

## THE NATURE OF ANXIETY AND THE FACTORIAL METHOD

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The large scale factor analytic studies of Cattell, which have given rise to his review of anxiety (1), are an important landmark in the development of a scientific personality theory. They also raise questions which appear to demand an answer before one can accept his solution. In the first place, factor analysis assumes an additive model of behaviour. If the actual model should be compensatory, the results achieved by the factorial method, or by any correlational method, would bear only a tenuous relationship to reality (5). According to the additive model, which appears to work well in the cognitive field, a given source trait for ability determines performance on tests  $T_1, T_2, T_3 \dots T_n$ . These tests are intercorrelated to the extent of their correlation with the underlying source trait or ability, and the matrix of intercorrelations permits the recovery of this hypothetical source. According to the compensatory model, a given source trait or ability might find an outlet either in behaviour  $B_1$ , or in behaviour  $B_2$ , or in behaviour  $B_3 \dots B_n$ . Correlations between these different types of behaviour vary from high positive to zero, or even high negative, depending on the precise mode of working of the compensatory model. It appears that compensatory tendencies are active in the personality field, particularly in relation to physiological measurements of concomitants of anxiety which play some part in Cattell's analysis (6, 7, 8). It would not be impossible to handle such mechanisms factor-analytically, but no such straightforward type of correlational analysis as Cattell has performed would be adequate. It would need a more theoretical and experimental approach [using the term 'experimental' in the traditional sense to distinguish analysis of dependence from analysis of interdependence (3)] to incorporate such divergent models in one scheme.

In the second place, factor analytic methods are well adapted only to rectilinear regression, which assumption seems to work reasonably well in the cognitive field, but clearly breaks down in relation to such concepts as anxiety. Cattell writes that "confusion . . . arises because anxiety is given by some the character of a 'dysfunction' or upsetter of motivation, and by others the status of motivation or organiser of action." In terms of linear regression, such contradictory hypotheses are absurd; yet almost 40 years ago the Yerkes-Dodson Law postulated a curvilinear regression, and much recent evidence by Spence and his colleagues suggests that this law is in fact derivable from Hullian postulates (4). If this is true (experimental evidence is certainly very strong), attempts like Cattell's to deal with such concepts by means of ordinary correlation procedures are doomed to give rise to very low or zero relationships. The fact that most of his positive data are derived from ques-

tionnaires and that the relationship between questionnaire and objective test data is so poor, may be due to his neglect of theoretical considerations and experimental results from modern learning theory, or even from such classics as Yerkes and Dodson.

This neglect of the theories and findings of modern experimental psychology is extensive. Miller and Mowrer have conceptualised anxiety as a conditioned fear response, and my own work has lent strong support to their conclusions by demonstrating that the dysthymic personality (which descriptively agrees closely with Cattell and Scheier's conception of "anxiety"), was characterised by strong emotional reactivity and a high degree of conditionability (4). That is, dysthymia or anxiety is a combination of high neuroticism and high introversion. Cattell demonstrates that anxiety cannot be identified with either neuroticism or introversion, but he does not consider the hypothesis that it might be a joint effect of these two factors.

The fact that these comments on the Cattell and Scheier monograph are critical, should not lead readers to believe the paper is not important. The excellence of the statistical treatment, the ingenuity of test construction, and the indefatigable industry with which experimental replications have been arranged, make this study unique and outstanding in the field of personality measurement. However, the good points will be obvious to most readers; it seemed more appropriate to comment on how Cattell has cut himself off from some of the most important and best documented areas of modern psychology, and how he has disregarded ascertained facts, which throw considerable doubt on the relevance of correlational methods of the simple form used by him. Cronbach (2) has very powerfully argued the case for integration of psychometric and experimental approaches. Cattell's work may serve as an illustration of the loss which psychometrists suffer by not following this excellent piece of advice. I have elsewhere tried to show that the loss to experimentalists who fail to pay heed to the teachings of psychometrists is equally serious (4). If only these two broad groups could join forces, how very much more quickly would we gain a real understanding of the nature of anxiety!

#### SUMMARY

Cattell's factor analytic studies, summarized in his review of the nature of anxiety, are a landmark in the development of personality theory. However, two questions arise. Is the model of behaviour additive (as assumed by factor analysis) or compensatory? Is the assumption of rectilinear regression (satisfactory to factor analytic methods) more adequate in handling the concept of anxiety than curvilinear regression which is supported by much strong experimental evidence? In spite of Cattell's failure to deal with these problems, his review is of value in systematizing and clarifying one approach to anxiety.

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