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Early maladaptive schemas in Finnish adult chronic male and female pain patients

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ABSTRACT

Background and aims of the study: The connection between chronic pain and traumatic experiences in childhood has been established in several studies. The association of emotional maltreatment with chronic pain has been studied, but to a lesser degree. Schema therapy [24] is an extension of cognitive therapy and presents the early maladaptive schema (EMS) concept. EMSs reflect early, mainly emotional maltreatment. The aim of the present study was to examine the existence of EMSs, the association between EMSs and pain variables and EMS driven patterns.
Patients and measures: The study consisted of 271 first visit pain patients. Their socio-demographic data, pain variables and pain disability were assessed. The presence of EMSs was measured using the Young Schema Questionnaire Short Form Extended. One hundred and three successive participants were also interviewed according to the cognitive case conceptualization.
Results: More than half (58.3%) of the chronic pain patients scored EMSs as meaningful. The patients with meaningful EMSs had significantly higher pain intensity, duration of pain and pain disability. The two most frequently occurring EMSs in male pain patients were Unrelenting Standards/Hypercriticalness (US) (36.2%) and Self-Sacrifice (SS) (23.6%) and in female pain patients SS (40.3%) and US (27.1%). The speech contents of five of the highest scoring US and SS male and female patients ($n = 20$) were analyzed. The analyses showed schema driven behavior which exacerbated the pain situation. US and SS schemas had a stronger motivational effect on their behavior than the pain itself. Regression analyses showed that Self-Sacrifice schema in women and Emotional Deprivation schema in the total sample predicted pain disability as did pain intensity and the number of pain locations.
Conclusions: This study suggested that a remarkable amount of chronic pain patients may suffer from early maladaptive schemas which have an effect on their current pain situation and may reflect underlying early emotional maltreatment.

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1. Introduction

The reporting of abusive or neglectful childhood experiences is associated with an increased risk of experiencing chronic pain in adulthood [1]. Physical and sexual abuse in childhood are connected with non-specific chronic pain and pelvic pain [2,3]. Both physical/sexual, psychological and social adversities of childhood have been linked to different kinds of pain, e.g. low-back pain, fibromyalgia, prostatic/pelvic pain and somatoform pain disorder [4–9]. The association of chronic pain and emotional maltreatment alone has been less studied. However, emotional abuse and neglect have been shown to be associated with fibromyalgia [10,11].

Pain disability, related to restrictions and limitations in daily living, is associated with or predicted by numerous factors such as age [12], male gender [13], pain severity [14,15], pain distribution [15] and psycho-social factors [14,16]. Pain and disability are also associated with psychological factors like distress [17], fear avoidance [18], self-efficacy [19,20], motivational stages of chronic pain management [21] and depression (e.g. [12,22]).

Young [23] introduced his early maladaptive schema (EMS) concept as an extension of cognitive therapy. According to the schema theory [23,24] early childhood experiences lay the foundations for an individual's patterns and models of the self, others and the world. Young hypothesizes that in adverse life situations these patterns become maladaptive, i.e. dysfunctional, pervasive and causing suffering. EMSs reflect underlying psychic themes representing important core needs of the child. There are now 18 different EMSs grouped into 5 schema domains [24]. The domains represent (1) needs for safety, nurture, empathy and security; (2) expectations about oneself and environment with one's ability to separate, function and survive; (3) limits; (4) an excessive focus on the desires and needs of others at the expense of personal needs; (5) an excessive emphasis on suppressing one's spontaneous feelings, impulses and choices, and meeting rigid, internalized rules [25]. Some EMSs like Unrelenting Standards/Hypercriticalness and Self-Sacrifice are conditional and can cover earlier developed, unconditional EMSs like Emotional Deprivation. Because of their early origin, the individual regards EMSs as a familiar and the best and most reliable way to construe and manage different life situations [24,26]. Many EMSs reflect purely early emotional maltreatment, such as neglect, abandonment and betrayal.

The aim of the study was to examine the presence of early maladaptive schemas and schema driven behavior in a chronic pain patient sample and to investigate the relationship between these schemas and different pain variables. We also wanted to explore if EMSs predict pain or pain disability.

