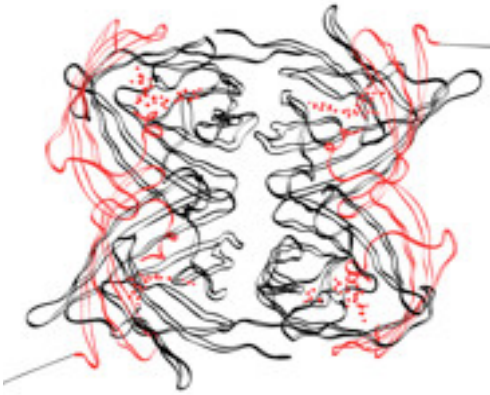
VAKGROEP PSYCHOLOGIE, GEZONDHEID
& TECHNOLOGIE

Relationship between self-efficacy and psychological health in polyarthritis patients

A positive approach



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Abstract

Objective. Self-efficacy is known to be negatively related to negative psychological functioning like depression and anxiety, in polyarthritis patients. A field that has not yet been attended to is the association between positive psychological functioning and self-efficacy. The current study is focussing on this relationship. Purpose in life, positive affect and participation are chosen as indicators of psychological functioning.

Method. A number of 331 polyarthritis patients participated in a questionnaire study (61% female, 29% employed, mean age: 62 years, mean disease duration: 15 years). To examine a possible relationship between self-efficacy and positive psychological functioning, regression analyses were carried out. Mediation analyses were done to examine if self-efficacy was mediating relationships between physical health and psychological functioning.

Results. In all of the regression analyses more variance in the model was explained by adding self-efficacy (R^2: .15-.50). Pain and other symptoms self-efficacy were both significant predictors of psychological functioning in polyarthritis patients. Except for one model (purpose in life, other symptoms self-efficacy) self-efficacy was found to be partly mediating the relationship between physical health and psychological functioning.

Conclusion. Self-efficacy is not only related to aspects as anxiety and depression, but also to positive psychological functioning as purpose in life, positive affect and participation. Self-efficacy is also reducing the direct effect of physical health on the positive aspects of psychological functioning.

Implications. More research about self-efficacy and other factors that are related to positive psychological functioning should be done. Trainings that enhance self-efficacy, and possible other factors, in patients diagnosed with polyarthritis may result in a more positive life for them.

Samenvatting

Achtergrond. Bij patiënten met polyartritis is al veel onderzoek gedaan naar de verbanden tussen zelf-effectiviteit en negatief psychologisch functioneren, zoals depressies en angst. Echter, geen onderzoek werd tot nu toe aan de relatie tussen zelf-effectiviteit en de positieve aspecten van psychologische adaptatie bij polyartritis gewijd. Het huidige onderzoek gaat juist daarom in op deze relatie. Als indicatoren voor adaptatie werden doelen in het leven, het positieve affect en participatie gekozen.

Methode. 331 polyartritis patiënten hebben aan een vragenlijstonderzoek meegedaan (61% vrouwelijk, 29% werkzaam, gemiddelde leeftijd: 62 jaar, gemiddelde ziekteduur: 15 jaar). Een mogelijke relatie tussen zelf-effectiviteit en positieve psychologische adaptatie werd met behulp van een regressieanalyse onderzocht. Om te onderzoeken of zelf-effectiviteit de relatie tussen fysieke gezondheid en psychologische adaptatie medieert werd een mediatie analyse gedaan.

Resultaten. In alle modellen werd door het toevoegen van zelf-effectiviteit meer variantie in het model verklaard (R^2: .15-.50). Zelf-effectiviteit voor het omgaan met pijn en andere symptomen zijn allebei significante voorspeller van psychologische adaptatie in patiënten met polyartritis. Behalve in het model met doelen in het leven en andere symptomen van zelf-effectiviteit, medieert zelf-effectiviteit de relatie tussen fysieke gezondheid en psychologische adaptatie gedeeltelijk.

Conclusie. Zelf-effectiviteit is niet alleen maar gerelateerd aan angst en depressie, maar ook aan positieve psychologische aspecten, zoals doelen in het leven, het positieve affect en participatie. Bovendien vermindert zelf-effectiviteit het directe effect van fysieke gezondheid op de indicatoren van positieve psychologische adaptatie.

Implicaties. Toekomstig onderzoek moet gericht zijn op zelf-effectiviteit, als ook mogelijke andere factoren, die gerelateerd zijn aan positief psychologisch functioneren. Trainingen die de zelf-effectiviteit, en mogelijke andere factoren, van patiënten met polyartritis verhogen zouden in een positiever leven voor hen kunnen resulteren.

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1. Introduction

1.1 Self-efficacy

Handling different situations in life is influenced by a psychological factor called self-efficacy. Self-efficacy can be defined as the confidence in own competencies if a person has to perform a task or to reach a specific goal (Bandura, 1977). For example, the confidence the reader has to read and understand this thesis. This psychological factor is domain specific (Brekke, Hjordtdahl & Kvien, 2003; Cross et al., 2008). This means being confident to read and understand this text, doesn't mean that the same amount of confidence is present in writing a paper. Certainly self-efficacy is not only affecting normal, everyday actions, but it's also influencing the health behaviour of people.

1.2 Self-efficacy and health behaviour

An example of self-efficacy related to health behaviour is a recent study about the relationship between self-efficacy and the observed eating habits of girls who lose the control of the amount of intake while eating (Glasofer et al., 2013). In the study, it was found, that those girls who were less confident about their ability to resist the food they are surrounded by, were less able to inhibit their eating behaviour. Similar results were found by Konttinen et al. (2010), who studied the associations between depressive symptoms, emotional eating, physical activity, self-efficacy and adiposity indicators. They found a negative correlation between physical activity, self-efficacy, the body mass index and the waist circumference of the men and women who participated in the study. An additional example of self-efficacy in connection to health is the influence of it on the health related quality of life in patients with multiple sclerosis. A change in the self-efficacy for functioning in patients with multiple sclerosis was associated with changes of physical health related quality of life, whereas changes in self-efficacy for control were associated with a change in the psychological health related quality of life in patients with multiple sclerosis (Motl et al., 2013).

