



## ENRICHING SCIENCE: How do our memories work?

The question of [如何に我々は記憶し : h\_\_\_ we remember] and [何故に我々は忘却するか : w\_\_\_ we forget] is [魅力的な、心を強く捉えるもの(だ) : f\_\_\_c\_\_\_n\_\_\_t\_\_\_o\_\_\_]. [我々のうちの多く(は) : M\_\_\_u\_\_\_] [~の経験を持ったことがある : have h\_\_\_ the e\_p\_\_\_e\_\_\_o\_\_\_] [~を簡単に思い出せること(の経験) : b\_\_\_a\_\_\_t\_\_\_e\_\_\_l\_\_\_r\_\_\_c\_\_\_] [取るに足りない日々の情報(を) : t\_\_\_v\_\_\_e\_\_\_d\_\_\_ information] —like the score of a sports game [何年も前の(試合) : f\_\_\_m\_\_\_ years ago] but not [重要な試験やレポートに我々が必要な事実 : the f\_\_\_s we n\_\_\_ f\_\_\_ an important e\_\_\_ or report]. There is now [~に関する沢山の研究 : a b\_\_\_y of research i\_\_\_] how the brain learns and remembers, and it has [実用的な影響 : p\_\_\_c\_\_\_ i\_p\_\_\_c\_\_\_t\_\_\_s] for all of us.

One reason why the sports result [(試合結果の記憶が) 定着する : s\_\_\_s] is because we [~に積極的に注意を払っていた : were a\_t\_v\_l\_p\_\_\_ing a\_\_\_t\_\_\_t\_\_\_], and interested in, the result. [勉強の場合 : I\_\_\_ the c\_\_\_o\_\_\_a\_\_\_d\_\_\_c study], [注意を払うこと(は) : p\_\_\_ing a\_\_\_t\_\_\_] [~を要する : r\_q\_\_\_s] [ただ聞いて読むだけ以上のこと(を) : m\_\_\_t\_\_\_j\_\_\_ listening and reading]. It means [新情報を私たちが既に知っている物事と関連付けようとする(を) : t\_\_\_ing t\_r\_l\_\_\_ the new information \_\_\_ things we already know]. For example, if you learn that [亀 : t\_\_\_t\_\_\_s] are a kind of [爬虫類 : r\_\_\_t\_\_\_], you can [これを、他の爬虫類の生物種に関して君が知る事実に、結びつける : l\_\_\_t\_\_\_ f\_\_\_s you know about o\_\_\_r\_\_\_t\_\_\_s\_\_\_c\_\_\_], like crocodilesクロコダイル and snakes. [これをすること(は) : D\_\_\_t\_\_\_] [...であることを君が予測することを可能にする : a\_\_\_s you \_\_\_ p\_\_\_d\_\_\_ that] turtles will also be [冷血(動物)である : c\_\_\_-b\_\_\_d\_\_\_], which they are.

However, even if we [本当に~に注意を払う(動詞強調) : \_\_\_ p\_\_\_ a\_\_\_t\_\_\_n t\_\_\_] and think about new information, we can [それでも : s\_\_\_] quickly forget it. In fact, after just a few days, we will [典型的に : t\_p\_c\_\_\_l\_\_\_] forget [最大70%まで(を) : \_\_\_ t\_\_\_ 70%] of any new material we study. This [現象 : p\_\_\_n\_m\_n\_\_\_] is shown on the Ebbinghaus<sup>エビングハウス</sup> [忘却曲線 : forgetting c\_\_\_], [~にちなんで名付けられた : n\_\_\_ a\_\_\_] the German scientist who first [~を述べる、説明する : d\_\_\_c\_\_\_d] it in 1885.

