

## CORONARY ARTERY DISEASE AND RESPONSE TO THE ROSENZWEIG PICTURE-FRUSTRATION STUDY<sup>1</sup>

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Patients with coronary artery disease (CAD) were compared with a group of control Ss matched for 2 demographic variables, socioeconomic status (SES) and age, in response to Rosenzweig Picture-Frustration Study (P-F). CAD patients did not, in general, differ from control Ss, whereas both SES and age produced predictable kinds of differences on the test. The results were consistent with the assertion that specific personality factors were not related to the development of CAD, i.e., there does not exist a coronary personality, and that the inconsistent findings in previous investigations were due to the operation of demographic variables.

The response to frustration and, in particular, the management of aggression have figured prominently in several theoretical formulations concerning the role of psychological factors in the etiology of coronary artery disease (CAD). Menninger and Menninger (1936) considered heart disease symptoms to be "a reflection of strongly aggressive tendencies which have been totally repressed [p. 20]." They emphasized the deeply buried hostility directed at the father which was not allowed to come to awareness. Dunbar (1948) included among the attributes of the CAD patient a surface calm which concealed underlying aggression and resentment. A more recent theory (Friedman & Rosenman, 1959) stresses the excessive competitive drive and persistent desire for recognition of the CAD patient. This trait was also described by Dunbar as compulsive striving, and similar traits, for example, hard work and compulsive devotion to the termination of tasks, etc., were listed by Arlow (1945) as being characteristic of the CAD patient.

Despite the seeming consensus which exists in the description of the personality of the CAD patient and the general importance of frustration and aggression to its etiology, a recent review of the empirical literature (Mordkoff & Parsons, 1966) revealed little consistent experimental evidence to support the contention that personality factors in

general were at all implicated in the pathogenesis of CAD. The review concluded that the inconsistent findings in this area were most probably due to the action of variables other than CAD, such as age, education, and SES; and that the differences obtained on personality measures between coronary and control Ss could be attributed to the confounded differences in S groups on these demographic characteristics. The present study attempted to test this hypothesis by comparing the responses to the Rosenzweig Picture-Frustration Study (P-F) of CAD patients to the responses of a group of control Ss carefully matched on age, education, and SES. The P-F appeared to be particularly appropriate for the present investigation as it is intended to measure the type and direction of aggressive responses to frustrations of everyday occurrence, frustration and aggression being central to conceptions of the coronary personality.

### METHOD

#### *Subjects*

The Ss for this study were obtained from among participants in the Neurocardiology Research Program, a longitudinal study of CAD of the University of Oklahoma Medical Center. All Ss were obtained from the wards and clinics of the University of Oklahoma Medical Center, from referrals by private physicians, or from participating industrial and governmental organizations including Western Electric, Eastern Airlines, AVCO, and the Oklahoma Highway Department. The patient group was composed of those who had suffered a myocardial infarction as documented by history and electrocardiogram. Control Ss showed no evidence of cardiovascular disease. Thirty white male patients were matched with 30

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TABLE 1  
MATCHING DATA: MEANS FOR PATIENT  
AND CONTROL GROUPS

Variable	Patients	Controls
Age	51.0	54.3
IQ	107.6	113.6
Education (in yr.)	11.5	12.45
SES	3.4	3.2

Note.—SES = socioeconomic status.

healthy control Ss with respect to age, IQ, education, type of job, and an overall index of SES (Hollingshead & Redlich, 1958), and all were individually administered the P-F. Mean scores for the quantifiable matching variables are given in Table 1.

### Procedure

The Rosenzweig P-F consists of 24 line drawings each of which depicts two people involved in a mildly frustrating situation. One person in the cartoonlike drawing is shown saying something to the other, and the task of S is to give the response of the other person. A test booklet is available in which S can write his response, but for the present study each of the stimuli were mounted on cards and presented individually to S with E recording the responses. This was intended to produce fewer illegible or unscorable responses and to obtain the first response of S.

Each of the responses to the 24 stimuli is scored simultaneously on two dimensions: (a) direction of aggression and (b) reaction type. The three directions of aggression are extrapunitive (outward), intropunitiveness (inward), and impunitiveness (evasion). The three types of reaction are obstacle dominance (emphasis placed on frustrating object), ego defense (emphasis placed on protecting the ego), and need persistence (emphasis placed on finding a solution). The several combinations of these two scoring dimensions result in nine separate scoring categories in addition to the six marginal totals. Rosenzweig also describes two variants of the ego-defense response, a method for scoring trends, and a method for computing a group conformity rating which were not analyzed in the present study. Aside from these differences, all the records were scored according to the procedures described by Rosenzweig, Fleming, and Clarke (1947). Prior to analysis, frequency of response in each of the scoring categories was converted to percentage to compensate for those few instances in which unscorable responses were obtained.

