

The human-given cues and behavioural plasticity of horses during a delayed three choice task

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Recent studies have tested the ability of horses to understand human gestures. But even at the moment results are rather contradictory. This study was aimed at analyzing ability of horses to understand, remember and use human-given cues in a delayed three choice task. After the training period, sixteen horses had to choose between three blue buckets. One of them hid a carrot. Eight horses (A-group) saw the person hiding the carrot and they had to choose the correct bucket only after the person had hidden carrot and gone away. Control group, eight horses (B-group) did not know where the carrot was, and could only choose the bucket through the use of smell or by random choice. Each horse carried out 10 trials in the same test session. A-group chose the correct bucket to a greater extent on the first try (4.37 ± 1.42), compared to the second (3.00 ± 0.53) and the third try (0.75 ± 0.71). With significant differences between the first and the second try ($t_{14} = 2.582$, $p = 0.022$), the first and the third try ($t_{14} = 6.508$, $p = 0.000$), and between the second and the third try ($t_{14} = 7.180$, $p = 0.000$).

Also the B-group chose the correct bucket to a greater extent on the first try (3.87 ± 0.83) compared to the second (3.37 ± 1.51) and the third (1.75 ± 1.49). Anyway, there was no differences between the first and the second try ($t_{14} = 0.821$, $p = 0.425$). As regards the B-group, statistical differences were found between the first and the third try ($t_{14} = 3.523$, $p = 0.003$) and between the second and the third try ($t_{14} = 2.171$, $p = 0.048$).

Moreover, A-group showed a negative correlation ($r = -0.652$, $p = 0.0409$) between the number of correct answers at first trial and the number of test, and seemed that they used human information during the first half of the trials. As the trials proceeded, the average time required to find carrot decreased, with a negative correlation ($r = -0.779$, $p = 0.0079$) over trials while, the number of overturned bucket to find carrot increased over trials ($r = 0.770$, $p = 0.0091$). As the trials proceeded, the horses tended to choose at first the

bucket where the carrot had been found in the previous trial ($r = 0.450$, $p = 0.013$). Any kind of correlation over trials was found in B-group.

In the first trials, the horses we studied seemed to understand human given-cues information, store it and use it appropriately even in absence of a person. As trials proceeded they seemed to change strategy, searching carrots where it had been found in the previous trial. Therefore, horses could use human given-cues or other cognitive strategy depending on the time, energy cost and mental effort required to solve the task.

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