



Known knowns, known unknowns, unknown unknowns and the propagation of scientific enquiry

David C. Logan

Journal of Experimental Botany, Volume 60, Issue 3, March 2009, Pages 712–714, <https://doi.org/10.1093/jxb/erp043>

Published:

01 March 2009

Issue Section:

[eXtra Botany](#)

In February 2002, Donald Rumsfeld, the then US Secretary of State for Defence, stated at a Defence Department briefing: ‘There are known knowns. There are things we know that we know. There are known unknowns. That is to say, there are things that we now know we don't know. But there are also unknown unknowns. There are things we do not know we don't know.’ As a result, he was almost universally lampooned since many people initially thought the statement was nonsense. However, careful examination of the statement reveals that it does make sense, indeed the concept of the unknown unknown existed long before Donald Rumsfeld gave it a new audience.

Much scientific research is based on investigating known unknowns. In other words, scientists develop a hypothesis to be tested, and then in an ideal situation experiments are best designed to test the null hypothesis. At the outset the researcher does not know whether or not the results will support the null hypothesis. However, it is common for the researcher to believe that the result that will be obtained will be within a range of known possibilities. Occasionally, however, the result is completely unexpected—it was an unknown unknown.

Extracted from: <https://academic.oup.com/jxb/article/60/3/712/453685>