Predicting Work Disability and the Outcome of Vocational Rehabilitation:

The Role of Persistent Physical Symptoms and Mental Health

by

Sigrún Ólafsdóttir Flóvenz

PhD in Psychology

Department of Psychology, School of Social Sciences

Reykjavík University

August 2021

This Thesis is submitted to the Department of Psychology, School of Social Sciences at Reykjavik University in partial fulfilment of the requirements for the degree of Doctor of Philosophy. The introductory part constitutes the formal Thesis which summarises the accompanying papers that have either already been published or submitted for peer review.

ORCID: 0000-0001-6529-7261

ISBN: 978-9935-9537-9-7 (Printed)

ISBN: 978-9935-9537-8-0 (Electronic)

© Sigrún Ólafsdóttir Flóvenz

Thesis committee

Dr. Jón Friðrik Sigurðsson, Supervisor

Professor of Psychology, Reykjavik University and University of Iceland, Iceland.

Dr Paul Salkovskis, Supervisor

Professor of Clinical Psychology, Department of Experimental Psychology, University of Oxford, England.

Dr Heiðdís Valdimarsdóttir

Professor of Psychology, Reykjavik University, Iceland and Mount Sinai School of Medicine in New York, USA.

Dr Engilbert Sigurðsson

Professor of Psychiatry, University of Iceland and Clinical Director, Landspitali – The National University Hospital.

Abstract

In this Thesis, the relationship between Persistent Physical Symptoms (PPS), mental health, work disability and vocational rehabilitation outcome was examined in two samples. First, we looked at a sample of 324 people seeking vocational rehabilitation services and then at a subsample of 285 Non-Cardiac Chest Pain (NCCP) patients taken from a larger study on 504 chest pain patients that attended an Icelandic cardiac emergency department (CED). The participants in the vocational rehabilitation sample were between 18 and 65 years old, their mean age was 39.34 years and the majority of them were female (78.1%). Participants in NCCP study were between 18 and 66 years old, their mean age was 49.84 years and about half of them were female (54.0%) and a half of them male (46.0%). In both samples, participants filled out questionnaires measuring PPS and mental health problems. Information regarding the rehabilitation of the vocational rehabilitation service seekers and medical diagnoses of the chest pain patients was retrieved from the service providers. In the vocational rehabilitation sample, we firstly estimated the prevalence of PPS, examined how the extent of PPS related to mental health problems, and estimated how many rehabilitation seekers might benefit from psychological treatment for PPS. Secondly, we investigated whether the outcome of vocational rehabilitation and functional impairment at its beginning could be predicted by the presence of PPS, specific PPS types or symptoms of psychological distress using logistic- and hierarchical linear regression. In the CED sample, we examined the relationship between PPS, mental health and work disability from another angle by looking at patients diagnosed with NCCP. NCCP patients whose symptoms were severe enough to meet PPS criteria (n=85) were compared to other NCCP (n=200) patients in terms of work status, psychological symptoms, and total number of PPS. In our vocational rehabilitation sample, the prevalence of PPS was

80.9%, and the modal number of symptoms was three. Participants with PPS more commonly had depression, anxiety and health anxiety symptoms in the clinical range, and these symptoms were positively correlated with the number of PPS. Between 46.2% and 64.6% of our participants were identified as being likely to benefit from a specialised PPS treatment. Functional impairment at the beginning of service was predicted by depressive symptoms, PPS and social anxiety symptoms. Only persistent pain and depressive symptoms independently predicted not returning to work, and the rehabilitation duration was not related to the severity or number of psychological symptoms nor the presence or number of PPS. In the CED sample, NCCP patients whose symptoms met PPS criteria reported more symptoms of depression, anxiety and health anxiety than other NCCP patients. They also ruminated more, had a higher number of other PPS and were more likely to be inactive or unable to work. Within Icelandic vocational rehabilitation, special attention should be given to PPS and depressive symptoms as they are common, positively associated with functional impairment at the beginning of service and a specific combination of these symptoms was associated with a lower return to work rate. Overall, the results suggest a clear need for routine evaluation and specialised treatment for PPS within vocational rehabilitation and that such treatments should preferably be both transdiagnostic and work focussed. Furthermore, the results indicate that there might be value in identifying and treating PPS at earlier stages, such as through the CED.

Útdráttur

Tengsl þrálátra líkamlegra einkenna við sálræn einkenni, skerta vinnugetu og árangurs starfsenduhæfingar var skoðuð í tveimur úrtökum. Fyrra úrtakið samanstóð af 324 einstaklingum sem sóttu starfsendurhæfingu til VIRK Starfsendurhæfingarsjóðs. Síðara úrtakið var hlutaúrtak, 285 sjúklinga með óútskýrða brjóstverki, úr stærri rannsókn á 514 sjúklingum sem leituðu bráðaþjónustu á Hjartagátt Landspítala vegna einkenna frá hjarta og brjóstholi. Aldur þátttakenda í fyrra úrtakinu var á bilinu 18 til 65 ár, meðaldur þeirra var 39.4 ár og meirihluti þeirra voru konur (78.1%). Aldur þátttakenda í síðara úrtakinu var á bilinu 18 til 66 ár, meðalaldur þeirra var 49.84 ár. Rúmlega helmingur þeirra voru konur (54.0%) og tæplega helmingur karlar (46.0%). Þátttakendur beggja rannsókna fylltu út spurningalista sem meta þrálát líkamleg einkenni og ýmis sálræn einkenni. Upplýsingar um endurhæfingu þátttakenda hjá VIRK og sjúkdómsgreiningar þátttakenda á Hjartagátt voru sóttar til þjónustuaðilanna. Í fyrra úrtakinu var algengi þrálátra líkamlegra einkenna metið meðal skjólstæðinga VIRK og tengsl þeirra við sálrænan vanda skoðuð. Lagt var mat á hve stór hluti skjólstæðinga VIRK gæti haft gagn af sálfræðilegri meðferð við þrálátum líkamlegum einkennum. Fjölbreytuaðhvarfsgreining var notuð til þess að kanna hvort sálræn og þrálát líkamleg einkenni spáðu fyrir um færniskerðingu í upphafi starfsendurhæfingar og aðhvarfsgreining hlutfalla til að meta hvort hægt væri að spá fyrir um árangur og lengd starfsendurhæfingar. Í síðara úrtakinu voru tengsl þrálátra líkamlegra einkenna, sálræns vanda og starfsgetu skoðuð frá öðru sjónarhorni með því að beina sjónum að sjúklingum sem greindir höfðu verið með óútskýrða brjóstverki eftir að hafa leitað til Hjartagáttar. Sjúklingunum var skipt í tvo hópa eftir því hvort að einkenni þeirra flokkuðust sem þrálát líkamleg einkenni eða ekki. Hóparnir voru síðan bornir saman með tilliti til sálrænna

einkenna, heildarfjölda þrálátra líkamlegra einkenna og stöðu á vinnumarkaði. Meðal skjólstæðinga VIRK var algengi þrálátra líkamlegra einkenna 80.9% og var algengast að fólk hefði þrjú slík einkenni samtímis. Þátttakendur með slík einkenni voru líklegri en aðrir til að vera með depurðar-, kvíða- og heilsukvíðaeinkenni yfir klínískum viðmiðunarmörkum. Alvarleiki þessara sálrænu einkenna jókst með fjölda þrálátra líkamlegra einkenna. Niðurstöðurnar benda til þess að 46.2% til 64.6% þátttakenda gætu haft gagn af sálfræðilegri meðferð við þrálátum líkamlegum einkennum. Þunglyndiseinkenni, þrálát líkamleg einkenni og félagskvíði spáðu fyrir um færniskerðingu í upphafi starfsendurhæfingar en einungis þrálátir verkir og þunglyndiseinkenni spáðu sjálfstætt fyrir um það hvort þátttakendur sneru aftur til vinnu. Lengd starfsendurhæfingarinnar tengdist hvorki fjölda og alvarleika sálrænna einkenna né hvort til staðar væru þrálát líkamleg einkenni. Sjúklingar með óútskýrða brjóstverki sem leituðu til Hjartagáttar grufluðu meira og fundu fyrir meiri depurðar- kvíða- og heilsukvíðaeinkennum ef hjarta- og brjóstholseinkenni þeirra flokkuðust sem þrálát líkamleg einkenni. Þeir fundu einnig að jafnaði fyrir fleiri öðrum þrálátum líkamlegum einkennum og voru mun líklegri til að vera með skerta starfsgetu. Gefa þarf þrálátum líkamlegum einkennum og þunglyndiseinkennum sérstakan gaum innan starfsendurhæfingar á Íslandi þar sem þessi einkenni eru algeng, tengjast meiri færniskerðingu í upphafi endurhæfingar og tiltekin blanda þeirra virðist tengjast minnkuðum líkum á því að snúa aftur til vinnu. Niðurstöðurnar gefa til kynna að þörf sé á reglulegu mati á og sérhæfðri meðferð við þrálátum líkamlegum einkennum innan starfsendurhæfingar á Íslandi. Æskilegt væri að slík meðferð væri ósérhæfð að því leyti að hún taki bæði á sameiginlegum og sértækum þáttum mismunandi einkennagerða. Niðurstöðurnar benda einnig til mögulegrar gagnsemi þess að greina og meðhöndla þrálát líkamleg einkenni á fyrri þjónustustigum t.d. á Hjartagátt.

Acknowledgements

At the end of this long and often steep road, I look back full of gratitude for all those that made my journey possible. First I want to thank the two white wizards, Jón Friðrik Sigurðsson and Paul Salkovskis for their invaluable guidance and support. I consider myself extremely lucky to have had supervisors that are not only knowledgeable and wise but also kind, an important quality that cannot be taken for granted. I would like to thank Heiðdís Valdimarsdóttir for her valuable perspective and input and Engilbert Sigurðsson for reading my work and providing constructive criticism.

I would like to thank Jónína Waagfjörð, Linda Bára Lýðsdóttir and everyone at VIRK who made this research possible and provided us with support. A special thanks to all the amazing rehabilitation counsellors that went out of their way to collect data for us. I thank Erla Svansdóttir, Hróbjartur Darri Karlsson, Karl Andersen and their team for including me in their research. I also want to thank all the chest pain patients and vocational rehabilitation service seekers that participated in the studies. I thank Reykjavík University for providing important financial support and facilities and the Icelandic Research Fund for partial financial support.

I want to thank Baldur Heiðar for his help and friendship. I am grateful to Haukur and Rannveig for their friendship, help and moral support. Your silliness and laughter made all the difference. I also want to thank my fellow PhD students and co-workers for interesting discussions and good company.

I want to thank my parents, Sigurrós and Óli for all the support they provided through various means, from watching children, inviting tired parents to dinner or helping us deal with the random things life threw at us. The deepest gratitude goes to my loving husband and wonderful daughters. Thank you Siggi for supporting me in doing this and believing in me even when I didn’t. Thank you for all your love, understanding and patience. Thank you Mía and Lóa for all your love, kindness, patience, hugs and kisses. Because of you it has always been perfectly clear to me what is truly important in life. You really are the best!

List of Studies

This Thesis is based on the following studies referred to in the text by their Roman numerals.

I. Flóvenz S.Ó., Salkovskis P.M., Gregory J., Valdimarsdóttir, H., Sigurðsson, E., Sigurðsson J.F. Persistent Physical Symptoms and mental health problems among individuals seeking work rehabilitation. *Manuscript submitted for publication in Nordic Psychology.*

II. Flóvenz, S.Ó., Salkovskis, P.M., Broddadóttir, E., Sigurðsson, B.H., Valdimarsdóttir, H., Sigurðsson, E., and Sigurðsson, J.F. Predicting work disability and the success of work rehabilitation. *Manuscript submitted for publication in Nordic Psychology*.

III. Flóvenz S.Ó., Salkovskis P.M., Svansdóttir E., Karlsson H.D., Andersen K. and Sigurðsson, J.F. Non-Cardiac Chest Pain as a Persistent Physical Symptom: Psychological distress and workability. *Manuscript submitted for publication in International Journal of Environmental Research and Public Health*.

Declaration of Contribution

The doctoral candidate, Sigrún Ólafsdóttir Flóvenz (SÓF), wrote this doctoral Thesis under the guidance of Paul M. Salkovskis (PMS) and Jón Friðrik Sigurðsson (JFS), supervisors, and the thesis committee, Heiðdís Valdimarsdóttir (HV) and Engilbert Sigurðsson (ES). Further collaborators on the manuscripts were Erla Álft Svansdóttir (EÁS), James Gregory (JG), Elín Broddadóttir (EB) and Baldur Heiðar Sigurðsson (BHS). Grants were applied for by SÓF under the guidance of JFS, PS and HV. The contribution to each study is as follows:

I. SÓF developed the research question, designed and organized the study with input from PMS, JFS and HV. SÓF applied for ethical permits and was responsible for the data collection, data analysis, the interpretation of results and writing of the manuscript with input from co-authors. All co-authors (PMS, JG, HV, ES, JFS) made revisions to the article for relevant scientific and intellectual content.

II. SÓF developed the research question, designed and organized the study with input from PMS, JFS and HV. SÓF applied for ethical permits and was responsible for the data collection, data analysis, the interpretation of results and writing of the manuscript with input from co-authors. All co-authors (PMS, EB, BHS, HV, ES, JFS) made revisions to the article for relevant scientific and intellectual content.

III. SÓF developed the research question with input from PMS, JFS and ES. SÓF was responsible for the data analysis, interpretation of results and writing of the manuscript with input from co-authors. All co-authors (PMS, EÁS, BHS, HV, ES, JFS) made revisions to the article for relevant scientific and intellectual content.

Table of Contents

Abstract iv

Útdráttur vi

Acknowledgements viii

List of Studies ix

Declaration of Contribution x

Table of Contents xi

List of tables xiv

List of figures xv

List of abbreviations xvi

Introduction 1

Different conceptualisations of PPS 1

Persistent physical symptoms and classification systems 2

Defining Persistent physical symptoms 4

Prevalence 4

Correlates of PPS 5

PPS and societal cost: Health care use and work disability 6

Treating Persistent physical symptoms 7

A transdiagnostic model for Persistent physical symptoms 9

Applying the transdiagnostic CBT model to the treatment of PPS 11

Vocational rehabilitation 12

The outcome of vocational rehabilitation 13

Vocational rehabilitation in Iceland 16

Aims 18

Method 19

Design 19

Participants 19

Procedure 23

Measures 23

Psychological measurements 23

Background information 28

Measuring the outcome of vocational rehabilitation 29

Medical diagnosis 29

Missing data 30

Statistical analysis 31

Ethical consideration 32

Results 33

Study I and II 33

Prevalence and descriptives 33

Number and types of PPS 33

PPS, functional impairment and mental health 34

Vocational rehabilitation service seekers that might benefit PPS treatment 36

Predicting work disability at the beginning of vocational rehabilitation 36
Predicting return to work 37
Predicting the duration of vocational rehabilitation and drop out 38
Study III 38
Prevalence and descriptives 38
Heart-related PPS and its relationship with other PPS, work status and mental health 39
Discussion 40
The prevalence of PPS and associations with mental health problems and work disability. 41
Predicting the outcome of vocational rehabilitation 43
Methodological consideration and limitations 44
Future directions 46
Clinical implications 47
Conclusions 49
References 50
Appendix 1

List of tables

Table 1. The prevalence of PPS subtypes and multiple PPS.

Table 2. Number and percentages of VIRK's service seekers that surpass cut-off on psychological measures.

Table 3. Comparisons of working status, rumination and symptoms of anxiety, depression and health anxiety between NCCP patients that did and did not meet criteria for heart related PPS.

List of figures

Figure 1. A transdiagnostic cognitive behavioural model of persistent physical symptoms

Figure 2. Flow chart of participant selection from VIRK's vocational rehabilitation service seekers.

Figure 3. Flow chart of participant selection from patients attending the CED.

List of abbreviations

AUDIT	Alcohol Use Disorders Identification Test
PPS	Persistent Physical Symptoms
BDS	Bodily Distress Syndrome
CBT	Cognitive Behavioural Therapy
CCP	Cardiac Chest Pain
CED	Cardiac Emergency Department
CFS	Chronic Fatigue Syndrome
CPS	Chronic Pain Syndrome
DUDIT	Drug Use Disorders Identification Test (DUDIT)
FMS	Fibromyalgia Syndrome
GAD-7	The Generalised Anxiety Disorder-7
HT-CBT	Hybrid Transdiagnostic Cognitive Behavioural Therapy
IBS	Irritable Bowel Syndrome
IES-R	The Impact of Event Scale-Revised
NCCP	Non-Cardiac Chest pain
PHQ-9	The Patient Health Questionnaire-9
PMS	Premenstrual Syndrome
PPSC	The Persistent Physical Symptom Checklist
PTQ	The Perseverative Thinking Questionnaire
PTSD	Post Traumatic Stress Disorder
RTW	Return to Work
SHAI	The Short Health Anxiety Inventory
SIAS	Social Interaction Anxiety Scale
SPS	The Social Phobia Scale
SSS-8	Somatic Symptom Scale – 8
T-CBT	Transdiagnostic Cognitive Behavioural Therapy
WSAS	The Work and Social Adjustment Scale

Introduction

Persistent Physical Symptoms (PPS) are common within all health care settings. These symptoms can range in number, duration and severity, from single mild symptoms to multiple severe symptoms that follow a chronic course. At the more severe end, they are associated with disability (den Boeft et al., 2016; Harris et al., 2009a; Hoedeman et al., 2009, 2010; Loengaard et al., 2015; Rask et al., 2015), psychological distress (Budtz-Lilly, Vestergaard, et al., 2015b; Harris et al., 2009a; Rask et al., 2017, 2015), and diminished quality of life. They come with a massive personal and societal cost as they are associated with high health care use (Barsky et al., 2005; Budtz-Lilly, Vestergaard, et al., 2015a; Konnopka et al., 2013; Reid et al., 2001), work disability (den Boeft et al., 2016; Loengaard et al., 2015; Rask et al., 2015), unemployment (Amland et al., 2014; Hoedeman et al., 2010; Loengaard et al., 2015; Momsen et al., 2016) and increased risk of needing permanent disability pension (Rask et al., 2015).

Different conceptualisations of PPS

There is a lack of consistency in the definitions and terminology used for PPS. Many terms have been used, including *medically unexplained symptoms* and *functional symptoms,* and definitions can vary considerably in terms of symptom number, duration and severity. Many categories of unexplained physical symptoms have been further defined as syndromes, and such syndromes are to be found within most medical specialities. Examples of such syndromes are Irritable bowel syndrome (IBS), Non-cardiac chest pain (NCCP), Chronic fatigue syndrome (CFS), Chronic pain syndrome (CPS), Fibromyalgia syndrome (FMS) and Premenstrual syndrome (PMS). The defined syndromes are often similar in terms of reported symptoms and non-symptom associations, and their diagnostic criteria commonly overlap (Petersen, Schröder, Jørgensen, Ørnbøl, Meinertz Dantoft, et al., 2020). This has led some

authors to conclude that unexplained physical symptoms are better defined as a single syndrome (Dimsdale et al., 2011; Wessely et al., 1999; Wessely & White, 2004). The usefulness of distinguishing between medically explained and unexplained physical symptoms has been questioned (Dimsdale et al., 2011; Wessely et al., 1999; Wessely & White, 2004). Defining different unexplained physical symptoms as a single syndrome has been criticised by others (Bransfield & Friedman, 2019; Tack, 2019; Van Den Eede & Van der Feltz-Cornelis, 2018) as not all the defined syndromes overlap and there may be some pathophysiological differences between them as well as differences in terms of cognitive and behavioural maintenance factors (Neeck & Crofford, 2000; T. E. Williams et al., 2017). Both sides of this debate have adduced evidence to support their claims, and it has been suggested that to move forward, we need to consider both aspects (White, 2010). There are thus both substantial similarities and important differences between these syndromes, and to gain a better understanding of unexplained physical symptoms we need to study both (Lacourt et al., 2013; White, 2010).

