

# How much information is too much information?

February 15 2005

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Has anyone ever told you during a conversation: “Stop, that’s too much information?” Well University of Queensland psychologists have discovered just how much too much information actually is.

Emeritus Professor Graeme Halford and his colleagues from UQ’s School of Psychology have discovered most humans cannot represent relations between more than four variables.

Their study, *How Many Variables Can Humans Process?*, pushed a group of 30 academics to their mental limits.

Participants were given incomplete descriptions of interactions between variables, with an accompanying set of bar graphs representing the interactions. They were then required to complete the descriptions so that they correctly described the graphs.

“At the level of the four-way interactions, participants made comments such as “Everything fell apart and I had to go back”,” Professor Halford said.

“Only chance levels of performance were obtained for five-way interactions.”

The results have implications for the design of high-stress work environments such as the coordination of fire-fighting operations.

“If the number of variables to be considered exceeds human processing

capacity then the worker will drop his or her mental bundle and become unable to proceed,” Professor Halford said.

“More seriously, the worker may revert to a simplified version of the task that does not take all aspects into account and therefore may make the wrong decision.

“This type of problem is particularly acute in tasks that have to be performed under time pressure or where unusual combinations of circumstances are likely to arise.

“Modern high-technology industries produce many situations of this kind because of the number of variables that have to be taken into account in decision making.”

Professor Halford’s team included Dr Rosemary Baker and Dr Julie McCredden from UQ’s School of Psychology and Professor John D Bain from Griffith University.

Their results showed that as the complexity of the interaction increased, performance and confidence levels dropped significantly.

“While all levels of complexity are logically possible, the evidence suggests that they are not cognitively manageable,” Professor Halford said.

Professor Halford said complex ideas were conceptual structures built in the temporary working area of the mind called the working memory. His findings are the outcome of a decade of research, investigating tasks that push cognitive processing to the limits.

“Four way interactions require humans to represent relations between relations between relations between pairs of bars; which can be reframed

mathematically as a four-dimensional task,” he said.

“We found that four dimensions are the most that humans can conceive of.

“Therefore, if the world was five-dimensional, rather than three, we would not be able to understand it.”

Source: The University of Queensland

Citation: How much information is too much information? (2005, February 15) retrieved 15 August 2024 from <https://phys.org/news/2005-02-how-much-information-is-too.html>

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