Do children search for multiple solutions to a physical problem?

Work on children's problem solving in physical cognition tasks (e.g. bending a hook to retrieve a bucket from a tube) tends to focus either on their difficulties innovating novel solutions (e.g. Beck et al., 2011) or their competence copying others (Nielsen & Blank, 2011). But one element of innovative problem solving that has not yet been explored is whether children are satisfied with a single solution or if they are curious to explore other possible solutions. This tension between exploiting a solution that has already been found and exploring for new solutions is address by Gopnik (2020). Although much evidence suggests that younger human children may explore more widely than adults (Liquin & Gopnik, 2022), some supports an alternative that children tend to stick with an early solution, even if it is far from optimal (Cutting et al., 2019).

Following a fruitful tradition in developmental and comparative psychology, we borrowed a task devised for non-human animals. The Multi-Access Box (Auersperg et al., 2011) contains a reward which can be obtained using several different techniques (using a stick to push off a plinth, dropping a ball to dislodge it, pulling a string positioned beneath it, for example). In the first stage of our study, children (N = 42, 4–8-year-olds), tested individually, were free to use any technique to retrieve the reward. Once it had been retrieved, the child was given the reward and the experimental apparatus was reset. 71% of 4- to 8-year-olds used just one technique consistently for 8 trials, i.e. having found one solution they stuck with it. In contrast, 29% used a mix of techniques, ranging from 2 to 5 different techniques. In a second stage, once children used a technique it was then blocked from them. Given 3 more attempts, only 3 younger children (4-6) failed to find any further solutions. Younger children found a further 2.5 techniques and older children found 2.7. We will discuss children's motivation to identify multiple solutions and the potential impacts of individual differences and context. We will discuss the developmental trajectory of curiosity in problem solving, including how children's behaviour compares to that of adults' and how it compares to other measures of divergent thinking or creativity. Overall, we hope to make a case for why problem solving needs to consider curiosity.