EXPERIMENTAL PSYCHOLOGY SOCIETY

The next meeting of the Society will be held at Cambridge (at the kind invitation of Professor O.L. Zangwill) from 10.00 a.m. on Thursday 28 March 1968 until 5.00 p.m. on Friday 29 March 1968. Papers will be given in the Psychological Laboratory, Downing Street, Cambridge. There will be a Committee meeting at 8.30 p.m. on Wednesday 27 March 1968.

Programme

Thursday 28 March 1968

10.00 a.m.	Mr. D. Gerver (by invitation)	Some experiments on simultaneous translation
11.00	Coffee	
11.30	Mr. D. Salter (by invitation)	Delayed auditory feedback: a limited capacity model.
12.00	Dr. D.R.J. Laming	Temporal uncertainty in choice-reaction experiments
12.30 p.m.	Lunch	
2.00	Dr. Elizabeth Warrington	Disorders of visual perception in patients with localized cerebral lesions
2.30	Dr. A.W.H. Buffery, Mr. C.J. Cheney (by invitation) and Dr. J.L. Gedye	An automated technique for the study of learning ability in psychogeriatric patients
3.30	Tea	
4.00	Dr. Brenda Milner	Speech and memory during anaesthetization of one or other cerebral hemisphere
5.00	Extraordinary General Meeting	
6.00-8.00	Party given by the Department of Experimental Psychology to members of the Society and their guests in the Audit Room, King's College.	

Friday 29 March 1968

10.00 a.m.	Dr. R.G.A. Stretch	Maintenance of responding by a fixed-interval schedule of electric-shock presentation in squirrel monkeys (Saimiri Sciurens).
11.00	Coffee	
11.30	Dr. F.W. Campbell, Dr. G.F. Cooper (by invitation) and Dr. J.G. Robson (by invitation)	A new theory of visual spatial resolution based on neuro-physiological findings
12.30 p.m.	Lunch	
2.00	Dr. M. Treisman	On the measurement of loudness
2.30	Dr. M.P. Haggard	The invariance of the critical bandwidth

Friday 29 March 1968 (contd.)

3.00	Dr. A.D. Baddeley and Miss D.J.A. Longman (by invitation)	Massed and distributed practice - is it a dead issue?
3.30	Tea	
4.00	Dr. M. Hammerton	Anxiety stress and decrements in skill
4.30	Mr. B.R. Gaines (by invitation)	Interaction of verbal instructions and task difficulty in the learning of perceptual-motor skill.
5.00	End of meeting	

ABSTRACTS

Some experiments on simultaneous translation

Mr. D. Gerver, Department of Psychology, University of Durham

The study of the process of simultaneous translation provides a unique opportunity for studying human information processing, as well as the possibility of shedding some light on the process of translation per se. The conference interpreter must continuously monitor, store and retrieve the input language whilst at the same time translating, and then monitoring his own output. He is in a sense engaged on a paced tracking task involving transformation of information. The question arises as to whether these processes occur in sequence or in parallel, or both. In order to shed some light on the mechanisms involved a number of studies have been carried out within the framework of an information processing model of simultaneous translation.

Subjects were trainee and professional interpreters. In order to assess the effects of the requirement to translate on STM capacity, both language and strategy of recall of French and English word lists were varied. Recall in a target language of lists presented in a source language was found to have no significant effect on free recall scores. Further experiments were based on the recent work of Goldman-Eisler and others on hesitation phenomena in speech. The present studies investigated the effect of varying rate of input by compression of the original speech signal, as well as by eliminating pauses by splicing the input tape. The results will be discussed in terms of the variability of output measures such as speech time, words per utterance, and output rate under different input conditions.

