4th World Conference on **Psychology** and **Behavioral Sciences**

London, UK

15 - 17 May 2026

Beyond the Steering Wheel: Characterising the Cognitive Determinants of Motorsport Racing

Le Viennesse, C.[1,2], Deschamps, T[1]

[1]Laboratoire Mouvement - Interactions - Performance, MIP, Nantes Université, UR 4334, 44000 Nantes, France
[2]BTW Alpine F1 Team, OX7 4EE, Enstone, United-Kingdom

Abstract

High-level driving performance relies on a complex integration of advanced visual processing, physical capacity, and rapid decision-making (Baur et al., 2006; Lappi et al., 2022). However, the specific cognitive skills underpinning elite performance remain insufficiently characterised, as previous research has focused more on the demands of driving than on the underlying physical and cognitive determinants (Reid et al., 2019). This study investigated the association between executive functions [EF], (specifically switching, updating, and inhibition) and driving performance in highly skilled drivers. Twenty-eight participants (single-seater: n=12; karting: n=12; endurance: n=4) completed a standardised 2.5-hour protocol, including 30 minutes of EF testing (Modified Flanker, N-back, and Stop Signal Task) and a 20-minute driving simulator session but also some strength testing. Driving performance was measured by the fastest valid lap time on the Red Bull Ring circuit (Austria), using the F1 25 game. Significant correlations were found between superior executive performance and faster lap times: switching ($r = 0.522$, $p = .006$), inhibition ($r = 0.574$, $p = .002$), and updating ($r = 0.497$, $p = .008$). For switching and inhibition, performance was quantified using the Inverse Efficiency Score to integrate both speed and accuracy. These findings suggest that executive functioning is a critical determinant of racing performance. Future research should investigate these functions during longer sessions and under conditions that more closely replicate the physiological strain of on-track driving (heat, vibrations, long stints) that are likely to affect the cognitive functions and the driving performance.

Keywords: Cognitive Skills, Executive Function, Performance Determinants, Motorsport