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Introduction

- The psychomotor vigilance task (PVT) is a standard test (PVT_{stand}) measuring the vigilance of an individual to a particular stimulus [1].
- Only a few PVTs are available on mobile devices and usually lack comprehensive validation [2].
- Therefore, an easily available and quick PVT test would facilitate the detection of impaired vigilance in individuals through any touchscreen device.

Aim:

To validate the readily available three-minute PVT (PVT_{SR}) delivered through digital means, more specifically, a mobile application accessible through any touchscreen mobile device.

Methods

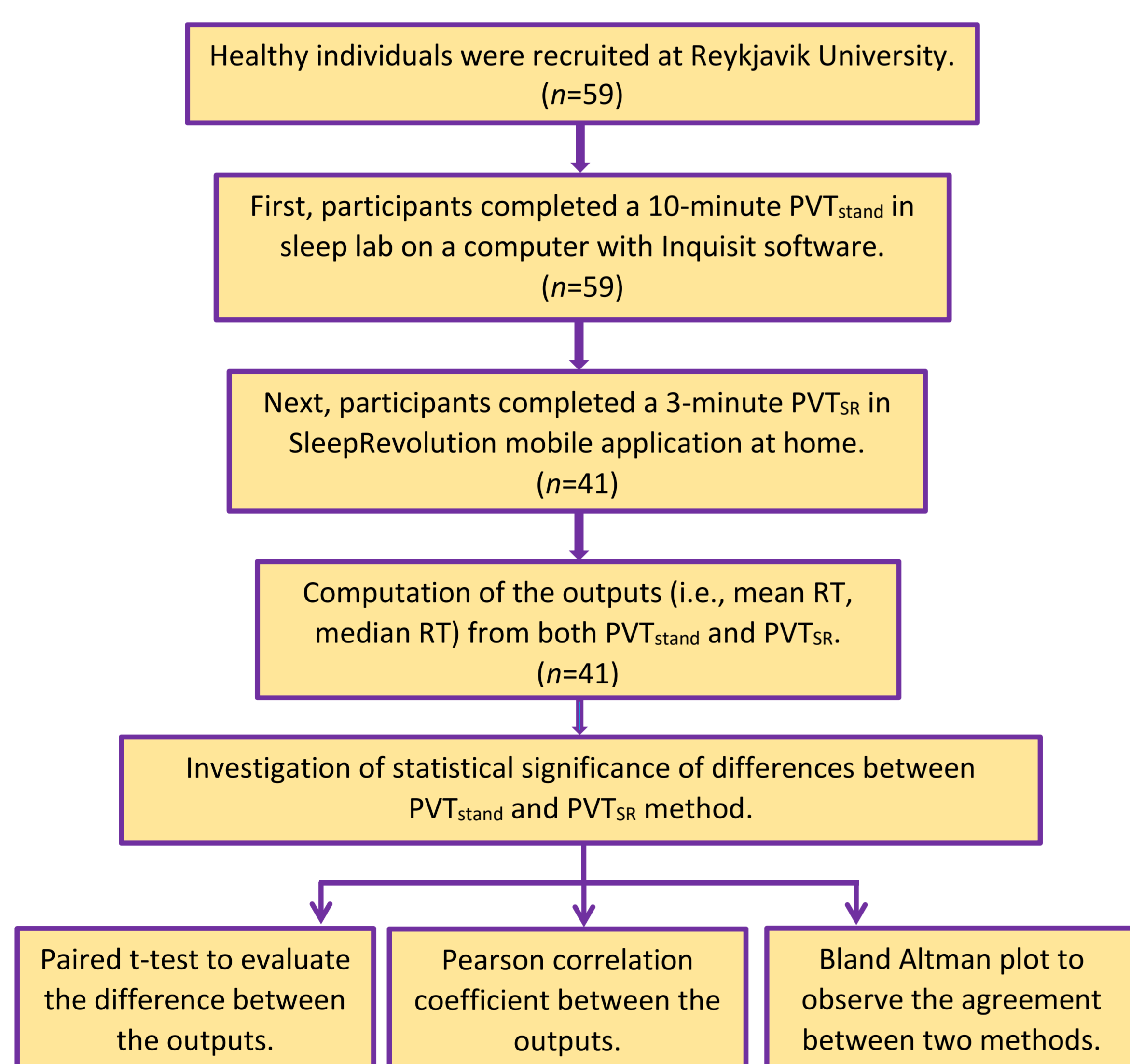


Figure1: Flowchart of the study; RT: reaction time.

Results

Table1: The results from PVT_{stand} and PVT_{SR}

Parameters	PVT _{stand}		PVT _{SR}		Pearson Correlation r [95 % CI]
	median [iqr]	SD	median [iqr]	SD	
Mean RT (ms)	322.07 [296.95-372.36]	92.98	394.86* [346.71-459.63]	188.75	0.96 <0.0001 [0.92-0.98]
Median RT (ms)	314.50 [287.50-358.63]	76.95	383.03* [338.80-453.31]	189.73	0.94 <0.0001 [0.89-0.97]

*The difference of mean and median RT of PVT_{SR} was significantly higher ($p < 0.0001$) compared to PVT_{stand}.

