Benefits of a Structured Biopsychosocial Approach to Workplace Rehabilitation for Musculoskeletal Injury

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List of Abbreviations

AB-5	Abilita Triage Questionnaire
ARI	Abilita Rehabilitation Index
ARPA	Australian Rehabilitation Providers Association
ASORC	Australian Society of Rehabilitation Counsellors
AUC	Area Under the Curve
BPS	Biopsychosocial
CBT	Cognitive Behavioural Therapy
CCBT	Contextual Cognitive Behavioural Therapy
CDSMP	Chronic Disease Self-Management Program
CI	Confidence Interval
DoC	Duration of Claim
EP	Explain Pain
EPIS	Exploration, Adoption/Preparation, Implementation and Sustainment
HWCA	Heads of Workers' Compensation Authorities
IV	Independent Variable
LBP	Low Back Pain
LSI	Life Satisfaction Indicators
MBR	Multidisciplinary Biopsychosocial Rehabilitation
MCID	Minimally Clinically Important Difference
MSKD	Musculoskeletal Disorders (Injury or Disease)
NCAF	Nationally Consistent Approval Framework for Workplace Rehabilitation Providers
NIDMAR	National Institute of Disability Management and Research
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
ÖMPSQ	Örebro Musculoskeletal Pain Screening Questionnaire
ÖMPSQ-SF	Örebro Musculoskeletal Pain Screening Questionnaire—Short Form
OTA	Occupational Therapy Australia
PCS	Pain Catastrophising Scale
PGAP	Progressive Goal Attainment Program

PIEF	Personal Injury Education Foundation
PSEQ	Pain Self-Efficacy Questionnaire
RC	Rehabilitation Consultant
RCT	Randomised Control Trial
ROC	Receiver Operating Characteristic
RCAA	Rehabilitation Counselling Association of Australasia
ROSES	Return to Work and Self-Efficacy Scale
RTW	Return to Work
SA	South Australia
SD	Standard Deviation
UK	United Kingdom
UPM	University of Putra Malaysia
VAI	Vocational Advice Intervention
WATT	Work Assessment Triage Tool
WISE	Work Injury Screening and Early Intervention
WRP	Workplace Rehabilitation Provider

Abstract

Many work-related injuries develop complexities that impede recovery. For this reason, compensation schemes have encouraged a biopsychosocial injury management approach. However, the lack of improvement in work outcomes over recent decades may indicate that a comprehensive biopsychosocial approach is rarely applied. There is often provision of services to address the physical, psychological and work factors particular to each individual yet commonly missing is recognition that the worker needs to understand the relationships between and influence of these bio-psycho-social interactions. The insight gained from this understanding provides the motivation to learn strategies to better self-manage the barriers to recovery.

This thesis examines current biopsychosocial approaches and describes a rehabilitation model in which psychosocial triage, assessment and self-management coaching are linked to provide tailored intervention following musculoskeletal injury. The thesis examines whether this approach could potentially deliver improved Workplace Rehabilitation outcomes.

The first study develops a comprehensive instrument to screen for multiple psychosocial processes that contribute to pain and disability—the Abilita Rehabilitation Index (ARI)—which was found to be reliable and valid. The second study develops a triage tool to identify individuals who require ARI assessment. The third study evaluates the psychosocial and work outcomes following self-management coaching (n = 423). Statistically significant change is seen in the mean ARI score, and this is associated with early referral and highest post-coaching work hours. The participants provide high ratings for the program's helpfulness and their satisfaction. The benefits and challenges of implementing a structured approach are investigated through a qualitative study that interviews rehabilitation consultants (n = 13) who have used any biopsychosocial resources to provide psychosocial assessment and self-help skill development within their RTW programs.

This research draws on the varied perspectives of many researchers in pain management, injury management and the biopsychosocial model. That knowledge, viewed through the

lens of an experienced workplace rehabilitation professional, has led to new insights into the challenges and potential solutions for improved management of work disability.

