



# Cognitive Function in Tropical Climate



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## Introduction

The physiological and psychological responses to environmental heat stress have been well established [1, 2]. However, in the tropical climate (i.e., hot: 31 °C±2 °C and wet climatic environment: 75%±10%rH), most studies deals with exercise: Aerobic exercise is negatively affected [3] and the impact of this environment on cognition is unclear. This article reviews studies using cognitive tasks realized in Tropical Climate (TC) or using environmental conditions leading heat stress. In the heat, and consequently in TC, there are wide ranges of environmental factors that can influence the cognitive performances [4,5].

Indeed, task complexity (whereas simple task are not affected or faster performed as simple reaction time, more complex task are negatively affected by TC [6,4]), time heat exposition (degradation of performance in sustained attention tasks is proportional to duration and is amplified under thermal stress [7]), acclimation (at least 10-days in TC is needed to limit the performance decrement [8], or acclimatization (people born in CT have a better physiological functioning allowing them to better tolerate heat exposure, to better withstand the loss of performance caused by heat stress and to provide less cognitive effort for a similar performance [6]) can affect cognition of these factors, humidity is particularly debilitating. Indeed, a high level of relative humidity impairs cognitive and dual tasks performance [7,9].

Moreover, individual subjective states as thermal discomfort and fatigue, which are higher in TC or hot environment [2,10], may be other factors affecting cognitive performance. In addition, the evolution of the positives and negatives affective states must also be taken into consideration: TC reduces positive affect without affecting negative affect [5]. The performance decrement can be explained by the fact that participants have at their disposal a certain amount of neural resources that can be allocated to different tasks or activities, performance of the latter will deteriorate when

the amount of resources is insufficient to deal with both the tasks and environmental constraints (heat stress and relative humidity), such that subjects will be able to maintain their performance level until the resources are overloaded [7]. Further investigations, using cooling (e.g., cold drink) or psychological training techniques, are needed in order to try to limit the negatives effects of TC on cognition.

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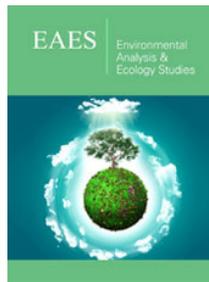
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