be used as cognitive strategies may help to overcome factors that threaten optimal performance, such as negative mood. The state of mind is considered a key factor in triathlon performance because it is related to perceived effort, fatigue or self-confidence. Likewise, mind-body training techniques unfolded from a particular mindfulness-based state of mind have proved to yield positive mood states. A total of 18 Spanish triathletes were randomly assigned to one out of three experimental conditions: indoor cycling, treadmill or step. They exercised for 20 minutes at 60% of Maximum Heart Rate, while focusing their attention on counting their own breath. Mood state was measure pre-post session through two instruments: Profile of Mood State (POMS) and Two Dimensional Mood State (TMS). Statistical analysis showed a significant decrease pre-post session in tension and anger POMS subscales. Results from the TMS pointed out low scores in displeasure, whereas high scores in vitality, stability and pleasure. In short, preliminary data suggest that performing cyclical exercise disciplines while paying attention to one's own breath can improve mood states.

Key words: POMS, TMS, performance, mindfulness, triathlon.

Resumen:

La toma de conciencia y la auto-regulación de la atención se pueden emplear como estrategias cognitivas y pueden ayudar a superar factores que amenazan un rendimiento óptimo, tales como el estado de ánimo negativo. Debido a su relación con la percepción del esfuerzo, la fatiga o la auto-confianza, el estado de ánimo se considera un factor decisivo en el rendimiento en triatlón. Asimismo, las técnicas de ejercicio mente-cuerpo han demostrado su eficacia en la modulación de los estados de ánimo. Un total de 18 triatletas españoles fueron asignados al azar a una de las tres condiciones experimentales (bicicleta estática, cinta de correr y step) donde realizaban un

ejercicio de 20 minutos de duración y una intensidad del 60% de su frecuencia cardíaca máxima, mientras focalizaban la atención en su propia respiración. El estado de ánimo fue evaluado (pre-post sesión) mediante la Escala del Perfil de los Estados de Ánimo (POMS) y la Escala Bidimensional del Estado de Ánimo (TMS). Los análisis estadísticos mostraron una reducción significativa pre-post sesión en dos de las subescalas medidas por el POMS: tensión y cólera. Los resultados obtenidos con el TMS determinaron puntuaciones reducidas en desagrado y elevadas en vitalidad, estabilidad y placer. Los datos preliminares de este estudio sugieren que el rendimiento en disciplinas deportivas de carácter cíclico, centrando la atención en su propia respiración, pueden mejorar el estado de ánimo.

Palabras clave: POMS, TMS, rendimiento, mindfulness, triatlón.

Introduction:

Triathlon is a highly demanding sport that encompasses physical endurance, technique and strategic aspects besides mental strength. Cognitive strategies comprise awareness and self-regulation of attention that can help to overcome optimal performance's threats such as negative mood (3, 9).

Thus, mood state is a key factor in triathlon performance due to its relationship with perceived effort, fatigue or self-confidence (5). The Profile of Mood State (POMS) has been used as a reliable scale to appraise sport related mood states in long distance disciplines such as biking, running or triathlon (7). The so called *iceberg profile* (6) derived from POMS has been associated with optimal performance in sport. Furthermore, mind-body exercise techniques yield positive mood states (10) unfolded from a particular mindfulness-based state of mind.

To be mindful of one's own breath can be an effective cognitive strategy that could improve the efficiency of athletes in training or competition (4). Despite of some studies on the effects of mindfulness-based techniques on long distance sports (2), further research is needed. Therefore, the purpose of this pilot study was to explore the mood state of elite triathletes exercising, while focusing their attention on their own breath, in laboratory settings.

Method:

A total of 18 Spanish elite triathletes took part in this study. They were randomly assigned to one of the three experimental conditions (indoor cycling, treadmill and step) during 20 minutes at 60% of Maximum Heart Rate while focusing their attention on counting their own breath. To

record their focus of attention during the experimental task, they had to push the split button of a chronometer after every ten exhales during the whole duration of the session.

Mood state was measure pre-post session with two instruments: POMS 15-items (1) that measure five subscales (tension, depression, anger, vigor and fatigue) and the TMS (8) that measures vitality, stability, pleasure and displeasure through eight items.

