

# TECHNICAL PAPERS

## A Preliminary Report on the Study of the Relationship of Psychosomatics to Oral Conditions—Relationship of Personality to Dental Caries

John H. Manhold<sup>1</sup> and Vivian W. Manhold<sup>2</sup>

Tufts College Dental School, Boston

The influence of psychosomatic factors on bodily disorders has been established by the correlation found between clinical and psychological data. Such pathological conditions as duodenal ulcer (1, 27), mucous colitis (20, 25), asthma (5, 9, 10), chronic rheumatism and rheumatoid arthritis (12), and thyroid disorders (8, 13, 17), have been shown to have psychogenic factors. Many assumptions have been made that oral conditions may also have

TYPE OF SUBJECTS	NUMBER OF SUBJECTS	NEUROTIC TENDENCIES VS. D.M.F. SCORE	INTROVERSION-EXTROVERSION VS. D.M.F. SCORE	SIGNIFICANCE LEVEL	
				5%	1%
MEN	25	+446	+405	.388	.496
WOMEN	25	+463	+447	.388	.496
MEN AND WOMEN	50	+474	+443	.276	.358

FIG. 1. Correlation coefficients.

a psychosomatic basis (6, 11). Sometimes these assumptions are based upon chemical tests of blood and saliva of institutionalized subjects (15, 24, 26), and more often merely upon clinical observations (18, 19). In no instance has there been statistical proof of a correlation between oral conditions and psychogenic factors. This study was initiated to discover whether such a correlation exists among persons who would be classified as normal from the psychiatric standpoint.

The Personality Inventory of Robert G. Bernreuter (2), and a modified D.M.F. (decayed, missing, filled) scale (14, 21) were employed as systems of measurement. Bernreuter's Personality Inventory is advantageous for our purposes in that it permits the measurement of several different traits of personality at one time without allowing the nature of the qualities under study to be readily discernible either by the examiner or by the person examined. It purports to measure neurotic tendency, self-sufficiency, introversion-extroversion, dominance-submission, confidence in one's self, and sociability. On our first 21 subjects, the inventory was scored for all six traits, but we discontinued scoring for all as soon as we discovered that only two traits, introversion-extroversion and neurotic tendency, were highly correlated with a dental condition. Snyder tests (22, 23) for acidophilus

bacilli were also run on the first 21 cases, but did not correlate with any Bernreuter traits. The high correlations were between D.M.F. and the two traits mentioned.

Therefore, we proceeded to increase the number of subjects to 50, equally divided as to sex. All subjects were faculty, students, or employees of Tufts College Dental School. The age, sex, and education of each person was recorded, but names were omitted in order to increase our expectation of obtaining truthful answers to the questions. The subjects were charted for the number of caries, fillings, and missing teeth. Each surface of a tooth containing caries or a filling was scored as one point.

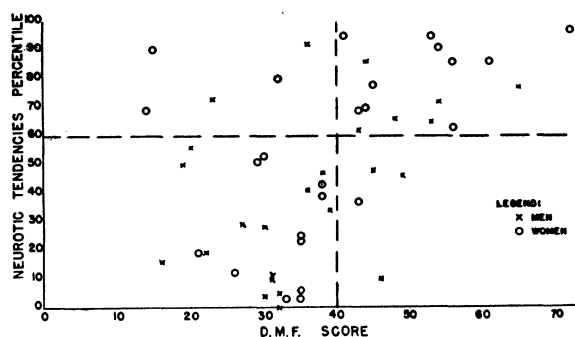


FIG. 2. Neurotic tendencies percentile vs. D.M.F. score.

Extracted teeth were scored as 3 points in accordance with the Bodecker system (3, 4), and Marshall-Day's A.C.F. (average caries frequency) ratings (7, 16). Decay around fillings was not counted unless it involved new sur-

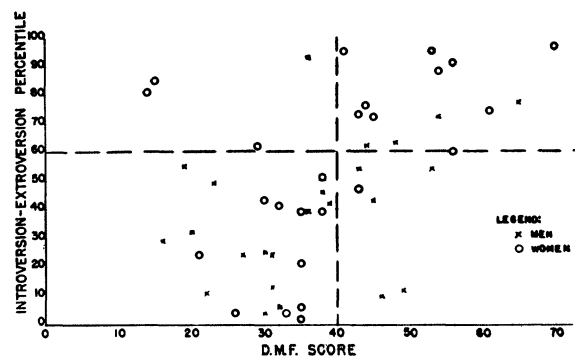


FIG. 3. Introversion-extroversion percentile vs. D.M.F. score.

faces, for such decay is usually considered to result from faulty restorations.

The D.M.F. score was then placed on the outside sheet of each Bernreuter test, and the tests were scored for introversion-extroversion and neurotic tendencies. Scoring was done with Bernreuter standard scoring sheets and percentiles were then found on the standardized scale.

The results are presented in Figs. 1-4. All but four of the subjects who were well below the lowest levels of

<sup>1</sup> Dept. of Oral Pathology.

<sup>2</sup> Psychometrist Counseling Service, Y.M.C.A.

neurotic tendencies (60 percentile and slightly below) had gained less than a 40 D.M.F. score, while those who were above these limits had, with but five exceptions, gained a D.M.F. score higher than this. The results obtained on the introversion-extroversion scoring showed that all but six of the subjects who were well within the normal limits had gained fewer than 40 points, and all but four above this limit had scored higher than 40.

