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Cognitions and perceptions of workers with a chronic disease

Development and evaluation of a training program for occupational health professionals

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CHAPTER 2

Person-related factors associated with work participation in employees with health problems: a systematic review

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Abstract

Purpose: The objective of this systematic review was to explore and provide systematically assessed information about the association between person-related factors and work participation of people with health problems. The research question was: what is the association between selected person-related factors and work participation of workers with health problems?

Methods: A systematic review was carried out in PubMed and PsycINFO to search for original papers published between January 2007 and February 2017. The risk of bias of the studies included was assessed using quality assessment tools from the Joanna Briggs Institute. The quality of evidence was assessed using the GRADE framework for prognostic studies.

Results: In total, 113 studies were included, all of which addressed the association between person-related factors and work participation. The factors positively associated with work participation were positive expectations regarding recovery or return to work, optimism, self-efficacy, motivation, feelings of control, and perceived health. The factors negatively associated with work participation were fear-avoidance beliefs, perceived work-relatedness of the health problem, and catastrophizing. Different coping strategies had a negative or a positive relationship with work participation.

Conclusions: The results of this review provide more insight into the associations between different cognitions and perceptions and work participation. The results of this study suggest that person-related factors should be considered by occupational- and insurance physicians when they diagnose, evaluate or provide treatment to employees. Further research is required to determine how these physicians could obtain and apply such information and whether its application leads to a better quality of care.

Introduction

Sickness absence has negative financial consequences and leads to a loss of enthusiasm and satisfaction with the work situation.¹ In addition, long-term sick leave can lead to lower self-confidence, a depressed mood and feelings of isolation.^{2, 3} These negative consequences of sick leave constitute significant reasons why it is important to minimize the work absence of employees due to health problems.

In order to minimize work absence and improve work participation, it is essential to know which factors influence work retention and return to work (RTW) after sick leave. Research has revealed that sick leave is determined by many different factors.^{4, 5} In addition to disease-related and environmental factors, person-related factors such as cognitions and perceptions of employees also play a role in work participation.^{4, 6, 7} Research by Dekkers-Sánchez et al.⁴ has revealed that physicians identify person-related factors as important factors for RTW. The cognitions and perceptions of an employee about his or her health problems or limitations, are factors in which clinicians could intervene to encourage work participation.^{4, 8}

As most research acknowledges the multifactorial nature of sick leave, many reviews have been conducted to gain better insight into the precise factors influencing the work participation of employees with health problems. However, most of these reviews are limited to specific diseases or disorders, or are limited to the outcome RTW rather than work participation in general.⁹⁻¹¹ In addition, as far as we know, there is no review which primarily focuses on the cognitions and perceptions of employees themselves that influence work participation. This is despite the fact that structuring the information about the influence of cognitions and perceptions could help to develop tailored interventions targeting these factors. Such interventions could in turn be used to support work participation of employees with health problems.⁴ Moreover, a clear overview of the association between person-related factors and work participation could assist occupational physicians and insurance physicians to prevent sick leave or decrease the duration of sick leave in these employees.

This systematic review was conducted to fill this gap in research and provide structured information about the association between person-related factors and work participation for employees with all kinds of diseases, disorders and injuries. For this review of the literature, we formulated the following research question using the patient, intervention, comparison, outcome (PICO) statement:

in employees with health problems (P), which person-related factors (I) are associated with work retention and return to work after sick leave (O)?

Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed as a basis for reporting this systematic review.¹² This review is registered in the Prospective Register of Systematic Reviews (PROSPERO 2017 registration number CRD42017062459; <https://www.crd.york.ac.uk/PROSPERO/>).

Information sources and search strategy

Literature searches were conducted by the first author in the databases PubMed and PsycINFO (MdW). The search strategy had three main elements: health problems, person-related factors and work participation. The main person-related factors of interest that formed the basis of our search strategy were selected by two experts in occupational and insurance medicine. The possible relevance of these factors for work participation was confirmed by a workgroup consisting of three insurance physicians, two occupational physicians and a patient representative. The broad term 'work participation' covered concepts such as RTW, sickness absence and current work status. The search strategies used in PubMed and PsycINFO are presented in Appendix 1.

Eligibility criteria

This review includes studies published between January 2007 and February 2017 that investigated the association between person-related factors and work participation of employees with health problems. Articles considered eligible for inclusion had to be available in full-text in English or Dutch and had to be published in peer-reviewed journals. We included (non-)randomized controlled trials, cohort studies, cross-sectional studies and qualitative studies. Reference lists of meta-analyses and reviews that were found in our search were examined to identify additional publications, in order not to miss any relevant literature published between 2007 and 2017. Case studies were excluded from this review. Studies in which students, military personnel or veterans with health problems or employees with substance abuse problems were the subjects of the analyses were excluded. We also excluded studies in which disability was the only outcome, or studies in which it was not clear how the person-related factors were measured.

Study selection

One reviewer selected all relevant studies on the basis of the title and abstract (MdW). The other researchers (HW, CH, MF) each screened the title and abstract of one-third of all studies, so that all studies were independently screened by two reviewers (MdW and HW, MdW and CH or MdW and MF). Subsequently, the full-text articles of potentially relevant studies were reviewed by one reviewer to determine whether they fulfilled all the inclusion criteria (MdW). Additionally, three reviewers screened 10% of the full-text articles (HW, CH, MF). In the case of doubt, eligibility of the study was discussed until consensus was reached. Reasons for exclusion were documented.

Extraction of data

One reviewer extracted the details and findings of the studies included using a self-developed data-extraction form (MdW). Data-extraction from 30% of the studies was checked by the other three reviewers (HW, CH, MF). Disagreements about the data-extraction were resolved by discussion and consensus. The following details were extracted: number of subjects, age, gender, occupation and health status of subjects, study design, person-related factors of interest, time to follow-up and the main results. To ensure a clear overview of the main results, the coefficients and odds ratios were only noted in the table if they were significant and from multivariate analyses. In addition, we noted *p*-values from significant univariate analyses. Non-significant results were only described in words. We contacted authors when clarification of data was needed.

Quality assessment

The risk of bias of the studies included was assessed using quality assessment tools developed by the Joanna Briggs Institute.¹³ Before the researchers assessed the risk of bias, the Joanna Briggs Institute criteria were discussed between the researchers in order to reduce ambiguity and disagreements between the researchers. One reviewer (MdW) assessed the risk of bias of all studies and the other reviewers (HW, CH, MF) each assessed the risk of bias of 10% of the studies. Disagreements were resolved by discussion and consensus. Each criterion from the quality tools was answered with 'yes', 'no', 'unclear' or 'not applicable'. For categorizing in studies with high, moderate and low risk of bias, we applied the same classification rules as used in the study by Reilly et al.¹⁴ Studies which met more than 80% of the criteria were considered as high-quality studies with a low risk of bias. Studies which met 50-80% of the criteria were considered as moderate-quality studies with a moderate risk of bias. Studies which met less than 50% of the criteria were considered as low-quality studies with a high risk of

bias. Studies were not excluded on the basis of their risk of bias; however, the risk of bias was taken into account when drawing conclusions in this review.

Grading the level of evidence

The overall quality of evidence for the association between each person-related factor and work participation was assessed by one reviewer (MdW) using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach¹⁵ and discussed with the other reviewers (HW, CH, MF). The base level of the quality of evidence for the associations was based on the design and phase of the studies. The factors that were further examined were the risk of bias, inconsistency, indirectness, imprecision and publication bias. The overall quality of evidence for the associations was categorized as high, moderate, low or very low. If possible, a meta-analysis was performed to assess the effects of the person-related factors on work participation.

Results

Studies selected

In total, 3032 studies were found in PubMed and 1226 studies in PsycINFO (Figure 1). After removing duplicates, studies without abstracts and books or book sections, 3465 studies remained. In total, 3226 studies were excluded after screening the title and abstract. The remaining 239 articles were reviewed on full text. Of these, 117 articles did not meet the inclusion criteria and were thus excluded. The reasons for excluding these articles were: (1) study group did not consist of employees; (2) participants did not have health problems at baseline; (3) factors of interest were not studied; (4) outcome of interest was not studied; (5) study method or results were not (clearly) described; or (6) other study type than (non-)randomized controlled trials, cohort studies, cross-sectional studies, qualitative studies, systematic reviews and meta-analyses. The remaining articles included 24 reviews and meta-analyses. After screening the reference lists of these studies, 15 studies were added, making a total of 113 studies that were included in this review. The characteristics of these studies are presented in the data-extraction tables in Appendix 2.

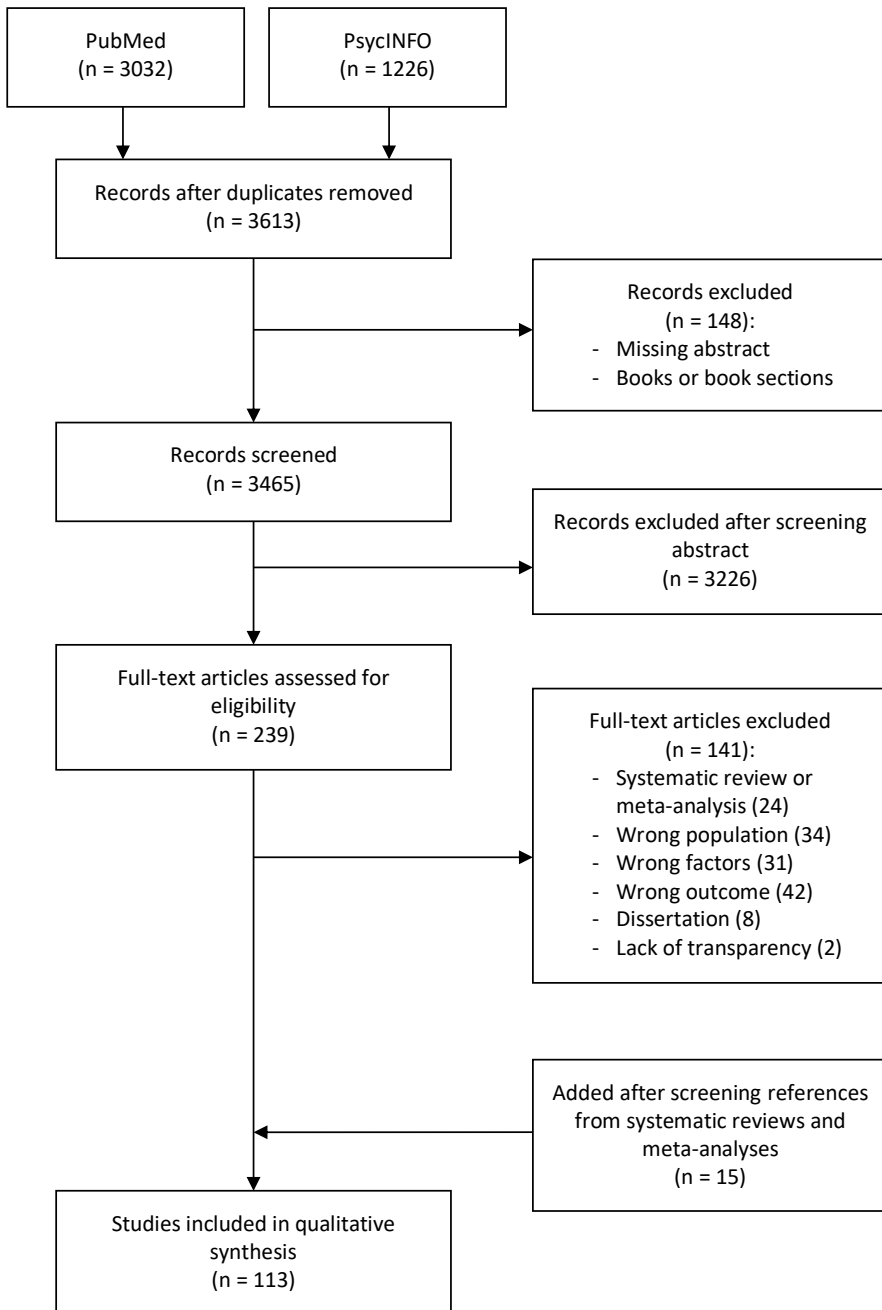


Figure 1. Search flowchart

Risk of bias

From the 113 studies included, 68 had a low risk of bias, one study had a high risk of bias and the remaining 44 studies were classified as having a moderate risk of bias. A frequent reason for risk of bias in qualitative studies was that information about the researcher and his possible influence on the study was lacking. Moreover, many cohort studies did not meet the criteria for complete follow-up. Scores on each criterion of the quality assessment tools can be found in Appendix 3.

Evidence for the influence of person-related factors on work participation

Results of the multivariate analyses of the quantitative studies that were included in this literature review are summarized in Tables 1 and 2. If no multivariate analyses were performed in a study, conclusions about the association between the person-related factor and work participation were based on the univariate or bivariate analyses that were performed in that study.¹⁶ Due to the heterogeneity in methods used to measure the person-related factors and outcomes and the heterogeneity in the statistical analyses performed, it was not possible to perform meta-analyses. The quality of evidence for the potential factors associated with work participation as assessed by GRADE is presented in Table 3. Because we used broad terms for the work participation outcomes and used strict inclusion criteria for the participants and the factors measured in the studies, none of the evidence was downgraded for indirectness. In addition, the criteria for publication bias were judged as not applicable, as the large body of evidence made it impossible to come to a conclusion on possible publication bias. Moreover, most of the studies were explorative and the phase of the investigation was already considered as a factor that could downgrade the quality of evidence. The synthesis of evidence led to a rating of moderate evidence for the association between the factors expectations regarding recovery or RTW and perceived health and work participation. The overall quality of evidence for the association between the person-related factors optimism, catastrophizing, self-efficacy, coping strategies, fear-avoidance beliefs, feelings of control, and perceived work-relatedness of health problems and work participation was rated as low. The evidence for the association between motivation and work participation was rated as very low.

Expectations regarding recovery or RTW

In total, 32 quantitative studies investigated the association between expectations regarding recovery or RTW and work participation (Table 1).¹⁷⁻⁴⁸ The majority of these studies found evidence of a positive association, which suggests that having positive expectations about one's recovery or chances of RTW has a

positive effect on work participation for employees with health problems.^{17, 18, 20-23, 25-30, 32-36, 38-45, 47, 48} However, some of these studies indicated that the effect was dependent on the subgroup of participants or the form of expectations.^{27, 28, 36, 43, 48} For example, in a study by Ekberg et al.²⁷, positive recovery expectations were associated with early RTW, but RTW expectations were not. Only four studies did not find any association between expectations and work participation in multivariate analyses.^{19, 24, 31, 46} There were no qualitative studies which suggested a positive association between these expectations and work participation. The overall quality of evidence for the effect of expectations regarding recovery or RTW on work participation was moderate. It was downgraded because all evidence came from exploratory studies.

Optimism

Being optimistic or pessimistic was the least investigated person-related factor addressed in the studies found in this systematic review. Three quantitative studies investigated the influence of optimism or pessimism (Table 1).⁴⁹⁻⁵¹ One quantitative study reported a negative effect of pessimism on RTW, but did not find any effect of optimism.⁴⁹ This was in contrast to a study by Øyeflaten et al.⁵¹ which reported that being pessimistic about oneself and the future had no significant effect on RTW, and to a study by Lydell et al.⁵⁰, which found support for a positive effect of optimism on RTW. There were three qualitative studies in which it was mentioned that being optimistic was important for work participation.⁵²⁻⁵⁴ In summary, the majority of the studies suggest a positive association between optimism and work participation in employees with health problems. As most evidence came from explorative studies and because of inconsistency in study results, the overall quality of evidence was rated as low.

Self-efficacy

The association between self-efficacy and work participation was investigated in 29 quantitative studies (Table 1).^{18, 27, 37, 42, 48, 51, 55-77} Eleven studies found a positive association between self-efficacy and work participation.^{18, 27, 37, 59, 63-66, 70, 72, 76} Two studies found evidence of a positive association between self-efficacy and work participation for only some specific subgroups.^{62, 71} The results of three other studies suggest that the association depends on the form of self-efficacy.⁵⁵⁻⁵⁷ In summary, the majority of the results suggest that having more self-efficacy is associated with more work participation in employees with health problems. Six qualitative studies supported these results.^{52, 54, 78-81} However, some quantitative studies did not find evidence of an association between self-efficacy and work participation.^{42, 48, 51, 58, 61, 67, 68, 73-75} One study even found a negative association

between work-related social skills self-efficacy and current employment status.⁷⁷ As there was serious inconsistency in study results, the overall quality of evidence was downgraded to low.

Motivation

Of the eight quantitative studies which investigated the association between motivation and work participation (Table 1),^{50, 82-88} five found a positive association.^{50, 82-84, 87} One additional quantitative study only found an influence of motivation for some forms of work participation.⁸⁶ This study by Puolakka et al.⁸⁶ indicated that motivation to work was associated with fewer days off work, but not with permanent work disability. Two studies with a low risk of bias did not find any association between motivation and work participation.^{85, 88} Seven qualitative studies addressed the possible positive influence of motivation, which suggests that employees with health problems who are motivated will have higher levels of work participation.^{52, 78, 79, 89-92} However, the overall quality of the quantitative evidence for this factor was downgraded to very low because evidence primarily came from explorative studies with serious risk of bias.

Feelings of control

There were 14 quantitative studies which addressed the possible positive association between feelings of control and work participation (Table 1).^{19, 20, 27, 43, 67, 69, 70, 75, 93- 98} The results of six studies indicated that the feeling of having more control is associated with more work participation.^{20, 43, 70, 95, 97, 98} These results were supported by one qualitative study by Dionne et al.⁹⁹, in which it was reported that participants who did not RTW considered that their return depended more on factors related to their environment than on personal factors. However, one quantitative study only found evidence on some specific forms of control but not others.⁹⁶ For example, in this study, having the feeling that one controls one's own pain was not associated with RTW, but believing that control of pain is a chance outcome decreased the likelihood of RTW.⁹⁶ Seven studies found no evidence of an association between feelings of control and work participation at all.^{19, 27, 67, 69, 75, 93, 94} The overall quality of evidence derived from this review was low and was downgraded for serious inconsistency.

Perceived health

Twenty-four quantitative studies addressed the possible influence of perceived health on work participation (Table 1).^{17, 27, 31, 32, 34, 36, 40, 42, 47, 59, 60, 85, 100-111} Seven studies found no association at all between the factor and work participation.^{32, 34, 40, 59, 85, 102, 106} However, the majority of the studies found that being positive about one's general health was positively associated with work participation.^{17, 27, 36, 47, 60, 100, 101, 103, 104, 107-111} There were three studies in which the results indicated that this association was dependent on the form of work participation.^{42, 60, 105} For example, the results of the study by Grøvle et al.¹⁰⁵ suggested that perceived health was positively associated with the likelihood of RTW, but not with number of days until sustained RTW. The results of a study by Iakova et al.³¹ indicated that improvement in general health was associated with a higher likelihood of RTW, but general health at baseline and physical health were not. There were no qualitative studies which addressed the association between perceived health and work participation. The quality of evidence was rated as moderate.