1.3 Self-efficacy and polyarthritis

Another domain within these studies of health and self-efficacy is the effect of self-efficacy on patients with polyarthritis. In particular how they experience and handle their illness. In the Netherlands nearly 420.000 people are affected by polyarthritis. 210.000 of these polyarthritis patients are suffering from rheumatoid arthritis (RA). RA is one of the most reviewed polyarthritis diseases. It is an autoimmune disease, characterized by chronic joint inflammation that eventually leads to joint destruction, which is caused by the deterioration of the bone and the cartilage (Schellekens et al., 2000; Nielen et al., 2004). Symptoms include a warm sensation in the joints, as well as pain and swelling close to the affected joints; RA can make the person feel fatigued and faint (Arthritis Foundation, 2013). Next to fatigue, pain and functional limitations are other determinants that help to create the full clinical picture (Scott et al., 2000; Keefe & Somers, 2010; Walsh & McWilliams, 2012). Not only physical, but also psychological consequences are bound to RA. Depression and anxiety are very common in patients with RA, between these two, a high level of comorbidity was found (Covic et al., 2012). Dickens et al. (2002) showed that depression is less common in healthy individuals than in patients with RA. Depression can be described as a mental disorder that is characterized by melancholy low self-esteem, loss of interest, sadness, agitated sleep patterns and loss of appetite, as well as feelings of tiredness and insufficient concentration (WHO, 2013). Furthermore Van Dyke et al. (2004) showed that trait anxiety scores on the State Trait Anxiety Scale (STAI) were higher than the scores of the STAI normative group. On this scale, anxiety is characterized as a high level of concerns that are not controllable, and is furthermore associated with physical signs of arousal, for example trembling, feelings of strain, petulance or sleep difficulties (NIMH, 2013).

The physical and psychological factors are correlated. More functional limitations, pain and fatigue are associated with higher levels of depression and anxiety. This association was found in different settings and ethnical groups (Wolfe & Michaud, 2009; Margaretten et al., 2011; Margaretten et al., 2009; Stebbings et al., 2010; Covic, Tyson, Spencer & Howe, 2006).

Another factor that is correlated with the levels of depression and anxiety in RA patients is self-efficacy. Two self-efficacy dimensions in RA patients are pain self-efficacy, which refers to the confidence of being able to manage daily pain, and other symptoms self-efficacy, which refers to the confidence of being able to control other symptoms, for example mood and fatigue (Lowe et al., 2008). Paukert et al. (2010) found that general self-efficacy

was related to decreased depression and anxiety. They also found a moderating effect of general self-efficacy on the relationship between subjective physical health and depressive symptoms. Barlow et al. (2002) calculated partial correlations of functional limitations, pain and fatigue with depression, anxiety, positive and negative affect and acceptance. They controlled for pain and other symptoms self-efficacy and found suggestions that self-efficacy was changing the relationships between the three physical health constructs and the psychological adaptation in RA and osteoporosis patients. So, self-efficacy is apparently not only related to the psychological adaptation of rheumatoid patients, but is also associated to the physical health and is furthermore mediating the relationship between the psychological and physical factors. This relationship was part of a study done by Cross et al. (2006). They found correlations between the two self-efficacy dimensions and pain, as well as between the two dimensions and functional limitations.

1.4 Positive psychological adaptation

The above mentioned studies focused on the negative aspects, evoked and influenced through the joint inflammations. The subjects of the studies are the relationships between physical aspects, as functional limitations, pain and fatigue, and the negative psychological functioning such as depression and anxiety. The studies about associations between self-efficacy and psychological adaptation in rheumatoid patients are also focussing on negative aspects. Correlations between self-efficacy and positive factors are rarely considered.

The focus on positive aspect belongs to a field within psychology that is called positive psychology. Positive psychology criticises the focus on pathology, because of its lack of positive features. These positive features make life worth living. It's about nurturing what is best, and not about fixing damages or correcting weaknesses (Seligman & Csikszentmihalyi, 2000).

It is probable that functional limitations, pain and fatigue, as well as the two self-efficacy dimensions are related to positive psychological functioning too. Furthermore self-efficacy might be mediating the relationship between physical health and psychological functioning.

Somers et al. (2010) found that disease severity in RA patients only amounts to a fraction of the variability in self-efficacy. They concluded that self-efficacy could vary independent of disease severity. An enhancement of self-efficacy through trainings could improve the situation of patients.

To achieve even better outcomes for patients, not only negative psychological functioning, but also positive aspects should be enhanced. Therefore the relationship between self-efficacy, physical health and positive psychological functioning should be studied. Based on the literature functional limitations, pain and fatigue are chosen as measurements for the physical health. Based on Arends et al. (2013) who studied the role of goal management for successful adaptation to arthritis, the positive aspects considered in the current study are purpose in life, positive affect and participation. These aspects can also be seen as indicators of adaptation. Arends et al. (2013) summarized a successful adaptation to arthritis as the absence of psychological distress and the presence of well-being.

1.4.1 Purpose in life

Purpose in life is a sense of meaning, without which an individual would experience boredom and distress or anxiety (Frankl, 2006). A higher purpose in life is associated with better mental health, more participation in free time activities, more social activities and a more optimistic coping style (Verduin et al., 2008). Verduin et al. (2008) found that purpose in life is felt less by RA patients, compared to healthy people. Another study also pointed out that patients with arthritis feel less purpose in life, especially in domains affected by the worse physical functioning and the experienced pain (Salaffi et al., 2009). In a study about self-efficacy and its relation to purpose of life in retention to studying, DeWitz et al. (2009) found a correlation between the two aspects. Self-efficacy was significantly and positively related with reports of purpose in life; if self-efficacy increases does purpose in life increase as well (DeWitz, Woolsey & Walsh, 2009). They also found self-efficacy to be the most significant predictor of purpose in life.

Together with the previous mentioned correlation between physical and psychological functioning (Section 1.3) and the mediating effect of self-efficacy on this relation (Section 1.3), is it also possible that self-efficacy is not only a predictor of purpose in life. It could also be a mediator of the relationship between physical health and purpose in life.

1.4.2 Positive affect

Positive affect can be defined as the positive, cheerful end of the spectrum of feelings (Fredrickson & Losada, 2005); hence it is an indicator of well-being. Positive affect in RA patients could be a source of resilience during states of increased pain, in terms of lower weekly pain and states of higher positive affect (Strand et al., 2006; Strand et al., 2007). The results of a study about women suffering from chronic pain is in line with these findings, positive affect during periods of pain weakened the strength of negative feelings and made them more resilient in coping with the pain (Zautra, Johnson & Mary, 2005).

1.4.3 Participation

Participation can be described as the attendance in life situations. It is representing the interaction between the individual and its physical, social and attitudinal environment (Colver & the SPARCLE group, 2006). Participation is important for psychological well-being and the quality of life (Reinhardt & Stucki, 2007). Most studies focused on the influence in the ability to work. The rate of work disability in RA patients increases within the first years after onset of the disease (Eberhardt, Larsson, Nived & Lindqvist, 2007). The most important factors that cause work disability are physical limitations (Eberhardt, Larsson, Nived & Lindqvist, 2007; Sokka et al., 2010). Other factors that are mentioned in connection with work disability are fatigue, energy loss and stiffness (Hoving et al., 2013). Decreased concentration and problem solving abilities are caused by pain, stiffness and fatigue. The decreases not only induce a decline in the general work ability, but are also affecting the personal life (Hoving et al., 2013). A study about the relation of self-efficacy and social participation in patients with spastic bilateral cerebral palsy showed that a higher general self-efficacy to dedicate effort in realizing behaviour was related to better participation (van der Slot et al., 2010). Considering the relationship between physical health and negative psychological functioning (Wolfe & Michaud, 2009; Margaretten et al., 2011; Margaretten et al., 2009; Stebbings et al., 2010; Covic, Tyson, Spencer & Howe, 2006), could self-efficacy be a predictor, as well as it might also be a mediator, in the just described relation between self-efficacy and participation.

