Going ape over virtual reality: Foraging cognition in the human primate

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The evolution of large primate brains

Large brains are thought to have evolved in primates due to the requirements of foraging on perishable resources in the forest canopy. Today, observational studies suggest that chimpanzees show high level cognitive skills when foraging. Chimpanzees appear to direct their searches towards trees that are most likely to be yielding fruit, which suggests that chimpanzees learn which tree species are fruiting and when,and that they either acquire mental representations of tree locations in their environment or rely on environmental cues to guide them.

The virtual reality task

Participants searched for apples within virtual arrays of coloured poles, representing different trees, which yielded apples according to different temporal patterns across the trials. This simulated the ripening of fruit in the forest canopy. Two colours, or 'species', were rewarded in any given trial.

Efficient foraging is a combination of cognitive skills

Our findings show that humans display a proficiency in long term memory, working memory, and prospective memory during foraging. As such, humans quickly learn which locations do not yield fruit, make few revisits to locations already depleted, and spontaneously become more efficient at directing their searches to locations that were fruiting across the trials. Humans appear to implicitly acquire spatial information during foraging, despite the salience of visual cues, supporting the idea of a cognitive map.

Implications for human and non-human primate cognition

These findings show that evolutionarily-relevant foraging tasks are a useful way to help characterise the skills deployed during search. These experiments with humans suggest it is feasible that chimpanzees may also possess these skills, and that they may have first been acquired by a common ancestor of chimpanzees and humans who foraged on ephemeral resources. This has important implications for our understanding of the cognitive bases of primate foraging and the evolutionary origins of human intelligence.

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