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Therapy outcome in patients with severe somatoform disorder: prediction from psychological profiles

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Abstract

Treatment effects for patients with a severe somatoform disorder are generally modest with large inter-individual differences. Because of these large inter individual differences in outcomes; it would be valuable to be able to make an estimation of the chance at a positive therapy outcome before the therapy starts. This study investigated whether psychological profiles can be associated with outcome after treatment in 114 patients with somatoform disorder. Five distinct profiles that differed in terms of resilience, vulnerability, and avoidance were examined. These profiles were labeled inflexible, active, limiting, adaptive and maladaptive. Levels of psychopathology, complaints, mental- and physical functioning and frequency of daily activities differed between these profiles. Psychological profiles did not significantly predict the outcome of therapy. Because lack of significance might be due to the small sample size, outcomes with at least a small effect size were explored. This tentatively indicated that the offered therapy might be more suitable for active and inflexible individuals and less appropriate for the individuals from the adaptive, maladaptive and limiting groups. Overall, the mean result of the therapy was disappointing underscoring the importance of examining predictors of therapy outcome. A replication of this study in a larger sample is needed to examine the tentatively indicated finding that the therapy might better fit specific subgroups. If this is confirmed, the implication would be that therapy should be adapted or more personalized to the individual.

Preface

This thesis is written as part of the graduation of the Master of Clinical and Health Psychology at Utrecht University. Firstly I would like to thank Altrecht Psychosomatics for providing the data. Secondly, I would also like to thank Jacqueline Valentijn, Rinie Geenen, Saskia van Broeckhuysen, and Ron Scholten for their inspiration and pleasant cooperation. In particular, my thanks go to my supervisor in this process, Rinie Geenen. I thank him for his critical but constructive feedback, pleasant words and kindness.

Introduction

The onset, progress and outcome of disorders varies greatly between people. There are several factors that contribute to this difference. According to the diathesis-stress model (Monroe & Simons, 1991), there are vulnerability factors that ensure that people have an increased risk of a disorder or of a poor outcome. A more positive view on psychology states there are also factors that ensure that people are less prone to disorders, known as resilience factors (Seligman & Csikszentmihalyi, 2000). Furthermore, avoidance is a factor that has been indicated to affect the onset, progress and outcome of disorders, especially for chronic pain disorders (Leeuw et al., 2007). Psychological profiles, which are composed of these vulnerability, resilience and avoidance factors, can potentially be used to predict a certain outcome. Greater insight into these predictive profiles could be helpful for therapy assignment and thus improve treatment outcome. This would be especially useful in disorders that are difficult to treat, such as somatoform disorders.

Somatoform disorders, in DSM 5 known as somatic symptom disorders, are characterized by persistent physical symptoms that suggest the presence of a medical condition but are not fully explained by this condition or by the direct effect of a substance or another mental disorder (American Psychiatric Association, 2000). Patients with somatoform disorders have to deal with severe functional limitations, a substantial burden of disease (de Waal, Arnold, & van Hemert, 2006) and make extensive use of health care (Zoccolillo & Cloninger, 1986). Patients with severe somatoform disorders are frequently diagnosed with comorbid disorders, such as mood-, anxiety- and personality disorders (van der Boom & Houtveen, 2014). A recent meta-analysis has shown that various forms of psychotherapy may also be effective for the treatment of severe somatoform disorders, with small to moderate effects (Koelen et al. 2014). Recent research has indicated that a multidisciplinary treatment can have a positive effect for patients with severe somatoform disorders (Houtveen, Broeckhuysen-Kloth, Lintmeijer, Bühring, & Geenen, 2015). This study showed that a reduction of somatic symptoms and an improvement in health related quality of life had taken place after the multidisciplinary treatment. However, large inter-individual differences were found in treatment outcome. This finding is consistent with the previously mentioned vulnerability, resilience and avoidance theories, because it is expected that a similar treatment will not yield the same effect in every patient, because different combinations of factors will influence the course and outcome of the disorder.

Thus, patients have to deal with a large burden of disease (de Waal, Arnold & van Hemert, 2006) and make extensive use of health care (Zoccolillo & Cloninger, 1986). Because there are large inter individual differences between therapy outcomes (Houtveen et al., 2015), it would be valuable if it would be possible to make an estimation of the chance at a positive therapy outcome. If we could predict who will and who won't do well in a particular therapy, people could be assigned to a therapy that has an effect. In addition, this would give valuable information about which components of a therapy should be improved in order to achieve an effect. The general question of the present study is therefore: which psychological profiles are associated with the outcome of treatment in patients with severe somatoform disorder? Additional to this question, it will be investigated whether age, education level and gender of the patients are associated with the outcome or affect the association between psychological profiles and the outcome.

Özçulha (2015) has studied psychological profiles in patients with severe somatoform disorders. This study has revealed five distinct profiles, which all significantly differ on states of 'psychopathology', 'complains', 'mental-' and 'physical functioning' and 'frequency of daily conducted activities'. The profiles were: 'inflexible', 'limiting', 'active', 'adaptive' and 'maladaptive'. These five profiles are each made up of three factors, which are: 'resilience', 'vulnerability' and 'avoidance'. Resilience is characterized by adequate cognitions and coping strategies, a positive body image and social support. Vulnerability exists of inadequate cognitions and psychological inflexibility. The factor avoidance is characterized by inadequate coping strategies and low vitality. Figure 1 shows the combinations of factors that are included in the profiles. The current study examines whether these specific profiles are predictive of the therapy outcome.

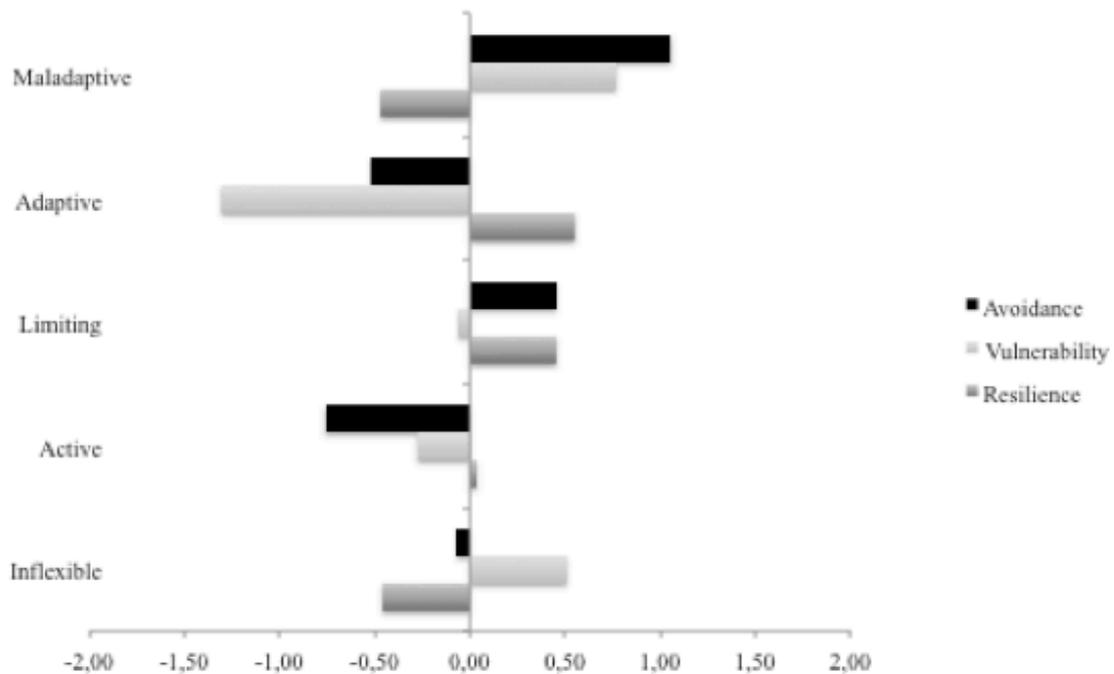


Figure 1. Five psychological profiles, existing of three psychological factors (Özçulha, 2015).

Literature review

To guide the hypothesis, a literature review was performed on pain disorders, focusing on studies that included aspects of the three main factors of the current study: avoidance, vulnerability and resilience. Web of Science was searched for prospective studies, focusing on somatization disorders, fibromyalgia or chronic fatigue syndrome. Both correlational studies and systematic reviews were included in the literature review. Exclusion criteria were children and adults. Whether avoidance, resilience or vulnerability factors would have a certain effect on the outcome is interesting because two different models give an explanation for the possible effect of a factor: *the growth based model* and *the deficiency-based model*. The growth based model states that people that possess more skills and less psychopathology, will benefit more from therapy because they have more capabilities. The deficiency-based model states the opposite: persons who have fewer skills will benefit more from therapy, because they can learn more (Bongarts, 2014). Appendix 1 shows an overview of the studies and the observed relation between avoidance, vulnerability and resilience factors and a possible outcome.

