

Effect of Experience on Evacuation of Mice in Emergency Conditions

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Abstract : With the acceleration of urbanization and the increasing of the population in the city, the evacuation of pedestrians suffering from disaster environments such as fire in a room or other limited space becomes a vital issue in modern society. Mice have been used in experimental crowd evacuation in recent years for its good similarities to human in physical structure and stress reaction. In this study, the effect of experience or memory on the collective behavior of mice was explored. To help mice familiarize themselves with the design of the space and the stimulus caused by smoke, we trained them repeatedly for 2 days so that they can escape from the emergency conditions as soon as possible. The escape pattern, trajectories, walking speed, turning angle and mean individual escape time of mice in each training trail were analyzed. We found that mice can build memory quickly after the first trial on the first day. On the second day, the evacuation of mice was maintained in a stable and efficient state. Meanwhile, the group with size of 30 (G30) had a shorter mean individual escape time compared with G12. Furthermore, we tested the experience of evacuation skill of mice after several days. The results showed that the mice can hold the experience or memory over 3 weeks. We proposed the importance of experience of evacuation skill and the research of training methods in experimental evacuation of mice. The results can deepen our understanding of collective behavior of mice and conduce to the establishment of animal models in the study of pedestrian crowd dynamics in emergency conditions.

Keywords : experience, evacuation, mice, group size, behavior

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