Results:

Wilcoxon analysis showed a significant statistical reduction pre-post session in tension ($p<.05$) and anger ($p<.01$) measure by POMS (see Table1).

Table 1. Pre-post scores comparison in POMS and TMS through Wilcoxon

	Triathletes (N=18)		Statistic	
	Pre-exercise *M* (SD)	Post-exercise *M* (SD)	*Z*	*p*
POMS				
Tension	3.06 (2.62)	2.00 (2.83)	-2.236	.025*
Depression	.78 (1.26)	.39 (.98)	-1.518	.129
Anger	1.78 (1.86)	.89 (1.41)	-2.676	.007**
Vigor	9.78 (2.51)	9.94 (1.70)	-.108	.914
Fatigue	3.83 (2.81)	3.50 (2.31)	-.893	.372
TMS				
Vitality	6.61 (3.73)	7.89 (1.60)	-1.980	.048*
Stability	5.83 (4.25)	6.11 (3.23)	-.746	.456
Pleasure	6.22 (3.06)	7.00 (2.07)	-1.456	.145
Displeasure	.39 (2.57)	1.00 (1.51)	-1.256	.209

Figure 1 shows the POMS's *iceberg profile*, characterized by low scores in the subscales of tension, depression, anger and fatigue and high scores in vigor. Results of the TMS illustrate low scores in displeasure and high scores in stability, pleasure and vitality which increased after the exercise ($p<.05$) (Figure 2).

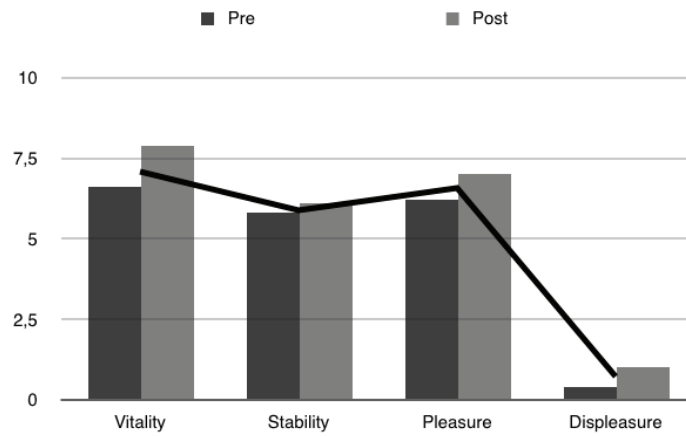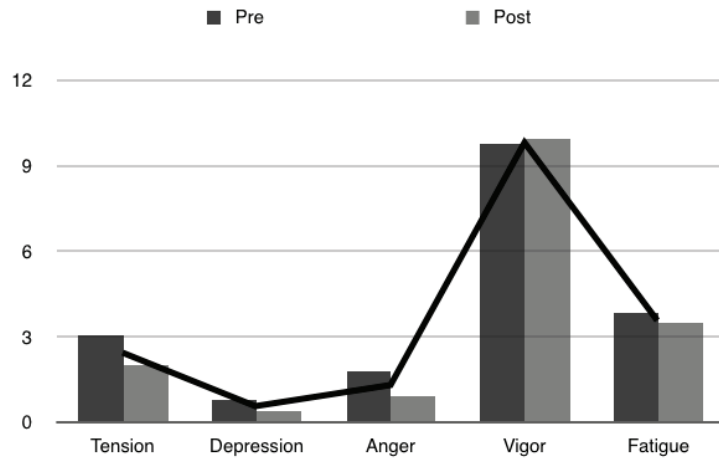Figure 1. Profile obtained from POMS and pre-post mean scores

Figure 2. Profile obtained from TMS and pre-post mean scores.

Discussion/Conclusion:

Preliminary data of this study suggest that performing rhythmical and cyclical exercise disciplines while paying attention to one's own breath could improve mood state. Moreover, tracking on-going attentional focus may be a useful mental task to put aside disruptive thoughts or emotions while exercising. Further studies are necessary to better understand the interaction between mood state and cognitive strategies at different levels of exercise intensity; and its influence on other variables such as subjective perceived exertion, fatigue or pain. This study represents a first step for future research projects in order to develop psychometric tools to monitor mood states and train self-regulation of attention during exercise.

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