

RB
Univ ARR

file please

January 19, 1960

ANNUAL REPORT OF RESEARCH, 1959

D. O. Hebb
Department of Psychology
McGill University

The research covered by this report was supported by the National Research Council and the Defence Research Board of Canada, and by the National Institute of Mental Health, United States Public Health Service, Department of Health, Education and Welfare. In addition, I wish to acknowledge a generous gift of funds from the Rockefeller Foundation: a sustaining grant without time limit in its expenditure, to cover unanticipated needs or possible failure in obtaining the annual grants on which we primarily subsist.

Changes in senior personnel: Dr Milner, formerly supported by research funds, has been appointed Associate Professor as a normal member of the University staff, but is continuing to share in the direction of the research reported on here. Dr Douglas Kimura has left for a research post in Chicago. An important addition to the research group is Dr Roy Pritchard, Ph.D. in physics from the University of Reading.

Graduate-student research assistants: Dr Jane Stewart received her Ph.D. from the University of London during the year and has taken a research appointment with a pharmaceutical firm in Montreal (Ayerst, McKenna and Harrison). Five other students have joined the group: H. Cohen, J. Gawronski, L. Gilden, Anne Replogle, and H. Teitelbaum.

Eight papers were published in 1959, and are listed at the end of this report. Eight papers were read at professional meetings (American Psychological Association, 2; Canadian Psychological Association, 3; and 3 papers read in symposium programs). One Master's thesis was completed.

CONTENT OF RESEARCH ACTIVITY

Most of the research continued along the lines of my report for 1959. Dr Douglas Kimura's study of hippocampal lesions was completed and will be published. Dr Jane Stewart's study of intelligence in the rat (in which I also took part) reached a termination before she left us, and she and I are now trying to determine whether, or in what form, she should publish the results, since these were not quite as clear-cut as one might wish. No particularly new developments appeared in the physiological-type research of Ehrlich, Kenyon, Cooper and Vanderwolf, with the laboratory rat; this work is continuing, and is in general concerned with interference with the brain-stem arousal system. The same remark applies to the studies of human perception by Bryden and Doreen Hogg Kimura. These are all capable students, and this work when published will be a worthwhile contributions to knowledge.

Dr Stern made a discovery during the year which has considerable significance for any animal experimentation in which barbiturate anesthesia is used. Following nembotal or pentothal (but not ether) anesthesia, learning is demonstrably affected for some weeks, with eventual return to normal. The exact nature of the defect, and the different forms it may take in different situations, are now being studied by Dr Stern with Mr Gilden.

The single-unit (microelectrode) research of Drs Burns and Grafstein, of the Physiology Department, in which Dr Heron has been collaborating, made important progress during the year, especially in finding direct experimental support for the theoretical conclusions of Marshall and Talbot's important paper of 1942--the first such confirmation. A further significance of the work is that it appears to be converging on the work of Pritchard and Heron below.

Dr Pritchard, working with Dr Heron on the Ditchburn-Riggs effect, has obtained results which appear to offer a radically new source of information about the structure of visual perceptions. Originally, Ditchburn and Riggs independently discovered that when the image of a line or a simple rectangle is held motionless on the retina, by a complex optical system utilizing a mirror attached to a contact lens, the image tends to disappear rapidly. Pritchard's Ph.D. thesis at Reading followed up some casual observations made by Ditchburn and Fender, suggesting that disappearance was not all-or-none but selective. Using a new method (actually, the same one that we thought of using here, referred to in the last paragraph of my report for 1958), and more complex diagrams, Pritchard was able to show that parts attended to would continue while others disappeared. The significance of this for studying the mechanism of attention is obvious, especially since he also found that almost any sensory disturbance which might be considered to raise the level of activity in the arousal system would also tend to re-instate perception of the whole. Further work by Pritchard and Heron and students working with them is providing new light on some Gestalt conceptions--a direct demonstration of closure is obtained, for example--and at the same time agrees rather well with some cell-assembly ideas. It seems possible, therefore, that two sets of ideas which seemed opposed to each other (Gestalt field theory, and cell assemblies) may be coordinated with each other, some modification of each resulting.