Persistent physical symptoms and classification systems

In the DSM-5 (American Psychiatric Association, 2013) a new chapter, *Somatic symptoms and related disorders,* was introduced and replaced the chapter *Somatoform disorders* from the DSM-IV (American Psychiatric Association, 2000) which included the diagnosis *somatisation disorder* and *undifferentiated somatoform disorder*. The hallmark of these disorders was the presence of unexplained disabling physical symptoms. The diagnostic criteria for somatisation disorder require that multiple disabling unexplained physical symptoms, have been present for years and the criteria for undifferentiated somatoform disorder requires that one or more disabling unexplained physical symptoms have been present

for at least six months. With the introduction of the new DSM-5 chapter Somatic symptoms and related disorders and a new disorder *Somatic symptom disorder,* the definitions changed considerably, and there is no longer an emphasis on the physical symptom being unexplained. The diagnostic criteria for Somatic symptom disorder require one or more persistent distressing or impairing physical symptom to be present as well as excessive problematic thoughts, feelings or behaviours related to the symptoms. Somatic symptom disorder does not require the physical symptom to be unexplained, and thus the disorder can be present alongside medical conditions that do explain the symptoms to some extent even though they can be and are in many cases unexplained (American Psychiatric Association, 2013). The most recent ICD version, ICD-11 (World Health Organization, 2018), contains the disorder *Bodily distress disorder* which is similar to Somatic symptom disorder in that it requires the presence of persistent physical symptoms accompanied by excessive attention given to the symptoms and again does not require the symptoms to be unexplained. It is specified that the disorder usually involves multiple physical symptoms although it occasionally can involve only single symptoms.

Another noteworthy recent but slightly different conceptualisation is *Bodily Distress Syndrome (BDS)* (Budtz-Lilly, Schröder, et al., 2015; Fink et al., 2007; Fink & Schröder, 2010; Petersen, Schröder, Jørgensen, Ørnbøl, Dantoft, et al., 2020; Rask et al., 2017) which is a single syndrome with four subtypes: cardiopulmonary, gastrointestinal, musculoskeletal and general symptoms. The diagnostic criteria for BDS require the presence of three or more symptoms from one of the symptom groups or four or more symptoms from any symptom group. The symptoms need to cause significant impairment, have been present for at least six

months and relevant differential diagnoses need to have been ruled out. BDS can also be divided into two severity groups, i.e., single-organ and multi-organ type.

Defining Persistent physical symptoms

In this Thesis, the term, Persistent physical symptoms will be used throughout. PPS is a relatively new overarching term which is both more consistent with the DSM-5 conceptualisation than older terms and has been shown to be preferred by patients (Marks & Hunter, 2015). PPS are defined as distressing and impairing physical symptoms that have no known biological cause. A variety of different symptoms can fall under PPS, some of which have been described and defined as syndromes.

Prevalence

PPS are common across clinical settings (Carson et al., 2000; Nimnuan et al., 2001; Reid et al., 2001) although prevalence estimations vary due to variations in definitions and study designs. Within primary care, it has been estimated that about a third of patients meet criteria for one or more PPS (Budtz-Lilly, Vestergaard, et al., 2015a; Jackson & Passamonti, 2005; Roca et al., 2009; Steinbrecher et al., 2011) and that PPS account for 15 to 35% of all General Practitioner appointments (Kirmayer et al., 2004; Peveler et al., 1997). Thirty-one percent of English and 25% of Icelandic primary care patients have one or more PPS according to two recent studies using the same definition and measures as used in this Thesis (Flóvenz et al., 2021; Gregory et al., n.d.). Primary care patients in both countries who reported having PPS most commonly reported having only one such symptom (44.8% in Iceland and 48.8% in England) (Flóvenz et al., 2021; Gregory et al., n.d.). Within secondary care, between one third and two-thirds of patients meet criteria for one or more PPS (Carson et al., 2000; Nimnuan et

al., 2001) and about a fifth of patients that frequently seek consultations within secondary care (Reid et al., 2001).

Correlates of PPS

The associations between PPS and gender, age, education and socio-economic status are somewhat unclear as study results vary considerably. A number of studies have indicated that PPS may be more common in females (Gureje et al., 1997; Nimnuan et al., 2001; Toft et al., 2005; Verhaak, 2006) while other studies reveal no gender differences (Budtz-Lilly, Vestergaard, et al., 2015a). PPS have been associated with higher age in some studies, (Budtz-Lilly, Vestergaard, et al., 2015a; Gureje et al., 1997; Loengaard et al., 2015; Verhaak, 2006) while other studies have found no association (Harris et al., 2009a), or an association between PPS and lower age (Nimnuan et al., 2001). These variations again might be due to variations in definitions, measures, and context.

PPS have been consistently found to be associated with psychological distress and high psychiatric comorbidity (Bekhuis et al., 2015; Budtz-Lilly, Vestergaard, et al., 2015a; Gureje et al., 1997; Hoedeman et al., 2009; Kroenke et al., 1994, p. 199; Löwe et al., 2008; Park & Gilmour, 2017; Rask et al., 2015; Roca et al., 2009). It has been estimated that about 40-60% of people with PPS also meet criteria for depression or an anxiety disorder (Harris et al., 2009a; Löwe et al., 2008; Toft et al., 2005).

PPS have been associated with decreased quality of life and functional impairment (Harris et al., 2009a; Hoedeman et al., 2009, 2010; Rask et al., 2015), at levels comparable to the impairment caused by many severe chronic medical conditions (Harris et al., 2009a). This

association holds even when the effects of comorbid mood or anxiety disorders have been taken into account (den Boeft et al., 2016; Harris et al., 2009a; van der Leeuw et al., 2015).

PPS and societal cost: Health care use and work disability

The societal cost that PPS carry with them is substantial as they have been associated with work disability, high health care use (Barsky et al., 2005; Budtz-Lilly, Vestergaard, et al., 2015a; Harris et al., 2009a; Park & Gilmour, 2017), and high health care costs. There are clear associations between PPS and work disability (den Boeft et al., 2016; Loengaard et al., 2015; Rask et al., 2015) as they have been linked with increased absence from work due to sick leaves (den Boeft et al., 2016; Harris et al., 2009a; Hoedeman et al., 2009, 2010; Loengaard et al., 2015; Rask et al., 2015; Terluin et al., 2011), high unemployment rates (Amland et al., 2014; Momsen et al., 2016), increased risk of becoming unemployed (Hoedeman et al., 2010; Loengaard et al., 2015), and needing permanent disability pension even after adjustment for both psychiatric and chronic medical comorbidity (Rask et al., 2015).

PPS have been linked with high health care use at all levels of health service utilisation, but has in some studies been especially prominent within primary care (Budtz-Lilly, Vestergaard, et al., 2015b). The average use of health care is consistently higher for patients with PPS than for patients with well-defined medical conditions (Barsky et al., 2005; Budtz-Lilly, Vestergaard, et al., 2015b) and has, in some studies, been estimated to be twice as high (Barsky et al., 2005; Budtz-Lilly, Vestergaard, et al., 2015b). The use of medical care tends to increase with the number and severity of symptoms (Katon et al., 1991) and there is evidence that over-investigation and over-treatment are common in the management of PPS (Kouyanou et al., 1998; McGorm et al., 2010). This high use of health care increases health care costs accordingly. It has been estimated that the health care cost for patients with multiple PPS is

double the cost for patients without such symptoms, or that for patients with well-defined medical conditions (Barsky et al., 2005).

Treating Persistent physical symptoms

Increased use of medical care and the high health care cost associated with PPS could be readily justified if such interventions led to symptom improvement or resolution. Sadly, it seems that this use of resources neither leads to symptom improvement nor a decrease in psychological distress. There is however evidence that other approaches including Cognitive behavioural therapy (CBT) and Graded exercise (treatment that involves slowly and gradually introducing and increasing people's physical activity) are effective in treating some PPS (Kim et al., 2020; Kleinstäuber et al., 2011, 2019; Larun et al., 2017). However, such treatments have mostly been focussed on specific PPS types. CBT has for an example been shown to be effective in treating NCCP with small to medium effect sizes (Esler et al., 2003; Jonsbu et al., 2011; Kisely et al., 2015; Spinhoven et al., 2010; van Peski-Oosterbaan et al., 1999), CF with small to medium effect sizes, (Castell et al., 2011; Knoop et al., 2007, 2008; Larun et al., 2017; Malouff et al., 2008; Prins et al., 2001; White et al., 2011), FM with small to medium effect sizes (Glombiewski et al., 2010; Karlsson et al., 2015; Thieme et al., 2006; D. A. Williams, 2003), CP with small to medium effect sizes (Dear et al., 2013; Pike et al., 2016; Tang et al., 2012; A. Williams et al., 2012), IBS with medium to large effect sizes (Craske et al., 2011; Lackner et al., 2007; Laird et al., 2017; Li et al., 2014; Ljótsson et al., 2010, 2011, 2014), sleep problems with medum to large effect sizes (Boness et al., n.d.; Ho et al., 2020; Thakral et al., 2020) and various other specific PPS types.

CBT has been the dominant approach in the treatment for PPS, but it includes a large variety of treatment types and techniques, varying in the degree of evidence for effectiveness.

CBT for different PPS are typically based on highly specialised treatment protocols that, in turn, are based on highly specific cognitive models that have been developed to explain each specific type of PPS. Training for and delivering symptom-specific CBT for PPS might be feasible in some more specialist settings but disseminating and implementing them in a way that would make them widely accessible to patients might prove to be difficult. Doing so would require the training of several therapists with special training in CBT for every particular syndrome and patients with multiple PPS may need to go through more than one treatment in order to have their needs met. Also, conducting group therapy might be difficult as it might be hard to identify enough individuals suffering from the same syndrome in any given setting. These issues are especially likely to be problematic within primary care and smaller communities.

To address these issues, one possibility would be to treat these symptoms transdiagnostically. Transdiagnostic cognitive behavioural therapy (T-CBT) has been shown to be effective and feasible as a treatment choice for many mood and anxiety disorders, and it works as well for general symptom and disorder-specific symptoms (Kristjánsdóttir et al., 2016, 2019). T-CBT might be a suitable option for treating PPS as different PPS share many common factors that are believed to play a role in their maintenance (Burton et al., 2011; Wessely et al., 1999) and there is already some evidence that PPS can be better managed with T-CBT than with general medical treatment (Schröder et al., 2012).

Although different PPS share many common factors, some factors are more prominent in certain PPS types than in others. Agoraphobic avoidance is for example commonly seen in patients with IBS that fear that they will soil themselves in public, while patients with CF often avoid exercise as they fear that exertion will have negative long-term consequences.

While T-CBT is a sensible option for PPS from a pragmatic point of view, there is also a clear need for a more balanced approach that would address both common and specific factors of different PPS. One possible solution would be using hybrid transdiagnostic cognitive behavioural therapy (HT-CBT), meaning that it contains parts that are transdiagnostic and some symptom-specific parts to be incorporated into the treatment when needed.

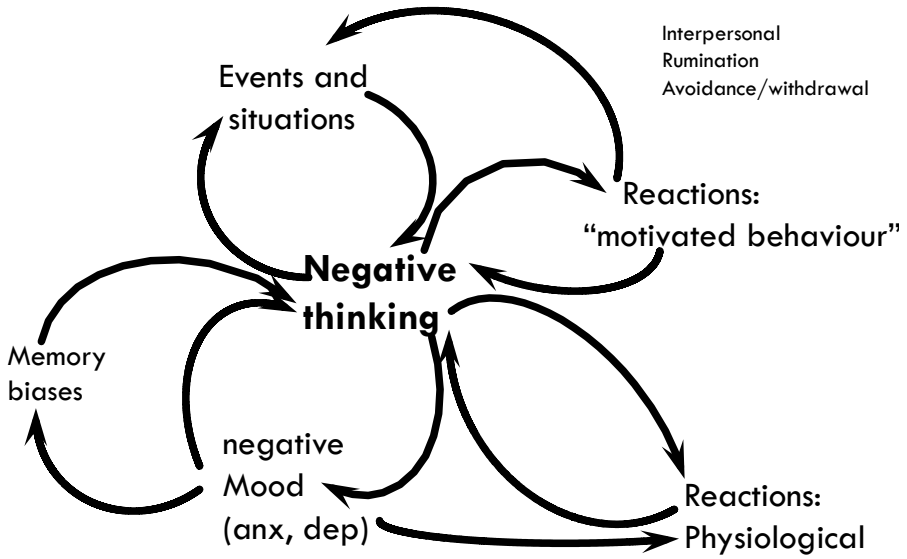
A transdiagnostic model for Persistent physical symptoms

Recently transdiagnostic models of PPS have been proposed (Chalder & Willis, 2017; Salkovskis et al., 2016) and T-CBT and HT-CBT protocols are being or have been developed and Randomized Controlled Trials to test them are underway (Chalder et al., 2019)

Salkovskis et al. first presented a transdiagnostic model of PPS in 2016. The model is shown in Figure 1 and is meant to serve as a template for cognitive formulation and the development of a shared understanding of the problem between patient and therapist. Formulations based on this model can vary in complexity and additional identified maintaining factors and links between them can and should be incorporated when needed.

Figure 1

A transdiagnostic cognitive behavioural model of persistent physical symptoms



Like most other cognitive models, this model is based on the assumption that it is not events and situations, but the meaning attached to them that causes emotional reactions. In the case of PPS, bodily variations are often (mis)interpreted as a sign of sickness, disease or disability, and this interpretation elicits negative emotions, particularly anxiety and depression. The strength of the emotional response is dependent on details of the meaning, i.e., a) the perceived likelihood of the feared consequence, b) believed severity of the consequence, c) perceived ability to cope with the consequence and d) perceived probability of other factors intervening and reducing the severity of the consequence or increase the individual's ability to cope. Once events, situations or sensations have been negatively appraised, a simple spiral is

set into motion where negative thoughts lead to negative emotions which in turn strengthen the negative thoughts and increase the negative emotions. Negative emotions can increase the accessibility of negative memories that in turn, can increase and strengthen the negative thoughts and appraisals. Strong emotions such as anxiety generally lead to increases in physical arousal, which in turn can be misinterpreted as a sign of disease or disability. After negatively appraising bodily sensations, most people react behaviourally. The reactions can take many forms but are generally in accordance with the specific meaning of the appraisal. Some people will react with avoidance or unhelpful safety-seeking behaviour intended to check for, exclude, or avoid illness or to lessen or prevent exacerbation of their symptoms. Common examples of such behaviours are avoidance of physical exertion or any activity thought to provoke symptoms, bodily checking, and reassurance seeking through contact with health care professionals or internet searches, withdrawal from situations or activities where the experience or management of symptoms might be difficult, dangerous or embarrassing. These behavioural reactions can increase negative emotions by keeping attention focused on physical sensations and health-related worries and through repeated rumination, which can increase the scope of negative interpretation.

Applying the transdiagnostic CBT model to the treatment of PPS

With effective disorder-specific treatment and promising transdiagnostic ones being available, the question becomes how best to apply them. One option would be to identify patients with PPS in early stages, e.g., within primary care. Detecting and treating PPS early on could be immensely beneficial in the long run and could possibly prevent some of their more severe consequences. Another option would be to focus on treating the most severe and disabling cases as they cause greater suffering and come with massive personal and societal

cost. Given the strong association between PPS and work disability, unemployment and disability pension, a logical place to look for those cases would be within a work rehabilitation setting, and it would be reasonable to assume that PPS are a significant problem in that context.

Vocational rehabilitation

Studies within vocational rehabilitation have been mainly focussed on relatively homogenous populations and typically dichotomise physical and mental health. The focus of these studies and many rehabilitation programs tends to be on diagnostic categories, specific disorders such as pain, or even more narrow subgroups such as people with lower back pain or carpal tunnel syndrome. Individuals seeking vocational rehabilitation are though a very heterogeneous group, in terms of physical and mental health diagnoses, education, age and proximity to the labour market (OECD, 2010b; VIRK Vocational Rehabilitation Fund, 2016). Having multiple health complaints is common, and there are high levels of comorbidity between many physical and mental health problems. The most common diagnostic categories associated with long term sick leave in an international context are mental health and musculoskeletal disorders (OECD, 2010b; Vos et al., 2012). Diagnoses from these categories are also by far the most common reasons for referral to vocational rehabilitation in Iceland (VIRK Vocational Rehabilitation Fund, 2014, 2015, 2016, 2019) and the most common primary causes of permanent disability pension (Tryggingastofnun, 2015). In 2015, diagnoses from these categories were listed as the primary cause of 67% of all disability pension in Iceland with mental disorders being the primary cause in 38% of cases and musculoskeletal disorders in 29% of cases (Tryggingastofnun, 2015). Through the years there has been an increase in the complexity and severity of cases referred to vocational rehabilitation in Iceland,

with a considerable proportion of service seekers reporting impairment in both physical and mental health (VIRK Vocational Rehabilitation Fund, 2016).

The outcome of vocational rehabilitation

There is a wide range of interventions used in the context of work rehabilitation, medical treatment, physiotherapy, psychological treatment, occupational therapy and various work focussed interventions. These are commonly used both as single treatments but also as a part of multi-domain interventions. The main goals of work rehabilitation are to increase work participation and reduce longer-term disability. Reducing distressing and disabling symptoms is an important goal in general health care and is, therefore, the primary effectiveness measure of many health care interventions. On the other hand, vocational rehabilitation is only successful if it leads to beneficial work-related outcomes such as an increased rate of return to work (RTW). Even though reducing symptoms and distress of an individual is an important health care goal, meeting that goal is not sufficient to make an intervention effective in the context of work rehabilitation.

Several important factors have been identified that are associated with return to work outcomes across health conditions, some of which are fixed and others that are modifiable. Factors related to specific health conditions often do not predict return to work and therefore perhaps do not always play an important role in facilitating it (Cancelliere et al., 2016; Hara, Bjørngaard, et al., 2018; Loisel et al., 2001). Higher socio-economic status and education, lower severity of the condition causing the work disability, and being employed are all associated with an increased likelihood of returning to work while greater age, female gender, previous sick leave and periods of unemployment are associated with decreased return to work (Cancelliere et al., 2016). Factors related to health care and compensation systems also seem

to influence return to work rates to some degree (Hara, Bjørngaard, et al., 2018; Loisel et al., 2001).

