

Thinking and using an Internet search engine might seem to be two very different activities. But a study suggests they draw on similar principles. When you type words into the popular Google search engine, it returns a list of web pages containing those words. The list is not ordered any old way: it's ordered based on how important Google deems the pages to be. Google measures a page's importance using a formula based on popularity. It takes into account how many other pages link to that page; how many others, in turn, link to those; and so on.

(Courtesy Google Inc.)

Now, psychologists have found that our brains return results in much the same way when given a simple task, such as to think of a list of words that start with A. Thomas Griffiths of the University of California, Berkeley, and colleagues ranked the importance of over 5,000 words using the same basic Google formula, called PageRank. But instead of Internet links, the researchers tallied between words as reflected in answers given in word-association games by people participating in previous studies. The investigators found that a word's PageRank was a good predictor of how often it would show up when people were asked to think of words that start with A, with B, and so on. When it came to predicting these results, PageRank beat two other seemingly reasonable ranking systems: tallies of how often words show up in ordinary writing; and a simple count of direct links to a word that doesn't consider how many words, in turn, link to those linking words. In the PageRank formula, a page gains importance based on how many other pages link to it. But links from pages that are themselves important confer more importance than those that aren't. Thus, importance can be thought of as flowing through the Web's link network toward the most highly linked-in sites. One explanation for the new findings, wrote Griffiths and colleagues, could be that connections among brain cells work similarly to Web links. Cells that are targets of many connections might become more active than others, in the same way that highly linked-in web sites are deemed more important. Our approach indicates how one can obtain novel models of human memory by studying the properties of successful information-retrieval systems, such as Internet search engines, the group wrote in the study, published in this month's issue of the research journal *Psychological Science*. The study also suggests brain science might help design better search engines and data-retrieval systems, they added. "These problems are being explored in computer science," they wrote, but "one might be equally likely to find good solutions by studying the mind."