1.5 Research question

The given study is about the relationships between self-efficacy, physical and psychological adaptation in patients with polyarthritis. Based on the literature functional limitations, pain and fatigue are chosen as measurements of physical health. Based on the study of Arends et al. (2013), purpose in life, positive affect and participation are chosen as aspects belonging to psychological adaptation. Self-efficacy will be the centre of the research. The subjects of the research questions are based on studies with anxiety or depression as indicators of psychological adaptation. The first question is 'Are pain and other symptoms self-efficacy related to purpose in life, positive affect and participation?'. A second question that is rising due to previous research is 'Are pain and other symptoms self-efficacy mediating the relationship between physical health (functional limitations, pain, fatigue) and psychological adaptation (purpose in life, positive affect and participation)?'

2. Methods

2.1 Participants

A total of 639 patients received an invitation letter to participate in the study. Based on the inclusion criteria I) patient is diagnosed with polyarthritis and II) patient is receiving treatment for polyarthritis, 803 patients were randomly selected. The source was an electronic diagnosis registration system of an outpatient clinic for rheumatology. Two further inclusion criteria were added; III) patient is18 years or older and IV) patient is able to complete the questionnaire in Dutch. These criteria were examined for every single participant by rheumatologists. A number of 164 patients out of the 803 were screened out, because they did not meet the inclusion criteria. The result of the inclusion criteria is the above mentioned total of 639 patients who were invited to participate. A total of 331 questionnaires and informed consents (52%) were received. The demographic and clinical characteristics of the participants are shown in Table 1.

The study was approved by the internal review board of the Faculty of Behavioural Sciences at the University of Twente.

Table 1

Demographic and disease characteristics of the participants

Demographic characteristics			
Sex, n (%)			
Male	129	(39)	
Female	202	(61)	
Age (years), mean (SD), range	61.6	(12.72)	24-91
Marital status, n (%)			
Not living with partner	83	(25)	
Living with partner	241	(72.8)	
Missing	7	(2.1)	
Educational level, n (%)			
No/lower	128	(38.6)	
Secondary	137	(41.3)	
Higher	72	(17.5)	
Missing	8	(2.4)	
Work status, n (%)			
No paid job	229	(69.2)	
Full time and	96	(29)	
Part-time employment			
Missing	6	(1.8)	
Disease characteristics			
Diagnosis, n (%)			
Rheumatoid arthritis	181	(54.7)	
Crystal diseases	35	(10.6)	
Degenerative diseases	61	(18.4)	
Chronic polyarthritis	15	(4.5)	
Connective tissue disease	15	(4.5)	
Spondyloarthritis	74	(22.4)	
Other/ non-classifiable	40	(12.1)	
Disease duration (years), mean (SD), range	14.67	(12.26)	1-71

2.3 Measures

The questionnaire that was sent contained different parts. Not all of the parts are important for the current study. Only the important parts of the entire questionnaire are described in the next passages.

2.3.1 Demographic and clinical data

Questions about sex, age, marital status, education and employment were asked. Disease duration ('In which year did the complaints associated with your arthritis start?') and disease characteristics ('Which kind of rheumatism do you suffer from?' – 12 alternatives plus 'I don't know' and 'Other, namely:…') were also included.

2.3.2 Self-efficacy

Self-efficacy was measured with the Dutch translation of the Arthritis Self-Efficacy Scale (Taal et al., 1993). The original Arthritis Self-efficacy scale contains three scales, the Self-Efficacy Pain Scale, the Self-Efficacy Function Scale and the Self-Efficacy Other Symptoms Scale (Lorig et al., 1989). The Self-Efficacy Pain Scale and the Self-Efficacy Other Symptoms Scale are applied in the current study. The Self-Efficacy Pain Scale includes 5 items; an example is 'I am certain that I can keep arthritis pain from inferring with my sleep'. The cronbach's alpha for the Self-Efficacy Pain Scale in this population is .824 at baseline. The Self-Efficacy Other Symptoms Scale includes 6 items; an example is 'I am certain that I can control my fatigue'. The cronbach's alpha for the Self-Efficacy Other Symptoms Scale in this population is .818 at baseline. The response options of both scales range from 'Strongly disagree' (score 1) to 'Strongly agree' (score 5). The subscales are scored autonomously, by calculating the mean of the items. The scale range is 1 to 5, a higher score indicates higher self-efficacy. In the analysis only cases with answers on all items will be included.

2.3.3 Psychological adaptation

2.3.3.1 Purpose in life

The purpose in life was measured with the Purpose In Life Scale (PIL) (Verduin et al., 2008). The PIL version used in the current study contains 6 items, an example is 'My daily activities often seem trivial and unimportant to me'. The items can be answered by response options ranging from 'Strongly disagree' (score 1) to 'Strongly agree' (score 5). Item 2 and item 3 have to be recoded. The scores for the individual items have to be added, resulting in a scale range of 6 to 30. Only cases in which every item was answered were included. A higher score indicates a higher purpose in life. Cronbach's alpha for the PIL in this population is .816 at baseline.

2.3.3.2 Positive affect

Positive affect was measured with the Positive Scale of the Positive and Negative Affect Schedule (PANAS) (Watson, Clark & Tellegen, 1988). The Positive Scale contains 10 items, the participant has to rate how they felt during the last week. Examples of feelings are 'Attentive' and 'Interested'. The response options are 'Very slightly or not at all' (score 1) to 'Very much' (score 5). The scores of all items are added and the scale scores can range from 10 to 50. A higher score is representing a higher level of positive affect. Cronbach's alpha of the PANAS in this population is .919 at baseline. Only cases with 10 answers were included in the analysis.

2.3.3.3 Participation

Different subscales of the Impact on Participation and Autonomy (IPA) questionnaire were used to measure participation (Cardol et al., 2001). Participation was split into participation and work participation. This was done to get a clearer picture of both of the participation fields since most studies so far focused on work participation. Another reason to do this was the low employment rate of polyarthritis patients, as mentioned in Section 1 above. The subscales 'Family role', 'Autonomy outdoors' and 'Social relations' were used to measure the participation. The subscale 'Work and education' was used to measure work participation. The 3 subscales to measure participation contain a total of 19 items, the subscale to measure work participation contains 6 items. All subscales have the response options 'Very good' (score 0) to 'Very poor' (score 4). The IPA is scored by calculating the

mean of the item scores; hence the range of the scale is 0 to 4. No limitations in autonomy are indicated by a score of 0, whereas very weak autonomy is indicated by a score of 4. 75% of the items have to be answered to get a reliable score. The cronbach's alpha for the 'Family role' subscale in this population is .903 at baseline. The Cronbach's alpha for the 'Autonomy outdoors' subscale at baseline is .906. The 'Social relations' subscale in this population has a Cronbach's alpha of .857 at baseline. The three subscales together, as used in the current study, have a Cronbach's alpha of .939. The Cronbach's alpha for work participation, subscale 'Work and education', is .729.