Pain and disability levels are all negatively associated with return to work while positive expectations about recovering and returning to work predict positive return to work outcomes (Cancelliere et al., 2016; Hamer et al., 2013; Hara, Bjørngaard, et al., 2018). Individual expectations, pain and level of disability can all depend on a number of factors and can seldom be attributed entirely to factors specific to a particular health condition (Cancelliere et al., 2016; Hara, Bjørngaard, et al., 2018). The association between positive expectations about returning to work and actually returning to work has been shown in studies on mental health, musculoskeletal disorders and cardiac patients (Cancelliere et al., 2016; Hara, Bjørngaard, et al., 2018). Depression has been negatively associated with return to work in some studies; (Cornelius et al., 2011; Crisp, 2005; Detaille et al., 2009; Lagerveld et al., 2010; O'Neil et al., 2010) while others have found no connection between depression and work outcome (Iles et al., 2008; Velzen et al., 2009). Anxiety, on the other hand, does not seem to predict work outcomes across conditions (Iles et al., 2008; Velzen et al., 2009) although it might to some extent predict work outcomes in cases where work disability is attributed to mental health problems (Cornelius et al., 2011), perhaps through negative expectations.

Various organisational factors within vocational rehabilitation seem to predict beneficial work outcomes (Cancelliere et al., 2016; Hara, Bjørngaard, et al., 2018; Loisel et al., 2001). Multidisciplinary assessment, individualised rehabilitation plans and having a return to work coordinator have been shown to predict beneficial vocational outcomes (Berglund et al., 2018; Cancelliere et al., 2016; Cullen et al., 2018; Hamer et al., 2013; Lytsy

et al., 2017; Schandelmaier et al., 2012). Longer time since injury has been shown to negatively impact return to work for workers with chronic pain (Hamer et al., 2013) but that effect seems to be reduced when a rehabilitation coordinator is actively involved in the rehabilitation process.

Interventions within vocational rehabilitation that seem to have the most beneficial influence on return to work are those that are multidisciplinary (Berglund et al., 2018; Briand et al., 2008; Cancelliere et al., 2016; Cullen et al., 2018; Lytsy et al., 2017). Multidisciplinary interventions generally involve giving service users access to different health and occupational professionals that work together in providing a combination of interventions that can be tailored to their individual needs. Those that have been shown to positively influence return to work generally include varying combinations of physical, psychological, educational and vocational interventions. Interventions that focus on a single domain seem to have a relatively limited effect on return to work (Cullen et al., 2018). Of health-related interventions, work-focussed cognitive behavioural therapies and graded activity programs have been shown to have a positive effect on vocational outcomes with mental health problems while traditional CBT for these conditions does not seem to improve return to work (Cullen et al., 2018). As diagnosis-specific factors do not adequately predict return to work, and distinguishing between physical and mental health does not seem to be important in terms of work outcomes, the use of transdiagnostic treatment interventions has been proposed. Such interventions have been shown to be feasible and acceptable to patients within vocational rehabilitation (Hara, Borchgrevink, et al., 2018) and there is some evidence that they can positively influence return to work (Hara, Borchgrevink, et al., 2018). Providing access to multidisciplinary treatment is important within vocational rehabilitation and seems to be particularly so for those with health

conditions that have a poorer prognosis (Cancelliere et al., 2016; Hara, Bjørngaard, et al., 2018) as patients with poorer prognosis are equally likely to benefit from such programs as those with better prognosis, to begin with (Hara, Bjørngaard, et al., 2018).

Actively involving stakeholders and workplaces in the rehabilitation process positively impacts return to work (Cancelliere et al., 2016; Cullen et al., 2018). This can, for example, include active participation of and communication between the service seeker, health care providers, rehabilitation coordinators, occupational counsellors, insurance representatives and employers. Work accommodations such as changes or adjustments in tasks, work schedules, physical work environment can also positively influence return to work across conditions (Cancelliere et al., 2016; Cullen et al., 2018).

Vocational rehabilitation in Iceland

In Iceland, individuals with employment difficulties due to ill health or injury are referred to VIRK – Vocational rehabilitation Fund for assessment and rehabilitation. VIRK is a social enterprise of which all the major employers and unions in the Icelandic labour market are members. The fund is supposed to systematically reduce the likelihood of individuals leaving employment due to permanent disability, by helping them return to work. The fund operates according to Icelandic law which main objective is to ensure that individuals who have reduced workability following illness or accidents receive proper occupational rehabilitation (VIRK Vocational Rehabilitation Fund, 2013, 2014). VIRK's services are free of charge and all those who have not been able to work because of infirmity, have a doctor's request for service and plan to resume to work or increase their employment, have the right to the fund's service (VIRK Vocational Rehabilitation Fund, 2013, 2014). VIRK works closely with the labour unions, employers, social welfare agencies, the National University Hospital

of Iceland and other organisations that provide rehabilitation, and collaborates with referring physicians and other parties involved in each individual‘s care. After being referred to VIRK, service seekers meet with a vocational rehabilitation counsellor at their labour union to develop an individualised rehabilitation plan. During this process, the counsellor and service user cooperate with referring physicians, other specialists and employers as needed. A multidisciplinary assessment may be provided by various experts such as psychologists, physicians, social workers, and occupational therapists in more complex cases. In severe cases, the service seeker undergoes assessment before being assigned a counsellor in order to assess whether vocational rehabilitation is appropriate at the time and likely to succeed. In some cases, individuals referred to VIRK are referred back to the health care system. This can, for example, happen when the service seeker is still undergoing demanding treatment or when individuals have active alcohol or substance-related problems that need to be treated.

In 2014 VIRK – Vocational Rehabilitation Fund, recruited a group of five psychologists (including the author) and one psychiatrist, led by Jón Friðrik Sigurðsson and Paul Salkovskis, to make suggestions about how psychological services could effectively be delivered within work rehabilitation in Iceland as well as evaluating the psychological services the fund already provided their clients with. As part of the evaluation process, the group met with service managers, rehabilitation counsellors and psychologists who worked for VIRK and reviewed a substantial amount of data. During the conversations with these people, it became apparent that mental health and persistent physical symptoms affected a significant proportion of their clients and meeting their needs in vocation rehabilitation was proving challenging to the organisation. Despite this impression shared by many of the rehabilitation counsellors,

very little was known about the extent of PPS, various mental health problems and their possible interplay within vocational rehabilitation in Iceland.

Aims

Study I

The primary goal of study I was to estimate the prevalence of PPS within the Icelandic vocational rehabilitation setting and investigate how such symptoms related to mental health problems as indicated by caseness on self-report scales. Our second goal was to investigate whether different PPS subtypes differed in relation to mental health problems. Our third goal was to identify the extent to which vocational rehabilitation service seekers might be expected to benefit from psychological treatment for PPS.

Study II

The primary goal of study II was to investigate, in an inclusive real-life setting, how well PPS and psychological distress, predict work disability and response to work rehabilitation in terms of likelihood of returning to work and the duration of rehabilitation needed. Secondly, we wanted to know whether these same factors influenced dropout from vocational rehabilitation.

Study III

In study III, we wanted to investigate the relationship between PPS, psychological distress and work disability from a health service perspective. We examined a large sample of emergency cardiac department patients with NCCP, dividing them into those who did and did not meet the broader definition of PPS. We hypothesised NCCP patients meeting PPS criteria: 1) would be more likely to be inactive or unable to work; 2) would experience more anxiety about their

health; 3) were more likely to ruminate; 4) would have a higher number of other PPS and 5) would be more likely to be anxious and depressed.

Method

Design

The three studies presented in this Thesis were done on samples from two larger cross-sectional studies. In study I and II, we looked at a sample of Icelanders that sought vocational service from VIRK in 2017 and 2018. In study III we looked at a subsample of NCCP patients from a larger study on chest pain patients who had visited an Icelandic emergency cardiac department.

Participants

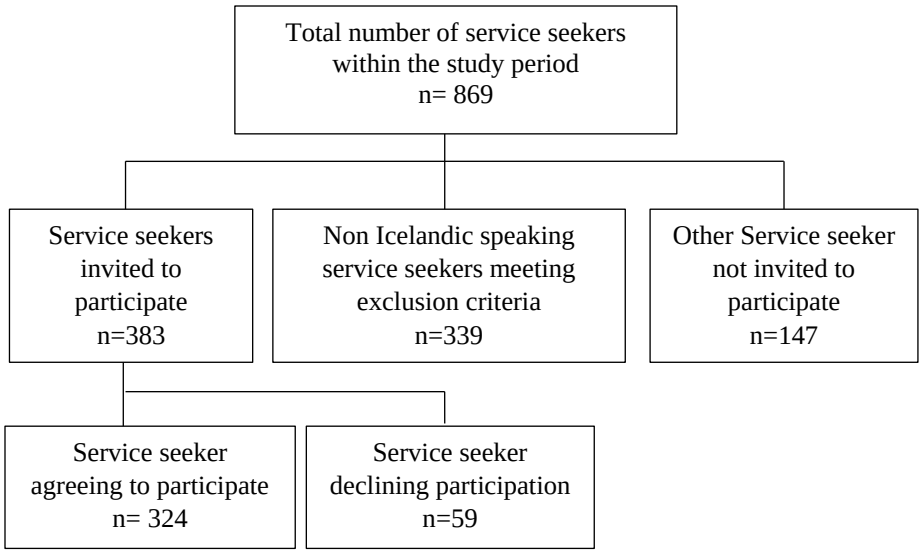
Study I and II.

Both studies were done on the same sample of participants which consisted of people that sought work rehabilitation through VIRK, for the first time, in Iceland's capital area, between June 2017 and May 2018. To be eligible to participate, the service seekers had to speak Icelandic and be 18 years old or older. Service seekers that had begun receiving rehabilitation and service seekers with limitation in their language or reading ability that prevented them from filling in the study's questionnaires were not eligible for participation. The participants came from all sectors of the labour market and were members of labour unions representing state and municipal employees, store and office workers, manual labourers, trade workers, or university graduates. Figure 2 shows the number of people who sought VIRK's services,

during the study period, through one of the participating trade unions, how many were invited to participate and accepted participation.

Figure 2

Flow chart of participant selection from VIRK's vocational rehabilitation service seekers



As shown in Figure 2, 486 service seekers either did not meet the study's inclusion criteria or were not invited to participate for other reasons. Of those 339 cases met exclusion criteria as interpretation services were required. Exact information was not available about whether the remaining 147 participants that were not invited to participate met the study's inclusion criteria. Estimates obtained from VIRK suggested that about two-thirds of these service seekers would not have met the inclusion criteria, and about one third were eligible for participation. We, therefore, estimate that about 50 potentially eligible service seekers were not invited to participate in the study. The most common reason for missed recruitment

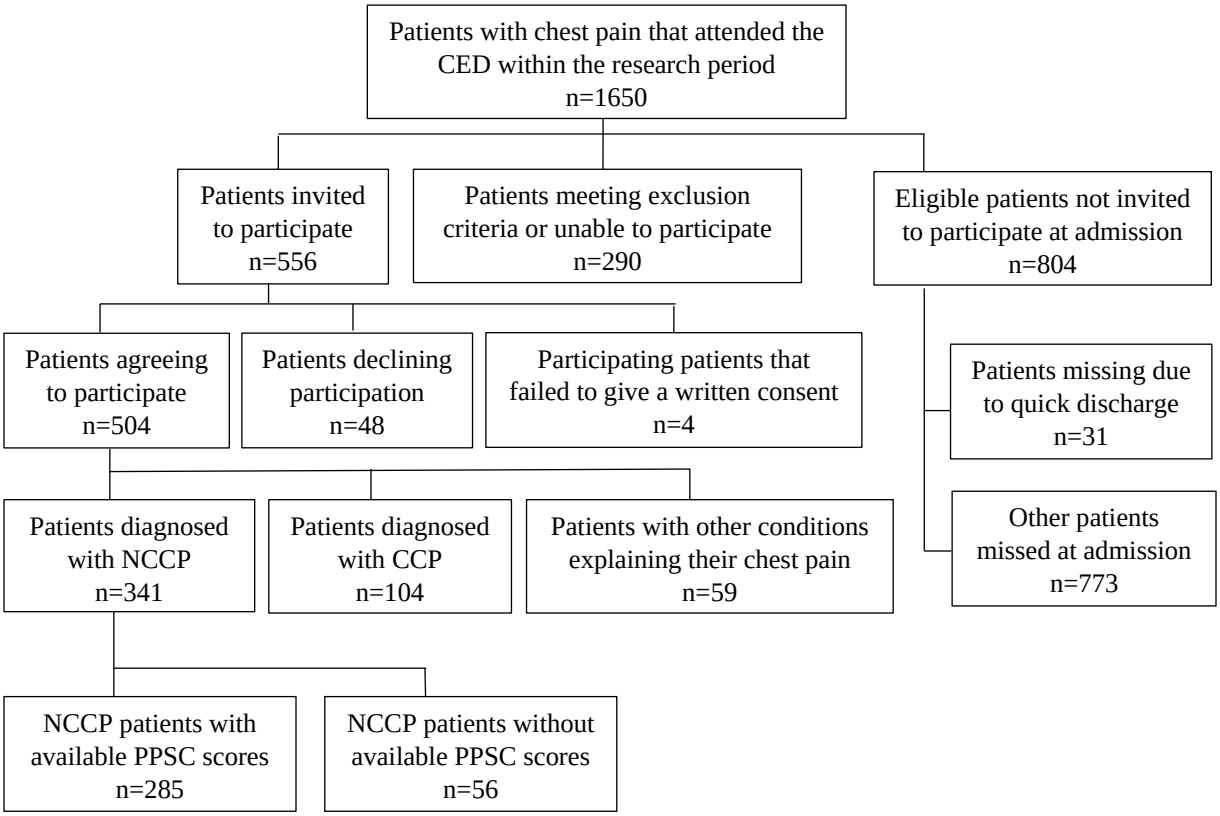
opportunities was that some counsellors forgot to approach their clients, and in some cases, they were not instructed to do so by their supervisors. Occasionally, the counsellors did not ask their clients to participate in the study as they considered them too exhausted or emotionally upset to do so. We estimate that about 8 potentially eligible service seekers were not invited to participate due to this reason.

Study III.

This study was a part of a larger study on chest pain patients that attended the emergency cardiac department (CED) at Landspitali-The National University Hospital of Iceland, between October 2015 and December 2016. The original study was designed to assess the prevalence of non-cardiac chest pain in Iceland, and examine its association with psychological functioning, medication use, health-care utilisation and health care costs. To be eligible for participation in the original larger study the patients had to be attending the CED due to chest pain or discomfort, be between 18 and 65 years old, speak Icelandic, and physically and mentally able to fill out a study's questionnaires. Patients diagnosed with non-cardiac conditions that could explain their chest pain or any conditions that prevented them from participating (e.g. loss of consciousness, intoxication, or critical medical condition) in the study were excluded. Participants from the original study were included in study III if they had received an NCCP diagnosis and filled out the Persistent Physical Symptom Checklist (PPSC), but the list was used to divide participants into groups. Figure 3 shows how many of the patients that attended the CED during the research period were eligible, were invited to participate, accepted participation and met the inclusion criteria for study III.

Figure 3

Flow chart of participant selection from patients attending the CED



Note. CED = Cardiac emergency department; NCCP = Non cardiac chest pain; CCP = Cardiac Chest Pain; PPSC = Persistent Physical Symptom Checklist.

A large number of eligible patients were not asked to participate in study III at admission because the health care staff did not always, at busy times, have the opportunity to obtain consent. The CED can be very busy, and patient safety is always prioritised. Missed opportunities for patient recruitment are considered as occurring at random with regard to the associations being investigated. Also, of 341 participants diagnosed with NCCP, 31 were excluded from further analysis as they had not completed the PPSC and additional 25 were

excluded as they had too many missing items on questions measuring heart-related PPS on the PPSC. The excluded participants were not significantly different from the remaining 285 NCCP patients in terms of gender, age, education or marital status.

Procedure

Study I and II.

Eligible vocational rehabilitation service seekers were offered participation, by their rehabilitation counsellors, during one of their first sessions and those agreeing to participate gave written informed consent. After their counselling session, the participants filled out a battery of self-report questionnaires and put them in a sealed mailbox upon completion. Information about participants was retrieved from VIRK's database and matched with the questionnaire data using research identification numbers.

Study III.

Eligible patients were asked to participate in the study by a nurse while they attended the CED and those agreeing gave written informed consent. While waiting to be seen by a doctor, participants filled out self-report questionnaires which they returned to the CED staff upon completion.

Measures

Psychological measurements

The Persistent Physical Symptom Checklist (PPSC) is a self-report screening instrument that measures persistent problems with seven types of physical symptoms that, i.e., sleep problems, pain, chronic tiredness fatigue or muscle problems, gastrointestinal problems, heart and chest symptoms, dizziness and/-or related problems and gynaecological problems.

Respondents are asked whether they have had problems with a particular symptom for more than six months (one month for sleep problems), whether their symptoms have a known cause and if so what causes their problems. The reported causes are considered and coded according to whether they included a possible medical explanation for their symptoms. They are then asked to rate on a 9-point scale to which extent their problems interfere with their lives. The criteria for a particular PPS is considered met if the problem has been present for more than six months, does not have a clear defined medical cause and is definitely interfering with the respondent's life (≥4 points).

There has been no standard for measuring PPS and a simple screening instrument that could be used at the first stage of assessment was sorely needed. The PPSC was developed to meet this need and address the problems inherent in previous assessment methods. The PPSC was developed by Paul M. Salkovskis and his collaborators and is currently being used to screen for PPS within some of the Improving Access to Psychological Therapies program (IAPT) in the United Kingdom. The PPSC was used in our studies to ensure consistency between our research and the research our collaborators have been doing within primary care in the UK. Unpublished data on the English version of the scale suggest acceptable validity and reliability. The data also suggests a good correspondence between a participant´s score on the list and their GP's clinical judgement, although there is some evidence that suggests that GP's are in general underestimating PPS related problems.

An evaluation of the checklists convergent validity was done in an internal sample of 55 participants from study III. This subsample filled out the PPSC, Patient Health Questionnaire-9 (PHQ-9), General Anxiety Disorder-7 (GAD-7) (described below) and the Somatic Symptom Scale – 8 (SSS-8) which is a brief measure of the somatic symptom burden

that has been shown to be both valid and reliable (Gierk et al., 2014). We found a significant correlation between the number of PPS and depression (r_{PHQ-9}=0.49), anxiety (r_{GAD-7}=0.52) and somatic symptom burden (r_{SSS-8}=0.62) suggesting adequate convergent validity

The Short Health Anxiety Inventory (SHAI) (Alberts et al., 2013; Salkovskis, 2002) is a 14-item self-report instrument that measures health-related anxiety. Each item consists of four statements from which the participant is asked to choose based on what best describes his/her feelings, over the past six months. The scale has a total score that can range between 0 and 54 and total scores of 18 or more have been shown differentiate reliably between those that meet DSM-IV criteria for hypochondriasis and those that do not. Both the original and the Icelandic version of the scale have good psychometric properties (Alberts et al., 2013; Viðarsson, 2016). Cronbach's alpha was 0.89 in study I and II and 0.88 in study III.