Consistent evidence was found that resilience factors were linked to a positive treatment outcome. All studies provided evidence for a positive effect of the resilience

factors. Therefore, it is predicted that resilience factors will have a positive effect on treatment outcome. For a summary of the results of the systematic reviews and correlational researches, see Figure 2.

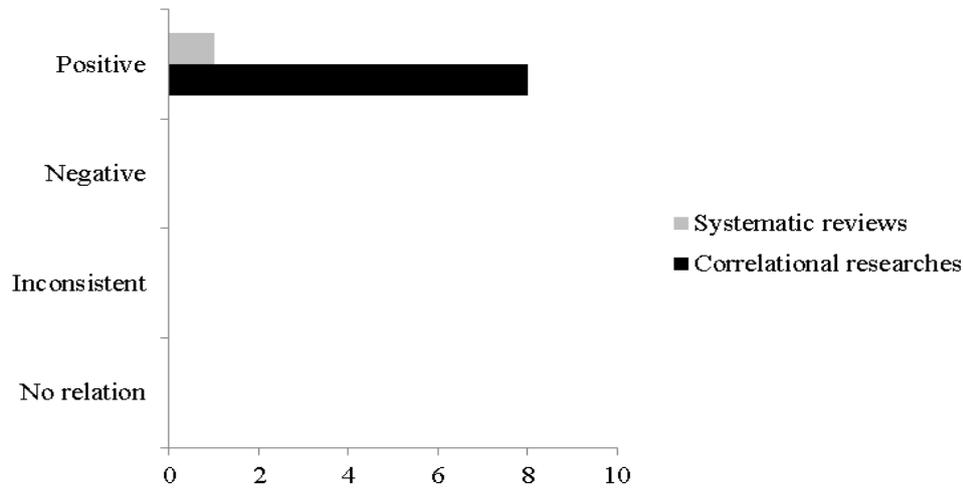


Figure 2. The number of resilience factors that were associated with a positive, negative, inconclusive progression or showed no relationship with symptoms and functioning in chronic pain disorders.

For the vulnerability and avoidance factors, conflicting evidence was found. For both factors, systematic reviews and prospective correlational researches showed an inconclusive-, negative- and positive effect, or no relationship on treatment outcome. Therefore, it is not possible to make a prediction about the impact of vulnerability and avoidance factors. For an overview of the results of the systematic reviews and correlational researches, see Figure 3 and 4.

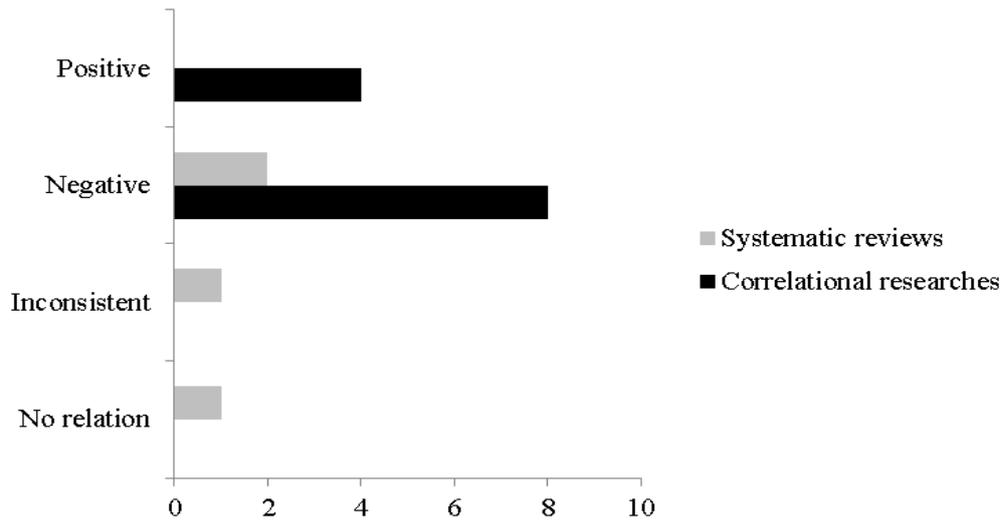


Figure 3. The number of vulnerability factors that were associated with a positive, negative, inconclusive progression or showed no relationship with symptoms and functioning in chronic pain disorders.

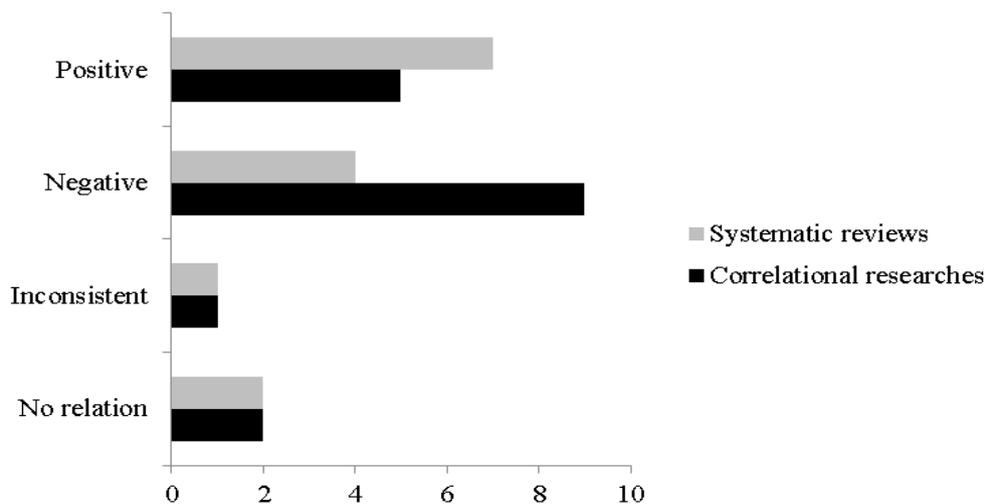


Figure 4. The number of avoidance factors that were associated with a positive, negative, inconclusive progression or showed no relationship with symptoms and functioning in chronic pain disorders.

There are multiple possible explanations for the observed inconsistencies. A first possible explanation for the conflicting evidence is that the studies showed heterogeneity regarding the studied populations, used interventions and outcomes. Another possible explanation for the observed results is that this literature review has not looked individually upon the quality of the studies. It is therefore, for example, possible that all the high quality studies would point a positive outcome and the low quality researches would point at a negative outcome. When

this would have been the case, it would have been possible to draw conclusions from the literature.

Resilience is expected to be associated with a good outcome. Because no firm conclusions can be drawn from the literature on other pain disorders regarding the predictive effect of an avoidance or vulnerability profile, it is not possible to form any hypothesis about the effect of these variables on treatment outcome for severe somatoform disorders. Therefore, the current study will be explorative in the search for psychological profiles that can be linked to outcomes. Since the literature study showed also an inconclusive influence for age (Petersen, Larsen, & Jensen, 2007; van der Hulst, Vollenbroek-Hutten & Ijzerman, 2005; Verkerk, Luijsterburg, Miedema, Pool-Goudzwaard, & Koes 2012) and gender (van der Hulst et al., 2005; Verkerk et al., 2012), no hypothesis can be formed regarding the question whether age and gender will have a certain impact on the main question. For education level, the study of Haldorsen, Kronholm Skouen, and Ursun (1998) showed that a low education level was predictive for a good outcome. Therefore, it is hypothesized that a low education level will be predictive for a good therapy outcome.

Methods

Participants

Participants were patients of tertiary care institution Altrecht, location Eikenboom, Zeist, the Netherlands. In Eikenboom, specialized multidisciplinary treatment is provided for patients with severe somatoform disorders. Treatment at Eikenboom is body-related mentalization, acceptance, cognitive behavioral modulation and the social environment. The therapy consists of several components, which are acceptance and commitment therapy, cognitive behavioural therapy, systemic therapy, psychosomatic physiotherapy and art therapy (Houtveen et al., 2015).

For this study, inclusion criteria were the following: Individuals had to be diagnosed with a somatoform disorder, according to the criteria of DSM IV. Exclusion criteria were hypochondriasis or body dysmorphic disorder, a diagnosis of an addiction disorder, bipolar disorder or psychosis, high risk of suicidality and if the patient was under treatment by a specialized physician outside the center (Houtveen et al., 2015). In total, the data of n=114 participants was included in the study. For this study, the participants were divided into the five profile groups, which emerged from the study of Özçulha (2015). See Table 1 for the characteristics of the participants.