## RESULTS

### Rater Reliability

A sample of 12 protocols was independently scored by two psychologists<sup>2</sup> and product-

<sup>2</sup> The authors are indebted to Kathryn L. West who scored the test protocols in the investigation of the interrater reliabilities.

moment correlation coefficients obtained for each of the 15 variables (Table 2). The coefficients ranged from .65 to .97, with the median at .90. Only four of the correlations were less than .80. Considering the small *N*, these reliabilities compare quite favorably with those reported in the literature (Clarke, Rosenzweig, & Fleming, 1947).

### Coronary Status and SES

The coronary and control groups were each divided into high and low SES groups. The original intention was to use the Hollingshead-Redlich (1958) composite index of SES to achieve this breakdown, but the 5-point scale resulted in numerous ties which had to be resolved arbitrarily. Intercorrelations among the several indices related to SES available in the present study (some of which are utilized in the calculation of the index) revealed that number of years of education correlated with SES  $-.82$  in the patient group and  $-.81$  in the control Ss. Hence, the breakdown of Ss into high and low SES groups was accomplished using number of years of education as the index, and the few ties which now resulted were broken by recourse to the overall index of SES. High SES patients and controls averaged 15.3 and 15.5 yr. of education, respectively, while low SES patients and controls averaged 8.1 and 9.5 yr.

TABLE 2  
INTERRATER RELIABILITIES

Protocol	<i>r</i>
Total	
Extrapunitive	.91
Intropunitive	.91
Impunitive	.91
Obstacle dominance	.79
Ego defensive	.82
Need persistence	.96
Obstacle dominant	
Extrapunitive	.81
Intropunitive	.66
Impunitive	.65
Ego defense	
Extrapunitive	.90
Intropunitive	.97
Impunitive	.94
Need persistence	
Extrapunitive	.85
Intropunitive	.92
Impunitive	.72

Each of the 15 variables obtained from the P-F protocols was then treated by a two-way analysis of variance. The two orthogonal factors were coronary versus control status, and high versus low SES. Recall that the original coronary and control groups had been equated for age, IQ, education, and SES, so that differences which might emerge between coronary and control groups should not be due to operation of these variables.

Only one variable, the frequency of impunitive responses within the obstacle dominance category, significantly differentiated between the coronary and control groups. Patients made reliably more such responses than the control Ss (Table 3). This response is scored when the obstacle in the frustrating situation is minimized almost to deny its existence. There was also a trend, significant at only the .10 level for the total percentage of impunitive responses, in which aggression in general is minimized and glossed over, to be greater in the CAD than in the control Ss.

Level of education, the index of SES, appeared to be a more potent determiner of response to the P-F. Four of the variables were significant at least at the .05 level and

TABLE 3  
MEANS OF SIGNIFICANT MAIN EFFECTS

Variable	M	
	Patients	Controls
Coronary versus control		
Total impunitive*	31.92	27.00
Obstacle dominant-impunitive***	7.26	3.68
High versus low SES	High	Low
Total extrapunitive***	46.35	36.44
Total impunitive**	27.40	30.79
Ego defense-extrapunitive**	28.34	21.26
Ego defense-intropunitive*	12.94	15.87
Ego defense-impunitive***	13.78	20.10
Old versus young Ss	Old	Young
Total ego defense*	59.23	53.74
Total need persistence**	21.78	27.06
Obstacle dominant-intropunitive**	27.15	46.78
Ego defense-intropunitive**	16.05	12.63
Need persistence-impunitive**	5.25	8.88

Note.—SES = socioeconomic status.

\*  $p < .10$ .

\*\*  $p < .05$ .

\*\*\*  $p < .01$ .

TABLE 4  
MEANS OF SIGNIFICANT INTERACTIONS

Variable	Patient	Control
Coronary-Control $\times$ High-Low SES: Total need persistence		
High SES	21.64	26.58
Low SES	27.66	21.96
Coronary-Control $\times$ Old-Young Ss: Obstacle dominant-impunitive		
Old	8.09	2.64
Young	5.32	4.72
Coronary-Control $\times$ Old-Young Ss: Ego defense-impunitive		
Old	15.77	18.61
Young	19.63	14.58

Note.—SES = socioeconomic status.

a fifth exhibited a trend significant at the .10 level (Table 3).