The Patient Health Questionnaire-9 (PHQ-9) (Kroenke & Spitzer, 2002) is a 9-item self-report scale that measures the severity of depressive symptoms over a two weeks period (Kroenke & Spitzer, 2002). Answers are rated on a 4-point scale, and the scale has a total score that ranges from 0 to 27. The PHQ-9 has cut-off points of 5, 10, 15 and 20, which are interpreted as mild, moderate, moderately severe and severe depression. Scores were generally considered being in the clinical range if they reached a cut-off score of 10. Both the original and the Icelandic version of the PHQ-9 have good psychometric properties (Kroenke et al., 2001; Kroenke & Spitzer, 2002; Pálsdóttir, 2007). Cronbach's alpha was 0.81 in study I and II and 0.71 in study III.

The Generalised Anxiety Disorder-7 (GAD-7) (Spitzer et al., 2006) is a 7-item self-report scale that measures symptoms of general anxiety over the last two weeks. Answers are

rated on a 4-point scale, and the scale has a total score that ranges from 0 to 21. The GAD-7 has cut-off points at 5, 10 and 15, which are interpreted as mild, moderate, and severe anxiety. Scores were generally considered being in the clinical range if they reached a cut-off score of 10. Both the original and the Icelandic version of the GAD-7 have good psychometric properties (Ingólfsdóttir, 2014; Spitzer et al., 2006). Cronbach's alpha was 0.88 in study I and II and 0.92 in study III.

The Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (Mattick & Clarke, 1998) are two companion measures for assessing social anxiety. SIAS measures fear of engaging socially with others while the SPS measures fear of being observed by others during everyday activities. Both scales consist of 20 items rated on a 5-point scale and generate a total score ranging from 0 to 80. The original and the Icelandic versions of both scales have good psychometric properties (Ólafsdóttir, 2012; Osman et al., 1998). The scales were used in study I and II where Cronbach's alpha was 0.94 for the SIAS and 0.96 the SPS. In study I and II we considered social anxiety scores to be in the clinical range if the combined total score of SIAS and SPS met a cut-off of 74 as this scoring method has been shown to best discriminates between those with and without social anxiety disorder in an Icelandic sample (Ólafsdóttir, 2012).

Traumatic experiences. Participants were asked about past traumatic events with the following single, yes or no, question taken from the Icelandic version of MINI International Neuropsychiatric Interview version 5.0 (Lecrubier et al., 1997; Sheehan & Lecrubier, 1998): *Have you ever experienced or witnessed or had to deal with an extremely traumatic event that included actual or threatened death or serious injury to you or someone else*?

The Impact of Event Scale-Revised (IES-R) (Beck et al., 2008; Sundin & Horowitz, 2002) is a 22-item self-report scale that measures post-traumatic stress symptoms. Answers are rated on a 5-point scale, and the scale has a total score that ranges from 0 to 88. A score of 33 or higher has been shown to discriminate between people with and without Post Traumatic Stress Disorder (PTSD) (Creamer et al., 2003). The IES-R has good psychometric properties (Creamer et al., 2003). The scale was used in study I and II, where it had a Cronbach's alpha of 0.95.

Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al., 1993) is a 10-item self-report scale that measures hazardous or harmful alcohol consumption. The answers are rated from 0 to 4, and the scale has a total score that ranges from 0 to 40. Total scores of 8 or more have been shown to indicate hazardous or harmful alcohol use (Saunders et al., 1993). The AUDIT has been shown to have good psychometric properties (Reinert & Allen, 2007). It was used in study I and II where it had a Cronbach's alpha of 0.86.

Drug Use Disorders Identification Test (DUDIT) (Berman et al., 2005) is an 11 item scale used to screen for substance-related problems and is intended to be used with the AUDIT. Total scores range from 0 to 44. According to a Swedish study, a total score of 2 for women and 6 for men could be used as a cut-off score for harmful substance use in a general population sample (Berman et al., 2005). In contrast, an American study indicates that a total score of 8 could discriminate between patients with drug-related problems and only alcohol-related problems (Voluse et al., 2012) In the current study DUDIT scores were considered to indicate problematic substance use if they met a cut-off score of 6. The scale has been shown to have good psychometric properties (Berman et al., 2005; Voluse et al., 2012), and in our sample, it had a Cronbach's alpha of 0.93.

The Work and Social Adjustment Scale (WSAS) (Mundt et al., 2002) is a five-item self-report scale that measures impaired functioning in five areas of everyday life: the ability to work, manage a home, form and maintain close relationships and engage in social or private leisure activities. Answers are rated on an 8-point scale, and the scale has a total score that ranges from 0 to 40. Scores between 10 and 20 have been associated with significant functional impairment and scores over 20 a more severe pathology (Mundt et al., 2002). The scale has been shown to have good psychometric properties. The scale was used in study I and II, where it had a Cronbach's alpha of 0.84.

The Perseverative Thinking Questionnaire (PTQ) (Ehring et al., 2011) is a 15-item self-report scale that measures rumination. The scale consists of 15 items and generates one total score that ranges from 0 to 60 and three subscale scores which refer to three aspects of rumination: repetitive thinking, the intrusive nature of the thoughts and difficulties disengaging from them. In this study, we used only the total score to measure rumination. The PTQ has been shown to have good psychometric properties (Ehring et al., 2011). The scale was used in study III, where it had a Cronbach's alpha of 0.97.

Background information

Study I and II. Information on participants' gender, age, marital status, and their highest education level was retrieved from VIRK's database.

Study III. Patients provided information about their gender, marital status, employment status and the highest education they had completed on multiple-choice questions. For the purposes of this study, we categorised employment status in two ways. First were divided patients into two groups based on whether they were active, i.e., working,

studying, managing a household or retired due to old age, or inactive, i.e., were neither active on the labour market nor studying as they were unemployed, receiving rehabilitation benefits or permanent disability pension. Secondly, we divided patients into two groups based on whether they were able to work or not, i.e., if they were receiving rehabilitation benefits or permanent disability pension.

Measuring the outcome of vocational rehabilitation

To measure the outcome of vocational rehabilitation, we used return to work as a primary measure, duration of the rehabilitation as a secondary measure and drop out as a tertiary measure. Return to work was defined as working or studying at the time of discharge from vocational rehabilitation. Participants that were still receiving rehabilitation at the end of our study (N=12) were counted as not having returned to work. Duration of the rehabilitation was defined as days from first contact to discharge. Drop out from rehabilitation was defined as discontinuation of the vocational rehabilitation decided by the service seeker, irrespective of the reasons for such decisions. When analysing return to work and duration of the rehabilitation, we excluded participants who were unemployed at the time of discharge (N=20) as it was not possible to conclude whether they would return to work. We also excluded participants who were referred elsewhere (N=25) when analysing return to work, duration of the rehabilitation and drop out, as these participants were not offered full rehabilitation.

Medical diagnosis

Study III. The diagnosis given to patients at the CED and any prior cardiac diagnoses were retrieved from patients' medical records. The following ICD-10 diagnoses were counted as CCP: Unstable angina (I20.0), Myocardial infarction (I21), Cardiac arrest (I46), Chronic ischemic heart disease (I25), Heart failure (I50). In cases where no diagnosis

was specified in the medical records, an assessment was made based on notes from any physician that had examined the patient. The patient was considered to have CCP if the notes included information about known cardiac conditions. The following ICD-10 diagnoses were counted as NCCP: Chest pain, unspecified (R07.4), Other chest pain (R07.3), Observation for other suspected cardiovascular diseases (Z03.5) and other diagnoses suggesting persistent physical or stress-related causes such as Myositis, unspecified (M60.9), Gastro-esophageal reflux disease without esophagitis (K21.9), Myalgia (M79.1), Acute stress reaction (F43.0) and Hyperventilation (R06.4). Patients were excluded from further analysis if they had been given a diagnosis of an acute physical condition that could have explained the chest pain such as cholelithiasis (K80), arrhythmia (I40), pulmonary embolism (I26), aortic aneurysm and dissection (I71), cholecystitis (K81), appendicitis (K37), acute pancreatitis (K85), pericarditis (I30), and herpes zoster (B02). Patients were also excluded if they could not participate due to other illnesses such as alcohol or drug abuse, or severe anxiety.

Missing data

Study I and II. Missing items on the questionnaires were believed to be missing at random. Mode imputations were used for single missing items on the SHAI, PHQ-9, GAD-7, AUDIT and DUDIT and for up to two items on the SIAS, SPS and IES-R. Single missing items on the WSAS were mean imputed. Listwise deletions were used when missing items surpassed these criteria which resulted in 0.3% to 6.8% of the cases missing, with an average of 2.5%. Information retrieved from VIRK's database did not contain any information on 17 participants (5.2%) and occasionally contained missing values on individual items as well. This was caused by errors in registration or retrieval of the data and is therefore considered to be missing completely at random. The participants that were completely missing from the data

retrieved from VIRK were excluded from three analyses in study II. The proportion of missing values on background information ranged from zero to 7.1% with an average of 4.6%. These missing values were not handled specifically and listwise deletions were used.

Study III. Individual missing items on the questionnaires and background questions were considered to be missing at random. Mode imputations were used for single items on the SHAI, PHQ-9, GAD-7 for up to two items on the PTQ. Listwise deletions were used when missing items surpassed these criteria which resulted in 2.8% to 3.8% of the cases missing, with an average of 3.3%. Missing values on background questions were not handled specifically and were deleted listwise. The proportion of missing values on these questions varied from zero to 3.5% with an average of 2.2%.

Statistical analysis

Statistical analyses in all three studies were carried out with SPSS 26.

Study I. We examined the prevalence of PPS and used χ^2 tests to examine whether there was an association between having PPS and reaching threshold for clinical levels of depression, general anxiety, health anxiety, social anxiety or post-traumatic symptoms. Continuous measures of the psychological variables, which were found to be related to the presence of PPS were then correlated with the number of PPS. Following this, we intended to examine the differences between PPS subtypes in terms of psychological symptoms but were unable to do so as participants rarely reported having only one symptom type. Finally, we estimated how many service seekers at VIRK might benefit from a cognitive behavioural treatment for PPS by identifying participants who reported PPS and psychological distress, defined as an elevated score on the PHQ-9, GAD-7 or the SHAI; this was presented descriptively.

Study II. We ran two separate hierarchical linear regressions, using WSAS scores and duration of the rehabilitation as dependent variables and age, gender, PPS and scores on the PHQ-9, SHAI, IES-R and combined SIAS and SPS as independent variables. When predicting the duration of the rehabilitation, we also used WSAS scores as an independent variable. Logistic regression was used to predict return to work using binary variables as independent variables that represented whether participants met criteria for any PPS subtype or had scores above or below clinical cut off on the PHQ-9, SHAI, IES-R, WSAS or SIAS and SPS combined. Participants that had not experienced trauma and thus did not fill out the IES-R were given zero points on the scale so they could be included in these analyses. Chi-square tests were used to compare those that dropped out of rehabilitation with those that continued in terms of demographic and psychological variables. The analyses of drop out were exploratory only.

Study III. We divided a group of patients that had received an NCCP diagnosis after visiting the CED into two groups based on whether they met criteria for having heart-related PPS on the PPSC. We then used t-tests to examine whether there was a difference between these groups on depression-, general anxiety-, health anxiety-, and rumination scores or in the total number of non-heart related PPS. Finally, we used χ^2 tests and odd ratios to examine whether there was an association between having heart-related PPS and being inactive, unable to work, or scoring above clinical cut-off for depression, general anxiety and health anxiety. Because of multiple comparisons, p values were adjusted with a Bonferroni correction.

Ethical consideration

The National Bioethics Committee of Iceland approved of the two larger studies that study I, II (application no. VSN-16-045) and III (application no. VSN-15-121) were a part of, and the

Icelandic Data Protection Authority was informed of both studies. Participants in both studies gave their written informed consent after being given detailed information about the study's aims and what participating would involve. No compensation was offered for participating in either study.

Results

The main results from the three papers which comprise this Thesis are summarised in the following section. A more detailed description of each study's results can be found in the individual papers appended at the end of the Thesis.

Study I and II

Prevalence and descriptives

The majority of participants (262, 80.9%) reported having one or more PPS on the PPSC, while 62 (19.1%) reported no such symptoms. More than three-quarters of our participants were female, and the distribution of gender and education was similar in the group that reported PPS and the group that did not. Participants that met criteria for at least one PPS were younger on average (M=38.40, SD= 11.63) than those without such symptoms (M=43.15, SD= 13.16), $t\,(305) = 2.78$, p =0.006, r = 0.16. Participants with PPS were also more likely to be separated (27.9%) than those who did not meet these criteria (12.3%), $\chi^2(2) = 9.75$, p=0.015.

Number and types of PPS

The prevalence of the seven PPS subtypes and having any number of PPS simultaneously is summarised in Table 1.

Table 1.

The prevalence of PPS subtypes and multiple PPS.

Reported symptoms	Participants *n* (%)	Number of PPS criteria met	Participants *n* (%)
PPS present	262 (80.9%)	0	62 (19.1%)
PPS type		1	62 (19.1%)
PPS_{Sleep}	191 (59.0%)	2	57 (17.6%)
PPS_{Pain}	143 (44.1%)	3	74 (22.8%)
$PPS_{Fatigue}$	204 (63.0%)	4	39 (12.0%)
$PPS_{Gastrointestinal}$	55 (17.0%)	5	15 (4.6%)
$PPS_{Heart\ and\ chest}$	39 (12.0%)	6	12 (3.7%)
$PPS_{Neurological}$	68 (21.0%)	7	9 (0.9%)
$PPS_{Gynoecological}$[a]	22 (8.7%)*		

Note. PPS = Persistent physical symptoms.

[a] $PPS_{Gynoecological}$ is calculated as a percentage of the total number of female participants.

VIRK's service seekers most commonly met criteria for multiple PPS, and 61.7% of our participants reported having two or more PPS. The most common PPS are fatigue, followed by sleep problems and pain. Neurological, gastrointestinal and heart and chest related symptoms are also fairly common, although much less so than the other three.

PPS, functional impairment and mental health

As shown in Table 1 and 2, our participants commonly reported having one or more PPS and high levels of depression, health anxiety, social anxiety and post-traumatic stress symptoms as well as high levels of functional impairment overall. More than two-thirds of our participants had WSAS scores indicating severe functional impairment (see Table 1), and the average WSAS score was also high (M=23.96, SD= 9.00). Problematic alcohol and substance use were somewhat less common as 24% (n=76) of the sample reported problematic alcohol- or drug use during the past year with 15.8% (n=12) of those reported currently being abstinent. The

number and percentages of participants, with and without PPS, which score above clinical cut-off on psychological measures are summarised in Table 2.

Table 2

Number and percentages of VIRK's service seekers that surpass cut-off on psychological measures

Measure	All participants	Participants with PPS	Participants without PPS	χ^2	OR
$SHAI_{\geq 18}$	104 (32.7%)	95 (37.0%)	9 (14.8%)	11.05*	3.39
$PHQ\text{-}9_{\geq 10}$	245 (75.9%)	218 (82.2%)	27 (44.3%)	40.97*	6.24
$GAD\text{-}7_{\geq 10}$	170 (52.8%)	148 (56.7%)	22 (36.1%)	8.45*	2.32
$SIAS/SPS_{\geq 74}$	93 (29.1%)	80 (31.0%)	13 (21.0%)	2.44	1.77
$IES\text{-}R_{\geq 33}$	114 (37.9%)	95(38.9%)	19 (33.3%)	0.34	1.35
AUDIT	64 (20.1%)	50 (19.5%)	14 (22.6%)	0.58	0.83
DUDIT	34 (10.7%)	28 (10.9%)	6 (9.8%)	0.81	1.12
$WSAS_{\geq 20}$	216 (69.9%)	195(78.0%)	21 (35.6%)	40.8**	6.41

Note. PPS = Persistent physical symptoms; OR = Odds ratio; SHAI = Short Health Anxiety Inventory; PHQ-9 = Patient Health Questionnaire-9; GAD-7=Generalised Anxiety Disorder-7; SPS = Social Phobia Scale: SIAS = Social Interaction Anxiety Scale; IES-R = Impact of Event Scale-Revised; AUDIT = Alcohol Use Disorders Identification Test; DUDIT = Drug Use Disorders Identification Test; WSAS = Work and Social Adjustment Scale.
[a] IES-R scores were only calculated for participants who reported a past traumatic experience.
$^{*}p < 0.05$, $^{**}p < 0.01$

As shown in Table 2, participants with one or more PPS were more likely than those without such symptoms to report symptoms of depression, anxiety or health anxiety in the clinical range and have a severe functional impairment. They were also more functionally impaired on average (M_{WSAS}= 25.73, SD= 7.86) than those without such symptoms (M_{WSAS}= 16.46, SD= 9.70), $t(76.937)=-6.83$, $p < 0.01$, $r= 0.61$. Participants with PPS were not more likely to report problematic alcohol or substance use, clinical levels of social anxiety- or post-traumatic stress or to have experienced a traumatic event in their past. The number of reported PPS was significantly correlated with depressive symptoms, $r_{PHQ\text{-}9} = 0.52$, $p < 0.001$, general anxiety

symptoms $r_{GAD\text{-}7} = 0.38$, $p < 0.00$, health anxiety symptoms, $r_{SHAI} = 0.33$, $p < 0.001$ and functional impairment, $r_{WSAS} = 0.46$, $p < 0.001$.

Vocational rehabilitation service seekers that might benefit PPS treatment

A high percentage of service seekers who report PPS have high levels of depression ($N_{PHQ\text{-}9\geq10}$ = 218, 83.2%; $N_{PHQ\text{-}9\geq15}$ = 119, 45.6%), anxiety ($N_{GAD\text{-}7\geq10}$ = 148, 56.7%; $N_{GAD\text{-}7\geq15}$ = 70, 26.8%) and health anxiety symptoms ($N_{SHAI\geq18}$ = 95, 37.0%). Between 159 (61.4%) and 226 (86.6%), service seekers surpass clinical cut-off on one or more of these measures, depending on which cut-off scores are used for depressive symptoms and general anxiety. Notably, 91.7% of participants with PPS reported that they believed it would be helpful to discuss their PPS and how they are affected by them with a trained professional and would accept such help if offered. If we use the conventional cut-off score of 10 for the PHQ-9 and the GAD-7, 64.6% VIRK service seekers would be identified as having PPS, being psychologically distressed and willing to accept psychological help for their symptoms. If we use the higher cut-off score of 15, 46.2% of the total sample would meet these criteria.

Predicting work disability at the beginning of vocational rehabilitation

A hierarchical linear regression analysis was carried out in order to predict functional impairment at the beginning of vocational rehabilitation from age, gender, PPS, symptoms of depression, health anxiety, social anxiety, and post-traumatic stress. The overall regression model was significant and predicted 36% of the variance of functional impairment. The presence of PPS and self-reported symptoms of depression and social anxiety contributed independently and significantly to the model while age, gender and other psychological measures and their interactions did not. Self-reported depression was the strongest predictor,

with a large effect size (f^2=0.427), the presence of PPS the second strongest, with a medium effect size (f^2=0.207), and finally, social anxiety, with a medium effect size (f^2=0.150).

