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Psychological Factors in the Treatment of Chronic Low Back Pain

Follow-Up Study of a Back School Intervention

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Abstract. The aim of the study was to investigate the role of certain psychological factors (e.g. neurotic features, alexithymia, and hostility) as intervening variables modifying the outcome of the back school intervention or correlating with spontaneous recovery. The results indicated that those patients who reacted favorably to the back school intervention could be described as emotionally well adjusted and controlled showing relatively good cognitive capacity with undisturbed reality testing. The poor responders in the treatment group were less capable cognitively and not so well balanced emotionally. Patients showing spontaneous recovery in the control group were characterized by a more lively and less controlled way of expressing emotions and affects. In contrast to these, patients who showed increasing disability during the 1-year follow-up were characterized by restricted expression of emotions and affects indicating alexithymia.

Introduction

Low back pain exemplifies a major health problem in most industrialized countries. In Finland, for instance, there has been a rapid increase in disability pensions due to musculoskeletal diseases during the past two decades: an increase of 144% from 1969 to 1984, while at the same time an increase caused by all diseases has been 51% only [1].

The chronic low back pain syndrome has proved to be a special problem considering the effectiveness of various treatment methods. Various forms of the so-called back school have been developed in order to find practical alternatives to costly surgical and other medical treatment. According to Zachrisson-Forssell [2], the main goal of the back school program is to avoid the therapeutic nihilism and pessimism connected with low back disorders because of the chronic nature of these disorders and due to the lacking knowledge of the exact etiology of the syndrome. To reach this goal it is necessary to motivate patients to take care of their health. Therefore, patients need information and skills.

Studies evaluating the efficiency of back school interventions have so far given somewhat contradictory results [3]. Bergquist-Ullman and Larsson [4] were able to show that the sick leaves after an acute low back pain period were significantly shorter among those participating in the back school intervention program compared to controls. In the subjective pain experience after the treatment there was, however, no significant difference. Lankhorst et al. [5], in their study of chronic low back pain patients, could not find any significant benefits in a back school intervention.

In addition to the differences in samples, one possible explanation for these contradictory results might be the fact that there are probably subgroups which react in different ways to treatment. The problem is common to all new therapeutic methods: to identify the appropriate patient population for the specific treatment method, i.e., those patients who are most likely to benefit from a particular kind of treatment.

Generally speaking, there are two main types of approaches in studying the problems mentioned above. First, you can compare those patients who react favorably to treatment to those with poor results. Or, secondly, you can form the subgroups on a theoretical basis and then compare the treatment outcome of these groups. As far as the authors of this report know, neither type of research has so far been accomplished in back school interventions. On the other hand, there are some studies which report treatment outcome of different multimodal pain treatment programs by comparing subgroups of patients, usually with the aid of the MMPI [6–9]. Again, the results of different studies are in clear contradiction to each other. As Love and Peck [10] in their recent review have pointed out, there are many differences in patient samples, treatment methods etc. which make it difficult at the present state of knowledge to draw firm conclusions about the interaction of patient characteristics with any particular type of pain treatment.

The first type of approach mentioned above is represented by Forrest and Wolkind [11] who compared two groups of low back pain patients (good vs. poor responders) receiving physiotherapy. In their previous study they found the poor responders to score significantly higher on three subscales of the Middlesex Hospital Questionnaire (MHQ): somatic, obsessional, and depressive. In a more recent study Lloyd et al. [12], however, failed to replicate the earlier findings.

During recent years the phenomenon of alexithymia [13] has gained growing interest among researchers in the field of psychosomatics. This construct refers to patients characterized by lacking ability to recognize and describe their feelings, as well as by a difficulty in discriminating between emotional states and bodily sensations [13, 14]. Although there are a number of studies on the prevalence of alexithymic features in chronic pain patients [15–17], very little has been done to explore its possible role in the process of recovery and in the treatment.

The aim of the present study is to investigate the role of certain psychological factors (neurotic features, alexithymia, and hostility) as predictors of the outcome of the Swedish type of back school in the treatment of chronic low back pain patients. This study is a part of a larger project on the effectiveness of the Swedish type of back school. The main results of the study are reported elsewhere [18].

Hypothesis

The study was based on a general assumption that psychological factors play a role as intervening variables which modify the reactions to the back school intervention and which have an effect on the spontaneous course of the disorder. It was furthermore assumed that different kinds of variables correlate to the outcome measures in the case of intervention in comparison with the results of the control group (for the general design of the study, see fig. 1). Thus an effort was made to combine the two approaches described above.