2. Methods

2.1. Participants and procedure

Participants were recruited from 6 pain clinics in central and northern Finland during a period of one year (January 2004–2005), and were consecutive 18–64-year-old first-time patients. Sources of referral included primary health care and various medical specialists. Patients having a psychotic disorder, a cognitive impairment or inability to complete questionnaires were excluded from the study. The total sample consisted of 318 patients, of whom fifteen percent ($n = 47$) declined to take part. All patients were suffering from non-malignant, daily, chronic pain lasting 6 months or longer ($n = 254$; 94%) or more than what is expected as normal recovery time after an injury or disease ($n = 17$; 6%). The mean age of the sample was 47.0 years (SD = 9.3 years; range 18–64 years) and included 127 males (47%) and 144 females (53%). The mean length of total education was 11.1 years (SD 1.6 years; range 9–18 years) and was estimated from the occupation. Men and women did not differ in age or education. All participants were Caucasians. Data was collected by questionnaires sent to every patient attending the pain clinic for the first time. The clinic nurse provided assistance if a patient had problems in completing the questionnaire.

One hundred and three of the aforementioned participants were semi-structurally interviewed according to the cognitive case formulation in one pain clinic: all their pain and other symptoms, thoughts about their pain disease, self, others, the world and the future, emotions concerning their pain and life situation and changes in their behavior concerning work, hobbies and social relations were elicited, tape-recorded and transcribed.

The patients were informed by letter about the study protocol and written consent was obtained. The study protocol was approved by the ethical committee of the Hospital District of Northern Ostrobothnia.

2.2. Measures

2.2.1. Pain variables

The pain questionnaire was developed for this study to collect information on patients' socio-demographic data (age, occupation, gender), pain localization (body map), the onset of the pain disease, the temporal quality of the pain and the current pain intensity measured with two 10-cm Visual Analogue Scales (VAS). On the first VAS (pain max) patients were asked to rate their current maximal experienced pain (0 = "no pain" to 10 = "the worst pain one can imagine") and on the second VAS (pain min) their current minimal experienced pain (0 = "no pain" to 10 = "the worst pain one can imagine"). Pain intensity was the mean of those two visual analogue scales. The Pain Disability Scale (PDS) was developed for this study. It is a 9-item self-report scale consisting of 7 direct statements: "My pain is disturbing my sleep", "... my hobbies", "... my sex life", "... my work", "... my ability to move", "... my economy", "... my social contacts", and 2 inverted statements: "I can enjoy life despite my pain", "I can control my pain". All the items were self-reported on a Likert-type 0–3 scale: 0 = not at all; 1 = to some extent; 2 = significantly; 3 = very much. The total score (range 0–27) reflects the overall level of pain disability. The reliability of the PDS was 0.84 (Cronbach's alpha). Descriptive data on the pain variables is presented in Table 1. Typical pain diagnoses were sciatica, arthrosis, neuropathic and musculoskeletal pain.

2.2.2. Early maladaptive schemas (EMS)

The patients completed the Finnish version of the Young Schema Questionnaire short form – extended (=YSQ-S2-extended, 18 EMSs, 90 schema items) [27]. This is a self-report, Likert-type questionnaire. Every EMS consists of five items, which can be rated from 1 (Completely untrue of me) to 6 (Describes me perfectly). If two or more of these five items are rated 5 or 6, the patient has a meaningful schema signifying that the schema exists and is of importance in the patient's life and has an effect on behavior [24]. The YSQ-S2-extended was designed to assess 18 EMSs, namely: Emotional Deprivation, ED; Abandonment/Instability, AB; Mistrust/Abuse, MA; Defectiveness/Shame, DS; Social Isolation/Alienation, SI; Dependence/Incompetence, DI; Vulnerability to Harm or Illness, VH; Enmeshment/Undeveloped Self, EM; Failure, FA; Entitlement/Grandiosity, ET; Insufficient Self-Control/Self-Discipline, IS; Subjugation, SB; Self-Sacrifice, SS; Emotional Inhibition, EI; Unrelenting Standards/Hypercriticalness, US; Approval-Seeking/Recognition-Seeking, AS; Negativity/Pessimism, NP; Punitiveness, PU. The reliability of the individual EMS subscales varied between 0.94 and 0.79 (Cronbach's alpha). The reliability and 18-factor structure of the YSQ-S2-extended in Finnish language has been established [27].

Table 1
Pain variables in chronic male and female pain patients.

