

Blakemore and Cooper (1970)

Impact of Early Visual Experience.

Background and aim: The aim of this experiment was to investigate the physiological and behavioural effects of a limited visual experience and whether brain development/plasticity occurs due to experiences rather than nature.

Method: This study was a **laboratory experiment**, taking place in a controlled artificial environment. The participants in the study were new born kittens who were immediately placed into a dark room. At two weeks of age the kittens were then randomly placed into one of two conditions for five hours a day: this was either a horizontal or a vertical environment (**IV**).



The kittens had to stand on a clear glass platform which was inside a tall cylinder of which the inner surface was covered with either horizontal or vertical black-and-white stripes. Additionally, there were no corners or edges in their environment. The kittens' visual field was restricted to 130 degrees, as they were required to wear a wide black collar. This prevented them from seeing their own body and 'beyond their world of stripes'. Blakemore and Cooper defended the ethics of the study by stating that the kittens did not seem distressed, as they inspected the walls of the tube for long periods of time.

After five months, exposure to the experimental conditions ended and the kittens were then placed for several hours a week from their dark cage to a small, well-lit furnished room. The Dependent Variable (**DV**) was then measured: this was whether kittens raised in a horizontal environment could detect vertically aligned objects and vice-versa. After 7 and a half months, two of the kittens, one from each environment were anaesthetised and their neurophysiology was examined.

Results: All the kittens were extremely visually impaired; they demonstrated no visual placing when brought up to a table top and had no startle response when an object was thrust towards them. However, their papillary reflexes were normal and they guided themselves mainly by touch. All kittens showed behaviour blindness, meaning that they could not detect objects or contours that were aligned in the opposite way to their previous environment. They also demonstrated fear when they were standing on the edge of a surface.

There was recovery of some deficiencies from their early deprivation. After about 10 hours the kittens showed visual placing and some startled responses; they could also easily jump from a chair to the floor. But the kittens did suffer some permanent damage such as trying to touch things well beyond their reach and following objects with clumsy head movements. Moreover, the neurophysiological examination found no evidence of

astigmatism (blurred vision), but there was evidence that horizontal plane recognition cells did not ‘fire-off’ in the kitten from the vertical environment and vice-versa – meaning that kittens were unable to perform orientation selectivity and therefore they suffered from ‘physical blindness’.

Conclusion: Brain development is clearly affected by early experiences and environmental factors rather than just genetics and there is clear evidence of **brain plasticity** – ‘the visual experience of these animals had modified their brain’ and therefore has serious perceptual consequences. The kittens’ visual cortex adjusts during development as a result of its visual experiences.

Evaluation

Research method: As this was a **laboratory experiment**, the kittens’ environments were highly controlled and therefore causal conclusions can be made. The study has levels of internal validity - we can infer that the **IV** (environment) caused visual impairment and neurophysiological damage (**DV**). The study could also be easily replicated in order to test the **reliability** of the findings (although this wasn’t done).

Ethical considerations: Exposing animals to a dark room for two weeks and then up until 5 months of age a visually depriving environment, could be considered to be **psychologically harmful** for the kittens. However, Blakemore and Cooper reported no distress from the animals. Furthermore, the study complied with the **ethical guidelines** for animal research. It could also be argued that any harm to the animals were outweighed by the **usefulness** of this research.

Sampling bias: Blakemore and Cooper would argue that due to some physiological similarities between cats and humans, we can **generalise** results to humans. However, critics would argue against this due to obvious differences between the species. Furthermore, as the sample was very small (only 2 cats’ neurophysiology was examined) we may not be even able to generalise to other cats!

Exam Style Questions

1. Which of these statements of results is false? (1)
 - A. All kittens showed behaviour blindness
 - B. Kittens suffered from ‘physical blindness’
 - C. There was no evidence of astigmatism
 - D. There was no recovery of any deficiencies from their early deprivation

2. Outline one problem with the sample used in this study (2)

3. Describe the procedure used in this study (3)

4. Describe one similarity and one difference between Blakemore and Cooper’s study into impact of early visual experience and Maguire’s study on taxi drivers (4)

Exam Style Questions – With Answers

1. Which of these statements of results is false? (1)

D. There was no recovery of any deficiencies from their early deprivation

2. Outline one problem with the sample used in this study (2)

A small sample of cats were used, therefore the effects of a limited visual experience on cats cannot be generalised to human behaviour or physiology.

3. Describe the procedure used in this study (3)

Two weeks old kittens were randomly put in one of two environments. They stood on a glass platform in a tall cylinder which either had horizontal or vertical black-and-white stripes. The visual field was restricted to 130 degrees and they wore a wide black collar; this prevented them from seeing their own body or anything beyond their world. This ended after 5 months and they were put in a well-lit room. Two months later, 2 of the kittens had their brains examined.

4. Describe one similarity and one difference between Blakemore and Cooper's study into impact of early visual experience and Maguire's study on taxi drivers (4)

Both studies used scientific, objective evidence to gain results. Blakemore and Cooper examined the neurophysiology of two kittens to see how the brain developed under these deprived conditions, while Maguire conducted MRI scans of taxi drivers in order to measure grey matter in the hippocampus. A difference between the studies is that Blakemore and Cooper conducted a longitudinal study over a month period wherein they subjected cats to visual deprivation. On the other hand Maguire's study was a snapshot study in which brain scans of taxi drivers were taken.