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Bobrowicz, Katarzyna; Osvath, Mathias

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Cylinder size affects cat performance in the motor self-regulation task

Katarzyna Bobrowicz[1,2] and Mathias Osvath[2]
[1]University of Warsaw, Faculty of Psychology, Stawki 5/7, 00-183 Warszawa, Poland,
[2]Lund University, Department of Philosophy, Helgonavägen 3, 22100 Lund, Sweden;
katarzyna.bobrowicz@lucs.lu.se

We tested domestic cats in the so-called cylinder task, and found that they perform better if the cylinder is larger. We also found that their highest performance parallels that of great apes and corvids, which are known as the best performing animals on this task. The cylinder task is used to test animals' motor self-regulation: the inhibition of unproductive, but prepotent, movements in favour of productive movements that require a slight detour. Recently a large-scale study tested 36 species on this task and found that absolute brain size correlate with the performance; with great apes as top performers. Another study showed that corvids perform as good as great apes despite having smaller absolute brain size. We questioned whether average brained animals has as poor motor self-regulation as suggested, as it appears highly maladaptive; instead the results could be a reflection of the sensorimotor set-up of different species in relation to the materials used. No cats has yet been tested on the task. As ambush and sneak hunters, cats would arguably have high levels of motor self-regulation, but on the other hand their brain size and neuronal numbers are not above average in mammals. Eight adult domestic cats were tested in four versions of the task. We manipulated the size and materials to test whether that influenced performance: two large cylinders (16 cm diameter) out of glass and plastic respectively, and two small cylinders (9 cm diameter) of the same two materials. Each of the four conditions had two phases with a 24-hour delay in between. Each phase consisted of 10 consecutive trials. On the first day, a subject learned to retrieve a reward from an opaque cylinder. Next day, the cat was tested on a transparent cylinder. A retrieval of the reward without touching the cylinder's front counted as a successful trial. The success rate differed between conditions, and reached 98.75% in the 'big glass' condition, and 97.5% in the 'big plastic' condition, and 83.75% in the 'small glass', and finally 73.75% in the 'small plastic' condition. Two-Factor ANOVA for two within variables revealed a significant main effect of the cylinder size on the success rate [$F(1,7)=64.06$, $P<0.001$]. Neither a main effect of the material nor an interaction effect of size and material was statistically significant. The size effect was seen in all subjects. Failure rates did not decrease over time in any condition, so no learning curve was detected. Our results show that cats parallel great apes and corvids in the cylinder task as long as it is 16 cm in diameter and made of glass, despite their average mammalian neural characteristics. There are several possible explanations such as that a bigger size allows for more options of retrieval (e.g. mouth or paw), and/or requires less precise retrieval; it could also be that the distance to the reward is perceived as different. This calls into question whether the large-scale study took into account the sensorimotor architecture of each species, and more importantly, whether the task always measures motor self-regulation.