2.3.4 Physical health

2.3.4.1 Functional limitations

The Disability Index of the Health Assessment Questionnaire (HAQ-DI) was used to measure functional limitations (Fries, Spitz, Kraines & Holman, 1980). The HAQ-DI contains 20 items, distributed over 8 categories (dressing and grooming, arising, eating, walking, hygiene, reach, grip and common daily activities). Four responses are possible 'without any difficulty' (0), 'with some difficulty' (1), 'with much difficulty' (2) and 'unable to do' (3). The rating is about the patients' abilities over the past week. An example of a questions is 'Are you able to dress yourself, including tying shoelaces and doing buttons?'. The score is calculated by summing up the scores of each category, the sum has to be divided by the number of answered categories. More than 5 categories have to be answered to calculate the score. The score of a category is the highest response to the items belonging to the given category. Accordingly the scores can range from 0 to 3. The Cronbach's alpha of the HAQ-DI was .963 in the current study.

2.3.4.2 Pain

Pain was measured by using a one item rating scale. The scale ranged from 0 (no pain at all) until 10 (unbearable pain). The given answer is the score used in the analysis.

2.3.4.3 Fatigue

The amount of fatigue was measured by using a 100mm visual analogue scale. The question was to set a mark of the mean amount of fatigue during the past seven days on the

100mm line. The left end, rated as 0, was ‘no fatigue’. The right end, rated as 100, was ‘completely exhausted’. Accordingly, the scores range from 0 to 100.

2.4 Data analysis

The data was analysed by using SPSS version 20. First of all the different scales were scored, as described in the previous sections (Section 2.3.2 – Section 2.3.4.3). To test the distribution of the data, a Kolmogorov-Smirnov test was completed. Afterwards the mean, standard deviation and Pearson correlation between all relevant constructs was calculated. To get a better understanding of the relation between self-efficacy and the indicators of psychological adaptation, regression analyses were done. Next to testing the relationship of self-efficacy and psychological adaptation, the relationship between physical health and psychological adaptation was included in the regression analyses. Assumptions of the regression analyses were tested by collinearity diagnostics, as multi collinearity can be a threat for the model estimates if more than one predictor is included. Multi collinearity analyses include the variance inflation factor (VIF) and the tolerance statistics are calculated. If one of the VIF values is greater than 10, or if the average VIF is greater than 1 the regression could be biased. Additionally, this could occur if the tolerance is greater than 0.2.

Self-efficacy and the indicators of psychological adaptation were analysed to get a better understanding of their relationship. The regression analyses were done separately for pain and other symptoms self-efficacy. Functional limitations, pain and fatigue were included in all regression analyses; work situation and education based on the significance of their correlation with the indicators of adaptation. The choice for constructs to be considered in the regression analyses was based on the significance level. The confidence intervals and standard errors in the regression analyses are bootstrapped; hence they do not rely on normality.

To get a better understanding if self-efficacy was mediating the relation between physical health and psychological health, mediation analyses were done.

In a case of mediation, including a mediator to the model, reductions are seen in the strength of the relationship between a predictor and an outcome. The model that is used for the mediation analyses is shown in figure 1.

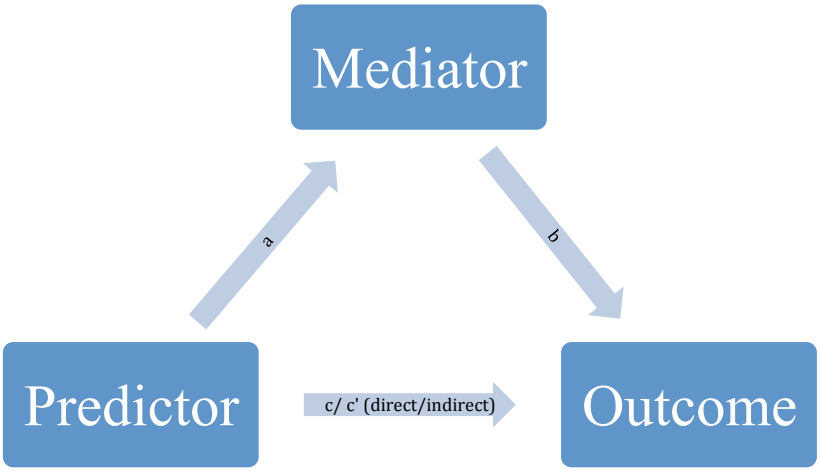

Figure 1. Model of a mediated relationship. This model is used as basis for the mediation analyses about the mediating effect of self-efficacy between the predictors and the outcomes.

The mediation analyses were done separately for pain self-efficacy and other symptoms self-efficacy. The decision on included variables in the different models was based on the correlation matrix (Table 2). All variables that correlated with the self-efficacy factors on a level of $p<.01$ were included. Furthermore variables that met two criteria were included. They had to be significant predictors in the regression analyses (in the model that contained self-efficacy) and the strength of the prediction had to be weaker in the model that included self-efficacy (the relationship was less strong) than in the model without self-efficacy. The significance values and the confidence intervals (indirect effect) were bootstrapped.

To measure the size of the indirect effect the kappa-square was used. The kappa-square describes the indirect effect as a ratio to the maximum possible indirect effect that could be found. It is therefore bound between 0 and 1.

3. Results

Firstly, the normality of the scale score for self-efficacy (pain and other symptoms) and the physical and psychological constructs (functional limitations, pain, fatigue, purpose in life, positive affect, participation and work participation) was analysed. For this analysis the Kolmogorov-Smirnov test was used. The result was that all of the scale scores are non-normal (pain self-efficacy: $D(324)=0.100$, $p<.001$; other symptoms self-efficacy: $D(322)=0.097$, $p<.001$; functional limitations: $D(315)=0.110$, $p<.001$; pain: $D(315)=0.114$, $p<.001$; fatigue: $D(315)=0.076$, $p<.001$; positive affect: $D(322)=0.116$,$p<.001$; participation: $D(330)=0.075$, $p<.001$; work participation: $D(128)=0.115$, $p<.001$; functional limitations: $D(325)=0.110$,$p<.001$; pain: $D(322)=0.117$,$p<.001$; fatigue: $D(322)=0.077$, $p<.001$). This is not an issue due to the robustness of regression analyses. To avoid any possible threat to the results, bootstrapped confidence intervals and significance values will be used in further analyses. This is done because bootstrapped intervals and significance values do not rely on the assumption of normality.

To get a first impression of the data the means and standard deviations of all relevant constructs were calculated.

3.1 Correlations

To get an idea about the possible relation between self-efficacy and the four indicators of positive adaptation a correlation study was completed. Next to the five above mentioned constructs, other important constructs, which might influence the relationship between self-efficacy and adaptation, were included. The results of the correlation analyses are shown in Table 2.

