Psychotherapy and Psychosomatics
Editor: *P.E. Sifneos,* Boston, Mass.
Publishers: S. Karger, Basel
Reprint (Printed in Switzerland)

Psychother. Psychosom. *27:* 163–167 (1976/77)

Borderline Hypertensives Volunteering for Follow-Up and Biofeedback

A Preliminary Study: Locus of Control Characteristics[1]

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Abstract. We compared the locus of control scores of the following groups: (1) 19 male borderline hypertensives volunteering for biofeedback treatment; (2) 100 consecutive males who were screened for hypertension; (3) 30 male cancer patients receiving radiation therapy, and (4) the normative data from college students.

The biofeedback volunteer group was significantly more internal in locus of control as compared to all other groups. The locus of control of the borderline hypertensives within the screened population did not differ from the normotensives, but the screened population as a whole had a relatively internal locus of control. Our findings imply that the 'internals' may be more attracted to self-control treatments like biofeedback, and data generated from this particular population may have limited generalizability, especially in regard to 'externals'.

The purpose of this study was to understand the characteristics of hypertensive patients who participate in and benefit from a nonpharmacologic method of blood pressure control through biofeedback. This is a part of an ongoing study to develop a more effective biofeedback treatment technique for hypertension.

Our report concerns the initial phase of the study, in which only male subjects were used. The subjects for our study were referred to us by the Heart Association of Greater New Haven, which has an ongoing program of mass screening for hypertension in various sites in our community. An individual was

[1] Presented at the 11th European Conference on Psychosomatic Research, Heidelberg, West Germany, September 14–17 (1976).

This research was supported in part by USPHS grant 53532 1 RO3 MH 25639–01A1.

referred to us if his blood pressure was found to be between 140–180 mm Hg systolic or 90–105 mm Hg diastolic. These individuals were told at screening that the follow-up examination was free of charge and that they had a choice concerning whether they would be treated with biofeedback. Men whose pressures exceeded our criteria were referred directly to their own physicians or to a medical clinic. Some of our subjects were self-referred – they simply walked in to have their blood pressure checked, attracted by the sign in front of our laboratory which says 'Borderline Blood Pressure Project'. All the self-referred subjects had been told previously that they had borderline hypertension.

When the potential subjects came to our laboratory for examination, they were given an interview concerning their health status, a physical examination with emphasis on the cardiovascular system, and the locus of control questionnaire developed by *Rotter.*

Locus of control measures the extent to which an individual believes that important reinforcements in life are dependent on his own efforts rather than on chance or powerful others. This is measured by a 29-item questionnaire, which is sometimes called the 'Social Reaction Inventory'. For example, previous studies have shown that internals, who believe that they can control or influence their environment and reinforcement, are more likely to engage in constructive social action, and are more likely to learn, to remember and to employ information relevant to their personal goals (*Rotter,* 1975).

The locus of control dimension was studied in biofeedback of heart rate by *Foutopoulos* (1970), and by *Ray and Lamb* (1974). *Ray and Lamb* found that internals were better able to *increase* heart rate while externals were better able to *decrease* heart rate. They suggest that individuals respond differently to the task of controlling heart rate and that these differences may be observed in personality measures such as locus of control.

We decided to use this measure of personality to explore whether the locus of control dimension would be helpful in discriminating individuals who were better able to use biofeedback methods to *decrease* their blood pressure. We also hypothesized that those who volunteer to learn a self-control technique such as biofeedback are more likely to be internal on the locus of control measure.

19 consecutive referrals comprised our experimental group. Their mean age was 46.4, with a standard deviation of 14.16. For comparison, we administered the locus of control questionnaire to all screenees during 1 day's mass screening until 100 males completed the questionnaire. None of the persons screened at this time belonged to our volunteer group. Of the 100, 45 screenees had blood pressure in the borderline range.

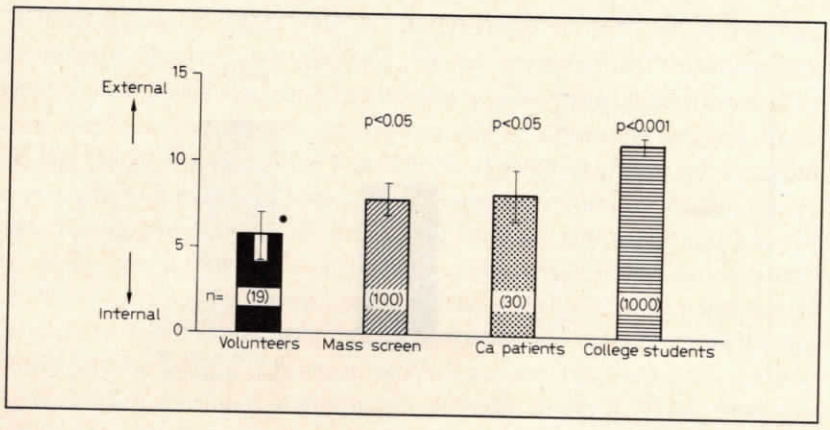

Fig. 1. Locus of control scores of biofeedback volunteers and comparison groups. All subjects and comparison groups are males. * = Mean ± SEM.