Predicting return to work

When the study ended, 229 (74.8) had finished their rehabilitation, 12 (3.9%) were still receiving rehabilitation from VIRK, 40 (13.1%) dropped out, and, 25 (8.2%) had discontinued as they were referred elsewhere. One hundred sixty-one participants (72.9%) were considered as having returned to work, as they were working or studying at the end of their rehabilitation, while sixty (27.1%) were not. Hierarchical logistic regression was carried out in order to predict return to work at the end of vocational rehabilitation. Binary variables representing whether participants met criteria for the seven specific PPS types or had clinical levels of depression, health anxiety, social anxiety or post-traumatic stress symptoms were used as independent variables. The final and most parsimonious model included three variables (persistent pain, persistent fatigue and clinical levels of depression) but only two contributed significantly to the prediction (persistent pain and clinical levels of depression). The model correctly predicted whether or not participant returned to work in 75.1% of cases, and with it, we were able to identify 11.7% of all cases where participants did not return to work. The identified cases all had persistent pain and clinical levels of depression in the absence of persistent fatigue. A closer look at different combinations of persistent pain, persistent fatigue and depression, revealed that there was a significant association between return to work rate and symptom combination, χ^2 (7) = 16.15, p = 0.006. Participants with persistent pain and clinical levels of depression in the absence of persistent fatigue had a significantly lower return to work rate (22.2%) than participants with other symptom combinations (between 67.5% and 83.9%) and were 18.2 times more likely not to return to work.

Predicting the duration of vocational rehabilitation and drop out

The rehabilitation duration of participants that returned to work (n=159) ranged from 109 to 989 days. Almost half of them (42.8%) had finished their rehabilitation within a year and almost everyone within two years (97.2%). The average duration of rehabilitation was 432.19 days (SD = 190.12), and the mode was 314 days. A hierarchical linear regression analysis was carried out to predict the duration of vocational rehabilitation from age, gender, PPS, functional impairment, and symptoms of depression, health anxiety, social anxiety, and post-traumatic stress. None of these variables or their interactions predicted the duration of the vocational rehabilitation as the overall regression model and each of its steps were found to be insignificant. The analyses of drop out were exploratory only and are not given in detail. Comparing participants that dropped out with those that finished rehabilitation we found that participants were more likely to drop out of their rehabilitation if persistent fatigue was not present, $\chi^2(1) = 5.93$, p=0.015, OR=2.28, if they had moderately severe symptoms of depression (PHQ-9 ≥15), $\chi^2(1) = 5.47$, p=0.019, OR= 2.21, or clinical levels of social anxiety (combined SIAS and SPS score ≥74), $\chi^2(1) = 4.84$, p=0.028, OR=2.13.

Study III

Prevalence and descriptives

Eighty-five patients (29.8%) met criteria for heart-related PPS on the PPSC, and 200 (70.2%) did not. The distribution of age, gender and education was similar in both groups. Participants that met criteria for at least one PPS were less likely to have a university degree (28.9%) than those without such symptoms (46.4%), $\chi^2(2) = 7.86$, p=0.02, and somewhat less likely to be in a relationship (67.9%) than those without (79.5%), $\chi^2(2) = 4.22$, p=0.04.

Heart-related PPS and its relationship with other PPS, work status and mental health

As shown in Table 3, NCCP patients who met the additional criteria for heart-related PPS were more likely to be inactive or unable to work, had on average more general anxiety and anxiety about their health, and were more depressed and ruminated more relative to other NCCP patients. There was a significant association between meeting the additional PPS criteria and having health anxiety and depression scores in the clinical range. NCCP patients meeting these criteria were almost four times more likely to have health anxiety scores and more than five times more likely to have depression scores in the clinical range than other NCCP patients.

Table 3

Comparisons of working status, rumination and symptoms of anxiety, depression and health anxiety between NCCP patients that did and did not meet criteria for heart-related PPS

Measure	All NCCP patients (N=285) n (%)	Heart-related PPS criteria met (*N*=85) *n* (%)	Heart-related PPS criteria not met (*N*=200) *n* (%)	Significance χ^2	Effect size *OR*
Work inactivity	27 (10.1%)	14 (18.2%)	13 (6.8%)	7.75*	3.03
Inability to work	22 (8.2%)	11 (14.3%)	11 (5.8%)	5.23*	2.71
SHAI $_{\geq 18}$	17 (6.2%)	10 (12.2%)	7 (3.6%)	7.22*	3.67
GAD-7 $_{\geq 10}$	40 (14.4%)	17 (20.7%)	23 (11.8%)	3.73	1.96
PHQ-9 $_{\geq 10}$	47 (17.0%)	29 (34.9%)	18 (9.3%)	26.95*	5.22
	M (SD)	*M (SD)*	*M (SD)*	*t*	*r*
SHAI $_{\text{Mean (SE)}}$	8.79 (5.52)	10.88 (6.83)	7.90 (4.60)	-3.62*	0.32
GAD-7 $_{\text{Mean (SE)}}$	4.70 (5.02)	6.77 (5.81)	3.83 (4.38)	-4.11*	0.35
PHQ-9 $_{\text{Mean (SD)}}$	6.50 (3.98)	8.47 (4.57)	5.65 (3.38)	-5.06*	0.42
PTQ $_{\text{Mean (SE)}}$	14.54 (12.44)	18.68 (13.68)	12.78 (11.46)	-3.43*	0.29
Total number of non-heart related PPS	1.31 (1.46)	2.41 (1.55)	0.84 (1.13)	-8.49*	0.61

Note. NCCP = Non cardiac chest pain; PPS = Persistent physical symptoms; OR = Odds ratio; SHAI = Short Health Anxiety Inventory; PHQ-9 = Patient Health Questionnaire-9; GAD-7=Generalised Anxiety Disorder-7; PTQ = Perseverative Thinking Questionnaire.

* $p < 0.05$

NCCP patients that met the additional PPS criteria had a higher number of other PPS on average than other NCCP patients. NCCP patients in general and those that do not meet the additional criteria most commonly do not meet criteria for any other PPS and the prevalence declines as the number of PPS increase. On the other hand, most NCCP patients who met the additional PPS criteria also met criteria for one or more non-heart related PPS and in fact, they most commonly met criteria for 3 to 4 other PPS as well.

Discussion

The aim of this thesis was to investigate the extent of and relationship between PPS, psychological distress and work disability. First, we evaluated the prevalence of PPS within an Icelandic vocational rehabilitation setting, investigated how they related to mental health problems and identified vocational rehabilitation service seekers that might benefit from psychological treatment in the context of their PPS. Next, we examined how well PPS and psychological distress predicted work disability and the response to work rehabilitation in the same setting, and whether these same factors influenced drop out from rehabilitation. Finally, we investigated the relationship between PPS, mental health and work disability from another angle in a different setting by looking specifically at patients that had been diagnosed with NCCP after a CED visit. We compared NCCP patients who met the criteria for heart-related PPS to those that did not in terms of work status, non-heart related PPS and psychological symptoms.

The prevalence of PPS and associations with mental health problems and work disability.

The prevalence of PPS among Icelandic vocational rehabilitation service seekers was very high (80.9%), with most participants meeting criteria for multiple PPS (61.7%); the modal number of PPS being three. Symptoms of depression, anxiety, social anxiety and post-traumatic stress were also prevalent with 80.1% of service seekers meeting caseness criteria for depression, anxiety or health anxiety on self-report measures. The presence and number of PPS were both found to be significantly associated with depression, anxiety and health anxiety.

In our sample of NCCP patients, patients commonly met criteria for heart-related PPS. Patients that met these criteria were more depressed, anxious and health anxious and ruminated more than other NCCP patients and were more likely to meet caseness for depression and health anxiety on self-report measures. A minority of these patients (16.5%) did not meet criteria for any other PPS; they most commonly met criteria for three to four additional PPS. In contrast, patients, whose heart and chest symptoms did not meet PPS criteria typically did not meet criteria for any other PPS, and if they did they rarely met criteria for more than two (10%).

The prevalence of PPS has, to our knowledge, not been examined before in the context of work rehabilitation. Studies in other settings have revealed substantially lower prevalence rates. According to those studies, about a third of primary care patients (Budtz-Lilly, Vestergaard, et al., 2015a; Jackson & Passamonti, 2005; Roca et al., 2009; Steinbrecher et al., 2011), between one third and two-thirds of secondary care patients (Carson et al., 2000; Nimnuan et al., 2001) and one-fifth of patients who frequently attend secondary care

specialities (Reid et al., 2001) have one or more PPS. The prevalence of PPS was estimated, with the PPSC, in two recent studies within English and Icelandic primary care. In these studies, 24.5% of Icelandic and 31.3% of English primary care patients reported having one or more PPS, and the modal number was one (Flóvenz et al., 2021; Gregory et al., n.d.). This thesis's results are generally consistent with what is already known about PPS in terms of comorbidity and the prevalence of multiple PPS. PPS have been associated with common psychiatric disorders such as anxiety and depression (Budtz-Lilly, Vestergaard, et al., 2015a; Harris et al., 2009a; Löwe et al., 2008) and when people meet criteria for a specific PPS they often meet criteria for more than one such condition (Dimsdale et al., 2011; Wessely et al., 1999; Wessely & White, 2004).

In our sample of work rehabilitation service seekers, PPS, depressive and social anxiety symptoms independently predicted functional impairment at the beginning of vocational rehabilitation while age, gender, other psychological symptoms, and their interactions with PPS did not. Similarly, in our sample of NCCP patients, those that met the additional criteria for heart-related PPS were more than twice as likely to be unable to work and three times more likely to be occupationally inactive than other NCCP patients. They were also more depressed, anxious and health anxious, ruminated more and had a higher average number of other PPS than other NCCP patients. These results are also in line with previous research on PPS where they have been linked with functional impairment, work disability and reduced quality of life (den Boeft et al., 2016; Hoedeman et al., 2009, 2010; Loengaard et al., 2015; Rask et al., 2015). PPS have previously been found to be associated with sickness absence from work, prolonged sickness leaves, permanent disability, unemployment and an increased risk for becoming unemployed (Amland et al., 2014; den Boeft et al., 2016; Harris et al.,

2009b; Hoedeman et al., 2010; Loengaard et al., 2015; Momsen et al., 2016; Rask et al., 2015).

Predicting the outcome of vocational rehabilitation

The results of our study on the outcome of vocational rehabilitation, which was done in an inclusive real-life setting, are not easily comparable to the results of other studies due to the narrow focus of most other studies. By contrast, the participants in our study were drawn from all sectors of the labour market, their background and health conditions varied, and the interventions they were offered differed as they were based on individual rehabilitation plans.

We conclude that the general outcome of VIRK's rehabilitation programme is good. At the end of our vocational rehabilitation study, about two-thirds of VIRK's service seekers had completed their rehabilitation, and the majority of those did so successfully by having returned to work or study. Only about a quarter of service users completed their rehabilitation without returning to work. About one in ten cases where service seekers did not return to work could be predicted with our data, but none of our demographic variables and only a few of our psychological ones contributed to that prediction. Our model may have identified a subgroup of people with a particular symptom combination and a substantially reduced probability of success. People with depressive symptoms in the clinical range that have persistent pain but not persistent fatigue were substantially less likely to return to work than participants with any other combination of these symptoms. Detailed examination of the data did not reveal any apparent reason for this. These participants do not seem to have more disabling pain, and most do report experiencing fatigue but below the threshold for PPS fatigue criteria. In should be noted in this context that fatigue is a common symptom of depression. A possible explanation for this could be how the rehabilitation interventions these participants receive are matched

with their symptoms. For example, there could be a mismatch if these individuals were offered fatigue-focused treatment as their fatigue is not a primary contributor to their disability. It is worth noting that further research is needed to confirm these results as they are based on a small sample.

The rehabilitation VIRK service seekers received varied in length and ranged from about three and a half months to two years and eight months, with a mean of approximately one year and three months. Almost all service users finished their rehabilitation within two years, and about half within one year. The rehabilitation duration was not related to the presence or number of PPS, nor the severity or number of psychological symptoms. This could also be explained by how rehabilitation interventions are matched with the service users' symptoms. The treatment, which service users receive, might vary in: effectiveness, how well it matches their problems, and the extent to which it targets the particular symptoms that contribute to their work disability.

Methodological consideration and limitations

Comparisons with reports from VIRK (VIRK Vocational Rehabilitation Fund, 2018) suggests that the sample in study I and II were broadly similar to the population of people seeking work rehabilitation in Iceland although there seem to be some differences in terms of education as a somewhat higher proportion of people in our sample have a university degree. This is not surprising given that participants that had limited reading abilities or did not speak Icelandic were excluded from the study. This exclusion criteria somewhat limits the study's generalizability as substantial number of VIRK's service seekers (most commonly manual labourers) do not speak Icelandic. The sample in study III is roughly comparable with previously studied NCCP-samples in terms of age, gender, educational level and marital status

(Dammen et al., 2008; Eslick & Talley, 2004, 2008; Mourad et al., 2016). Symptoms of anxiety and depression were broadly similar to what has previously been reported in similar settings, although average levels of depressive symptoms might be slightly higher and the proportion of participants with anxiety problems slightly smaller than in previous studies (Eslick & Talley, 2008; Webster et al., 2012). These differences may be accounted for by different scales and cut-off scores being used in different studies. The cultural characteristics of the population might also have influenced the results although this possible limitation of generalizability is not likely to be of major concern as Icelanders tend to be similar to other North-European populations in terms of reported psychological characteristics.

Not all eligible rehabilitation service seekers and chest pain patients were invited to participate; in study III, a number of patients were not recruited to the study. Those missing recruitment opportunities are considered being at random with regard to the associations under study as they were caused by the CED staff not having the opportunity to present the study to their patients at busy times. Missed recruitment opportunities in our vocational rehabilitation sample (study I and II) were both due to random and non-random reasons. The most common reason for missed recruitment opportunities was that the rehabilitation counsellors forgot to present the study to their clients or were not instructed to do so by their supervisors. The main non-random reason was that that the rehabilitation counsellors occasionally deemed it too invasive to ask their client to participate in the study due to their sensitive emotional state. This might have caused the exclusion of a small number of service seekers with, particularly severe emotional symptoms. It is also worth noting that non Icelandic speaking individuals were not included in the study as they would not have been able to fill out the study questionnaires. Despite these limitations, our samples largely represent the targeted

populations, and the response rates were very high (85% for study I and II and 91% for study III).

Future directions

The results of this thesis are mainly based on self-report scales completed by participants, and it would be helpful to replicate them with more robust methods where differential diagnoses could also be considered. It would also be appropriate to confirm results concerning the outcome of vocational rehabilitation in a larger sample as our sample size resulted in small subgroup sizes in some analyses. However, it is worth noting in this context that our sample of 324 individuals is close to being the population, i.e., all Icelandic speaking individuals that sought vocational rehabilitation within Reykjavík during the study period. Due to the Icelandic population's size, recruiting a larger sample of vocational rehabilitation service seekers would require an extended data collection or incorporating the measures of interest into VIRK's routine clinical evaluation.

The prevalence of PPS was extremely high among Icelandic vocational rehabilitation service seekers, and a substantial proportion of the NCCP patients also met PPS criteria. In both samples, meeting criteria for PPS was associated with having clinical levels of depression and health anxiety as well as with higher scores on measures of general anxiety. It is not clear which of these variables are primary and secondary, or (more likely) whether there is a complex interaction between them. Consequently, these psychological symptoms might need to be specifically targeted in the treatment of PPS or alternatively might be resolved by treating the PPS. Further studies are needed on which psychological and psychophysiological factors and processes play a role in PPS and how they might best be targeted in treatment. Furthermore, an investigation of how such factors might differ between different PPS subtypes

is needed. Investigating this in our vocational rehabilitation sample proved to be impossible because of how prevalent multiple PPS were.

Based on the results of the vocational rehabilitation studies, there is a clear need to investigate how interventions offered to service users are matched with their symptoms and particularly the symptoms that directly relate to their work disability. Interventions that specifically target symptoms that have been shown to relate to work disability should be implemented and evaluated in terms of their impact on return to work and the duration of the rehabilitation. In this context, special attention should be given to depressive symptoms, PPS, and social anxiety symptoms as these symptoms were found to specifically predict functional impairment among Icelandic vocational rehabilitation service seekers.

Clinical implications

Organisational factors known to positively influence return to work are embedded in VIRK's services and the overall beneficial outcome of the rehabilitation they offer highlights the importance of systematically employing such factors within vocational rehabilitation. PPS and depression were extremely prevalent in this setting and were shown to predict work disability at the beginning of the rehabilitation. Furthermore, it seems that subgroup of people with a specific combination of these symptoms may be significantly less likely to return to work than other vocational rehabilitation service seekers. Taken together, these observations warrant giving special attention to PPS and depressive symptoms by routinely assessing and specifically treating them within the vocational rehabilitation setting.

Despite the general success of VIRK's vocational rehabilitation there was an incredible variability in its duration which could not be predicted by the severity of psychological

symptoms or functional impairment at its beginning. This suggests that the problems contributing to work disability might be targeted more efficiently. In this context, service providers should consider offering a specialized T-CBT for PPS to individuals with PPS and psychological distress. Cognitive behavioural approaches have been shown to be effective for specific PPS types, and transdiagnostic ones a promising alternative. Transdiagnostic or hybrid transdiagnostic/diagnosis specific intervention would be preferable in vocational rehabilitation settings as the prevalence of multiple PPS is high and the group being treated tends to be heterogeneous in terms of background characteristics, medical diagnoses and psychological symptoms. It is important to note here that any cognitive behavioural intervention used in this context should have an embedded work focus as such a focus has been shown important in terms of return to work outcomes. The treatment provided to this group should be continuously evaluated in terms of return to work in addition to their impact on symptoms and general functional impairment.

Although this thesis' results highlight the importance of specifically targeting PPS in vocational rehabilitation, they also suggest that there may be value in identifying people with PPS and providing them with effective psychological treatment. This could (and should) be done at different stages. These patients could be identified as early as possible in primary care settings, where about a quarter of patients report having PPS, and the majority of these patients are psychologically distressed or experience multiple such symptoms (Flóvenz et al., 2021; Gregory et al., n.d.). They might also be identified in secondary care clinics such as in the CED, where our results suggest a significant number of patients are likely to benefit from psychological treatment for PPS. Furthermore, a system that reviews the circumstances of people struggling with workability at an even earlier stage in an occupational context such (as

workplace occupational health services or through labour unions) might be preferable. Early detection and treatment of PPS might be beneficial not only for the affected individuals but also for employers and labour unions because it might reduce the associated work disability and risk of permanent disability.

Conclusions

Our studies demonstrate that PPS are extremely common among Icelandic vocational rehabilitation service seekers and that those with such symptoms commonly report multiple symptoms and reach clinical levels in terms of ratings of depression, anxiety and health anxiety. Furthermore, these psychological symptoms increase in severity with the number of PPS. PPS were also common among NCCP patients, and those with such symptom were similar to other PPS patients in terms of comorbidity and disability. Overall, these results suggest that 1) Identifying and treating PPS within primary or secondary care or in an occupational context might be valuable. 2) In vocational rehabilitation, special attention should be given to PPS and depressive symptoms, as they are associated with more severe impairment and with a lower return to work rate. 3) Many vocational rehabilitation service seekers and NCCP patients might benefit from specialized psychological treatment for PPS, and such treatment should preferably be transdiagnostic or hybrid-transdiagnostic. 4) The interventions used in work rehabilitation need to be evaluated in terms of how well they match reported symptoms and whether they target the particular symptoms contributing to work disability.