Delayed auditory feedback: a limited capacity model

David Salter,
Department of Psychology,
University of Sheffield

Discrepancies between the results of previous studies of the differential disruption under conditions of delayed auditory feedback with verbal material are examined. An experiment with prose and random word material is described which assesses (a) the extent of the decrement with each type of material, (b) the improvement in performance when the same material is presented for a second time. The Difference and Ratio measures employed give significant differences for the first measure but not

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Delayed auditory feedback: a limited capacity model (contd.)

with the second. This conflict is resolved by a suggested explanation in terms of a limited capacity hypothesis. The rates of speech obtained indicate the degree to which the language processing system accommodates to the material and the extent to which capacity is used to process the material under conditions of delayed auditory feedback. By taking into account the two measures of performance the effect of the two types of material is gauged in relation to an overall rate of information processing.

Temporal uncertainty in choice-reaction experiments

Dr. D.R.J. Laming,
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Downing Street, Cambridge.

Five years ago, I described to the Society a simple two-choice sequential decision model for choice-reaction experiments. This paper reviews three results adverse to that model. All three results can be interpreted in terms of the subject's knowledge (or lack of it) about when the signal will appear, and one development of the model, incorporating temporal uncertainty, is currently in press. But it now appears that a more radical rethinking is required. For a two-choice experiment it is necessary that the subject consider three possibilities, signal A, signal B and 'no signal.' Sequential decision procedures for more than two alternatives are mathematically rather intractable; however, it seems likely that the more general model now envisaged will enable a unified theory covering choice-reactions, simple reactions and temporal uncertainty.

Disorders of visual perception in patients with localized cerebral lesions

Dr. Elizabeth K. Warrington,
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Queen Square, London, W.C.1.

A consecutive series of sixty-five patients with unilateral cortical lesions was given three tests of visual recognition and one of immediate visual retention, together with the W.A.I.S. The right parietal group showed a deficit on all tests of visual perception. Test stimuli, which were both verbal and familiar, were graded in difficulty on a perceptual dimension, and discriminated between right and left hemisphere lesions. Evidence for some degree of differentiation of function within the right hemisphere will be presented. The test of visual retention was associated with constructional impairment in the right hemisphere group, but not in the left hemisphere group. The relationship between perceptual disorders following cortical lesions and the 'non-verbal' role of the right hemisphere will be discussed.

An automated technique for the study of learning ability in psychogeriatric patients

A.W.H. Buffery, C.J. Cheney
and J.L. Gedye,
Unit for Research on Medical
Applications of Psychology,
University of Cambridge

Tests of the ability to learn can be useful tools for studying the psychological effects of organic brain disease. The work to be reported was undertaken in order to explore the possibility of using modern methods of automated instruction for this purpose (Gedye, 1966, 1967; Gedye and Wedgwood, 1966).

A visual 'matching-to-sample technique was used in a program to teach pictorially presented paired-associates. On each trial the patient was required to make a 'left' or 'right' response by pressing an appropriate button. The response, and the response latency, were recorded directly in computer-compatible form for subsequent display and analysis.

An automated technique for the study of learning ability in psychogeriatric patients (contd.)

Results from a recent feasibility study on a sample of over fifty psychogeriatric patients will be presented and discussed in relation to the results of independent 'global' clinical assessments.

References

GEDYE, J.L. (1966) Experience with an automated psychological testing system designed for clinical use. Bull.Brit.Psychol.Soc., 19, A18.

GEDYE, J.L. (1967) A teaching program for use as a test of learning ability in 'Aspects of Educational Technology,' London: Methuen.

GEDYE, J.L. and WEDGWOOD (1966) Experience in the use of a teaching machine for the assessment of senile mental changes. Proc. 7th Int.Cong.Gerontal., Vienna.

