

reward. Under 47 and 71 hours deprivation the fourth rat began pressing at about his average rate before punishment. This seems to indicate that the bar-pressing habit was not removed by the punishment but was suppressed by a competing aversive tendency. In this rat, increased hunger apparently provided sufficient motivation to overcome the aversion. That his aversive habit may have been weaker and more easily overcome is suggested by the fact that of the three rats receiving 100-msec shocks, he received the fewest punishments.

While Estes's rats had not stopped pressing the bar after an hour of punishment for each response—an average of 81 punishments, in the present experiment no more than 13 punishments were necessary to stop bar pressing. Since moderate punishments were used in both this experiment and that of Estes, the difference may well be in the strains of rats. This is supported by the fact that differences in emotionality have been found among different strains of rats (6), and hooded rats learn the conditioned squeak reaction with shock as the unconditioned stimulus much more rapidly than do white rats (7). Estes's rats may also have ceased responding if punishment had been severe enough or continued long enough. On the basis of the present investigation it can be concluded that, as Appel found with squirrel monkeys, in hooded rats punishment continued until responding ceases has a marked and prolonged effect on the performance of the punished response. Whether the same effect can be obtained in other strains of rats needs further investigation. Our results also suggest that the effects of intensity of shock are worthy of further study.

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## Mask for Controlling Visual Input in Cats

**Abstract.** Analysis of visual function frequently requires control of visual input. The present report describes a mask which can be used for achieving this control in a variety of experimental situations.

The particular study for which this mask was designed required a complete separation of the inputs to the two eyes (1). Transilluminated red and blue light panels were used, and corresponding color filters were placed in the mask to provide for stimulation of each eye by frequencies widely separated on the visual spectrum. Input to a single eye was effected by simply making both light sources identical in color.

Slight modification of the mask shown here would allow the experimenter to substitute different filters with ease, even during a single training session. It should not be difficult to mount lenses (for example, inverting prisms) in the mask instead of filters. This mask could also be used in various other situations such as pattern discrimination problems, studies of interocular trans-

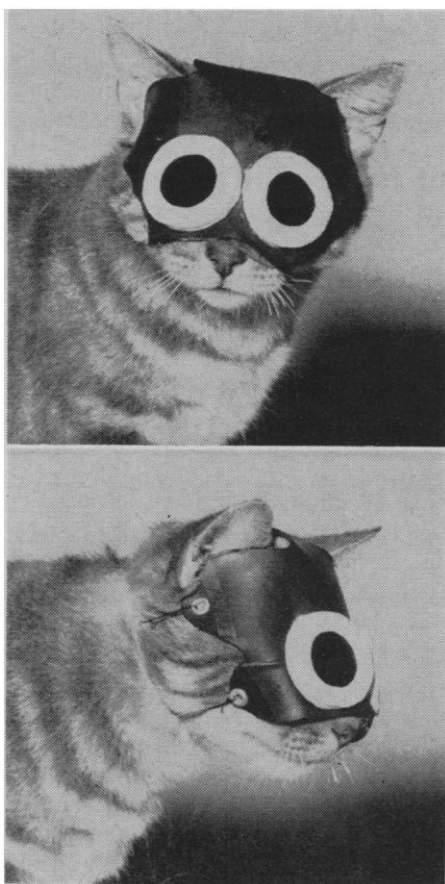


Fig. 1. Front and side views showing mask in position.

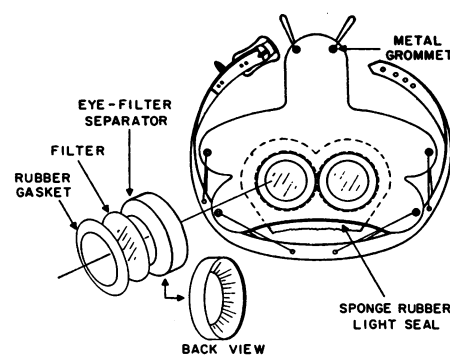


Fig. 2. Diagrammatic sketch of mask with color filters.

fer and hemispheric dominance, and open field tests. It is particularly easy to put on, and is worn for periods of an hour or longer with no signs of discomfort or distraction. It is therefore especially useful in frequently repeated training and testing situations of limited duration.

The photographs (Fig. 1) and the diagrammatic sketch (Fig. 2) are for the most part self-explanatory. The following suggestions, however, may prove helpful:

1) It is important that the apertures be made sufficiently large to allow for complete freedom of eye movement. If they are too small, eye irritation will result. The possibility of light leakage is precluded by the sponge rubber light seal surrounding the apertures.

2) Ample separation of the filters from the eyes is critical. We found the use of cork advantageous because of its light weight and the ease with which it can be shaped.

3) The vibrissae and hair around the eyes should be clipped short.

4) Animals adapt much more readily if they are allowed to wear the mask without filters for short periods on each of several days prior to the onset of training. It is especially helpful to let them eat with the mask on (2).

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#### References and Notes

1. A rubber mask which covered one eye of the experimental animal was designed some years ago by R. E. Myers. Its basic design was utilized in developing the mask described here.
2. This work was supported in part by grant M-3372 from National Institutes of Health, U.S. Public Health Service, and was completed during the tenure of the senior author as special research fellow, NIH (grant MF-4083).

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