References

Alberts, N. M., Hadjistavropoulos, H. D., Jones, S. L., & Sharpe, D. (2013). The Short Health Anxiety Inventory: A systematic review and meta-analysis. *Journal of Anxiety Disorders*, *27*(1), 68–78. https://doi.org/10.1016/j.janxdis.2012.10.009

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR.* American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders 5th ed.* (Washington, DC). American Psychiatric Association.

Amland, A., Malterud, K., & Werner, E. L. (2014). Patients with persistent medically unexplained physical symptoms: A descriptive study from Norwegian general practice. *BMC Family Practice*. https://doi.org/doi:10.1186/1471-2296-15-107

Barsky, A. J., Orav, E. J., & Bates, D. W. (2005). Somatization increases medical utilization and costs independent of psychiatric and medical comorbidity. *Archives of General Psychiatry*, *62*(8), 903. https://doi.org/10.1001/archpsyc.62.8.903

Barsky AJ, Orav E, & Bates DW. (2005). Somatization increases medical utilization and costs independent of psychiatric and medical comorbidity. *Archives of General Psychiatry*, *62*(8), 903–910. https://doi.org/10.1001/archpsyc.62.8.903

Beck, J. G., Grant, D. M., Read, J. P., Clapp, J. D., Coffey, S. F., Miller, L. M., & Palyo, S. A. (2008). The Impact of Event Scale –Revised: Psychometric properties in a sample of motor vehicle accident survivors. *Journal of Anxiety Disorders*, *22*(2), 187–198. https://doi.org/10.1016/j.janxdis.2007.02.007

Bekhuis, E., Boschloo, L., Rosmalen, J. G. M., & Schoevers, R. A. (2015). Differential associations of specific depressive and anxiety disorders with somatic symptoms.

Journal of Psychosomatic Research, *78*(2), 116–122. https://doi.org/10.1016/j.jpsychores.2014.11.007

Berglund, E., Anderzén, I., Andersén, Å., Carlsson, L., Gustavsson, C., Wallman, T., & Lytsy, P. (2018). Multidisciplinary Intervention and Acceptance and Commitment Therapy for Return-to-Work and Increased Employability among Patients with Mental Illness and/or Chronic Pain: A Randomized Controlled Trial. *International Journal of Environmental Research and Public Health*, *15*(11). https://doi.org/10.3390/ijerph15112424

Berman, A. H., Bergman, H., Palmstierna, T., & Schlyter, F. (2005). Evaluation of the Drug Use Disorders Identification Test (DUDIT) in Criminal Justice and Detoxification Settings and in a Swedish Population Sample. *European Addiction Research*, *11*(1), 22–31. https://doi.org/10.1159/000081413

Boness, C. L., Hershenberg, R., Kaye, J., Mackintosh, M.-A., Grasso, D. J., Noser, A., & Raffa, S. D. (n.d.). An evaluation of cognitive behavioral therapy for insomnia: A systematic review and application of Tolin's Criteria for empirically supported treatments. *Clinical Psychology: Science and Practice*, *n/a*(n/a), e12348. https://doi.org/10.1111/cpsp.12348

Bransfield, R. C., & Friedman, K. J. (2019). Differentiating Psychosomatic, Somatopsychic, Multisystem Illnesses and Medical Uncertainty. *Healthcare*, *7*(4), 114. https://doi.org/10.3390/healthcare7040114

Briand, C., Durand, M.-J., St-Arnaud, L., & Corbière, M. (2008). How well do return-to-work interventions for musculoskeletal conditions address the multicausality of work

disability? *Journal of Occupational Rehabilitation*, *18*(2), 207–217. https://doi.org/10.1007/s10926-008-9128-1

Budtz-Lilly, A., Schröder, A., Rask, M. T., Fink, P., Vestergaard, M., & Rosendal, M. (2015). Bodily distress syndrome: A new diagnosis for functional disorders in primary care? *BMC Family Practice*, *16*(1), 180. https://doi.org/10.1186/s12875-015-0393-8

Budtz-Lilly, A., Vestergaard, M., Fink, P., Carlsen, A. H., & Rosendal, M. (2015a). Patient characteristics and frequency of bodily distress syndrome in primary care: A cross-sectional study. *Br J Gen Pract*, *65*(638), 617–623. https://doi.org/10.3399/bjgp15X686545

Budtz-Lilly, A., Vestergaard, M., Fink, P., Carlsen, A. H., & Rosendal, M. (2015b). The prognosis of bodily distress syndrome: A cohort study in primary care. *General Hospital Psychiatry*, *37*(6), 560–566. https://doi.org/10.1016/j.genhosppsych.2015.08.002

Burton, C., McGorm, K., Weller, D., & Sharpe, M. (2011). Depression and anxiety in patients repeatedly referred to secondary care with medically unexplained symptoms: A case-control study. *Psychological Medicine*, *41*(3), 555–563. https://doi.org/10.1017/S0033291710001017

Campbell, K. A., Madva, E. N., Villegas, A. C., Beale, E. E., Beach, S. R., Wasfy, J. H., Albanese, A. M., & Huffman, J. C. (2017). Non-cardiac Chest Pain: A Review for the Consultation-Liaison Psychiatrist. *Psychosomatics*, *58*(3), 252–265. https://doi.org/10.1016/j.psym.2016.12.003

Cancelliere, C., Donovan, J., Stochkendahl, M. J., Biscardi, M., Ammendolia, C., Myburgh, C., & Cassidy, J. D. (2016). Factors affecting return to work after injury or illness:

Best evidence synthesis of systematic reviews. *Chiropractic & Manual Therapies*, *24*(1). https://doi.org/10.1186/s12998-016-0113-z

Carson, A. J., Ringbauer, B., Stone, J., McKenzie, L., Warlow, C., & Sharpe, M. (2000). Do medically unexplained symptoms matter? A prospective cohort study of 300 new referrals to neurology outpatient clinics. *Journal of Neurology, Neurosurgery, and Psychiatry*, *68*(2), 207–210.

Castell, B. D., Kazantzis, N., & Moss-Morris, R. E. (2011). Cognitive Behavioral Therapy and Graded Exercise for Chronic Fatigue Syndrome: A Meta-Analysis. *Clinical Psychology: Science and Practice*, *18*(4), 311–324. https://doi.org/10.1111/j.1468-2850.2011.01262.x

Chalder, T., Patel, M., James, K., Hotopf, M., Frank, P., Watts, K., McCrone, P., David, A., Ashworth, M., Husain, M., Garrood, T., Moss-Morris, R., & Landau, S. (2019). Persistent physical symptoms reduction intervention: A system change and evaluation in secondary care (PRINCE secondary) - a CBT-based transdiagnostic approach: study protocol for a randomised controlled trial. *BMC Psychiatry*, *19*(1), 307. https://doi.org/10.1186/s12888-019-2297-y

Chalder, T., & Willis, C. (2017). “Lumping” and “splitting” medically unexplained symptoms: Is there a role for a transdiagnostic approach? *Journal of Mental Health*, *26*(3), 187–191. https://doi.org/10.1080/09638237.2017.1322187

Chambers, J. B., Marks, E. M., Russell, V., & Hunter, M. S. (2015). A multidisciplinary, biopsychosocial treatment for non-cardiac chest pain. *International Journal of Clinical Practice*, *69*(9), 922–927. https://doi.org/10.1111/ijcp.12533

Cornelius, L. R., van der Klink, J. J. L., Groothoff, J. W., & Brouwer, S. (2011). Prognostic factors of long term disability due to mental disorders: A systematic review. *Journal of Occupational Rehabilitation*, *21*(2), 259–274. https://doi.org/10.1007/s10926-010-9261-5

Craske, M. G., Wolitzky-Taylor, K. B., Labus, J., Wu, S., Frese, M., Mayer, E. A., & Naliboff, B. (2011). A Cognitive-Behavioral Treatment for Irritable Bowel Syndrome Using Interoceptive Exposure to Visceral Sensations. *Behaviour Research and Therapy*, *49*(6–7), 413–421. https://doi.org/10.1016/j.brat.2011.04.001

Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the Impact of Event Scale—Revised. *Behaviour Research and Therapy*, *41*(12), 1489–1496. https://doi.org/10.1016/j.brat.2003.07.010

Crisp, R. (2005). Key Factors Related to Vocational Outcome: Trends for Six Disability Groups. *The Journal of Rehabilitation*, *71*(4), 30.

Cullen, K. L., Irvin, E., Collie, A., Clay, F., Gensby, U., Jennings, P. A., Hogg-Johnson, S., Kristman, V., Laberge, M., McKenzie, D., Newnam, S., Palagyi, A., Ruseckaite, R., Sheppard, D. M., Shourie, S., Steenstra, I., Van Eerd, D., & Amick, B. C. (2018). Effectiveness of Workplace Interventions in Return-to-Work for Musculoskeletal, Pain-Related and Mental Health Conditions: An Update of the Evidence and Messages for Practitioners. *Journal of Occupational Rehabilitation*, *28*(1), 1–15. https://doi.org/10.1007/s10926-016-9690-x

Dammen, T., Ekeberg, Ø., Arnesen, H., & Friis, S. (2008). Health-related quality of life in non-cardiac chest pain patients with and without panic disorder. *International Journal of Psychiatry in Medicine*, *38*(3), 271–286. https://doi.org/10.2190/PM.38.3.d

Dear, B. F., Titov, N., Perry, K. N., Johnston, L., Wootton, B. M., Terides, M. D., Rapee, R. M., & Hudson, J. L. (2013). The Pain Course: A randomised controlled trial of a clinician-guided Internet-delivered cognitive behaviour therapy program for managing chronic pain and emotional well-being. *Pain, 154*(6), 942–950. https://doi.org/10.1016/j.pain.2013.03.005

Debney, M. T., & Fox, K. F. (2012). Rapid access cardiology—A nine year review. *QJM: An International Journal of Medicine, 105*(3), 231–234. https://doi.org/10.1093/qjmed/hcr182

den Boeft, M., Twisk, J. W. R., Hoekstra, T., Terluin, B., Penninx, B. W. J. H., van der Wouden, J. C., Numans, M. E., & van der Horst, H. E. (2016). Medically unexplained physical symptoms and work functioning over 2 years: Their association and the influence of depressive and anxiety disorders and job characteristics. *BMC Family Practice*, *17*, 46. https://doi.org/10.1186/s12875-016-0443-x

Detaille, S. I., Heerkens, Y. F., Engels, J. A., van der Gulden, J. W. J., & van Dijk, F. J. H. (2009). Common prognostic factors of work disability among employees with a chronic somatic disease: A systematic review of cohort studies. *Scandinavian Journal of Work, Environment & Health*, *35*(4), 261–281. https://doi.org/10.5271/sjweh.1337

Dimsdale, J., Sharma, N., & Sharpe, M. (2011). What do physicians think of somatoform disorders? *Psychosomatics*, *52*(2), 154–159. https://doi.org/10.1016/j.psym.2010.12.011

Dumville, J. C., MacPherson, H., Griffith, K., Miles, J. N. V., & Lewin, R. J. (2007). Non-cardiac chest pain: A retrospective cohort study of patients who attended a Rapid

Access Chest Pain Clinic. *Family Practice*, *24*(2), 152–157. https://doi.org/10.1093/fampra/cmm002

Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schönfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*(2), 225–232. https://doi.org/10.1016/j.jbtep.2010.12.003

Esler, J. L., Barlow, D. H., Woolard, R. H., Nicholson, R. A., Nash, J. M., & Erogul, M. H. (2003). A brief cognitive-behavioral intervention for patients with noncardiac chest pain. *Behavior Therapy*, *34*(2), 129–148. https://doi.org/10.1016/S0005-7894(03)80009-6

Eslick, G. D., Jones, M. P., & Talley, N. J. (2003). Non-cardiac chest pain: Prevalence, risk factors, impact and consulting--a population-based study. *Alimentary Pharmacology & Therapeutics*, *17*(9), 1115–1124. https://doi.org/10.1046/j.1365-2036.2003.01557.x

Eslick, G. D., & Talley, N. J. (2004). Non-cardiac chest pain: Predictors of health care seeking, the types of health care professional consulted, work absenteeism and interruption of daily activities. *Alimentary Pharmacology & Therapeutics*, *20*(8), 909–915. https://doi.org/10.1111/j.1365-2036.2004.02175.x

Eslick, G. D., & Talley, N. J. (2008). Natural history and predictors of outcome for non-cardiac chest pain: A prospective 4-year cohort study. *Neurogastroenterology and Motility*, *20*(9), 989–997. https://doi.org/10.1111/j.1365-2982.2008.01133.x

Fass, R., & Dickman, R. (2006). Non-cardiac chest pain: An update. *Neurogastroenterology and Motility: The Official Journal of the European Gastrointestinal Motility Society*, *18*(6), 408–417. https://doi.org/10.1111/j.1365-2982.2006.00787.x

Fink, P., & Schröder, A. (2010). One single diagnosis, bodily distress syndrome, succeeded to capture 10 diagnostic categories of functional somatic syndromes and somatoform disorders. *Journal of Psychosomatic Research*, *68*(5), 415–426. https://doi.org/10.1016/j.jpsychores.2010.02.004

Fink, P., Toft, T., Hansen, M. S., Ørnbøl, E., & Olesen, F. (2007). Symptoms and Syndromes of Bodily Distress: An Exploratory Study of 978 Internal Medical, Neurological, and Primary Care Patients: *Psychosomatic Medicine*, *69*(1), 30–39. https://doi.org/10.1097/PSY.0b013e31802e46eb

Flóvenz, S., Broddadóttir, E., Brynjólfsson, S., Agnarsdóttir, A., Salkovskis, P. M., & Sigurðsson, J. F. (2021). Tíðni þrálátra óútskýrðra líkamlegra einkenna og tengsl við einkenni þunglyndis og kvíða. *Læknablaðið*.

Flóvenz, S., Salkovskis, P. M., Gregory, J., Valdimarsdóttir, H., Sigurðsson, E., & Sigurðsson, J. F. (n.d.). Persistent Physical Symptoms and mental health problems among individuals seeking work rehabilitation. *Manuscript Submitted for Publication*.

Flóvenz, S., Salkovskis, P. M., Svandsdóttir, E., Karlsson, H. D., & Andersen, K. (n.d.). Non-Cardiac Chest Pain as a Persistent Physical Symptom: Psychological distress and workability. *Manuscript Submitted for Publication*.

Frieling, T. (2018). Non-Cardiac Chest Pain. *Visceral Medicine*, *34*(2), 92–96. https://doi.org/10.1159/000486440

Gierk, B., Kohlmann, S., Kroenke, K., Spangenberg, L., Zenger, M., Brähler, E., & Löwe, B. (2014). The Somatic Symptom Scale–8 (SSS-8): A Brief Measure of Somatic Symptom Burden. *JAMA Internal Medicine*, *174*(3), 399–407. https://doi.org/10.1001/jamainternmed.2013.12179

Glombiewski, J. A. a, Sawyer, A. T. a, Gutermann, J. a, Koenig, K. a, Rief, W. b, & Hofmann, S. G. a. (2010). Psychological treatments for fibromyalgia: A meta-analysis. *Pain*, *151*(2), 280–295. https://doi.org/10.1016/j.pain.2010.06.011

Gregory, J., Flóvenz, S., Broddadóttir, E., Sigurðsson, J. F., & Salkovskis, P. M. (n.d.). Managing 'Persistent Physical Symptoms' in adults in primary care: Prevalence, co-morbidity with psychological distress and willingness to engage in treatment. *Manuscript in Preperation*.

Gureje, O., Simon, G. E., Ustun, T. B., & Goldberg, D. P. (1997). Somatization in cross-cultural perspective: A World Health Organization study in primary care. *The American Journal of Psychiatry*, *154*(7), 989–995. https://doi.org/10.1176/ajp.154.7.989

Hamer, H., Gandhi, R., Wong, S., & Mahomed, N. N. (2013). Predicting return to work following treatment of chronic pain disorder. *Occupational Medicine (Oxford, England)*, *63*(4), 253–259. https://doi.org/10.1093/occmed/kqt019

Hara, K. W., Bjørngaard, J. H., Jacobsen, H. B., Borchgrevink, P. C., Johnsen, R., Stiles, T. C., Brage, S., & Woodhouse, A. (2018). Biopsychosocial predictors and trajectories of work participation after transdiagnostic occupational rehabilitation of participants with mental and somatic disorders: A cohort study. *BMC Public Health*, *18*(1), 1014. https://doi.org/10.1186/s12889-018-5803-0

Hara, K. W., Borchgrevink, P. C., Jacobsen, H. B., Fimland, M. S., Rise, M. B., Gismervik, S., & Woodhouse, A. (2018). Transdiagnostic group-based occupational rehabilitation for participants with chronic pain, chronic fatigue and common mental disorders. A

feasibility study. *Disability and Rehabilitation*, *40*(21), 2516–2526. https://doi.org/10.1080/09638288.2017.1339298

Harris, A. M., Orav, E. J., Bates, D. W., & Barsky, A. J. (2009a). Somatization Increases Disability Independent of Comorbidity. *Journal of General Internal Medicine*, *24*(2), 155–161. https://doi.org/10.1007/s11606-008-0845-0

Harris, A. M., Orav, E. J., Bates, D. W., & Barsky, A. J. (2009b). Somatization increases disability independent of comorbidity. *Journal of General Internal Medicine*, *24*(2), 155–161. https://doi.org/10.1007/s11606-008-0845-0

Ho, F. Y.-Y., Chan, C. S., Lo, W.-Y., & Leung, J. C.-Y. (2020). The effect of self-help cognitive behavioral therapy for insomnia on depressive symptoms: An updated meta-analysis of randomized controlled trials. *Journal of Affective Disorders*, *265*, 287–304. https://doi.org/10.1016/j.jad.2020.01.062

Hoedeman, R., Blankenstein, A. H., Krol, B., Koopmans, P. C., & Groothoff, J. W. (2010). The Contribution of High Levels of Somatic Symptom Severity to Sickness Absence Duration, Disability and Discharge. *Journal of Occupational Rehabilitation*, *20*(2), 264–273. https://doi.org/10.1007/s10926-010-9239-3

Hoedeman, R., Krol, B., Blankenstein, N., Koopmans, P. C., & Groothoff, J. W. (2009). Severe MUPS in a sick-listed population: A cross-sectional study on prevalence, recognition, psychiatric co-morbidity and impairment. *BMC Public Health*, *9*, 440. https://doi.org/10.1186/1471-2458-9-440

Iles, R. A., Davidson, M., & Taylor, N. F. (2008). Psychosocial predictors of failure to return to work in non-chronic non-specific low back pain: A systematic review. *Occupational*

and Environmental Medicine, 65(8), 507–517. https://doi.org/10.1136/oem.2007.036046

Ingólfsdóttir, R. (2014). *Psychometric Properties of the Icelandic Version of the Generalized Anxiety Disorder-7*. Háskólinn í Reykjavík.

