

# Relearning process not always a 'free lunch'

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Researchers at Sheffield University and the University of St. Andrews, United Kingdom, have helped determine why relearning a few pieces of information may or may not easily cause a recollection of other associated, previously learned information. The key, they find, is in the way in which the learned information is forgotten. Details are published August 22nd in the open-access journal *PLoS Computational Biology*.

When one learns a language and then doesn't use it, one may find that relearning a few words will trigger many others to come back and be relearned. The same happens with other skills that involve mental associations. The authors term this phenomenon "free-lunch learning." Previous work has shown that "free-lunch learning" occurs both in humans and in artificial neural networks.

In this study, co-authors Jim Stone and Peter Jupp created a mathematical model to show the opposite effect, called "negative free-lunch learning." These are cases in which relearning parts of forgotten associations decreases the recall of the remaining parts. The authors find that the difference between free-lunch learning and negative free-lunch learning is due to the particular method used to induce forgetting.

If forgetting is induced by random fluctuations in the strength of synaptic connections, then free-lunch learning will be observed. However, the authors show here that if forgetting is induced by directional decay in synaptic connectivity, then negative free-lunch learning occurs.

This suggests that evolution may have selected physiological mechanisms that involve forgetting using a form of synaptic drift, as in humans we typically observe free-lunch learning.

Source: Public Library of Science

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