

Effects of Exercise on Working Memory in a Rat Model of Attention-Deficit/Hyperactivity Disorder (ADHD)

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Working memory requires maintaining information across a gap in time. Some studies have shown working memory to be deficient in children with attention-deficit/hyperactivity disorder (ADHD). In this experiment, we examined whether working memory was abnormal in a rat model of ADHD, the spontaneously hypertensive rat (SHR) and whether working memory could be improved by voluntary exercise, which has been shown to improve cognition in both humans and animals. SHRs were given access to an unlocked (Group SHR-Exercise) or locked (Group SHR-Sedentary) running wheel in their home cage. Wistar rats, a normo-active control strain, were given access to a locked running wheel (Group Wistar-Sedentary) in their home cage. Working memory was assessed using trace eyeblink conditioning, in which presentation of one stimulus (e.g., a tone) must be remembered across a brief gap in time so that it can be associated with presentation of a second stimulus (e.g., an eyelid stimulation). For trace eyeblink conditioning, each trial (100 trials/day) consisted of a 250-ms tone, followed by a 500-ms stimulus-free interval that ended with a brief eyelid stimulation. The learned response is an eyeblink between tone onset and eyelid stimulation. As of this time, we are just beginning data collection. Our prediction is that Group SHR-Sedentary will show the poorest learning while Group SHR-Exercise and Group Wistar-Sedentary will show equivalent learning.