ROLE OF DREAM CONTENT IN MEMORY PROCESSING DURING SLEEP: PRELIMINARY SETUP

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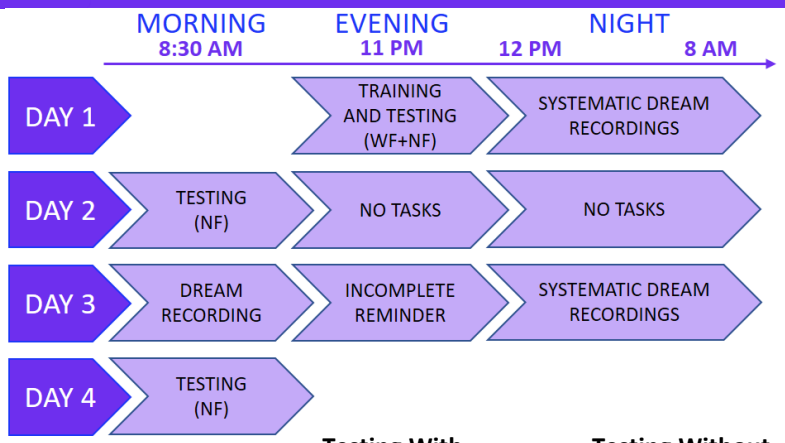
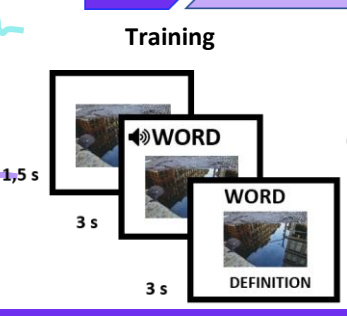
INTRODUCTION

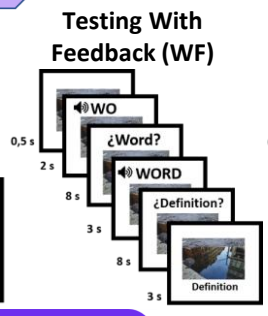
After acquisition memories are in a labile state followed by a period of stabilization known as consolidation[1]. This process is particularly favored by sleep, where the new information is spontaneously reactivated in the hippocampus, transferred and redistributed in neocortical networks facilitating long term consolidation[2]. Also, during sleep, specifically during REM sleep, new memories are integrated into the stored information[3]. From a neuroscientific perspective, dream content is proposed to be a consequence of the memory processes that occur during sleep. Thus, the incorporation of elements about the learned tasks during wakefulness in the content of a dream, can predict the performance of the task after sleep[4,5]. Here, we developed a new paradigm to study whether dream content related to a new word learning task correlates with consolidation of new words and integration into the pre-existed semantic networks.

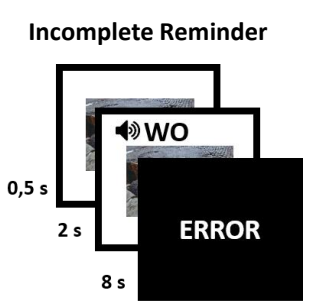
METHODS

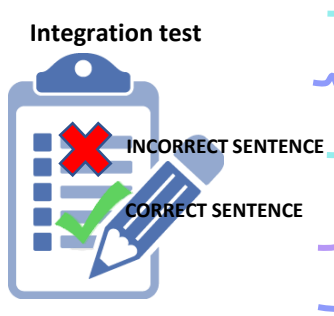


Participants:
Native speakers of Spanish, 24-35 years (N=3).
Stimuli:
20 low-frequency Spanish words (average 0.03 in EsPal), with between 5-8 letters.
20 definitions corresponding to each word.
20 images associated with each word and definition.
160 sentences to evaluate memory integration (40 correct sentences and 40 incorrect sentences using the words with low frequency, and 80 control sentences using words with high frequency).
Systematic Dream Recordings:
4 awakenings every 90 minutes.

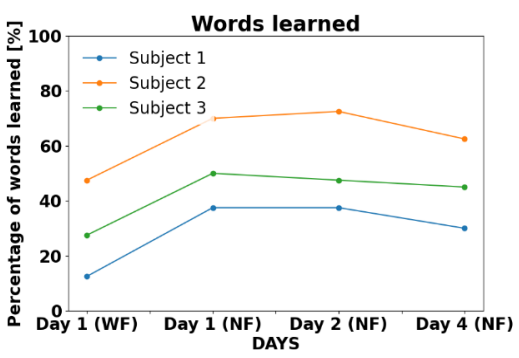


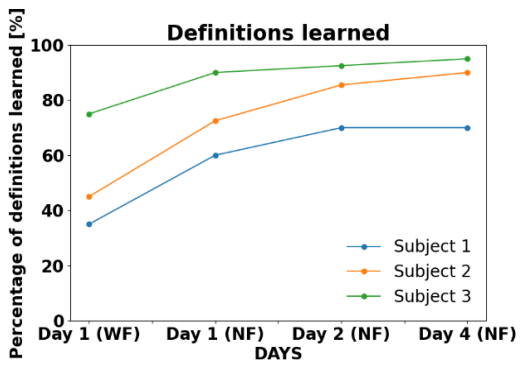






RESULTS and DISCUSSION





Integration test

	Old words	New words	p-value
SUBJ 1	93,8%	81,3%	0,398
SUBJ 2	88,8%	85,0%	0,7991
SUBJ 3	93,8%	83,8%	0,502

Dream content

	Specific content	Details of the experiment	Example
SUBJ 1	1	2	"I dreamed that I was **answering questions**."
SUBJ 2	0	1	"I dreamed that I was filling out **forms**"
SUBJ 3	7	1	"I dreamed that I was on a **spiral staircase** that reaches the ceiling"

The systematic dream recordings, every 90 minutes, did not affect the consolidation process, since an increase in memory was observed for all subjects. However, subjects reach 30-60% of correct responses at training; therefore, it would be desirable to improve the training. Also, there are no significant differences between the integration of old words and the new ones. The subjects dreamed with specific training content and with the experiment itself.

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[1] Dudai Y. (2004). Annual review of psychology. 55. 51-86 **[2]** Rasch B & Born J. (2013). Physiological reviews. 93. 681-766. **[3]** Sterpenich V, Schmidt C, Albouy G, Matarazzo L, Vanhaudenhuyse A, Boveroux P, Degueldre C, Leclercq Y, Balteau E, Collette F, Luxen A, Phillips C, Maquet P. (2014) Sleep. 37(6):1061-75. **[4]** Eichenlaub JB, van Rijn E, Gaskell MG, Lewis PA, Maby E, Malinowski JE, Walker MP, Boy F, Blagrove M. (2018) Soc Cogn Affect Neurosci. 13(6):637-647. **[5]** Schoch SF, Cordi MJ, Schredl M, Rasch B. (2018) J Sleep Res. 28(1):e12754.