Recovery of memory for a traumatic event after lesions in the amygdala and hippocampus

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Albino rats were trained in a classically conditioned fear response and then were subjected to lesions in the basolateral amygdala or dorsal hippocampus. A retention test given 2 weeks later showed a memory deficit for both placements. The function recovered with reconditioning.

An experiment was conducted to investigate the effects of bilateral lesions in the amygdala and dorsal hippocampus on the retention of a classically conditioned fear response. Three groups of subjects, each consisting of 10 Holtzman albino rats, were used.

Groups 1 and 2 contained animals with lesions in the amygdala and hippocampus, respectively, and Group 3 consisted of sham-operated controls. The animals were first given 20 acquisition trials in a classical conditioning fear apparatus (Goldstein, 1975, 1977). During this session, the CS (buzzer and light) was presented with the UCS (electric shock). Following a 10-min consolidation period, during which the animals were placed into a holding cage, medium-sized electrolytic lesions were produced in either the basolateral amygdala or the dorsal hippocampus. After a recovery period of 2 weeks, the subjects were given a retention test in which the CS was presented without the UCS.

At the end of this retention session, the animals were reconditioned and later retested.

The results of the experiment showed that both the amygdaloid and hippocampal lesions produced retention deficits, which were followed by recovery of function. Future research on this problem should be designed to determine the behavioral and physiological conditions under which permanent memory deficits might be obtained.

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