Intelligence and consciousness from a clinical neuropsychological perspective

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Abstract

In this talk, the development of intelligence as a concept of psychometric measurement is discussed in relation to animal-, human- and artificial intelligence (AI). Intelligence measurement in psychology has evolved from the concept of mental age to five factors contributing to a total intelligence quotient (IQ), of which the fluid intelligence functions show the most overlap with the total score. Understandings about the components of IQ have developed in parallel with technological advances like computerized factor analysis. There appears to be some between neuroscientific theories of intelligence and consciousness like the pareto frontal integration theory and the global workspace theories. Animals show IQ and this relates to brain size and certain types of conscious experience like self-awareness. Chimpanzees pass some tests of self-awareness and have been reported to show comparable IQ scores to human toddlers ages 2-3 years, roughly the time when self-awareness develops in humans. Abstraction and reasoning skills emerge in late childhood, and intellectual disabilities are associated with reduced ability to perform these functions. Therefore, certain aspects of consciousness could be associated with IQ. Language models and AI vastly outperform humans on four of the five factors contributing to IQ but show lower performance on fluid reasoning. The way AI solves IQ tests also differs from humans and other animals. Does this limit the ability of AI to develop consciousness? The evolutionary roots of both IQ and consciousness could limit the capacities of machines to develop these abilities. However, much progress has been made in the field of AI-based task performance and the incremental progress in developing software and hardware makes AI performance on IQ tests for humans an interesting and dynamic topic for future research. A certain level of fluid reasoning skills could be necessary for general AI.

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