Jackson, J. L., & Passamonti, M. (2005). The outcomes among patients presenting in primary care with a physical symptom at 5 years. *Journal of General Internal Medicine, 20*(11), 1032–1037. https://doi.org/10.1111/j.1525-1497.2005.0241.x

Jonsbu, E., Dammen, T., Morken, G., Lied, A., Vik-Mo, H., & Martinsen, E. W. (2009). Cardiac and psychiatric diagnoses among patients referred for chest pain and palpitations. *Scandinavian Cardiovascular Journal*, *43*(4), 256–259. https://doi.org/10.1080/14017430902946749

Jonsbu, E., Dammen, T., Morken, G., Moum, T., & Martinsen, E. W. (2011). Short-term cognitive behavioral therapy for non-cardiac chest pain and benign palpitations: A randomized controlled trial. *Journal of Psychosomatic Research, 70*(2), 117–123. https://doi.org/10.1016/j.jpsychores.2010.09.013

Karlsson, B., Burell, G., Anderberg, U.-M., & Svärdsudd, K. (2015). Cognitive behaviour therapy in women with fibromyalgia: A randomized clinical trial. *Scandinavian Journal of Pain, 9*, 11–21. https://doi.org/10.1016/j.sjpain.2015.04.027

Katon, W., Lin, E., Von Korff, M., Russo, J., Lipscomb, P., & Bush, T. (1991). Somatization: A spectrum of severity. *The American Journal of Psychiatry*, *148*(1), 34–40.

Kim, D.-Y., Lee, J.-S., Park, S.-Y., Kim, S.-J., & Son, C.-G. (2020). Systematic review of randomized controlled trials for chronic fatigue syndrome/myalgic encephalomyelitis

(CFS/ME). *Journal of Translational Medicine*, *18*(1), 7. https://doi.org/10.1186/s12967-019-02196-9

Kirmayer, L. J., Groleau, D., Looper, K. J., & Dao, M. D. (2004). Explaining medically unexplained symptoms. *Canadian Journal of Psychiatry. Revue Canadienne De Psychiatrie*, *49*(10), 663–672. https://doi.org/10.1177/070674370404901003

Kisely, S. R., Campbell, L. A., Yelland, M. J., & Paydar, A. (2015). Psychological interventions for symptomatic management of non-specific chest pain in patients with normal coronary anatomy. *Cochrane Database of Systematic Reviews*, *6*. https://doi.org/10.1002/14651858.CD004101.pub5

Kleinstäuber, M., Allwang, C., Bailer, J., Berking, M., Brünahl, C., Erkic, M., Gitzen, H., Gollwitzer, M., Gottschalk, J.-M., Heider, J., Hermann, A., Lahmann, C., Löwe, B., Martin, A., Rau, J., Schröder, A., Schwabe, J., Schwarz, J., Stark, R., … Rief, W. (2019). Cognitive Behaviour Therapy Complemented with Emotion Regulation Training for Patients with Persistent Physical Symptoms: A Randomised Clinical Trial. *Psychotherapy and Psychosomatics*, *88*(5), 287–299. https://doi.org/10.1159/000501621

Kleinstäuber, M., Witthöft, M., & Hiller, W. (2011). Efficacy of short-term psychotherapy for multiple medically unexplained physical symptoms: A meta-analysis. *Clinical Psychology Review*, *31*(1), 146–160. https://doi.org/10.1016/j.cpr.2010.09.001

Knoop, H., Bleijenberg, G., Gielissen, M. F. M., van der Meer, J. W. M., & White, P. D. (2007). Is a full recovery possible after cognitive behavioural therapy for chronic fatigue syndrome? *Psychotherapy and Psychosomatics*, *76*(3), 171–176. https://doi.org/10.1159/000099844

Knoop, H., van der Meer, J. W. M., & Bleijenberg, G. (2008). Guided self-instructions for people with chronic fatigue syndrome: Randomised controlled trial. *The British Journal of Psychiatry: The Journal of Mental Science*, *193*(4), 340–341. https://doi.org/10.1192/bjp.bp.108.051292

Konnopka, A., Kaufmann, C., König, H.-H., Heider, D., Wild, B., Szecsenyi, J., Herzog, W., Heinrich, S., & Schaefert, R. (2013). Association of costs with somatic symptom severity in patients with medically unexplained symptoms. *Journal of Psychosomatic Research*, *75*(4), 370–375. https://doi.org/10.1016/j.jpsychores.2013.08.011

Kouyanou, K., Pither, C. E., Rabe-Hesketh, S., & Wessely, S. (1998). A comparative study of iatrogenesis, medication abuse, and psychiatric morbidity in chronic pain patients with and without medically explained symptoms. *Pain*, *76*(3), 417–426.

Kristjánsdóttir, H., Salkovskis, P. M., Sigurdsson, B. H., Sigurdsson, E., Agnarsdóttir, A., & Sigurdsson, J. F. (2016). Transdiagnostic cognitive behavioural treatment and the impact of co-morbidity: An open trial in a cohort of primary care patients. *Nordic Journal of Psychiatry*, *70*(3), 215–223. https://doi.org/10.3109/08039488.2015.1081404

Kristjánsdóttir, H., Sigurðsson, B. H., Salkovskis, P., Sigurðsson, E., Sighvatsson, M. B., & Sigurðsson, J. F. (2019). Effects of a Brief Transdiagnostic Cognitive Behavioural Group Therapy on Disorder Specific Symptoms. *Behavioural and Cognitive Psychotherapy*, *47*(1), 1–15. https://doi.org/10.1017/S1352465818000450

Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals*, *32*(9), 509–515. https://doi.org/10.3928/0048-5713-20020901-06

Kroenke, K., Spitzer, R. L., Williams, J. B., Linzer, M., Hahn, S. R., deGruy, F. V., & Brody, D. (1994). Physical symptoms in primary care. Predictors of psychiatric disorders and functional impairment. *Archives of Family Medicine, 3*(9), 774–779.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. *Journal of General Internal Medicine, 16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Lackner, J. M., Jaccard, J., Krasner, S. S., Katz, L. A., Gudleski, G. D., & Blanchard, E. B. (2007). How does cognitive behavior therapy for irritable bowel syndrome work? A mediational analysis of a randomized clinical trial. *Gastroenterology, 133*(2), 433–444. https://doi.org/10.1053/j.gastro.2007.05.014

Lacourt, T., Houtveen, J., & van Doornen, L. (2013). "Functional somatic syndromes, one or many?": An answer by cluster analysis. *Journal of Psychosomatic Research, 74*(1), 6–11. https://doi.org/10.1016/j.jpsychores.2012.09.013

Lagerveld, S. E., Bültmann, U., Franche, R. L., van Dijk, F. J. H., Vlasveld, M. C., van der Feltz-Cornelis, C. M., Bruinvels, D. J., Huijs, J. J. J. M., Blonk, R. W. B., van der Klink, J. J. L., & Nieuwenhuijsen, K. (2010). Factors associated with work participation and work functioning in depressed workers: A systematic review. *Journal of Occupational Rehabilitation, 20*(3), 275–292. https://doi.org/10.1007/s10926-009-9224-x

Laird, K. T., Tanner-Smith, E. E., Russell, A. C., Hollon, S. D., & Walker, L. S. (2017). Comparative efficacy of psychological therapies for improving mental health and daily functioning in irritable bowel syndrome: A systematic review and meta-analysis. *Clinical Psychology Review, 51,* 142–152. https://doi.org/10.1016/j.cpr.2016.11.001

Larun, L., Brurberg, K. G., Odgaard-Jensen, J., & Price, J. R. (2017). Exercise therapy for chronic fatigue syndrome. *The Cochrane Database of Systematic Reviews*, *4*, CD003200. https://doi.org/10.1002/14651858.CD003200.pub7

Lecrubier, Y., Sheehan, D., Weiller, E., Amorim, P., Bonora, I., Harnett Sheehan, K., Janavs, J., & Dunbar, G. (1997). The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: Reliability and validity according to the CIDI. *European Psychiatry*, *12*(5), 224–231. https://doi.org/10.1016/S0924-9338(97)83296-8

Lecrubier, Y., Wittchen, H. U., Faravelli, C., Bobes, J., Patel, A., & Knapp, M. (2000). A European perspective on social anxiety disorder. *European Psychiatry*, *15*(1), 5–16. https://doi.org/10.1016/S0924-9338(00)00216-9

Li, L., Xiong, L., Zhang, S., Yu, Q., & Chen, M. (2014). Cognitive–behavioral therapy for irritable bowel syndrome: A meta-analysis. *Journal of Psychosomatic Research*, *77*(1), 1–12. https://doi.org/10.1016/j.jpsychores.2014.03.006

Ljótsson, B., Falk, L., Vesterlund, A. W., Hedman, E., Lindfors, P., Rück, C., Hursti, T., Andréewitch, S., Jansson, L., Lindefors, N., & Andersson, G. (2010). Internet-delivered exposure and mindfulness based therapy for irritable bowel syndrome – A randomized controlled trial. *Behaviour Research and Therapy*, *48*(6), 531–539. https://doi.org/10.1016/j.brat.2010.03.003

Ljótsson, B., Hedman, E., Lindfors, P., Hursti, T., Lindefors, N., Andersson, G., & Rück, C. (2011). Long-term follow-up of internet-delivered exposure and mindfulness based treatment for irritable bowel syndrome. *Behaviour Research and Therapy*, *49*(1), 58–61. https://doi.org/10.1016/j.brat.2010.10.006

Ljótsson, B., Hesser, H., Andersson, E., Lackner, J. M., El Alaoui, S., Falk, L., Aspvall, K., Fransson, J., Hammarlund, K., Löfström, A., Nowinski, S., Lindfors, P., & Hedman, E. (2014). Provoking symptoms to relieve symptoms: A randomized controlled dismantling study of exposure therapy in irritable bowel syndrome. *Behaviour Research and Therapy*, *55*, 27–39. https://doi.org/10.1016/j.brat.2014.01.007

Loengaard, K., Bjorner, J. B., Fink, P. K., Burr, H., & Rugulies, R. (2015). Medically unexplained symptoms and the risk of loss of labor market participation—A prospective study in the Danish population. *BMC Public Health*, *15*, 844. https://doi.org/10.1186/s12889-015-2177-4

Loisel, P., Durand, M.-J., Berthelette, D., Vézina, N., Baril, R., Gagnon, D., Larivière, C., & Tremblay, C. (2001). Disability Prevention. *Disease Management and Health Outcomes*, *9*(7), 351–360. https://doi.org/10.2165/00115677-200109070-00001

Löwe, B., Spitzer, R. L., Williams, J. B. W., Mussell, M., Schellberg, D., & Kroenke, K. (2008). Depression, anxiety and somatization in primary care: Syndrome overlap and functional impairment. *General Hospital Psychiatry*, *30*(3), 191–199. https://doi.org/10.1016/j.genhosppsych.2008.01.001

Lytsy, P., Carlsson, L., & Anderzén, I. (2017). Effectiveness of two vocational rehabilitation programmes in women with long-term sick leave due to pain syndrome or mental illness: 1-year follow-up of a randomized controlled trial. *Journal of Rehabilitation Medicine*, *49*(2), 170–177. https://doi.org/10.2340/16501977-2188

Malouff, J. M., Thorsteinsson, E. B., Rooke, S. E., Bhullar, N., & Schutte, N. S. (2008). Efficacy of cognitive behavioral therapy for chronic fatigue syndrome: A meta-

analysis. *Clinical Psychology Review*, *28*(5), 736–745. https://doi.org/10.1016/j.cpr.2007.10.004

Marks, E. M., & Hunter, M. S. (2015). Medically Unexplained Symptoms: An acceptable term? *British Journal of Pain*, *9*(2), 109–114. https://doi.org/10.1177/2049463714535372

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety1. *Behaviour Research and Therapy*, *36*(4), 455–470. https://doi.org/10.1016/S0005-7967(97)10031-6

Mayou, R., Bryant, B., Forfar, C., & Clark, D. (1994). Non-cardiac chest pain and benign palpitations in the cardiac clinic. *British Heart Journal*, *72*(6), 548–553. https://doi.org/10.1136/hrt.72.6.548

McGorm, K., Burton, C., Weller, D., Murray, G., & Sharpe, M. (2010). Patients repeatedly referred to secondary care with symptoms unexplained by organic disease: Prevalence, characteristics and referral pattern. *Family Practice*, *27*(5), 479–486. https://doi.org/10.1093/fampra/cmq053

Momsen, A. H., Nielsen, C. V., Nielsen, M. B. D., Rugulies, R., & Jensen, C. (2016). Work participation and health-related characteristics of sickness absence beneficiaries with multiple somatic symptoms. *Public Health*, *133*, 75–82. https://doi.org/10.1016/j.puhe.2015.10.018

Mourad, G., Strömberg, A., Johansson, P., & Jaarsma, T. (2016). Depressive Symptoms, Cardiac Anxiety, and Fear of Body Sensations in Patients with Non-Cardiac Chest Pain, and Their Relation to Healthcare-Seeking Behavior: A Cross-Sectional Study. *The Patient*, *9*(1), 69–77. https://doi.org/10.1007/s40271-015-0125-0

Mundt, J. C., Marks, I. M., Katherine, M., & Greist, J. M. (2002). The Work and Social Adjustment Scale: A simple measure of impairment in functioning. *The British Journal of Psychiatry*, *180*(5), 461–464. https://doi.org/10.1192/bjp.180.5.461

Neeck, G., & Crofford, L. J. (2000). Neuroendocrine perturbations in fibromyalgia and chronic fatigue syndrome. *Rheumatic Diseases Clinics of North America*, *26*(4), 989–1002. https://doi.org/10.1016/s0889-857x(05)70180-0

Nimnuan, C., Hotopf, M., & Wessely, S. (2001). Medically unexplained symptoms: An epidemiological study in seven specialities. *Journal of Psychosomatic Research*, *51*(1), 361–367. https://doi.org/10.1016/S0022-3999(01)00223-9

OECD. (2010a). *Sickness, Disability and Work: Breaking the Barriers*. https://www.oecd-ilibrary.org/content/publication/9789264088856-en

OECD. (2010b). *Sickness, Disability and Work: Breaking the Barriers: A Synthesis of Findings across OECD Countries*. OECD. https://doi.org/10.1787/9789264088856-en

Ólafsdóttir, H. Ó. (2012). *Psychometric properties of the Icelandic translations of the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale(SPS)*. University of Iceland.

O'Neil, A., Sanderson, K., & Oldenburg, B. (2010). Depression as a predictor of work resumption following myocardial infarction (MI): A review of recent research evidence. *Health and Quality of Life Outcomes*, *8*, 95. https://doi.org/10.1186/1477-7525-8-95

Ormel, J., VonKorff, M., Ustun, T. B., Pini, S., Korten, A., & Oldehinkel, T. (1994). Common mental disorders and disability across cultures. Results from the WHO Collaborative Study on Psychological Problems in General Health Care. *JAMA*, *272*(22), 1741–1748. https://doi.org/10.1001/jama.272.22.1741

Osman, A., Gutierrez, P. M., Barrios, F. X., Kopper, B. A., & Chiros, C. E. (1998). The Social Phobia and Social Interaction Anxiety Scales: Evaluation of Psychometric Properties. *Journal of Psychopathology and Behavioral Assessment; New York*, *20*(3), 249–264. http://dx.doi.org/10.1023/A:1023067302227

Pálsdóttir, V. E. (2007). *Tha validity of the Patient Health Questionnaire (PHQ) within Icelandc primary care.* [Cand.psych.]. University of Iceland.

Park, J., & Gilmour, H. (2017). Medically unexplained physical symptoms (MUPS) among adults in Canada: Comorbidity, health care use and employment. *Health Reports*, *28*(3), 3–8.

Petersen, M. W., Schröder, A., Jørgensen, T., Ørnbøl, E., Dantoft, T. M., Eliasen, M., Thuesen, B. H., & Fink, P. (2020). The unifying diagnostic construct of bodily distress syndrome (BDS) was confirmed in the general population. *Journal of Psychosomatic Research*, *128*, 109868. https://doi.org/10.1016/j.jpsychores.2019.109868

Petersen, M. W., Schröder, A., Jørgensen, T., Ørnbøl, E., Meinertz Dantoft, T., Eliasen, M., Benros, M. E., & Fink, P. (2020). Irritable bowel, chronic widespread pain, chronic fatigue and related syndromes are prevalent and highly overlapping in the general population: DanFunD. *Scientific Reports*, *10*(1), 3273. https://doi.org/10.1038/s41598-020-60318-6

Peveler, R., Kilkenny, L., & Kinmonth, A. L. (1997). Medically unexplained physical symptoms in primary care: A comparison of self-report screening questionnaires and clinical opinion. *Journal of Psychosomatic Research*, *42*(3), 245–252.

Picariello, F., Ali, S., Moss-Morris, R., & Chalder, T. (2015). The most popular terms for medically unexplained symptoms: The views of CFS patients. *Journal of*

Psychosomatic Research, 78(5), 420–426. https://doi.org/10.1016/j.jpsychores.2015.02.013

Pike, A., Hearn, L., & Williams, A. C. (2016). Effectiveness of psychological interventions for chronic pain on health care use and work absence: Systematic review and meta-analysis. *Pain, 157*(4), 777–785. https://doi.org/10.1097/j.pain.0000000000000434

Prins, J. B., Bleijenberg, G., Bazelmans, E., Elving, L. D., de Boo, T. M., Severens, J. L., van der Wilt, G. J., Spinhoven, P., & van der Meer, J. W. (2001). Cognitive behaviour therapy for chronic fatigue syndrome: A multicentre randomised controlled trial. *The Lancet, 357*(9259), 841–847. https://doi.org/10.1016/S0140-6736(00)04198-2

Rask, M. T., Rosendal, M., Fenger-Grøn, M., Bro, F., Ørnbøl, E., & Fink, P. (2015). Sick leave and work disability in primary care patients with recent-onset multiple medically unexplained symptoms and persistent somatoform disorders: A 10-year follow-up of the FIP study. *General Hospital Psychiatry*, *37*(1), 53–59. https://doi.org/10.1016/j.genhosppsych.2014.10.007

Rask, Ørnbøl, E., Rosendal, M., & Fink, P. (2017). Long-Term Outcome of Bodily Distress Syndrome in Primary Care: A Follow-Up Study on Health Care Costs, Work Disability, and Self-Rated Health. *Psychosomatic Medicine*, *79*(3), 345–357. https://doi.org/10.1097/PSY.0000000000000405

Reid, S., Wessely, S., Crayford, T., & Hotopf, M. (2001). Medically unexplained symptoms in frequent attenders of secondary health care: Retrospective cohort study. *BMJ*, *322*(7289), 767. https://doi.org/10.1136/bmj.322.7289.767

Reinert, D. F., & Allen, J. P. (2007). The Alcohol Use Disorders Identification Test: An Update of Research Findings. *Alcoholism: Clinical and Experimental Research*, *31*(2), 185–199. https://doi.org/10.1111/j.1530-0277.2006.00295.x

Roca, M., Gili, M., Garcia-Garcia, M., Salva, J., Vives, M., Garcia Campayo, J., & Comas, A. (2009). Prevalence and comorbidity of common mental disorders in primary care. *Journal of Affective Disorders*, *119*(1–3), 52–58. https://doi.org/10.1016/j.jad.2009.03.014

Rode, S., Salkovskis, P., Dowd, H., & Hanna, M. (2006). Health anxiety levels in chronic pain clinic attenders. *Journal of Psychosomatic Research*, *60*(2), 155–161. https://doi.org/10.1016/j.jpsychores.2005.07.005

Salkovskis, P. M. (2002). The Health Anxiety Inventory: Development and validation of scales for the measurement of health anxiety and hypochondriasis. *Psychological Medicine*, *32*(5), 843–853. https://doi.org/10.1017/S0033291702005822

Salkovskis, P. M., Gregory, J., Sedgwick-Taylor, A., White, J., Opher, S., & Olafsdottir, S. (2016). Extending Cognitive-Behavioural Theory and Therapy to medically unexplained symptoms and long-term physical conditions: A hybrid Transdiagnostic/problem specific approach. *Behavioural Change*.

