Language learning comprises two interacting aspects: word learning and regularity learning, and existing evidence suggests that sleep might play a role in offline consolidation of both aspects\(^1\),\(^2\),\(^3\),\(^4\). Specifically, consolidation of linguistic information was shown to be associated with sleep spindles occurring during Sleep stage N2. The number of sleep spindles was found to be associated with declarative aspects of memory\(^1\),\(^5\),\(^6\), and with integration of novel words into the mental lexicon\(^7\). In the current study, adult participants learned a small artificial language: novel words that denote familiar objects, and these words’ plural form. We examined the association of fast sleep spindles occurring during N2 with the consolidation of novel words and the consolidation of a linguistic regularity.

**Sleep analysis**

Fast spindles (12-15Hz) in N2 stage were automatically detected. Due to the pattern of correlations between the electrodes, a Principal Component Analysis was applied.

**Sleep results**

- **Frequent words retention**: was not found to be associated with sleep spindles.
- **Infrequent words retention** during the first night and the following week were positively associated with sleep spindles.
- **The change in memory for morphological inflections during the first night was found to be negatively associated with sleep spindles.**
- **No significant association of sleep spindles with generalisation.**

**Summary**

The results suggest that the temporal dynamics of vocabulary consolidation and regularity learning are different, and that vocabulary and linguistic regularity are associated in a different way with sleep spindles: a positive (marginally significant) association for vocabulary, a negative association for learned inflections, and no significant association with generalisation. Furthermore, higher spindle density on the morning of the first day was associated with better vocabulary retention, in line with prior literature.

**References**