According to earlier research, although different treatment methods were used, it was assumed that neurotic features, especially depression, correlate negatively to recovery in both groups. Furthermore, variables reflecting good emotional rapport and expressiveness, i.e. lack of alexithymia, were assumed to be special predictors for spontaneous recovery.

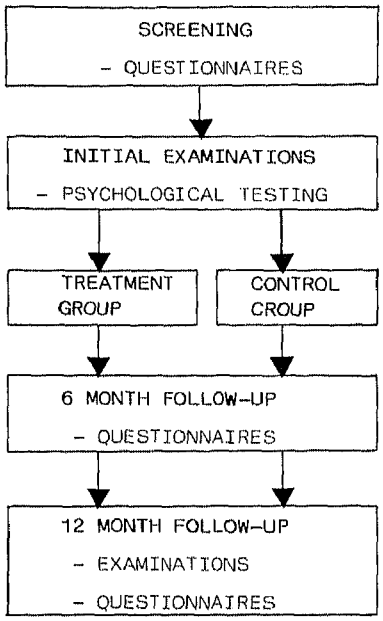


Fig. 1. Design of the study.

Subjects and Methods

Subjects

The sample comprised 204 female employees of a large, cooperative commercial enterprise in Finland. The criteria for the participants were: low back pain syndrome of at least 1 year's duration and manifest symptoms during the month preceding the initial examination. Patients having rheumatoid arthritis or any other systemic connective tissue diseases and those who had undergone back surgery were excluded. A minimum of 1 year's employment was also required. The selection of patients for the study was completed through a mailed questionnaire and a clinical examination by a doctor.

In the course of the study, 16 patients were lost and, additionally, 13 were excluded from the present analysis due to incomplete psychological data. Thus a total of 175 cases was included in the present report.

The participants were randomly assigned to a treatment group and a control group. Individual matching was performed in respect of age, severity of the low back pain syndrome, and the quality of work. The main characteristics of the subjects of both groups are summarized in table 1.

Methods

The patients in the treatment group attended a 1-hour meeting six times in the course of 3 weeks. A review class twice took place 6 months later. The whole program was organized and conducted by a physiotherapist. The review class in this modification of the back school was the most significant difference compared to the original one. The patients in the control group were given the back school information in written form; a 15-page copy comprising basic anatomical and physiological facts about the spine, principles of ergonomics for low back pain patients, in-

Table 1. The baseline data of the treatment group and the control group

	Treatment group (n = 95)	Control group (n = 93)	Significance of difference between the two groups
Age, years (mean ± SD)	46.1 ± 9.5	45.4 ± 9.2	NS
Duration of symptoms, years (mean ± SD)	11.6 ± 9.4	9.9 ± 8.2	NS
Severity of symptoms, %[1]			
Very mild	19	11	NS
Mild	58	51	
Moderately severe	16	26	
Severe	7	13	

[1] Evaluated by the physician.

Table 2. Mean values (± SD) of the psychological measures in different outcome groups, and significance of the differences

	Variables	Treatment groups		Control groups	
		T+ (n = 44)	T− (n = 41)	C+ (n = 37)	C− (n = 53)[1]
MHQ	FFA	5.46 ± 3.53	4.56 ± 3.87	6.05 ± 3.20	6.08 ± 3.90
	PHO	3.61 ± 2.19	4.00 ± 2.98	4.32 ± 2.32	3.72 ± 2.40
	OBS	7.48 ± 2.68	7.39 ± 3.02	8.24 ± 2.55	7.66 ± 2.37
	SOM	6.14 ± 3.12	5.98 ± 3.78	6.60 ± 3.58	6.92 ± 3.72
	DEP	5.50 ± 2.82	4.93 ± 3.17	5.35 ± 2.85	5.94 ± 2.89
	HYS	5.09 ± 2.86	4.29 ± 3.42	5.57 ± 3.60	4.04 ± 2.59
Rorschach	R	20.3 ± 8.9	15.4 ± 6.3	20.2 ± 8.1	16.5 ± 6.3
	rej	0.2 ± 0.6	1.2 ± 2.4	0.4 ± 1.2	0.9 ± 2.0
	Ri	5.3 ± 1.7	4.0 ± 2.2	5.2 ± 1.7	4.7 ± 2.0
	$GL_{\bar{x}}$	29.3 ± 3.6	24.8 ± 9.2	27.7 ± 5.2	27.7 ± 6.3
	Mfun + sex	0.9 ± 0.8	0.8 ± 1.0	1.0 ± 1.3	0.5 ± 0.9
	FC	1.5 ± 1.5	0.5 ± 1.0	0.8 ± 1.1	0.9 ± 1.0
	EA	36.9 ± 20.9	28.3 ± 18.6	35.0 ± 24.4	28.8 ± 19.5
	AT%	12.2 ± 13.7	24.0 ± 30.2	16.1 ± 20.7	14.4 ± 21.0
	HO/Elizur	1.5 ± 2.0	1.9 ± 2.3	1.4 ± 1.9	1.1 ± 1.5
SCT	A+A	14.4 ± 6.3	13.3 ± 6.1	14.8 ± 5.7	12.2 ± 4.9