Table 1. Results of multivariate analyses of quantitative studies factors expectations, optimism, self-efficacy, motivation, feelings of control, and perceived health

Factor	Positive association	Negative association	No association
Positive RTW/ recovery expectations	Audhoe et al. 2012 ¹⁷ Besen et al. 2015 ¹⁸ Busch et al. 2007 ²⁰ Carriere et al. 2015a ²¹ Carriere et al. 2015b ²² Carstens et al. 2014 ²³ Cowan et al. 2012 ²⁵ Du Bois et al. 2009 ²⁶ Ekberg et al. 2015 ^{27 a, b} Gross and Battié 2010 ^{28 c} Hou et al. 2012 ²⁹ Hou et al. 2008 ³⁰ Jensen et al. 2013 ³² Johansson et al. 2010 ³³ Lindell et al. 2010 ^{34 b} Magnussen et al. 2007 ^{b35} Murgatroyd et al. 2016 ^{36 a} Opsahl et al. 2016 ³⁸ Reme et al. 2009 ^{39 b} Richter et al. 2011 ⁴⁰ Rönnberg et al. 2007 ^{41 d} Sampere et al. 2012 ⁴² Sluiter and Frings-Dresen 2008 ^{43 a} Spector et al. 2012 ⁴⁴ Truchon et al. 2012 ⁴⁵ Vuistiner et al. 2015 ⁴⁷ Wählin et al. 2012 ^{48 c}		Boot et al. 2008 ¹⁹ Coggon et al. 2013 ²⁴ Ekberg et al. 2015 ^{27 a} Gross and Battié 2010 ^{28 c} Iakova et al. 2012 ³¹ Murgatroyd et al. 2016 ^{36 a} Nieuwenhuijsen et al. 2013 ^{37 d} Sluiter and Frings-Dresen 2008 ^{43 a} Turner et al. 2008 ⁴⁶ Wählin et al. 2012 ^{48 c}
Optimism	Hystad and Bye 2012 ^{49 a, e} Lydell et al. 2011 ^{50 b, d}		Hystad and Bye 2012 ^{49 a, e} Øyeflaten et al. 2008 ⁵¹

Table 1. Continued

Factor	Positive association	Negative association	No association
Self-efficacy	Besen et al. 2015 ¹⁸ Brouwer et al. 2015 ^{55 a, b} Brouwer et al. 2009 ^{56 a} Brouwer et al. 2010 ^{57 a} De Vries et al. 2012b ⁵⁹ Dionne et al. 2007 ^{60 f} Ekberg et al. 2015 ^{27 b} Huijs et al. 2012 ^{62 c} Huijs et al. 2017 ⁶³ Lagerveld et al. 2016 ⁶⁴ Mangels et al. 2011 ^{65 g} Martins 2015 ^{66 d} Nieuwenhuijsen et al. 2013 ³⁷ Richard et al. 2011 ^{69 f} Roesler et al. 2013 ^{70 g} Sarda et al. 2009 ^{71 h} Shaw et al. 2011 ^{72 b, g} Waghorn et al. 2007 ⁷⁶	Waynor et al. 2016 ^{77 a}	Brouwer et al. 2015 ^{55 a} Brouwer et al. 2009 ^{56 a} Brouwer et al. 2010 ^{57 a} D'Amato and Zijlstra 2010 ⁵⁸ Dionne et al. 2007 ^{60 f} Healey et al. 2011 ⁶¹ Huijs et al. 2012 ^{62 c} Murphy et al. 2011 ⁶⁷ O'Sullivan et al. 2012 ⁶⁸ Øyeflaten et al. 2008 ⁵¹ Richard et al. 2011 ^{69 f} Sampere et al. 2012 ⁴² Sarda et al. 2009 ^{71 h} Strauser et al. 2010 ⁷³ Stulemeijer et al. 2008 ^{74 d} Volker et al. 2015 ⁷⁵ Wählin et al. 2012 ⁴⁸ Waynor et al. 2016 ^{77 a}
Motivation	Awang et al. 2016 ⁸² Boyle et al. 2014 ^{83 d} Braathen et al. 2007 ⁸⁴ Lydell et al. 2011 ^{50 b, d} Puolakka et al. 2008 ^{86 f} Saperstein et al. 2011 ⁸⁷		Elfving et al. 2009 ^{85 d} Puolakka et al. 2008 ^{86 f} Wan Kasim et al. 2014 ⁸⁸
Feelings of control	Busch et al. 2007 ²⁰ Roesler et al. 2013 ⁷⁰ Selander et al. 2007 ⁹⁵ Sluiter and Frings-Dresen 2008 ⁴³ Torres et al. 2009 ^{96 a} Truchon et al. 2010 ^{97 b} Vlasveld et al. 2013 ^{98 b}		Boot et al. 2008 ¹⁹ Ekberg et al. 2015 ²⁷ Karoly et al. 2013 ⁹³ Krause et al. 2013 ^{94 d} Murphy et al. 2011 ⁶⁷ Richard et al. 2011 ⁶⁹ Torres et al. 2009 ^{96 a} Volker et al. 2015 ⁷⁵

Table 1. Continued

Factor	Positive association	Negative association	No association
Perceived health	Audhoe et al. 2012 ^{17 b, g}		Chen et al. 2012 ¹⁰²
	Boot et al. 2014 ^{101 d}		De Vries et al. 2012b ^{59 d}
	Boot et al. 2011 ¹⁰⁰		Dionne et al. 2007 ^{60 f}
	Dawson et al. 2011 ^{103 i}		Elfving et al. 2009 ^{85 d}
	Dionne et al. 2007 ^{60 f}		Grøvle et al. 2013 ^{105 f}
	Dyster-Aas et al. 2007 ^{104 d}		Hansen et al. 2009 ¹⁰⁶
	Ekberg et al. 2015 ^{27 b}		lakova et al. 2012 ^{31 a}
	Grøvle et al. 2013 ^{105 f}		Jensen et al. 2013 ³²
	He et al. 2010 ¹⁰⁷		Lindell et al. 2010 ³⁴
	lakova et al. 2012 ^{31 a}		Richter et al. 2011 ⁴⁰
	Morrison et al. 2016 ^{108 d}		Sampere et al. 2012 ^{42 c, e, f}
	Murgatroyd et al. 2016 ³⁶		
	Nielsen et al. 2012 ¹⁰⁹		
	Ramel et al. 2013 ^{110 d}		
	Sampere et al. 2012 ^{42 c, e, f}		
	Sivertsen et al. 2013 ¹¹¹		
Vuistiner et al. 2015 ⁴⁷			

Bold indicates studies with a low risk of bias

^a Depends on the form/subscale of the factor; ^b Not for every moment on which the outcome is measured; ^c Depends on the type of disorder of the participant; ^d Outcomes from univariate analysis; ^e Depends on the gender of the participant; ^f Depends on the form of work participation; ^g Not for every moment on which the factor is measured; ^h Depends on the country where the participant lives; ⁱ Outcomes from bivariate analysis

Coping strategies

In total, 14 quantitative studies investigated the association between different coping strategies and work participation (Table 2).^{31, 51, 59, 62, 93, 97, 103, 112-118} Nine studies found an effect of some coping strategies.^{31, 51, 62, 93, 103, 112, 113, 116, 118} The results of these studies indicated that some coping strategies, such as active problem-solving,⁶² could increase the chance of work participation in sick employees, while other coping strategies, such as passive coping¹⁰³ and avoidance coping,³¹ could decrease the chance of work participation. However, five of the quantitative studies did not find any evidence of the effect of coping strategies.^{59, 97, 114, 115, 117} Six qualitative studies addressed the importance of different coping strategies for work participation.^{52, 54, 79, 81, 90, 119} The overall quality of evidence derived from this review was downgraded to low because most of the studies were explorative and because of serious inconsistency in study results.

Fear-avoidance beliefs

In total, 27 studies addressed the possible association between fear-avoidance beliefs and work participation (Table 2).^{18, 21, 24, 26, 32, 35, 38, 40, 44-46, 51, 59, 60, 85, 103-105, 114, 117, 120-126} Most of the studies made a distinction between fear-avoidance beliefs for movement or physical activity and fear-avoidance beliefs for work. Six studies did find an association between fear-avoidance beliefs for work and work participation, but did not find an association between fear-avoidance beliefs for physical activity or movement and work participation.^{35, 51, 117, 122-124} However, Du Bois et al.²⁶ reported that fear-avoidance beliefs for movement, rather than fear-avoidance beliefs for work were associated with a higher chance of not returning to work. Three studies which only studied fear-avoidance for movement or physical activity found negative associations between this factor and work participation.^{24, 59, 103} Two studies which only investigated the association between fear-avoidance for work and work participation, also found negative associations.^{38, 45} Three studies found a negative association between general fear-avoidance and work participation.^{104, 114, 120} Studies by Dionne et al.⁶⁰ and Grøvle et al.¹⁰⁵ indicated that the effect of fear-avoidance was dependent on how work participation is measured. For example, the results of the study by Grøvle et al.¹⁰⁵ suggested that fear-avoidance for movement is associated with the likelihood of RTW within two years, but not with number of days until sustained RTW. Ten studies did not find any association between fear-avoidance beliefs and work participation.^{18, 21, 32, 40, 44, 46, 85, 121, 125, 126} There were no qualitative studies which addressed this association. However, overall, the majority of the studies which investigated fear-avoidance beliefs, found a negative association between fear-avoidance and work participation. Because most of these studies were explorative and because there was serious inconsistency in study results, the overall quality of evidence was downgraded to low.

Perceived work-relatedness

Of the limited number of studies that addressed the relationship between perceiving the health problem as work-related and work participation, three studies did not find any association between this factor and work participation,^{24, 46, 103} while three studies found a negative association (Table 2).^{32, 121, 127} These latter studies suggest that perceiving the health problem as work-related has a negative association with work participation in employees with health problems. Findings from an additional study, by Sampere et al.⁴², supported this negative association, but only for women and only for employees with mental disorders. There were no qualitative studies which addressed this association. As all of the studies which investigated this association were explorative and because there was serious inconsistency, the overall quality of evidence was downgraded to low.

Catastrophizing

Fifteen quantitative studies examined the association between catastrophizing and work participation (Table 2).^{18, 21, 25, 34, 44, 46, 59, 71, 93, 103, 121, 123, 124, 128, 129} Eight quantitative studies in this review did not find an effect of catastrophizing on work status or sickness absence.^{18, 44, 46, 71, 103, 121, 123, 124} No qualitative studies reported the negative influence of catastrophizing on work participation. However, six quantitative studies,^{21, 34, 59, 93, 128, 129} including four studies with a low risk of bias,^{21, 34, 59, 128} found a negative association between catastrophizing and work participation. One quantitative study found a negative association between catastrophizing and return to modified work for some subgroups.²⁵ The evidence suggest that catastrophizing is negatively associated with work participation. Because most of the evidence came from explorative studies and because there was serious inconsistency, its overall quality was downgraded to low.

Table 2. Results of multivariate analyses of quantitative studies with factors coping strategies, fear-avoidance, work-relatedness and catastrophizing

Factor	Positive association	Negative association	No association
Coping strategies	Huijs et al. 2012 ^{62 a, c} Karoly et al. 2013 ⁹³ Øyeflaten et al. 2008 ^{51 a}	Arwert et al. 2017 ^{112 a} Dawson et al. 2011 ^{103 a} Grytten et al. 2017 ^{113 a, g} Iakova et al. 2012 ³¹ Karoly et al. 2013 ^{93 d} Norlund et al. 2011 ¹¹⁶ Strober and Arnett 2016 ^{118 a}	Arwert et al. 2017 ^{112 a} Dawson et al. 2011 ^{103 a, d} De Vries et al. 2012b ⁵⁹ Grytten et al. 2017 ^{113 a, g} Heymans et al. 2009 ¹¹⁴ Huijs et al. 2012 ^{62 a, c} Luk et al. 2010 ^{115 d} Øyeflaten et al. 2008 ^{51 a} Øyeflaten et al. 2016 ¹¹⁷ Strober and Arnett 2016 ^{118 a} Truchon et al. 2010 ⁹⁷

Table 2. Continued

Factor	Positive association	Negative association	No association
Fear-avoidance beliefs		Coggon et al. 2013 ^{24 i}	Besen et al. 2015 ^{18 j}
		Dawson et al. 2011 ^{103 i}	Carriere et al. 2015a^{21 i}
		De Vries et al. 2012b^{59 i}	Dionne et al. 2007^{60 e, j}
		Dionne et al. 2007^{60 e, g, i, j}	Du Bois et al. 2009^{26 j}
		Du Bois et al. 2009^{26 i}	Elfving et al. 2009^{85 d}
		Dyster-Aas et al. 2007^{104 d, k}	Grøvle et al. 2013^{105 d, g, i}
		Grøvle et al. 2013^{105 d, h, g, i}	Heymans et al. 2009^{114 i}
		Heymans et al. 2009^{114 k}	Jensen et al. 2013^{32 k}
		Heymans et al. 2007^{120 k}	Karels et al. 2010 ^{121 j}
		Kovacs et al. 2007^{122 j, k}	Kovacs et al. 2007^{122 i}
		Magnussen et al. 2007b ^{35 j}	Magnussen et al. 2007b ^{35 i}
		Mannion et al. 2009 ^{123 j}	Mannion et al. 2009 ^{123 i}
		Morris and Watson 2011^{124 j}	Morris and Watson 2011^{124 d, i}
		Opsahl et al. 2016^{38 h, j}	Øyeflaten et al. 2008^{51 i}
		Øyeflaten et al. 2008^{51 j}	Øyeflaten et al. 2016 ^{117 d, i}
		Øyeflaten et al. 2016 ^{117 j}	Poulain et al. 2010^{125 i, j, k}
		Truchon et al. 2012 ^{45 j}	Richter et al. 2011^{40 i}
		Spector et al. 2012^{44 j}	
		Steenstra et al. 2010^{126 d, i, j}	
		Turner et al. 2008^{46 j}	
Perceived work-relatedness		Jensen et al. 2013³²	Coggon et al. 2013 ²⁴
		Karels et al. 2010 ¹²¹	Dawson et al. 2011 ¹⁰³
		Kuiper et al. 2016¹²⁷	Sampere et al. 2012^{42 c, e}
		Sampere et al. 2012^{42 c, e}	Turner et al. 2008^{46 d}
Catastrophizing		Adams et al. 2017¹²⁸	Besen et al. 2015 ¹⁸
		Carriere et al. 2015a²¹	Cowan et al. 2012^{25 f, g}
		Cowan et al. 2012^{25 f, g}	Dawson et al. 2011 ¹⁰³
		De Vries et al. 2012b⁵⁹	Karels et al. 2010 ¹²¹
		Karoly et al. 2013 ⁹³	Mannion et al. 2009 ¹²³
		Lindell et al. 2010^{34 b}	Morris and Watson 2011^{124 d}
		Wijnhoven et al. 2007 ¹²⁹	Sarda et al. 2009⁷¹
			Spector et al. 2012⁴⁴
		Turner et al. 2008⁴⁶	

Bold indicates studies with a low risk of bias

^a Depends on the form/subscale of the factor; ^b Not for every moment on which the outcome is measured; ^c Depends on the type of disorder of the participant; ^d Outcomes from univariate analysis; ^e Depends on the gender of the participant; ^f Depends on the job of the participant; ^g Depends on the form of work participation; ^h Outcomes from bivariate analysis; ⁱ Fear-avoidance beliefs for movement/physical activity; ^j Fear-avoidance beliefs for work; ^k Total fear-avoidance

Table 3. GRADE assessment of selected potential factors associated with work participation

Factor	Quality assessment							Summary of findings			
	Study design	Study phase	Risk of bias			Imprecision ^b	Publication bias ^c	Effect			
			Inconsistency	Indirectness ^a	Inconsistency			+	-	0	Overall quality
Positive expectations regarding recovery or RTW	RCT: 1	Confirmative: 10	✓	✓	✓	✓	n.a.	27	0	10	Moderate
	PCS/RCS: 28 CSS: 3	Explorative: 22									+++
Optimism	RCT: 0	Confirmative: 1	✓	X	✓	n.a. ^d	n.a.	2	0	2	Low
	PCS/RCS: 3 CSS: 0	Explorative: 2									++
Self-efficacy	RCT: 0	Confirmative: 11	✓	X	✓	✓	n.a.	18	1	18	Low
	PCS/RCS: 23 CSS: 6	Explorative: 18									++
Motivation	RCT: 0	Confirmative: 1	X	✓	✓	✓	n.a.	6	0	3	Very low
	PCS/RCS: 3 CSS: 4	Explorative: 7									+
Feelings of control	Non-RCT: 1										
	RCT: 0	Confirmative: 5	✓	X	✓	✓	n.a.	7	0	8	Low
Perceived health	PCS/RCS: 9 CSS: 5	Explorative: 9									++
	RCT: 0	Confirmative: 2	✓	✓	✓	✓	n.a.	17	0	11	Moderate
Coping strategies	PCS/RCS: 18 CSS: 6	Explorative: 22									+++
	RCT: 0	Confirmative: 3	✓	X	✓	✓	n.a.	3	7	11	Low
	PCS/RCS: 9 CSS: 5	Explorative: 11									++

Table 3. Continued

Factor	Quality assessment						Summary of findings				
	Study design	Study phase	Risk of bias	Inconsistency	Indirectness ^a	Imprecision ^b	Publication bias ^c	Effect	Overall quality		
Fear-avoidance beliefs	RCT: 1	Confirmative: 9	✓	X	✓	✓	n.a.	0	17	20	Low
	PCS/RCS: 19	Explorative: 18									++
Perceived work-relatedness	CSS: 7										
	RCT: 0	Confirmative: 0	✓	X	✓	✓	n.a.	0	4	4	Low
Catastrophizing	PCS/RCS: 5	Explorative: 7									++
	CSS: 2										
Catastrophizing	RCT: 0	Confirmative: 5	✓	X	✓	✓	n.a.	0	7	9	Low
	PCS/RCS: 8	Explorative: 10									++
	CSS: 7										

RCT: Randomized controlled trial, PCS: Prospective cohort study, RCS: Retrospective cohort study, CSS: Cross-sectional study

^a The quality of evidence was not downgraded for indirectness due to the broad terms for work participations and the strict inclusion criteria for the participants and factors used for this study

^b Studies which did not report confidence intervals for both significant and non-significant results, were not taken into account when deciding when to downgrade for imprecision

^c The quality of evidence was not downgraded for publication bias because of the large body of evidence and because most of the studies were explorative studies and phase of investigation was already taken into account as a factor that could downgrade the overall quality of evidence

^d The quality of evidence was not downgraded for imprecision because none of the studies in which the effect of pessimism or optimism was non-significant reported confidence intervals

Discussion

This systematic review of 113 studies identified the association between ten selected person-related factors and work participation of employees with health problems. The factors positively associated with work participation were positive expectations regarding recovery or RTW, optimism, self-efficacy, motivation, feelings of control, and perceived health. The factors negatively associated with work participation were fear-avoidance beliefs, perceived work-relatedness of the health problem and catastrophizing. Coping strategies had both positive and negative associations with work participation.

The synthesis of evidence showed that we can be moderately confident that positive expectations regarding recovery or RTW and better self-perceived health lead to a higher level of work participation in employees with health problems. This possible association between these expectations and work participation is in line with the findings of a review by Iles et al.¹³⁰, in which recovery expectations in employees with low back pain were a strong predictor of work outcome. Our finding on the association between self-perceived health and work participation is supported by the results of a review by Lidal et al.¹³¹ in which poor state of health was one of the most frequent self-reported barriers to employment in employees with spinal cord injury.

For the person-related factors optimism, catastrophizing, self-efficacy, coping strategies, fear-avoidance beliefs, feelings of control, and perceived work-relatedness of health problems, the quality of evidence for an association with work participation was rather low. Nevertheless, the results of this review suggest that fear-avoidance beliefs, perceived work-relatedness of health problems and catastrophizing are negatively associated with work participation. Optimism, self-efficacy and feelings of control seem to lead to more work participation. According to the results of our review, different coping strategies can have a positive or a negative effect on work participation.

The results of our review of these factors are consistent with the results of a Delphi study by Peters et al.¹³², which indicate that researchers and clinicians in the field of work disability or RTW identify most of these factors (catastrophizing, self-efficacy, coping strategies, fear-avoidance beliefs and feelings of control) as affecting work participation. However, the results of the current review partly stand in contrast to the results of a review by De Vries et al.¹³³, in which catastrophizing had no association with remaining at work for employees at all. However, that

review only included three cross-sectional studies on employees with chronic non-specific musculoskeletal pain, including two of low quality, which might explain this contradictory finding.

Studies conducted by Achterberg et al.¹³⁴ and Peters et al.¹³² found that insurance physicians and experts identified motivation as the most important person-related factor for work participation. The results of the qualitative studies included in the current review are in line with this.^{52, 78, 79, 89-92} Surprisingly, the current review found a very low quality of quantitative evidence for an association between motivation and work participation. The results of a review by Faber et al.¹³⁵ indicate that motivation consists of seven underlying aspects, including intrinsic motivation, expectations and self-efficacy. If researchers choose to study individual aspects of motivation rather than overall motivation, this could explain why we did not find many studies addressing the association between overall motivation and work participation. Moreover, when researchers choose to study the effects of factors such as self-efficacy and expectations alongside motivation, the overall effect of motivation could be underestimated due to the association with these other factors. These reasons could explain why we found very low evidence for an association between motivation and work participation.

Strengths and limitations of the current review

This systematic review studied the association between a set of selected person-related factors and work participation and was not limited to specific diseases or disorders; this makes the results of this study generalizable to various health problems. A key methodological strength of this review is that the articles were screened and assessed by multiple independent reviewers, explicitly to avoid bias. In addition, the quality of the studies as assessed by the assessment tools of the Joanna Briggs Institute,¹³ was considered when interpreting the results of this review. The benefit of using these tools is that, although they are adapted to different study designs, the criteria on which the risk of bias is assessed are comparable between the different tools. A final strength of our study is that when assessing the level of evidence for possible associations, we used the GRADE framework for prognostic factor research¹⁵ to prevent errors in judgement.

Despite methodological strengths, there were also some constraints in the methodology of our review. We included 113 studies which had different ways of defining and measuring the person-related factors, which raises uncertainties in the interpretation of our findings. Besides, we included studies with participants with different diseases and disorders and participants with different occupations.

At first sight, the diversity in participants improves the generalizability of our findings. However, it is possible that the influence of some of the studied factors on work participation differs across participants with different diseases and disorders or differs across occupations, which may also raise uncertainties in the interpretation of our findings. Moreover, due to heterogeneity of measurements of factors and outcomes, and heterogeneity in the statistical analyses performed in these studies, it was not possible to perform a meta-analysis. Furthermore, not every study controlled for the same variables in their analysis, and therefore there may have been hidden variables which may have influenced the outcomes.

Implications for practice and future research

We suggest that in addition to health-related factors and environmental factors, person-related factors should be considered by occupational physicians and insurance physicians when they diagnose, evaluate or provide treatment to employees. In particular, the factors perceived health and expectations regarding recovery or RTW may have significant influence on work participation and, therefore, they should be considered by occupational and insurance physicians in their efforts to improve work participation of employees with health problems.

Although the results of this review suggest that person-related factors are associated with work participation, the quality of evidence for the involvement of some of these factors was low or very low. Therefore, more research is needed to improve the quality of evidence for the involvement of these factors. Future research should also focus on how physicians might gain more insight into these different cognitions and perceptions of employees. This might assist in the identification of barriers to RTW or barriers to remaining at work for employees with health problems. Finally, research will be needed to determine whether the use of information about person-related factors by physicians improves work participation of employees with health problems and leads to a better quality of care.

