

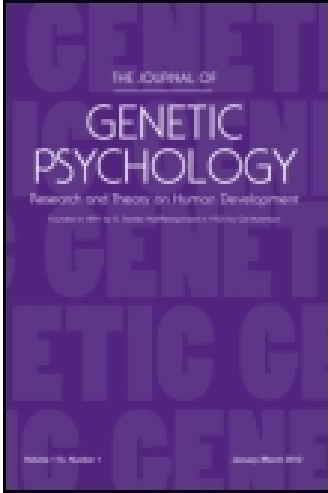
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### Arousal and Expressive Movements

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## AROUSAL AND EXPRESSIVE MOVEMENTS\*

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### A. INTRODUCTION

The purpose of this paper is first to put forward the hypothesis that the concept of arousal as formulated by Lindsley (7), Malmo (8) and others corresponds to Eysenck's (2) and his associates' construct of psychoticism. Our hypothesis is that these two groups of researchers, the one working from neurophysiology and the other from personality theory, have arrived at similar conclusions and the two fields should benefit mutually from integration. The second purpose of this paper is to present the results of two experiments on expressive movements designed to test this hypothesis.

An attempt will be made to cite briefly, but not in detail, the evidence in favour of our hypothesis that arousal corresponds to psychoticism. Eysenck's construct of psychoticism is made up of three principal types of measure, namely tests of speed of reaction, perceptual efficiency, and expressive movements. It has been shown in a number of investigations that these measures differentiate psychotics (schizophrenics and depressives) from normals, and that they intercorrelate positively in normal and psychotic samples (2, 4, 10). The construct therefore obeys two of the most important criteria of construct validity suggested by Cronbach and Meehl (1). The present argument is that high arousal corresponds to low psychoticism. If this is so, it follows that increases of arousal should have the effect of lowering subjects' scores on psychoticism, i.e., should reduce reaction times, increase perceptual efficiency, and reduce expressive movements. As far as the speed of reaction and perceptual efficiency measures are concerned, there is fairly extensive evidence that both are improved by increases and lowered by decreases in arousal (e.g. 7, 11). There appears, however, to be no evidence on the effects of variations in arousal on expressive movements, and since expressive movements are an integral part of the psychoticism construct, evidence on the variables affecting expressive movements are important for the interpretation of psychoticism. Since high psychoticism is associated with large expressive movements, the present hypothesis yields the prediction that increases of arousal should have the effect of reducing expressive movements. Two experiments testing this hypothesis are reported below.

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## B. METHOD

Eysenck (2) has used two principal measures of expressive movement, namely the dimensions of writing numbers and drawing three squares. Both of these measures were used in the present experiments.

1. *The First Experiment*

This experiment was concerned with expressive movements in number writing. Subjects were 56 university students. *Ss* were divided into two groups and required to write down numbers in two conditions, namely (*a*) at the sound of a hammer every 2-1/2 seconds; (*b*) as fast as they could: in this condition it was emphasised that *Ss* were being tested for speed and their task was to write down as many numbers as they could in three minutes. The two groups did the tasks in different orders to balance order effects. It is assumed that instructing *Ss* to work as fast as they could had an effect of increasing arousal, since Lindsley (7, p. 83-84) includes "mental set," "anticipation," "readiness instruction," and "a desire to compete with someone or oneself" as conditions inducing an increase in arousal.

The effect of increasing arousal on expressive movements was examined by measuring the length of the first ten numbers (i.e., the distance from the first number to the tenth) written down in the two conditions. The mean lengths were these: condition *a*: 8.5 cm; condition *b*: 6.8 cm ( $t = 4.37, p < .01$ ). This result shows at a statistically significant level that increasing arousal reduces expressive movements and hence reduces psychoticism.

The *Ss*' scores were available on Eysenck's other two principal dimensions of personality, namely neuroticism and introversion-extraversion, as assessed by the Maudsley Personality Inventory (3). The correlations between neuroticism and expressive movements and extraversion and expressive movements were computed but were not statistically significant. This finding is in line with Eysenck's (2) previous findings on the independence of psychoticism from neuroticism and introversion-extraversion.

2. *The Second Experiment*

This experiment was designed to determine whether the effect in the first experiment could be repeated using a new sample of subjects and a different measure of expressive movements, namely the drawing-three-squares test (2, 4). *Ss* for this experiment were 45 female students. *Ss* were again divided into two groups and asked to draw three squares (*a*) in their own time, and (*b*) as fast as they could. (The two groups did the task in different orders to balance order effects.) Again there was a statistically significant decrease

in expressive movements in the heightened arousal condition. Mean average diagonals were: condition *a*: 23.70 mm; condition *b*: 17.68 mm ( $t = 5.47$ ,  $p < .01$ ). Expressive movements did not correlate significantly with either neuroticism or extraversion.

### C. DISCUSSION OF RESULTS

Both experiments showed at a high level of statistical reliability that increasing arousal has the effect of decreasing expressive movements. Since expressive movements are a measure of psychoticism, the results lend support to the hypothesis that high arousal corresponds to low psychoticism. This hypothesis yields many predictions for further investigation, for example that other methods of manipulating arousal (e.g. by drugs) will have effects on expressive movements consistent with those reported here, and that other measures of Eysenck's construct of psychoticism will be found to be functions of levels of arousal.

More generally, since psychotics score highly on psychoticism (2), the results suggest that psychosis, or at any rate certain kinds of psychosis, may be explained in terms of low arousal. This conclusion is in line with that reached by several other investigators working at the problem from different approaches. A low arousal theory of certain kinds of schizophrenia has been advanced by Venables (12) and a somewhat similar theory of chronic schizophrenia in terms of low drive by Mednick (9). The work of Gellhorn (5) and Hoffer (6) showing low sympathetic reactivity in many schizophrenics also suggests a low arousal theory of psychosis, since sympathetic reactivity is a function in part of excitation in the reticular formation (e.g. 5). It is hoped that the present paper will do something to stimulate integration between these neurophysiological findings and the factor-analytic approach developed by Eysenck.

### D. SUMMARY

The hypothesis is put forward that the concept of arousal corresponds to Eysenck's construct of psychoticism, individuals who are low on arousal being high on psychoticism. It is argued that this hypothesis can be confirmed if it can be shown that measures of psychoticism vary with variations of arousal. Of the three principal measures of psychoticism, namely speed of reaction, perceptual efficiency, and expressive movements, existing evidence shows that the first two are in part functions of arousal. There is, however, no evidence on the relation of arousal to expressive movements. Two experiments were therefore carried out in which arousal was manipulated and the effect on expressive movements examined.

It was found that increases in arousal had the effect of reducing expressive movements. The result supports the hypothesis that arousal corresponds to psychoticism.

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