Table 2

Pearson correlation between the relevant constructs

Variable	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Sex[a]			-														
2. Age			-.02	-													
3. Living situation[b]			-.22**	-.17**	-												
4. Education[c]			-.06	-.33**	.05	-											
5. Work situation[d]			-.19**	-.52**	.10	.31**	-										
6. Disease duration	14.67	12.26	.00	.19**	-.02	-.02	-.15**	-									
7. HAQ-DI	0.98	0.76	.31**	.24**	-.17**	-.26**	-.33**	.28**	-								
8. Pain	4.12	2.47	.20**	.05	-.11	-.22**	-.21**	.13*	.63**	-							
9. Fatigue	42.17	26.28	.15**	-.09	-.06	-.05	-.08	.11*	.56**	.66**	-						
10. Self-efficacy pain	3.21	0.78	-.12*	.02	.10	.12*	.15**	-.07	-.52**	-.54**	-.49**	-					
11. Self-efficacy other	3.49	0.65	-.14*	.06	.10	.06	.06	.03	-.44**	-.48**	-.53**	.77**	-				
12. Purpose in life	21.83	3.82	-.07	-.10	.02	.15*	.24**	.08	-.29**	-.19**	-.29**	.33**	.52**	-			
13. Positive affect	34.21	7.03	-.08	-.06	.05	.13*	.19**	-.01	-.32**	-.24**	-.37**	.38**	.50**	.62**	-		
14. Participation	1.34	0.66	.07	.11*	-.10	-.18**	-.30**	.07	.66**	.49**	.55**	-.53**	-.57**	-.52**	-.54**	-	
15. Work participation	1.44	0.84	-.01	.07	.02	-.06	-.18*	-.05	.53**	.49**	.51**	-.53**	-.54**	-.48**	-.57**	.75**	-

Note. N=317-331 for all variables, except work participation. (n)= 126-128.

[a] 1= male, 2= female.

[b] 0= not living with partner, 1= living with partner.

[c] 1=no/ lower education, 2= secondary education, 3= higher education.

[d] 0= no paid job, 1= full-time and part-time employment.

* Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed).

By taking a closer look at Table 2, some first conclusions could be drawn. Self-efficacy (pain and other symptoms) correlated with all four of the indicators of psychological functioning (purpose in life, positive affect, participation and work participation). All of these correlations were significant at a two-tailed level of $p<.01$. The correlations between pain self-efficacy and purpose in life, positive affect, participation and work participation were slightly lower than the correlations between other symptoms self-efficacy and the four constructs. The correlations with purpose in life and positive affect were positive, whereas the correlations with participation and work participation were negative. All of the four indicators of psychological adaptation were also correlated with functional limitations, pain and fatigue (for all of the correlations $p<.01$). The correlations between purpose in life and the three previous mentioned constructs were negative, as well as the correlations between positive affect and the three previous mentioned constructs. Functional limitation, pain and fatigue were positively related to participation and work participation. Purpose in life and were positively correlated to the work situation, participation was negatively correlated to the work situation (both on a two-tailed level of $p<.01$). Education was negatively correlated to participation ($p<.01$).

All of the mentioned results are considered in further analyses. Self-efficacy and the indicators of psychological adaptation will be analysed to get a better understanding of their relationship. Functional limitations, pain and fatigue are included in all further analyses, work situation and education based on the significance of their correlation with the indicators of adaptation. To be sure to include all possible confounders the strength of the correlation is neglected and the choice for constructs to be considered in the regression analyses is based on the significance level.

3.2 Regression and mediation analyses

3.2.1 Purpose in life

As shown in Table 3, two of the three criterions of multi collinearity are not met. This is the reason that the regression analysis was done. The constructs functional limitations, pain, fatigue and work situation explained 15% of the variance in purpose in life. Functional limitations and pain were no significant predictors. In this model fatigue was found to be the strongest predictor of purpose in life. By adding pain self-efficacy another 4% of the variance in purpose in life was explained. In this model pain self-efficacy was the strongest predictor of purpose in life. Fatigue, work situation and pain self-efficacy were meaningful in predicting purpose in life in the second model.

Table 3

Linear model of predictors of purpose in life (pain self-efficacy as added predictor)

						Collinearity	
Model		B (CI)	SE B	β	P (2-tailed)	Tolerance	VIF
1	Constant	23.15 (22.27, 24.08)	0.45		p=.001		
	HAQ-DI	-0.68 (-1.49, 0.08)	0.42	-.13	p=.103	.52	1.94
	Pain	0.15 (-0.14, 0.46)	0.15	.09	p=.334	.47	2.14
	Fatigue	-0.04 (-0.07, -0.01)	0.01	-.28	p=.003	.50	2.00
	Work	1.55 (0.70, 2.41)	0.45	.19	p=.001	.87	1.15
2	Constant	18.39 (15.75, 20.98)	1.33		p=.001		
	HAQ-DI	-0.37 (-1.22, 0.42)	0.42	-.07	p=.386	.49	2.04
	Pain	0.25 (-0.05, 0.54)	0.15	.16	p=.110	.44	2.25
	Fatigue	-0.03 (-0.06, -0.01)	0.01	-.23	p=.015	.48	2.07
	Work	1.55 (0.71, 2.42)	0.43	.19	p=.001	.87	1.15
	SEpain	0.24 (0.12, 0.36)	0.07	.24	p=.001	.63	1.60

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses
Sample size: N=299
R^2=.15 for Model 1; R^2=.19 for Model2; ΔR^2=.04 for Model 2 (p<.001)

An effect of pain self-efficacy on the relation between fatigue and purpose in life was found (b=-0.02; 95% BCA CI [-0.03, -0.01]). Fatigue had an indirect effect of 11%, out of possible 100%, via pain self-efficacy on purpose in life (K^2=.11; 95% BCA CI [.057, .183]).

The same analysis was done for other symptoms self-efficacy. Again there were no problems with the tolerance and no VIF was greater than 10. The average VIF is greater than one, but this was not enough reason to not do a regression analysis. The collinearity diagnostics and the results of the regression analysis can be found in Table 4.

Table 4

Linear model of predictors of purpose in life (other symptoms self-efficacy as added predictor)

Model		B (CI)	SE B	β	P (2-tailed)	Collinearity	
						Tolerance	VIF
1	Constant	23.27 (22.12, 24.12)	0.45		p=.001		
	HAQ-DI	-0.62 (-1.42, 0.18)	0.40	-.12	p=.117	.52	1.94
	Pain	0.11 (-0.19, 0.41)	0.15	.07	p=.511	.47	2.13
	Fatigue	-0.04 (-0.07, -0.02)	0.01	-.29	p=.002	.50	1.98
	Work	1.58 (0.60, 2.55)	0.49	.19	p=.003	.87	1.15
2	Constant	10.47 (7.29, 13.94)	1.68		p=.001		
	HAQ-DI	-0.22 (-0.98, 0.46)	0.37	-.04	p=.561	.51	1.97
	Pain	0.25 (-0.01, 0.53)	0.14	.16	p=.069	.46	2.18
	Fatigue	-0.02 (-0.04, 0.01)	0.01	-.11	p=.161	.47	2.15
	Work	1.73 (0.89, 2.68)	0.44	.21	p=.001	.87	1.15
	SEothers	0.51 (0.38, 0.64)	0.07	.52	p=.001	.67	1.49

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses

Sample size: N=295

R^2=.16 for Model 1; R^2=.34 for Model 2 ΔR^2=.18 for Model 2 (p<.001)

Other symptoms self-efficacy added 18% to the explanation of the variance in the first model. Additional was other symptoms self-efficacy the greatest predictor in the second model. In this model work situation and other symptoms self-efficacy were meaningful in predicting purpose in life.

