

A non-invasive polysomnographic study on dogs (*Canis familiaris*) during owner-dog co-sleeping

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Recently dogs (*Canis familiaris*) have been demonstrated to be a promising model species for studying human behaviour as they have adapted to the human niche and developed human-like socio-cognitive skills. Research on dog behaviour, however, has so far almost exclusively focused on awake functioning. Here we present a non-invasive polysomnographic technique applied to dogs: scalp EEG, EOG, ECG, EMG and respiratory movements were recorded while subjects (N=14) were sleeping together with their owners for 3 hours during day-time. In order to validate this method, we investigated whether pre-sleep experiences influence brain activity during sleep similarly to humans. Adaptation to the laboratory (1st recording) was followed by two experimental sessions (2nd and 3rd recordings), involving either active (6-8 hours of walking and/or training) vs. passive pre-sleep wakefulness or learning (known actions such as *Sit!* prompted by new commands) vs. control (known actions prompted by known commands) tasks before the sleep recordings.

The design allows the comparison of the macro- and microstructure of sleep in different conditions in order to reveal possible experience-dependent changes in dogs' sleep. Our results validate the family dog as a model species for studying the effect of pre-sleep activities on EEG pattern under natural (non-laboratory) conditions.

Keywords: dog (*Canis familiaris*), non-invasive polysomnography, EEG, memory