[1] Because of incomplete data there are 10 persons lacking in the treatment group and 5 in the control group.

structions for exercises of body muscles and for action during an acute phase of low back pain.

Psychological testing was accomplished in small groups on the same days as the initial medical examination was done. The psychological measures used were the MHQ [19], the Rorschach Test, and a Sentence Completion Test (SCT) modified for this study.

The MHQ comprises six scales measuring different psychoneurotic features: anxiety (FFA), phobic anxiety (PHO), obsessional (OBS), somatic (SOM), depressive (DEP), and hysterical (HYS) [19, 20].

The Rorschach protocols were scored by the standard technique [21], and the scorer (J.K.) was kept blind to the allocation of patients to treatment or control groups.

The following variables and indices were used: total number of answers (R), number of rejected tables (rej), number of form-color responses (FC), percentage of anatomic responses (AT%), reality index by Neiger (Ri), a modified genetic level index (GL) [22], Elizur's hostility index (HO/Elizur) [23], experience actual index (EA), and number of human movement responses with the content of play, dancing, erotic, sexual, or other pleasurable activity (Mfun+sex). A low score in this last variable was supposed to indicate alexithymia.

Another index of alexithymia was derived from the SCT, i.e. the sum of adjectives and adverbs (A+A) used by the subject. A low score on this index was supposed to indicate alexithymia. The rationale behind this measure is that previous research has shown alexithymic individuals to be verbally less productive and especially having a more limited vocabulary for expressing feelings and affective nuances [24].

For the purpose of analyzing the interplay of psychological measures and the treatment outcome, both study groups were divided into 'good responders' (T+ and C+) and into 'poor responders' (T– and C–). The Oswestry index of experienced disability was chosen to serve as the particular criterion variable, because it is well documented in the literature [25]. It showed good reliability in this study, too [18]. If the difference between the initial measurement and the 1-year follow-up result showed a decrease of experienced disability, the subject was considered a good responder (T+ or C+); if the difference equalled zero or reflected an increase of disability, the subject belonged to the group of poor responders (T– or C–). Differences between these four outcome groups were then investigated by comparing their means in the psychological measures and, furthermore, using a multiple discriminant analysis.

The p values ($p <$) of two-way t tests

T+/T–	T+/C+	T+/C–	T–/C+	T–/C–	C+/C–
–	–	–	0.10	0.10	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	0.10	–	–	0.05
0.01	–	0.02	0.01	–	0.02
0.02	–	0.05	0.10	–	–
0.01	–	–	0.02	–	–
0.01	–	–	–	0.10	–
–	–	0.05	–	–	0.05
0.001	0.05	0.05	–	0.05	–
0.10	–	0.10	–	–	–
0.05	–	–	–	0.10	–
–	–	–	–	0.05	–
–	–	0.10	–	–	0.05

Results

The means of different outcome groups and the results of respective t tests are shown in table 2. The means of the MHQ subscales only indicate one statistically significant difference between the outcome groups: those responding favorably in the control group (C+) – indicating spontaneous recovery – score significantly higher on the hysteria scale than poor responders in the control group (C–). A similar trend is observed in the treatment group, too.

Table 3. Correlations of variables with the two discriminant functions

Variables		Discriminant functions	
		I	II
Rorschach	R	0.68	0.35
	FC	0.70	−0.27
	Ri	0.63	0.06
	GL	0.60	−0.21
	AT%	−0.47	0.28
	HO/Elizur	−0.18	0.33
	Mfun + sex	0.22	0.52
SCT	A + A	0.26	0.48
MHQ	HYS	0.34	0.48

An analogous pattern can be seen in the mean values of the alexithymia indexes used in this study (A+A and Mfun+sex) indicating that poor responders in both groups are more alexithymic than good responders, although the difference is significant in the control group only.

