

Brain capacity limits exponential online data growth

February 1 2012

Scientists have found that the capacity of the human brain to process and record information - and not economic constraints - may constitute the dominant limiting factor for the overall growth of globally stored information. These findings have just been published in an article in *EPJ B* by Claudius Gros and colleagues from the Institute for Theoretical Physics at Goethe University Frankfurt in Germany.

The authors first looked at the distribution of 633 public internet files by plotting the number of videos, audio and image files against the size of the files. They gathered files which were produced by humans or intended for human use with the spider file search engine Findfiles.net. They chose to focus on files which are hosted on domains pointing from the [online encyclopaedia](#) Wikipedia and the [open web](#) directory dmoz.

Assuming that [economic costs](#) for data production are proportional to the amount of data produced, these costs should be driving the generation of information exponentially. However, the authors found that, in fact, economic costs were not the limiting factors for data production. The absence of exponential tails for the graph representing the number of files indicates this conclusion.

They found that underlying neurophysiological processes influence the brain's ability to handle information. For example, when a person produces an image and attributes a subjective value to it, for example, a given resolution, he or she is influenced by his or her perception of the quality of that image. Their perception of the amount of information

gained when increasing the resolution of a low-quality image is substantially higher than when increasing the resolution of a high-quality photo by the same degree. This relation is known as the Weber-Fechner law.

The authors observed that file-size distributions obey this Weber-Fechner law. This means that the total amount of information cannot grow faster than our ability to digest or handle it.

More information: Gros C., Kaczor G., Marković D., (2012) Neuropsychological constraints to human data production on a global scale, *European Physical Journal B (EPJ B)* 85: 28, [DOI 10.1140/epjb/e2011-20581-3](https://doi.org/10.1140/epjb/e2011-20581-3)

Provided by Springer

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