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Appendix 1. Search strategy

Table 1. PubMed search strategy

Search	Query
#1 Population of interest	"chronic disease"[Mesh] OR chronic disease*[tw] OR chronic health[tw] OR chronic condition*[tw] OR long-term sickness[tw] OR long-term sick[tw] OR chronic patients[tw] OR disorder[tw] OR disorders[tw] OR disability[tw] OR disabilities[tw] OR injury[tw] OR injuries[tw]
#2 Person-related factors	"diagnostic self evaluation"[Mesh] OR self evaluation[tw] OR subjective health complaints[tw] OR self-appraisal[tw] OR health concerns[tw] OR perceived health[tw] OR illness perceptions[tw] OR patient beliefs[tw] OR patient perceptions[tw] OR perceived severity[tw] OR disability perceptions[tw] OR pain beliefs[tw] OR perceived disability[tw] OR perceived illness[tw] OR perceived impairment[tw] OR beliefs about illness[tw] OR illness beliefs[tw] OR illness representations[tw] OR illness cognitions[tw] OR illness identity[tw] OR psychological factors[tw] OR Motivation[Mesh:NoExp] OR motivation[tw] OR motivated[tw] OR unmotivated[tw] OR willingness to work[tw] OR meaning of work[tw] OR employee motivation[tw] OR work attitudes[tw] OR work motives[tw] OR work reasons[tw] OR work drive[tw] OR rehabilitation expectation*[tw] OR patient expectation*[tw] OR prognostic expectation*[tw] OR improvement expectation*[tw] OR recovery expectation*[tw] OR return to work expectation*[tw] OR RTW expectation*[tw] OR negative expectation*[tw] OR positive expectation*[tw] OR optimism[Mesh] OR optimism[tw] OR pessimism[Mesh] OR pessimism[tw] OR expected outcome[tw] OR perceived curability[tw] OR perceived work ability[tw] OR irrational cognitions[tw] OR irrational beliefs[tw] OR irrational thoughts[tw] OR irrational feelings[tw] OR irrationality[tw] OR Catastrophization[Mesh] OR catastrophization[tw] OR catastrophizing[tw] OR cognitive insufficiency[tw] OR negative perceptions[tw] OR negative orientation[tw] OR negative thoughts[tw] OR Shared decision making[tw] OR involvement in decision making[tw] OR participation in decision making[tw] OR patient participation[Mesh] OR patient participation[tw] OR client participation[tw] OR informed decision making[tw] OR "patient preference"[Mesh] OR patient preference*[tw] OR "internal-external control"[Mesh:NoExp] OR internal-external control[tw] OR control orientation[tw] OR control beliefs[tw] OR perceptions of control[tw] OR illness controllability[tw] OR perceived cause*[tw] OR external orientation[tw] OR internal orientation[tw] OR work-related*[tw] OR "Adaptation, Psychological"[Mesh] OR psychological adaption[tw] OR coping[tw] OR fear-avoidance[tw] OR adaptive response[tw] OR avoidance behavior[tw] OR cognitive reappraisal[tw] OR "Self concept"[Mesh] OR self-concept[tw] OR self-efficacy[tw] OR self-confidence[tw] OR self-esteem[tw] OR perceived ability[tw] OR self-image[tw] OR perceived competence[tw]
#3 Work participation outcome	"return to work"[Mesh] OR (return to[tw] AND work[tw]) OR RTW[tw] OR returning to work[tw] OR back to work[tw] OR unemployment[Mesh] OR unemployment[tw] OR "Employment"[Mesh:NoExp] OR employment[tw] OR employability[tw] OR work resumption[tw] OR working age[tw] OR "job satisfaction"[Mesh] OR job satisfaction[tw] OR "sick leave"[Mesh] OR sick leave[tw] OR absenteeism[Mesh] OR absenteeism[tw] OR work retention[tw] OR job retention[tw] OR job status[tw] OR work status[tw] OR paid work[tw] OR vocational status[tw] OR occupational status[tw] OR work functioning[tw] OR job functioning[tw] OR work capacity[tw] OR employment capacity[tw] OR work participation[tw] OR stay at work[tw] OR presenteeism[tw] OR work outcomes[tw] OR work ability[tw]
#4	#1 AND #2 AND #3
Limits:	Publication date from 01/01/2007-02/2017; English language or Dutch language.

Table 2. PsycINFO search strategy

Search	Query
#1 Population of interest	"chronicity (disorders)"/ or chronic illness/ or (chronic disease\$ or chronic health or chronic condition\$ or chronic illness).ab,id,ti. or (long-term sickness or long-term sick or chronic patients).ab,id,ti. or disorders/ or (disorder or disorders).ab,id,ti. or disabilities/ or (disability or disabilities).ab,id,ti. or injuries/ or (injury or injuries).ab,id,ti.
#2 Person-related factors	self evaluation/ or (self evaluation or subjective health complaints or self-appraisal or health concerns or perceived health or illness perceptions).ab,id,ti. or health attitudes/ or health attitudes.ab,id,ti. or client attitudes/ or (client attitudes or patient beliefs or patient perceptions or perceived severity or disability perceptions or pain beliefs or perceived disability or perceived illness or perceived impairment or beliefs about illness or illness beliefs or illness representations or illness cognitions or illness identity or psychological factors).ab,id,ti. or motivation/ or motivation.ab,id,ti. or employee motivation/ or (motivated or unmotivated or willingness to work or meaning of work).ab,id,ti. or "work (attitudes toward)"/ or work attitudes.ab,id,ti. or employee attitudes/ or (employee attitudes or work motives or work reasons or work drive).ab,id,ti. or (rehabilitation expectation\$ or patient expectation\$ or prognostic expectation\$ or improvement expectation\$ or recovery expectation\$ or return to work expectation\$ or RTW expectation\$ or negative expectation\$ or positive expectation\$ or expected outcome or perceived curability or perceived work ability).ab,id,ti. or optimism/ or optimism.ab,id,ti. or pessimism/ or pessimism.ab,id,ti. or irrational beliefs/ or (irrational beliefs or irrational cognitions or irrational thoughts or irrational feelings or irrationality).ab,id,ti. or negativism/ or catastrophizing/ or (negativism or catastrophization or catastrophizing or cognitive insufficiency or negative perceptions or negative orientation or negative thoughts).ab,id,ti. or client participation/ or (client participation or patient participation or shared decision making or involvement in decision making or participation in decision making or informed decision-making or patient preference\$).ab,id,ti. or "internal external locus of control"/ or (locus of control or internal-external control or control orientation or control beliefs or perceptions of control or illness controllability or perceived cause\$ or external orientation or internal orientation or work-related\$).ab,id,ti. or coping behavior/ or (coping or psychological adaption or fear-avoidance or adaptive response or avoidance behavior).ab,id,ti. or cognitive appraisal/ or cognitive appraisal.ab,id,ti. or self-concept/ or self-concept.ab,id,ti. or self-efficacy/ or self-efficacy.ab,id,ti. or self-confidence/ or self-confidence.ab,id,ti. or self-esteem/ or (self-esteem or perceived ability or self-image or perceived competence).ab,id,ti.
#3 Work participation outcome	reemployment/ or (return to work or (return to adj3 work) or back to work or RTW).ab,id,ti. or unemployment/ or unemployment.ab,id,ti. or employment status/ or (employment or work resumption or working age or paid work or work functioning or job functioning).ab,id,ti. or occupational status/ or (occupational status or job status or work status or vocational status or work participation or stay at work or presenteeism or work outcomes or work ability).ab,id,ti. or employability/ or (employability or work capacity or employment capacity).ab,id,ti. or job satisfaction/ or (job satisfaction or work retention or job retention).ab,id,ti. or employee absenteeism/ or (employee absenteeism or sick leave or absenteeism).ab,id,ti.
#4	#1 and #2 and #3
Limits:	Publication date from 01/01/2007-02/2017; English language or Dutch language.

Appendix 2. Data-extraction tables

Table 1. Association between person-related factor 'expectations regarding recovery or RTW' and work participation

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Audhoe et al. 2012 ¹⁷ The Netherlands (Europe)	Prospective cohort study	N: 932 A: 18-34; 232, 35-44; 260, 45-65; 418 G: 398 males, 514 females O: Agency workers H: Psychological complaints	10, 18, 27 months	Low	Positive RTW expectations at 10 months were associated with work participation at 18 months ($p < .01$) and positive RTW expectations at 18 months were associated with work participation at 27 months ($p < .01$) in univariate analysis. Positive RTW expectations at 10 months were a prognostic factor for work participation at 18 months (OR: 1.7 (1.08-2.71), $p = .02$) in multiple logistic analysis. Positive RTW expectations at 18 months were a prognostic factor for work participation at 27 months (OR: 2.6 (1.12-5.86), $p = .03$) in multiple logistic analysis.
Besen et al. 2015 ¹⁸ United States (North-America)	Prospective cohort study	N: 241 A: 38 (11.4), 18-63 G: 130 males, 111 females O: 76% blue collar H: Low back pain	1 week, 3 months	Moderate	More favorable RTW expectations were negatively related to days of absence ($r = -.19, p < .01$) and negatively related to work status ($r = -.42, p < .001$) in univariate analysis (correlations). In multivariate analysis positive RTW expectations were associated with fewer days of absence ($r = -.19, p < .05$) and with work status ($.35, p < .001$).

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Boot et al. 2008 ¹⁹ The Netherlands (Europe)	Cross-sectional study	Employed N: 345 A: 44.2 (10.2) G: 168 males, 177 females O: - H: Chronic physical disease Fully work-disabled N: 170 A: 52.4 (8.6) G: 66 males, 104 females O: -	-	Low	The participants in the employed group had more positively oriented illness perceptions about how long their illness would last ($p = .027$) and about the effect of their treatment ($p < .001$) compared to those who were fully work-disabled in univariate analysis. Those factors had no effect in multivariate logistic regression analysis.
Busch et al. 2007 ²⁰ Sweden (Europe)	Prospective cohort study	H: Chronic physical disease Sick absent N: 130 A: <45: 64, >45: 66 G: 45 males, 85 females O: - H: Chronic musculoskeletal pain Work capable N: 103 A: <45: 58, >45: 45 G: 32 males, 71 females O: -	3, 7, 11, 15 months	Low	Expectations of recovery were a significant predictor of long-term sickness absence in univariate analysis ($p < .05$). Having low expectations of recovery was a significant predictor of long-term sickness absence during follow-up (B = .88, OR: 2.41 (1.22-4.78), $p = .01$) in multivariate logistic regression analysis.
Carriere et al. 2015a ²¹ Canada (North-America)	Prospective cohort study	H: Chronic musculoskeletal pain N: 154 A: 36.4 (9.2), 20-60 G: 81 males, 73 females O: Diverse H: Whiplash associated disorders	1 year	Low	High RTW expectations were directly related to successful RTW ($\beta = 1.05$, $p < .001$) in multivariate analysis. Pain catastrophizing influenced RTW expectations ($p < .001$). Expectations partially mediated the relation between pain catastrophizing and RTW status in multiple regression analysis.

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Carriere et al. 2015b ²² Canada (North-America)	Prospective cohort study	N: 109 A: 36.08 (9.70) G: 47 males, 62 females O: Diverse H: Work-related musculoskeletal disorders	1 year	Low	Lower recovery expectations were associated with lower probability of RTW ($\chi^2 = 36.75, p < .001$) in univariate Chi-square analysis. Recovery expectations contributed significantly to the prediction of RTW status at follow-up ($\chi^2 = 31.51, OR = 952 (932-972), p < .001$) in multivariate logistic regression analysis. Low recovery expectations were associated with a low probability of RTW. Recovery expectations fully mediated the relation between depression and RTW status at follow-up in logistic regression analysis.
Carstens et al. 2014 ²³ United States (North-America)	Prospective cohort study	N: 496 A: 37.0 (11.3), 18-65 G: 287 males, 209 females O: - H: Work-related acute back pain	3 months	Moderate	Four different recovery clusters were identified: having stable high expectations, having stable medium expectations, having decreasing expectations and having stable low expectations. The participants with stable low expectations for recovery had a higher risk for not returning to work within 3 months (OR: 3.38 (2.40-8.18), $p < .01$) as compared to participants with stable high expectations for recovery. The participants with decreasing expectations had the highest risk for not returning to work (OR: 5.29 (2.11-13.26), $p < .01$) in comparing to the other participants in multivariate logistic regression analysis. There was no difference between the participants in the stable high cluster and the participants in the stable medium cluster.
Coggon et al. 2013 ²⁴ Diverse (Europe, South- North-America, South-America, Africa, Asia, Oceania)	Cross-sectional study	N: 12416 A: 20-29: 3058, 30-39: 3971, 40-49: 3451, 50-59: 1936 G: 4348 males, 8068 females O: Diverse H: Musculoskeletal illness	-	Moderate	Adverse beliefs about the prognosis of pain did not have a significant effect on prolonged sickness in the full model (PRR: 1.03 (-.86-1.23)) in Poisson regression analysis.
Cowan et al. 2012 ²⁵ United States (North-America)	Prospective cohort study	N: 66 A: 49.7 (11.3) G: 17 males, 49 females O: Desk-based, non-desk-based H: Carpal tunnel release	2-4 months	Low	Less expected time until RTW ($p = .001$) was associated with earlier return to modified work in bivariate analysis. In multivariate analysis less expected time until RTW ($R^2 = .36$) was significantly associated with earlier return to modified work. In bivariate analysis less expected time until RTW ($p < .001$) was significantly associated with earlier return to full work. Less expected time until RTW was also a significant predictor of earlier return to full work ($R^2 = .18$) in multivariate analysis.

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Du Bois et al. 2009 ²⁶ Belgium (Europe)	Prospective cohort study	N: 346 A: 41 G: 183 males, 163 females O: 74% blue collar H: Low back pain	6 months	Low	Expecting to RTW within 6 months was positively associated to RTW within 3 months (OR: 1.14 (1.04–1.25)) in multivariate analysis. The question 'Do you expect to RTW within 6 months?' was together with 4 other questions able to correctly classify the poor outcome (no RTW within 3 months) of 62% of the participants in multivariate logistic regression analysis.
Ekberg et al. 2015 ²⁷ Sweden (Europe)	Prospective cohort study	RTW <3 months N: 195 A: 44 (11), 18-65 G: 38 males, 157 females O: 77 white collar, 89 pink collar, 29 blue collar H: Common mental disorders RTW 3-12 months N: 98 A: 44 (10), 18-65 G: 14 males, 84 females O: 47 white collar, 34 pink collar, 16 blue collar H: Common mental disorders	1 year	Low	Participants who returned to work within 3 months had higher expectations of recovery from treatment than participants who returned to work between 3 and 12 months ($p = .035$) in univariate Chi-square analysis. Expectations of recovery from treatment were also associated with RTW in the 3-month sub-cohort, but not in the 3-12 month sub-cohort in multivariate Cox regression analysis when looking at the influence of personal resources. Positive expectations of recovery from treatment were associated with early RTW in the final model (HR: 1.50 (1.04-2.16)) in multivariate Cox regression analysis. Expectations of RTW did not differ between the two groups in univariate analysis and were not associated with RTW in multivariate analysis.

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Gross and Battié 2010 ²⁸ Canada (North-America)	Prospective cohort study	Specific pathology N: 234 A: 38.1 (11.6) G: 199 males, 35 females O: - H: Specific pathology Back pain N: 298 A: 38.1 (10.6) G: 203 males, 95 females O: - H: Back pain Non-back strain/sprain/pain N: 461 A: 40.5 (10.4) G: 290 males, 171 females O: - H: Non-back strain/sprain/pain Other pain N: 47 A: 40.7 (9.1) G: 28 males, 19 females O: - H: Other pain	1 year	Moderate	Positive work related recovery expectations were significantly associated with more days to suspension of time loss benefits in participants with back pain in univariate ($p < .05$) and in multivariate analysis (OR: .83 (.73-.96), $p < .05$), but not in other diagnostic groups in multivariate analysis. Participants with back pain and with positive expectations recover more rapidly, than participants with back pain with neutral or negative expectations. Expectations did influence the time to claim closure in univariate analysis for participants with back pain ($p < .05$), but did not influence time to claim closure in other diagnostic groups or in multivariate analysis. When taking the non-chronic and chronic back pain groups apart, recovery expectations were associated with time to benefit suspension in univariate ($p < .05$) and in multivariate analysis (OR: .76 (.62-.92), $p < .05$) in the non-chronic back pain group, but not in the chronic back pain group. Recovery expectations were associated with time to claim closure in univariate ($p < .05$) and in multivariate analysis (OR: .80 (.66-.98), $p < .05$) in the non-chronic back pain group, but not in the chronic back pain group.

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Hou et al. 2012 ²⁹ Taiwan (Asia)	Prospective cohort study	N: 804 A: 41.8 (15.2), 20-65 G: 574 males, 230 females O: White-collar, blue-collar, part-time job H: Traumatic limb injury	1, 3, 6, 12, 18, 24 months	Low	The participants who expected that the likelihood for RTW within one month was moderate (OR: .29, (.17-.51)) or high (OR: .20 (.09-.47)) were more likely to be in the fast RTW group than in the slow RTW group, in comparing to participants who expected that there was no chance for RTW within one month. The participants who expected that the likelihood for RTW within one month was moderate (OR: .52 (.34-.80)) or high (OR: .34 (.17-.69)) were more likely to be in the average RTW group than the slow RTW group in multinomial logistic regression analysis. There were no significant differences in expectations for RTW between participants in the average RTW and the fast RTW group.
Hou et al. 2008 ³⁰ Taiwan (Asia)	Prospective cohort study	N: 154 A: 36.9 (10.9), 18-65 G: 115 males, 39 females O: White-collar and blue-collar H: Orthopaedic injury	1, 3, 6 months	Low	For non-workers' compensation group expecting that the likelihood for RTW within one month is high, was associated with a greater chance of RTW in univariate and multivariate analysis (OR: 4.88 (2.31-10.30)). For workers' compensation group high expectations (OR: 2.87 (1.11-13.15)) and very high expectations (OR: 11.14 (2.40-51.59)) for RTW within one month were associated with a greater chance of RTW in univariate and in multivariate Cox regression analysis.
Iakova et al. 2012 ³¹ Switzerland (Europe)	Prospective cohort study	N: 411 A: 43.3 (10.3), <60 G: 336 males, 75 females O: - H: Orthopedic trauma	2 years	Moderate	Expected injury outcome (recovering vs. no recovery or worsening) was positively associated with RTW in a univariate regression ($p < .001$), but was not a significant predictor of RTW in the full model in multivariate analysis.
Jensen et al. 2013 ³² Denmark (Europe)	Prospective cohort study	N: 325 A: 41.7 (10.4), 18-60 G: 159 males, 166 females O: - H: Low back pain	1 year	Low	Low expectations for RTW ($p < .001$) predicted unsuccessful RTW after one year in univariate analysis. Low RTW expectations were in combination with five other variables also negatively associated with RTW in multivariate logistic regression analysis ($p < .001$).
Johansson et al. 2010 ³³ Sweden (Europe)	Prospective cohort study	N: 59 A: 40 (8), 18-60 G: 35 males, 24 females O: - H: Lumbar disc herniation	1 year	Low	Having low expectations to RTW within 3 months was a predictor of sick leave 12 months after surgery (OR: 19.5 (2.1-179.2), $p = .009$) in multivariate logistic regression analysis.

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Lindell et al. 2010 ³⁴ Sweden (Europe)	Prospective cohort study	Rehabilitation group N: 63 A: 42.2 (2.4), <60 G: 30 males, 33 females O: 87% blue collar H: non-acute non-specific spinal pain Primary-care group N: 62 A: 43.0 (2.6), <60 G: 27 males, 35 females O: 87% blue collar H: non-acute non-specific spinal pain	6, 12, 18, 24 months	Low	The participants' own belief in RTW was a significant predictor of RTW at 6 months ($p = .03$), 12 months ($p = .002$), 18 months ($p = .005$), and 24 months ($p = .008$) in univariate analysis. The participants' own belief in RTW was a predictor of RTW at 6 months (OR: 4.1 (1.1-15.7), $p = .02$) and 12 months (OR: 5.2 (1.5-17.5), $p = .009$), but not at 18 months and 24 months in multivariate analysis.
Magnussen et al. 2007 ³⁵ Norway (Europe)	Randomized controlled trial	Intervention N: 45 A: 49.1 (6.4), 36-56 G: 19 males, 26 females O: - H: Back pain Control N: 44 A: 49 (4.5), 36-56 G: 14 males, 30 females O: - H: Back pain	1 year	Moderate	Belief in RTW was associated with having entered in a RTW process (being on educational course or being in work training) in univariate analysis ($p = .003$). The participants who at baseline believed to RTW (OR: 10.5 (2.4-44.5), $p < .05$) were more likely to have entered a RTW process when adjusted for age and gender in multivariate logistic regression analysis.

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Murgatroyd et al. 2016 ³⁶ Australia (Oceania)	Prospective cohort study	N: 334 A: 36 (13.9), >18 G: 267 males, 67 females O: Diverse H: Upper and/or lower extremity fractures	6, 12, 24 months	Moderate	Recovery expectations for work ($p = .08$) and recovery expectations for usual activities ($p < .001$) were associated with RTW in univariate analysis. Expecting that one could perform usual activities in less than 90 days was associated with a shorter time to RTW (HR: 2.10 (1.49-2.95), $p < .001$) in comparing to expecting that one could not perform usual activities within 90 days in the Cox model in multivariate analysis. However, recovery expectations for work were not associated with RTW in multivariate Cox regression analysis.
Nieuwenhuijsen et al. 2013 ³⁷ The Netherlands (Europe)	Retrospective cohort study	N: 179 A: 45 (10) G: 51 males, 128 females O: - H: Common mental disorders	3, 6, 9, 12 months	Moderate	Participants with positive RTW expectations did not differ in median time till RTW in comparing to workers with negative RTW expectations in a univariate logrank test. Positive RTW expectations were not significantly associated with a shorter median time to RTW.
Opsahl et al. 2016 ³⁸ Norway (Europe)	Prospective cohort study	N: 574 A: 44.3 (9.7), 20-60 G: 285 males, 289 females O: - H: Low back pain	1 year	Low	Having high expectations of RTW instead of low or moderate expectations predicted RTW at 12 months for men ($p < .05$) and women ($p < .05$) in bivariate analysis and for men (OR: 4.17 (1.90-9.17)) and women (OR: 3.36 (1.58-7.14)) in the full model in multivariate analysis. Having uncertain expectations were no better than having low or moderate expectations in bivariate logistic regression analysis.
Reme et al. 2009 ³⁹ Norway (Europe)	Prospective cohort study	N: 246 A: 41.1 (10.7), <60 G: 120 males, 126 females O: - H: Low back pain	3, 12, 24 months	Low	Negative RTW expectations predicted non RTW in univariate analysis ($p < .01$). In adjusted regression models negative RTW expectations predicted non RTW at 3 months (OR: 4.2 (1.7-10.0), $p = .001$), but did not predict non RTW at 12 or 24 months.
Richter et al. 2011 ⁴⁰ The Netherlands (Europe)	Prospective cohort study	N: 276 A: 45 (7) G: 256 males, 20 females O: Self-employed H: Musculoskeletal symptoms	1 year	Low	Participants who estimated their RTW to be within one month had shorter claim duration than participants who estimated RTW in more than a month or never (OR: .24 (.15-.38), $p < .001$) or who had no idea of when they would RTW (OR: .23 (15-.34), $p < .001$) in univariate and in multivariate Cox regression analysis.
Rönnerberg et al. 2007 ⁴¹ Sweden (Europe)	Prospective cohort study	N: 148 A: 40, 18-66 G: 80 males, 68 females O: - H: Lumbar disc hernia	2 years	Moderate	Participants who expected to return (76%) and not return (24%) to their present or similar work, returned in 78% and 26%, respectively ($p = .021$) in univariate analysis.