Finally, among new developments, Milner and Hebb have become sufficiently irked by the repeated charge that psychologists are bigoted on the topic of ESP to set up a simple little experiment in which the two main sources of error (in our opinion) are controlled: (1) selection of data, and (2) errors in recording or scoring the results. Preliminary data show no faintest sign of ESP in circumstances in which it should show up; whatever the further results of the experiment, we believe it possible to obtain data which will be convincing, one way or the other; and though we realize that negative conclusions can never be accepted by the true believer, it seems that it should be possible to obtain results that will be convincing to an impartial judge--if negative, that the results will show him that there is no valid positive evidence to require the conclusion that ESP exists.

DETAILS OF PERSONNEL AND PROJECTS

The following is a complete list of persons working with support from the research grants being reported on, and the projects with which they are concerned (including supervisory functions):

Dr P. M. Milner: co-investigator, U.S.P.H. grant; direction of research of

Annette Ehrlich, tegmental lesions and eating behavior

Harry Cohen, electrical recording following "rewarding" stimulation

Herman Teitelbaum, functions of anterior thalamus in learning

co-direction (with Hebb) of research of

John Kenyon, effects of septal lesions on learning

Rod Cooper, midline thalamic stimulation and learning

Cornelius Vanderwolf, arrest and midline thalamic lesions

Dr Woodburn Heron: single-unit studies of cat visual cortex; collaboration in fixed-retinal-image; direction of research of

M. P. Bryden, motor factors in visual perception

Doreen Hogg Kimura, perception in brain-injured man

co-direction (with Pritchard) of research of

John Gawronski, perception with fixed retinal image

Dr Muriel Stern: hormones, mood, and behavior, with clinical subjects; barbiturate anesthesia and behavior; direction of research of

Lloyd Gilden, effect of drugs (including barbiturates) on a perceptual-motor task

Dr Roy Pritchard: perception with fixed retinal image; co-direction (with Heron, as above) of research of Gawronski

Hebb: direction (with Milner) of research by three students named above, and

Anne Replogle, exploratory study, subcortical structures

PUBLICATIONS

- Doane, B. K., Mahatoo, W., Heron, W. & Scott, T. H. Changes in perceptual function after isolation. Canad. J. Psychol., 1959, 13, 210-219.
- Ehrlich, Annette. Effects of past experience on exploratory behavior in rats. Canad. J. Psychol., 1959, 13, 248-255.
- Hebb, D. O. Intelligence, brain function and the theory of mind. Brain, 1959, 82, 260-275.
- Hebb, D. O. A neuropsychological theory. In Koch, S. (Ed.), Psychology: a study of a science. New York: McGraw-Hill, 1959, Pp. 622-643.
- Hebb, D. O. Karl Spencer Lashley, 1890-1958. Amer. J. Psychol., 1959, 72, 142-150.
- Kimura, Doreen. The effect of letter position on recognition. Canad. J. Psychol., 1959, 13, 1-10.
- Scott, T. H., Bexton, W. H., Heron, W. & Doane, B. K. Cognitive effects of perceptual isolation. Canad. J. Psychol., 1959, 13, 200-209.
- Smith, C. J. Mass action and early environment in the rat. J. comp. physiol. Psychol., 1959, 52, 154-156.

828 1008

ABSTRACTED BY:
RB

FEB 9 1960

RB

*D. S. Jones
writer*

DIRECTORATE OF SCIENTIFIC INFORMATION SERVICE	
DEFENCE RESEARCH BOARD	
Date:	FEB 8 1960
From:	
Copy No:	1 of 1
ACC. No:	60/01839

Acc DBR (HRR) RA