As to the Rorschach variables there are several significant differences between the outcome groups. A comparison of the respective results in the treatment group and in the control group makes it easy to see that there are more significant differences between T+ and T− groups than between C+ and C− groups. In other words, this set of variables is a more powerful discriminator in the treatment group than in the control group. The general line of the results of the treatment group indicates that good responders are more productive in Rorschach (high R, less rejections), they give more FC responses, their reality testing is sounder (high Ri), and the general developmental level (GL) of their responses is higher.

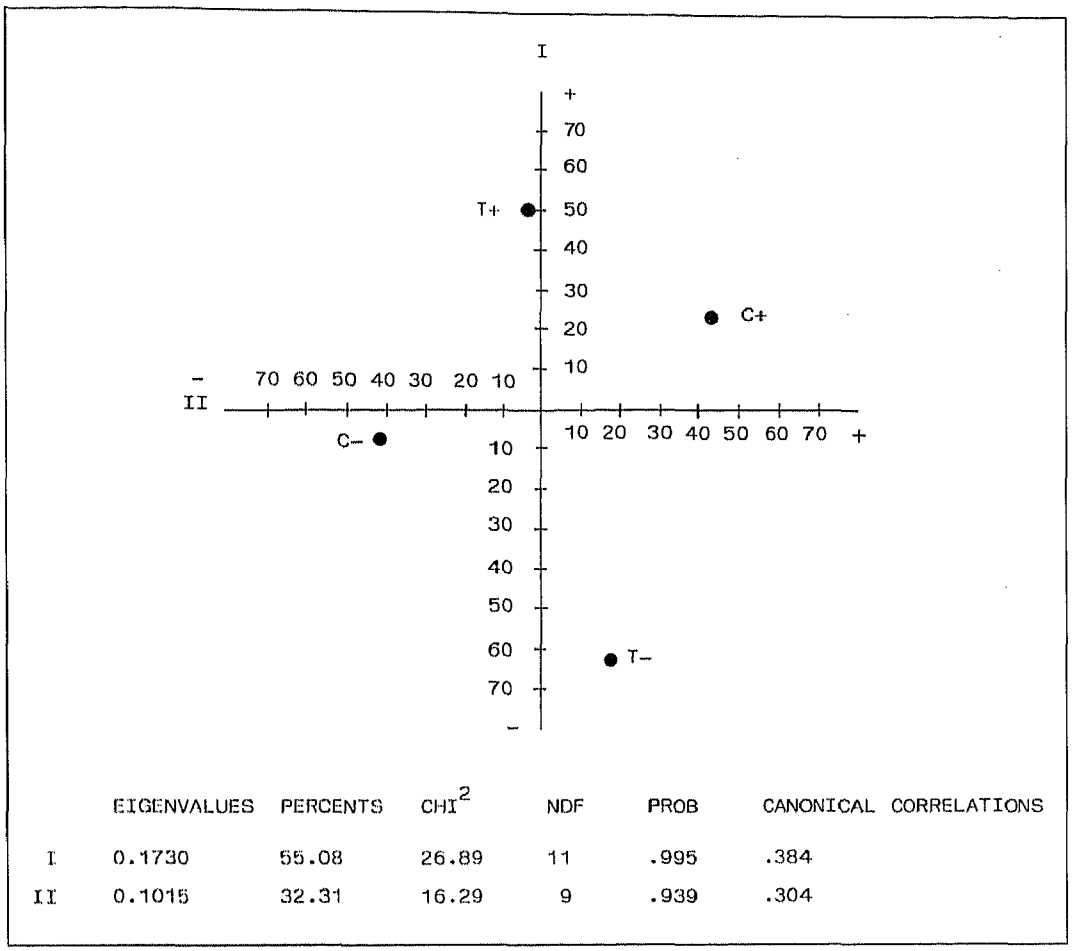
In the control group, the good responders score higher in the total number of responses (R) and in the number of M responses with the content of play and/or sex (fig. 2).