Pain variable	Men			Women			*p*
	127[a]			144[a]			
	Mean	SD	Range	Mean	SD	Range	
Duration of pain in years	9.9	9.4	0.5–36	8.8	8.3	0.3–35	ns.
Pain intensity, mean (VAS 0-10)	6.0	1.4	2.5–9.5	5.8	1.1	3–9	ns.
Pain disability scale (PDS; range 0–27)	17.4	4.9	5–27	15.6	5.1	3–26	.003[b]
Pain sites in number	1.8	1.0	1–5	1.8	0.9	1–5	ns.
Face pain	8.7%			13.2%			ns..
Cervico-cranio-brachial pain with or without limb pain	44.9%			59.7%			.015[c]
Low back pain with or without limb pain	71.7%			66.7%			ns.
Sole limb pain	18.1%			14.6%			ns.
Thoracic pain	12.6%			11.2%			ns.
Abdominal pain	22.8%			12.5%			.025[c]

Note: Pain sites are shown as percentages of the total male and female sample. ns, non significant.
[a] Number.
[b] Student's *t*-test.
[c] Pearson's Chi-square.

2.3. Data analysis

2.3.1. Quantitative analysis

The meaningful EMSs were sought according to Young [28] (see Section 2.2.2). Pearson's Chi-square was used in categorical variables and Student's *t*-test in normally distributed variables in group analyses between meaningful and non-meaningful EMS groups. To describe the schema distribution bar graphs were presented. The two most frequently occurring schemas in male and female chronic pain patients were sought. Linear regression analyses (enter method) were used to find out if age, duration of education and the most frequently occurring EMSs predicted pain intensity or if the aforementioned independent variables and pain characteristics predicted pain disability. As the kurtosis, skewness and histogram showed normal distribution of the dependent values and the residuals in the linear regression analyses also showed normal distribution, this method could be used. The word *predict* in this context refers to statistical association and not to real causality. Because the schema distribution differed in magnitude and order between men and women we conducted the analyses separately for both genders in the first two regression analyses. Standardized coefficients are shown so that the relative importance of all the variables can be compared. The statistical analyses were conducted with SPSS (version 12.0.1. for Windows).

2.3.2. Speech analysis

The tape-recorded and transcribed interviews were analyzed by two cognitive psychotherapists (A.S. and T.S.). The schemas and the schema driven behavior were expected to be found in the speech content where the patient was situated in a different position or relationship to one's self and disease, the health care system, work or other people. The schemas were identified according to their special features [24]. Special attention was paid to the schema driven behavior related to pain disease. For the assessment, both readers had to agree on the interpretation of the content of the speech.

3. Theory

We (A.S. and T.S.) have observed in clinical practice that female pain patients often display elements of self-sacrifice while male pain patients display elements of high standards in their speech and behavior. Theoretically, Young et al. [24] stated that Self-Sacrifice schema is common in psychosomatic disorders such as headache, gastrointestinal problems, chronic pain and fatigue. The