Statement of Authorship and Attribution

This thesis is submitted to La Trobe University in fulfilment of the requirements for the degree of Doctor of Philosophy. This thesis includes work by the author that has been published as described in the text. Except where reference is made in the text of the thesis, this thesis contains no other material published elsewhere or extracted in whole or in part from a thesis accepted for the award of any other degree or diploma. No other person's work has been used without due acknowledgment in the main text of the thesis.

Chapter 5 includes a paper published in a peer-reviewed International Scientific Indexing (ISI) journal:

Garton, P., Murphy, G., & O'Halloran, P. (2016). A practical tool to improve outcomes in work injury management. *Work, 53*(4), 927–937. doi:10.3233/WOR-162276.

Although the publication involved joint authorship, I was the principal author and was responsible for the overall study design, design of the instrument to be tested, data analysis, interpretation of the results and writing of the manuscript.

I confirm that the intellectual content of this thesis is the product of my own work, and all assistance received in preparing this thesis and sources have been acknowledged. Editing assistance was provided by Elite Editing with editorial intervention restricted to Standards D and E of the Australian Standards for Editing Practice.

I understand that, if my candidature is successful, my thesis will be lodged with the Director of University Libraries and made available for immediate use.

I confirm that ethical approvals were granted from the College of Science, Health and Engineering Human Ethics Subcommittee, La Trobe University—references FHEC13/250 and S17-184.

Candidate's signature—Pam Garton

11th December 2019

As supervisor of Pam Garton's doctoral work, I certify that her thesis entitled 'Benefits of a Structured Biopsychosocial Approach to Workplace Rehabilitation for Musculoskeletal Injury' is suitable for examination and does not exceed the prescribed word limit. I further attest that, as supervisor for the candidature on which this thesis is based, the authorship attribution statements are correct.

Principal supervisor's signature—Dr Paul O'Halloran

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Disclosure of Interest

I am the founder of the Abilita Program and a director of Abilita Services Pty Ltd. To mitigate potential bias, this research was conducted with integrity according to the standards set out in the Australian Code for the Responsible Conduct of Research (2018) and La Trobe University statutes and policies. My interests were disclosed to Supervisors, Progress Committee, Human Research Ethics Committee, and research participants. The Progress Committee and my supervisors provided appropriate guidance in research integrity and conduct.

Acknowledgments

I am grateful to the many practitioners and researchers who have contributed quality and diversity to the body of knowledge in this field. The content of those studies was a catalyst for my research, as was the knowledge gained from each client who shared their experience of pain and disability with me.

The database used in my quantitative studies was collated by early adopters of a new rehabilitation approach, who were driven by a desire to implement best-practice rehabilitation for their clients. Thank you to all past and present Abilita licensees.

The responses of the rehabilitation consultants who volunteered as interviewees were thoughtful and open, and they richly informed my qualitative study into the benefits and challenges of implementing a biopsychosocial approach in workplace rehabilitation. My thanks to them and their employers for that input. I appreciate the assistance provided by ARPA, ASORC, RCAA and OTA in encouraging their members to participate.

My supervisors assisted me to devise a research program that achieved my goals. Professor Greg Murphy had faith in my capacity to step up to this doctoral level and his wisdom guided the pathway. Dr Paul O'Halloran has ensured integrity in the research conceptualisation and data analysis, and has kept me to task with his invaluable attention to detail. I am very grateful to both for contributions through review and editing of the thesis. My panel also provided valuable suggestions and advice regarding my research. This work was supported by an Australian Government Research Training Program Scholarship.