Maintenance of responding by a fixed-interval schedule of electric-shock presentation in squirrel monkeys (Saimiri sciureus)

Dr. R.G.A. Stretch,
Department of Psychology,
University of Alberta,
Edmonton, Canada

Experiments are described in which it has been found possible to maintain for several months patterns of schedule-controlled behaviour in squirrel monkeys in which the only programmed consequence of responding is the scheduled delivery of brief, but intense, electric shocks. Under different circumstances, the intensities of shock used could satisfactorily be employed to suppress responding (the 'punishment' operation) or to maintain responding which delays the occurrence of shock (the 'avoidance' operation). The present results are dependent upon a prior history of free-operant avoidance training and will be discussed in relation to previous work (1-3) demonstrating essentially the same phenomenon, and in relation to the difficulties the results raise for existing theories of punishment.

References

1. MORSE, W.H., and KELLEHER, R.T. Schedules as fundamental determinants of behavior. Unpublished paper presented to the Eastern Psychological Association, 1965.

2. MORSE, W.H., MEAD, R. and KELLEHER, R.T. Modulation of elicited behavior by a fixed-interval schedule of electric shock presentation. Science, 1967, 157, 215-217.

3. MORSE, W.H. and KELLEHER, R.T. Schedules using noxious stimuli I Multiple fixed-ratio and fixed-interval termination of schedule complexes. J.exp.Anal.Behav., 1966, 9, 267-290.

A new theory of visual spatial resolution based on neurophysiological findings

F.W. Campbell, G.F. Cooper and J.G. Robson, Psychological Laboratory, Cambridge.

The Fourier techniques recently developed for describing quantitatively the properties of an optical system have been applied to the dioptrics of the human eye. The quality of the image formed on the retina is high and most of the limit for the resolution of details is due to the retina-brain system. Fourier techniques can also be applied to the visual nervous system to evaluate how spatial information is transmitted, providing that the system

The invariance of the critical bandwidth (contd.)

Explanations of the differing results are offered and implications for the underlying mechanism discussed. The simplicity of the new methods appears to fit them for clinical application.

Massed and distributed practice - is it a dead issue?

A.D. Baddeley,
Laboratory of Experimental Psychology, University of Sussex
and
Miss D.J.A. Longman,
General Post Office

According to the traditional view (Woodworth, 1938), distributed practice facilitates the learning of everything from black/white discrimination (in the dancing mouse) to archery (in man). Following vast numbers of studies in the 1950s, this view has been replaced by the contention that distribution of practice is a transient phenomenon of limited generality which has so far proved theoretically sterile (Adams, 1964). A re-examination of the early literature shows that two basic variables were studied, one of these, length of session tended to show large effects, the other, inter-session interval did not. Modern studies have, however, been concerned with the second, minor factor, largely because it initially seemed to fit Hullian theory. It is suggested that attention should be redirected to the major variable of session length. A keyboard training experiment is described in which Ss practised for sessions of 1 pr 2 hours once or twice a day. There was a marked effect of length of session on both speed and accuracy, and a small effect of session frequency.

References

WOODWORTH, R.S. Experimental Psychology, 1938, Methuen, London.

ADAMS, J.A. Motor skills, Ann.Rev.Psychol., 1964, 15, 181-202.

Anxiety, stress and decrements in skill

M. Hammerton,
MRC Applied Psychology Research Unit, Cambridge.

An investigation was carried out into the effect of an anxiety-producing situation, namely the imminence of a parachute jump, upon skill in a tracking task. The task was one of acquisition, using first order (velocity) control. Parachutists at three levels of practice were examined: experienced regulars, trainee regulars and trainees from the territorials.

The findings supported the views of Venn (1672). The T.A. men were more affected than the trainee regulars, who were more affected than the experienced regulars, who were scarcely affected at all.

It is concluded that tasks of the kind used are adversely affected by anxiety stress, though the loss in performance can be minimised by appropriate training.

Interaction of difficulty and verbal instruction in the learning of a perceptual-motor skill

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University of Essex

An investigation has been carried out of the learning by human subjects of a complex perceptual-motor skill, involving compensatory tracking through

Interaction of difficulty and verbal instruction in the learning of a perceptual-motor skill (contd.)

high-order dynamics with controls which are, initially, highly unnatural. A model of the learning behaviour of the human controller is proposed, and some aspects of this behaviour are traced to fundamental problems in learning about a system whilst, at the same time, controlling it.