[幸運にも : F\_\_\_n\_\_\_l\_\_\_], we [~と戦うことができる、抗うことができる : can f\_\_\_a\_\_\_t\_\_\_] the forgetting curve. [最近学ばれた情報に関して私達自身に小テストすること(は) : Q\_\_\_z\_\_\_i\_\_\_ o\_\_\_s\_\_\_ o\_\_\_r\_\_\_l\_\_\_l\_\_\_n\_\_\_ information] is [よく研究されている技術(複合分詞) : a w\_\_\_-r\_s\_\_\_h\_\_\_t\_\_\_n\_\_\_] for moving information from [短期 : s\_\_\_-t\_\_\_] to [長期記憶 : l\_\_\_-t\_\_\_ memory]. Because [我々の記憶から、以前に学ばれた事実や数値を、思い出すことは、多くの精神的労力を要する(形式主語) : \_\_\_ r\_\_\_r\_s a lot of m\_\_\_t\_\_\_e\_\_\_t\_\_\_r\_c\_\_\_p\_\_\_v\_\_\_s\_\_\_l\_\_\_n\_\_\_f\_\_\_s and f\_g\_\_\_s f\_\_\_our memories], many people [自己テストよりも、ノートを再読することを、より好む : p\_\_\_f\_\_\_ re-r\_\_\_ing n\_\_\_s o\_\_\_s\_\_\_-q\_\_\_ing]. [ノートを再読すること(は) : Re-r\_\_\_ing] [それが助けになるように、感じる : f\_\_\_s l\_\_\_ it's h\_\_\_f\_\_\_]. However, [証拠 : the e\_\_\_d\_\_\_] from [様々な : v\_\_\_t\_\_\_] research studies is [自己テスト(の方)が、(君が)覚えるのを、より助けること(である) : t\_\_\_ s\_\_\_-q\_\_\_ing h\_\_\_s you r\_\_\_m\_\_\_]. [...のようである(形式主語) : \_\_\_ s\_\_\_s t\_\_\_] [情報を覚えようとする労力(こそが) : the e\_\_\_t o t\_\_\_i\_\_\_ remember the information] is [それ(記憶情報)が我々の記憶の中によりよく定着するのを助けるものである : w\_\_\_ h\_\_\_s it s\_\_\_k in our memories b\_\_\_r].

There are [たくさんので : n\_\_\_\_\_ ] techniques you can use for self-quizzing. You can [ただ~するだけ : s\_\_\_\_\_ ] close your book and ask yourself, "What do I remember about this topic?" If asking yourself questions [奇妙に感じる : f\_\_\_\_\_ s o\_\_\_\_\_ ], you could [君のノートを友達か家族の人に手渡す : h\_\_\_\_\_ your study notes \_\_\_\_\_ a friend or family m\_\_\_\_\_ b\_\_\_\_\_ ] and [彼らに、あなたに質問を尋ねるように、してもらう (使役) : g\_\_\_\_\_ them \_\_\_\_\_ a\_\_\_\_\_ you questions] . [君が学んだことを他の誰かに説明すること (は) : E\_\_\_\_\_ n\_\_\_\_\_ w\_\_\_\_\_ you have l\_\_\_\_\_ ed t\_\_\_\_\_ s\_\_\_\_\_ o\_\_\_\_\_ e\_\_\_\_\_ ] also [君が~に気づくことを助ける (原形不定詞) : h\_\_\_\_\_ s you n\_\_\_\_\_ c\_\_\_\_\_ ] [君自身が理解しているか、またはまだ確信していないこと (を) : w\_\_\_\_\_ you y\_\_\_\_\_ s\_\_\_\_\_ understand o\_\_\_\_\_ a\_\_\_\_\_ not y\_\_\_\_\_ s\_\_\_\_\_ a\_\_\_\_\_ t\_\_\_\_\_ ] .