The percentage of extrapunitive responses within the ego-defense category was significantly greater for the high SES Ss as was the total percentage of extrapunitive responses. High SES individuals were more likely to place blame for the frustrating situation outside themselves and in particular turn their blame or hostility against someone or something in the environment.

The percentage of impunitive responses within the ego-defense category and the total percentage of ego-defensive responses were also significantly greater for the low SES Ss. Low SES Ss appeared in general to evade and gloss over the frustrating situation and in particular regard the situation as being unavoidable and absolve the frustrating individual from any blame. Moreover the trend was for the low SES Ss to also make more intrapunitive responses within the ego-defense category, that is, to direct blame or censure upon themselves.

None of the interactions between coronary-control status and SES was significant. Total need persistence approached significance at the .10 level. This tendency resulted from the low SES coronary Ss making more need-

persistence responses than the high SES patients while the high SES control Ss made more of such responses than the low SES controls (Table 4).

### *Coronary Status and Age*

Some researchers have hypothesized that the relative importance of variables which are related to CAD might be a function of the age of the individual (Dotzauer & Naeve, 1957; Morris, 1953), and, in particular, that psychological factors might be more important in the etiology of the disease of the younger coronary patient than in his elder counterpart. Friedman and Rosenman (1960), for example, assert that their Behavior Pattern A is associated with CAD in only relatively younger patients. Miller (1965), who directly investigated the relation of certain personality variables to CAD as a function of age, found that most of the overall differences between CAD and control Ss could be accounted for by differences in the younger Ss. Thus, in the present study, differences between younger CAD and control Ss could be masked by the absence of such differences in older Ss. To evaluate the data with respect to this possibility, the coronary and control groups were divided into younger and older groups, and two-way analyses of variance, similar to those reported above concerning SES, were performed on the 15 P-F variables.\* In this case, the two orthogonal factors were coronary versus control status, and older versus younger Ss. Differences between younger coronary and control Ss which were previously masked by the total variability of the populations would be indicated by significant interactions between patient status and age. Older patients and controls averaged 61.8 and 63.6 yr., respectively, while younger patients and controls averaged 40.1 and 45.0 yr.

None of the interactions between age and patient status was significant, although one

of them (obstacle-dominant-impunitive responses) barely missed significance at the .05 level. Older patients were more likely to respond by minimizing the presence of the frustrating obstacle than their younger counterparts, whereas older control Ss made fewer obstacle-dominant-impunitive responses than the younger control group (Table 4).

There was also a tendency toward a significant interaction with respect to ego-defense-impunitive responses. Younger coronary Ss gave more responses which absolved the frustrating individual from any blame than the older patients, whereas the reverse was the case for the control Ss. Younger control Ss made fewer ego-defense-impunitive responses than the older control Ss.

Age, as a main effect, proved to be as potent as SES in relating to response on the P-F. Four of the variables were significant at least at the .05 level and a fifth variable showed a .10 trend.

An interesting reversal was obtained with respect to intrapunitive responses within the obstacle-dominant compared to ego-defensive categories. Older Ss made more ego-defense-intrapunitive responses but fewer obstacle-dominant-intrapunitive ones. The latter responses are characterized by a reinterpretation of the frustrating situation so that the frustrating obstacle is no longer construed as such, but may even be seen as beneficial; whereas ego-defense-intrapunitive responses, as previously described, are scored when S blames himself for the frustrating situation. There was also a trend, significant at only the .10 level, for the total ego-defense responses, in which emphasis is placed in general on protecting the self, to be greater in older than in younger Ss. The other two significant effects both concerned the need-persistence category wherein older Ss made fewer impunitive-need-persistence responses. Older Ss were less likely to look to time to bring about an amelioration of the frustrating situation or attempt to find solutions to the frustrating situation in general.

### DISCUSSION

In the previously cited review of the experimental literature concerning the role of personality factors in the etiology of CAD

\* To maximize the contribution of age, the total set of available protocols was consulted and 15 oldest and 15 youngest matched pairs of coronary and control Ss were constituted. The differences between coronary and control status for this slightly different set of Ss remain essentially the same as those reported in conjunction with the analyses of SES but are not identical.

(Mordkoff & Parsons, 1966), it was pointed out that there exists little empirical support for the concept of a "coronary personality," in the sense of a particular constellation of personality traits that is differentially associated with the occurrence of CAD. It was suggested that apparent differences cited in some studies actually reflected discrepancies between coronary and control groups in such demographic characteristics as age and SES. The results of the present study were consistent with both these assertions.

