RIGIDITY AS A FUNCTION OF INTROVERSION AND NEUROTICISM: A STUDY OF UNMARRIED MOTHERS

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IN recent years, the hypothetical personality trait of *rigidity* has been widely studied, together with the related concept of *intolerance of ambiguity*; both notions seem to have developed from the much earlier one of *perseveration* originally put forward by Spearman[18] and his students. Eysenck[8] has reviewed the literature on these various concepts; he agreed with Fink,[12] Luchins,[14] Applezweig,[1] Brown[4] and others "that rigidity is too complex and poorly defined at this stage to encourage any expectation of conclusive evidence concerning consistency effects". Similarly he agreed with Kenny and Ginsberg[13] that "while the array of techniques for assessing intolerance of ambiguity has increased, there unfortunately has been no corresponding demonstration that the various measures intercorrelate". While agreeing that little consistency can be found in experimental and situational measures of rigidity, some writers (Nigniewitzky,[15] Brengelmann[2, 3]) have maintained that a single general factor of rigidity could be isolated by means of questionnaires. Thus the former found that "the correlations [between different rigidity and intolerance of ambiguity scales] fell in an hierarchical arrangement", and the latter concluded that "intercorrelations supported the existence of a general factor of rigidity". This rigidity was "relatively independent of extraversion and neuroticism". The present study was undertaken in order to examine the correctness of these views; both with reference to the *existence* of a trait of rigidity, and to its *independence* from introversion-extraversion and neuroticism.

The writers' own hypothesis was that if a set of questions on rigidity could be found which correlated together positively and defined a factor, then this factor would be found to be correlated positively with introversion and with neuroticism; in other words, rigidity is a *dysthymic* trait (Eysenck[6]). The reasons for this hypothesis may be stated as follows. (1) According to Eysenck,[6] extraverted people are characterized by strong, quickly developing and slowly dissipating cortical inhibition and satiation; this cuts short ongoing perceptual, cognitive and motor activities. Rigidity usually denotes the perseverance of such activities beyond the normal, so that this trait should be characteristic of introverted persons showing relatively little inhibition-satiation. It may be remembered that perseveration has since the days of Gross, Heymans and Wiersma been conceived of as the fundamental trait of the introverted syndrome (Eysenck[8]). (2) Adopting a Hullian formulation, we may say that behaviour ($_SE_R$) is a multiplicative function of drive (D) and habit ($_SH_R$), and Spence[19] has shown how strong drives can prevent adaptive changes in

behaviour by strengthening existing habits, thus making for rigidity. If we also follow Spence[19] in assuming that anxiety-neuroticism is a drive, then rigid behaviour should be found to be correlated with neuroticism.

The design of the experiment was determined by the main purpose, as stated above. Ss were administered a set of twelve rigidity questions, taken from Nigniewitzky,[15] who had relied for the construction of his questionnaire on various previous writers, and in turn was followed by Brengelmann[2, 3] in his choice of questions. The actual questions chosen are given in Table 1. Also administered was the Maudsley Personality Inventory (M.P.I.), which contains forty-eight questions designed to measure extraversion and neuroticism (Eysenck[7]), and the Mill Hill Vocabulary Scale (Raven[17]), which provides a quick guide to Ss' intelligence. Tetrachoric correlations were calculated between these fifteen variables (plus two others, as discussed below), and the resulting matrix factor-analysed by means of Hotelling's method of principal components. It was expected that if the Nigniewitzky-Brengelmann hypothesis was correct, i.e. if a general trait of rigidity was measured by the twelve items *independently* of intelligence, introversion, or neuroticism, then only one factor should be extracted from the matrix, having high positive loadings on the twelve rigidity items and zero or low loadings on the other three measures, and leaving effectively zero residuals. If our own hypotheses were correct, then two or three factors should make their appearance, such that two of these would be identifiable with *introversion* and *neuroticism*, and the third, if it existed, with *rigidity*, purged of that portion of the variance for each item which belonged with introversion and neuroticism.

The selection of the sample of Ss to be studied was determined by the need we have always felt for some form of proof of validity to be incorporated with experiments using questionnaires. Seven different methods for achieving this have been outlined by Eysenck,[5] and the one chosen here is the fourth, the "method of agreement with reasonable expectation". It was predicted, on theoretical grounds, that unmarried mothers, as compared with married mothers, would be more extraverted and more neurotic; consequently our sample was made up of 100 married mothers, interviewed and given the tests in the maternity wards of Lewisham General Hospital, and 100 unmarried mothers, mostly seen at Moral Welfare Homes to which they had returned after confinement.† All Ss were English born, and all were primiparae having had normal births (i.e. without Caesarian section or miscarriage). The prediction was based on Eysenck's[6, 9] theory of lack of socialization in extraverts, leading to greater immorality in Ss of this type, and on the greater drive properties of Ss high on neuroticism (anxiety) as compared with Ss low on neuroticism.