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Chapter 1: Introduction

Return-to-work rates for Australians who have sustained work-related injury are poor and have been stagnant for over two decades (Social Research Centre, 2018). The accompanying poorer health outcomes for people with compensable injuries have also been well known since they were comprehensively reported by the Australasian Faculty of Occupational Medicine (2001). Currently, the estimated annual economic cost of this long-unsolved problem is AU$61.8 billion (Safe Work Australia, 2019) and the broader effects on workers, their families and society as a whole are far greater (Newnam, Collie, Vogel, & Keleher, 2014). Acknowledging the effects of this problem, Safe Work Australia (2019) has recently developed and published a *National Return to Work Strategy 2020–2030*, with the aim to minimise the effects of work-related injury and illness.

Traumatic injury and musculoskeletal disorders contribute the greatest effect to this personal and economic tragedy, accounting for 89% of serious work injury claims[1] in 2016 to 2017 (Safe Work Australia, 2018a). Chronic pain commonly accompanies ongoing disability and, in Australia, the consequential productivity cost comprises 66% of the total estimated cost associated with chronic pain, which, in 2018, was estimated at AU$139.33 billion (Deloitte Access Economics, 2019).

In 2006, research evidence indicated that work disability and return to work (RTW) are multi-determined outcomes—they cannot be accurately predicted from only the knowledge of the medical or physical condition, and reform is subsequently required within health and rehabilitation systems, including reduced use of unreliable or invalid assessments or interventions (Foreman, Murphy, & Swerissen, 2006). International research has shown that Australia does not stand alone with this problem or with attempts to understand and manage its complexities (Buchbinder et al., 2018; Institute for Work & Health, 2017; Loisel et al., 2005).

Research has reinforced the view that scheme design for injury compensation has significant effects on health and work outcomes (Collie, Lane, Hatherell, & McLeod,

[1] A ‘serious claim’ refers to a claim that has received compensation for one week or more for absenteeism from work.

2015) and has identified multiple opportunities for scheme improvement, including aligning case management and healthcare service models, and engaging employers in prevention and rehabilitation (Collie, Di Donato, & Iles, 2018). One recent systematic review found that, when these components are combined in an intervention, they are significantly more effective than when delivered alone (Institute for Work & Health, 2017). The authors of that review found that a successful RTW intervention needs to incorporate appropriate health services linked to work, RTW planning, good communication between healthcare providers and the workplace, and workplace modification and support.

A variety of terms are used to refer to the rehabilitation service provided to assist workers to achieve timely and sustainable RTW outcomes following injury or illness, including 'work injury management', 'workplace rehabilitation', 'occupational rehabilitation' and 'vocational rehabilitation'. The term 'workplace rehabilitation' is most commonly used in this thesis because that is the term used by the relevant authorities within Australia. The terms 'workplace rehabilitation consultant' and 'rehabilitation consultant' are generic job titles for health and vocational rehabilitation professionals who assist injured or ill individuals in returning to work.

In Australia, a Workplace Rehabilitation Provider (WRP) must have jurisdiction approval to operate, usually including a requirement to adhere to the *National Consistent Approval Framework for Workplace Rehabilitation Providers* (Heads of Workers' Compensation Authorities, 2015). A WRP must employ tertiary qualified health professionals who specialise in the complex needs of workers and their employers. This approval framework has been in place since 2010 and, as a consequence of changes in the economy, working environment and legislation, Heads of Workers' Compensation Authorities (HWCA) have recently undertaken a consultative review, and now plan to replace this framework in June 2020 with the *Principles of Practice for Workplace Rehabilitation Providers* (Heads of Workers' Compensation Authorities, 2019).

As a result of the complexity of RTW rehabilitation, as explained throughout this thesis, the traditional medical model for healthcare does not sufficiently accommodate the non-linear relationship between injury, symptoms and incapacity (Buchbinder et al., 2018). The biopsychosocial (BPS) model of health, illness and disability is more appropriate in this context because it highlights the multiple and interacting biological, psychological

