

Psychological Studies of Allergic Women

The Relation Between Skin Reactivity and Personality

BEN F. FEINGOLD, M.D.,* FRANK J. GORMAN, M.A.,†
MARGARET THALER SINGER, Ph.D.,‡ and KURT SCHLESINGER, M.A.§

THERE HAS BEEN long and continuing interest in the interrelationships between psychological events and the course of allergic disease. Both professionals and laymen believe that psychological factors are important in allergic disease, but beyond the level of gross agreement, opinions differ vastly. Yet in spite of a lack of data outlining the basic mechanisms involved in the interactions between emotional-behavioral responses and allergic conditions, most clinicians have observed patients in whom some association between psychological events and the course of allergic disease was strongly indicated. The literature supporting this view consists of reports of both conditioning studies and of clinical and psychiatric observations.

The conditioning studies are illustrated by the following. Herxheimer⁵ reported that he was able to produce asthmatic symptoms in humans as a function of an environment previously associated with allergens. Dekker and Groen² reported similar observations. By utilizing a technique initially

developed by Ratner *et al.*,¹³ Ottenberg *et al.*,¹² demonstrated that asthma-like symptoms could be produced in guinea pigs through the use of classic conditioning procedures. In this same context, the studies of Liddell,⁶ who observed respiratory disturbances in many "experimentally neurotic" animals, should be noted.

There are three clinical and psychiatric approaches. Childhood relations have been indicated to be important in the precipitation of allergic disease by French and Alexander,⁴ in their pioneer studies and more recently by Miller and Baruch,⁹ in their emphasis on maternal rejection. Secondly, the suggestion that certain allergic patients appear to have "emotional disturbances" was supported by the work of McDermott and Cobb,⁸ Rogerson,¹⁴ and Tuft.¹⁵ Exponents of the third approach report that psychotherapy seems to have an ameliorative effect upon allergy.^{7, 10, 11}

Personality studies tend to emphasize childhood response patterns carried over into adulthood, and traits, conflicts, or emotions which characterize persons with an allergic condition are sought. Although many investigators have suggested personality patterns associated with various allergic syndromes, no specific personality pattern has been identified with all allergic conditions. On the whole, asthmatic subjects referred for psychiatric treatment have been most thoroughly studied. The other allergic con-

From the Allergy Department of the Kaiser Foundation Hospitals and the Permanente Medical Group.

*Kaiser Foundation Hospitals, San Francisco, Calif.

†Langley Porter Neuropsychiatric Institute, San Francisco, Calif.

‡Adult Psychiatry Branch, National Institute of Mental Health, Bethesda, Md.

§Kaiser Foundation Hospital, San Francisco, Calif.
Received for publication Mar. 6, 1961.

ditions have been less frequently explored, and allergic persons not undergoing psychiatric treatment have been studied only rarely. Also, there are few overviews of the entire group of allergic subjects. Particularly neglected has been the study, in an individual, of the relationships between level of skin reactivity to allergens, type of allergic syndrome, and personality features. The degree of skin reactivity, although an important part of the diagnostic evaluation, tends to be ignored in psychological studies, and little is known of the interrelationships, if any, between skin reactivity, personality, and specific allergic syndromes.

We chose the latter as our area of study. It was thought that the results obtained would be enhanced by careful attention to three aspects of experimental design: (1) more precise differentiation of subjects on the basis of skin testing, especially since Wittkower and Petow¹⁶ caution against describing true allergic disease and nonreactive allergic disease* as one and the same phenomenon; (2) utilization of psychological tests which provide both subjective and objective measures of a wide variety of personality characteristics; and (3) use of more adequate, sensitive, and powerful statistical techniques for evaluating the data. A preliminary study was undertaken to explore three questions of general interest:

Is there a personality pattern typical of allergic subjects?

Are there different personality patterns for groups with true allergic disease and with nonreactive disease?

Are the various true allergic diseases associated with characteristic personality differences?