For the purpose of further analyzing the differences between these four outcome groups, nine variables were chosen for a multiple discriminant analysis. The analysis yielded three discriminant functions of which the first one was statistically significant, the second one just about to reach the level of significance, and the third one clearly nonsignificant. As can be seen in figure 2, the two first discriminant functions differentiate all four outcome groups from each other giving support to the proposed hypothesis that different sets of variables will predict the outcome in these two study groups.

For the interpretation of discriminant functions the correlations of these nine variables to two discrimination functions are shown in table 3. The highest correlations with the first discriminator are yielded by Rorschach variables: FC, R, Ri, and GL, in this order. The highest correlations with the second discriminator, respectively, are given by Mfun+sex, A+A index from the SCT, and the HYS scale from the MHQ.

Discussion

The results of the main study concerning the effectiveness of the back school intervention have been published elsewhere [18] showing that the back school intervention significantly decreased the experienced pain and disability. This conclusion is based on the results of the visual analogue scale, the global index of low back pain, and the frequency of low back pain attacks.



	EIGENVALUES	PERCENTS	CHI^2	NDF	PROB	CANONICAL CORRELATIONS
I	0.1730	55.08	26.89	11	.995	.384
II	0.1015	32.31	16.29	9	.939	.304

Fig. 2. Discriminant analysis between the four outcome groups: Good responders to the treatment (T+), poor responders to the treatment (T–), spontaneous recovery (C+), poor responders in the control group (C–).

The present study concentrated on exploring the interaction of psychological factors and the back school intervention applied. The general pattern of the results yielded by the multiple discriminant analysis tends to give support to the hypothesis that different kinds of variables correlate to the outcome in the treatment group in comparison with the control group. It has to be reminded, however, that the second discriminative function slightly failed to reach the level of statistical significance. Therefore one might say that the back school intervention leads to another kind of interaction between psychological factors and the low back pain syndrome than the spontaneous course of the disorder. The overall pattern of the discriminant analysis further indicates that

the difference between the poor responders and good responders in the treatment group (the first discriminant function) lies more in cognitive, even intellectual factors, whereas the second discriminator rather seems to reflect emotional responsivity and lack of strict affective control. These results also give support to the proposed hypothesis of the negative role of alexithymia in spontaneous recovery.

On the other hand, in this study we could find no significant correlation with depression or any other neurotic features and poor prognosis. Contrary to this, there was a significant difference on the hysteria scale in favor of the good responders in the control group. The interpretation of this particular scale has actually been critically discussed by Gadd and Merskey [26], as well as by Forrets and Wolkind [11], who are inclined to see it measure extraversion rather than neurotic hysteria. The manifest content of the items and the present results support this conclusion. Also in this study the hysteria scale seems to reflect lack of alexithymia.

Although the previous studies have demonstrated some interaction of psychological measures and specific treatment methods, the specific predictors of a specific treatment versus spontaneous course of the disease have not been found [1, 10]. In this study we were able to identify different sets of psychological variables as predictors of the outcome of the treatment as compared to spontaneous recovery.

Recently, Keltikangas-Järvinen et al. [27] have reported that the compliance with a self-care program in a group of patients with intermittent claudication correlated negatively with hostility, aggressiveness, and affect lability assessed by the Rorschach Test. Although there are differences in the patient material and in the outcome criteria used, the parallel trend in the results is obvious.

Summarizing the results of the discriminant analysis the four outcome groups can be described as follows: The good responders in the treatment group could be characterized as emotionally well-adjusted and controlled showing relatively good cognitive-intellectual capacity with undisturbed reality testing. The poor responders in the treatment group, on the other hand, seem to be less capable cognitively, and not so well-balanced emotionally as those who benefited from the applied intervention. The ones showing spontaneous recovery in the control group are characterized by a more lively and less controlled way of expressing emotions and affects; they are relatively outgoing and ready to express their feelings. In contrast to the above-mentioned group, those who show increasing disability during the 1-year follow-up period are characterized by restricted expression of emotions and affects, which indicates alexithymia.

The differences referred to above seem to support the conclusion that there is specific interaction between the treatment method and the psychological characteristics of patients. The treatment method applied in this study seems to favor patients with relatively good cognitive capacity and psychic integrity.

Alexithymic features, on the other hand, are predictive of increasing disability after a 1-year follow-up, especially when no treatment is provided.

The major limitation of our study, of course, is the fact that we only had women in our sample. It remains the task of future studies to show, whether parallel results can be observed in a male sample of low back pain patients.

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