Due to the fact that the two criterions for a mediation analyses were not met, no mediation analysis was done.

3.2.2 Positive affect

The first analysis looked at the value that pain self-efficacy could add to the explanation of variance. The collinearity diagnostic shows no results that would raise large concerns regarding a regression analysis (see Table 5).

Significant predictors for the variance in positive affect were fatigue and work. Together with functional limitations and pain they explained a variance of 19%, with fatigue as greatest predictor. By adding pain self-efficacy to the model another 4% of the variance was explained. As in the first model, fatigue was the strongest predictor; pain, fatigue, work situation and pain self-efficacy were significant predictors for positive affect (see Table 5).

The relationship between fatigue and positive affect was mediated by pain self-efficacy (b=-0.03; 95% BCA CI [-0.05, -0.02]). The indirect effect of fatigue on positive affect was 12% of the maximum possible value (K^2=.12; 95% BCA CI [.064, .186]).

Table 5

Linear model of predictors of positive affect (pain self-efficacy as added predictor)

Model		B (CI)	SE B	β	P (2-tailed)	Collinearity	
						Tolerance	VIF
1	Constant	37.69 (35.92, 39.48)	0.89		p=.001		
	HAQ-DI	-1.50 (-3.14, -0.05)	0.80	-.16	p=.058	.51	1.97
	Pain	0.29 (-0.18, 0.73)	0.23	.10	p=.195	.46	2.17
	Fatigue	-0.09 (-0.14, -0.05)	0.02	-.34	p=.001	.50	1.99
	Work	2.02 (0.48, 3.59)	0.79	.13	p=.013	.87	1.15
2	Constant	28.75 (23.86, 33.63)	2.48		p=.001		
	HAQ-DI	-0.97 (-2.75, 0.52)	0.82	-.10	p=.242	.49	2.05
	Pain	0.47 (0.00, 0.92)	0.23	.16	p=.043	.44	2.27
	Fatigue	-0.08 (-0.12, -0.04)	0.02	-.29	p=.002	.49	2.05
	Work	2.03 (0.56, 3.47)	0.75	.13	p=.005	.87	1.15
	SEpain	0.45 (0.21, 0.67)	0.12	.25	p=.001	.64	1.56

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses
Sample size: N=298
R^2=.19 for Model 1; R^2=.22 for Model 2; ΔR^2=.04 for Model 2 (p<.001)

The VIF and tolerance was also calculated for the regression analysis with other symptoms self-efficacy as predictor in the second model. No reason against the regression analysis was found (see Table 6).

By adding other symptoms self-efficacy to the first model, another 11% of the variance in positive affect was explained. In this model other symptoms self-efficacy was the greatest predictor. Fatigue, work situation and other symptoms self-efficacy were significant predictors (see Table 6).

The relation between fatigue and positive affect was mediated by other symptoms self-efficacy (b=-0.06; 95% BCA CI [-0.08, -0.04]), with an effect size of 19% (K^2=.19; 95% BCA CI [.129, .255]

Table 6

Linear model of predictors of positive affect (other symptoms self-efficacy as added predictor)

Model		B (CI)	SE B	β	P (2-tailed)	Collinearity	
						Tolerance	VIF
1	Constant	38.03 (36.28, 39.77)	0.87		p=.001		
	HAQ-DI	-1.13 (-2.49, 0.31)	0.71	-.12	p=.114	.51	1.97
	Pain	0.19 (-0.27, 0.61)	0.22	.07	p=.373	.46	2.16
	Fatigue	-0.10 (-0.14, -0.06)	0.02	-.37	p=.001	.51	1.97
	Work	2.07 (0.45, 3.67)	0.81	.14	p=.017	.87	1.15
2	Constant	20.14 (14.52, 26.16)	3.01		p=.001		
	HAQ-DI	-0.59 (-1.84, 0.70)	0.63	-.06	p=.341	.50	2.00
	Pain	0.39 (-0.04, 0.78)	0.20	.14	p=.067	.45	2.14
	Fatigue	-0.06 (-0.10, -0.03)	0.02	-.24	p=.001	.47	2.15
	Work	2.29 (0.89, 3.76)	0.75	.15	p=.006	.87	1.15
	SEothers	0.72 (0.49, 0.94)	0.12	.40	p=.001	.68	1.48

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses
Sample size: N=293
R^2=.20 for Model 1; R^2=.31 for Model 2; ΔR^2=.11 for Model 2 (p<.001)

3.2.3 Participation

In the regression analysis related to pain self-efficacy the collinearity diagnostics did not give raise to be worried about multi collinearity (see Table 7).

The meaningful predictors of participation are functional limitations, fatigue and work situation, of which functional limitations was the greatest predictor. The explained variance in participation in model 1 was 50%. Added explained variance through adding pain self-efficacy was 3%. In this second model functional limitations remained to be the greatest predictors. Fatigue, work and pain self-efficacy are additional meaningful predictors (see Table 7).

Table 7

Linear model of predictors of participation (pain self-efficacy as added predictor)

Model		B (CI)	SE B	β	P (2-tailed)	Collinearity	
						Tolerance	VIF
1	Constant	0.72 (0.54, 0.90)	0.09		p=.001		
	HAQ-DI	0.40 (0.29, 0.50)	0.05	.45	p=.001	.51	1.97
	Pain	0.00 (-0.03, 0.04)	0.02	.00	p=.988	.46	2.16
	Fatigue	0.01 (0.00, 0.01)	0.00	.28	p=.001	.51	1.98
	Work	-0.18 (-0.30, -0.06)	0.06	-.12	p=.004	.83	1.20
	Education	-0.02 (-0.09, 0.05)	0.04	-.02	p=.536	.87	1.15
2	Constant	1.45 (1.07, 1.82)	0.19		p=.001		
	HAQ-DI	0.35 (0.24, 0.45)	0.05	.40	p=.001	.48	2.07
	Pain	-0.02 (-0.05, 0.02)	0.02	-.06	p=.374	.44	2.27
	Fatigue	0.01 (0.00, 0.01)	0.00	.24	p=.001	.49	2.03
	Work	-0.17 (-0.29, -0.07)	0.06	-.12	p=.004	.83	1.20
	Education	-0.02 (-0.09, 0.05)	0.03	-.02	p=.515	.87	1.15
	SEpain	-0.04 (-0.05, -0.19)	0.01	-.21	p=.001	.64	1.58

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses
Sample size: N=304
R^2=.50 for Model 1; R^2=.52 for Model 2; ΔR^2=.03 for Model 2 (p<.001)

The relationship of functional limitations with participation was mediated by pain self-efficacy (b=0.11; 95% BCA CI [0.07, 0.17]). The indirect effect on participation was 15% of the possible effect (K^2=.15; 95% BCA CI [.093, .209]). The relationship of fatigue with participation was not mediated by pain self-efficacy (b=0.00; 95% BCA CI [0.00, 0.01]).