The correlation coefficient for neurotic tendency percentile and D.M.F. points in men was +0.446, and for introversion-extroversion and D.M.F. points the coefficient was +0.405. These correlations are significant at the 5% level of confidence.

The coefficient of correlation between neurotic tendency percentile and D.M.F. points in women was +0.463, and

TYPE OF SUBJECTS	NUMBER OF SUBJECTS	NEUROTIC TENDENCIES	INTROVERSION EXTROVERSION
MEN	25	7.8	5.3
WOMEN	25	11.9	11.9
MEN AND WOMEN	50	19.8	10.9

SIGNIFICANCE  
 $\chi^2 > 3.84$

FIG. 4. Chi square values.

the introversion-extroversion coefficient was +0.447 which is also significant at the 5% level.

The combined correlation coefficients for the total 50 subjects were  $n_c + 0.474$  and  $i-c_c + 0.443$ . These are significant at the 1% level.

Another method of testing the relationship just shown is the chi square test, which was applied with the following tabulated results.

Since all of these results are well above the required 3.84, the data obviously have statistical significance. The mean results indicate that there is less than 1% possibility that the results might be owing to chance distribution.

The Bernreuter Personality Inventory is not necessarily an exact measurement of personality, but is today the best and most valid test of its kind to measure traits of personality as divorced from intelligence. Furthermore, the important fact is not so much that specific personality traits are measured, but rather that a correlation between some traits and oral conditions exists. The D.M.F. scales which we are forced to use are also not the final answer to the measurement of caries incidence, but again are the most valid we have at our command. Added to this, we have a good indication that the value of the correlation coefficient will prove to be above +0.40 if further studies are undertaken. This is surprisingly high if one realizes that the best correlations between medical disorders and psychic factors are rarely higher than +0.50. It appears that the correlation between psychological factors and oral conditions merits further investigation with different types and larger numbers of subjects.

## References

- BELL, J. *Ann. Eugen., Camb.*, 1940, **10**, 379.
- BERNREUTER, ROBERT G. *The personality inventory*. California: Stanford Univ. Press, 1935.
- BODECKER, C. F. *J. Amer. dent. Ass.*, 1949, **26**, 1453.
- BODECKER, C. F. and BODECKER, H. W. C. *Dent. Cosmos*, 1931, **73**, 707.
- BRAY, G. W. *Recent advances in allergy*. Philadelphia: Blakiston, 1937. 2nd Ed.
- BRIGGS, E. F. *Oral Hygiene*, 1936, **26**, 341.
- DAY, C. D. and SEDGWICK, H. J. *Dent. Cosmos*, 1935, **77**, 442.
- EWALT, J. *J. A. M. A.*, 1944, **126**, 150.
- FRENCH, T. M. *Amer. J. Psychiat.*, 1939, **96**, 87.
- FRENCH, T. M. and ALEXANDER, F. *Psychosom. Med.* Mono. No. 4, 1939.
- GILL, A. W. *Brit. dent. Rec.*, 1941, **61**, 175.
- GORDON, R. G. *Brit. med. J.*, 1939, **1**, 1165.
- HALLIDAY, J. L. *Lancet*, 1943, **2**, 692.
- JACKSON, D. *Brit. dent. J.*, 1948, **85**, 79.
- LIPPMAN, C. W. *J. nerv. ment. Dis.*, 1937, **86**, 680.
- MARSHALL-DAY, C. D. *J. Amer. dent. Ass.*, 1944, **31**, 52.
- MEANS, J. H. *Thyroid and its diseases*. Philadelphia: J. B. Lippincott, 1937.
- MELLARS, N. and HERMS, F. W. *Amer. J. ortho. oral Surg.*, 1946, **32**, 30.
- MILLER, S. C. and FIRESTONE, J. M. *Amer. J. Orthodontics*, 1947, **33**, 675.
- RYLE, J. A. *Lancet*, 1939, **2**, 297, 353, 407.
- SANDLER, N. C. *J. dent. Res.*, 1940, **19**, 545.
- SNYDER, M. L. *J. dent. Res.*, 1940, **19**, 349.
- . *J. Amer. dent. Ass.*, 1941, **28**, 44.
- STRONGIN, E. I. and HINSIE, L. E. *Amer. J. Psychiat.*, 1938, **94**, 1459.
- WHITE, B. V. *et al.* *Psychosom. Med.* Mono. No. 1, 1939.
- WHITE, C. J. *J. cutan. Dis.*, 1919, **37**, 671.
- WILSON, A. T. M. *Brit. J. med. Psychol.*, 1939, **18**, 112.

## A Preliminary Report on Histochemography<sup>1, 2</sup>

George A. Boyd and Francis A. Board

Department of Radiation Biology,  
School of Medicine and Dentistry,  
University of Rochester, Rochester, New York

During the summer of 1948, it was observed that normal rat bone marrow diluted with clear dog serum blackened an Eastman NTB photographic plate when smeared directly on the emulsion surface and stored at approximately -15° C for several days. This observation was made on control experiments during an attempt to obtain single bone marrow cell autoradiographs.

Fig. 1 is a dark-field photomicrograph showing individual silver grains after development. The grains are

<sup>1</sup> A histochemograph is defined as a gross picture on a photographic plate or, at high magnification, a pattern of silver grains produced by the chemical action of a histological specimen in direct contact with the emulsion of the plate.

<sup>2</sup> This paper is based on work performed under contract with the U. S. Atomic Energy Commission at the University of Rochester Atomic Energy Project, Rochester, New York, and supported in part by the National Advisory Cancer Council of the U. S. Public Health Service.