Sanderson, K., & Andrews, G. (2006). Common Mental Disorders in the Workforce: Recent Findings from Descriptive and Social Epidemiology: *The Canadian Journal of Psychiatry*. https://doi.org/10.1177/070674370605100202

Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO

Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption--II. *Addiction (Abingdon, England)*, *88*(6), 791–804.

Schandelmaier, S., Ebrahim, S., Burkhardt, S. C. A., de Boer, W. E. L., Zumbrunn, T., Guyatt, G. H., Busse, J. W., & Kunz, R. (2012). Return to Work Coordination Programmes for Work Disability: A Meta-Analysis of Randomised Controlled Trials. *PLoS ONE*, *7*(11). https://doi.org/10.1371/journal.pone.0049760

Schröder, A., Rehfeld, E., Ornbøl, E., Sharpe, M., Licht, R. W., & Fink, P. (2012). Cognitive-behavioural group treatment for a range of functional somatic syndromes: Randomised trial. *The British Journal of Psychiatry: The Journal of Mental Science*, *200*(6), 499–507. https://doi.org/10.1192/bjp.bp.111.098681

Sheehan, D. V., & Lecrubier, Y. (1998). The Mini-International Neuro-mental Interview (M.I.N.I.): The Development and Validation of a Structured Diagnostic Mental Interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, *59 Suppl 20*(Suppl 20), 22–33; quiz 34–57.

Spinhoven, P., Van der Does, A. J. W., Van Dijk, E., & Van Rood, Y. R. (2010). Heart-focused anxiety as a mediating variable in the treatment of noncardiac chest pain by cognitive-behavioral therapy and paroxetine. *Journal of Psychosomatic Research*, *69*(3), 227–235. https://doi.org/10.1016/j.jpsychores.2010.02.005

Spitzer, R. L., Kroenke, K., Williams, J. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The gad-7. *Archives of Internal Medicine*, *166*(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Stallone, F., Twerenbold, R., Wildi, K., Reichlin, T., Rubini Gimenez, M., Haaf, P., Fuechslin, N., Hillinger, P., Jaeger, C., Kreutzinger, P., Puelacher, C., Radosavac, M., Moreno

Weidmann, Z., Moehring, B., Honegger, U., Schumacher, C., Denhaerynck, K., Arnold, C., Bingisser, R., … Mueller, C. (2014). Prevalence, characteristics and outcome of non-cardiac chest pain and elevated copeptin levels. *Heart (British Cardiac Society)*, *100*(21), 1708–1714. https://doi.org/10.1136/heartjnl-2014-305583

Stein, M. B., McQuaid, J. R., Pedrelli, P., Lenox, R., & McCahill, M. E. (2000). Posttraumatic stress disorder in the primary care medical setting. *General Hospital Psychiatry*, *22*(4), 261–269. https://doi.org/10.1016/S0163-8343(00)00080-3

Steinbrecher, N., Koerber, S., Frieser, D., & Hiller, W. (2011). The Prevalence of Medically Unexplained Symptoms in Primary Care. *Psychosomatics*, *52*(3), 263–271. https://doi.org/10.1016/j.psym.2011.01.007

Sundin, E. C., & Horowitz, M. J. (2002). Impact of Event Scale: Psychometric properties. *The British Journal of Psychiatry*, *180*(3), 205–209. https://doi.org/10.1192/bjp.180.3.205

Tack, M. (2019). Medically Unexplained Symptoms (MUS): Faults and Implications. *International Journal of Environmental Research and Public Health*, *16*(7). https://doi.org/10.3390/ijerph16071247

Tang, N. K. Y., Goodchild, C. E., & Salkovskis, P. M. (2012). Hybrid cognitive-behaviour therapy for individuals with insomnia and chronic pain: A pilot randomised controlled trial. *Behaviour Research and Therapy*, *50*(12), 814–821. https://doi.org/10.1016/j.brat.2012.08.006

Terluin, B., van Rhenen, W., Anema, J. R., & Taris, T. W. (2011). Psychological symptoms and subsequent sickness absence. *International Archives of Occupational and Environmental Health*, *84*(7), 825–837. https://doi.org/10.1007/s00420-011-0637-4

Thakral, M., Von Korff, M., McCurry, S. M., Morin, C. M., & Vitiello, M. V. (2020). Changes in dysfunctional beliefs about sleep after cognitive behavioral therapy for insomnia: A systematic literature review and meta-analysis. *Sleep Medicine Reviews*, *49*, 101230. https://doi.org/10.1016/j.smrv.2019.101230

The Icelandic Social Insurance Administration. (2015). *The Icelandic Social Insurance Administration's Annual Report and Statistics.* The Icelandic Social Insurance Administration. https://indd.adobe.com/view/a1f3a048-adc0-4225-a090-58f73af98a90

Thieme, K., Flor, H., & Turk, D. C. (2006). Psychological pain treatment in fibromyalgia syndrome: Efficacy of operant behavioural and cognitive behavioural treatments. *Arthritis Research & Therapy*, *8*(4), R121. https://doi.org/10.1186/ar2010

Toft, T., Fink, P., Oernboel, E., Christensen, K., Frostholm, L., & Olesen, F. (2005). Mental disorders in primary care: Prevalence and co-morbidity among disorders. Results from the Functional Illness in Primary care (FIP) study. *Psychological Medicine*, *35*(8), 1175–1184. https://doi.org/10.1017/S0033291705004459

Tryggingastofnun. (2015). *Ársskýrsla og staðtölur Tryggingastofnunar*. Tryggingastofnun. https://indd.adobe.com/view/a1f3a048-adc0-4225-a090-58f73af98a90

Van Den Eede, F., & Van der Feltz-Cornelis, C. (2018). The Need to Distinguish between Bodily Distress Disorder and Somatic Symptom Disorder. *Psychotherapy and Psychosomatics*, *87*(4), 234–235. https://doi.org/10.1159/000490731

van der Leeuw, G., Gerrits, M. J., Terluin, B., Numans, M. E., van der Feltz-Cornelis, C. M., van der Horst, H. E., Penninx, B. W. J. H., & van Marwijk, H. W. J. (2015). The association between somatization and disability in primary care patients. *Journal of*

Psychosomatic Research, *79*(2), 117–122. https://doi.org/10.1016/j.jpsychores.2015.03.001

van Peski-Oosterbaan, A. S., Spinhoven, P., van Rood, Y., van der Does, J. W., Bruschke, A. V., & Rooijmans, H. G. (1999). Cognitive-behavioral therapy for noncardiac chest pain: A randomized trial. *The American Journal of Medicine*, *106*(4), 424–429. https://doi.org/10.1016/s0002-9343(99)00049-2

Velzen, J. M. van, Bennekom, C. A. M. van, Edelaar, M. J. A., Sluiter, J. K., & Frings-Dresen, M. H. W. (2009). Prognostic factors of return to work after acquired brain injury: A systematic review. *Brain Injury*, *23*(5), 385–395. https://doi.org/10.1080/02699050902838165

Verhaak, P. F. M. (2006). Persistent presentation of medically unexplained symptoms in general practice. *Family Practice*, *23*(4), 414–420. https://doi.org/10.1093/fampra/cml016

Viðarsson, J. V. (2016). *Health Anxiety and Medically Unexplained Symptoms: Psychometric properties of two Translated Questionnaires*. Reykjavik University.

VIRK Vocational Rehabilitation Fund. (2013). *Annual Report 2013*. VIRK Vocational Rehabilitation Fund. https://www.virk.is/static/files/kynningarefni/virk-arsrit-2013-net.pdf

VIRK Vocational Rehabilitation Fund. (2014). *Annual report 2014*. VIRK-Vocational Rehabilitation Fund. https://www.virk.is/static/files/_2014/Arsfundur_2014/virk_arsrit_2014_net.pdf

VIRK Vocational Rehabilitation Fund. (2015). *Annual report 2015*. VIRK Vocational Rehabilitation Fund. https://www.virk.is/static/files/_2015/Arsfundur_2015/virk_arsrit_2015_net.pdf

VIRK Vocational Rehabilitation Fund. (2016). *Annual report 2016*. VIRK Vocational Rehabilitation Fund.

VIRK Vocational Rehabilitation Fund. (2018). *Annual report 2018* (pp. 16–17). VIRK-Vocational Rehabilitation Fund. https://www.virk.is/static/files/virk-a-9568-rsrit-2018_lokaskjal.pdf

VIRK Vocational Rehabilitation Fund. (2019). *Annual report 2019*. VIRK Vocational Rehabilitation Fund.

Voluse, A. C., Gioia, C. J., Sobell, L. C., Dum, M., Sobell, M. B., & Simco, E. R. (2012). Psychometric properties of the Drug Use Disorders Identification Test (DUDIT) with substance abusers in outpatient and residential treatment. *Addictive Behaviors, 37*(1), 36–41. https://doi.org/10.1016/j.addbeh.2011.07.030

Vos, T., Flaxman, A. D., Naghavi, M., Lozano, R., Michaud, C., Ezzati, M., Shibuya, K., Salomon, J. A., Abdalla, S., Aboyans, V., Abraham, J., Ackerman, I., Aggarwal, R., Ahn, S. Y., Ali, M. K., Alvarado, M., Anderson, H. R., Anderson, L. M., Andrews, K. G., … Memish, Z. A. (2012). Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010. *Lancet (London, England), 380*(9859), 2163–2196. https://doi.org/10.1016/S0140-6736(12)61729-2

Webster, R., Norman, P., Goodacre, S., & Thompson, A. (2012). The prevalence and correlates of psychological outcomes in patients with acute non-cardiac chest pain: A

systematic review. *Emergency Medicine Journal: EMJ*, *29*(4), 267–273. https://doi.org/10.1136/emermed-2011-200526

Webster, R., Norman, P., Goodacre, S., Thompson, A. R., & McEachan, R. R. C. (2014). Illness representations, psychological distress and non-cardiac chest pain in patients attending an emergency department. *Psychology & Health*, *29*(11), 1265–1282. https://doi.org/10.1080/08870446.2014.923885

Wessely, S., Nimnuan, C., & Sharpe, M. (1999). Functional somatic syndromes: One or many? *Lancet (London, England)*, *354*(9182), 936–939. https://doi.org/10.1016/S0140-6736(98)08320-2

Wessely, & White, P. D. (2004). There is only one functional somatic syndrome. *The British Journal of Psychiatry*, *185*(2), 95–96. https://doi.org/10.1192/bjp.185.2.95

White, P. (2010). Chronic fatigue syndrome: Is it one discrete syndrome or many? Implications for the "one vs. many" functional somatic syndromes debate. *Journal of Psychosomatic Research*, *68*(5), 455–459. https://doi.org/10.1016/j.jpsychores.2010.01.008

White, P., Goldsmith, K., Johnson, A., Potts, L., Walwyn, R., DeCesare, J., Baber, H., Burgess, M., Clark, L., Cox, D., Bavinton, J., Angus, B., Murphy, G., Murphy, M., O'Dowd, H., Wilks, D., McCrone, P., Chalder, T., & Sharpe, M. (2011). Comparison of adaptive pacing therapy, cognitive behaviour therapy, graded exercise therapy, and specialist medical care for chronic fatigue syndrome (PACE): A randomised trial. *Lancet*, *377*(9768), 823–836. https://doi.org/10.1016/S0140-6736(11)60096-2

Williams, A., Eccleston, C., & Morley, S. (2012). Psychological therapies for the management of chronic pain (excluding headache) in adults. *The Cochrane Database of Systematic Reviews*, *11*. https://doi.org/10.1002/14651858.CD007407.pub3

Williams, D. A. (2003). Psychological and behavioural therapies in fibromyalgia and related syndromes. *Best Practice & Research Clinical Rheumatology*, *17*(4), 649–665. https://doi.org/10.1016/S1521-6942(03)00034-2

Williams, T. E., Chalder, T., Sharpe, M., & White, P. D. (2017). Heterogeneity in chronic fatigue syndrome—Empirically defined subgroups from the PACE trial. *Psychological Medicine*, *47*(8), 1454–1465. https://doi.org/10.1017/S0033291716003615

World Health Organization. (2018). *International classification of diseases for mortality and morbidity statistics (11th Revision)*. https://icd.who.int/browse11/l-m/en

Zahra, D., Qureshi, A., Henley, W., Taylor, R., Quinn, C., Pooler, J., Hardy, G., Newbold, A., & Byng, R. (2014). The work and social adjustment scale: Reliability, sensitivity and value. *International Journal of Psychiatry in Clinical Practice*, *18*(2), 131–138. https://doi.org/10.3109/13651501.2014.894072

Appendix

I. Flóvenz S.Ó., Salkovskis P.M., Gregory J., Valdimarsdóttir, H., Sigurðsson, E., and Sigurðsson J.F. Persistent Physical Symptoms and mental health problems among individuals seeking work rehabilitation. *Manuscript under review.*

II. Flóvenz, S.Ó., Salkovskis, P.M., Broddadóttir, E., Sigurðsson, B.H., Valdimarsdóttir, H., Sigurðsson E., and Sigurðsson, J.F. Predicting work disability and the success of work rehabilitation: PPS, psychological distress and demographics. *Manuscript under review.*

III. Flóvenz S.Ó., Salkovskis P. M., Svansdóttir E., Karlsson H.D., Andersen K. and Sigurðsson, J.F. Non-Cardiac Chest Pain as a Persistent Physical Symptom: Psychological distress and workability. *Manuscript under review*.

IV. The Persistent Physical Symptoms Checklist (PPSC)

Questionnaire on physical symptoms

We are now going to ask you some questions about "medically unexplained symptoms". These are upsetting and sometimes disabling physical symptoms for which no obvious medical explanation has been found. Please tick the boxes as appropriate.

1. **Sleep problems**
   a. Do you have problems with your sleep which have been with you for ***more than one month?*** Yes □ No □ (if no go to question 2)

      If yes, Please tick those that apply
      - □ Problems falling asleep
      - □ Problems waking through the night
      - □ Problem waking too early
      - □ Problems not feeling like you have slept

      Do your symptoms have a known cause? Yes □ No □
      If yes, what causes you to have these problems? _____

   b. How severely do your ***sleep*** problems interfere with your life, i.e., to what extent do your problems impair your ability to work, manage your home, carry out private leisure activities, take part in social activities or impair your ability to form and maintain close relationships?

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

2. **Pain**
   a. Do you have problems with pain in some part of your body (for example back pain, headache and so on) which have been with you for ***more than six months?*** Yes □ No □ (if no go to question 3)

      If yes, Please specify where the pain is _____

      Do your symptoms have a known cause? Yes □ No □
      If yes, what causes you to have these problems? _____

   b. How severely do your problems with ***pain*** interfere with your life, i.e., to what extent do your problems impair your ability to work, manage your home, carry out private leisure activities, take part in social activities or impair your ability to form and maintain close relationships?

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

3. **Chronic tiredness, fatigue and muscle problems**
   a. Do you have persistent problems with any of the following which have been with you for ***at least six months?*** Yes □ No □ (if no go to question 4)

      If yes, Please tick those that apply
      - □ Excessive fatigue that is not alleviated by rest
      - □ Muscle or joint aches and pains
      - □ Shaky and weak muscles

      Do your symptoms have a known cause? Yes □ No □
      If yes, what causes you to have these problems? _____

   b. How severely do your problems related to ***chronic tiredness and fatigue*** interfere with your life, i.e., to what extent do your problems impair your ability to work, manage your home, carry out private leisure activities, take part in social activities or impair your ability to form and maintain close relationships?

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

4. **Gastrointestinal problems**

a. Do you have persistent problems with any of the following which have been with you for ***at least six months?*** Yes □ No □ (if no go to question 5)

If yes, Please tick those that apply

- □ Constipation
- □ Diarrhoea
- □ Stomach cramps or pains
- □ Feeling sick
- □ Lump in your throat/difficulty swallowing

Do your symptoms have a known cause? Yes □ No □
If yes, what causes you to have these problems? _____

b. How severely do your ***gastrointestinal*** problems interfere with your life, i.e., to what extent do your problems impair your ability to work, manage your home, carry out private leisure activities, take part in social activities or impair your ability to form and maintain close relationships?

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

5. **Heart and chest symptoms**

a. Do you have persistent problems with any of the following which have been with you for ***at least six months?*** Yes □ No □ (if no go to question 6)

If yes, Please tick those that apply

- □ Pain in your chest or tight chest
- □ Difficulty breathing
- □ Irregular heartbeat/palpitations/heart racing

Do your symptoms have a known cause? Yes □ No □
If yes, what causes you to have these problems? _____

b. How severely do your ***heart and chest*** symptoms interfere with your life, i.e., to what extent do your problems impair your ability to work, manage your home, carry out private leisure activities, take part in social activities or impair your ability to form and maintain close relationships?

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

6. **Dizziness and/or related problems**
   a. Do you have persistent problems with any of the following which have been with you for ***at least six months?*** Yes □ No □ (if no go to question 7)

      If yes, Please tick those that apply
      - □ Dizziness
      - □ Feeling faint
      - □ Feeling unsteady or balance problems
      - □ Feeling unreal or distant from your surroundings
      - □ Problems with feeling confused and/or thinking clearly
      - □ Ringing or persistent noises in your ears

      Do your symptoms have a known cause? Yes □ No □
      If yes, what causes you to have these problems? _____

   b. How severely does your ***dizziness and related problems*** interfere with your life, i.e., to what extent do your problems impair your ability to work, manage your home, carry out private leisure activities, take part in social activities or impair your ability to form and maintain close relationships?

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

7. **Women only: gynaecological**
   a. Do you have persistent problems with any of the following which have been with you regularly for ***at least six months?*** Yes □ No □ (if no go to question 8)

      If yes, Please tick those that apply
      - □ Problem before your period
      - □ Problems during and immediately after your period
      - □ Menopausal problems

      Do your symptoms have a known cause? Yes □ No □
      If yes, what causes you to have these problems? _____

   b. How severely do your ***gynaecological*** problems interfere with your life, i.e., to what extent do your problems impair your ability to work, manage your home, carry out private leisure activities, take part in social activities or impair your ability to form and maintain close relationships?

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

8. Considering any symptoms that you ticked in items 1-7 above do you think it might be helpful to talk to a counsellor about these problems and how they affect you? **Yes** □ **No** □

9. If you were offered such help in this surgery over four to five session, would you be willing to attend? **Yes** □ **No** □