

Neural Decoding of Visual Imagery During Sleep

Horikawa T, Tamaki M, Miyawaki Y, Kamitani Y.

Visual imagery during sleep has long been a topic of persistent speculation, but its private nature has hampered objective analysis. Here we present a neural decoding approach in which machine-learning models predict the contents of visual imagery during the sleep-onset period, given measured brain activity, by discovering links between human functional magnetic resonance imaging patterns and verbal reports with the assistance of lexical and image databases. Decoding models trained on stimulus-induced brain activity in visual cortical areas showed accurate classification, detection, and identification of contents. Our findings demonstrate that specific visual experience during sleep is represented by brain activity patterns shared by stimulus perception, providing a means to uncover subjective contents of dreaming using objective neural measurement.

Science 3 May 2013:

Vol. 340 no. 6132 pp. 639-642 DOI:10.1126/science.1234330