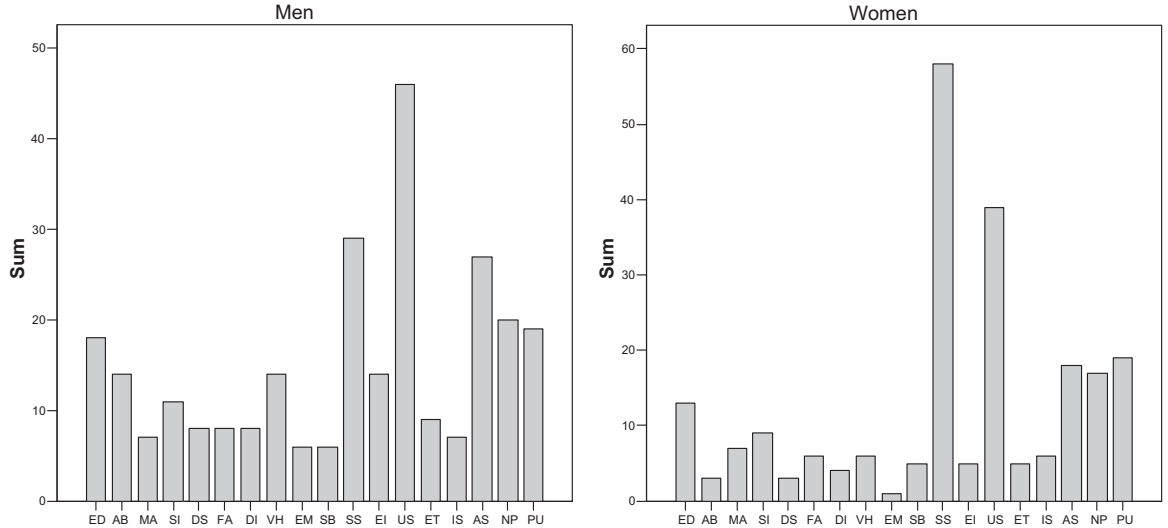

Fig. 1. Distribution of meaningful early maladaptive schemas in male and female chronic pain patients. *Note*: Emotional Deprivation, ED; Abandonment/Instability, AB; Mistrust/Abuse, MA; Social Isolation/Alienation, SI; Defectiveness/Shame, DS; Failure, FA; Dependence/Incompetence, DI; Vulnerability to Harm or Illness, VH; Enmeshment/Undeveloped Self, EM; Entitlement/Grandiosity, ET; Insufficient Self-Control/Self-Discipline, IS; Subjugation, SB; Self-Sacrifice, SS; Approval-Seeking/Recognition-Seeking, AS; Emotional Inhibition, EI; Unrelenting Standards/Hypercriticalness, US; Negativity/Pessimism, NP; and Punitiveness, PU.

Table 2
Demographic and pain variables in meaningful and non-meaningful schema groups.

Variable	Non-meaningful schema group		Meaningful schema group		*p*
	113[a]		158[a]		
	Mean	SD	Mean	SD	
Sex, number of males/females	55/58		72/86		.61[b]
Age in years	46.7	8.9	47.3	9.5	.64[c]
Education in years	11.0	1.5	11.1	1.7	.69[c]
Pain intensity, mean	5.6	1.2	6.1	1.2	.005[c]
Duration of pain in years	7.9	7.7	10.4	9.4	.022[c]
Number of pain locations	2.0	1.2	2.2	1.3	.18[c]
Pain disability scale (PDS; range 0–27)	15.6	4.8	17.1	5.2	.013[c]

[a] Number.
[b] Pearson's Chi-square.
[c] Student's *t*-test.

Table 3
Examples [extracts] from the speech of pain patients with the highest scored Unrelenting Standards/Hypercriticalness (US) or Self-Sacrifice (SS) schemas.

Man, 53 years, entrepreneur, shoulder pain with many shoulder operations, the 1st strongest US and the 3rd strongest SS schema
P(atient): Yes, it is aching, it is aching, but the situation is such that I haven't had time to rehabilitate myself. Immediately when I could get about I started a job. As an entrepreneur, I haven't had much time to lounge. As soon as I have been able to walk I have gone. . .

Man, 63 years, entrepreneur, retired, back pain, the 1st strongest SS schema
P: I've never saved myself, I worked day and night – if this backache had been treated in good order, it wouldn't be like this. However, when this was at its worst, the work was in a situation that I could not stop working just due to my own health [pain].

Man, 60, retired, widespread arthrosis, the 2nd strongest US schema
D(octor): What do you think about your future?
P: I hope I'll manage,. I even take the pain killers as little as possible although the doctors say that one should not suffer pain, but I have taken as few as possible.
D: You keep your head above water?

Man, 60 years, technician, low back pain, the 4th strongest US schema
D: You had a fight with a tractor?
P: It was a hell of a lift with this plank I tried to free the tractor from the stump while the engine was running and it jerked towards me when I took hold of the plank and this right leg was the lifting leg, it really jerked me, when I held it like this [the patient shows how he tried to lift the tractor with the plank] and as long as I had the strength I tried until the machine got the better of me and that was that. It felt funny there was no pain at the time. . .

Woman, 40 years, secretary, head-neck-shoulder pain, the 2nd strongest US schema
D: You mean that people close to you don't believe [your pains]?
P: Well, my mother believes me, but people who know me as a bundle of energy, as one who takes care of everything, they couldn't ever imagine, because I do not show the pain, I don't lie down when I have a lot of pains, I must do all the time.
. . .
D: We have now spoken about your symptoms, thoughts and emotions – how has this all affected your life, work and hobbies?
P: I don't let it affect them. . .I have never been off work because of these pains.
D: Would you have liked to be?
P: Yes, sometimes, but there hasn't been any concrete for being off [reason]
D: It is not concrete that you sleep only two hours in a row?
P: Uhm, yes, but. . .I am. . . how could I say. . .I am assiduous, diligent, hardworking, nice and good, so I do everything that is agreed however much pain I felt.