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Sampere et al. 2012 ⁴² Spain (Europe)	Prospective cohort study	N: 663 A: 39.8 (11.4) G: 364 males, 299 females O: - H: Musculoskeletal disorder, mental disorders or other physical conditions	2 years	Low	Expectations of returning to the same job were associated with time to RTW in bivariate analysis ($p < .005$). Expecting that the time required to RTW was 1-3 months (HR: .50 (.39-.63)) or was more than 3 months (HR: .36 (.25-.52)) was predictive for more time to RTW in comparing to expecting that the time required to RTW was less than 1 months. Lack of expectations of returning to the same job (HR: .13 (.06-.31)) and not knowing when to return (HR: .46 (.37-.57)) were also associated with a longer time to RTW in the full model among the total study population in multivariate analysis. RTW expectations were related to time to RTW across different health conditions and across different genders in multivariate analysis.
Sluiter and Frings-Dresen 2008 ⁴³ The Netherlands (Europe)	Cross-sectional study	Employed N: 745 A: 40.0 (8.3) G: 283 males, 462 females O: - H: Repetitive strain injury Sick-listed N: 376 A: 42.3 (9.4) G: 83 males, 293 females O: - H: Repetitive strain injury	-	Low	Participants with repetitive strain injury who were sick-listed differed from the working group in treatment control ($p < .001$). Sick-listed participants scored lower on treatment control than participants in the working group which indicated that they had less positive expectations about the effect of their treatment in multivariate ANOVA analysis. However, they did not differ in their perceptions about how long their illness would last.
Spector et al. 2012 ⁴⁴ United States (North-America)	Prospective cohort study	N: 670 A: 44.9 (9.6), >18 G: 255 males, 415 females O: Diverse H: Carpal tunnel syndrome	2 years	Low	Low or uncertain recovery expectations were significantly associated with long-term disability (missing work days and retrieving compensation) in univariate ($p < .05$) and in multivariate analysis (OR: 2.51 (1.39-4.54), $p = .002$).

Table 1. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Truchon et al. 2012 ⁴⁵ Canada (North-America)	Prospective cohort study	N: 535 A: 42 (10), 18-60 G: 317 males, 218 females O: Diverse H: Low back pain	6, 12 months	High	Expectations of time to RTW ($\beta = -.25, p = .00$) as measured with the new developed absenteeism screening questionnaire were predictive for long-term absence from work in multivariate Cox regression analysis.
Turner et al. 2008 ⁴⁶ United States (North-America)	Prospective cohort study	N: 1885 A: 39.4 (11.2) G: 1282 males, 603 females O: Diverse H: Back injury	1 year	Low	Having low or high instead of very high recovery expectations was associated with work disability ($p < .001$) in univariate analysis. In a multi-domain model none of the psychological factors, including recovery expectations, contributed independently to the prediction of 1-year work disability (wage replacement compensation for total disability 12 months after claim submission). This was because the score on the Roland-Morris disability questionnaire was substantially correlated with all the psychological factors.
Vuistiner et al. 2015 ⁴⁷ Switzerland (Europe)	Prospective cohort study	N: 1090 A: 42.9 (11.3), <62 G: 890 males, 200 females O: - H: Orthopaedic trauma	4 years	Low	The probability of being declared fit for work was higher for those expecting a positive evolution in univariate analysis and in multivariate Cox regression analysis (HR: 1.50 (1.32-1.70)).
Wåhlin et al. 2012 ⁴⁸ Sweden (Europe)	Prospective cohort study	N: 699 A: 48 (10.7), 18-65 G: 201 males, 498 females O: - H: Musculoskeletal or mental disorders	3 months	Low	For participants with mental disorders there was no association between RTW expectations and RTW. For participants with musculoskeletal disorders high RTW expectations were significantly associated with RTW within 3 months (OR: 2.41 (1.22-4.78)) in multiple logistic regression analysis.

RTW: Return to work

Table 2. Association between person-related factor 'optimism' and work participation

First author, year Country (Continent)	Study design	Population N: Number of subjects A: Age; mean age (SD), range G: Gender O: Occupation H: Health status	Follow-up	Risk of bias	Results
De Vries et al. 2011 ⁵² The Netherlands (Europe)	Qualitative study	N: 21 A: 49 (6.9), 10-60 G: 9 males, 12 females O: Diverse H: Chronic nonspecific musculoskeletal pain	-	Low	A positive outlook was according to participants with chronic nonspecific musculoskeletal pain an important factor for staying at work.
Ellingsen and Aas 2009 ⁵³ Norway (Europe)	Qualitative study	N: 4 A: 38-52 G: 2 males, 2 females O: - H: Acquired brain injury	-	Moderate	A belief that things would work out (optimism) was considered as a very important facilitating factor for work participation according to participants. Pessimism was a inhibiting factor for work participation.
Hystad and Bye 2012 ⁴⁹ Norway (Europe)	Prospective cohort study	N: 1190 A: 41.67 (10.87) G: 922 males, 268 females O: Diverse H: Musculoskeletal symptoms	2 years	Low	Pessimism was related to more sickness absence in 2 years for women ($R^2 = .12, p < .01$) after controlling for age, physical work environment and proposed mediators, but not for men ($R^2 = .04, p = .057$) in multivariate analysis. However, the coefficient did not significantly differ between men and women. There was no effect for optimism. Pessimism was a more salient predictor of physical health and functioning than optimism in a multiple mediation model.
Lundqvist and Samuelsson 2012 ⁵⁴ Sweden (Europe)	Qualitative study	N: 14 A: 51 (8.1), 37-63 G: 8 males, 6 females O: - H: Brain injury	-	Moderate	According to participants it was important to have a positive attitude for progressing in rehabilitation and RTW.

Table 2. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Lydell et al. 2011 ⁵⁰ Sweden (Europe)	Prospective cohort study	N: 320 A: 42 G: 130 males, 190 females O: Diverse H: Musculoskeletal disorders	1, 5, 10 years	Moderate	There were more participants in the motivation and optimism group who had returned to work 1 year after baseline as compared to the hindrance and hesitation group. However, there were no significant differences between the groups after 5 and 10 years in univariate Chi-square analysis.
Øyeflaten et al. 2008 ⁵¹ Norway (Europe)	Prospective cohort study	N: 135 A: 45 (8.4), 24-61 G: 48 males, 87 females O: Diverse H: Musculoskeletal complaints	3, 12 months	Low	Hopelessness (having negative expectancies about oneself and the future) had no significant effect on RTW at 3 and 12 months in univariate or multivariate logistic regression analysis.

RTW: Return to work

Table 3. Association between person-related factor 'self-efficacy' and work participation

First author, year Country (Continent)	Study design	Population	Follow-up	Risk of bias	Results
Besen et al. 2015 ¹⁸ United States (North-America)	Prospective cohort study	N: Number of subjects A: Age; mean age (SD), range G: Gender O: Occupation H: Health status N: 241 A: 38 (11.4), 18-63 G: 130 males, 111 females O: 76% blue collar H: Low back pain	1 week, 3 months	Moderate	Greater RTW confidence (confidence in ability to RTW) was negatively related to days of absence ($r = -.34, p < .001$) and positively related to work status ($r = .32, p < .001$) in univariate analysis (correlations). In multivariate analysis greater RTW confidence ($r = -.10, p < .05$) was associated with fewer days of absence. Greater RTW confidence ($r = .09, p < .05$) was also directly associated with work status.
Brouwer et al. 2015 ⁵⁵ Canada (North-America)	Prospective cohort study	N: 632 A: 15-29; 93, 30-39; 137, 40-49; 228, >49; 173 G: 350 males, 282 females O: - H: Musculoskeletal disorders	1, 6, 12 months	Low	High levels of pain RTW self-efficacy (ability to cope with pain) as measured with the new return-to-work self-efficacy scale 1 month after injury was positively related to 6-month RTW status in univariate ($p < .001$) and in multivariate analysis ($\beta = .18, OR: 1.20 (1.06-1.37), p = .005$). Overall RTW self-efficacy was positively associated with 6 month RTW status in univariate ($p = .004$), but not in multivariate analysis. Other self-efficacy scales (supervisor RTW self-efficacy and co-worker RTW self-efficacy) were not significant in predicting 6-months RTW status in univariate or multivariate analysis. Overall RTW self-efficacy ($p = .015$) and pain RTW self-efficacy ($p = .029$) predicted 12 month RTW status in univariate analysis, but not in multivariate analysis. Supervisor RTW self-efficacy and co-worker self-efficacy did not predict 12 month RTW status in univariate or multivariate logistic regression analysis. Improvements in overall RTW self-efficacy ($\beta = .66, OR: 1.92 (1.04-3.57), p = .038$) and coworker RTW self-efficacy (ability to obtain help from coworkers) ($\beta = .89, OR: 2.43 (1.18-5.00), p = .016$) predicted 12-month RTW status, but only in multivariate logistic regression analysis. Other improvements of forms of RTW self-efficacy (pain RTW self-efficacy and supervisor RTW self-efficacy) were not significant in predicting RTW status in univariate or multivariate analysis.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Brouwer et al. 2009 ⁵⁶ The Netherlands (Europe)	Prospective cohort study	N: 926 A: 45.8 (9.5), 18-63 G: 466 males, 460 females O: - H: Musculoskeletal symptoms, other physical symptoms, mental symptoms	10 months	Low	Willingness to expend effort in completing a behavior ($p = .00$) and willingness to initiate behavior ($p = .01$) (two subscales of self-efficacy) were associated with less time till RTW in univariate analysis. The subscale persistence in the face of adversity was not associated with time till RTW in univariate analysis. Willingness to expend effort in completing the behavior was associated with shorter time till RTW (HR: 1.42 (1.17-1.74), $p = .00$) in multivariate analysis. Other subscales (willingness to initiate behavior and persistence in the face of adversity) were not significant in multivariate analysis.
Brouwer et al. 2010 ⁵⁷ The Netherlands (Europe)	Prospective cohort study	Musculoskeletal conditions N: 352 A: 45.4 (9.4) G: 201 males, 151 females O: - H: Musculoskeletal conditions Other physical health conditions N: 265 A: 47.7 (9.5) G: 148 males, 117 females O: - H: Other physical health conditions Mental health conditions N: 245 A: 44.2 (9.4) G: 86 males, 159 females O: - H: Mental health conditions	10 months	Low	High willingness to expend effort in completing a behavior was a significant predictor of shorter time to RTW for all three subgroups (musculoskeletal, other physical and mental health subgroup) in univariate analysis ($p < .05$). Willingness to initiate behavior was only associated with shorter time till RTW for the musculoskeletal subgroup in univariate analysis ($p < .01$), but not for the other physical subgroup and the mental health subgroup. The subscale persistence in the face of adversity was not associated with time to RTW in all three groups. Willingness to expend effort in completing a behavior (self-efficacy) was associated with time to RTW after 10 months ($p < .05$) in all three groups participants (musculoskeletal subgroup: HR 1.49 (1.12-1.99), $p < .01$, other physical subgroup: HR: 1.53 (1.07-2.18), $p = .02$, mental health subgroup: HR: 1.60 (1.07-2.40), $p = .02$) in the multivariate model. Other subscales of self-efficacy (willingness to initiate behavior and persistence in the face of adversity) were not significantly associated with time to RTW in multivariate analysis.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
D'Amato and Zijlstra 2010 ⁵⁸ Austria, Ireland, Finland, the Netherlands, the United Kingdom (Europe)	Prospective cohort study	N: 1460 A: <36: 210, 36-45: 337, 46-54: 515, >55: 396 G: 711 males, 749 females O: Diverse H: Mental or physical health problems	6 months	Moderate	Self-efficacy was not significant in predicting RTW in multivariate logistic regression analysis.
De Vries et al. 2011 ⁵² The Netherlands (Europe)	Qualitative study	N: 21 A: 49 (6.9), 10-60 G: 9 males, 12 females O: Diverse H: Chronic nonspecific musculoskeletal pain	-	Low	Being self-confident was according to participants with chronic nonspecific musculoskeletal pain an important factor for staying at work.
De Vries et al. 2012b ⁵⁹ The Netherlands (Europe)	Cross-sectional study	Staying at work N: 119 A: 51, 20-60 G: 48 males, 71 females O: - H: Chronic nonspecific musculoskeletal pain	-	Low	Pain self-efficacy (higher in staying at work group) was associated with work status in univariate analysis ($p = .001$). Participants in the staying at work group reported significantly higher pain self-efficacy beliefs compared to sick-listed participants in the sick-leave group ($B = .09$, $OR: 1.09$ (1.05-1.14), $p = .001$) in multivariate logistic regression analysis. However, self-efficacy was not one of the factors which best discriminated participants within the sick leave group and the staying at work group in backwards stepwise logistic regression analysis.
Dionne et al. 2007 ⁶⁰ Canada (North-America)	Prospective cohort study	N: 1007 A: 38.7 (10.6), 18-64 G: 589 males, 418 females O: - H: Back pain	6 weeks, 12 weeks, 1 year, 2 years	Low	Self-efficacy was associated with less failure after attempt(s) to RTW for women ($OR: .69$ (.51 - .91), $p < .05$) and men ($OR: .21$ (.07 - .68), $p < .05$) in multivariate analysis. However, self-efficacy was not associated with partial success or failure to RTW.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Dunn et al. 2010 ⁷⁸ United States (North-America)	Qualitative study	N: 23 A: 27-59 G: 11 males, 12 females O: Diverse H: Serious mental illness	-	Moderate	Seven facilitators of vocational recovery were received from the interviews. Having the confidence to work was important in helping participants with serious mental illness RTW and maintain their employment.
Ekberg et al. 2015 ⁷⁷ Sweden (Europe)	Prospective cohort study	RTW <3 months N: 195 A: 44 (11), 18-65 G: 38 males, 157 females O: 77 white collar, 89 pink collar, 29 blue collar H: Common mental disorders RTW 3-12 months N: 98 A: 44 (10), 18-65 G: 14 males, 84 females O: 47 white collar, 34 pink collar, 16 blue collar H: Common mental disorders	1 year	Low	Self-efficacy did not differ between participants who went back to work within 3 months and participants who went back to work between 3 and 12 months in univariate Chi-square analysis. Self-efficacy was related to RTW in the 3-12 months cohort, but not in sub-cohort for participants who returned to work within 3 months in multivariate Cox regression analysis. Significant variables from multiple Cox regression within each block of predictors (health, function and work ability, personal resources and work conditions) were included in the full model. Self-efficacy was not associated with early RTW in the final model in multivariate Cox regression analysis.
Hartke et al. 2011 ⁷⁹ United States (North-America)	Qualitative study	N: 12 A: 51, 31-67 G: 8 males, 4 females O: Diverse H: Stroke	-	Moderate	Struggling with regaining self-confidence was a barrier that stroke survivors encounter in their efforts to RTW.
Healey et al. 2011 ⁶¹ United Kingdom (Europe)	Cross-sectional study	N: 612 A: 50.8 (12.2) G: 438 males, 174 females O: - H: Ankylosing spondylitis	-	Low	Self-efficacy was negatively associated with unemployment and absenteeism (number of sick leave days) in univariate analysis ($p < .05$), but was not associated with employment status and absenteeism in multivariate logistic regression analysis.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Huijs et al. 2012 ⁶² The Netherlands (Europe)	Prospective cohort study	N: 682 A: 46.6 (9.25) G: 284 males, 389 females O: - H: Physical problems, mental problems or a combination of physical and mental problems	2 years	Low	Less RTW self-efficacy was associated with a longer duration until full RTW for participants with physical problems, and physical and mental problems in univariate analysis ($p < .01$), but not for participants with only mental problems. Self-efficacy was associated with duration until full RTW for participants with sickness absence due to physical complaints (HR: 1.38 (1.15-1.64), $p < .01$) and for participants with physical and mental problems (HR: 1.24 (1.01-1.51), $p = .04$), but not for participants with only mental problems in multivariate analysis.
Huijs et al. 2017 ⁶³ The Netherlands (Europe)	Prospective cohort study	N: 883 A: 46.4 (9.2) G: 386 males, 497 females O: - H: Long-term sick-listed employees with and without depressive symptoms	1 year, 2 years	Moderate	RTW self-efficacy predicted duration until RTW within 1 year and within 2 years in univariate analysis ($p < .01$). A higher level of RTW self-efficacy predicted a shorter duration until full RTW within 1 year (HR: 1.19 (1.06-1.33), $p < .01$) or 2 years (HR: 1.20 (1.06-1.35), $p < .01$) after the start of sick leave for participants with depressive symptoms in multivariate analysis.
Lagerveld et al. 2016 ⁶⁴ The Netherlands (Europe)	Prospective cohort study	N: 168 A: 40.7 (9.9), >50: 32 G: 67 males, 101 females O: - H: Common mental disorders	1, 3, 6, 9 months	Moderate	Higher baseline self-efficacy (HR: 3.16 (2.04-4.87), $p < .01$) and stronger self-efficacy increase (HR: 1.91 (1.46-2.53), $p < .01$) were significant predictors of a faster RTW within 9 months in multivariate Cox regression analysis.
Lundqvist and Samuelsson 2012 ⁶⁴ Sweden (Europe)	Qualitative study	N: 14 A: 51 (8.1), 37-63 G: 8 males, 6 females O: - H: Brain injury	-	Moderate	According to participants it was important to have self-confidence for progressing in rehabilitation and RTW.
Magnussen et al. 2007 ^{a60} Norway (Europe)	Qualitative study	N: 17 A: 38-56 G: 5 males, 12 females O: - H: Back pain	-	Moderate	Low self-esteem was for many participants a main barrier for RTW.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Mangels et al. 2011 ⁶⁵ Germany (Europe)	Prospective cohort study	Short-term sick leave N: 161 A: 48.6 (13.7) G: 39 males, 122 females O: - H: Musculoskeletal disease Long-term sick leave N: 53 A: 50.3 (6.5) G: 12 males, 41 females O: - H: Musculoskeletal disease	1 year	Moderate	Pretreatment self-efficacy did not contribute to the prediction of sick leave at follow-up in multivariate analysis. Participants with low scores on self-efficacy at follow-up were more likely to be on long-term sick leave at follow-up than patients with higher scores on self-efficacy ($\beta = -.36, p < .001$) in hierarchical regression analysis.
Martins 2015 ⁶⁶ Portugal (Europe)	Cross-sectional study	N: 149 A: 40.61 (11.13), 19-64 G: 109 males, 40 females O: - H: Chronic disease or injury, using a wheelchair	-	Moderate	Participants who are employed scored higher on self-efficacy than retired or unemployed participants ($t = 6.26, p < .001$) in a t-test.
Murphy et al. 2011 ⁶⁷ Australia (Oceania)	Prospective cohort study	N: 72 A: 35.3 (14.4) G: 58 males, 14 females O: - H: Spinal cord injury	2 years	Moderate	Self-efficacy was not a predictor of employment status in univariate analysis or multivariate discriminate function analysis.
Nieuwenhuijsen et al. 2013 ³⁷ The Netherlands (Europe)	Retrospective cohort study	N: 179 A: 45 (10) G: 51 males, 128 females O: - H: Common mental disorders	3, 6, 9, 12 months	Moderate	Positive RTW self-efficacy was associated with a shorter time until RTW ($\chi^2 = 17.8, p < .000$) in a Kaplan-Meier curve in survival analysis.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
O'Sullivan et al. 2012 ⁶⁸ United states (North-America)	Cross-sectional study	N: 56 A: 40.7 (13.2), 19-69 G: 23 males, 32 females O: - H: Physical disability, psychiatric disability, learning disability	-	Low	Collective work behavior self-efficacy was associated with length of prior employment. Participants who reported higher levels of work behavior self-efficacy reported longer periods of employment ($r = .36, p < .01$) in univariate analysis. However, self-efficacy was not an independent predictor of length of prior employment when adding personality factors in hierarchical regression analysis.
Øyeflatten et al. 2008 ⁵¹ Norway (Europe)	Prospective cohort study	N: 135 A: 45 (8.4), 24-61 G: 48 males, 87 females O: Diverse H: Musculoskeletal complaints	3, 12 months	Low	Self-efficacy had no significant effect on RTW at 3 and 12 months in univariate or multivariate logistic regression analysis.
Richard et al. 2011 ⁶⁹ Canada (North-America)	Prospective cohort study	N: 1007 A: 38.7 (10.6), 18-64 G: 589 males, 418 females O: - H: Back pain	2 years	Low	Participants with high RTW self-efficacy were less likely to be found in the failure after attempt to RTW group (OR: .28 (.14-.57), $p < .05$) or in the failure group (OR: .19 (.07-.48), $p < .05$) than participants with low self-efficacy in bivariate and multivariate analysis. Participants with a moderate level of RTW self-efficacy were less likely to be found in the failure after attempt (OR: .82 (.47-1.40), $p < .05$) or in the failure group at 2 years (OR: .51 (.26-1.00), $p < .05$) in univariate and multivariate analysis. There was no effect of self-efficacy and the chance of being in the partial success group.
Roesler et al. 2013 ⁷⁰ Australia (Oceania)	Prospective cohort study	N: 192 A: 35.1, 18-63 G: 163 males, 29 females O: Blue collar, white collar H: Hand injury	4, 12 weeks	Low	Self-efficacy at 7-10 days was a negative predictor of failing to RTW before 12 weeks ($B = -.21, \text{Exp}(B) = .81, p = .014$), but self-efficacy at 28 days was not a predictor of RTW before 12 weeks in multivariate logistic regression analysis.
Sampere et al. 2012 ⁴² Spain (Europe)	Prospective cohort study	N: 663 A: 39.8 (11.4) G: 364 males, 299 females O: - H: Musculoskeletal disorder, mental disorders or other physical conditions	2 years	Low	General self-efficacy was not related to time to RTW in bivariate analysis and not in multivariate analysis.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Sarda et al. 2009 ⁷¹ Australia (Oceania) Brazil (South-America)	Cross-sectional study	Australian N: 207 A: 44, 18-65 G: - O: - H: Chronic pain Brazil N: 222 A: 45, 18-65 G: - O: - H: Chronic pain	-	Low	In the Brazilian sample low self-efficacy was associated with a more chance of being unemployed (OR: 2.52 (1.06-6.00), $p = .04$) in multivariate analysis. Self-efficacy was not associated with chance of being unemployed in the Australian sample in multivariate logistic regression analysis.
Shaw et al. 2011 ⁷² United States (North-America)	Prospective cohort study	N: 399 A: 36.5 (11.2), 18-63 G: 236 males, 163 females O: Mostly blue-collar H: Acute low-back pain	3 months	Moderate	Participants with medium (OR: 3.40 (1.58-7.33), $p < .01$) or high (OR: 4.93 (2.23-10.91), $p < .01$) RTW self-efficacy at visit 1 at the occupational health clinic were more likely to RTW within 7 days in univariate ($p < .01$) and multivariate analysis. Self-efficacy at visit 1 was not a predictor of RTW within 3 months in univariate or multivariate analysis. High self-efficacy at visit 2 (4-10 days after first visit at the clinic) was a significant predictor of RTW within 3 months in univariate ($p < .05$) and multivariate analysis (OR: 3.72 (1.51-9.13), $p < .01$).
Strauser et al. 2010 ⁷³ United States (North-America)	Cross-sectional study	N: 84 A: 40.7 (13.2), 19-69 G: 35 males, 48 females O: - H: Physical disabilities, psychiatric disabilities, learning disabilities	-	Low	Level of contextual work behavior self-efficacy was not different between employed and unemployed participants. Contextual work behavior self-efficacy did not contribute to predicting the longest period of prior employment next to work personality in hierarchical multiple regression analysis.
Stulemeijer et al. 2008 ⁷⁴ The Netherlands (Europe)	Prospective cohort study	N: 201 A: 35.6 (12.3), 18-60 G: 123 males, 78 females O: - H: Mild traumatic brain injury	6 months	Low	Self-efficacy did not predict RTW in univariate analysis.

