

Are naïve and scientific theories accessed by reasoning processes sequentially or in parallel?

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Summary

An important goal of science education is to help people replace their intuitive theories of the world with scientific ones. However, recent findings suggest that rather than replacing intuitive theories, scientific theories about a variety of domains such as astronomy, evolution and fractions co-exist with intuitive understanding. Here, we will consider whether intuitive theories about science become accessible to reasoning processes before knowledge in scientific theories is available, or at the same time. Using a mouse tracking paradigm [1, 2], we asked participants to answer 200 questions about 10 domains of knowledge. In a fully factorial design, we varied whether the answer to each of these questions was true or false under intuitive and scientific theories of each domain. Thus, we were able to compare answers supported by both types of theory to those supported by the scientific or intuitive theory alone. Reaction times showed that participants were slower to answer when intuitive and scientific theories suggested different answers. Analysis of mouse cursor movements showed that intuitive theories did not influence responding any earlier than did scientific theories. Thus, whilst reasoning processes are impaired when intuitive and scientific theories are in conflict, those processes appear to access intuitive scientific beliefs and scientific knowledge in parallel rather than in sequence.

Keywords: Scientific Reasoning, Knowledge Activation, Mouse Tracking.

References

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