

Cognitive Performance Analysis of Deployed US Army Unmanned Aerial Surveillance Operators

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Background

Current work-rest cycles for US Army Unmanned Aerial Surveillance (UAS) operators may contribute to increased cognitive decline while deployed. The purpose of this research is to analyze the cognitive performance of deployed US Army UAS operators.

Research Questions:

1. When do operators **begin to experience** cognitive decline?
2. Which portions of cognitive function **deteriorate faster**?
3. **How significant** is the cognitive decline?

Process

The study relies upon observational data consisting of daily sleep data, physiological data, and cognitive test results collected from nine Soldiers during a 90-day deployment.

Fig. 1 shows Trails test [1] reaction times for each Soldier over the 90-day deployment. Several of the Trails test reaction time graphs show an increase in reaction time around day 50.

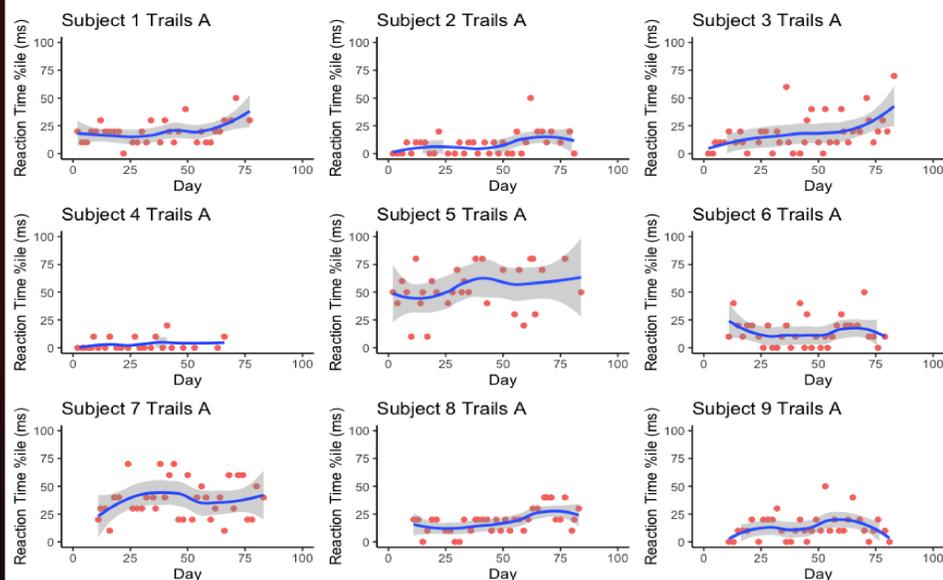


Fig. 1: Trails test [1] data over deployment.

Normalizing the cognitive test data relative to predeployment baseline scores permits development of linear models to isolate significant predictors from the sleep and physiological data sets. While these predictors had low p-values using regression, further analysis is required to draw practical conclusions.

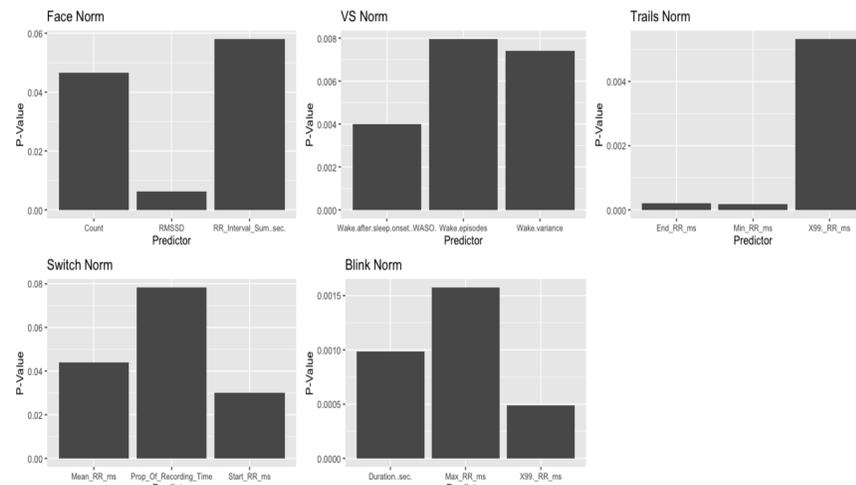


Fig. 2: Strength of predictors for various cognitive tests [1]. Smaller p-values indicate stronger predictors.

