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Stressed-Out Rats: Can Changing Contextual Cues Improve Their Deficits in Learning a New Task?

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Poster Presentation P19

**STRESSED -OUT RATS: CAN CHANGING CONTEXTUAL CUES IMPROVE
THEIR DEFICITS IN LEARNING A NEW TASK?**

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Chronic stress has been shown to have many damaging effects on the body, including impairment of hippocampal-dependent memory. Long-term exposure to corticosteroid (stress) hormones following chronic stress can lead to brain impairment, including a retraction of dendritic processes in the hippocampus, decreased hippocampal volume, and suppression of neurogenesis in the dentate gyrus. The hippocampus has been shown to process spatial and contextual information. Previously, we have shown that adding a context-shift during transfer from a reward-based (appetitive) to punitive-based (aversive) task alleviated learning deficits found in rats. This supports the idea of hippocampal involvement in learning avoidance after transfer from an appetitive task. Our study examined the effects of chronic stress on performance on an appetitive-to-aversive transfer-learning paradigm, and subsequently the effect of adding a context-shift at the point of transfer. Chronic stress was induced through restraint for six hours a day over the course of six weeks. The animals were tested in an operant conditioning chamber. Once the animals scored 90% or higher correct responses for two consecutive days in the appetitive task, they were transferred to 10 days of aversive training. We found that chronically stressed rats performed worse on both the transfer and aversive-only learning. Learning deficits were alleviated in stressed rats exposed to changes in the environment (contextual shift) during task-learning trials. Although the impairments seem to be aversive-specific, they were moderated in response to a context-shift, which suggests that chronic stress may impair hippocampal functioning in combination with affecting other brain structures, such as the amygdala.