RESULTS

The means and variances of the married and unmarried mothers respectively are 29.8 ± 84.86 and 32.4 ± 79.17 for extraversion (population norms $= 24.9 \pm 94.28$), and 15.6 ± 92.92 and 25.8 ± 119.43 for neuroticism (population norms $= 19.9 \pm 121.44$). The unmarried mothers are significantly more extraverted and more neurotic than the married mothers; they are also more

† These Ss also took part in a study by Eysenck (1961) on personality differences in pain reactions to childbirth. This paper contains further information on methods of selection and characteristics of Ss.

extraverted and more neurotic than the population norms. The normal mothers are significantly more extraverted and less neurotic than the population norms. Married and unmarried mothers did not differ in their rigidity and intelligence scores. They did differ significantly with respect to age, the married mothers being almost five years older on the average ($p = .001$). Previous work with the M.P.I. has not disclosed any marked relationship between age and personality within the limits of the age range presented by the present sample.

Table 1 shows the results of the factor analysis carried out on the fifteen variables listed above, to which have been added age and marital status. Three factors were extracted and rotated in such a way that as near as possible two orthogonal axes passed through the E and N scores, thus identifying these factors as *extraversion* and *neuroticism*; the third factor has almost exclusively positive loadings on the twelve rigidity items, and may therefore *pro tempore* be labelled *rigidity*. The pattern of results contradicts the Nigniewitzky-Brengelmann hypothesis, and is in good agreement with the one proposed in the opening paragraphs of this paper.

TABLE 1

	E	N	R	h²
1. Extraversion	.62	−.13	−.00	.40
2. Neuroticism	−.02	.71	.01	.50
3. Vocabulary I.Q.	−.30	−.20	−.52	.40
4. Age	−.36	−.57	.26	.52
5. Marriage	−.42	−.69	.11	.67
6. Before undertaking a trip, do you always plan well in advance and decide exactly what you are going to do and see, and are you then unwilling to change these plans if necessary?	−.08	.36	.33	.25
7. Do you ever get so absorbed in a task that you don't like to be interrupted and have to change to something new?	−.16	.49	−.10	.28
8. Do you always prefer the familiar, the safe and sure to taking chances with anything new and untried?	−.52	.06	.39	.42
9. Would you turn down an opportunity to broaden your experience (new job, new home, travel, etc.) because you do not like changes?	−.40	.23	.40	.37
10. Do you feel unable to really enjoy yourself with friends until your various chores are done? ...	.01	.14	.67	.47
11. Do you agree that a job worth doing is worth doing well?	.24	.11	.12	.08
12. Are you rather hesitant about starting something new and unfamiliar?	−.66	.22	.30	.58
13. Do you find that there are certain styles and colours that suit you, and that you would hate to try something new?	−.33	.46	.10	.33
14. Are you very annoyed when people drop in unexpectedly?	−.02	−.08	.30	.10
15. If you cannot get what you are looking for when shopping, do you refuse to buy a substitute and prefer to do without?	−.22	−.06	.06	.05
16. Do you feel uncomfortable with people who are unsure of themselves?	−.19	.42	.21	.26
17. Do you believe in the saying: "Everything in its place and a place for everything"?	.48	.15	.59	.60
Variance:	13.4%	12.8%	10.7%	36.9%

Several points call for comment. (1) The great majority of rigidity items have negative loadings on E, thus supporting our hypothesis that introversion

ıs linked with rigidity as measured by these items.‡ (2) Two items (Nos. 11 and 17) have positive loadings, and it is interesting to note that both of these are well-known sayings; Eysenck[5] has suggested a connection between extraversion and a form of response set leading to agreement with popular or majority views. This endorsement on the part of the more extraverted Ss may be an expression of this tendency. (3) Marriage has a negative loading on E, confirming that unmarried mothers are more extraverted. As they are also younger, age also has a negative loading, but this should not be interpreted independently of the group difference in age. Similarly, vocabulary I.Q. has a negative loading, but this variable is known to correlate with age, and the remarks applied to age apply here also, although it has been noted in past research that while not inferior in non-verbal tests of intelligence, extraverts do usually score a little less well than introverts on verbal tests (Eysenck[8]). (4) The great majority of rigidity items have a positive loading on N, thus supporting our hypothesis that neuroticism is linked with rigidity as measured by these items. (5) Marriage has a negative loading on N, confirming that unmarried mothers are more neurotic. As they are also younger, age also has a negative loading, but this should not be interpreted independently of the group difference in age. (6) With one exception, all the rigidity items have positive loadings on the third factor. It should, however, be noted that vocabulary I.Q. also has a high negative loading on this factor, suggesting that this may be a factor of (lack of) intelligence, rather than of rigidity. This loading of the vocabulary test cannot be explained away in terms of the differences in age between the married and unmarried mothers because (*a*) marriage has only a negligible loading on this factor, and (*b*) age has a slight *positive* loading on this factor. There is, therefore, little evidence here in support of the interpretation of this factor in terms of rigidity.

