

## The effects of wakeful rest on novel word learning in adults and children

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### Abstract

Vocabulary learning is a gradual process, with sleep being one state that is proposed to support the consolidation of newly learned words. Here we will present data from pre-registered experiments that examine developmental differences in the mechanisms that underpin the consolidation of new words. In an initial experiment, we taught participants new words for previously unfamiliar animals and found greater offline benefits for children (aged 9-11 years) than adults after a 1-day delay, with this difference widening one week later. These data align with previous claims that developmental differences in sleep architecture underpin a greater role for consolidation mechanisms in children (e.g., James et al., 2017). Alternatively, children may also benefit more from periods of cognitive “downtime” that sleep provides, during which new words are passively protected from external interference. Indeed, studies comparing a short post-learning period of “wakeful rest” to active wake control conditions showed declarative memory benefits for familiar stimuli in adults (Dewar et al., 2012) and adolescents (Martini et al., 2021). Thus, we examined the effects of a 10-minute wakeful rest (as compared to active wake) on the recall of newly learned words in adults and children aged 9 to 11. Participants learned the orthographic and phonological forms of 16 unfamiliar words paired with pictures of animals in a group setting. Cued recall and picture naming tasks (measuring orthographic word form and word-picture association knowledge) were administered immediately after learning, after a 10-minute retention period and after a 1-week delay. During the retention period, participants either engaged in eyes-closed wakeful rest, with minimised external interference and sensory stimulation, or they completed a series of timed spot-the-difference tasks. Critically, the results will allow us to examine whether a wakeful rest benefit extends to the learning of new words and whether children show an enhanced benefit of wakeful rest when directly compared with adults, shedding light on the underlying mechanisms that contribute to developmental differences in word learning. Furthermore, the results also have the potential to inform educational practice regarding the effectiveness of incorporating short quiet breaks throughout the school day to support learning and consolidation.