C5

Jenessa Holder M.S. Advisor(s): André Fenton Ph.D.

Co-author(s): -

Learning to Learn: How Cognitive Control Training Improves Learning

We use prior experiences to understand novel situations. However, most learning and memory animal research studies use naïve subjects with no prior experience to minimize confounds of prior experience. Accordingly, "Learning to Learn" (LtL) is understudied and arises from specific experiences that enable improved learning across unrelated tasks or settings, but the mechanism underlying LtL remains poorly understood. Our lab developed an active place avoidance (APA) task where mice needed to avoid a mild foot shock by using cognitive control, the ability to suppress distractions while focusing on task-relevant information. Using APA, we recently established that cognitive control training (CCT) caused neural circuit changes lasting months and resulted in LtL that was measured in multiple aversively conditioned tasks. Whether this LtL is general or specific to APA-related tasks is unclear. The present study investigates whether the CCT improves performance on all types of tasks, consistent with the general hypothesis, by testing whether the CCT improves subsequent learning of a set of unconditioned recognition tasks that have no cognitive or sensory features of APA.

Mice received CCT as before. A control group received the identical experience but were never shocked. Three days after training, recognition memory was assessed using an object recognition paradigm, during which the mice received object-context, object-place, and object-location recognition memory tests. Preliminarily, we observe that mice can detect a change in the environment during each memory test. However, we don't see a difference in learning between the CCT and control groups. This suggests that the CCT effect previously observed is not generalized to all tasks and may be instead specific to tasks that have features related to the CCT itself.