Figure 1 shows the locus of control scores of the volunteers and the 100 consecutive males who filled out the questionnaire at the time of mass screening. As we expected, the volunteers were significantly more internal as compared to the comparison group of screenees ($p < 0.05$). There was no significant difference in demographic data between these two groups.

We then compared the locus of control scores of our volunteers with the locus of control scores of the 45 borderline hypertensives in the screenee population. Although both groups were now comparable in terms of blood pressure, the volunteers still were significantly more internal ($p < 0.05$) than the borderline hypertensives in the screened population (fig. 2).

The locus of control of the screened borderline hypertensive group did not differ significantly from that of the normotensives in the screened population, in spite of recent evidence that indicated that some discontented externals were more hypertensive (*Naditch,* 1974). The mean locus of control scores of the total screened population on the other hand was more internal than that of a large comparison group of college students (*Rotter,* 1975) (fig. 1).

Because our volunteer population had locus of control scores that were strikingly internal relative to the screened population as well as other normative groups (*Rotter,* 1975), we wondered whether this extreme degree of internality was situationally determined. These individuals knew that they had a medical condition and that they were responding to questionnaires in an office within a general hospital. Thus, we decided to obtain an additional comparison group

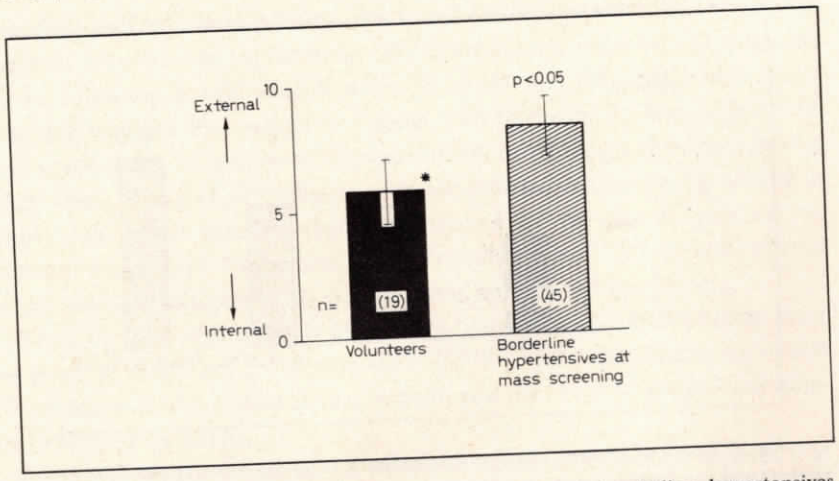

Fig. 2. Locus of control of biofeedback volunteers and borderline hypertensives screened (all males). * = Mean ± SEM.

composed of men who were aware that they had a serious medical condition and who were receiving treatment as outpatients. This group consisted of cancer patients who were receiving radiation therapy in the hospital. As figure 1 shows, the volunteer population again was significantly more internal than the 30 consecutive male cancer patients below 70 years of age.

To summarize the results, regardless of blood pressure status, those individuals who actually came to our laboratory for a follow-up physical examination and possible biofeedback treatment of borderline hypertension were significantly more internal than persons who participated in a mass blood pressure screening project. They were more internal than college students and they were also more internal than cancer patients undergoing radiation therapy.

What, then, are the implications of our study? Our study confirms and expands other findings that internality is associated with social and medical activism. For example, volunteers in a state mental hospital (*Beckman,* 1972) were found to be more internal than controls. *Garrity* (1973) found that internality predicted good return to work following myocardial infarction in a study of 58 patients.

In fact, one of the remarkable findings about our volunteer subjects was that, during the course of the biofeedback treatment, many of them also undertook other self-improvement projects, such as reducing smoking and weight, learning how to swim, etc.

A methodological implication of our findings is that volunteering for follow-up physicals after mass screening may not be random and that the results obtained from any related experimentations may not be generalizable because of selection bias. For example, the strategies and mechanisms our subjects use in controlling blood pressure during biofeedback experiments might not be applicable to a group of externals in the general population who have similar degrees of hypertension. Furthermore, in view of the relatively internal locus of control of the entire screened sample, a clinical and epidemiological implication is that hypertension screening may attract only the internal locus of control segment of the population and that follow-up physicals are pursued only by an even more extremely internal segment for whom biofeedback may be an attractive method of blood pressure control. One conclusion we might derive from this finding is that, if a comprehensive approach to the detection and treatment of hypertension is to become a reality, more persuasive techniques should be devised to communicate the fact that individual effort, and not luck, offers the best opportunity for preventing the complications of hypertension.

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