

## Stress Effects on Simple Learning and Memory: A Rodent Model

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Inability to handle stress is closely associated with impaired physiological functions and maladaptive behaviors. Recent studies indicate that males and females handle stress differently, leading to different behavioral deficits. Using a rodent model, this study compared stress-induced behavior of male and female rats in simple learning. Initially, Wistar rats were trained on a fixed ratio 5 (FR5) schedule, which required five lever-presses for a food pellet (45 mg) until they reached a behavioral criterion. On the day of testing, rats were either placed in a restraint for 30 minutes or kept in their home cages prior to testing on FR5. The first response latency (time to make the first lever-press) and runtime (time to complete 5 lever-presses) were measured. Overall, stressed rats showed markedly slower responses in pressing the lever and took longer to complete the response requirement. However, males and females showed different patterns of behavior. Females and males took longer to make the first lever-press, but made a significantly slower response than males across 4 days, reflecting no adaptation to stress in initiating first response. Runtime was not affected in stressed males, whereas stressed females took longer to complete five lever-presses compared to controls. Such impairment in females decreased substantially across four days, reflecting adaptation. Our data suggest that appetitive behaviors are differentially affected by stress, and that susceptibility to stress differs between sexes. Given that stress-induced changes are likely mediated via the limbic system, such as the amygdala, and subsequent activation of the hypothalamus-pituitary-adrenal (HPA) axis, examining sex differences in pharmacologically-induced stress would provide further information.