The Effect of Sleep Deprivation on the Startle Response
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INTRO
- Sleep deprivation has become an endemic in US and around the world1
- Cognitive, motor, and learning abilities are impaired when sleep deprived
- Older adults struggle to learn new and retain new skills2 leading to difficulties in physical therapies after an accident or illness
- Aging coupled with sleep deprivation could significantly diminish the impact of physical therapies
- Recent literature implies motor learning is, in part, mediated by the reticulospinal system3
- The startle reflex, response to a loud auditory que measured by muscle onset latency, is a reliable predictor of the reticulospinal system4
- Using the startle response, we can determine if sleep deprivation correlates to delays in the reticulospinal system identifying factor for impaired learning when deprived of sleep

METHODS
- Recruited 53 young adults (21.2 ± 2.2 years) with no alcohol abuse, hearing loss or sensitivity, mental disorders, or lower limb physical impairments
- 2 experimental sessions: 1 rested(control) & 1 sleep deprived in crossover model
- Electromyography (EMG) data taken from left and right SCM during passive reading task receiving 15 loud acoustic startles (120dB) within 10 minutes per session
- Functional performance assessment (8 tests) administered to determine cognitive skill (3 tests), balance (2 tests), motor ability (2 tests), and reaction time (1 tests)

CONCLUSIONS
- Significant declines observed in 7 of 8 functional performance assessments (p<0.05) indicating subjects were sleep deprived during experimental session
- Left and right SCM onset latencies exhibited no significant differences suggesting this is not an effective metric to predict sleep deprivation
- Reticulospinal system may not be responsible for learning deficits in older adults
- SCM muscle onset amplitude may be a more robust indicator of reticulospinal system when sleep deprived to be explored in future work

Citations:

The sternocleidomastoid (SCM) muscle onset latencies as an index of startle is not an effective indicator of sleep deprivation

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