ABSTRACT

Animal episodic-like memory tasks represent important component of episodic memory research. However, currently available episodic-like memory tasks are not based on episodic-like memory or encompass important caveats. In our laboratory, we recently devised a novel one-trial trace association task (OTTAT) to examine one-time associations of temporally discontinuous stimuli. This thesis deals with the improvement of OTTAT protocol by rat strain and compartment divider ('doors') selection which optimally promote the establishment of invariable behaviour of rats in OTTAT. Moreover, the accuracy of one-trial associations is also assessed by determining specificity of "rapid escape" response to conditioned stimulus of given sound characteristics. In Experiment 1, rats (Sprague-Dawley (SD), n = 36; Wistar (WI), n = 17; Long-Evans (LE), n = 8) were habituated 15 min daily for 3 days with standard doors (9 x 11 cm opening) to modified light and dark apparatus. The number of transfers between compartments and values of time spent in dark compartment obtained from 3rd habituation session were evaluated as indicators of invariable behaviour of rats. We found WI rats spend significantly more time in dark compartment than LE ($p = 0.002$) and SD rats ($p = 0.001$) and have significantly fewer transfers than LE rats ($p = 0.001$). In experiment 2, rats (WI, n = 34) were habituated 15 min daily for 3 days with doors with wide opening (3 x 40 cm). The number of transfers between compartments and values of time spent in dark compartment obtained from 3rd habituation session were evaluated as indicators of invariable behaviour of rats. We found WI rats habituated with wide doors spend significantly more time in dark compartment ($p = 0.003$) and have fewer transfers than WI rats habituated with standard doors. In Experiment 3 WI rats (n = 16) were subjected to standard OTTAT protocol. During testing session, half of the rats received shock-paired sound (2.4 kHz), the other half received novel sound (5 kHz) and numbers of rats with "rapid escape" response were obtained. There was no difference in frequency of rats with "rapid escape" response following 5 kHz and 2.4 kHz sound during testing session (42.9 % in both cases). We conclude Wistar rats habituated with wide doors display the most invariable behaviour and thus are the optimal combination for OTTAT. Additionally, the results suggest rats are not able to distinguish between novel and shock-paired sounds differing by 2.6 kHz during memory recollection in OTTAT.

KEY WORDS: episodic-memory, one-trial learning, associative learning, rat, hippocampus