Table 3. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Tamminga et al. 2012 ⁸¹	Qualitative study	N: 12 A: 42 (7), 18-65 G: 0 males, 12 females O: -	-	Low	Being confident was a RTW facilitator according to participants with breast cancer.
The Netherlands (Europe)		H: Breast cancer			
Volker et al. 2015 ⁵	Prospective cohort study	N: 493 A: >44: 308 of 487 G: 220 males, 237 females O: -	2 years	Low	Participants with high RTW self-efficacy had a shorter time to RTW compared to participants with low RTW self-efficacy (HR: 2.02 (1.50-2.73), $p < .01$) in bivariate Cox regression analysis. Higher RTW self-efficacy was not significantly associated with shorter duration until RTW (HR: 1.60 (1.12-2.28), $p = .010$) in multivariate analysis.
The Netherlands (Europe)		H: Long-term sick-listed			
Waghorn et al. 2007/ ¹⁶	Prospective cohort study	N: 104 A: 19-24: 12, 25-34: 37, 35-44: 28, 45-56: 27 G: 75 males, 29 females O: -	6, 12 months	Moderate	Total work self-efficacy was associated with current employment in univariate analysis ($p < .001$) and in a multivariate mixed regression model ($F = 5.84, p = .02$). General work skills self-efficacy ($p < .001$), job securing skills self-efficacy ($p < .05$) and career planning skills self-efficacy ($p < .01$) were also associated with current employment status in univariate analysis. Work-related social skills self-efficacy was not related to current employment in univariate analysis.
Australia (Oceania)		H: Schizophrenia or schizoaffective disorders			
Wahlén et al. 2012 ⁴⁸	Prospective cohort study	N: 699 A: 48 (10.7), 18-65 G: 201 males, 498 females O: -	3 months	Low	For participants with mental disorders and with musculoskeletal disorders there was no association between self-efficacy and RTW in multiple logistic regression analysis.
Sweden (Europe)		H: Musculoskeletal or mental disorders			
Waynor et al. 2016 ⁷⁷	Prospective cohort study	N: 105 A: 44 (10.8) G: 62 males, 43 females O: Diverse	6 months	Moderate	Baseline self-efficacy was not a positive predictor of competitive employment at 6 months. Only the subscale work-related social skills self-efficacy (one subscale of self-efficacy) was negatively associated with current employment status ($r = -.24, p = .03$) in univariate analysis and was a significant predictor of obtaining employment in multivariate logistic regression analysis. Lower work-related social skills self-efficacy was a predictor of competitive employment. The subscales career planning self-efficacy, general work skills self-efficacy and job securing skills self-efficacy were not.
United States (North-America)		H: Serious mental illness			

RTW: Return to work

Table 4. Association between person-related factor 'motivation' and work participation

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Åhrberg et al. 2010 ⁸⁹ Sweden (Europe)	Qualitative study	N: 7 A: 30-57 G: 0 males, 7 females O: - H: Chronic pain problems	-	Moderate	Motivation was important for RTW according to women who were on long-term sick leave.
Awang et al. 2016 ⁹² Malaysia (Asia)	Cross-sectional study	N: 9850 A: <30: 3041, 30-39: 3081, >39: 3728 G: 7776 males, 2074 females O: Diverse H: Work-related injury	-	Moderate	Participants who successful returned to formal employment were more often motivated than participants with unsuccessful RTW ($p < .01$) in univariate Chi-square analysis. Motivated participants were 7 times more likely to return to employment compared to those who were not motivated (B: 2.04, OR: 7.67 (5.50-10.69), $p < .05$) in multivariate logistic regression analysis.
Boyle et al. 2014 ⁸³ Australia (Oceania)	Cross-sectional study	N: 14 A: 36.5 (12.6), 18-75 G: 11 males, 3 females O: Diverse H: Spinal cord injury or traumatic brain injury	-	Low	The most commonly cited facilitator for employment was motivation.
		N: 16 A: 41.8 (13.7), 18-75 G: 15 males, 1 female O: Diverse H: Spinal cord injury or traumatic brain injury			

Table 4. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Braathen et al. 2007 ⁸⁴ Norway (Europe)	Non-randomized experimental study	Intervention N: 183 A: <40: 44, 40-49: 68, >49: 61 G: 48 males, 135 females O: - H: Long-term sick leave Control N: 96 A: <40: 25, 40-49: 31, >49: 36 G: 24 males, 72 females O: - H: Long-term sick leave	4 months	Moderate	RTW at 4 months was predicted by improved work motivation (B = .67, OR: 1.96 (1.04-3.69), p = .04) in multivariate logistic regression analysis. Improvement of one unit of a 5-point motivation scale increased the probability of RTW by 96%.
De Vries et al. 2011 ⁵² The Netherlands (Europe)	Qualitative study	N: 21 A: 49 (6.9), 10-60 G: 9 males, 12 females O: Diverse H: Chronic nonspecific musculoskeletal pain	-	Low	There were different important motivators for staying at work. Motivation to work may be considered to be an important prerequisite for staying at work.
Dekkers-Sánchez et al. 2010 ⁹⁰ The Netherlands (Europe)	Qualitative study	N: 27 A: 49, 25-63 G: 14 males, 13 females O: Blue collar, white collar H: Chronic work disability	-	Moderate	Work motivation was a promoting factor for RTW proposed by work disabled participants.
Dunn et al. 2010 ⁷⁸ United States (North-America)	Qualitative study	N: 23 A: 27-59 G: 11 males, 12 females O: Diverse H: Serious mental illness	-	Moderate	Having the motivation to work was important in helping participants with serious mental illness RTW and maintain their employment.

Table 4. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Elfving et al. 2009 ⁸⁵ Sweden (Europe)	Prospective cohort study	N: 312 A: 43, 22-63 G: 144 males, 168 females O: Diverse H: Spinal pain	6 months	Low	Self-motivation was not a significant predictor of less sickness absence after 6 months in univariate analysis (logistic regression).
Hartke et al. 2011 ⁷⁹ United States (North-America)	Qualitative study	N: 12 A: 51, 31-67 G: 8 males, 4 females O: Diverse H: Stroke	-	Moderate	Being motivated emerged to be an important facilitator that stroke survivors encounter in their efforts to RTW after stroke.
Lydell et al. 2011 ⁵⁰ Sweden (Europe)	Prospective cohort study	N: 320 A: 42 G: 130 males, 190 females O: Diverse H: Musculoskeletal disorders	1, 5, 10 years	Moderate	There were more participants in the motivation and optimism group who had returned to work 1 year after baseline as compared to the hindrance and hesitation group. However, there were no significant differences between the groups after 5 and 10 years in univariate Chi-square analysis.
Puolakka et al. 2008 ⁸⁶ Finland (Europe)	Prospective cohort study	N: 152 A: 39 (10) G: 86 males, 66 females O: - H: Lumbar disc herniation	2 months, 5 years	Low	More motivation to work two months after surgery was associated with less work disability days after lumbar disc herniation surgery (B: -2.88 (-3.97- -1.79), $p < .001$). However, motivation for work was not associated with permanent disability pension after lumbar disc herniation in multivariate analysis.
Saperstein et al. 2011 ⁸⁷ United States (North-America)	Cross-sectional study	N: 145 A: 42.76 (8.84) G: 116 males, 29 females O: - H: Schizophrenia	-	Moderate	Intrinsic motivation was correlated with total hours worked after rehabilitation ($p = .01$) and mean work behavior ratings ($p < .001$) in univariate analysis. Intrinsic motivation was significantly correlated with total hours worked after rehabilitation ($\beta = 0.31, p = .002$) and mean work behavior ratings at the conclusion of rehabilitation ($\beta = 0.32, p = .001$) in hierarchical regression analysis. Intrinsic motivation was a significant mediator of the relationship between negative symptoms and work outcomes.

Table 4. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Van Veizen et al. 2011 ⁹¹ The Netherlands (Europe)	Qualitative study	N: 12 A: 52.1 (6.7), 18-60 G: 9 males, 3 females O: Diverse H: Brain injury	-	Moderate	Motivation was according to almost all participants a facilitator for RTW.
Wan Kasim et al. 2014 ⁸⁸ Malaysia (Asia)	Cross-sectional study	N: 126 A: 39.6 (9.2), 18-60 G: 113 males, 13 females O: Diverse H: Severe mental illness	-	Low	Being motivated to work was associated with successful employment ($p < .000$) in bivariate analysis. However, when this variable was entered into a stepwise logistic regression model to predict successful employment status, motivation was not significant.
Wilbanks and Ivankova 2015 ⁹² United States (North-America)	Qualitative study	N: 4 A: 42-57 G: 3 males, 1 female O: Diverse H: Spinal cord injury	-	Low	Motivation was one of the four major themes that emerged as a facilitator for RTW from interviews with participants with spinal cord injury. Both extrinsic and intrinsic motivators seem to be important for rejoining the workforce.

RTW: Return to work

Table 5. Association between person-related factor 'feelings of control' and work participation

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Country (Continent)		N: Number of subjects A: Age; mean age (SD), range G: Gender O: Occupation H: Health status			
Boot et al. 2008 ¹⁹ The Netherlands (Europe)	Cross-sectional study	Employed N: 345 A: 44.2 (10.2) G: 168 males, 177 females O: - H: Chronic physical disease Fully work-disabled N: 170 A: 52.4 (8.6) G: 66 males, 104 females O: - H: Chronic physical disease	-	Low	The participants in the employed group had more positively oriented illness perceptions about the personal control over their illness ($p < .001$) compared to those who were fully work-disabled in univariate analysis, but personal control had no effect in multivariate analysis.
Busch et al. 2007 ²⁰ Sweden (Europe)	Prospective cohort study	Sick absent N: 130 A: <45: 64, >45: 66 G: 45 males, 85 females O: - H: Chronic musculoskeletal pain Work capable N: 103 A: <45: 58, >45: 45 G: 32 males, 71 females O: - H: Chronic musculoskeletal pain	3, 7, 11, 15 months	Low	Mastery (beliefs about control over current life and future) was a significant predictor of long-term sickness absence in univariate analysis ($p < .05$). Low sense of self mastery ($B = .73$, OR: 2.08 (1.27-3.40), $p = .004$) was a significant predictor of long-term sickness absence during follow-up in multivariate logistic regression analysis.

Table 5. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Dionne et al. 2013 ⁹⁹ Canada (North-America)	Qualitative study	No RTW or recent RTW N: 10 A: 30-39: 2, 40-49: 3, 50-59: 5, >59: 0 G: 7 males, 3 females O: Manual work, service job H: Back pain RTW N: 9 A: 30-39: 1, 40-49: 4, 50-59: 3, >59: 1 G: 7 males, 2 females O: Manual work, service job H: Back pain	-	Moderate	The participants' perceptions of the control they had over their health problem played an important role in determining whether or not they returned to work. Participants in the no or recent return group considered that their return depended more on factors related to the work environment and to the healthcare system than on personal factors (extern instead of intern locus of control).
Ekberg et al. 2015 ²⁷ Sweden (Europe)	Prospective cohort study	RTW <3 months N: 195 A: 44 (11), 18-65 G: 38 males, 157 females O: 77 white collar, 89 pink collar, 29 blue collar H: Common mental disorders RTW 3-12 months N: 98 A: 44 (10), 18-65 G: 14 males, 84 females O: 47 white collar, 34 pink collar, 16 blue collar H: Common mental disorders	1 year	Low	Mastery (the extent to which individuals perceive themselves in control of forces that affect their lives) was not different between the participants who returned within 3 months and the participants who returned in 3-12 months in univariate Chi-square analysis. Mastery was not related to RTW in the 3 month sub-cohort or in the 3-12 months sub-cohort in multivariate Cox regression analysis.

Table 5. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Karoly et al. 2013 ³³ United States (North-America)	Cross-sectional study	On disability N: 434 A: 25-44: 122, 45-64: 260, 65-80: 52 G: 221 males, 213 females O: - H: Chronic pain Working N: 859 A: 25-44: 464, 45-64: 309, 65-80: 86 G: 481 males, 378 females O: - H: Chronic pain	-	Moderate	Participants who were working had higher scores on pain control than participants on disability ($p < .05$) in a t-test. Pain control was not a predictor of work status in multivariate logistic regression analysis.
Krause et al. 2013 ³⁴ Germany (Europe)	Cross-sectional study	Early-retired N: 39 A: 45.87 (9.57), 18-60 G: 15 males, 24 females O: - H: Multiple Sclerosis Employed N: 48 A: 34.96 (10.04), 18-60 G: 19 males, 29 females O: - H: Multiple Sclerosis	-	Moderate	Post-hoc analysis revealed that there are no significant differences between early retired participants with MS and employed participants with MS on self-reported health locus of control in univariate analysis.
Murphy et al. 2011 ⁶⁷ Australia (Oceania)	Prospective cohort study	N: 72 A: 35.3 (14.4) G: 58 males, 14 females O: - H: Spinal cord injury	2 years	Moderate	Internal locus of control had a positive relationship with paid employment at 2 years ($p < .05$). However internal locus of control was not significant in predicting employment status in univariate analysis. Locus of control was not a significant predictor of employment in multivariate discriminant function analysis.

Table 5. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Richard et al. 2011 ⁶⁹ Canada (North-America)	Prospective cohort study	N: 1007 A: 38.7 (10.6), 18-64 G: 589 males, 418 females O: - H: Back pain	2 years	Low	Participants who had a higher level of powerful others health locus of control were more likely to be found in the failure after attempt or in the failure group at 2 years in bivariate analyses ($p < .05$) in comparing to participants with a lower score. Participants with a higher level of chance health locus of control were more likely to be found in failure group at 2 years in bivariate analyses ($p < .05$) instead of participants with a lower score. There was no significant effect of internal locus of control on RTW in bivariate analysis. In multivariate analysis none of the forms of health locus of control was significant in predicting RTW.
Roesler et al. 2013 ⁷⁰ Australia (Oceania)	Prospective cohort study	N: 192 A: 35.1, 18-63 G: 163 males, 29 females O: Blue collar, white collar H: Hand injury	4, 12 weeks	Low	Participants who attributed recovery to external factors at 28 days were more than five times more likely to have a delayed recovery (RTW later than 12 weeks) ($B = 1.70$, $Exp (B) = 5.11$, $p = .015$) in multivariate logistic regression analysis.
Selander et al. 2007 ⁷⁵ Sweden (Europe)	Prospective cohort study	N: 347 A: 42 G: 187 males, 160 females O: - H: Back pain	6 months	Low	Participants with high internal locus of control had roughly 70% better chances of receiving a positive rehabilitation outcome (less sickness allowance than before) as compared to participants with low internal locus in bivariate ($p = .000$) and in multivariate analysis (OR: .73 (.59-.89), $p = .003$).
Sluiter and Frings-Dresen 2008 ⁴³ The Netherlands (Europe)	Cross-sectional study	Employed N: 745 A: 40.0 (8.3) G: 283 males, 462 females O: - H: Repetitive strain injury Sick-listed N: 376 A: 42.3 (9.4) G: 83 males, 293 females O: - H: Repetitive strain injury	-	Low	Participants with repetitive strain injury who were sick listed differed from the working group in personal control ($p < .001$) in multivariate analysis of variance. Sick-listed participants scored lower on personal control than participants in the working group which indicated that they felt they had less control over their disease.

Table 5. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Torres et al. 2009 ⁹⁵ Spain (Europe)	Prospective cohort study	N: 98 A: 43.6 (7.9), 21-59 G: 3 males, 95 females O: Blue collar, white collar H: Fibromyalgia	1, 3, 6, 12 months	Low	High scores on the fate scale (factor in the chance subscale) of the multidimensional health locus of control pain questionnaire predicted which participants with fibromyalgia would not be able to return after discharge ($B = .102, \chi^2 = 24.47, \text{Exp}(B) = 1.107 (1.06-1.15), p < .001$) in the full model in multivariate logistic regression and which participants remained active during at least 6 months during follow up ($B = .039, \chi^2 = 15.37, \text{Exp}(B) = 1.039 (1.02-1.06), p < .001$). However, for the last model was inadequate goodness-of-fit. Other scales of multidimensional health locus of control scale (internal, powerful professionals, luck subscales) did not have a significant effect.
Truchon et al. 2010 ⁹⁷ Canada (North-America)	Prospective cohort study	N: 439 A: 38 (10), 18-60 G: 261 males, 178 females O: - H: Low back pain	6, 12 months	Moderate	At 12 months, cognitive appraisal of low back pain (control of pain and fear of physical activity) was predictive of absence from work (work status), when controlling for other variables (OR: 2.57, $p = .00$) in multivariate logistic regression analysis, but cognitive appraisal was not predictive for work absence at 6 months. Cognitive appraisal did also predict days of absence at 6 months ($\beta = 17.11, p < .05$) and at 12 months ($\beta = 38.72, p < .05$) in multivariate analysis.
Vlasveld et al. 2013 ⁹⁸ The Netherlands (Europe)	Cross-sectional study	Current depressive or anxiety disorder N: 1023 A: 40.6 (11.2), 18-65 G: 363 males, 660 females O: - H: Current depressive/anxiety disorder Remitted depressive or anxiety disorder N: 402 A: 43.3 (11.1), 18-65 G: 128 males, 274 females O: - H: Remitted depressive/anxiety disorder	-	Low	In participants with psychopathology external locus of control was associated with long-term absenteeism (longer than 2 weeks) (OR: .744 (63-89), $p = .001$), but not with short-term absenteeism (shorter than 2 weeks) in multinomial logistic regression analysis.
Volker et al. 2015 ⁷⁵ The Netherlands (Europe)	Prospective cohort study	N: 493 A: >44: 308 of 487 G: 220 males, 237 females O: - H: Long-term sick-listed	2 years	Low	Participants who scored high on sense of mastery (more control) had a shorter time to RTW compared to participants with low sense of mastery (HR: 1.668 (1.202-2.315), $p = .002$) in bivariate Cox regression analysis. Sense of mastery was not significantly associated with shorter duration until RTW in multivariate analysis.

RTW: Return to work

Table 6. Association between person-related factor 'perceived health' and work participation

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Country (Continent)		N: Number of subjects A: Age; mean age (SD), range G: Gender O: Occupation H: Health status			
Audhoe et al. 2012 ¹⁷ The Netherlands (Europe)	Prospective cohort study	N: 932 A: 18-34; 232, 35-44; 260, 45-65; 418 G: 398 males, 514 females O: Agency workers H: Psychological complaints	10, 18, 27 months	Low	Moderate to good perceived health instead of poor health was associated with work participation (not being sick-listed and being able to or being back to work) at 18 months ($p < .01$) and with work participation at 27 months ($p < .01$) in univariate analysis. Moderate to good perceived health (OR: 4.2 (2.43-7.20), $p < .01$) at 10 months was a prognostic factor for work participation at 18 months in multiple logistic analysis. Perceived health at 18 months was not a prognostic factor for work participation at 27 months in multiple logistic analysis.
Boot et al. 2014 ¹⁰¹ Canada (North-America)	Prospective cohort study	No comorbidity N: 1382 A: 38.4 (10.9) G: 700 males, 682 females O: Diverse H: Musculoskeletal injuries Comorbidity N: 183 A: 43.0 (11.7) G: 94 males, 89 females O: Diverse H: Musculoskeletal injuries and somatic comorbidity	1 year	Low	A better general health was a significant predictor of RTW after 12 months for participants with and without comorbidity (OR: 1.77 (1.21-2.58)) in univariate logistic regression analysis.

Table 6. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Boot et al. 2011 ¹⁰⁰ The Netherlands (Europe)	Cross-sectional study	N: 7748 A: 43 (12), 15-65 G: 3968 males, 3780 females O: - H: Chronic illness	-	Moderate	Lower perceived health status was associated with more sick leave in each chronic illness group ($B > 0; p < .05$) in multivariate analysis. Limitations at work, work characteristics and work adjustments partially explained the association between perceived health and sick leave.
Chen et al. 2012 ¹⁰² Taiwan (Asia)	Cross-sectional study	N: 120 A: 35.7, 16-23; 18, 25-45; 78, 46-60; 24 G: 92 males, 28 females O: - H: Work-related hand injury	-	Low	Self-perceived general health was not associated with time of work in multivariate stepwise regression analysis.
Dawson et al. 2011 ¹⁰³ Australia and New Zealand (Oceania)	Cross-sectional study	No sick leave N: 1678 A: 45.2 (37.0-51.1), 18-65 G: 126 males, 1552 females O: Nursing or midwives H: Low back pain Sick leave N: 486 A: 43.9 (35.2-51.0), 18-65 G: 47 males, 439 females O: Nursing or midwives H: Low back pain	-	Moderate	General physical health was better for participants who were not on sick leave than for participants who were on sick leave in bivariate analyses (OR: .94 (93-96), $p < .001$).

