Set-shifting in a Rat Model of Attention-Deficit/Hyperactivity Disorder (ADHD)

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Set-shifting is a type of cognitive control of responding that some studies have shown to be deficient in children with attention-deficit/hyperactivity disorder (ADHD). An example of a very simple set-shifting task would involve four stimuli: a green triangle, a green circle, a red triangle, and a red circle. Initially, correct responses are determined by one stimulus dimension (e.g., green is correct, red is incorrect). Later, correct responses are determined by the other stimulus dimension (e.g., triangle is correct, circle is incorrect). To correctly set-shift, the initial "set" (e.g., color) must be discarded and a new "set" (e.g., shape) adopted. In the current experiment, we examined whether this ability is impaired in a rat model of ADHD, the spontaneously hypertensive rat (SHR). SHRs and rats of a control strain were tested in a plus-shaped maze with one of the four arms blocked off on every trial so that the remaining three arms formed a T. On each trial, the rat began in the stem of the T and could find a food pellet down either the left or the right arm. The maze was rotated between trials and a new arm was blocked off. Arms were analogous to the four stimuli described above: a smooth white arm, a rough white arm, a smooth black arm, and a rough black arm. Each rat had to learn an initial "set" (e.g., texture) and then, the next day, had to learn a new "set" (e.g., color). The dependent measure of interest was the number of trials required to learn the new set. Preliminary results suggest that SHRs actually learn to set-shift more quickly, rather than more slowly, than a control strain. We are currently examining whether SHRs differ in their ability to shift back to the first set.