Method

Forty patients constituted the initial sample, which included only those patients whose presenting complaint suggested the

*In this article, the term "nonreactive allergic" is applied to individuals presenting the symptomatology of allergic disease but lacking confirmation by positive skin tests. Patients who show positive skin reactions as well as clinical symptomatology are said to have "true allergic disease."

presence of an allergic disease. These patients had not been under treatment in the allergy department during the preceding year and were not so acutely ill that hospitalization was required. In the interest of greater group homogeneity with respect to variables of possible importance but not of immediate interest, only married women between the ages of 20 and 40 were included. With these exceptions, no other restrictions were made, in the hope to achieve an unselected sample with respect to diagnosis, degree of skin reactivity, and the group of allergens involved. The mean age of the group was 30.4 (S.D., 3.84). Of the sample, 35 were married and living with their first husband, and 5 had been divorced and had remarried.

At the initial visit, subjects were interviewed by a staff physician seeking an allergy-oriented history, and were given a complete physical examination, at which the eyes, nose, throat, lungs, and skin were examined carefully for findings suggestive of allergic disease. If the history and physical findings were suggestive of allergic disease and the subject met the other criteria for inclusion in the sample, she was referred to the psychologist, who requested the patient's cooperation in research studies exploring psychological aspects of allergic disease; only 1 subject refused. The tests used were the Minnesota Multiphasic Personality Inventory (MMPI) and the Rorschach test. On occasions, the Draw-a-Person test and selected Thematic Apperception Test cards were used. Biographical data were also obtained in a brief interview after the testing.

Concurrently with the psychological studies, the patient underwent allergy skin tests. In every instance, the patient was skin-tested with inhalant factors.* For the initial skin

*Inhalant factors consisted of: (1) the epidermal group, including cotton lintens, chicken feathers, duck feathers, goose feathers, turkey feathers, cat hair, cattle hair, dog hair, goat hair, hog hair, horse hair, rabbit hair, hemp, kapok, sheep wool, jute, coconut fiber, and a pooled sample of house dust; and (2) the pollen group, including allergenic pollens prevalent in the spring, late spring, and fall, and those from tree flora of California.

test, the puncture technique, with use of a 1:50 dilution (w/v) of 50% glycerolated extract, was applied. Patients who failed to react were retested by the intradermal technique with use of a 1:1000 dilution (w/v) of a 50% glycerolated extract diluted in normal saline. Skin tests were performed by trained allergy technicians, and the reactions were read after 20 min. by a staff physician. The reactions were graded for each of five groups of allergens on the customary 1-4 scale. A rating of 1 was applied to a barely visible local whealing and flare reaction, while a Grade 4 reaction indicated strong whealing with pseudopods surrounded by a pronounced flare.

The results of skin testing were correlated with the history and physical findings. On the basis of this evaluation, management for each patient was outlined. When indicated, hyposensitization with appropriate antigens was ordered.

The subjects were classified on the basis of reactivity and diagnosis as follows:

Reactivity

1. Reactivity to epidermal factors: a four-point range, from strong puncture reactivity to slight or none on intradermal testing
2. Reactivity to epidermal and inhalant factors: a five-component rating embracing reactivity to epidermal factors and to prevailing spring, late spring, fall, and tree flower pollen, as outlined in Table 1.

TABLE I CLASSIFICATION OF GLOBAL RATINGS OF SKIN REACTIVITY

<i>Response</i>	<i>Rating</i>
"Strong" response to any two of the five classes of allergens tested and moderate to the remainder	Strong
At least one "strong" response and not more than one "none" response to any one of the five classes of allergens tested	Moderate
Not more than one "moderate" response and at least two "weak" responses	Weak
More than three "none" responses	None

VOL. XXIV, NO. 2, 1962

Diagnosis

1. Asthmatic patients were grouped according to whether they had bronchial asthma, bronchial asthma with other concurrent allergic conditions, or nonreactive asthma.
2. Patients with rhinitis were classed as having allergic rhinitis, allergic rhinitis with other concurrent allergic conditions, or nonreactive rhinitis.
3. Patients with a sole diagnosis of bronchial asthma, allergic rhinitis, or seasonal hay fever were compared.
4. Patients with nonreactive asthma were compared with those with nonreactive rhinitis.

Results

This paper will present only those results obtained with the MMPI test. Other findings will be reported in a forthcoming article.