Table 1

Number of Participants, Mean Age with Standard Deviation, Education Level, Gender and Type of Disorder on Axis I, by Profile Group

	Profile group					Total n (%)
	Inflexible (n=29)	Active (n=29)	Limiting (n=27)	Maladaptive (n=11)	Adaptive (n=18)	
Sex, n(%)						
Male	11 (37,9)	11 (37,9)	6 (22,2)	5 (45,5)	7 (38,9)	40 (35,1)
Female	18 (62,1)	18 (62,1)	21 (77,8)	6 (54,5)	11 (61,1)	74 (64,9)
Average age in years (SD)	48,4 (9,9)	42,2 (12,7)	43,7 (10,8)	42,1 (11,6)	40,6 (10,1)	
Education level, n(%)						
Low	3 (10,3)	0	1 (3,7)	1 (9,1)	1 (5,6)	6 (5,3)
Middle	10 (34,5)	11 (37,9)	9 (33,3)	2 (18,2)	6 (33,3)	38 (33,3)
High	3 (10,3)	9 (31,0)	7 (25,9)	1 (9,1)	6 (33,3)	26 (22,8)
Unknown	13 (44,8)	9 (31,0)	9 (33,3)	7 (63,6)	5 (27,8)	43 (37,7)
Type of disorder on Axis I, n(%)						
Anxiety disorder NOS	2 (6,9)	0	0	0	0	2 (1,8)
Depressive disorder	0	0	1 (3,7)	0	1 (5,6)	2 (1,8)
Conversion disorder	3 (10,3)	12 (41,4)	9 (33,3)	3 (27,3)	2 (11,2)	29 (25,4)
Undiff. som. dis.	14 (48,3)	8 (27,6)	12 (44,4)	7 (63,6)	8 (44,4)	49 (43,0)
Somatization disorder	1 (3,4)	0	0	0	1 (5,6)	2 (1,8)
Som. disorder NOS	1 (3,4)	0	0	0	0	1 (0,9)
Personality disorder	0	0	0	0	1 (5,6)	1 (0,9)
Dependence disorder	1 (3,4)	0	0	0	0	1 (0,9)
Pain disorder	7 (24,1)	7 (24,1)	5 (18,5)	1 (9,1)	5 (27,8)	25 (22,0)
No diagnosis on Axis I	0	1 (3,4)	0	0	0	1 (0,9)
Unknown	0	1 (3,4)	0	0	0	1 (0,9)

Note. Undiff. som. dis. = undifferentiated somatoform disorder.

Procedure

Certified professionals collected the data during the diagnostic and the final phase of treatment, as a part of the *Routine Outcome Monitoring*. Routine Outcome Monitoring is a systematical procedure whereby symptoms and other important variables are measured, before, during and after treatment. Routine Outcome Monitoring has three objectives: diagnostics, impact assessment and scientific research (Workgroup measurement instruments Eikenboom, 2015).

Design

The design of the study was a one-group pretest posttest study. The profiles that emerged from the research of Özçulha (2015) were used as independent variables. The dependent

variable was the therapy outcome. Therapy outcome was measured by five outcome measures, which were psychopathology, complaints, mental functioning, physical functioning and frequency of daily activities.

Determining the profile groups

Several subscales of questionnaires were used for the classification of the participant in the profile groups. Figure 1 shows that each profile group is composed of a combination of three factors. The score on the resilience factor was determined by the subscales ‘self-exaltation’, ‘physical contact’ and ‘sexuality’ of the Dresdner Fragebogen zum Körperbild (DKB-35), the subscale ‘extraversion’ of the Dutch short version of the Minnesota Multiphasic Personality Inventory (NVM), the subscales ‘potential emotional support’ and ‘actual emotional support’ from the Inventory of Social Commitment (ISB), ‘diversion’ from the Pain Coping Inventory (PCI) and ‘disease benefits’ from the Sickness Cognition List (ZCL). The score on the factor vulnerable was determined by the subscale ‘psychological flexibility’ of the Acceptance and Action Questionnaire II (AAQ-II), ‘negativism’ from the NVM, ‘perceived life control’ from the Multi dimensional Pain Questionnaire (MPI-DLV), ‘acceptance’ from the ZCL and ‘worrying’ from the PCI. The avoidance factor was determined by a score on the subscales ‘resting’ and ‘withdrawal’ from the PCI and ‘vitality’ from the DKB-35. It was decided that when participants completed at least half of the questions on the required questionnaires, participants could receive a score on a factor.

The questionnaires that are used in this study have been described previously by Özçulha (2015). The ZCL was used for the measurement of disease cognitions. The ZCL consists of 18 items, which are distributed over the scales helplessness (6 items) (e.g., “Because of my illness, I often feel helpless”), acceptance (6 items) (e.g., “I have learned to accept the limitations of my illness”) and disease benefits (in a positive meaning to the disease) (6 items) (e.g., “Handling my illness has made me stronger”). The internal consistency of the ZCL was examined by Evers, Kraaimaat, van Lankveld, Jacobs, and Bijlsma (1998). They did a research on 263 patients with rheumatoid arthritis and 167 patients with multiple sclerosis. Cronbach's α coefficients ranged from .84 (disease benefits) to .91 (acceptance) and indicate good internal consistency .

In addition, for the measurement of cognitions, the AAQ-II was included in the study. The questionnaire consists of 10 items that measure acceptance as a part of psychological flexibility (e.g., “I control of my life”). Jacobs, Kleen, De Groot, and A-Tjak studied the internal consistency of the AAQ-II in 2008. They conducted a study with an overall sample,

consisting of 374 persons, and a clinical sample of 99 psychiatric patients. In both groups, the Cronbach's α for the entire questionnaire was .89, indicating good internal consistency

The PCI was included for the measurement of cognitive and behavioural pain coping styles. The PCI consists of 33 items, distinguishing between the dimensions active and passive pain coping. The active pain coping strategies covered the following scales: transformation of pain (4 items) (e.g., "Pretending the pain is not present"), distract themselves from the pain (5 items) (e.g., "Doing something pleasurable") and lower demand (3 items) (e.g., "continue in a slower pace"). The passive coping strategies covered the following scales: rest scales (5 items) (e.g., "Taking rest by sitting or lying down"), withdraw (7 items) (e.g., "Making sure I'm not bothered by disturbing noises") and worrying (9 items) (e.g., "Thinking of what remains"). In the study of Kraaimaat, Bakker, and Evers (1997), the internal consistency of the scales of the PCI was examined in 275 patients with rheumatoid arthritis, 410 patients with chronic headache and 104 patients from a pain clinic. The Cronbach's α ranged from .64 (distraction) to .79 (worrying). This suggests a questionable to reasonable internal consistency.

For the measurement of personality traits, the NVM was used. From the questionnaire, the following personality scales were included in the study: negativism (22 items) (e.g., "Sometimes I feel like swearing"), embarrassment (15 items) (e.g., "I wish I was not so shy") and extraversion (13 items) (e.g., "I love parties and nights out"). The scales somatization and severe psychopathology were not included in the study because they serve as outcome measures. Luteijn and Kingma (1979) investigated the internal consistency of the NVM scales in 894 psychiatric patients. Cronbach's α coefficients ranged from .76 (extraversion) to .86 (shyness), and suggest a reasonable to good internal consistency.

To measure the personality trait: alexithymia, the BVAQ was used. The questionnaire consists of 40 items on the handling of feelings. The items are divided between affective and cognitive scales. Among the affective scales fall: emotionalize (8 items) (e.g., "If anything happens quite unexpectedly, stay calm and unmoved") and fantasies (8 items) (e.g., "Before I fall asleep I often think of all kinds of events, meetings and conversations"). Among the cognitive scales fall: identifying (8 items) (e.g., "When I'm upset, I know if I anxious, sad or angry"), verbalization (8 items) (e.g., "I find it hard to put my feelings into words") and analyze (8 items) (e.g., "I don't immerse myself in my emotions"). Two separate dimensions are distinguished, i.e. affective alexithymia and cognitive alexithymia. Only the total scores on these two dimensions are included in the research. Individuals who score high on emotional alexithymia aren't easily emotionally moved. Also, these people attach little

importance to fantasy and imaginary issues. Imaginations and emotions are considered fantasies, which aren't important. Persons with high scores on cognitive alexithymia can't cognitively represent emotions very well. They have an attitude about emotions that they are not worthwhile to reflect on, comprehend and understand. These people also struggle to put their emotions into words and they are reluctant to talk about their feelings, not even with close friends (Vorst & Bermond, 2001). Özçulha (2015) showed that the affective dimension has a Cronbach's α of .73, indicating a reasonable internal consistency. Her research also showed that the affective dimension has a Cronbach's α of .68, which indicates a reasonable internal consistency.

To measure the body image of patients, the DKB-35 was included in the study. The DKB-35 consists of 35 statements about body experiences, which are distributed on the vitality scale (8 items) (e.g., "I have lots of energy"), self-acceptance (8 items) (e.g., "I am satisfied with my appearance"), sexuality (6 items) (e.g., "My sexual experiences have been satisfactory for me"), handedness (7 items) (e.g., "Other people find me attractive") and body contact (6 items) (e.g., "I consciously avoid touching other persons"). In the study by Scheffers, van Duijn, Bosscher, Wiersma, and van Busschbach (2014), the internal consistency was checked with 761 Dutch citizens, who weren't patients. Cronbach's α coefficients ranged from .73 (handedness) to .91 (sexuality), and indicate fair to good internal consistency.

