**Supplementary Materials and Methods**

**Touch screen training:**
From arrival rats were handled in the home cage in the colony room by the experimenter. Rats were habituated for two days to be brought to the test room in a white plastic box and placed for 30 minutes in the chamber with the house light on and with five 45 mg sucrose pellets (Sandown Scientific, Hampton, UK) in the reward tray.

In the next session rats were then for 30 minutes trained to touch the response windows by displaying one of five high-contrast training images pseudo randomly (not more than 3 times in a row on any one side) in one of the response windows, while the other remained blank. If the image was touched the image disappeared and three pellets were delivered, in conjunction with a ‘correct tone’ (1s 3000 Hz) and illumination of the tray light. On retrieving the pellets the tray light switched off and the 20s inter trial interval (ITI) was started. If no image was touched in 30 s the image disappeared and one pellet was delivered.

In the next session, rats were required to respond to the stimulus presented on the touch screen to gain reward. On each trial, one of five training images was shown pseudo randomly in one of the two response windows. The stimulus remained on the screen until the rat touched it, which was rewarded with a pellet, tone, and illumination of the tray. Upon collection of the pellet the tray light turned off and the ITI of 20 s started. Criterion to move on to the next step was 20 trials in 40 minutes.

Once criterion was reached rats were required to initiate each trial. The procedure was the same, but the trial started with illumination of the tray. When a head entry was detected in the tray the training image was displayed. This meant that on every trial the rat was situated at the back of the testing chamber when the stimuli were displayed and focussed on the task (Bussey et al. 2008, *Learn. Mem.* 15: 516-23). Criterion to move on to the next step was 50 trials in 50 minutes.

Once criterion was reached rats were moved onto the next stage, in which punishment for incorrect responses was introduced. The task was as before, with touching the image rewarded, but now touching the response window without the image resulted in disappearance of the image and ‘punishment’: a ‘wrong tone’ (1s 1000 Hz) and a 5-sec timeout period (house light switched), after which the ITI of 20 s started. In effect this was a simple version of the two-choice discrimination task. Criterion to move on to the proper two-choice discrimination task was >80% correct in 50 minutes. Rats that did not reach criterion in five sessions did not continue in the experiment.