

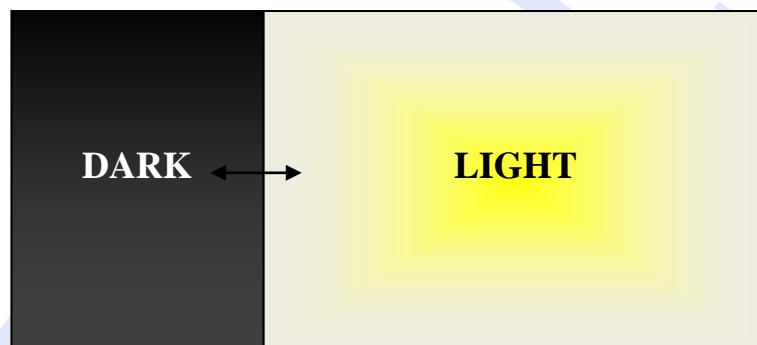
Animal Behaviour 6

Animal Models in Behavioural Neuroscience

The Light-Dark Box Experiment

Introduction

The light-dark box (LD box) is a much replicated procedure; it is a simple yet effective way of quantitatively measuring the response of a mouse to light. It has been used in countless experiments to investigate everything from neuropharmacokinetics to behavioural psychology. The aim of this experiment is to explore the difference between different strains of *Mus musculus*.



Method

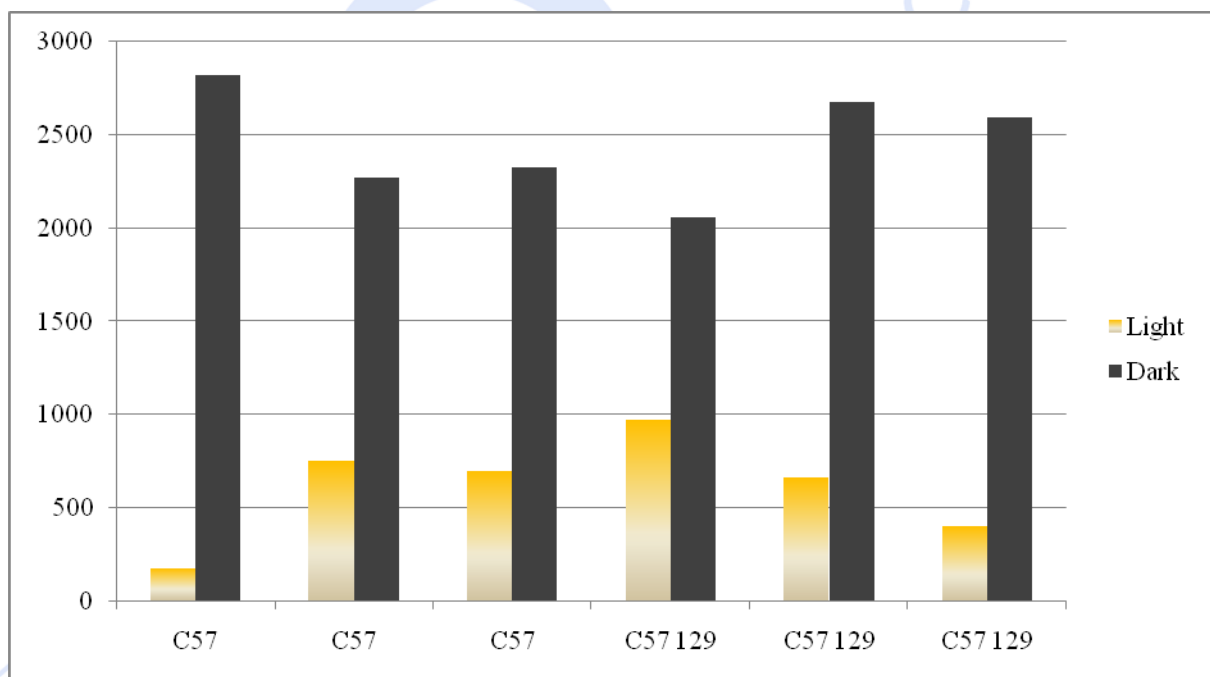
The light-dark box was set up as above; extra illumination was provided in the light section via a 60W anglepoise lamp. Three replicate mice of two strains were introduced into the centre of the light section of the box facing away from the dark section. The strains used were female C57BL/6 from Cage A and female C57BL/6/129 from Cage C. The number of milliseconds each mouse spent in each section was recorded along with the number of transitions between the light and dark sections.

Results

Table showing the milliseconds spent in each section and the number of transitions for both strains

	C57BL/6 Cage A ♀			AVERAGE	C57BL/6/129 Cage C ♀			AVERAGE
<i>Light</i>	175	749	694	539	971	666	405	681
<i>Dark</i>	2818	2269	2324	2571	2055	2680	2593	2443
<i>Events</i>	4-1=3	8-1=7	9-1=8	6	13-1=12	8-1=7	6-1=5	8

Graph of x = clone, y = milliseconds (up to 5 minutes)



Discussion

There was no statistically significant difference between the average time spent in the light and the dark section for the different strains. The C57BL/6 129 strain crossed between the two conditions a greater number of times relative to the C57BL/6 strain on average.

The weakness with these results, as with most animal behaviour experiments, is the inadequate number of repeats – three replicates is not enough to conclude that there is no difference between strains (as these results suggest).

In considering how to increase the strength of the conclusions drawn, we must understand the biology of the experimental subjects. The house mouse (*Mus musculus*) is nocturnal and is highly sensitive to olfactory stimuli. Since the experiment is conducted during the day when the subjects usually sleep, both strains may have an increased predilection for the dark section. This could be alleviated by conducting the experiment at night and comparing the results or the subjects could be 12h clock-shifted for experimenter convenience. In order to negate the effects of the order confound introduced as each subsequent mouse smells the scent left by its predecessors, a range of mice could be housed in the light dark-box for a period of time to confuse the odours this could be combined with a sterilization regime between subjects.

In summary; the two mouse strains C57BL/6 and C57BL/6/129 do not display significant predilection for light or dark conditions when tested against each other in a light-dark box arrangement. However this conclusion is spurious as it is based upon only three replicates.