For the measurement of the system factors, the ISB was used. Of the total ISB, 11 qualitative items were included in the study. The qualitative aspect is measured with the following scales: potential emotional support (5 items) (e.g., "If I feel tense or under pressure, there is someone to help me"), actual emotional support (3 items) (e.g., "I talk confidentially with others") and visiting each other (2 items) (e.g., "I visit friends or relatives"). The internal consistency of the scales of the ISB was investigated by Özçulha (2015). She examined 398 patients with severe somatoform disorder. The Cronbach's α coefficients ranged from .65 (visiting each other) to .85 (potential emotional support) and indicate a questionable to good internal consistency.

For the measurement of the system factors, two psychosocial aspects of pain from the MPI-DLV were included in the study. These concern the scales of social support (3 items) (e.g., "How worried is your spouse/partner to you because of your pain") and perceived control over life (3 items) (e.g., "To what extent were you able, over the past week, to handle the stress"). In the study of Lousberg and colleagues (1999), the internal consistency was of the scales was checked with 733 pain patients. Cronbach's α coefficient of the social support

scale was .88 and .74 for the perceived control scale, these data suggest reasonable to good internal consistency.

The questionnaires that were used for the measurement of the outcome variables.

The Brief Symptom Inventory (BSI) was used for the measurement of psychopathology. For this measurement, the general mental health scale was used. This scale exists of 53 items, including: somatic symptoms (7 items) (e.g., “Vertigo”), cognitive disorders (6 items) (e.g., “Having trouble to remember something”), interpersonal problems (4 items) (e.g., “Being easily hurt”), depression symptoms (6 items) (e.g., “Having thoughts of suicide”), anxiety (6 items) (e.g., “Being afraid”) hostility problems (5 items) (e.g., “Being easily annoyed by something”) agoraphobia symptoms (5 items) (e.g., “Feeling anxiously on open squares or large spaces”), paranoid symptoms (5 items) (e.g., “The feeling that you are being watched or that being talked behind your back”) and psychotic disorders (5 items) (e.g., “Feeling alone, even if you're in company”). Beurs and Zitman (2006) studied the internal consistency of the BSI in 4650 ambulatory patients and in 1960 healthy subjects. The Cronbach's α coefficient of the entire BSI was .96, indicating a very good internal consistency.

The Lichamelijke Klachten Vragenlijst (LKV) was used for the measurement of ‘experienced complaints’. The LKV consists of 51 items about physical complaints and includes all somatic symptoms listed in the DSM IV (e.g. “Palpitations”). The score on the LKV gives an indication of the severity of the physical symptoms of the respondent. The internal consistency of the LKV was examined in the study of de Waal and colleagues (2009) in a randomized sample, consisting of 1046 participants. For the entire questionnaire, Cronbach’s α - coefficient was .88, indicating good internal consistency.

For the measurement of the state variable "functioning" in the form of experienced limitations, the physical component score for physical functioning and the mental component score for mental functioning of the RAND-36 are included in the research (Westert et al., 2005). The scale scores for this are transformed into a 100-point scale, where a higher score indicates better health status. The scores were calculated, according to the Hays method. The internal consistency of the physical and mental component was calculated by Özçulha (2015). Cronbach's α -coefficient for both components was .79, indicating a reasonable internal consistency.

In order to measure the actual conducted activities, the subscale “daily activities” from the MPI-DLV was used. The subscale is a total score of the following scales: household (5 items) (e.g., “Washing”), working outside the house (5 items) (e.g., “Working in the garden”),

outdoor activities (4 items) (e.g., “Eating outdoors”) and social activities (4 items) (e.g., "playing cards or other games”). The internal consistency of the scales of the MPI DLV was examined by Lousberg and colleagues (1999) on 733 pain patients. Cronbach's α coefficients ranged from .63 (social activities) to .83 (Working outside the house), and reflect a questionable to good internal consistency.

Statistical analysis

All statistical analysis were performed by using IBM SPSS Statistics, version 21 for Mac. A value of $p < .05$ was used for the determination of statistical significance. Participants were allocated to the profile groups by computing squared Euclidean distances from the means that were found in the study of Özçulha (2015). The data file of Özçulha was used to verify whether allocation-using equations were identical to the allocation by SPSS, which was indeed the case.

It was investigated whether the data met several assumptions. The first assumption that was examined was whether significant outliers in the outcome variables were absent. After inspection of histograms, no significant outliers were found.

The second assumption that was examined was whether the difference scores were normally distributed. This was inspected by performing a Shapiro- Wilk test. The Shapiro- Wilk test showed that the residuals of physical functioning, $W(93) = .988, p = .55$, mental functioning, $W(93) = .987, p = .52$, and conducted activities, $W(54) = .963, p = .09$, did not deviate significantly from a normal distribution. However, the residuals of psychopathology, $W(114) = .938, p < .001$, and complaints, $W(98) = .963, p = .008$, deviated significantly from normal. Therefore, it was decided to bootstrap the difference scores of psychopathology and complaints in further analysis with 1000 samples.

In addition, Levene’s test was performed to examine whether the variances of the residuals of the outcomes were roughly equal between the profile groups. Firstly, Levene’s test showed that for the residuals of psychopathology, $F(4,109) = 1.71, p = .152$, physical functioning, $F(4, 88) = 1.66, p = .167$, and mental functioning, $F(4, 88) = 0.33, p = .861$, the variances were equal between the profile groups. However the variances between the profile groups were not equal for the residuals of the complaints $F(4,93) = 2.48, p < .05$, and conducted activities, $F(4, 49) = 3.31, p < .05$. For the residuals that showed no homogeneity of variances, Welch’s F was used to interpret the data.

Because nearly half of the participants did not fill out their education level, education level was not included as a covariate. In order to carry out an analysis with the covariates age

and gender, it was checked whether the relationship between the covariates and the residuals was constant between the profile groups. This showed that only the relationship between age and the residuals of conducted activities was not the same for all the profile groups. Therefore, the output resulting from this analysis will be interpreted with caution.

After it was confirmed that the assumptions were satisfied, several analysis were performed. Firstly, in order to investigate if the profile groups were related to therapy outcomes, a paired *t*-test was performed to investigate whether a significant residual change had occurred after therapy. Cohen's *d* was calculated in order to determine the effect sizes of the observed significant effects. An effect size of $d = 0.2$, $d = 0.5$ and $d = 0.8$ were respectively interpreted as small, medium and large effects (Field, 2013).

Secondly, a variance analysis was performed, that examined whether the profile groups showed a significant different score on the outcome measures after therapy with the baseline scores entered as covariates (thus actually the residual change was evaluated). Pearson's *r* was calculated in order to determine the effect sizes of the observed significant effects. An effect size of $r = 0.20$, $r = 0.50$ and $r = 0.80$ are respectively interpreted as small, medium and large effects (Field, 2013).

Thirdly, it was investigated whether the results were not due to confounding variables age and gender. This was investigated by including these variables in the analysis of variance as covariates. Partial η^2 was calculated in order to determine the effect sizes of the observed significant effects. Fourthly a correlation was performed to investigate the influence of the covariate. Finally, the number and percentage of participants within a profile group, who deteriorated, roughly remained the same or improved after therapy, was described. Participants were split into the three groups. The participants who were placed in the deterioration group, showed a decrease after therapy of more than -0.5 standard deviations, compared to the mean score of all the participants. The participants that remained roughly the same, showed a change that was in between -0.5 and 0.5 standard deviations. The participants that showed an improvement after the therapy of 0.5 standard deviations or more were placed in the improvement group. Because the groups were too small, no Chi^2 test was performed.

Results

The residual changes on the outcome measures

Firstly, it was investigated whether the residual changes deviated significantly from zero. Because this study used small samples, the effects that were found non-significant but showed

at least a small effect in terms of residual scores, were nevertheless emphasized in the results section. The effects of the residual changes are shown in Table 2.

