THE PSYCHOPHYSIOLOGY OF THE DEFENCE REACTION

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

by

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PREFACE

Some of the findings of this study were presented at the annual conference of the Australian Psychological Society, Melbourne, Victoria, August, 1971. Other portions have been published by or are in submission with the following journals:

Carroll, D. Signal value and physiological response to affective visual stimuli. Psychonomic Science, 1971, 25, 94 - 96.

Carroll, D. Electromyographic responses to affective visual stimulation. Perceptual and Motor Skills, 1971, 33, 755 - 758.

Carroll, D. Repression-sensitization and the verbal elaboration of experience. Journal of Consulting and Clinical Psychology, 1972, 38, 147.

Carroll, D. Repression-sensitization and duration of visual attention. Perceptual and Motor Skills, 1972, 34, 949 - 950.

Carroll, D. Orienting and defence reactions to affective visual stimuli. In submission, Psychophysiology.

Also published while the present author held an A.N.U. postgraduate scholarship:

Carroll, D. and Horne, P. V. Semantic and acoustic labeling. Psychonomic Science, 1971, 22, 241 - 242.

LIST OF ABBREVIATIONS

The following abbreviations have been used in this thesis.

BV	Blood volume
BVP	Blood volume pulse
CS	Conditioned stimulus
DR	Defence reaction (also referred to by other workers as the defence response or reflex, and the defensive reaction, response or reflex)
EEG	Electroencephalograph
E-I	Extraversion - introversion
EMG	Electromyograph
N	Neuroticism
MMPI	Minnesota multiphasic personality inventory
OR	Orienting reaction (also referred to by other workers as the orienting response or reflex, and the orientation reaction, response or reflex)
PSI	Perceived stress index
RF	Reticular formation
R-S	Repression-sensitization
RT	Reaction time
S	Subject
SCL	Skin conductance level
SCR	Skin conductance response (also referred to by other workers as the galvanic skin response)
UCS	Unconditioned stimulus

ABSTRACT

This thesis is concerned with the Soviet formulation of physiological arousal reactions as ORs and DRs. The proposed association of the OR with the heightening of perceptual sensitivity and the DR with the attenuation of sensitivity renders this formulation of theoretical importance. The reported occurrence of directionally distinct forehead vasomotor responding in the two reactions holds considerable empirical interest.

The initial experiment reported in Chapter 2 explored the generality of the Soviet formulation, i.e. whether physiological responses to complex, affective visual stimuli could be characterized as ORs and DRs. Forehead BVP was recorded as an index of forehead vasomotor responding. Changes in other physiological parameters, as a result of such stimulation, were also monitored. Whereas unpleasant homicide slides elicited extensive forehead constriction, indicative of the DR, mainly vasodilation, indicative of the OR, was observed with pleasant and interesting visual stimuli. The unpleasant stimuli also tended to elicit the most persistently large SCRs.

The effects of signal value on the nature of the response to such affective stimulation was then explored in Chapter 3. With the imposition of a "memory set" the differences noted in Chapter 2 were no longer observed.

Chapter 4 explored flexor and extensor EMG responses to such stimuli, to test a related hypothesis that linked dominant flexor EMG activity with unpleasant stimulation and dominant extensor EMG activity with pleasant visual stimulation. Whereas the unpleasant homicide slides tended to elicit the most emphatic flexor EMG activity, extensor EMG responding did not differentiate slide conditions.

Chapter 5 explored individual differences in forehead BVP response to the unpleasant homicide slides. The extent of the forehead BVP constriction response showed little or no relationship to self-

report of distress and defensive style as defined by position on the R-S perceptual-personality dimension. However, R-S scale score did influence self-report of affective experience. Ss showing little forehead BVP constriction tended to look relatively longer at the homicide pictures than Ss showing extensive forehead BVP constriction.

At the onset of the present thesis there were few accounts of Western experiments that monitored forehead vasomotor change. However, several such experiments have now been reported. The finding of some of these experiments, that forehead vasomotor responding, is an insensitive parameter, presents problems for the Soviet formulation. Consequently in Chapter 6 forehead vasomotor responding to moderate and intense simple auditory stimuli was re-examined. Both forehead BVP and BV were monitored as indices of forehead vasomotor change. The results were generally in line with the earlier Soviet findings of differential forehead vasomotor responding to moderate and intense stimulation.

A central assumption of the Soviet schema is that the OR and DR are associated respectively with increases and decreases in perceptual sensitivity. Chapter 7 reports an experiment which explored the relationship of forehead vasomotor responding and performance in a simple reaction time task. The results demonstrated an association between the presence of the DR and relatively slower reaction times, and the OR and relatively faster reaction times.

The findings of the present study suggest that forehead vasomotor measurement represents a useful addition to those more commonly employed psychophysiological variables, particularly in the study of phenomena that pass under the general heading of "stress". Further, doubt is cast on the classical "arousal" or "activation theory" view of autonomic function, that regards autonomic change as reflecting only "intensive" and not "directional" aspects of behaviour.

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