It would have been possible to analyse the results of the experiment by intercorrelating the forty-eight items of the M.P.I. together with the twelve "rigidity" items. It seemed that the method actually adopted gave a better chance to the Nigniewitzky-Brengelmann hypothesis, as the E and N factors had to be defined in a space largely created by the intercorrelations of the "rigidity" items. Such a procedure would only lead to the emergence of strong E and N factors if these were actually strongly represented in the set of "rigidity" items. The results are therefore more strongly opposed to the hypothesis under investigation than would have been the case if E and N had been defined in terms of the intercorrelations between M.P.I. items. (Other reasons for preferring the present procedure may be derived from an important paper by Peterson.[16])

SUMMARY AND CONCLUSIONS

One hundred married mothers and one hundred unmarried mothers were given questionnaire measures of extraversion and neuroticism, a vocabulary test, and a twelve-item questionnaire of "rigidity". A factor analysis was carried out of the correlations between the rigidity items, the E and N scores, the vocabulary

‡ Eysenck (ref. 6) has postulated that extraverts, due to their slower rate of formation of excitatory potential and faster rate of formation of inhibitory potential, should condition less well than introverts; this prediction has been confirmed by Franks (cf. Eysenck, 1957) for both neurotic and normal Ss. Rigidity, by virtue of its relationship with introversion, would be expected to correlate positively with conditioning. This hypothesis was tested by Field (ref. 11), using a rigidity questionnaire similar to the one used here; he found a correlation of +.50 between rigidity and eyeblink conditioning on 42 recidivist prisoners. He also found a correlation between conditioning and extraversion of —.20, and between conditioning and neuroticism of .00. The failure of the E correlation to be higher may be due to the fact that several questions of the M.P.I. scale, dealing with *sociability*, are clearly not applicable to prisoners!

score, age, and marital status. Three factors were extracted, and it was found that rigidity items had almost all their variance accounted for in terms of extraversion, neuroticism, and (vocabulary) intelligence; the results ran counter to the hypothesis of an independent rigidity factor. It was also found that unmarried mothers were more extraverted and more neurotic than married mothers.

REFERENCES

1. Applezweig, D. G.: "Some determinants of behavioral rigidity." *J. abnorm. soc. Psychol.*, 1954, 49, 224-228.

2. Brengelmann, J. C.: "Extreme response set, drive level and abnormality in questionnaire rigidity." *J. ment. Sci.*, 1960, 106, 171-186.

3. Brengelmann, J. C.: "A note on questionnaire rigidity and extreme response set." *J. ment. Sci.*, 1960, 106, 187-192.

4. Brown, R. W.: "A determinant of the relationship between rigidity and authoritarianism." *J. abnorm. soc. Psychol.*, 1953, 48, 469-476.

5. Eysenck, H. J.: *The Psychology of Politics.* London: Routledge & Kegan Paul, 1954.

6. Eysenck, H. J.: *Dynamics of Anxiety and Hysteria.* New York: Praeger, 1957.

7. Eysenck, H. J.: *Manual of the Maudsley Personality Inventory.* London: University of London Press, 1959.

8. Eysenck, H. J.: *The Structure of Human Personality.* New York: Wiley (2nd Ed.), 1960.

9. Eysenck, H. J.: Symposium: "The development of moral values in children. VII. The contribution of learning theory." *Brit. J. educ. Psychol.*, 1960, 30, 11-21.

10. Eysenck, S. B. G.: "Personality and pain assessment in childbirth of married and unmarried mothers." *J. ment. Sci.*, 1961, 107, 417-430.

11. Field, J. G.: "Eyelid conditioning and three personality parameters." Paper read at the 16th Int. Congr. exp. Psychol., Bonn, 1960.

12. Fink, P. R.: "Negative evidence concerning the generality of rigidity." *J. abnorm. soc. Psychol.*, 1958, 57, 252-254.

13. Kenny, P. T., and Ginsberg, R.: "The specificity of intolerance of ambiguity measures." *J. abnorm. soc. Psychol.*, 1958, 56, 300-304.

14. Luchins, A. S.: "On recent usages of the Einstellungs-effect as a test of rigidity." *J. consult. Psychol.*, 1951, 15, 89-94.

15. Nigniewitzky, R. D.: "A statistical study of rigidity as a personality variable." M.A. Thesis; University of London, 1955.

16. Peterson, D. R.: "The age generality of personality factors derived from ratings." *Educ. and psychol. Measmt.*, 1960, 20, 461-476.

17. Raven, J.: *The Mill Hill Vocabulary Test.* London: H. K. Lewis, 1947.

18. Spearman, C.: *Abilities of Man.* London: Macmillan, 1927.

19. Spence, K. W.: *Behavior Theory and Conditioning.* New Haven: Yale University Press, 1956.