Woman, 54 years, cleaner, widespread pain, the 3rd strongest SS schema
D: How long have you been married?
P: 28 years comes next.
D: How long has he been beating you since then?
P: Almost all the time, first when he was drunk,. . . and now when he had the palsy, I got him back into condition, and then he started it again.
D: Then the beating started again?
P: Yes. . .

Note: To ensure anonymity demographics have been altered.

connections between early adversities and chronic pain [1–9] and between early negative childhood experiences and EMSs [29] have been shown. Therefore, we hypothesize that chronic pain patients have EMSs. These may in turn produce unhealthy life patterns. Examining EMSs offers a method of measuring the existence of early emotional trauma and, in addition, offers a method for treating these patients [24].

4. Results

4.1. Early maladaptive schemas

From the total of 271 chronic pain patients 158 (of men 56.7%; of women 59.7%) scored one or more EMSs as meaningful (one schema = 21.4%, 2–4 schemas = 24%, 5–10 schemas = 9.6% and 11–16 schemas = 3.3%). The meaningful schema distribution in men and women is shown in Fig. 1. In men the scores for Unrelenting Standards/Hypercriticalness (US) and Self-Sacrifice (SS) EMSs and in women SS and US EMSs showed the highest occurrence in that order of magnitude.

The meaningful and non-meaningful schema groups did not differ by sex, age or length of education. However, patients scoring on one or more EMSs as meaningful had more intense, longer duration and more disabling pain (Table 2). The pain sites or the number of pain locations did not differ between these groups.

4.2. Manifestation of SS and US schemas in the speech of pain patients

Based on the analyses in Section 4.1, we selected 5 male and 5 female pain patients scoring highest on US or on SS schemas (totally $n = 20$ cognitive case formulations). US schema can be recognized as

Table 4
Linear regression analyses (enter method) of factors predicting pain disability in male, female and total pain patient samples.

Independent variable	Men					Independent variable	Women					Independent variable	Total sample				
	β (stand.)	R^2	F	t	Sig.	df		β (stand.)	R^2	F	t	Sig.	df		β (stand.)	R^2	F	t	Sig.	df
		0.248	5.56		<.001	7,118			0.236	5.99		<.001	7,136			.245	14.3		<.001	6,263
Age	.062			.713	.477		Age	.166			2.06	.041		Age	.130			2.32	.021	
Duration of education	−.067			−.80	.425		Duration of education	.103			1.31	.192		Duration of education	.034			.628	.530	
Mean pain intensity	.311			3.77	<.001		Mean pain intensity	.215			2.67	.009		Mean pain intensity	.258			4.73	<.001	
Number of pain sites	.282			3.44	.001		Number of pain sites	.257			3.31	.001		Number of pain sites	.210			3.76	<.001	
Duration of pain	.164			1.91	.058		Duration of pain	−.006			−.07	.942		Duration of pain	.049			.858	.392	
US	−.02			−.17	.86		SS	.206			2.55	.012		ED	.214			3.83	<.001	
SS	.04			−.38	.71		US	−.084			−1.0	.303								

Note: β (stand.), standardized regression coefficient; R^2, coefficient of determination; F, F-value; t, Student's t-value; df, degree of freedom. Unrelenting Standards/Hypercriticalness, US; Self-Sacrifice, SS; Emotional Deprivation, ED.

perfectionism in the work, rigid rules in many areas of life (a lot of "shoulds") and preoccupation with time and efficiency. SS schema can be recognized as an urge for one to focus voluntarily on fulfilling the needs of others at the expense of one's own gratification [24].

The most common and obvious feature of patients in both genders scoring high on SS and US EMSs was the importance of work and accomplishments. There was a dilemma in their speech: almost all of them reported that there had been too much work [since childhood] which had caused them to suffer pain and prevented them from recovering from pain and, at the same time, they hoped to be in less pain to return to the same work [conditions].

The men scoring high on US EMS ignored their pain treatment and preferred to work, they did not accept the use of pain medication and they had difficulties in trusting that others could do things properly. They also had difficulties in accepting help in their daily activities even when in pain. They thought that they did not get enough help from the health care system. All of the women scoring high on US EMS were workaholic and described their identity in the terms of working attitudes and skills. While on a sick leave, one of them even helped out daily in her office.

