Don't lose sleep over esports: How total sleep deprivation affects cognitive and in-game performance of Rocket League players

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1 BACKGROUND:

- Despite increasing earnings and resulting professionalism in esports, esport athletes often sleep poorly and are highly susceptible to sleep loss prior to competition.

- Esports performance has a very large cognitive component, leading esport athletes to be referred to as 'cognitive athletes'.

- Acute sleep loss tends to affect cognitive performance more than physical performance, however it is unknown how it affects in-game esports performance.

Aim: To determine whether acute total sleep deprivation (TSD) affects the cognitive and in-game performance of young adults who play the popular esport 'Rocket League'.

2 METHODS:

Procedure
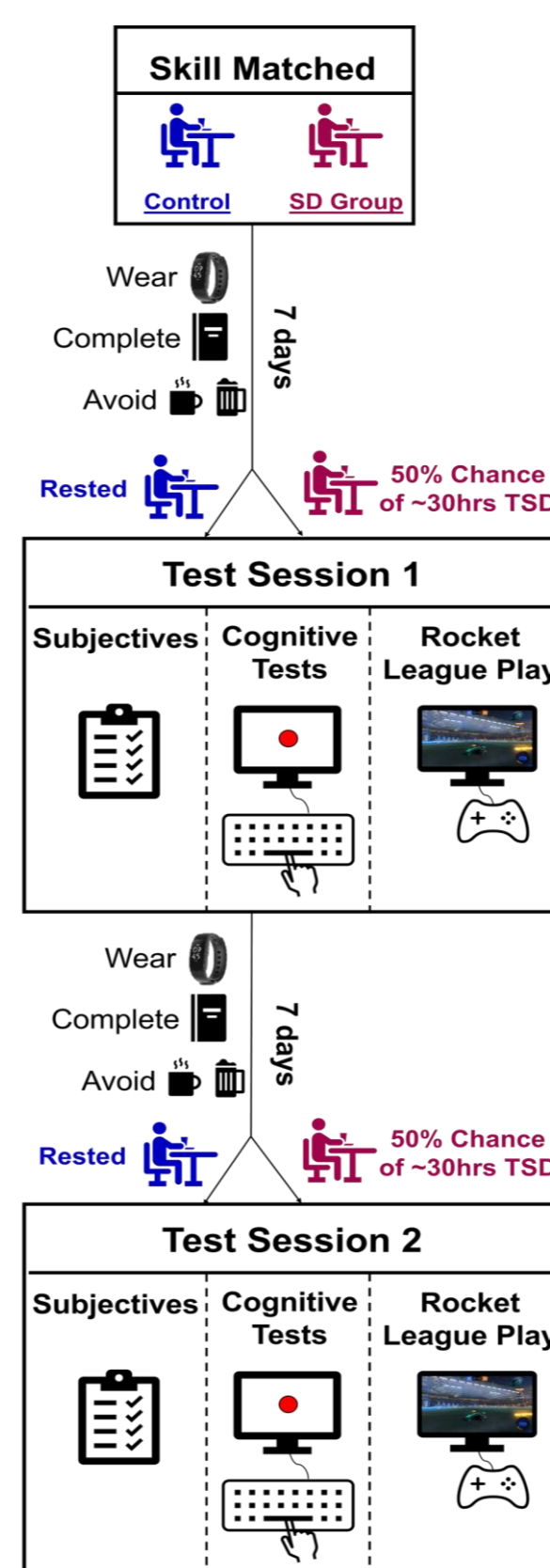
Demographics

	Control (*n* = 13)	SD Group (*n* = 13)	Mean pair diff.
Age	20 ± 3	20 ± 1	2 ± 1
Sex	13m	12m, 1f	
Skill level	~Top 12%	~Top 15%	Minimal
PSQI (*n* > 5)	4 ± 2: (4)	5 ± 2: (7)	2 ± 2
HSDQ (*n*)	Insom: (1)	RLS: (2)	

PSQI: Pittsburgh Sleep Quality Index
HSDQ: Holland Sleep Disorder Questionnaire
Other measures taken include:
SNS: Swiss Narcolepsy Scale
FAST/AUDIT: Alcohol Dependency Screening
MEQ: Horne-Östberg Morningness Eveningness Questionnaire

Materials:

- **Actigraphy** (Readiband™), worn throughout.
- **Consensus sleep diary**, completed throughout.
- **Subjective Measures:** KSS, Alertness & Motivation Visual Analog Scales.
- **Cognitive Tests:** PVT (10 min), SynWin Multitask, Category Switch Task.
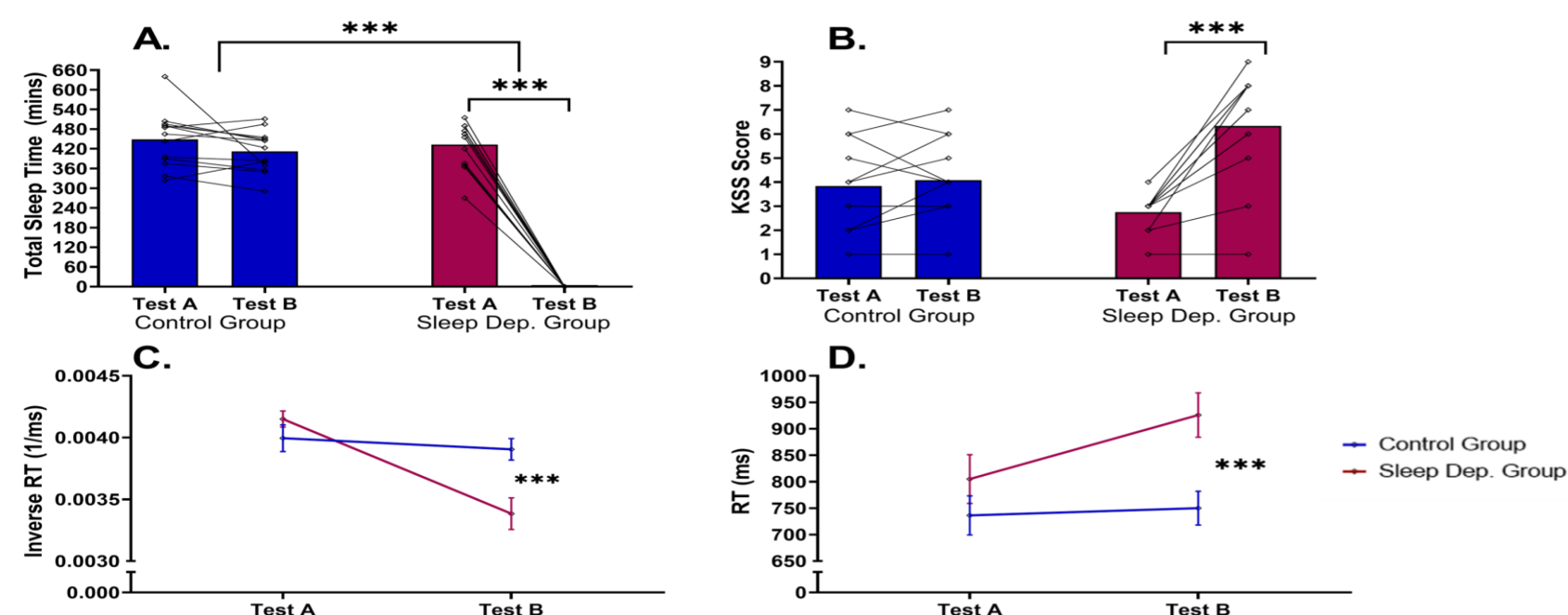- **Rocket League:** 7 matches (~1hr) per session.

3 RESULTS:

Figure 1. A. Total Sleep Time acheived the night before each test session. **B.** Karolinska Sleepiness Scale (**KSS**) rated subjective sleepiness ~10min before Rocket League Matches. **C.** Mean (±SEM) Inverse response time (RT) on a 10-min Psychomotor Vigilance Task (**PVT**) taken ~30min before Rocket League Matches. **D.** Mean (±SEM) response time (RT) on the mixed task blocks of the **Category Switch Task (CST)** taken ~20min before Rocket League Matches.