Table 8 shows the results of the regression analysis with other symptoms self-efficacy as added predictor. No worrying reasons in matters of multi collinearity could be found.

Table 8

Linear model of predictors of participation (other symptoms self-efficacy as added predictor)

Model		B (CI)	SE B	β	P (2-tailed)	Collinearity	
						Tolerance	VIF
1	Constant	0.72 (0.55, 0.89)	0.09		p=.001		
	HAQ-DI	0.39 (0.29, 0.50)	0.05	.44	p=.001	.51	1.97
	Pain	-0.01 (-0.04, 0.03)	0.02	-.02	p=.703	.46	2.17
	Fatigue	0.01 (0.01, 0.01)	0.00	.31	p=.001	.50	2.01
	Work	-0.19 (-0.31, -0.08)	0.06	-.13	p=.005	.84	1.19
	Education	-0.12 (-0.09, 0.05)	0.04	-.01	p=.706	.88	1.14
2	Constant	2.05 (1.59, 2.50)	0.23		p=.001		
	HAQ-DI	0.35 (0.26, 0.45)	0.05	.40	p=.001	.50	2.00
	Pain	-0.02 (-0.5, 0.01)	0.02	-.08	p=.171	.45	2.17
	Fatigue	0.01 (0.00, 0.01)	0.00	.27	p=.001	.46	2.18
	Work	-0.21 (-0.32, -0.01)	0.06	-.14	p=.002	.84	1.19
	Education	-0.02 (-0.09, 0,04)	0.03	-.02	p=.613	.88	1.14
	SEothers	-0.05 (-0.07, -0.04)	0.01	-.31	p=.001	.67	1.49

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses
Sample size: N=298
R^2=.50 for Model 1; R^2=.57 for Model 2; ΔR^2=.07 for Model 2 (p<.001)

By adding other symptoms self-efficacy, another 7% of the variance was explained. In the second model functional limitations, fatigue, work situation and other symptoms self-efficacy were significant predictors, of which functional limitations were the greatest one.

Other symptoms self-efficacy was mediating the relationship between functional limitations and participation (b=0.13; 95% BCA CI [0.08, 0.19]). The indirect effect was 20% (K^2=.20; 95% BCA CI [.135, 260]) of the maximum possible value. No significant mediating effect of other symptoms self-efficacy on the relation between fatigue and participation could be found (b=0.00; 95% BCA CI [0.00, 0.01]).

3.2.4 Work participation

The last indicator for positive adaptation to be analysed was work participation. Again the results of the analysis with pain self-efficacy will be defined first, followed by the analysis with other symptoms self-efficacy.

Because of the results of the collinearity diagnostics a regression analysis is justifiable (see Table 9). Functional limitations, pain and fatigue explained 35% of the variance in work participation. Significant predictors were functional limitations and fatigue, with fatigue being the greatest predictor. Pain self-efficacy added 6% to the explanation of work participation. Pain self-efficacy was the strongest predictor; the only other significant predictor was fatigue (see Table 9).

The relationship between fatigue and work participation was not mediated by pain self-efficacy (b=0.00; 95% BCA CI [0.00, 0.01]).

Table 9

Linear model of predictors of work participation (pain self-efficacy as added predictor)

Model		B (CI)	SE B	β	P (2-tailed)	Collinearity	
						Tolerance	VIF
1	Constant	0.64 (0.43, 0.83)	0.10		p=.001		
	HAQ-DI	0.34 (0.05, 0.62)	0.14	.27	p=.015	.57	1.77
	Pain	0.04 (-0.04, 0.12)	0.04	.12	p=.327	.49	2.05
	Fatigue	0.01 (0.00, 0.02)	0.00	.30	p=.006	.59	1.69
2	Constant	1.96 (1.23, 2.64)	0.35		p=.001		
	HAQ-DI	0.26 (0.00, 0.53)	0.14	.21	p=.057	.54	1.84
	Pain	0.01 (-0.06, 0.09)	0.04	.03	p=.773	.46	2.17
	Fatigue	0.01 (0.00, 0.02)	0.00	.27	p=.012	.59	1.70
	SEpain	1.96 (1.23, 2.64)	0.35	-.30	p=.001	.71	1.41

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses
Sample size: N=125
R^2=.35 for Model 1; R^2=.41 for Model 2; ΔR^2=.06 for Model 2 (p<.001)

For the model in the regression analysis with other symptoms self-efficacy as added predictor, the collinearity diagnostics did not show reasons against the use of this analysis method (see Table 10). In model 2 other symptoms self-efficacy was added, this addition added 7% to the explained variance in work participation. The strongest predictor in model 2 was other symptoms self-efficacy; functional limitations and fatigue were other significant predictors (see Table 10).

Other symptoms self-efficacy mediated the relationship between functional limitations and work participation (b=0.19; 95% BCA CI [0.10, 0.32]). The indirect effect was 16% (K^2=.16; 95% BCA CI [.089, .261]) of the 100% that was possible. Other symptoms self-efficacy was not mediating the relationship between fatigue and work participation (b=0.01; 95% BCA CI [0.00,0.01]).

Table 10

Linear model of predictors of work participation (other symptoms self-efficacy as added predictor)

Model		B (CI)	SE B	β	P (2-tailed)	Collinearity	
						Tolerance	VIF
1	Constant	0.64 (0.45, 0.83)	0.10		p=.001		
	HAQ-DI	0.32 (0.04, 0.63)	0.14	.26	p=.023	.56	1.77
	Pain	0.03 (-0.04, 0.11)	0.04	.09	p=.409	.48	2.08
	Fatigue	.01 (0.00, 0.02)	0.00	.34	p=.003	.56	1.79
2	Constant	2.24 (1.44, 2.30)	0.40		p=.001		
	HAQ-DI	0.30 (0.04, 0.55)	0.13	.23	p=.018	.56	1.78
	Pain	0.01 (-0.05, 0.09)	0.04	.04	p=.685	.47	2.12
	Fatigue	0.01 (0.00, 0.01)	0.00	.24	p=.020	.52	1.93
	SEothers	-0.06 (-0.09, -0.04)	0.02	-.31	p=.001	.76	1.32

Note. Confidence intervals and standard errors based on 1000 bootstrap sample. The confidence intervals are 95% bias corrected and accelerated, reported in parentheses
Sample size: N=124
R^2=.36 for Model 1; R^2=.43 for Model 2; ΔR^2=.07 for Model 2 (p<.001)

4. Discussion

This study was about the relationship of self-efficacy with purpose in life, positive affect and participation. Furthermore it was investigated whether self-efficacy mediates the relationship between physical health (functional limitations, pain and fatigue) and psychological adaptation (purpose in life, positive affect and participation). The two research questions were 'Are pain and other symptoms self-efficacy related to purpose in life, positive affect and participation?' and 'Are pain and other symptoms self-efficacy mediating the relationship between physical health (functional limitations, pain, fatigue) and psychological adaptation (purpose in life, positive affect and participation)?'