The men scoring high on SS EMS had a similar attitude to the men scoring high on US EMS (two of them scored high on US schema, too) "work before health". They were also concerned about others' problems and helped other people at their own expense. They even felt responsible for how others were feeling; that is, they had to keep others happy. The women scoring high on SS EMS had difficulties in focusing on questions concerning themselves. They did not express pain [to the people nearby] and did not like to bother others by asking help for themselves although they were exhausted with pain. They hid their pain and were ready to sacrifice for others; one woman scoring high on SS EMS told her spouse that he should leave her because she was such a painful burden.

Typical examples of high scoring SS and US schema speech are presented in Table 3.

4.3. Demographics, EMSs and pain characteristics as predictors of pain and disability

In the first regression analyses, age, the duration of education, US and SS schemas were entered as independent variables to predict pain intensity. No significant associations were found either in males or females. In the second regression analyses, age, the duration of education, pain intensity, the duration of pain, the number of pain sites, US and SS schemas were entered as independent variables to predict pain disability. Among males, the model predicted pain disability 24.8% by pain intensity and the number of pain sites, and among females, the model predicted pain disability 23.6% by pain intensity, the number of pain sites, SS schema and to a lesser degree by age (Table 4).

Post hoc, as SS and US schemas are regarded as conditional and may cover underlying Emotional Deprivation (ED) EMS [24], a third regression analysis was conducted on the total sample. Age, the duration of education, pain intensity, the duration of pain, the number of pain sites, and ED schema were entered as independent variables to predict pain disability. This model predicted pain disability 24.5%. Pain intensity, the number of pain sites and ED schema had equal significance and almost equal standardized coefficients (.258; .210; .214, respectively). Increasing age also had some predictive value for pain disability (.130) (Table 4).

5. Discussion

More than half of the pain patients scored early maladaptive schemas (EMS) as meaningful. Men mostly scored on Unrelenting Standards/Hypercriticalness (US) and Self-Sacrifice (SS) EMSs and

women on SS and US EMSs respectively and in that order of magnitude. Self-Sacrifice schema in women and Emotional Deprivation schema in the total sample were associated with pain disability. To the best of our knowledge, this is the first paper to study the influence of EMSs on chronic pain patients.

All 18 EMSs were present as meaningful in the sample. The pain population scoring EMSs as meaningful had more intense pain, longer duration of pain and more pain disability. This suggested that early emotional adversities may even predispose to more intense pain disease. This concurs with earlier studies [10,11].

Self-Sacrifice (SS) schema was the highest scored schema in women and the second highest scored schema in men in this study. In the speech analyses the pain patients with meaningful SS schema gave their time, support, help and empathy to others and neglected their own needs and finally became *pain-exhausted*, because only the maximum pain was able to stop them. They often assumed a caregiver's role and hid their pain. According to Young et al. [24] the patient with SS schema almost always has an accompanying Emotional Deprivation (ED) schema, which she/he seldom recognizes. The patient focuses on the needs of others, which works for the ED schema maintaining coping style – her/his own needs will remain unrecognized and unmet. They state that '*it is common for patients with this schema to have psychosomatic disorders such as headaches, gastrointestinal problems, chronic pain or fatigue*' [24].

Unrelenting Standards/Hypercriticalness (US) schema was the highest scored schema in male and the second highest scored EMS in female pain patients. Analysis of speech showed that US schema precipitated the pain problem, as the pain patients were very conscientious in their work and did not listen to their bodies. The patients were workaholics and ignored their bodily sensations or rehabilitation. They also often tried to use as few painkillers of every kind as possible. We wonder if US schema explained the disappointment with earlier care and the vast amount of ineffective treatments in their stories. We ask if the demands of patients scoring high on US schema cast the pain treating personnel in the role of trying all possible tricks. US schema is also regarded as a compensatory schema for ED and Defectiveness/Shame schemas [24].

Counterdependency [30] is characterised by emotional suppression, the idealization of relationships, strong work ethics, caregiver role-identity and self-reliance. Counterdependency was found as a trait typical of a chronic pain patient subgroup and it was independent of alexithymia, anxiety, depression and somatic amplification [31]. Interestingly, strong work ethics according to the US and AS schemas (=Approval-Seeking/Recognition-Seeking, the 3rd highest occurring schema in male pain patients, Fig. 1), and caregiver role identity by SS schema are similar to counterdependency suggesting the existence of similar personal traits as seen in this study. Van Houdenhove et al. [32] used the term 'action-proneness' for an overactive lifestyle found in patients with chronic fatigue syndrome (CFS) and fibromyalgia (FM). More specifically, the patients had a tendency to exceed their physical limits, strive frenetically for achievement, approval or perfection. They supposed action-proneness to be a predisposing, initiating and perpetuating factor for CFS and FM. The aforementioned is highly congruent with the US and SS schema driven behavior seen in our study. Pain patients are in danger of exacerbating their pain disease when high in standards and self-sacrifice.