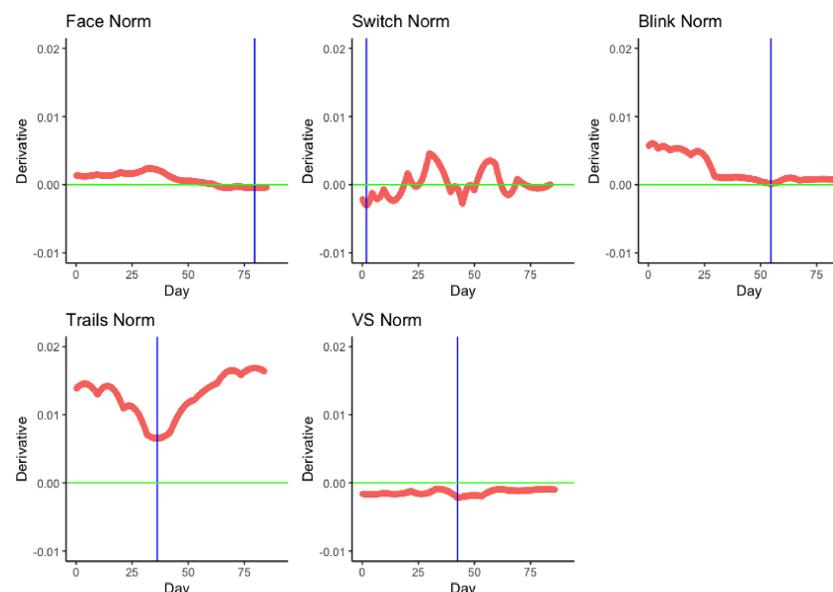


Fig. 3: Worst day of marginal cognitive decline marked with blue vertical line.

Cognitive Performance Over Time

- Data suggests Soldiers were still learning the **Multi-Tasking** test. Future studies must account for this learning effect.
- **Memory** and **Target Identification** tasks see clear decline. Small but noticeable decline in **Spatial Processing**.
- Deployment shows little impact on **Attention** task.
- Fig. 4 shows normalized scores with 1.0 as baseline.

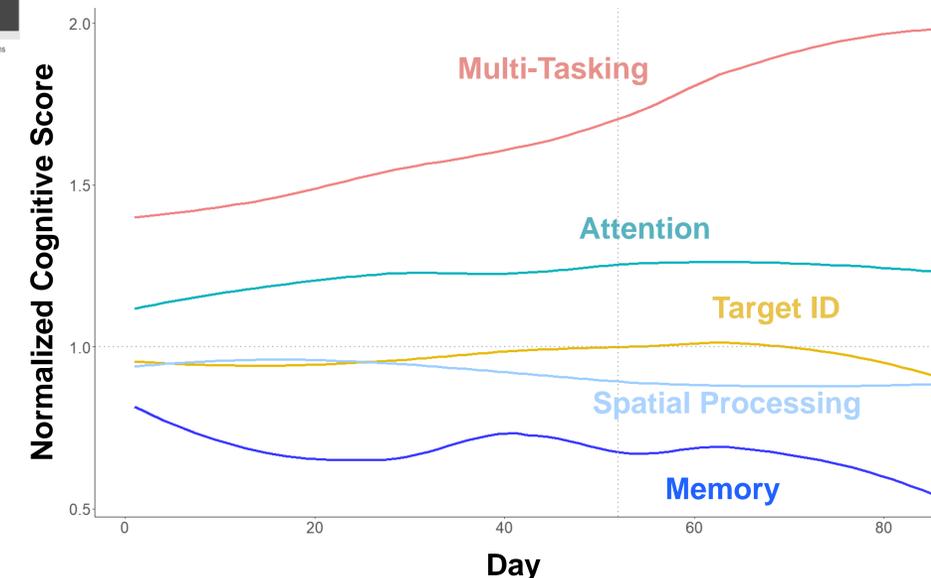


Fig. 4: Cognitive Performance Over Deployment.

Key Takeaways

- Before deployment day 50, most Soldiers experienced a decrease in spatial processing, target identification, and memory.
- High level of variance in daily sleep by subject (indicates irregular sleep patterns).
- 8-hour sleep benchmark is not reached often (19%).
- 56% of subjects experience decreasing sleep pattern through Day 50.
- Gaps in sleep data collected – average collection rate is 71%.