Table 2

Mean (Standard Deviation) Baseline and Exit Measurement and the Residual Change Scores of the Five Outcome Measures for each Profile Group

Psychopathology					
Profile group	Baseline measurement		Exit measurement		Residual change
	M	SD	M	SD	
Inflexible (n=29)	1.48	0.48	1.20	0.62	-.05
Active (n=29)	0.99	0.52	0.86	0.59	-.15
Limiting (n=27)	1.02	0.59	1.04	0.67	.11
Adaptive (n=18)	0.56	0.35	0.65	0.11	-.11
Maladaptive (n=11)	2.04	0.79	1.70	0.98	.24
Total (n=114)	1.24	0.70	1.10	0.73	

Complaints					
Profile group	Baseline measurement		Exit measurement		Residual change
	M	SD	M	SD	
Inflexible (n=25)	18.20	7.14	14.40	7.24	-.29
Active (n=23)	14.61	6.11	13.39	7.82	-.03
Limiting (n=23)	18.57	7.96	17.83	6.89	.23
Adaptive (n=18)	13.18	8.91	13.00	9.43	.08
Maladaptive (n=11)	22.44	7.27	19.94	9.92	.11
Total (n=98)	17.57	7.77	15.71	8.28	

Physical functioning					
Profile group	Baseline measurement		Exit measurement		Residual change
	M	SD	M	SD	
Inflexible (n=26)	42.69	28.08	49.81	28.54	.19
Active (n=21)	40.95	26.39	51.43	30.95	.34
Limiting (n=24)	41.67	26.24	35.83	22.87	-.49*
Adaptive (n=18)	44.38	30.64	41.88	24.04	-.28
Maladaptive (n=11)	36.07	17.22	43.93	24.35	.19
Total	41.18	25.63	45.00	26.97	

Mental functioning					
Profile group	Baseline measurement		Exit measurement		Residual change
	M	SD	M	SD	
Inflexible (n=26)	36.00	11.7	50.93	19.35	.23
Active (n=21)	53.33	13.4	58.86	18.6	.25
Limiting (n=24)	59.00	15.21	55.50	23.39	-.17
Adaptive (n=18)	72.00	11.90	70.50	11.89	.22
Maladaptive (n=11)	30.86	16.03	34.00	24.29	-.48
Total	48.17	18.83	53.03	22.36	

Conducted activities					
Profile group	Baseline measurement		Exit measurement		Residual change
	M	SD	M	SD	
Inflexible (n=13)	1.79	0.76	1.93	0.90	.07
Active (n=13)	2.17	0.45	2.19	0.93	.14
Limiting (n=15)	2.20	0.63	2.02	0.18	-.13
Adaptive (n=18)	2.48	0.71	2.07	0.64	-.28
Maladaptive (n=11)	1.46	0.81	1.83	1.15	.19
Total	2.05	0.70	2.02	0.83	

Note. A reduction of the psychopathology and complaints score reflects a positive result of the therapy, while a reduction in physical, mental and conducted activities reflects a negative result.

Note. The residual effects can be interpreted as effect sizes. Residual effects that are larger than .2 are made bold.

Note. An asterisk is placed behind the residual change when it deviates significantly ($p < .05$) from zero.

Taking a small effect size as a criterion, these results show that the maladaptive, adaptive and limiting groups show a decline or a small raw progression that stays behind as compared to the other groups, while the inflexible and active groups showed a progression in terms of average residual change scores.

Differences between the groups on residual change

Secondly, it was investigated whether the profile groups scored significantly different on the residual scores on the outcome variables. Results of significance testing are shown in Table 3. The analysis showed no significant differences between the profile groups on the residual score of respectively: psychopathology, somatic complaints, mental functioning and conducted activities, $F(4, 109) = 0.57, p = .69$; *Welch's F* $(4, 94) = 0.90, p = .47$; $F(4, 88) =$

1.60, $p = .18$; *Welch's F* (4, 49) = 0.33, $p = .86$. A significant effect was found for the profile groups on the residual scores of physical functioning, $F(4, 88) = 2.66$, $p < .05$, $r = 0.33$. However, post hoc tests showed that the change of the groups was not significantly different from each other applying the Bonferroni criterion.

Table 3

The p-value, F-value and Effect Sizes of Analyses of Variance Comparing the Profile groups Regarding Five Outcome Measures, Whether the Profile Groups Scored Significantly Different on the Outcome Measures

	n	p	F	Effect size (r)
Psychopathology	114	.69	0.57	-
Complaints	98	.47	0.90	-
Physical functioning	93	< .05	2.66	0.33
Mental functioning	93	.18	1.60	-
Conducted activities	54	.86	0.33	-

Note. Welch's F was used for the interpretation of the complaints and conducted activities.

The covariate age was significant related to the residual score of physical functioning, $F(1, 82) = 7.20$, $p < .01$, $\eta^2 = .076$. For the other scores, age and gender, were not significantly related to the residual scores of psychopathology, complaints, physical functioning, mental functioning and actual conducted activities.

When controlling for age, no significant effect of the profile groups on the residual scores of psychopathology, complaints, mental functioning and actual conducted activities was found, $F(4, 108) = 0.67$, $p = .62$; $F(4, 92) = 1.08$, $p = .37$; $F(4, 87) = 1.92$, $p = .11$; $F(4, 48) = 0.31$, $p = .87$. However, when controlling for age, there was a significant effect of the profile group on the residual scores of physical functioning, $F(4, 87) = 3.102$, $p < .05$, $\eta^2 = .13$. For an overview, see Table 4.

A Pearson correlation showed that there was a significant relation between the residual difference scores on physical functioning and the age of the participant; older patients progressed less: $r = -.24$, $p < .05$.

Table 4

The p-value, F value and Effect Sizes, Whether the Profile Groups Scored Significantly Different on the Outcome Measures, when Controlling for Age

	n	p	F	Effect size (r)
Psychopathology	114	.62	0.67	-
Complaints	98	.37	1.08	-
Physical functioning	93	< .05	3.10	.13
Mental functioning	93	.11	1.92	-
Conducted activities	54	.87	0.31	-

When controlling for gender, no significant effect of the profile groups on the residual score of psychopathology, complaints, physical functioning, mental functioning and actual conducted activities was found, $F(4, 104) = 1.19, p = .32$; $F(4, 88) = 1.31, p = .27$; $F(4, 83) = 1.86, p = .10$; $F(4, 83) = 1.81, p = .13$; $F(4, 44) = 0.59, p = .67$. For an overview, see Table 5.

Table 5

The p-value, F value and Effect Sizes, Whether the Profile Groups Scored Significantly Different on the Outcome Measures, when Controlling for Gender

	n	p	F	Effect size (r)
Psychopathology	114	.32	1.19	-
Complaints	98	.27	1.31	-
Physical functioning	93	.10	1.86	-
Mental functioning	93	.13	1.81	-
Conducted activities	54	.59	0.67	-

Concluding, the results show that outcomes of mental and physical functioning differ between subgroups, with small effect sizes, when not controlling for covariates. Post-hoc analysis revealed that the groups did not differ significantly on the residual changes. When age and gender were separately included in the model, the results showed that only the covariate age was significant related to the residual score of physical functioning. Analysis showed that younger age was correlated with better physical functioning.

Post-hoc analysis

Finally, the number of participants within each profile group, who deteriorated, remained roughly the same or improved after therapy was described. The results for each outcome

measure can be found in appendix 2. These results are consistent with the results from Table 2.

Discussion

This study examined whether psychological profiles are associated with outcomes after treatment of patients with severe somatoform disorders. The psychological profiles that were used in this study were derived from a previous study by Özçulha (2015), which showed that it is possible to make a distinction between five profiles for patients with a severe somatoform disorder: inflexible, active, limiting, adaptive and maladaptive. These profiles scored significantly different in the combinations of resilience, vulnerability and avoidance. Since the literature showed inconsistencies regarding the influence of vulnerability and avoidance factors on therapy outcomes, it was not possible to derive hypotheses about the expected growth or decline of the profiles but the patients with a resilient profile were expected to make a larger progress. Contrary to expectation, psychological profiles did not significantly predict the outcome of therapy. Because lack of significance might be due to the small sample size, outcomes with at least a small effect size were explored. This exploration tentatively indicated that the offered therapy is more suitable for active and inflexible individuals and less appropriate for the individuals from the adaptive, maladaptive and limiting groups. In the remainder of this discussion, these results will be compared with the existing literature. Furthermore the use of the outcome measurements will be discussed. Finally, the strengths and weaknesses, along with the clinical implications of this research and possible further research will be discussed.

Are the psychological profiles associated with outcomes after treatment?

Based on the residual changes, this research tentatively indicated that the therapy offered at Eikenboom seems to be most appropriate for the active and inflexible profiles, and less effective for the adaptive, maladaptive and limiting profiles. Caution in interpretation is important because this conclusion is based on a small sample and non-significant results. Contrary to what was expected, these are not the profiles which are characterized by high resilience. In addition, these results do not correspond to the *floor effect* (Turk et al., 1998). This is an effect that has been found in several studies that have done research on treatment responses of subgroups of pain disorders (De Rooij et al., 2013; Rudy, Turk, Kubinski, & Zaki, 1995; Strategier, Chwalisz, Altmaier, Russel, & Lehmann 1997; Turk, Okifuji, Sinclair,

& Starz, 1998). The floor effect can be explained as ‘those who are less disabled at the beginning of the treatment will make a relatively smaller improvement than those who are more disabled, because there is little room for growth’ (Turk, 1998). The severity and complexity of the complaints and comorbid disorders in patients who are treated at Eikenboom are a possible explanation for the differences between the results of the current study and literature. For example, in the study of Turk et al. (1998), 14.6% of the patients were unemployed due to pain, while the clinical experience from the researcher is that almost all the patients treated at Eikenboom stopped working.

Are the psychological profiles associated with differential outcomes after treatment?