The MMPI "T" scores without "K" correction on three validity and nine clinical scales for each group were included in an analysis of variance for unequal group size and nonindependent measures, as outlined by Collier and Stunkard.¹ Two of these six comparisons (for Reactivity Groups 1 and 2) yielded significant differences. The comparisons according to diagnostic categories did not yield significant differences.

Difference in Reactivity to Allergens

When subjects were classified by degree of epidermal reaction alone, both group and scale-by-group interaction differences were found (Table 2). The mean profiles (Fig. 1) of the three groups (strong, medium, and weak*) suggest that the group differences are the meaningful result, that the significant difference in interaction (i.e., profile pattern differences) is a by-product of the group differences. Inspection of the three mean profiles indicates that profile configurations from group to group tend to be

*There were no subjects who fell into the "no reaction" group for epidermal allergens.

TABLE 2. ANALYSIS OF VARIANCE OF MMPI SCORES FOR GROUPS WITH DIFFERING SKIN TEST REACTIVITY TO EPIDERMAL ALLERGENS

Source of variance	df	Sums of squares	Mean squares	F
Error (I)	385	23,353	61	
MMPI scores × epidermal reactivity	22	3,411	155	2.54*
MMPI scales	11	11,994		
Within Ss	418	38,758		
Error (II)	35	8,184	234	
Epidermal reactivity	2	2,622	1,311	5.68†
Between Ss	37	10,846		
TOTAL	455	49,604		

*Significant beyond the .01 level.

†Significant beyond the .05 level.

highly similar. Of more importance it would appear is the fact that the weaker the epidermal reactivity the more the mean pattern of MMPI responses deviates in an abnormal direction.*

It was thought useful to utilize all the reactivity data available and, consequently, all subjects were given over-all reactivity ratings based on criteria stated in Table 1. Four groups were compared on these overall ratings: none, weak, moderate, and

*It should be noted that deviations from the mean do not necessarily imply gross psychological abnormality.

strong. The analysis of variance (Table 3) indicated that profile pattern differences were significant. In order to present the differences more clearly the subjects rated as having weak or no reaction were combined and compared with the combined moderate and strong groups. There were 22 subjects in the low group, 16 in the high. Again analysis of the data (Table 4) indicated significant differences. Mean differences on each of the scales were evaluated by Student's "t" technique (Table 5). There were nonchance mean differences on six of the scales (Fig. 2). Stronger reactors tended to score lower on the hypochondriasis psychopathic deviate, psychasthenia, and hypomanic scales. Weaker reactors scored lower on the K scale. Although these findings require further empirical definition, they might be interpreted as indicating that stronger reactors see themselves as psychologically healthy, uncomplaining, conforming, sociable, friendly, and ready to interact with others, and in general, as holding rational control in high esteem. Differences are small, but weaker reactors tend to admit more impulsive actions and greater anxiety and dissatisfaction with things as they are.

The two sets of ratings (i.e., ratings based

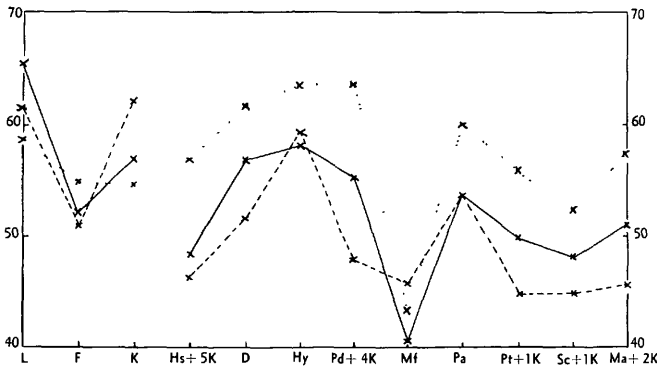


Fig. 1. Mean MMPI profiles of subjects grouped for reactivity to epidermal factors. (X X = weak, X ——— X = moderate, X - - - - X = strong)

TABLE 3. ANALYSIS OF VARIANCE OF MMPI SCORES FOR GROUPS DIFFERING IN GLOBAL REACTIVITY RATINGS

Source of variance	df	Sums of squares	Mean squares	F
Error (1)	374	23,053	62	
MMPI scores × reactivity rating	33	4,995	151	2.43*
MMPI scales	11	10,710		
Within Ss	418	38,758		
Error (11)	34	9,409	277	
Reactivity rating	3	1,437	479	1.75
Between Ss	37	10,846		
TOTAL	455	49,604		

*Significant beyond the .01 level.