Figure 2. Goal Differential (Within each pair, goals scored by the player in Sleep Dep. Group minus the player in the control group). Values were time normalised and averaged across the 7 games.
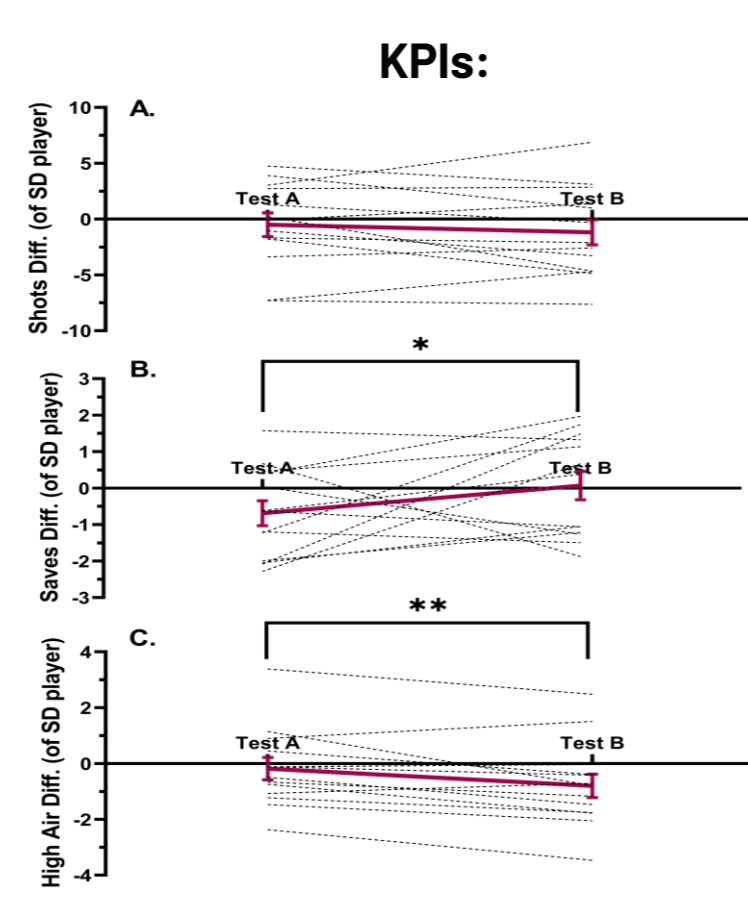
Figure 3. Notable Key Performance Indicators (KPIs) within the Rocket League Matches, namely **A. Shots** Differential, **B. Saves** Differential, and **C. Time Spent High in the Air** Differential. All values at Sleep. Dep. player minus control player for a given pair. Values were time normalised and averaged across the 7 games.

4 SIGNIFICANCE:

- Our TSD protocol impaired the alertness and cognitive performance of esport players.

- Overall game outcome was unaffected, however there is evidence of strategy change following TSD.

- Players used a simpler and more risk-averse 'playstyle' following TSD, in contrast to what prior literature would suggest.

References:
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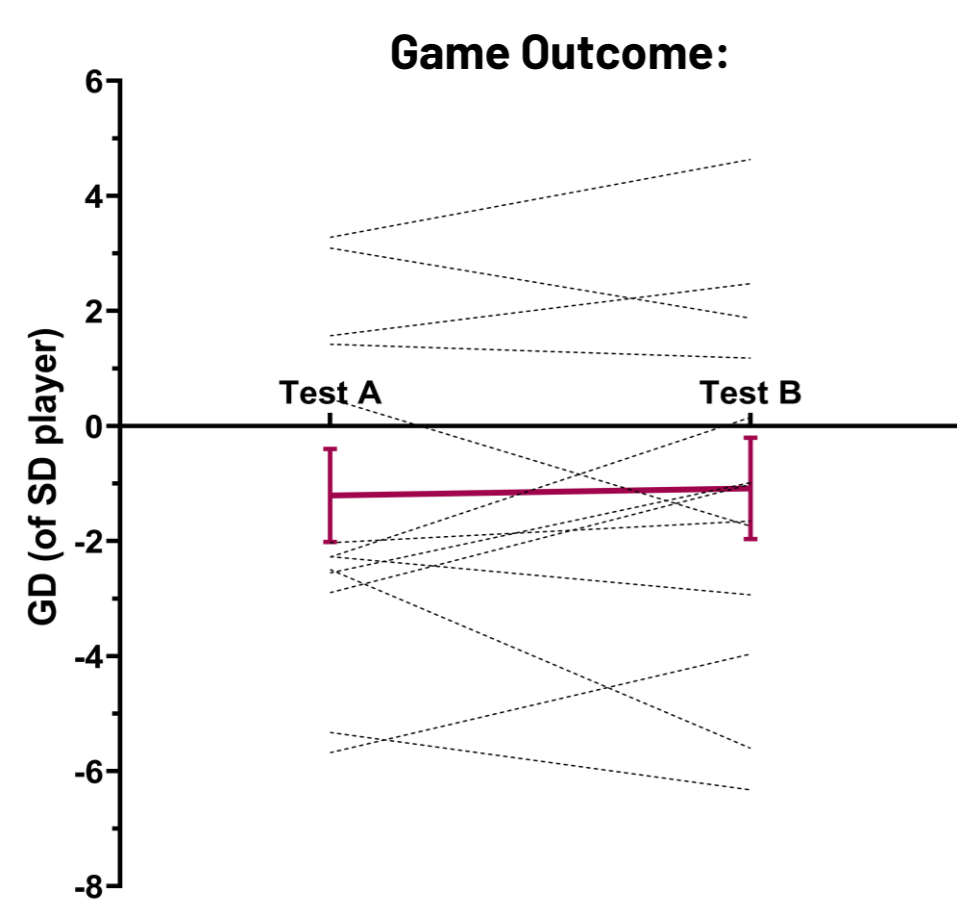5. **Womack** et al. Sleep Loss and Risk-Taking Behavior: A Review of the Literature. Behav Sleep Medi. 2013. DOI: 10.1080/15402002.2012.703628.