Table 6. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
De Vries et al. 2012 ^{b59} The Netherlands (Europe)	Cross-sectional study	Staying at work N: 119 A: 51, 20-60 G: 48 males, 71 females O: - H: Chronic nonspecific musculoskeletal pain Sick leave and referred for rehabilitation N: 122 A: 39, 20-60 G: 56 males, 66 females O: - H: Chronic nonspecific musculoskeletal pain	-	Low	General health perception was not significantly different between participants who were staying at work and who were sick-listed in univariate analysis.
Dionne et al. 2007 ⁶⁰ Canada (North-America)	Prospective cohort study	N: 1007 A: 38.7 (10.6), 18-64 G: 589 males, 418 females O: - H: Back pain	6 weeks, 12 weeks, 1 year, 2 years	Low	Fair or poor self-reported health status instead of excellent or very good health status was associated with failure in RTW in good health for men (OR: 8.20 (1.14-58.75), $p < .05$) and with partial success in RTW for men (OR: 3.08 (1.01-9.42), $p < .05$) but not with failure after attempts in multivariate analysis. The influence of general health on RTW for women was not studied.
Dyster-Aas et al. 2007 ¹⁰⁴ Sweden (Europe)	Cross-sectional study	N: 48 A: 44.4 (10.2), 23-64 G: 37 males, 11 females O: - H: Burn injury	-	Low	Participants who returned to work scored higher on general health than participants who did not RTW ($z = 2.9, p < .01$) in a univariate Mann-Whitney U test.

Table 6. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Ekberg et al. 2015 ²⁷ Sweden (Europe)	Prospective cohort study	RTW <3 months N: 195 A: 44 (11), 18-65 G: 38 males, 157 females O: 77 white collar, 89 pink collar, 29 blue collar H: Common mental disorders RTW 3-12 months N: 98 A: 44 (10), 18-65 G: 14 males, 84 females O: 47 white collar, 34 pink collar, 16 blue collar H: Common mental disorders	1 year	Low	Participants who returned to work within 3 months had a higher self-rated health than participants who returned to work at 3-12 months ($p = .005$) in univariate Chi-square analysis. Self-rated health remained associated with RTW when looking at the health, function and work ability factors in the sub-cohort of participants returning within 3-12 months in multivariate Cox regression analysis, but not in the sub-cohort for participants who returned to work within 3 months. Significant variables from multiple Cox regression within each block of predictors (health, function and work ability, personal resources and work conditions) were included in the full model. Self-rated health was not associated with early RTW in the final model in multivariate Cox regression analysis.
Elfvig et al. 2009 ⁶⁵ Sweden (Europe)	Prospective cohort study	N: 312 A: 43, 22-63 G: 144 males, 168 females O: Diverse H: Spinal pain	6 months	Low	General health was not a significant predictor of less sickness absence after 6 months in univariate logistic regression analysis.
Grøvie et al. 2013 ¹⁰⁵ Norway (Europe)	Prospective cohort study	Analysis RTW at 2 years N: 237 A: 43.2 (9.2), >18 G: 136 males, 101 females O: - H: Sciatica Analysis time to sustained RTW N: 125 A: 42.1 (10.4), >18 G: 68 males, 57 females O: - H: Sciatica	2 years	Low	General health was associated with RTW at 2 years ($p = .00$) and time to sustained RTW ($p = .01$) in univariate analyses. General health was significantly associated with a higher chance of RTW at the 2-year follow-up in multivariate analysis (OR: 1.03 (1.01-1.05), $p < .01$), but not with time to sustained RTW.

Table 6. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Hansen et al. 2009 ⁰⁶ Denmark (Europe)	Prospective cohort study	N: 75 A: 46 (10.1) G: 22 males, 53 females O: - H: Endoscopic carpal tunnel release	3 months	Moderate	Self-reported health status was not a significant predictor of sick leave of more than 21 days in univariate logistic regression or multiple logistic regression.
He et al. 2010 ⁰⁷ China (Asia)	Retrospective cohort study	N: 323 A: 37.8 (8.7), <60 G: 259 males, 64 females O: Workers in a state-owned locomotive vehicles company H: Occupational injury	7 months	Low	Participants with bad self-perceived health status instead of good perceived health status got less chance of successfully RTW in univariate ($p < .01$) and in multivariate Cox regression analysis (B: .32, HR: .35 (.18-.65), $p < .001$). Participants with better self-report health status took shorter sick leave ($p < .01$) in univariate analysis.
Iakovva et al. 2012 ³¹ Switzerland (Europe)	Prospective cohort study	N: 411 A: 43.3 (10.3), <60 G: 336 males, 75 females O: - H: Orthopedic trauma	2 years	Moderate	General health at admission ($p < .001$), improvement in general health during stay ($p = .02$), and physical health ($p = .002$) were significant for predicting RTW at 2 years in univariate analysis, but not in the complete model in multivariate regression analysis. However, backward selection created a minimal model with a minimal amount of predictors to predict RTW and in this model improvement of general health (OR: 1.16 (1.04-1.28)) was a significant predictor of RTW.
Jensen et al. 2013 ³² Denmark (Europe)	Prospective cohort study	N: 325 A: 41.7 (10.4), 18-60 G: 159 males, 166 females O: - H: Low back pain	1 year	Low	Perceiving general health as bad (OR: 3.25 (1.53-6.89), $p = .002$) instead of very good, good or not so good, predicted unsuccessful RTW at after one year in univariate analysis, but did not contribute in the final model in multivariate analysis.
Lindell et al. 2010 ³⁴ Sweden (Europe)	Prospective cohort study	N: 63 A: 42.2 (2.4), <60 G: 30 males, 33 females O: 87% blue collar H: non-acute non-specific spinal pain Primary-care group N: 62 A: 43.0 (2.6), <60 G: 27 males, 35 females O: 87% blue collar H: non-acute non-specific spinal pain	6, 12, 18, 24 months	Low	State of health was positively associated with stable RTW at 6 ($p = .02$) and 18 months ($p = .01$) in univariate analysis, but was not a significant predictor in the multiple logistic regression.

Table 6. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Morrison et al. 2016 ¹⁰⁸ Unites States (North-America)	Prospective cohort study	Employed full-time N: 219 A: 54.2 (11.6), 18-75 G: 132 males, 87 females O: - H: Cancer and hematopoietic stem cell transplantation Underemployed because of health	1 year	Moderate	There was a significant association between 1 year employment and current perceived health ($\chi^2 = 91.24, p < .001$) in Chi-square analysis. Full-time employed participants reported their health as very good or good, those who were unemployed reported their health as good, fair or poor in univariate analysis.
Murgatroyd et al. 2016 ³⁶ Australia (Oceania)	Prospective cohort study	N: 334 A: 36 (13.9), >18 G: 267 males, 67 females O: Diverse H: Upper and/or lower extremity fractures	6, 12, 24 months	Moderate	Self-assessed pre injury health status ($p = .05$) was associated with RTW in univariate analysis. Having fair to poor self-assessed pre-injury health status instead of having excellent health status was associated with longer time to RTW (HR: .36 (.14-.91), $p < .05$) in the Cox model in multivariate Cox regression analysis.
Nielsen et al. 2012 ¹⁰⁹ Denmark (Europe)	Prospective cohort study	N: 205 A: 40.1 (10.1) G: 42 males, 163 females O: Private, governmental and municipal sector H: Mental health problems	Max 52 weeks	Low	Self-rated health predicted a shorter time to RTW in univariate analysis ($p < .05$) and in multivariate analysis (HR: 1.18 (1.03-1.34), $p < .05$) with Cox regression modeling.

Table 6. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Ramel et al. 2013 ¹⁰ Sweden (Europe)	Prospective cohort study	RTW N: 27 A: 38 (14.2), 19-64 G: 22 males, 5 females O: - H: Hand injury No RTW N: 13 A: 42 (12.2), 19-64 G: 10 males, 3 females O: - H: Hand injury	3, 12 months	Low	Participants who did not RTW after 3 months had a lower health status at 12 months than participants who did RTW ($p = .039$). Participants who did not RTW after 12 months had a lower self-reported health status at 12 months than participants who did RTW ($p = .023$) in univariate logistic regression analysis.
Richter et al. 2011 ⁴⁰ The Netherlands (Europe)	Prospective cohort study	N: 276 A: 45 (7) G: 256 males, 20 females O: Self-employed H: Musculoskeletal symptoms	1 year	Low	General health was not a prognostic factor for claim duration in univariate or multivariate analysis.
Sampere et al. 2012 ⁴² Spain (Europe)	Prospective cohort study	N: 663 A: 39.8 (11.4) G: 364 males, 299 females O: - H: Musculoskeletal disorder, mental disorders or other physical conditions	2 years	Low	General health status was associated with time to RTW in bivariate analysis ($p < .05$). Poor perceived health status (HR: .71 (.59-.85)) instead of a good perceived health status was associated with a longer time to RTW in the full model among the total study population in multivariate analysis. Perceived poor health status was only significantly related to longer non-work related episodes in women (HR: .63 (.42-.95)) but not for men, when comparing men with women. Perceived health status was not related to longer time till RTW for workers on sick leave for mental disorders in multivariate analysis, but was related for participants with musculoskeletal disorders (HR: .52 (.39-.71)) and for participants with other physical conditions (HR: .72 (.52-.99)).

Table 6. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Sivertsen et al. 2013 ¹¹¹ Norway (Europe)	Cross-sectional study	Work group N: 2161 A: 51.29 (9.68), 20-69 G: 1067 males, 1094 females O: - H: Musculoskeletal pain Sick leave group N: 4511 A: 49.9 (9.95), 20-69 G: 1576 males, 2935 females O: - H: Musculoskeletal pain	-	Low	The work group and sick leave group differed in self-rated health status (higher for work group) ($p = .001$) in univariate analysis. Self-rated health was a significant predictor of work status ($B = .51$, Exp (B) = 1.66 (1.49-1.84), $p = .0001$) in multivariate logistic regression analysis. When self-rated health raised with one unit, the odds for being in the work group increased by 66%.
Vuistiner et al. 2015 ⁴⁷ Switzerland (Europe)	Prospective cohort study	N: 1090 A: 42.9 (11.3), <62 G: 890 males, 200 females O: - H: Orthopaedic trauma	4 years	Low	The probability of being declared fit for work was higher in participants with better perceived general health at hospitalization in univariate and multivariate Cox regression analysis (HR: 1.16 (1.13-1.19)).

RTW: Return to work

Table 7. Association between person-related factor 'coping strategies' and work participation

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Arwert et al. 2017 ¹¹² The Netherlands (Europe)	Cross-sectional study	N: Number of subjects A: Age; mean age (SD), range G: Gender O: Occupation H: Health status RTW N: 18 A: 48.5 (9.5), 20-90 (18-65 during hospitalization) G: 10 males, 8 females O: - H: Stroke Non-RTW N: 28 A: 47.1 (9.9), 20-90 (18-65 during hospitalization) G: 19 males, 9 females O: - H: Stroke	2-5 years	Low	Participants who returned to work scored lower on avoidance coping than participants who did not RTW in univariate ($p < .05$) and multivariate analysis (OR: .20 (.05-.78), $p < .05$). There were no significant differences in other types of coping (active coping and seeking support) in univariate and multivariate logistic regression analysis.
Becker et al. 2007 ¹¹⁹ United States (North-America)	Qualitative study	N: 38 A: 49.2 (7.0) G: 22 males, 17 females O: Diverse H: Severe mental illness	-	Moderate	Appropriate skills for coping with psychiatric problems appeared to play an important role in finding and maintaining work for participants with severe mental illness.

Table 7. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Dawson et al. 2011 ¹⁰³ Australia and New Zealand (Oceania)	Cross-sectional study	No sick leave N: 1678 A: 45.2 (37.0-51.1), 18-65 G: 126 males, 1552 females O: Nursing or midwives H: Low back pain Sick leave N: 486 A: 43.9 (35.2-51.0), 18-65 G: 47 males, 439 females O: Nursing or midwives H: Low back pain	-	Moderate	Participants on sick leave showed more passive coping ($p < .001$) than participants who were not on sick leave in univariate analysis. There was no difference in active coping in univariate analysis. Passive coping increased the likelihood of low back pain sick leave in the preceding 12 months (OR: 1.07 (1.04-1.12), $p < .001$) in multivariate analysis.
De Vries et al. 2011 ⁵² The Netherlands (Europe)	Qualitative study	N: 21 A: 49 (6.9), 10-60 G: 9 males, 12 females O: Diverse H: Chronic nonspecific musculoskeletal pain	-	Low	Coping with pain was according to participants an important factor for staying at work.
De Vries et al. 2012b ⁵⁹ The Netherlands (Europe)	Cross-sectional study	Staying at work N: 119 A: 51, 20-60 G: 48 males, 71 females O: - H: Chronic nonspecific musculoskeletal pain Sick leave and referred for rehabilitation N: 122 A: 39, 20-60 G: 56 males, 66 females O: - H: Chronic nonspecific musculoskeletal pain	-	Low	Active coping (higher for stay at work group) and passive coping (higher in sick leave group) were associated with work status in univariate analysis ($p = .001$), but not in multivariate logistic regression analysis. The coping form expression of emotions was higher in the staying at work group ($p = .049$) in univariate analysis and coping self-statements was higher in the staying at work group ($p = .042$) in univariate analysis. However, these two forms of coping were not associated with work status in multivariate logistic regression analysis. Other forms of coping (palliative reaction, social support) were not associated in univariate and multivariate logistic regression analysis.

Table 7. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Dekkers-Sánchez et al. 2010 ⁹⁰ The Netherlands (Europe)	Qualitative study	N: 27 A: 49, 25-63 G: 14 males, 13 females O: Blue collar, white collar H: Chronic work disability	-	Moderate	Poor coping style was according to disabled participants a perpetuating factor for long-term sick leave. Coping was also a promoting factor for RTW proposed by work disabled participants.
Grytten et al. 2017 ¹¹³ Norway (Europe)	Prospective cohort study	Employed N: 41 A: 32.29 (7.90) G: 19 males, 22 females O: Diverse H: Multiple sclerosis Unemployed N: 52 A: 34.59 (10.14) G: 10 males, 42 females O: Diverse H: Multiple sclerosis	13 years	Low	Unemployed and employed participants did not differ in coping style at baseline (planning, restraint coping, seeking social support for instrumental reasons, seeking social support for emotional reasons, positive reinterpretation and growth, focus on and venting of emotions, denial, behavioral disengagement, mental disengagement). Only the coping styles focus on and venting of emotions and denial were associated with time to awarding disability in univariate analysis ($p = .05$). For participants who were employed at baseline the coping strategy of denial was associated with shorter time to awarding disability pension (or a shorter time to unemployment) in multivariate analysis (HR: 1.59, 1.08-2.32, $p = .02$). Other coping styles were not significantly associated with time to awarding disability in multivariate analysis.
Hartke et al. 2011 ⁷⁹ United States (North-America)	Qualitative study	N: 12 A: 51, 31-67 G: 8 males, 4 females O: Diverse H: Stroke	-	Moderate	Positive coping strategies was a category that emerged to be an important facilitator that stroke survivors encounter in their efforts to RTW after stroke.
Heymans et al. 2009 ¹¹⁴ The Netherlands (Europe)	Prospective cohort study	N: 628 A: 40.6 (9.5), 18-65 G: 446 males, 182 females O: Blue collar, white collar workers H: Low back pain	1 year	Low	Pain coping was not associated with work absence in multivariate Cox regression analysis.

Table 7. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Huijs et al. 2012 ⁶² The Netherlands (Europe)	Prospective cohort study	N: 682 A: 46.6 (9.25) G: 284 males, 389 females O: - H: Physical problems, mental problems or a combination of physical and mental problems	2 years	Low	A lower level of active problem solving coping was associated with a longer duration until full RTW for the group with physical problems and the group with mental problems ($p < .05$), but not for the group with both physical and mental problems in univariate analysis. However, multivariate analysis showed that the lower level of active problem solving coping was only a predictor of a longer duration until RTW in participants with both physical and mental problems (HR: 1.58 (1.04-2.41), $p = .03$). More avoidance coping was a significant predictor of longer duration until full RTW in univariate analysis for participants with physical problems, but not for participants with mental problems or with both physical and mental problems. Avoidance coping was not a significant predictor in multivariate analysis in all three groups.
Iakova et al. 2012 ³¹ Switzerland (Europe)	Prospective cohort study	N: 411 A: 43.3 (10.3), <60 G: 336 males, 75 females O: - H: Orthopedic trauma	2 years	Moderate	Participants who used more avoidance of situations that are reminders of the accident had lower chances of RTW in univariate analysis ($p = .01$) and in the complete model (OR: .69 (.61-.79), $p < .001$) in multivariate analysis.
Karoly et al. 2013 ⁹³ United States (North-America)	Cross-sectional study	On disability N: 434 A: 25-44: 122, 45-64: 260, 65-80: 52 G: 221 males, 213 females O: - H: Chronic pain Working N: 859 A: 25-44: 464, 45-64: 309, 65-80: 86 G: 481 males, 378 females O: - H: Chronic pain	-	Moderate	Participants who were working had higher scores on ignoring, task persistence and positive self-talk than participants who were not working in univariate analysis. Participants on disability had higher scores on guarding in a t-test. Task persistence was also associated with work status in multivariate analysis ($b = .014$, eb: 1.15 (1.11-1.19), $p < .001$).

Table 7. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Luk et al. 2010 ¹¹⁵ Hong Kong (Asia)	Prospective cohort study	Returned to work N: 28 A: 37 (9), 20-56 G: 57 males, 8 females O: - H: Chronic low back pain Not returned to work N: 26 A: 42 (8), 20-56 G: 22 males, 4 females O: - H: Chronic low back pain	7, 14 weeks, 6 months	Low	The pain control (ability to cope with pain) ratings did not significantly differ between participants who returned to work and participants who did not RTW in a t-test.
Lundqvist and Samuelsson 2012 ⁵⁴ Sweden (Europe)	Qualitative study	N: 14 A: 51 (8.1), 37-63 G: 8 males, 6 females O: - H: Brain injury	-	Moderate	Coping (gaining awareness and develop coping strategies) was important for progressing in rehabilitation and RTW according to participants after acquiring brain injury.
Norlund et al. 2011 ¹¹⁶ Sweden (Europe)	Prospective cohort study	N: 117 A: 24-55 G: 35 males, 82 females O: - H: Burnout	1 year, 2 years	Low	Using covert coping towards supervisors or workmates was not associated with changes in sick leave in univariate analysis. However using covert coping (choosing avoidance behavior when experiencing a conflict) towards supervisors (OR: 2.78 (1.17-6.62), $p < .05$) and workmates (OR: 2.58 (1.05-6.34), $p < .05$) was associated with unchanged sick leave, when adjusting for background characteristics in multivariate analysis. Participants who showed less covert coping, had less sick leave at follow-up in comparing to the days of sick leave at baseline in logistic regression analyses.
Øyeflaten et al. 2008 ⁵¹ Norway (Europe)	Prospective cohort study	N: 135 A: 45 (8.4), 24-61 G: 48 males, 87 females O: Diverse H: Musculoskeletal complaints	3, 12 months	Low	The chances of RTW were higher with high scores on instrumental mastery-oriented coping than with low scores of coping at 3 months (OR: .3 (.10-.74), $p = .01$) and 12 months (OR: 5.9 (1.63-21.41), $p = .007$) in univariate and multivariate analysis. However other forms of coping (emotion-focused coping, hopelessness and coping expectancy) did not predict RTW in univariate or multivariate logistic regression analysis.

Table 7. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Øyeflaten et al. 2016 ¹¹⁷ Norway (Europe)	Prospective cohort study	N: 1155 A: 46 (9.1) G: 349 males, 806 females O: - H: Long-term sick leave	3 years and 4 months	Moderate	Poor coping ability ($r = .13, p < .001$) was positively associated with days on sickness benefits after work rehabilitation in univariate analysis. Poor coping ability did not have a direct or an indirect effect on days on sickness benefits after work rehabilitation in multivariate analysis with structural equation modeling.
Strober and Arnett 2016 ¹¹⁸ United States (North-America)	Cross-sectional study	Unemployed N: 27 A: 51.74 (8.31) G: 0 males, 27 females O: - H: Multiple sclerosis Employed N: 41 A: 46.07 (8.93) G: 0 males, 41 females O: - H: Multiple sclerosis	-	Moderate	Participants who left the workforce were more likely to endorse maladaptive coping behaviors like behavioral disengagement ($F = 4.30, p = .042$) and substance use ($F = 6.04, p = .017$) than participants who continued to work in multivariate analysis of covariance. There were no differences in the other 13 coping subscales.
Tamminga et al. 2012 ⁸¹ The Netherlands (Europe)	Qualitative study	N: 12 A: 42 (7), 18-65 G: 0 males, 12 females O: - H: Breast cancer	-	Low	The implementation of copings strategies to deal with cancer and work was a facilitator for RTW according to participants with breast cancer.
Truchon et al. 2010 ⁹⁷ Canada (North-America)	Prospective cohort study	N: 439 A: 38 (10), 18-60 G: 261 males, 178 females O: - H: Low back pain	6, 12 months	Moderate	Avoidance coping did not predict employment status or days of absence in multivariate linear regression analysis.