TABLE 4. ANALYSIS OF VARIANCE OF MMPI SCORES FOR GROUPS WITH HIGH AND LOW GLOBAL REACTIVITY RATINGS

Source of variance	df	Sums of squares	Mean squares	F
Error (1)	396	24,584	62	
MMPI scores × reactivity rating	11	2,331	212	3.4*
MMPI scales	11	11,893		
Within Ss	418	38,758		
Error (2)	36	9,771	271	
Reactivity	1	1,075	1075	3.96
Between Ss	37	10,846		
TOTAL	455	49,604		

*Significant beyond the .01 level.

on epidermal reactivity only and those based on the over-all reactivity rating) are closely inter-related. Nevertheless 13 of the 40 subjects were placed in different categories by the two methods. Consequently, since these seemed somewhat different measures, it was felt useful to explore both. More precise statement about the meaning of these findings must await future study.

Comparison of Diagnostic Groups

Four further analyses were performed, utilizing diagnostic criteria as bases for grouping the subjects. In the first of these were compared the mean MMPI patterns (Fig. 3) of subjects who had bronchial

TABLE 5. "t" TEST ON MMPI SCALES

Scale	t	P
L	—	
F	—	
K	2.12	<.05
Hs	1.998	<.06
D	—	
Hy	—	
Pd	2.34	<.05
Mf	—	
Pa	—	
Pt	2.19	<.05
Sc	—	
Ma	3.30	<.05

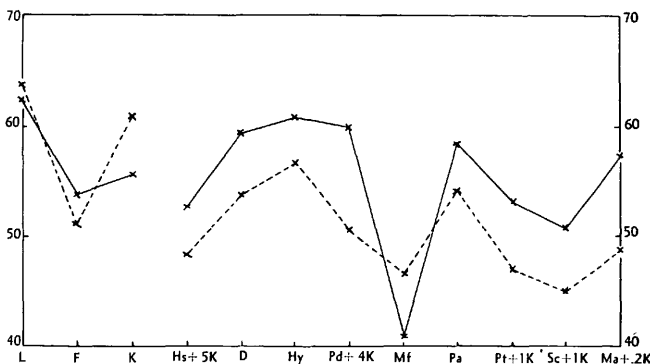


Fig. 2. Mean MMPI profiles for combined over-all allergen reactivity (X—X = non-weak, X - - - X = moderate-strong)

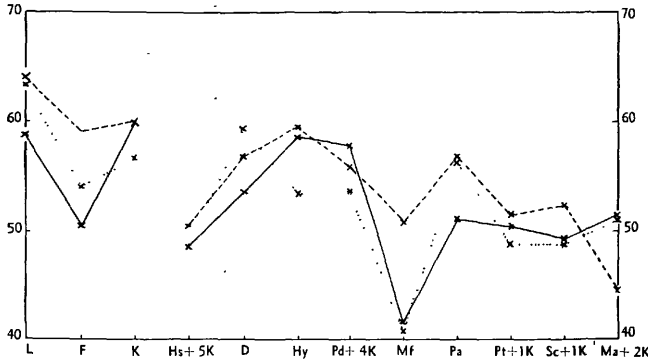


Fig. 3. Mean MMPI profiles for asthma, rhinitis, and hay fever groups. [X X = asthma (n=5), X——X = allergic rhinitis (n=7), X - - - - X = hay fever (n=4)]

asthma (n = 5), allergic rhinitis (n = 7), or hay fever (n = 4), and whose symptom patterns were uncomplicated by other allergic diseases. Next, subjects with nonreactive asthma (n = 3) and those with nonreactive rhinitis (n = 8) were contrasted (Fig. 4). No significant differences were found. However, there are suggestions in the profiles that nonchance differences might be established if adequate numbers of subjects are studied in the two nonreactive categories.