These considerations suggest two factors which will have a major effect on the learning behaviour. One is the level of difficulty of the task during learning, and it is proposed that there is an optimum level for most rapid learning. This is, however, a function of the operator's ability and changes continually as he learns. The second factor is the degree and type of verbal instruction given to the operator, which, although verbal behaviour is probably irrelevant to the final skill, may have a profound influence on the rapidity of learning.

An experiment carried out on 72 RAF pilots has demonstrated the nature of both these effects. It was found that operators who learned at a high level of difficulty showed little or no learning and performed badly on all tests. Those who learned at the low level of difficulty split clearly according to the instructions given - those with uninformative instructions did not show appreciably better performance than those who learned at a high level, whilst those with informative instructions showed a spread in performance from very poor to very good throughout the tests. Operators who learned under conditions of constant performance achieved a uniformly high standard on all tests. In terms of transfer this demonstrates that the easy-difficult or difficult-easy problem cannot be resolved - transfer from a high level of difficulty to a low level is best only if the high level is beyond the capabilities of the operator. In this experiment the levels of difficulty were such that the operator, in capability, passed through them, and a variable level was essential for optimum learning.

The overall effect of informative versus non-informative instructions is that the former give significantly improved performance in all groups. In both the groups who learnt little, or learnt to a high level, however, the effects of instructions was very small compared with that of difficulty. In the group who learnt under reasonable, but not optimum, conditions the instructions determine the degree of learning.

A new theory of visual spatial resolution based on neurophysiological findings (contd.)

behaves in a linear manner. Evidence will be presented to show that this proviso is valid, if care is taken to avoid nonlinear effects due to light adaptation and very high contrast stimuli which overload the nervous elements.

Results obtained from retinal ganglion cells, geniculate fibres and visual cortical cells of the cat indicate that spatial information is transmitted along channels which respond to limited bands of spatial frequency (rather analogous to the auditory nervous system which has pathways tuned to bands of temporal frequency). The cortical cells are also very selective to the orientation of the optical stimulus as well as its spatial frequency. This organisation may be an essential preliminary filtering to simplify image recognition procedures at higher levels in the visual system.

On the measurement of loudness

Michel Treisman,
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University of Reading.

The problem of scaling the central effect of auditory stimulus intensity, I, is considered, and it is argued that there need not be a unitary neurophysiological correlate for "loudness." Different psychophysical tasks may draw on different central measures of stimulus intensity. A "metric dimension," L, which the subject may use in making quantitative judgements, is distinguished from a more peripheral "discriminal dimension," E, involved in the immediate processing of the stimulus input. Binaural intensity summation data are used to derive the form of the function relating E to I.

The invariance of the critical bandwidth

Mark P. Haggard
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Cambridge.

The "critical bandwidth" (CB) is the name usually given to the frequency region around a given frequency, within which the neural effects of different components of the auditory stimulus can interact. Analogous to spatial summation in vision, the CB corresponds to a constant number of fibres leaving the basilar membrane, and varies with frequency in a way similar to the frequency JND. Many different types of experiment allow the calculation of CB values (most fairly complex). The values from the different methods agree in general, but there is some disagreement about the relationship of the CB values to the intensity of the stimuli with which they are measured; recently the supposed invariance of CB with intensity has been challenged.

Two new methods for measuring the CB have been developed which allow rapid determinations and easy explanation to subjects. Both method produce values as a function of frequency suggesting a close relationship to the traditional CB. The first involves single tone masking of tones lower in frequency than the masking tone; this method does not produce the increase in CB found at high intensities with two-tone masking, apparently by avoiding the upward spread of masking. The second method involves detection of frequency-modulation of a narrow stop-band in white noise; this method produces values of CB comparable with other experiments. Even at very low intensities where dependence on intensity has been claimed the CB thus measured did not vary with intensity.

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