We also need to think about [いつ復習したらいいか (を) : w\_\_\_\_\_ r\_\_\_\_\_ v\_\_\_\_\_ ] . We [~を忘れ始める : s\_\_\_\_\_ f\_\_\_\_\_ t\_\_\_\_\_ ] new information very quickly, so our first review should happen very soon after [我々が懸命に思い出そうとする必要があると、我々が思う、何かを学んだこと (のすぐ後で) : learning s\_\_\_\_\_ t\_\_\_\_\_ w\_\_\_\_\_ t\_\_\_\_\_ w\_\_\_\_\_ n\_\_\_\_\_ t\_\_\_\_\_ h\_\_\_\_\_ t\_\_\_\_\_ remember] . [それに続いて : F\_\_\_\_\_ t\_\_\_\_\_ ] , [一週間後のさらなる復習 : a f\_\_\_\_\_ t\_\_\_\_\_ r\_\_\_\_\_ v\_\_\_\_\_ after a week] , and [それから1ヶ月 (後の復習) : t\_\_\_\_\_ a m\_\_\_\_\_ t\_\_\_\_\_ ] will [その情報を長期記憶へと移動するのを助ける (原形不定詞) : h\_\_\_\_\_ m\_\_\_\_\_ the information i\_\_\_\_\_ l\_\_\_\_\_ -t\_\_\_\_\_ memory] .

Sometimes, [どれほど懸命に我々が試みようとも (複合関係詞譲歩) : h\_\_\_\_\_ h\_\_\_\_\_ we t\_\_\_\_\_ ] , we find that [私達が覚えないこと (が) : t\_\_\_\_\_ s we want to r\_\_\_\_\_ ] [ただ (≒全く) 定着しないようである : j\_\_\_\_\_ don't s\_\_\_\_\_ s\_\_\_\_\_ ] . This is [記憶の手がかりが助けになりうるところ (です) (先行詞省略) : w\_\_\_\_\_ memory c\_\_\_\_\_ s can h\_\_\_\_\_ ] . One [よく知られた例 (複合分詞) : w\_\_\_\_\_ -k\_\_\_\_\_ e\_\_\_\_\_ ] of a memory cue is the mnemonic=モニック、記憶補助, a tool that helps you remember [複雑な情報 (を) : c\_\_\_\_\_ p\_\_\_\_\_ information] [それをより記憶しやすい何かに結びつけることにより : b\_\_\_\_\_ l\_\_\_\_\_ it t\_\_\_\_\_ something more m\_\_\_\_\_ r\_\_\_\_\_ l\_\_\_\_\_ ] : such as a pattern of [文字 : l\_\_\_\_\_ s] , [語句 (熟語) : a p\_\_\_\_\_ s\_\_\_\_\_ ] or even a short song.