In the next step subjects with asthma-like symptoms were separated into three groups, those with: (1) bronchial asthma, (2) bronchial asthma combined with other allergic conditions, and (3) those with non-reactive asthma. Their mean profiles were compared. Finally a similar comparison was made of those subjects who manifested rhinitis-like symptom patterns. The mean MMPI profiles were analyzed for subjects with allergic rhinitis alone, those with al-

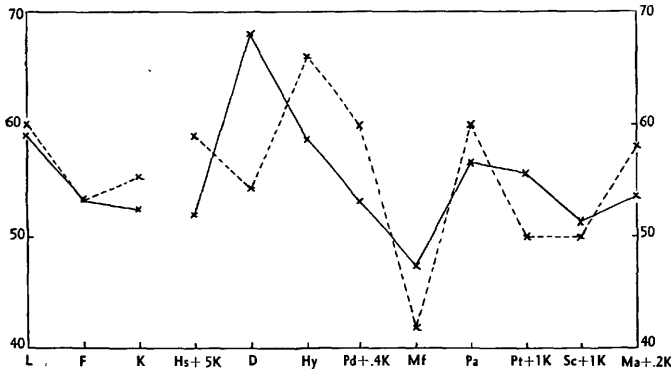


Fig. 4. Mean MMPI profiles for two nonreactive groups. [X——X = non-reactive asthma (n=3), X - - - - X = non-reactive rhinitis (n=8)]

lergic rhinitis, and complicating allergic conditions, and with nonreactive rhinitis. The results of these last two analyses could be attributed to chance.*

In sum, the analyses based on diagnostic information produced chance findings. There were some tentative indications that differences may be found between nonreactive categories, i.e., differences between those with asthma and rhinitis but nonreactive to skin tests.

Discussion

The findings indicate that psychological factors are of importance in understanding allergic illnesses. Their precise role or roles are not yet clear, but the groundwork for further study seems clearly established. The three exploratory questions posed at the beginning of this preliminary study can be at least partially answered.

First, the question of the existence of a "typical allergy personality pattern" was not attacked directly. Before we undertake the search for a typical pattern, it would be advisable that we know the appropriate variables regarding which a pattern might be meaningful. Accordingly, no attempt was made to differentiate allergic patients from others, i.e., no control groups were tested. Instead, knowledge was sought which might prove useful in determining what variables might be pertinent and of predictive significance within the group. On the basis of these preliminary results, it appears unlikely that any typical allergic pattern will emerge. Differences were found regardless

of diagnosis on the basis of degree of skin reactivity. Therefore, one must suppose that the allergy sample as a whole is quite heterogeneous; the greater the heterogeneity within a group, the less likely that one can find a pattern typical of that group which is at the same time precise enough to have useful meaning. At this point it would seem more probable that one might find patterns typical of specified, carefully defined subgroups within the total allergic population.

The second question dealt with differences between allergies and nonreactive allergies. Our sample did not include nonreactors (i.e., those with nonreactive allergies) in sufficient number to answer the question with finality. Nevertheless, there are clear psychological differences in a number of areas, differences associated with the strength of reactivity to allergens. These differences are at least initially definable and seem to form a consistent whole. Weaker reactors tend to be more deviant on the personality inventory. Stronger reactors are able to claim an attitude of closer affiliation with society and more adequate and satisfying interactions with others. The less sensitive tend to be dissatisfied with things as they are, more complaining, and more active in their attempts to do something about their complaints than the strong reactors. These are differences related to the dimension of sensitivity to allergens and suggest that clear psychological differences may be found between those with allergies and those with nonreactive allergies.

The third question deals with personality patterns associated with the various diagnostic categories. The sample which fitted these requirements is extremely small; until these methods are applied to a more substantial number of cases, the conclusion that the groups do not differ should be considered only tentative.