4.1 Self-efficacy and psychological adaptation

Self-efficacy was found to enhance the ability to predict psychological adaptation in all analyses. Other symptoms self-efficacy was found to be a better predictor than pain self-efficacy. This might be due to the fact that other symptoms self-efficacy is covering more factors than only one (for example mood and fatigue). Pain self-efficacy, in contrast, is only covering the confidence to handle pain.

Fatigue seemed to be the most important predictor of psychological adaptation, next to self-efficacy. This was the most obvious in the explanation of variance in positive affect. For participation the most important predictor was functional limitations. The finding of self-efficacy as one of the strongest predictors is in line with the findings of Paukert et al. (2010). In their study self-efficacy was found to be the strongest predictor for depression, positive affect and worries in older adults.

Higher self-efficacy is therefore not only associated to lower negative (for example depression and anxiety) (Paukert et al., 2010; Rahman et al., 2008; Brekke, Hjortdahl & Kvien, 2003). It is also related to higher positive psychological functioning (purpose in life, depression and participation).

Paukert et al. (2010) found meaningful correlations between depression and self-efficacy, as well as between positive affect and self-efficacy. The correlations were moderate ($r>.3$). Furthermore they found small correlations ($r<.1$) between self-efficacy and worries, as well as between self-efficacy and anxiety. A small correlation between self-efficacy and depression was found by Rahman et al. (2008). The correlations found in the mentioned studies are smaller than the correlations between self-efficacy and psychological adaptation

in the current study. The correlations between the two constructs found in the current study were moderate to strong (r>.5).

Pain self-efficacy and other symptoms self-efficacy were found to partially mediate some of the relationships between physical functioning (fatigue and functional limitations) and psychological functioning (purpose in life, positive affect, participation and work participation). All of the partial mediations were moderate, whereas other symptoms self-efficacy was found to be a stronger mediator than pain self-efficacy. Noticeable is that for purpose in life and positive affect only the relationship with fatigue was partially mediated by self-efficacy (purpose in life: pain self-efficacy; positive aspects: pain self-efficacy and other symptoms self-efficacy; Section 3.2.1 & Section 3.2.2). For participation and work participation only the relationship with functional limitations was partially mediated by self-efficacy (participation: pain self-efficacy and other symptoms self-efficacy; work participation: other symptoms self-efficacy; Section 3.2.3 & Section 3.2.4). Mediation through pain self-efficacy and other symptoms self-efficacy on the relation between physical and psychological well-being was suggested by Barlow et al. (2002), as already mentioned in the introduction (Section1.3). They used fatigue, pain and functional limitations as physical health constructs; anxiety and depression were the psychological constructs in their study. In the current study no mediation effects respectively to pain were found. But pain self-efficacy and other symptoms self-efficacy were mediating the relationships between the other two physical health constructs and psychological functioning; in the current study not anxiety and depression, but purpose in life, positive affect, participation and work participation. As Barlow et al. (2002) suggested mediation based on calculated partial correlations, the comparison should be drawn carefully.

4.2 Limitations and positive aspects

One limitation is the mean of the VIF in the regression analyses. A bias might occur, due to the fact that the mean values are all larger than 1. This could result in unreliable coefficients, as a result of increased standard errors. Furthermore is it more difficult to assess the importance of the individual predictors. It should also be mentioned, that the analyses could be done with a path analysis in a study that is more extensive than a bachelor thesis. In a path analysis the dependencies between variables are analysed in one big model, which contains all the relevant constructs.

Another limitation was the cross-sectional character of the study. No conclusion about the causality in a relationship can be made. To be able to make statements about the causality, a longitudinal study is needed.

A positive aspect is the high number of participants that took part in the study. This fact, next to the fact that the participants were chosen randomly, makes a generalisation possible. An additional positive feature is the good reliability of the questionnaires used in the study. Another positive aspect is the continuously different strength of pain self-efficacy and other symptoms self-efficacy as predictor and mediator. This difference debilitates the reasoning that all positive aspects would cluster together commonly. If this was the case, there should not be such meaningful differences between these two positive constructs with the constructs chosen to measure positive psychological functioning; the correlations would be more randomly. Furthermore participation was found to be correlated to pain self-efficacy and other symptoms self-efficacy. Participation is an action that is important for psychological well-being (Reinhardt & Stucki, 2007; Section 1.4.3). Consequently, participation by itself is not a positive emotion. On the basis of this reasoning the found correlation cannot be based on positive aspects that cluster together commonly. Another reason against this reasoning is the correlation of self-efficacy with negative psychological functioning as anxiety and depression, which was found in previous studies (Paukert et al., 2010; Barlow et al., 2002; Section 1.3).

4.3 Implications and conclusion

This study showed that self-efficacy plays a role in positive psychological functioning. A longitudinal study should be done to get more insights in the causality of the relations. Because of its influence on the relationships between physical and psychological factors, could it be that self-efficacy is a small wheel in the whole mechanism that could improve the situation for polyarthritis patients. Due to the moderate relationships of self-efficacy with the other constructs, however, other factors should be considered as well.
A possible other factor could be goal management. In their study about goal management in association to adaptation to arthritis Arend et al. (2013) found goal management constructs (goal maintenance, goal adjustment, goal reengagement) to be predictors of, mainly, purpose in life and positive affect, but also of participation and work participation.

Self-efficacy, as well as possible other factors, could be improved by trainings or education. This might lead to an enhanced psychological functioning in polyarthritis

patients. Studies about self-management programmes already showed that an enhancement of self-efficacy is possible. A study with participants who suffered of osteoarthritis showed that arthritis-related self-efficacy and pain beliefs could be improved by providing information about relevant skills. These skills were coping, how to understand and act on problems and how to enhance self-efficacy (Wu et al., 2011). Lorig et al. (2005) yielded similar results; their study showed that Arthritis Self-Management Programs (educational program/ workshops) could improve self-efficacy. Additional to self-efficacy, disability, pain fatigue and other factors were improved by the program. Lorig et al. (2008) also studied the effect of Internet based self-management programmes for arthritis patients. They also found an enhancement of self-efficacy in association with the programme.

The study did show that there is potential in focussing on positive aspects of psychological adaptation, in spite of some small limitations. A factor in improving the situation for arthritis patients could be self-efficacy. It is related to negative and positive psychological functioning. Additional it can be enhanced through training. Therefore future research should focus on self-efficacy, as well as on other possible factors that might influence, and could improve psychological functioning.

5. References

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