RTW: Return to work

Table 8. Association between person-related factor 'fear-avoidance beliefs' and work participation

First author, year Country (Continent)	Study design	Population N: Number of subjects A: Age; mean age (SD), range G: Gender O: Occupation H: Health status	Follow-up	Risk of bias	Results
Besen et al. 2015 ¹⁸ United States (North-America)	Prospective cohort study	N: 241 participants A: 38 (11.4), 18-63 G: 130 males, 111 females O: 76% blue collar H: Low back pain	1 week, 3 months	Moderate	Fear-avoidance beliefs were positively related to days of absence ($r = .21, p < .001$) and negatively with work status ($r = -.27, p < .001$) in univariate analysis (correlations). In multivariate analysis fear-avoidance beliefs were only indirectly associated to days of absence and work status.
Carriere et al. 2015a ²¹ Canada (North-America)	Prospective cohort study	N: 154 A: 36.4 (9.2), 20-60 G: 81 males, 73 females O: Diverse H: Whiplash associated disorders	1 year	Low	Participants who returned to work scored lower on fear-avoidance beliefs for movement than participants who did not RTW ($t = 3.38, p < .001$) in univariate analysis. Lower scores on fear-avoidance beliefs for movement ($\beta = -.30, t(254) = -1.26, p = .21$) were not associated with successful RTW when controlling for RTW expectations. Expectations mediated the relation between fear-avoidance beliefs for movement and RTW status in multivariate regression analysis.
Coggon et al. 2013 ²⁴ Diverse (Europe, South- North- America, South- America, Africa, Asia, Oceania)	Cross-sectional study	N: 12416 A: 20-29: 3058, 30-39: 3971, 40-49: 3451, 50-59: 1936 G: 4348 males, 8068 females O: Diverse H: Musculoskeletal illness	-	Moderate	Fear-avoidance for physical activity was a significant predictor of prolonged sickness in the full model (PRR: .68 (.53-.85)) in multivariate Poisson regression analysis.

Table 8. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Dawson et al. 2011 ¹⁰³ Australia and New Zealand (Oceania)	Cross-sectional study	No sick leave N: 1678 A: 45.2 (37.0-51.1), 18-65 G: 126 males, 1552 females O: Nursing or midwives H: Low back pain Sick leave N: 486 A: 43.9 (35.2-51.0), 18-65 G: 47 males, 439 females O: Nursing or midwives H: Low back pain	-	Moderate	Participants on sick leave had more fear-avoidance beliefs for movement ($p < .001$) than participants who were not on sick leave in bivariate analysis. Fear of movement was associated with sick leave in multivariate analyses for women (OR: 1.05 (1.02-1.08), $p = .001$) and for men (OR: 1.17 (1.05-1.29), $p = .004$).
De Vries et al. 2012b ⁵⁹ The Netherlands (Europe)	Cross-sectional study	Staying at work N: 119 A: 51, 20-60 G: 48 males, 71 females O: - H: Chronic nonspecific musculoskeletal pain Sick leave and referred for rehabilitation N: 122 A: 39, 20-60 G: 56 males, 66 females O: - H: Chronic nonspecific musculoskeletal pain	-	Low	Fear-avoidance for movement (higher in sick leave group) was negatively associated with work status in univariate analysis ($p = .001$). Participants who were on sick leave scored higher on fear-avoidance beliefs for movement than participants who stayed at work ($B = -.06$, OR: .94 (90-.99), $p = .028$) in multivariate logistic regression analysis. However, fear-avoidance beliefs for movement was not one of the factors which best discriminated participants within the sick leave group and the staying at work group in backwards stepwise logistic regression analysis.
Dionne et al. 2007 ⁶⁰ Canada (North-America)	Prospective cohort study	N: 1007 A: 38.7 (10.6), 18-64 G: 589 males, 418 females O: - H: Back pain	6 weeks, 12 weeks, 1 year, 2 years	Low	Fear-avoidance beliefs towards work were associated with failure in RTW in good health for women (OR: 3.01 (1.14-7.91), $p < .05$) and for men (OR: 4.08 (1.76-9.44), $p < .05$) in multivariate analysis. Fear-avoidance beliefs for work were not associated with partial success of RTW or failure after attempt to RTW. Fear-avoidance beliefs for activity were associated with partial success of RTW (OR: 1.36 (1.07-1.75), with failure after attempt (OR: 1.94 (1.27-2.95)) and with failure to RTW (OR: 1.98 (1.01-3.89)) for women.

Table 8. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Du Bois et al. 2009 ⁹⁵ Belgium (Europe)	Prospective cohort study	N: 346 A: 41 G: 183 males, 163 females O: 74% blue collar H: Low back pain	6 months	Low	Fear-avoidance beliefs for work, fear-avoidance beliefs for activity and fear-avoidance beliefs for movement were associated with sick leave for longer than 3 months ($p < .01$) in univariate analysis. Only the item "It is not advisable to be physically active" for measuring fear-avoidance beliefs for movement was significantly associated with no RTW in multivariate analysis (OR: 1.39 (1.10-1.76)).
Dyster-Aas et al. 2007 ¹⁰⁴ Sweden (Europe)	Cross-sectional study	N: 48 A: 44.4 (10.2), 23-64 G: 37 males, 11 females O: - H: Burn injury	-	Low	The participants who returned to work expressed less fear-avoidance beliefs ($z = 3.2, p < .01$) than those who were not working in a univariate Mann-Whitney U test.
Elfving et al. 2009 ⁹⁵ Sweden (Europe)	Prospective cohort study	N: 312 A: 43, 22-63 G: 144 males, 168 females O: Diverse H: Spinal pain	6 months	Low	Fear-avoidance beliefs for movement were not a significant predictor of less sickness absence after 6 months in univariate logistic regression analysis.
Grøvre et al. 2013 ¹⁰⁵ Norway (Europe)	Prospective cohort study	N: 237 A: 43.2 (9.2), >18 G: 136 males, 101 females O: - H: Sciatica	2 years	Low	Fear-avoidance beliefs for work were associated with RTW at 2 years ($p = .00$) and time to sustained RTW ($p = .01$) in univariate analyses. Less fear-avoidance for work was significantly associated with a higher probability of RTW at the 2-year follow-up (OR: .93, (.90-.97), $p = .00$) and more fear-avoidance for work was associated with a longer time to sustained RTW (OR: .97 (.95-.99), $p = .00$) in multivariate analysis.
Heymans et al. 2009 ¹¹⁴ The Netherlands (Europe)	Prospective cohort study	N: 125 A: 42.1 (10.4), >18 G: 68 males, 57 females O: - H: Sciatica	1 year	Low	Fear-avoidance beliefs for movement were associated with RTW at 2 years ($p = .00$), but not with time to sustained RTW in univariate analyses. A higher score for fear-avoidance beliefs was associated with a higher risk for not returning to work at 6 months in multivariate Cox regression analysis (B: -.02, HR: .98 (.97-1.00)). However, the effect was small. Fear-avoidance beliefs for movement were not associated with work absence in multivariate analysis (Cox regression).

Table 8. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Heymans et al. 2007 ¹²⁰ Australia (Oceania)	Retrospective cohort study	N: 194 A: 41.8 (9.9), 18-65 G: 65 males, 129 females O: - H: Low back pain	6 months	Low	Less fear-avoidance beliefs were predictive for being returned to work at 6 months (OR: .95 (.91-.99)) in multivariate logistic regression analysis.
Jensen et al. 2013 ³² Denmark (Europe)	Prospective cohort study	N: 325 A: 41.7 (10.4), 18-60 G: 159 males, 166 females O: - H: Low back pain	1 year	Low	Fear-avoidance was associated with unsuccessful RTW (OR: 1.62 (1.27-2.06), $p < .001$) in univariate analysis, but did not contribute in the final model in multivariate analysis.
Karels et al. 2010 ¹²¹ The Netherlands (Europe)	Prospective cohort study	N: 483 A: 41.5 (10.4) G: 161 males, 322 females O: Diverse H: Arm, neck and shoulder complaints	3, 6 months	Moderate	High fear-avoidance beliefs for movement were associated with the occurrence of sickness absence in univariate analysis (OR: 2.1 (1.3-3.4), $p < .05$), but not in multivariate analysis because it was correlated with other factors as somatization and catastrophizing.
Kovacs et al. 2007 ¹²² Spain (Europe)	Prospective cohort study	No sick leave N: 77 A: 47 G: 31 males, 46 females O: - H: Low back pain Short/medium sick leave N: 46 A: 46 G: 21 males, 25 females O: - H: Low back pain Long sick leave N: 42 A: 45 G: 24 males, 18 females O: - H: Low back pain	1 year	Low	Scores on fear-avoidance for work, fear-avoidance for physical activity and total fear-avoidance were significantly lower for participants with no sick leave in comparing to participants with sick leave ($p = .000$) in univariate analysis. More total fear-avoidance beliefs increased the odds of being on sick leave for up to 60 days (OR: 1.02 (1.01-1.04), $p = .011$) and the odds of being sick listed for 61 to 365 days (OR: 1.08 (1.05-1.11), $p = .000$). When the subscales were used instead of the total fear-avoidance beliefs scale, only fear-avoidance for work was significant for predicting sick leave for up to 60 days (OR: 1.04 (1.01-1.08), $p = .022$) and sick leave for up to 61-365 days (OR: 1.11 (1.06-1.16), $p = .000$), but not fear-avoidance beliefs for physical activity. Each additional point in the fear-avoidance for work score increased the odds of being on sick leave for up to 60 days by 4.2% and the odds of being sick listed for 61 to 365 days by 11.0% in a multivariate ordinal logistic regression model.

Table 8. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Magnussen et al. 2007 ^{5,6} Norway (Europe)	Randomized controlled trial	Intervention N: 45 A: 49,1 (6.4), 36-56 G: 19 males, 26 females O: - H: Back pain Control N: 44 A: 49 (4.5), 36-56 G: 14 males, 30 females O: -	1 year	Moderate	There was no significant difference in fear-avoidance beliefs for work and fear-avoidance beliefs for activity between participants who had entered a RTW process (being on educational course or being in work training) and who had not entered a RTW process in univariate analysis. However, when adjusting for age and gender, the odds ratio for fear-avoidance for work was significant (OR = 10.6 (1.5-78.1), $p < .05$) in multivariate analysis, in the way that disability pensioners with a lower score on fear-avoidance were more likely to have entered a RTW process at 1-year follow-up.
Mannion et al. 2009 ²³ Switzerland (Europe)	Cross-sectional study	H: Back pain N: 670 A: 44.5 (10.2) G: 362 males, 308 females O: - H: Low back pain	-	Moderate	Fear-avoidance beliefs for work and activity were higher for participants with work absence, than for participants without work absence ($p = .0001$) in univariate analysis with Spearman rank correlation coefficients. Fear-avoidance for work was a significant predictor of days of work absence ($\beta = .15, p = .001$) in hierarchical multiple regression analysis, but fear-avoidance for activity was not. Fear-avoidance beliefs for work and activity were also significantly different between participants with reductions in productivity and participants without reductions in productivity ($p = .0001$) in univariate analysis. Fear-avoidance for work was a significant predictor of reduced productivity at work due to low back pain ($\beta = -.26, p = .0001$) in multivariate analysis, but fear-avoidance for activity was not.

Table 8. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Morris and Watson 2011 ¹²⁴ Jersey (Europe)	Cross-sectional study	Sick-listed N: 62 A: 45, 19 (10.41), >18 G: 40 males, 22 females O: Private sector: 45, public sector: 17 H: Low back pain Non-sick-listed N: 57 A: 46.04 (11.98), >18 G: 29 males, 28 females O: Private sector: 45, public sector: 11 H: Low back pain	-	Low	Sick-listed participants recorded higher scores on the fear-avoidance for work measure ($p < .000$) than non-sick-listed participants in univariate analysis. There was no difference for fear-avoidance beliefs for activity. Logistic regression analysis revealed that fear-avoidance for work was a significant predictor of being sick-listed ($B = .07$, Exp (B) = 1.08 (1.02-1.13), $p = .004$) in multivariate analysis.
Opsahl et al. 2016 ³⁸ Norway (Europe)	Prospective cohort study	N: 574 A: 44.3 (9.7), 20-60 G: 285 males, 289 females O: - H: Low back pain	1 year	Low	Low fear-avoidance beliefs for work were associated with more chance to RTW at 12 months for men and women in bivariate analysis in comparing to high scores of fear-avoidance beliefs ($p < .05$). Having moderate fear-avoidance beliefs for work instead of low fear-avoidance beliefs was associated with more chance to RTW at 12 months for women ($p < .05$), but not for men in bivariate analysis.
Øyeflaten et al. 2008 ⁵¹ Norway (Europe)	Prospective cohort study	N: 135 A: 45 (8.4), 24-61 G: 48 males, 87 females O: Diverse H: Musculoskeletal complaints	3, 12 months	Low	Fear-avoidance for work was the most important risk factor for not returning to work at 3 months (OR: 3.8 (1.30-11.32), $p = .02$) and 12 months (OR: 9.5 (2.40-37.53), $p = .001$) in univariate and multivariate analysis, but fear-avoidance for activity was not a risk factor.
Øyeflaten et al. 2016 ¹¹⁷ Norway (Europe)	Prospective cohort study	N: 1155 A: 46 (9.1) G: 349 males, 806 females O: - H: Long-term sick leave	3 years and 4 months	Moderate	More fear-avoidance beliefs ($r = .38$, $p < .001$) were positively associated with days on sickness benefits after work rehabilitation ($p < .001$) in univariate analysis. Fear-avoidance beliefs for work were directly associated with days on sickness benefits after work rehabilitation ($\beta = .27$, $p < .001$) in the full structural model in multivariate analysis with structural equation modeling. Fear-avoidance beliefs for activity were not associated with RTW in univariate analysis.
Poulain et al. 2010 ¹²⁵ France (Europe)	Prospective cohort study	N: 105 A: 32.9 (9.8) G: 45 males, 60 females O: Diverse H: Chronic low-back pain	1, 6, 12 months, 3.5 years	Low	Participants who returned to work had less fear-avoidance beliefs for work ($p = .01$) and less global fear-avoidance beliefs ($p = .05$) than participants who had not returned to work in univariate analysis. Fear-avoidance beliefs for activity did not differ between the two groups. However, no form of fear-avoidance beliefs was an independent factor associated with RTW in a multivariate analysis.

Table 8. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Richter et al. 2011 ⁴⁰ The Netherlands (Europe)	Prospective cohort study	N: 276 A: 45 (7) G: 256 males, 20 females O: Self-employed H: Musculoskeletal symptoms	1 year	Low	Fear-avoidance beliefs for movement were associated with a longer period of claim duration in univariate analysis ($p = .03$), but not in multivariate Cox regression analysis.
Spector et al. 2012 ⁴⁴ United States (North-America)	Prospective cohort study	N: 670 A: 44.9 (9.6), >18 G: 255 males, 415 females O: Diverse H: Carpal tunnel syndrome	2 years	Low	High or very high fear-avoidance for work was associated with higher odds of long-term disability (missing work days and retrieving compensation) in univariate analysis ($p < .05$) in comparing to having very low or moderate fear-avoidance. However fear-avoidance was not a significant predictor of long-term disability in the final multi-domain model in multivariate analysis.
Steenstra et al. 2010 ²⁶ Canada (North-America)	Cross-sectional study	N: 442 A: 42.1 (10.3), >15 G: 254 males, 188 females O: - H: Low back pain	-	Low	Fear-avoidance beliefs for work and activity as measured 4 week after injury were not significantly associated with employment status at 4 weeks after injury in univariate Cox regression analysis.
Truchon et al. 2012 ⁴⁵ Canada (North-America)	Prospective cohort study	N: 535 A: 42 (10), 18-60 G: 317 males, 218 females O: Diverse H: Low back pain	6, 12 months	High	Fear-avoidance beliefs for work ($\beta = -.35, p < .00$) were predictive of long-term absence from work in multivariate Cox regression analysis.
Turner et al. 2008 ⁴⁶ United States (North-America)	Prospective cohort study	N: 1885 A: 39.4 (11.2) G: 1282 males, 603 females O: Diverse H: Back injury	1 year	Low	Work fear-avoidance was associated with work disability ($p < .001$) in univariate analysis. In a multi-domain model none of the psychological factors contributed independently to the prediction of 1-year work disability (wage replacement compensation for total disability 12 months after claim submission). This was because the score on the Roland-Morris disability questionnaire (RDQ) was substantially correlated with all the psychological factors, including work fear-avoidance.

RTW: Return to work

Table 9. Association between person-related factor 'perceived work-relatedness' and work participation

First author, year Country (Continent)	Study design	Population	Follow-up	Risk of bias	Results
Coggon et al. 2013 ²⁴ Diverse (Europe, South- North- America, South- America, Africa, Asia, Oceania)	Cross-sectional study	N: 12416 A: 20-29: 3058, 30-39: 3971, 40-49: 3451, 50-59: 1936 G: 4348 males, 8068 females O: Diverse H: Musculoskeletal illness	-	Moderate	The risk of prolonged sickness was higher for participants with adverse beliefs about work-relatedness of musculoskeletal pain (PRR 1.22 (1.01-1.47)) in Poisson regression models. However, when number of painful anatomical sites was included in the model, the effect of beliefs about work-relatedness of musculoskeletal pain was not significant anymore.
Dawson et al. 2011 ¹⁰³ Australia and New Zealand (Oceania)	Cross-sectional study	No sick leave N: 1678 A: 45.2 (37.0-51.1), 18-65 G: 126 males, 1552 females O: Nursing or midwives H: Low back pain Sick leave N: 486 A: 43.9 (35.2-51.0), 18-65 G: 47 males, 439 females O: Nursing or midwives H: Low back pain	-	Moderate	People on sick leave perceived work more often as a cause for their pain ($p < .001$) in bivariate analysis, but perceiving work as a cause was not related to sick leave in multivariate analysis.
Jensen et al. 2013 ³² Denmark (Europe)	Prospective cohort study	N: 325 A: 41.7 (10.4), 18-60 G: 159 males, 166 females O: - H: Low back pain	1 year	Low	Blaming the work for pain (OR: 2.40 (1.40-4.12), $p = .002$) predicted unsuccessful RTW after one year in univariate analysis. Blaming the work for pain was in combination with other variables also negatively associated with RTW in multivariate logistic regression analyses ($p < .001$).
Karels et al. 2010 ¹²¹ The Netherlands (Europe)	Prospective cohort study	N: 483 A: 41.5 (10.4) G: 161 males, 322 females O: Diverse H: Arm, neck and shoulder complaints	3, 6 months	Moderate	Self-reported work relatedness of complaints was significantly related to sickness absence during follow-up in the univariate model ($p < .05$), but also in the multivariate model (OR: 3.2 (1.6-6.4), $p < .05$).

Table 9. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Kuijer et al. 2016 ¹²⁷ The Netherlands (Europe)	Retrospective cohort study	Returned to work N: 121 A: 58.8 (8.3), <60: 69, >59: 52 G: 63 males, 58 females O: - H: Knee arthroplasty No RTW N: 46 A: 62.1 (8.3), <60: 16, >59: 30 G: 19 males, 27 females O: - H: Knee arthroplasty	At least 2 years	Low	Participant-reported work-relatedness of the knee symptoms was associated with no RTW after total knee arthroplasty surgery (OR: 5.3 (2.0-14.1)) in multivariate backward stepwise logistic regression.
Sampere et al. 2012 ⁴² Spain (Europe)	Prospective cohort study	N: 663 A: 39.8 (11.4) G: 364 males, 299 females O: - H: Musculoskeletal disorder, mental disorders or other physical conditions	2 years	Low	Thinking that there was a partial or complete relation between health and job instead of making no connection was associated with a longer time to RTW in bivariate analysis ($p < .05$). However, thinking that there was a partial or complete connection between the current health problem and job was not significantly associated with time to RTW in the total study population in multivariate analysis. When looking in women and men apart, thinking that there was a complete relation between health and job was related to longer time to RTW for women (HR: .63 (.42-.95)). Making a partial connection (HR: .43 (.23-.81)) or making a complete connection (HR: .41 (.20-.82)) between health and job was related to longer time till RTW for participants on sick leave for mental disorders, but not for participants with musculoskeletal disorders or other physical conditions.
Turner et al. 2008 ¹⁶ United States (North-America)	Prospective cohort study	N: 1885 A: 39.4 (11.2) G: 1282 males, 603 females O: Diverse H: Back injury	1 year	Low	Blame for injury (work, self, someone else or nothing) was not associated with work disability (wage replacement compensation for total disability 12 months after claim submission) in univariate analysis.

RTW: Return to work

Table 10. Association between person-related factor 'catastrophizing' and work participation

First author, year Country (Continent)	Study design	Population	Follow-up	Risk of bias	Results
Adams et al. 2017 ²⁸ Canada (North-America)	Prospective cohort study	N: 80 A: males 46.7 (9.5), females 45.7 (8.3) G: 26 males, 54 females O: - H: Major depressive disorder	1 month	Low	Reductions in catastrophizing were associated with a higher probability of occupational re-engagement ($\beta = .36$, OR: 1.4 (1.09-1.91), $p = .01$) in multivariate logistic regression analysis.
Besen et al. 2015 ¹⁸ United States (North-America)	Prospective cohort study	N: 241 participants A: 38 (11.4), 18-63 G: 130 males, 111 females O: 76% blue collar H: Low back pain	1 week, 3 months	Moderate	Catastrophizing was positively related to days of absence ($r = .23$, $p < .001$) and negatively with work status ($r = -.37$, $p < .001$) in univariate analysis (correlations). Catastrophizing was only indirectly associated to days of absence and work status in multivariate analysis.
Carriere et al. 2015a ²¹ Canada (North-America)	Prospective cohort study	N: 154 A: 36.4 (9.2), 20-60 G: 81 males, 73 females O: Diverse H: Whiplash associated disorders	1 year	Low	Participants who returned to work scored lower on catastrophizing than participants who did not RTW ($t = 6.63$, $p < .001$) in univariate analysis. Lower scores on pain catastrophizing ($\beta = -.74$, $t(254) = -2.92$, $p = .004$) were associated with successful RTW when controlling for RTW expectations. Pain catastrophizing also influences RTW expectations ($p < .001$). Expectations partially mediated the relation between pain catastrophizing and RTW status in multiple regression analysis.
Cowan et al. 2012 ²⁵ United States (North-America)	Prospective cohort study	N: 66 A: 49.7 (11.3) G: 17 males, 49 females O: Desk-based, non-desk-based H: Carpal tunnel release	2-4 months	Low	In bivariate analysis less catastrophic thinking ($p = .005$) was associated with earlier return to modified work. Pain catastrophizing was not significant for all subjects in predicting return to modified work, but was for desk-based subjects ($R^2 = .15$) in multivariate analysis. In bivariate analysis less catastrophic thinking ($p = .028$) was associated with earlier return to full work. Pain catastrophizing was not a significant predictor of earlier return to full time work in multivariate analysis.