Perhaps the most important finding of the study lies in the fact that personality test differences can be established when reactivity data are carefully enough defined. It may be that some of the controversy which exists around this topic might well have

*It has been brought to our attention by the editorial staff of *PSYCHOSOMATIC MEDICINE* that Dekker, Barendrecht, and De Vries⁸ published a study bearing on this point. Using objective criteria they selected two groups each of "allergic" and "nonallergic" female asthma patients. These groups were then evaluated for neuroticism by means of the Two Part Personality Inventory. Allergic and nonallergic groups were then compared. No significant differences were found, a result which is congruent with the findings reported above for the three asthmatic groups. However, these authors also compared their entire sample with a group of normal females and found the asthmatics significantly more neurotic.

been avoided had more emphasis been given to the precise ways in which allergic subjects tend to differ. Evaluation at less broad levels of generality has led to useful findings and may provide a clearer view of the operations of psychological variables.

It seems clear that the preliminary steps have been taken but the basic foundation has not been set for further definition of specific though complex personality differences until the findings can be generalized from more adequate samples to relevant populations. Future studies must continue careful definitions of classificatory variables and rigorous analysis of the data as well as expansion of the application of findings to larger groups of patients.

Summary and Conclusion

Psychological tests were administered to allergic patients differing with respect to diagnosis and severity of reactivity to skin testing with allergens.

The results indicate that severity of skin reaction is a significant dimension along which patients differed with respect to personality pattern. Type of allergic disease in small numbers of cases was not found to be a significant dimension in terms of personality configuration.

2425 Geary Blvd.
San Francisco 15, Calif

References

- 1 COLLIER, R. O., and STUNKARD, C. L. An analysis of variance of multiple measurements on subjects classified in unequal groups of one dimension. *J. Exper. Educ.* 25:255, 1957.

ALLERGY AND PERSONALITY

- 2 DEKKER, E., and GROEN, J. Reproducible psychogenic attacks of asthma, a laboratory study. *J. Psychosom. Res.* 1:58, 1956.
- 3 DEKKER, E., BARENDRECHT, J. T., and DE VRIES, K. "Allergy and neurosis in asthma," in *Advances in Psychosomatic Medicine*. S. Karger, Basle, 1960.
- 4 FRENCH, T. M., and ALEXANDER, F. Psychogenic factors in bronchial asthma. *Psychosom. Med. Monograph 4*. Washington, D. C., National Research Council, 1941.
- 5 HERXHEIMER, H. Induced asthma in humans. *Internat. Arch. Allergy* 7:192, 1953.
- 6 LIDDELL, H. "The influence of experimental neuroses on respiratory function," in *Treatment of Asthma*, edited by H. A. Abramson. Baltimore, Williams & Wilkins, 1951.
- 7 LOEWENSTEIN, J. Psychotherapy of asthma. *Med. Klin.* 22:994, 1926.
- 8 McDERMOTT, N. T., and COBB, S. Psychiatric survey of fifty cases of bronchial asthma. *Psychosom. Med.* 1:203, 1939.
- 9 MILLER, H., and BARUCH, D. W. Psychosomatic studies of children with allergic manifestations I. Maternal rejection: A study of 63 cases. *Psychosom. Med.* 10:275, 1948.
- 10 MOHR, F. *Psychophysische Behandlungsmethoden*. Leipzig, Hirzel, 1925.
- 11 MOOS, E. Zur Behandlung des Asthma bronchiale. *Munchen med. Wchnschr.* 75:1841, 1928.
- 12 OULLENBERG, P., STEIN, M., LEWIS, J., and HAMILTON, C. Learned asthma in the guinea pig. *Psychosom. Med.* 10:395, 1958.
- 13 RATNER, B., JACKSON, H. C., and GRUEHL, H. L. Respiratory anaphylaxis. Sensitization, shock, bronchial asthma and death induced in the guinea pig by the nasal inhalation of dry horse dander. *Am. J. Dis. Child.* 34:23, 1927.
- 14 ROGERSON, C. H. Psychological factors in asthma-prurigo. *Quart. J. Med.* 30:367, 1937.
- 15 TUFT, H. S. The development and management of intractable asthma of childhood. *Am. J. Dis. Child.* 93:251, 1957.
- 16 WITTKOWER, E., and PETOW, H. Beiträge zur Klinik des Asthma bronchiale und verwandter Zustände. Zur Psychogenese des Asthma bronchiale. *Ztschr. klin. Med.* 119:293, 1932.