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GREAT APES FACING GRAVITY: WHAT IS SO DIFFICULT ABOUT THE VERTICAL TUBES TASK?

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Previous studies have shown that when presented with a task where an object is dropped into one of several crossed opaque tubes placed vertically, 2 year-old children, monkeys, chimpanzees and dogs tend to search in the container just below the releasing point rather than in the container actually attached to the tube: this has been termed the *gravity bias*. However, there have been contradicting results and different variables have been proposed to explain performance in this task. We tested 20 chimpanzees using various versions of the tubes task, always involving two vertical crossed tubes, with the aim to explore the roles of causality, predictiveness and apes' understanding of invisible displacements. In the original task (retrospective task) the chimpanzees performed randomly or were gravity biased independently of the tubes being real (causal condition) or just flat plastic pieces (arbitrary condition). They performed better when they had to choose before the food was dropped (predictive task) and in this case the task was solved independently of the tubes being opaque (opaque condition) or transparent (clear condition). Our results show that chimpanzees can solve the predictive tubes task, although we found individual variability, with some subjects solving it after just a few trials and others not overcoming a gravity bias after several sessions. We suggest that attentional problems could be hindering the performance in the retrospective task. Finally, invisible displacements did not seem to play a key role. All research reported here adhered the German laws regarding animal holding and testing (German "Tierschutzgesetz").

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