

# Long-term effects of early undernutrition and environmental stimulation on learning performance of adult rats

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Early undernutrition was achieved in rats by increasing litter size; the undernourished groups were reared from birth to 21 days in litters of 18 pups per dam and the control groups in litters of six pups per dam. Each of these groups was divided at weaning into two sub-groups: previously undernourished, stimulated (PUS+) and non-stimulated (PUS-); and control, stimulated (CS+) and non-stimulated (CS-). From weaning, all animals were fed ad libitum. Environmental manipulation began at weaning and lasted 11 weeks. 'Stimulated' rats were maintained in colonies of three per cage, were handled for 5 minutes each day and allowed to explore a 'stimulation chamber' for 30 minutes. All groups were tested in a Hebb-Williams maze at  $100 \pm 10$  days of age. The nutritional treatment did not impair Hebb-Williams performance, and environmental stimulation improved the learning performance both in control and previously undernourished groups. Neither nutritional nor stimulation treatment affected intr