A personal trait of approval-seeking, self-sacrifice and unrelenting standards is also described in patient cases of emotional deprivation disorder [33]. Young et al. state (p. 215; [24]) "*This* [Emotional deprivation] *is probably the most common schema we treat in our work, although patients frequently do not recognize that they have it*". We ask if pain patients scoring high on US and SS schemas also suffer from emotional deprivation, namely, deprivation of nurture, empathy and/or protection. This would concur with the findings of Imbierowicz and Egle [5] that pain patients with fibromyalgia and somatoform pain disorders reported, e.g. lack of physical affection, a poor emotional relationship with both parents and separation. Emotional abuse with other adversities was found to be related to female breast pain [34], to an increased number of different pain conditions in individual migraine patients [35], to an increased prevalence of pelvic pain in men [6] and to the number of pain disorders in adulthood [8]. Women with chronic pelvic pain suffered more emotional neglect in their childhood than women in the pain-free control group [7]. The mediating role of emotional trauma in the development of chronic pain was hypothesized by Rome and Rome [36] and the neurobiological basis was explained by corticolimbic sensitization.

According to the regression analyses pain intensity was not predicted by any of the measures used. Among women Self-Sacrifice schema predicted pain disability more than increasing age but to a lesser degree than mean pain intensity or number of pain sites. In the total sample, Emotional Deprivation (ED) schema predicted pain disability to the same extent as pain intensity and the number of pain sites and more than increasing age. When the ED schema valence increased the chronic pain patient suffered more inability to live and cope with pain. Patients with ED schema do not seek help and do not believe that anybody can or will help them; on the other hand, Young et al. [24] state '*patients may have many physical complaints – psychosomatic symptoms – with the secondary gain of getting people to pay attention to them and take care of them (although this function is almost always outside their awareness)*' [24].

The sample was collected from several secondary and tertiary pain clinics from different types of public hospitals in Finland. The proportion of patients who refused to participate was low. The age range represented typical pain patient distribution. The pain sites were scattered throughout the body. We therefore assume that the results represent Finnish chronic pain patients in pain clinics. It is believed that abuse is underreported [3]. The effect of this underreporting would be the inclusion of sexual or psychological abuse survivors in the control groups. This in turn may diminish the effect size of association between aforementioned adversities and somatic outcomes. Measuring subjective beliefs, thoughts and attitudes with a questionnaire is controversial. Many of the EMSs not evaluated here may be as relevant to the development of or coping with a chronic somatic condition such as chronic pain. It would be interesting to know how specific these EMS patterns are for chronic pain patients and to compare them with patients having other chronic diseases and with general population. These questions, however, are unfortunately beyond the scope of the present study. This study was cross-sectional and thus unable to determine the specific causal relationships between EMSs, pain characteristics and pain disability. However, the assessment of the content of the speech of chronic pain patients revealed several ways in which meaningful schemas affected their behavior in a way that increased their pain. The study should be replicated with a control sample and in a different cultural setting. We also consider the pain disability scale used in this study to be a limitation. It was based on a pain disability scale used in many pain clinics in northern Finland.

5.1. Conclusions and implications

More than half of the chronic pain patients scored one or more early maladaptive schemas as meaningful, indicating the possibility of early emotional trauma. The patients scoring EMSs as meaningful had significantly higher pain intensity, the duration of pain and pain disability. Male and female chronic pain patients scored mostly Unrelenting Standards/Hypercriticalness and Self-Sacrifice (SS) schemas. The most scored EMSs served as an independent trap for the perpetuation of chronic pain. According to the data,

Emotional Deprivation schema was associated with pain disability as much as pain intensity and the number of pain sites. In female patients, pain disability was also associated to a significant degree with SS schema. The assessment of EMSs in chronic pain patients may offer an opportunity to elicit the pain perpetuating lifestyle and to understand patients' difficulties in following treatment guidelines. The schema therapeutic approach can be one tool more relieving persistent pain and disability.

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