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**Raphaël Vallat**

The cerebral correlates of dream recall

**Jury**

Dr. Sophie Schwartz Reviewer

Pr. Michael Schredl Reviewer

Pr. Yves Rossetti Examiner

Dr. Perrine Ruby PhD director

*A mes proches*

*« J’ai rêvé tant et plus, mais je n’y entends note. »*

François Rabelais*, Pantagruel,* 1532

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**Peer-reviewed publications**

**Submitted or under review**

**In preparation**

**\*** The authors contributed equally to this work

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ACKNOWLEDGMENTS

GENERAL INTRODUCTION

1. The dreaming brain

[ Insertion promenade dans le ciel – Granville ]

# Dreams

## Definition and historical perspective

According to the Cambridge Dictionary, a dream is a *“series of events or images that happen in the mind when one is sleeping”*. This vague definition illustrates quite clearly how little we know about dreams, despite more than a century of experimental research and millennia of religious and philosophical speculation on their nature and meanings. The main reason for this lack of a clear and consensual definition is that dreaming is, by nature, elusive, or, to say it in the words of Paul Valery, is *“a phenomenon that we observed only during its absence”* (Paul Valery, *Analecta*, 1926).

Several questions remain pending: do we dream every nights? For how long? Why do we sometimes recall our dreams and sometimes not? Are dream reports accurate and exhaustive transcriptions of the dream experience? What is, or what are, the function(s) of dreaming?

From an historical standpoint, dreams were seen in many ancient civilizations as omens or messages from deities and were interpreted to predict the future.

# Sleep

## Definition

## Sleep stages

## Sleep architecture

## Methodology: EEG and ERP

# Link between dreaming and sleep stages

## The REM sleep hypothesis of dreaming

## The new hypothesis: dreaming occurs in all sleep stages

# Neurophysiological correlates of dreaming

## A scientific deadlock

## Brain activity during REM sleep

## Brain activity in the minutes preceding awakening

## Dreaming and the default mode network

## Methodology; fMRI and functional connectivity

1. Cerebral correlates of dream recall

# Dream recall frequency

## Dreams are elusive

« Le rêve est le phénomène que nous n'observons que pendant son absence. Le verbe rêver n'a presque pas de présent. Je rêve, tu rêves, ce sont figures de rhétoriques car c'est un éveillé qui parle ou un candidat au réveil. »

Paul Valery, Analecta, 1926.

## Inter- and intra-individuals variability in DRF

## Group comparisons of high and low dream recallers

# Parameters correlated with DRF

## Psychological factors

## Physiological parameters

## Sleep parameters

# Brain activity associated with a high or low DRF

## EEG studies

## PET study

## Remaining questions

1. Dream content and dream function

# Dream content

## Methodology: basic principles of dream content analysis

## Experimental results

## The memory sources of dreams

# The function(s) of dreams

## Emotional regulation

## Memory processing

## Others hypotheses

1. Hypothesis and objectives

# Unresolved issues

## Differences between HR and LR at awakening

## Differences in the micro-structure of HR and LR

## What are the memory sources of dreaming?

EXPERIMENTAL RESULTS

METHODOLOGICAL DEVELOPMENT

GENERAL DISCUSSION

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