Relatively few differences in P-F scores were obtained between the CAD and control Ss, who had been matched for these demographic characteristics, and the nature of the differences which were obtained was not in accord with those which would have been predicted by most formulations of the coronary personality. Coronary patients made more impunitive responses on the P-F, responses in which aggression is glossed over, and more obstacle-dominant-impunitive responses, where the existence of the frustrating situation is denied, than control Ss. This would appear to be directly contrary to that which would be predicted by any theory of the coronary personality except that of Menninger and Menninger (1936) in which the aggressive tendencies of the CAD patient are thought to be repressed and, possibly via some mechanism like reaction formation, result in the appearance given by the CAD patients in the present study. This alternative does not seem to warrant serious consideration, for the viewpoint of Menninger and Menninger has little, if any, other empirical support (Mordkoff & Parsons, 1966) and most of the currently popular theories of the coronary personality are more similar to that of Friedman and Rosenman (1960) in which the aggressive manifestations are overt.

Compared with coronary-control differences, the demographic variables investigated in the present study produced a large number of significant effects on the P-F test. Thus it does not seem that the instrument was so unreliable that it was intrinsically incapable of producing significant results. Rather, although the dimensions tapped by the P-F are decidedly relevant to the characteristics of the postulated coronary personality, presence

or absence of coronary disease was just not a significant source of variance.

Most published clinical formulations of the coronary personality have been based upon middle- and upper-class patient populations. Mordkoff and Parsons (1967) suggested that the general characteristics ascribed to the coronary personality might well be applicable to a large portion of the stratum of the population. The present results were also consistent with this possibility. The nature of the differences obtained between high and low SES Ss were those which might have been predicted from a theory of the coronary personality. The high SES Ss appeared on the P-F the way coronary personalities ought to if the theory were valid. They were more extra-punitive and less impunitive, these traits being related in particular to ego-defensive maneuvers.

The results of this experiment should not be taken to imply that psychological factors in general are not related to CAD. Non-specific psychological stress acting either acutely to precipitate a myocardial infarction in individuals who are already structurally impaired (Dreyfuss, 1959) or chronically over a period of years to contribute to the eventual development of CAD (Russek, 1959) have also been suggested as possible ways psychological factors can be related to CAD. The hypothesis which was not supported in the present study is the specificity of the relation of psychological factors to CAD; that is, there was no evidence of a "coronary personality."

#### REFERENCES

- ARLOW, J. A. Identification mechanism in coronary occlusion. *Psychosomatic Medicine*, 1945, 7, 195-209.
- CLARKE, H. J., ROSENZWEIG, S., & FLEMING, E. E. The reliability of the scoring of the Rosenzweig Picture-Frustration Study. *Journal of Clinical Psychology*, 1947, 3, 364-370.
- DOTZAUER, G., & NAEVE, W. Coronary thrombosis: German study shows increase 1948-1957. *Deutsche Medizinische Wochenschrift*, 1957, 84, 1237.
- DREYFUSS, F. Role of emotional stress preceding coronary occlusion. *American Journal of Cardiology*, 1959, 3, 590-596.
- DUNBAR, F. *Psychosomatic diagnosis*. New York: Hoeber, 1948.
- FRIEDMAN, M., & ROSENMAN, R. H. Overt behavior pattern in coronary disease: Detection of overt

- behavior patterns in patients by a new psychophysiological procedure. *Journal of American Medical Association*, 1960, 173, 1320-1325.
- HOLLINGSHEAD, A. B., & REDLICH, F. C. *Social class and mental illness*. New York: Wiley, 1958.
- MENNINGER, K. A., & MENNINGER, W. C. Psychoanalytic observation in cardiac disorders. *American Heart Journal*, 1936, 11, 10-21.
- MILLER, C. K. Psychological correlates of coronary artery disease. *Psychosomatic Medicine*, 1965, 27, 257-264.
- MORDKOFF, A. M., & PARSONS, O. A. The coronary personality: A critique. *Psychosomatic Medicine*, 1967, 29, 1-14.
- MORRIS, J. N. Coronary heart disease and physical activity at work. *Lancet*, 1953, 2, 1111.
- ROSENZWEIG, S., FLEMING, E. E., & CLARKE, H. J. Revised scoring manual for the Rosenzweig Picture-Frustration Study. *Journal of Psychology*, 1947, 24, 165-208.
- RUSSEK, H. I. Role of heredity, diet and emotional stress in coronary heart disease. *Journal of American Medical Association*, 1959, 171, 503-508.

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