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Cognitive abilities evaluation of expert athletes : scientific validation of tests battery

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To be an expert in sport result of fine adaptations on the physical, technical, psychological and cognitive levels. For a long time, Sports sciences have examined the methods of physiological and technical development and they thus become essential in the preparation of athletes. While tests to measure the physiological and physical abilities of an athlete (e.g. Vameval test, force test) are widely standardized and referenced in the literature, the investigation of cognitive abilities still remains unclear and equivocal.

The present study was based on the postulates of the cognitive skills approach, which studies the differences between athletes by testing their basic cognitive abilities through standardized laboratory tests, dissociated from the sport context. Using a battery of cognitive tests to investigate different cognitive skills, the objective of the current study was to determine how expertise in a sport shaped the athletes cognitive identity card. The hypothesis that there is a specific development of certain skills according to the sport practiced was tested (as well as the link between this development and the level of expertise of the athletes).

A battery of cognitive tests was proposed to measure (i) executive functions (motor inhibition (Go/No Go task), cognitive flexibility (switching task), working memory (N back Task)), (ii) selective attention (Flanker task) and (iii) information processing (perceptual visual task).

98 athletes of national level (61 males & 27 females, average age : 16.3 ± 1.5) classified according to 3 categories of sport were involved in the experimental protocol (N = 40 for interception sports, N = 23 for static sports and N = 35 for strategic sports).

The results confirmed the law of information processing. Indeed, complexity of the processing process manipulated through the experimental conditions for each test resulted in increased processing time and lower success rates regardless of the sport. This main result allow us to validate our cognitive test battery. Secondly, differences obtained in dominant cognitive functions across sport types showed that athletes practicing interception and strategic sports performed better on the selective attention task, while athlete in interception sports showed better performance on motor inhibition and working memory test. Thus, the results of this study validate an operational test battery for the sports domain that reliably measures executive functions.

The prospects for the integration of this test protocol to the already well known physiological and physical test battery is of particular interest and really promising to complete the identity card of the athlete at different levels. Furthermore, later on, the choices and orientations of cognitive training protocols will be all the more relevant as they will be based on reliable and complete scientific data.

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