Mnemonics need to be [記憶しやすい : m\_\_\_\_\_ m\_\_\_\_\_ r\_\_\_\_\_ l\_\_\_\_\_ ] [それら自体において : i\_\_\_\_\_ t\_\_\_\_\_ s\_\_\_\_\_ ] , so it is a good idea to create a mnemonic which is [君にとって個人的な (記憶補助) : p\_\_\_\_\_ n\_\_\_\_\_ t\_\_\_\_\_ you] , or [面白いまたは普通じゃない心象を含む (記憶補助) : w\_\_\_\_\_ c\_\_\_\_\_ t\_\_\_\_\_ s f\_\_\_\_\_ y or u\_\_\_\_\_ u\_\_\_\_\_ l i\_\_\_\_\_ r\_\_\_\_\_ ] . For example, one of [最も頻繁に綴り間違われる単語 : the m\_\_\_\_\_ c\_\_\_\_\_ n\_\_\_\_\_ m\_\_\_\_\_ s\_\_\_\_\_ l\_\_\_\_\_ d words] in English is "embarrass," which is [油断のならない : t\_\_\_\_\_ k\_\_\_\_\_ ] [~が原因で : b\_\_\_\_\_ c\_\_\_\_\_ ] the two 'r's and two 's's. A mnemonic to remember this might be, "Really Red, [愚かなソーセージ : S\_\_\_\_\_ y S\_\_\_\_\_ s\_\_\_\_\_ g\_\_\_\_\_ ] ." [語句 (熟語) : The p\_\_\_\_\_ s\_\_\_\_\_ ] "Really Red" [~を指し示す : r\_\_\_\_\_ s\_\_\_\_\_ t\_\_\_\_\_ ] [君の頬がなるかもしれない色 (SV C) : the c\_\_\_\_\_ your c\_\_\_\_\_ s m\_\_\_\_\_ g\_\_\_\_\_ ] if you [恥ずかしく感じた時に : feel e\_\_\_\_\_ b\_\_\_\_\_ r\_\_\_\_\_ s\_\_\_\_\_ ] and " [愚かなソーセージ : S\_\_\_\_\_ y S\_\_\_\_\_ s\_\_\_\_\_ g\_\_\_\_\_ ] " is [愛情のこもった用語 : an a\_\_\_\_\_ t\_\_\_\_\_ n\_\_\_\_\_ t\_\_\_\_\_ ] for [恥ずかしい間違いをしてしまった誰か : s\_\_\_\_\_ o\_\_\_\_\_ w\_\_\_\_\_ has m\_\_\_\_\_ an e\_\_\_\_\_ b\_\_\_\_\_ r\_\_\_\_\_ i\_\_\_\_\_ mistake] .

In this [記事 : a\_\_\_\_\_ c\_\_\_\_\_ ] , we have seen [いかにして君が~を覚えることができるか (を) : h\_\_\_\_\_ you c\_\_\_\_\_ remember] [君が学習している教材 (を) : the m\_\_\_\_\_ r\_\_\_\_\_ you are studying] [より効果的に : more e\_\_\_\_\_ t\_\_\_\_\_ v\_\_\_\_\_ ] . First, [新しい情報を君が既に知っている物事に関係付けること (が) : r\_\_\_\_\_ ing new information t\_\_\_\_\_ things you a\_\_\_\_\_ r\_\_\_\_\_ d\_\_\_\_\_ know] is [必須だ : e\_\_\_\_\_ t\_\_\_\_\_ ] for creating memories. [いったん何か新しいものを学んだら (従属接続詞) : O\_\_\_\_\_ you learn something new] , it's important to [それをためにしに思い出してみる : t\_\_\_\_\_ r\_\_\_\_\_ c\_\_\_\_\_ i\_\_\_\_\_ it] , [これが記憶を強めるので : \_\_\_\_\_ this s\_\_\_\_\_ r\_\_\_\_\_ t\_\_\_\_\_ e\_\_\_\_\_ s the memory] . However, forgetting is [普通だ : n\_\_\_\_\_ m\_\_\_\_\_ ] , so [絶望するな : don't d\_\_\_\_\_ p\_\_\_\_\_ ] [これが起きる時に : w\_\_\_\_\_ t\_\_\_\_\_ h\_\_\_\_\_ s\_\_\_\_\_ ] . [最後に : F\_\_\_\_\_ l\_\_\_\_\_ ] , you can [忘却と戦う : c\_\_\_\_\_ forgetting] [定期的復習を通して : t\_\_\_\_\_ r\_\_\_\_\_ p\_\_\_\_\_ d\_\_\_\_\_ r\_\_\_\_\_ v\_\_\_\_\_ ] , and you can use mnemonics or other memory cues for things that just won't stick. In the next article in this series, we will look at [いかに、様々な睡眠パターンが君の記憶に影響を与えうるか (を) : h\_\_\_\_\_ d\_\_\_\_\_ f\_\_\_\_\_ r\_\_\_\_\_ t\_\_\_\_\_ s\_\_\_\_\_ p\_\_\_\_\_ p\_\_\_\_\_ t\_\_\_\_\_ s\_\_\_\_\_ can a\_\_\_\_\_ t\_\_\_\_\_ your memory] .