Secondly, it was investigated whether the groups experienced a significantly different residual change compared to each other. The results showed the profile groups did not show a dissimilar residual change on all outcomes. This indicates that, despite the fact that different groups of patients with a severe somatoform disorder can be distinguished; the change on the outcomes was not significantly different between the groups. This result is in line with research by Bergström, Jensen, Bodin, Linton, and Nygren (2001), Gatchel et al. (2002), and Walen, Cronan, Serber, Groessler, and Oliver (2002) who also found that different groups of pain patients did not show a different change regarding the outcomes. A possible explanation for this result might be that Eikenboom offers a multidisciplinary treatment which focuses at a wide range of components, rather than tuning in to specific characteristics of a patient and adjust the therapy to what a patient actually needs in order to grow on an outcome.

Overall, the mean result of the therapy was disappointing. Turk (2005) has described the multidisciplinary treatment offered at multidimensional pain clinics, such as Eikenboom, by the *patient uniformity myth*: A diverse group of patients are seen as a homogeneous group and are all treated in the same way, instead of customizing the treatment to the patient. Therefore, the advice for Eikenboom, following these results, is to customize their treatment to the specific characteristics of the patients in order to be more efficient. Several researches on pain disorders, such as temporomandibular disorder, early rheumatoid arthritis, musculoskeletal pain and chronic low back pain, indicated that tailoring the therapy has a positive effect on the outcome (Åsenlöf, Denison, & Lindberg, 2005; Brennan et al., 2006; Evers, Kraaijmaat, van Riel, & de Jong, 2002; Fersum, O’Sullivan, Skouen, Smith, & Kvåle, 2012; Turk, Zaki, & Rudy 1993). However, tailoring may be a complex and dynamic process. Research on psychosocial subgroups of the MPI by Asih, Mayer, Williams, Choi, and Gatchel (2015) and Broderick, Junghaenel, and Turk (2004) has indicated that patient change their

profile groups during treatment to other profile groups. This suggests that optimal tailoring should include a change of interventions when therapy progresses.

The results also indicated that young individuals have more benefit of therapy with regard to physical functioning than older people. The literature study showed an inconsistent picture about the influence of age (Petersen, Larsen, & Jensen, 2007; van der Hulst, Vollenbroek-Huts, & Ijzerman, 2005; Verkerk, Luijsterburg, Miedema, Pool-Goudzwaard, & Koes 2012). A possible explanation for the observed effect could be that younger people, compared to elderly, recover physically quicker and therefore show a faster progression.

Using different outcome measures

The results of the present study on mental and physical function, measured by the RAND-36, let the question arise whether the appropriate outcome measures were used. In this questionnaire, a score of 50 and a standard deviation of 10 corresponds with the average population (Westert et al., 2005). The results of this study showed that the average baseline measurement of physical functioning is only one standard deviation below the mean. The average baseline measurement of mental functioning is even around the mean of the general population. This is remarkable because patients who experience serious mental and physical problems completed the questionnaires. Comparable results were found in the study of Houtveen et al. (2015) where patients also treated at Eikenboom scored between the Dutch norm reference group of the normal population and the high score of the Dutch norm reference group of psychiatric patients on somatization and overall psychopathology on the SCL-90. It appears that the chosen outcome measures do not really reflect the core problems of most patients. The results of this study do not generalize beyond these outcome measures.

From the treatment view of Eikenboom, the MAMS method, it is also the question whether the appropriate outcome measures were used. While treatment for less severe somatoform disorders is often focused on modulating behavior and thoughts, treatment at Eikenboom also focuses on learning to be aware of the inner symptoms, accepting the complaints and the associated limitations and learning to deal with people in the immediate social environment (Spaans, 2006). This is in line with research by van Vliet (2014), which indicated that patients with severe somatoform disorders showed improvements on other outcomes than were used in this study. In the research by van Vliet (2014), patients with a severe somatoform disorder were asked in what categories they experienced growth. The study indicated that the self-chosen outcome measures were more specific for the treatment view. Some of the most important self-chosen outcome measures were: feeling relaxed,

dealing with complaints and satisfaction about the self. Future research could therefore focus more on outcome measures that are customized to the individual.

Strengths, limitations, implications of this study and further research

One of the strengths of this study was the longitudinal design where a great amount of information about the individuals was gathered. A shortcoming of this study was the relatively small group of participants that hampered significance testing. This shortcoming ensures that the found results should be interpreted with caution.

Because this research included only one evaluation moment for the outcome measurements, it is possible that the therapy has not yet reached its full potential. Therefore, if there is budget, future research could be conducted with measurement moment further away from the time the patients completed the therapy. If further research in a larger sample confirms that profiles are predictive of the therapy outcome, then new clinical experimental research could focus on the question what specific interventions, or parts of interventions, are most appropriate for the different profile groups, so that the effectiveness of therapy can be increased. This research could focus on providing the treatment in a modular fashion with measurement points after the components are finished so that a better understanding arises about the effect of a specific therapy or part of a therapy for the profile groups (Turk, 2005).

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Appendix 1

Table 6

The Effects Found in Systematic Reviews for the Vulnerability Factors

Factor	Study	Effect	Outcome	Disorder	Treatment
Catastrophizing on treatment outcome	Wertli et al., 2014	Negative	Pain and disability	Chronic low back pain	Several types of treatment
Catastrophizing on treatment outcome	Wertli et al., 2014	No relation	Pain and disability	Chronic low back pain	Several types of treatment
Depression	de Rooij et al., 2013	Negative	Pain, physical functioning, global effect and quality of life	Fibromyalgia	Multidisciplinary rehabilitation treatment
Fear of movement	Verkerk et al., 2012	Inconsistent	Pain intensity and disability	Chronic low back pain	Several types of treatment

Table 7

The Effects Found in Prospective Correlational Researches for the Vulnerability Factors

Factor	Study	Effect	Outcome	Disorder	Treatment
High affective distress	Thieme, Turk and Flor, 2007	Negative effect	Physical impairment	Fibromyalgia	Cognitive behavioural therapy, operant behavioural therapy and placebo
High level of catastrophizing	Thieme, Turk and Flor, 2007	Positive effect	Physical impairment	Fibromyalgia	Operant behavioural therapy
Depression	van der Hulst, Vollenbroek-Hutten, Groothuis-Oudshoorn, Hermens, 2007	Positive effect	Sickness impact, health related quality of life	Chronic low back pain	Multidisciplinary rehabilitation & back school treatment
Depression	Keeley et al., 2007	Negative effect	Physical health related quality of life	Chronic fatigue syndrome	Healthcare

More feelings of tensity and unfit	Haldorson, Kronholm, Skouen and Ursin, 1998	Negative effect	Return to work	Chronic low back pain	Multi modal cognitive behavioural treatment program
Expectations that complaints worsen	Haldorson, Kronholm, Skouen and Ursin, 1998	Negative effect	Return to work	Chronic low back pain	Multi modal cognitive behavioural treatment program
Hopelessness about the future	Haldorson, Kronholm, Skouen and Ursin, 1998	Negative effect	Return to work	Chronic low back pain	Multi modal cognitive behavioural treatment program
low expectations of future work ability	Petersen, Larsen and Jacobsen, 2007	Negative effect	Pain, sick leave and healthcare use	Chronic low back pain	Exercise therapy
low level of illness acceptance	Poppe, Petrovic, Vogelaers and Crombez, 2013	Positive effect	Mental and physical quality of life	Chronic fatigue syndrome	Cognitive behavioural therapy
High levels of neuroticism	Poppe, Petrovic, Vogelaers and Crombez, 2013	Positive effect	Mental and physical quality of life	Chronic fatigue syndrome	Cognitive behavioural therapy
Social stress related to back pain	Keeley et al., 2007	Negative effect	Mental and physical quality of life	Chronic fatigue syndrome	Orthopaedic outpatient clinic

Table 8

The Effects Found in Systematic Reviews for the Avoidance Factors

Factor	Study	Effect	Outcome	Disorder	Treatment
Sick leave at entry	Verkerk et al., 2012	Inconsistent effect	Pain intensity and disability	Chronic low back pain	Several types of treatment
Worse baseline status	de Rooij et al., 2013	Negative effect	Physical functioning and Global effect	Fibromyalgia	Multidisciplinary rehabilitation treatment
High level of perceived disability at baseline	van der Hulst, Vollenbroek- Hutten, Ijzerman, 2005	Positive effect	Activity limitation and participation restriction	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment

High pain intensity at start	van der Hulst, Vollenbroek-Hutten, Ijzerman, 2005	Negative effect	Activity limitation and participation restriction	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment
High pain intensity at start	Verkerk et al., 2012	No relation	Disability	Chronic low back pain	Several types of treatment
High pain intensity at start	de Rooij et al., 2013	Positive effect	Physical functioning	Fibromyalgia	Multidisciplinary rehabilitation treatment
High level of activity limitation	van der Hulst, Vollenbroek-Hutten, Ijzerman, 2005	Positive effect	Physical functioning	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment
High interference of pain with activities	van der Hulst, Vollenbroek-Hutten, Ijzerman, 2005	Negative effect	Activity limitation and participation restriction	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment
Negative health related variables	van der Hulst, Vollenbroek-Hutten, Ijzerman, 2005	No relation	Activity limitation and participation restriction	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment
High dysfunctional coping	de Rooij et al., 2013	Positive effect	Pain	Fibromyalgia	Multidisciplinary rehabilitation treatment
High pain profile	de Rooij et al., 2013	Negative effect	Pain and physical functioning	Fibromyalgia	Multidisciplinary rehabilitation treatment
More fatigue	de Rooij et al., 2013	Positive effect	Pain and physical functioning	Fibromyalgia	Multidisciplinary rehabilitation treatment
Low levels of active coping	van der Hulst, Vollenbroek-Hutten, Ijzerman, 2005	Positive effect	Activity limitation and participation restriction	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment

More avoidance beliefs	van der Hulst, Vollenbroek-Hutten, Groothuis-Oudshoorn, Hermens, 2008	Positive effect	Physical functioning	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment
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Table 9

The Effects Found in Prospective Correlational Researches for the Avoidance Factors

Factor	Study	Effect	Outcome	Disorder	Treatment
High physical impairment	Thieme, Turk and Flor, 2007	Positive effect	Physical impairment	Fibromyalgia	Cognitive behavioural therapy, operant behavioural therapy and placebo
High pain behaviour	Thieme, Turk and Flor, 2007	Positive effect	Physical impairment	Fibromyalgia	Cognitive behavioural therapy, operant behavioural therapy and placebo
Large number of physician visits	Thieme, Turk and Flor, 2007	Negative effect	Physical impairment	Fibromyalgia	Cognitive behavioural therapy, operant behavioural therapy and placebo
Large number of physician visits	Thieme, Turk and Flor, 2007	Positive effect	Physical impairment	Fibromyalgia	Operant behavioural therapy
Low coping	Thieme, Turk and Flor, 2007	Positive effect	Pain intensity, physical impairment	Fibromyalgia	Cognitive behavioural therapy

High pain intensity at start	van der Hulst, Vollenbroek-Hutten, Groothuis-Oudshoorn, Hermens, 2008	Positive effect	Physical health	Chronic low back pain	Multidisciplinary rehabilitation and back school treatment
Low physical activity	Haldorson, Kronholm, Skouen and Ursin	Negative effect	Return to work	Chronic low back pain	Multi modal cognitive behavioural treatment program
Low levels of energy	Haldorson, Kronholm, Skouen and Ursin	Negative effect	Return to work	Chronic low back pain	Physiotherapy
Sick leave at entry	Petersen, Larsen and Jacobsen	No relation	Sick leave	Chronic fatigue syndrome	Cognitive behavioural therapy
Sick leave at entry	van der Hulst, Vollenbroek-Hutten, Groothuis-Oudshoorn, Hermens, 2008	No relation	Sick leave	Chronic low back pain	Multidisciplinary rehabilitation and back school treatment
Sick leave at entry	Van der Hulst, Vollenbroek-Hutten, Ijzerman, 2005	Inconsistent effect	Activity limitation and participation restriction	Chronic low back pain	Multidisciplinary rehabilitation and Back school treatment
More avoidance beliefs	Keeley et al., 2007	Negative	Health service contacts		Healthcare
More avoidance beliefs	Camacho-Soto, Sowa, Perreira and Weiner, 2012	Negative	Disability	Chronic low back pain	Percutaneous electrical nerve stimulation and/or a general conditioning and aerobic exercise program

More avoidance beliefs	Grotle, Vøllestad and Brox, 2006	Negative	Pain and disability	Chronic low back pain	Mini back school and physical therapist
More avoidance beliefs	Klenerman et al., 1995	Negative	Development to chronic low back pain	Chronic low back pain	General practitioner
More avoidance beliefs	Lundberg, Frennered, Hägg and Styf, 2010	Negative	Disability	Chronic low back pain	Treatment at an orthopedic outpatient clinic
More avoidance beliefs	King, Wessel, Bhambhani, Sholter and Maksymowych, 2002	Negative	Success of intervention	Fibromyalgia	Exercise only, education only, or combination of exercise and education

Table 10

The Effects Found in Systematic Reviews for the Resilience Factors

Factor	Study	Effect	Outcome	Disorder	Treatment
Adaptive coping strategies	de Rooij et al., 2013	Positive effect	Pain	Fibromyalgia	Multidisciplinary rehabilitation treatment

Table 11

The Effects Found in Prospective Correlational Researches for the Resilience Factors.

Factor	Study	Effect	Outcome	Disorder	Treatment
Good therapeutic relationship	Ferreira, et al. 2013	Positive effect	function, global perceived effect, pain and disability	Chronic low back pain	General exercise, motor control exercise, spinal manipulative therapy
Low affective distress	Thieme, Turk and Flor, 2007	Positive effect	Physical impairment	Fibromyalgia	Cognitive behavioural therapy, operant behavioural therapy and placebo

Low solicitous spouse behaviour	Thieme, Turk and Flor, 2007	Positive effect	Physical impairment	Fibromyalgia	Cognitive behavioural therapy, operant behavioural therapy and placebo
Low pain behaviour	Thieme, Turk and Flor, 2007	Positive effect	Pain intensity, physical impairment	Fibromyalgia	Cognitive behavioural therapy
Psychological strength	Haldorson, Kronholm, Skouen and Ursin, 1998	Positive effect	Return to work	Chronic low back pain	Multi modal cognitive behavioural treatment program
High levels of energy	Haldorson, Kronholm, Skouen and Ursin, 1998	Positive effect	Return to work	Chronic low back pain	Physiotherapy
Less subjective health complaints	Haldorson, Kronholm, Skouen and Ursin, 1998	Positive effect	Return to work	Chronic low back pain	Physiotherapy
Being at work	van der Hulst, Vollenbroek-Hutten, Groothuis-Oudshoorn, Hermens	Positive effect	Physical health	Chronic low back pain	Multidisciplinary rehabilitation / Back school treatment

Appendix 2

Table 12

Percentage and Number of Persons, Divided by Profile Group, that Deteriorated, Stayed Equal or Increased in Terms of Experienced Psychopathology

Profile group	Psychopathology					
	Deterioration		Equal		Improvement	
	%	n	%	n	%	n
Inflexible	10%	3	52%	15	38%	11
Active	10%	3	62%	18	28%	8
Limiting	15%	4	59%	16	26%	7
Adaptive	9%	1	82%	9	9%	1
Maladaptive	11%	2	67%	12	22%	4

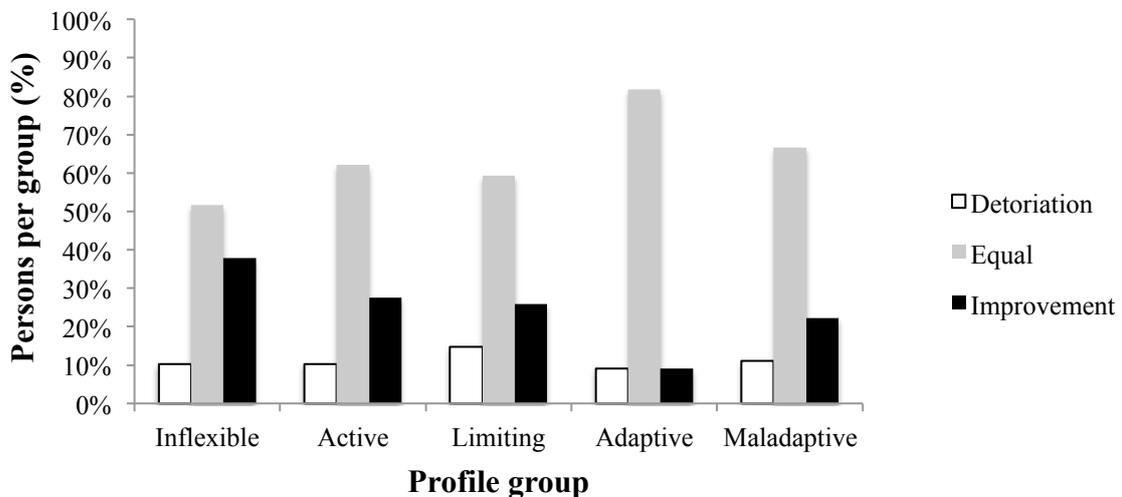


Figure 5. Percentage of persons, divided by profile group, that deteriorated, stayed equal or increased in terms of psychopathology.