Table 10. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Dawson et al. 2011 ¹⁰³ Australia and New Zealand (Oceania)	Cross-sectional study	No sick leave N: 1678 A: 45.2 (37.0-51.1), 18-65 G: 126 males, 1552 females O: Nursing or midwives H: Low back pain Sick leave N: 486 A: 43.9 (35.2-51.0), 18-65 G: 47 males, 439 females O: Nursing or midwives H: Low back pain	-	Moderate	Participants on sick leave had more pain catastrophizing ($p < .001$) than participants who were not on sick leave in bivariate analysis. Pain catastrophizing had no multivariable association with low back pain sick leave, possibly because it was correlated with passive coping and fear of movement.
De Vries et al. 2012b ⁵⁹ The Netherlands (Europe)	Cross-sectional study	Staying at work N: 119 A: 51, 20-60 G: 48 males, 71 females O: - H: Chronic nonspecific musculoskeletal pain Sick leave and referred for rehabilitation N: 122 A: 39, 20-60 G: 56 males, 66 females O: - H: Chronic nonspecific musculoskeletal pain	-	Low	Pain catastrophizing (higher in sick leave group) was associated with work status in univariate analysis ($p = .001$). Participants who were on sick leave scored higher on pain catastrophizing than participants who stayed at work (B = -.07, OR: .93 (.88-.98), $p = .005$) in multivariate logistic regression analysis. However, catastrophizing was not one of the factors which best discriminated participants within the sick leave group and participants within the staying at work group in backwards stepwise logistic regression analysis.
Karels et al. 2010 ¹²¹ The Netherlands (Europe)	Prospective cohort study	N: 483 A: 41.5 (10.4) G: 161 males, 322 females O: Diverse H: Arm, neck and shoulder complaints	3, 6 months	Moderate	High catastrophizing was associated with the occurrence of sickness absence in univariate analysis (OR: 2.8 (1.8-4.5), $p < .05$), but not in multivariate analysis because it was correlated with other factors as somatization.

Table 10. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Karoly et al. 2013 ³³ United States (North-America)	Cross-sectional study	On disability N: 434 A: 25-44:122, 45-64: 260, 65-80: 52 G: 221 males, 213 females O: - H: Chronic pain Working N: 859 A: 25-44: 464, 45-64: 309, 65-80: 86 G: 481 males, 378 females O: - H: Chronic pain Rehabilitation group N: 63 A: 42.2 (2.4), <60 G: 30 males, 33 females O: 87% blue collar H: non-acute non-specific spinal pain Primary-care group N: 62 A: 43.0 (2.6), <60 G: 27 males, 35 females O: 87% blue collar H: non-acute non-specific spinal pain N: 670 A: 44.5 (10.2) G: 362 males, 308 females O: - H: Low back pain	-	Moderate	Participants who were not working scored higher on catastrophizing than participants who were working ($p < .05$) in univariate analysis (t-test). Catastrophizing ($b = -.08$, $e. .92$ (90-95), $p < .001$) was a negative predictor of continued employment after controlling for severity and demographic factors in multivariate logistic regression analysis.
Lindell et al. 2010 ³⁴ Sweden (Europe)	Prospective cohort study		6, 12, 18, 24 months	Low	Non-catastrophizing was a predictor of RTW at 18 months ($p = .002$) and at 24 months ($p = .04$), but not for RTW at 6 months and 12 months in univariate analysis. Non-catastrophizing was only a predictor of RTW at 18 months (OR: 3.4 (1.3-9.1), $p = .01$) in multivariate logistic regression analysis, but not for RTW at 6 months, 12 months and 24 months. . .
Mannion et al. 2009 ²³ Switzerland (Europe)	Cross-sectional study		-	Moderate	Negative beliefs (thoughts about inevitable consequences) about low back pain were associated with more days off work ($p = .0001$) and reduced work-productivity ($p = .0001$) in univariate analysis with Spearman rank correlation coefficients. However, due to overlap between fear-avoidance beliefs and negative beliefs, negative beliefs was not a significant predictor of days of work absence in hierarchical multiple regression analysis.

Table 10. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Morris and Watson 2011 ¹²⁴ Jersey (Europe)	Cross-sectional study	Sick-listed N: 62 A: 45.19 (10.41), >18 G: 40 males, 22 females O: Private sector: 45, public sector: 17 H: Low back pain Non-sick-listed N: 57 A: 46.04 (11.98), >18 G: 29 males, 28 females O: Private sector: 45, public sector: 11 H: Low back pain	-	Low	There was no significant difference between the non-sick listed and sick-listed participants beliefs about the inevitable consequences of low back pain in univariate analysis.
Sarda et al. 2009 ⁷¹ Australia (Oceania) Brazil (South-America)	Cross-sectional study	Australian N: 207 A: 44, 18-65 G: - O: - H: Chronic pain Brazil N: 222 A: 45, 18-65 G: - O: - H: Chronic pain	-	Low	Catastrophizing was not associated with unemployment in the Australian and Brazilian sample in multivariate logistic regression analysis.
Spector et al. 2012 ⁴⁴ United States (North-America)	Prospective cohort study	N: 670 A: 44.9 (9.6), >18 G: 255 males, 415 females O: Diverse H: Carpal tunnel syndrome	2 years	Low	A high score on catastrophizing was associated with higher odds of long-term disability (missing work days and retrieving compensation) in univariate analysis ($p < .01$), but was not significant in the final multi-domain model in multivariate analysis.

Table 10. Continued

First author, year	Study design	Population	Follow-up	Risk of bias	Results
Turner et al. 2008 ⁴⁶ United States (North-America)	Prospective cohort study	N: 1885 A: 39.4 (11.2) G: 1282 males, 603 females O: Diverse H: Back injury	1 year	Low	Catastrophizing was associated with 1-year work disability (wage replacement compensation for total disability 12 months after claim submission) in univariate analysis ($p < .001$). In a multi-domain model none of the psychological factors, including catastrophizing, contributed independently to the prediction of 1-year work disability. This was because the score on the Roland-Morris disability questionnaire was substantially correlated with all the psychological factors.
Wijnhoven et al. 2007 ²⁹ The Netherlands (Europe)	Cross-sectional study	N: 2517 A: 25-64 G: 1070 males, 1447 females O: - H: Musculoskeletal pain	-	Moderate	For men with paid work high pain catastrophizing was positively associated with work leave in the past 12 months (PR: 1.56 (1.11-2.19), $p < .05$). For women with paid work medium catastrophizing (PR: 1.80 (1.14-2.85), $p < .05$) and high catastrophizing (PR: 1.69 (1.06-2.69), $p < .05$) were positively associated with work leave in the past 12 months in log-binomial regression analysis.

RTW: Return to work

Appendix 3. Scores quality assessment tools

Table 1. Scores on the criteria of the Joanna Briggs Institute quality assessment tools for the included articles

Study	Study design	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Quality score /total	Risk of bias
Adams et al. 2017 ¹²⁸	PCS	1	1	1	1	1	1	1	0	1	X	1	X	X	10/11	Low
Åhrberg et al. 20108 ⁹	QS	1	1	1	1	1	0	0	1	1	1	X	X	X	8/10	Moderate
Arwert et al. 2017 ¹¹²	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Audhoe et al. 2012 ¹⁷	PCS	1	1	0	1	1	1	1	1	0	1	1	X	X	9/11	Low
Awang et al. 2016 ⁸²	CSS	0	1	0	1	1	1	1	1	X	X	X	X	X	6/8	Moderate
Becker et al. 2007 ¹¹⁹	QS	0	1	1	1	1	0	1	0	1	1	X	X	X	7/10	Moderate
Besen et al. 2015 ¹⁸	PCS	1	1	1	1	1	1	0	1	0	0	1	X	X	8/11	Moderate
Boot et al. 2008 ¹⁹	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Boot et al. 2014 ¹⁰¹	PCS	1	1	1	1	1	1	1	1	0	0	1	X	X	9/11	Low
Boot et al. 2011 ¹⁰⁰	CSS	1	1	0	1	1	1	0	1	X	X	X	X	X	6/8	Moderate
Boyle et al. 2014 ⁸³	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Braathen et al. 2007 ⁸⁴	non-RCT	1	1	0	1	0	0	1	0	1	X	X	X	X	5/9	Moderate
Brouwer et al. 2015 ⁵⁵	PCS	1	1	1	1	1	1	1	1	1	1	1	X	X	11/11	Low
Brouwer et al. 2009 ⁵⁶	PCS	1	1	1	1	1	1	1	1	1	X	1	X	X	11/11	Low
Brouwer et al. 2010 ⁵⁷	PCS	1	1	1	1	1	1	1	1	0	1	1	X	X	10/11	Low
Busch et al. 2007 ³⁰	PCS	1	1	1	1	1	0	1	1	1	X	1	X	X	10/11	Low
Carriere et al. 2015a ²¹	PCS	1	1	1	1	1	1	1	1	0	0	1	X	X	9/11	Low
Carriere et al. 2015b ²²	PCS	1	1	1	1	1	1	1	1	0	1	1	X	X	10/11	Low
Carstens et al. 2014 ²³	PCS	1	1	1	0	0	0	1	1	0	0	1	X	X	6/11	Moderate
Chen et al. 2012 ¹⁰²	CSS	1	1	1	1	1	1	0	1	X	X	X	X	X	7/8	Low

Table 1. Continued

Study	Study design	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Quality score /total	Risk of bias
Coggon et al. 2013 ²⁴	CSS	1	1	1	0	1	1	0	1	X	X	X	X	X	6/8	Moderate
Cowan et al. 2012 ²⁵	PCS	1	1	1	1	1	1	0	1	1	1	1	X	X	10/11	Low
D'Amato and Zijlstra 2010 ⁸⁸	PCS	0	1	1	1	1	0	1	1	0	1	X	X	X	7/11	Moderate
Dawson et al. 2011 ¹⁰³	CSS	1	1	1	0	1	1	0	1	X	X	X	X	X	6/8	Moderate
De Vries et al. 2011 ⁵²	QS	1	1	1	1	1	1	1	1	1	1	X	X	X	10/10	Low
De Vries et al. 2012b ⁵⁹	CSS	1	1	1	1	1	1	0	1	X	X	X	X	X	7/8	Low
Dekkers-Sánchez et al. 2010 ⁹⁰	QS	1	1	1	1	1	0	0	1	1	1	X	X	X	8/10	Moderate
Dionne et al. 2013 ⁹⁹	QS	0	1	1	1	1	1	0	1	1	1	X	X	X	8/10	Moderate
Dionne et al. 2007 ⁵⁰	PCS	1	0	1	1	1	0	1	1	1	X	1	X	X	9/11	Low
Du Bois et al. 2009 ²⁶	PCS	1	0	1	1	1	1	0	1	1	X	1	X	X	9/11	Low
Dunn et al. 2010 ⁷⁸	QS	1	1	1	1	1	0	0	1	1	1	X	X	X	8/10	Moderate
Dyster-Asas et al. 2007 ¹⁰⁴	CSS	1	1	1	1	1	1	0	1	X	X	X	X	X	7/8	Low
Ekberg et al. 2015 ²⁷	PCS	1	1	1	1	1	1	1	1	0	1	1	X	X	10/11	Low
Elfvig et al. 2009 ⁸⁵	PCS	1	1	1	1	1	0	0	1	1	X	1	X	X	9/11	Low
Ellingsen and Aas 2009 ⁵³	QS	1	1	1	1	1	0	0	1	1	1	X	X	X	8/10	Moderate
Gross and Battié 2010 ²⁸	PCS	1	1	1	1	1	1	0	1	0	1	X	X	X	8/11	Moderate
Grøvlø et al. 2013 ¹⁰⁵	PCS	1	1	1	1	1	1	1	1	1	X	1	X	X	11/11	Low
Grytten et al. 2017 ¹¹³	PCS	1	1	1	1	1	1	0	1	1	X	1	X	X	10/11	Low
Hansen et al. 2009 ¹⁰⁶	PCS	1	1	0	1	1	0	0	1	1	1	X	X	X	8/11	Moderate
Hartke et al. 2011 ⁷⁹	QS	1	1	1	1	1	0	0	1	0	1	X	X	X	7/10	Moderate
He et al. 2010 ¹⁰⁷	RCS	1	1	0	1	1	1	1	1	1	X	1	X	X	9/11	Low
Healey et al. 2011 ⁶¹	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Heymans et al. 2009 ¹¹⁴	PCS	0	1	1	1	1	1	1	1	1	X	1	X	X	11/11	Low
Heymans et al. 2007 ¹²⁰	RCS	1	1	1	1	1	0	1	1	1	X	1	X	X	10/11	Low
Hou et al. 2012 ²⁹	PCS	1	1	1	1	1	1	1	1	0	1	1	X	X	9/11	Low
Hou et al. 2008 ⁸⁰	PCS	1	1	0	1	1	1	1	1	1	X	1	X	X	10/11	Low
Huijs et al. 2012 ⁶²	PCS	1	1	1	1	1	1	1	1	0	1	1	X	X	9/11	Low

Table 1. Continued

Study	Study design	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Quality score /total	Risk of bias
Huijs et al. 2017 ⁶³	PCS	1	1	1	1	1	0	1	1	0	0	1	X	X	8/11	Moderate
Hystad and Bye 2012 ⁴⁹	PCS	1	1	1	1	1	0	1	1	1	X	1	X	X	10/11	Low
Iakova et al. 2012 ³¹	PCS	1	1	1	1	1	0	1	1	0	0	1	X	X	8/11	Moderate
Jensen et al. 2013 ³²	PCS	1	1	0	1	1	1	1	1	1	X	1	X	X	10/11	Low
Johansson et al. 2010 ³³	PCS	1	1	1	1	1	0	1	1	1	X	1	X	X	10/11	Low
Karels et al. 2010 ¹²¹	PCS	1	1	1	1	1	0	1	1	0	0	1	X	X	8/11	Moderate
Karoly et al. 2013 ⁸³	CSS	1	1	1	0	1	1	0	1	X	X	X	X	X	6/8	Moderate
Kovacs et al. 2007 ¹²²	PCS	1	1	1	1	1	0	1	1	1	X	1	X	X	10/11	Low
Krause et al. 2013 ³⁴	CSS	1	1	1	1	0	0	0	1	X	X	X	X	X	5/8	Moderate
Kuijjer et al. 2016 ¹²⁷	RCS	1	1	1	1	1	1	1	1	0	0	1	X	X	9/11	Low
Lagerveld et al. 2016 ⁶⁴	PCS	0	0	1	1	1	1	1	1	0	0	1	X	X	7/11	Moderate
Lindell et al. 2010 ³⁴	PCS	1	1	1	1	1	1	0	1	1	X	1	X	X	10/11	Low
Luk et al. 2010 ¹¹⁵	PCS	1	1	1	1	1	1	0	1	1	X	1	X	X	9/11	Low
Lundqvist and Sumeliusson 2012 ⁵⁴	QS	1	1	1	1	1	0	0	1	1	1	X	X	X	8/10	Moderate
Lydell et al. 2011 ⁵⁰	PCS	1	0	0	0	0	1	1	1	1	X	1	X	X	7/11	Moderate
Magnussen et al. 2007a ⁸⁰	QS	1	1	1	1	1	0	1	1	0	1	X	X	X	8/10	Moderate
Magnussen et al. 2007b ³⁵	RCT	1	1	1	0	0	0	1	1	0	1	1	1	0	8/13	Moderate
Mangels et al. 2011 ⁶⁵	PCS	1	1	1	0	0	1	0	1	1	X	1	X	X	8/11	Moderate
Mannion et al. 2009 ¹²³	CSS	0	1	1	0	1	1	1	1	X	X	X	X	X	6/8	Moderate
Martins 2015 ⁶⁶	CSS	1	1	1	1	0	0	0	1	X	X	X	X	X	5/8	Moderate
Morris and Watson 2011 ¹²⁴	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Morrison et al. 2016 ¹⁰⁸	PCS	1	0	0	1	1	0	1	1	0	0	1	X	X	6/11	Moderate
Murgatroyd et al. 2016 ³⁶	PCS	1	1	1	1	1	0	1	1	0	0	1	X	X	8/11	Moderate

Table 1. Continued

Study	Study design	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Quality score /total	Risk of bias
Murphy et al. 2011 ⁶⁷	PCS	1	1	0	0	0	0	1	1	1	X	1	X	X	7/11	Moderate
Nielsen et al. 2012 ¹⁰⁹	PCS	1	0	0	1	1	1	1	1	1	X	1	X	X	9/11	Low
Nieuwenhuijsen et al. 2013 ³⁷	RCS	0	1	1	1	1	1	1	0	0	0	1	X	X	7/11	Moderate
Norlund et al. 2011 ¹¹⁶	PCS	1	1	1	1	1	1	1	1	1	X	1	X	X	11/11	Low
Opsahl et al. 2016 ³⁸	PCS	1	1	1	1	1	1	0	1	1	X	1	X	X	10/11	Low
O'Sullivan et al. 2012 ⁶⁸	CSS	1	1	1	1	1	1	0	1	X	X	X	X	X	7/8	Low
Øyeflaten et al. 2008 ⁵¹	PCS	1	1	1	1	1	1	1	1	0	0	1	X	X	9/11	Low
Øyeflaten et al. 2016 ¹¹⁷	PCS	0	1	1	0	0	1	1	1	1	X	1	X	X	8/11	Moderate
Poulain et al. 2010 ¹²⁵	PCS	1	1	1	1	1	1	1	1	0	1	1	X	X	10/11	Low
Puolakka et al. 2008 ⁸⁶	PCS	1	1	1	1	1	1	0	1	1	X	1	X	X	10/11	Low
Ramel et al. 2013 ¹¹⁰	PCS	1	1	1	1	1	1	0	1	1	X	1	X	X	10/11	Low
Reme et al. 2009 ³⁹	PCS	1	1	1	1	1	1	1	1	1	0	1	X	X	10/11	Low
Richard et al. 2011 ⁶⁹	PCS	1	1	1	1	1	1	1	1	0	0	1	X	X	9/11	Low
Richter et al. 2011 ⁴⁰	PCS	1	1	0	1	1	1	1	1	1	X	1	X	X	10/11	Low
Roesler et al. 2013 ⁷⁰	PCS	1	1	1	1	1	1	1	1	1	X	1	X	X	11/11	Low
Rönneberg et al. 2007 ⁴¹	PCS	1	1	1	0	0	1	1	1	0	0	1	X	X	7/11	Moderate
Sampere et al. 2012 ⁴²	PCS	1	1	1	1	1	1	1	1	0	0	1	X	X	9/11	Low
Saperstein et al. 2011 ⁸⁷	CSS	1	1	1	1	0	0	1	1	X	X	X	X	X	6/8	Moderate
Sarda et al. 2009 ⁷¹	CSS	1	1	1	1	1	1	0	1	X	X	X	X	X	7/8	Low
Selander et al. 2007 ⁹⁵	PCS	1	1	1	1	1	0	1	1	1	X	1	X	X	10/11	Low
Shaw et al. 2011 ⁷²	PCS	1	1	0	1	1	0	1	1	0	0	1	X	X	7/11	Moderate
Sivertsen et al. 2013 ¹¹¹	CSS	1	1	0	1	1	1	1	1	X	X	X	X	X	7/8	Low
Sluiter and Frings-Dresen 2008 ⁴³	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Spector et al. 2012 ⁴⁴	PCS	1	1	1	1	1	0	1	1	1	1	1	X	X	10/11	Low

Table 1. Continued

Study	Study design	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Quality score /total	Risk of bias
Steenstra et al. 2010 ²⁶	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Strauser et al. 2010 ⁷³	CSS	1	1	1	1	1	1	0	1	X	X	X	X	X	7/8	Low
Strober and Arnett 2016 ¹¹⁸	CSS	1	1	1	1	0	0	1	1	X	X	X	X	X	6/8	Moderate
Stulemeijer et al. 2008 ⁷⁴	PCS	1	1	1	1	1	1	1	1	0	0	1	X	X	9/11	Low
Tamminga et al. 2012 ⁸¹	QS	1	1	1	1	1	1	0	1	1	1	X	X	X	9/10	Low
Torres et al. 2009 ⁹⁶	PCS	1	1	1	1	1	0	1	1	1	X	1	X	X	10/11	Low
Truchon et al. 2010 ⁹⁷	PCS	1	1	1	1	1	1	0	1	0	0	1	X	X	8/11	Moderate
Truchon et al. 2012 ⁴⁵	PCS	1	1	0	0	0	1	0	1	0	0	1	X	X	5/11	High
Turner et al. 2008 ⁴⁶	PCS	1	0	0	1	1	1	1	1	1	X	1	X	X	9/11	Low
Van Velzen et al. 2011 ⁹¹	QS	1	1	1	1	1	0	0	1	0	1	X	X	X	7/10	Moderate
Vlasveld et al. 2013 ⁹⁸	CSS	1	1	1	1	1	1	1	1	X	X	X	X	X	8/8	Low
Volker et al. 2015 ⁷⁵	PCS	1	1	1	1	1	1	1	1	1	X	1	X	X	11/11	Low
Vuistiner et al. 2015 ⁴⁷	PCS	1	0	1	1	1	1	0	1	1	X	1	X	X	9/11	Low
Waghorn et al. 2007 ⁷⁶	PCS	1	1	0	1	1	0	0	1	1	X	1	X	X	8/11	Moderate
Wählin et al. 2012 ⁴⁸	PCS	1	1	1	1	1	1	1	1	1	X	1	X	X	11/11	Low
Wan Kasim et al. 2014 ⁸⁸	CSS	1	1	0	1	1	1	1	1	X	X	X	X	X	7/8	Low
Waynor et al. 2016 ⁷⁷	PCS	1	1	1	0	0	1	0	1	0	1	1	X	X	7/11	Moderate
Wijnhoven et al. 2007 ¹²⁹	CSS	1	1	1	0	1	1	0	1	X	X	X	X	X	6/8	Moderate
Wilbanks and Ivankova 2015 ⁹²	QS	1	1	1	1	1	1	1	1	1	1	X	X	X	10/10	Low

RCT: Randomized controlled trial, PCS: Prospective cohort study, RCS: Retrospective cohort study, CSS: Cross-sectional study, QS: Qualitative study
X: Item not applicable; 1: Description in study meets criterion; 0: Description in study does not meet criterion