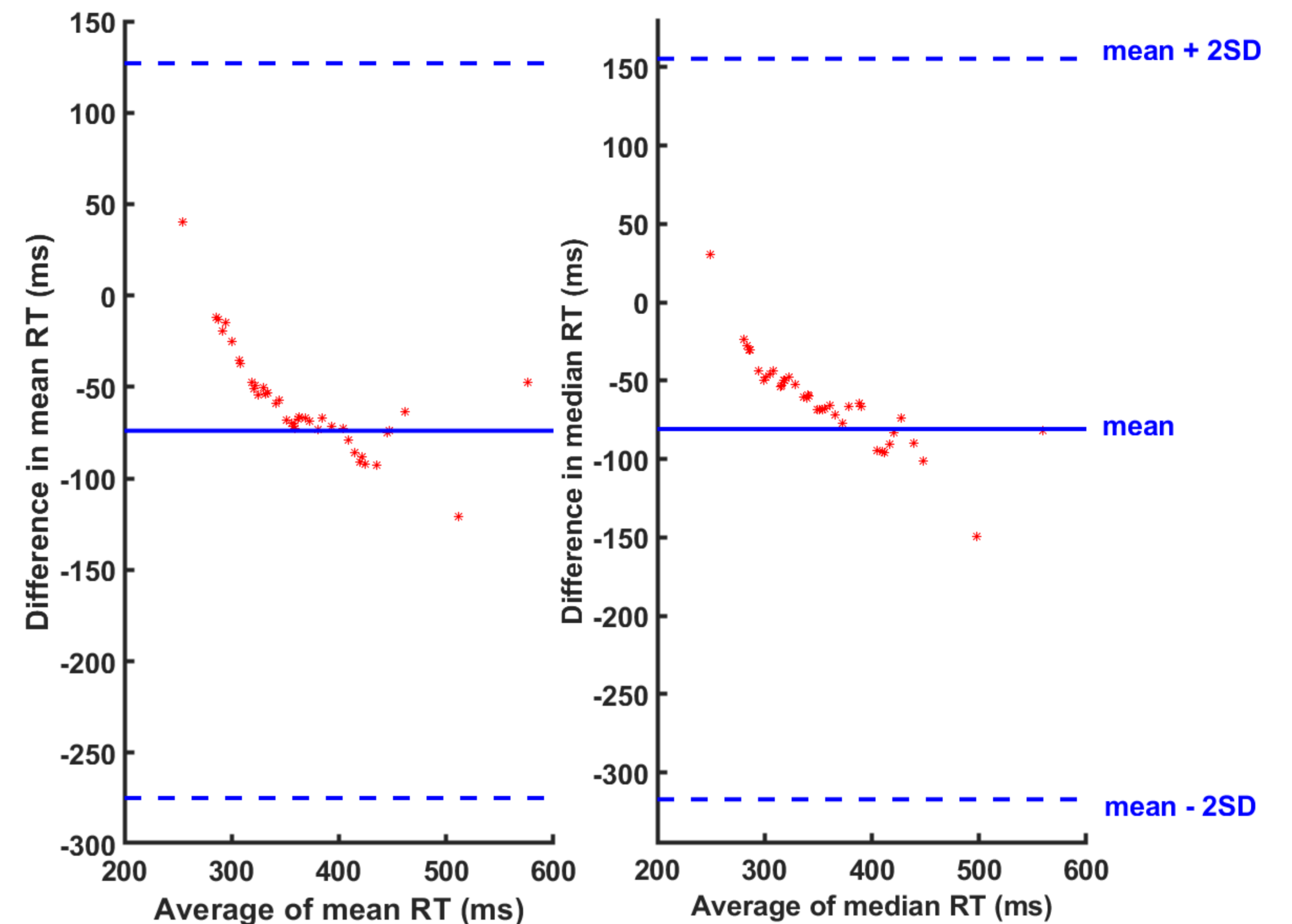


Figure2: Bland Altman plot for both PVT tests.

Conclusion

- The PVT_{SR} had a high correlation to PVT_{stand}.
- The Bland-Altman showed good agreement between the two methods.
- Mean and median RTs determined based on PVT_{SR} were systematically higher than those determined based on PVT_{stand} and this needs to be taken into account when comparing the results to PVT_{stand}.
- This quick three-minute PVT_{SR} could enable at-home long-term follow-up of impaired vigilance.

References

- [1]. Lee, In-Soo, et al. "Number of lapses during the psychomotor vigilance task as an objective measure of fatigue." *Journal of clinical sleep medicine* 6.2 (2010): 163-168.
- [2]. Grandner, Michael A., et al. "Addressing the need for validation of a touchscreen psychomotor vigilance task: important considerations for sleep health research." *Sleep health* 4.5 (2018): 387-389.

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