Table 13

Percentage and Number of Persons, Divided by Profile Group, that Deteriorated, Stayed Equal or Increased in Terms of Complaints

Profile group	Complaints					
	Deterioration		Equal		Improvement	
	%	n	%	n	%	n
Inflexible	16%	4	44%	11	40%	10
Active	22%	5	48%	11	30%	7
Limiting	30%	7	35%	8	35%	8
Adaptive	9%	1	91%	10	0%	0
Maladaptive	19%	3	44%	7	38%	6

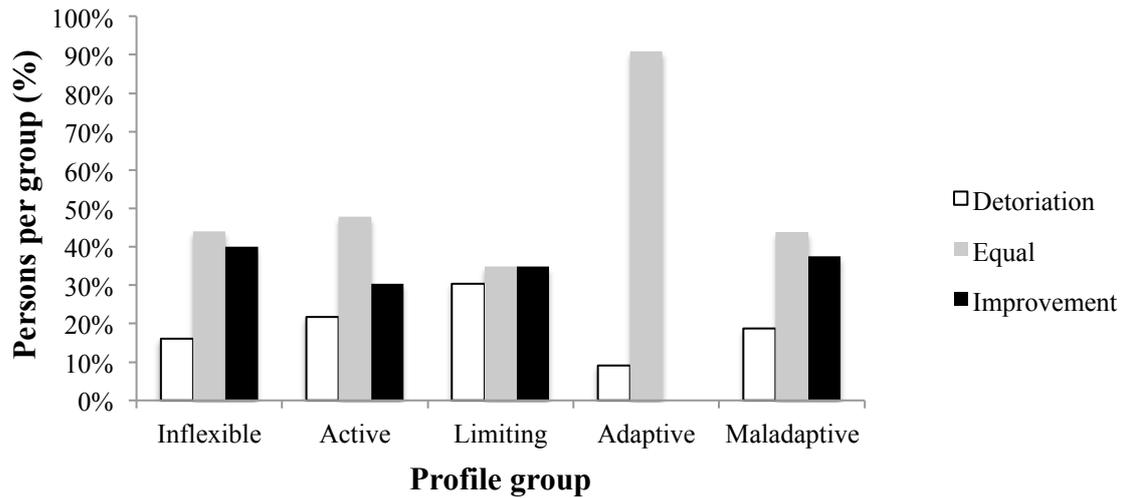


Figure 6. Percentage of persons, divided by profile group, that deteriorated, stayed equal or increased in terms of complaints.

Table 14

Percentage and Number of Persons, Divided by Profile Group, that Deteriorated, Stayed Equal or Increased in Terms of Physical Functioning

Profile group	Physical functioning					
	Deterioration		Equal		Improvement	
	%	n	%	n	%	n
Inflexible	23%	6	46%	12	31%	8
Active	5%	1	33%	7	62%	13
Limiting	17%	4	58%	14	25%	6
Adaptive	50%	4	38%	3	12%	1
Maladaptive	14%	2	43%	6	43%	6

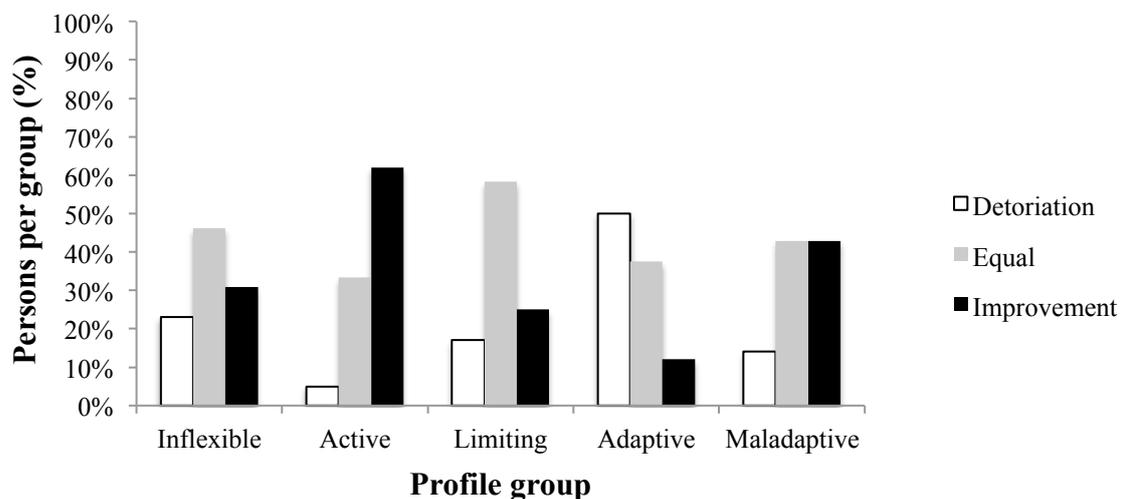


Figure 7. Percentage of persons, divided by profile group, that deteriorated, stayed equal or increased in terms of functioning.

Table 15

Percentage and Number of Persons, Divided by Profile Group, that Deteriorated, Stayed Equal or Increased in Terms of Mental Functioning

Profile group	Mental functioning					
	Deterioration		Equal		Improvement	
	%	n	%	n	%	n
Inflexible	8%	2	27%	7	65%	17
Active	29%	6	33%	7	38%	8
Limiting	38%	9	29%	7	33%	8
Adaptive	25%	2	13%	1	63%	5
Maladaptive	21%	3	64%	9	14%	2

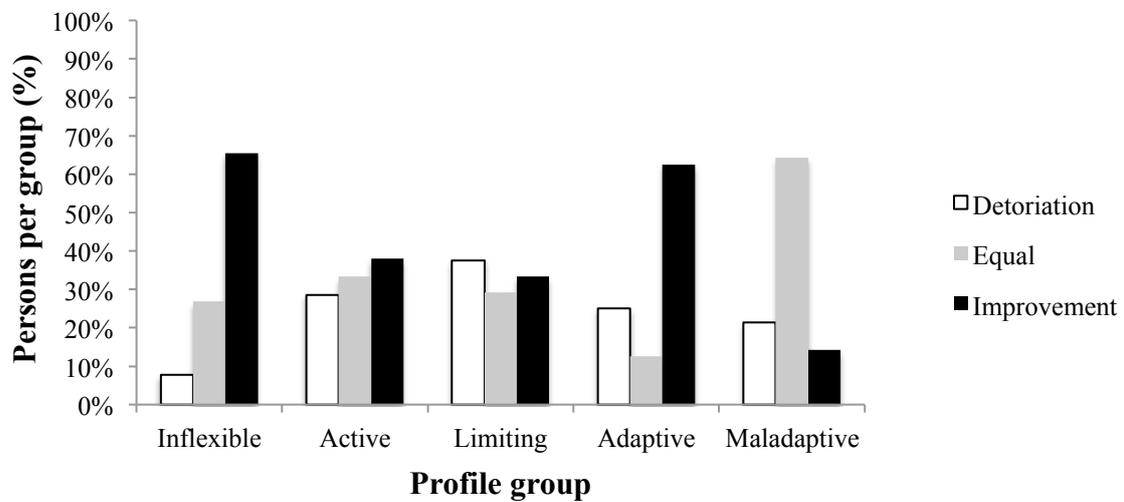


Figure 8. Percentage of persons, divided by profile group, that deteriorated, stayed equal or increased in terms of mental functioning.

Table 16

Percentage and Number of Persons, Divided by Profile Group, that Deteriorated, Stayed Equal or Increased in Terms of Conducted Activities

Profile group	Conducted activities					
	Deterioration		Equal		Improvement	
	%	n	%	n	%	n
Inflexible	15%	2	54%	7	31%	4
Active	15%	2	62%	8	23%	3
Limiting	53%	8	27%	4	20%	3
Adaptive	29%	2	71%	5	0%	0
Maladaptive	33%	2	17%	1	50%	3

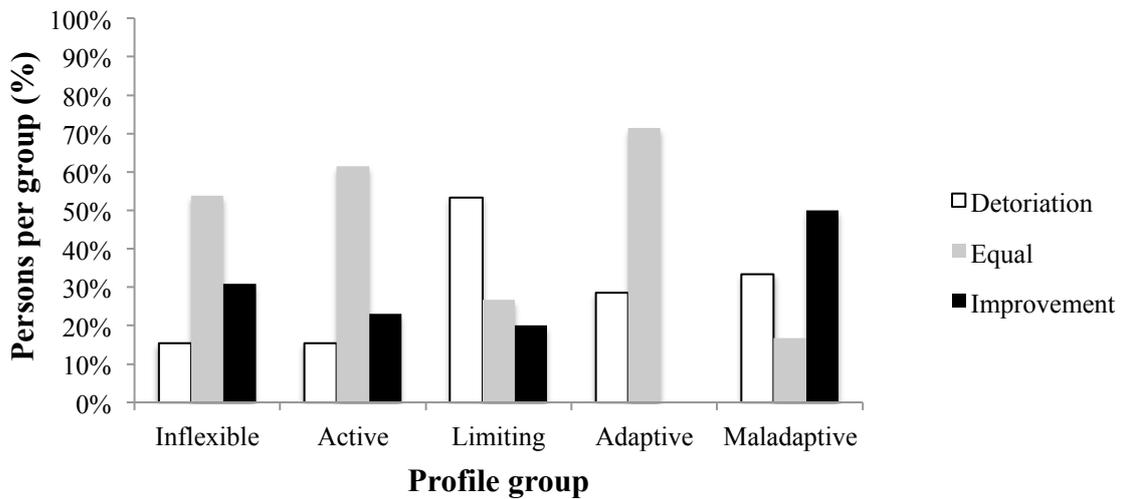


Figure 9. Percentage of persons, divided by profile group, that deteriorated, stayed equal or increased in terms of conducted activities.