and social determinants of health outcomes (Comcare, 2016a; World Health Organization, 2001). The BPS model is much more than the sum of the three components of biological, psychological and social; rather, it includes the interactions between those parts, focuses on the whole person, promotes active restoration to reduce disability and pain, and acknowledges that often the problem lies in the perceptions and reactions to pain held by both the individual and society (Hulla et al., 2019; Pincus et al., 2013; Waddell, 1987). Defined briefly, 'the biopsychosocial model is an interactive and individual-centred approach that considers the person, their health problem and their social/occupational context' (Waddell & Aylward, 2010, p. 28). Gatchel, Peng, Peters, Fuchs, and Turk (2007) emphasised that the BPS model is the most heuristic approach to managing chronic pain. They suggested that knowledge of this model is valuable to the individual because of the contribution of negative affect, unhelpful cognitions and physical deconditioning, to the dynamic process and maintenance of pain and disability.

The BPS model has been applied within varying protocols for many years and, in 2012, an international forum considered its success over the previous 25 years (Pincus et al., 2013). Forum participants concluded that the model is sound; however, failures have occurred in how it has been understood and applied. Pincus et al. (2013) reported that, despite the introduction of the model in 1987, there have since been increasing rates of disability and increasing costly and ineffective tests and biological monotherapies. Loisel et al. (2005) reasoned that a holistic system-wide reform is necessary to achieve the paradigm shift required to add the more complex BPS interactions and role of the individual to the essentially biomedical approach of work injury management.

In a comprehensive literature review, Waddell, Burton, & Kendall (2010) found that vocational rehabilitation needs to be applied as healthcare within the workplace, needs to apply a BPS approach, and needs to be initiated early post-injury/illness. They recommended that structured vocational rehabilitation be underpinned by cognitive behavioural approaches that promote helpful beliefs and behaviours and address personal and workplace psychosocial barriers. The literature reviewed for this doctoral thesis revealed that few researchers have studied how WRPs have applied the BPS model, despite the expectation that they will consider BPS components, as outlined in the HWCA's definition of their role: 'Providers identify and address the critical physical, psychological, social, environmental and organizational risk factors which may have an

impact on a worker's ability to successfully return to work' (Heads of Workers' Compensation Authorities, 2015, p. 4). Therefore, these health professionals are employed to identify and manage psychosocial risk factors, take responsibility for RTW planning, advise on workplace modifications and facilitate communication between treatment providers and the workplace (2015). However, in light of current Australian RTW statistics, it appears that the potential gains achievable from the synergy between the research recommendations cited above and the role of WRPs have not been harnessed (Social Research Centre, 2018). This doctoral research investigates current approaches to injury management, investigates the essential components for an effective BPS approach, and seeks to identify the barriers that have hindered its optimisation in workplace rehabilitation.

The research includes analysis of results from the implementation of a structured BPS rehabilitation program for individuals with work-related musculoskeletal disorders who were experiencing pain. Consistent with the work of eminent researchers in this field, this research defines a structured BPS approach as including psychosocial risk factor assessment and self-care skill development, integrated into workplace rehabilitation (Hulla et al., 2019; Loisel et al., 2005; Waddell et al., 2010). In this approach, the assessed needs of the individual determine the intervention of self-management skills coaching and workplace interactions, and this person-centred approach aligns it with other recent research highlighting the advantages of 'matched care' (Linton, Nicholas, & Shaw, 2018).

The Abilita program was designed by the present researcher to provide an effective workplace rehabilitation BPS model. The program includes a brief triage tool; a psychosocial factor self-report questionnaire in a web application to collate, calculate and categorise responses in automatically generated reports; a pain education and self-management skills coaching resource; consultant training to deliver the program; and re-administration of the questionnaire to measure changes. The structure of these resources and this training aimed to achieve the quality assurance benefits of consistency, standardisation and measurement of intervention effectiveness. This structured BPS approach has not previously been evaluated within workplace rehabilitation and may help inform future recommendations for service delivery within this context.

Chapter 2: Research Aim, Objectives, Questions and Outline

2.1 Research Aim and Objectives

The importance of the BPS model is acknowledged by all parties involved in work injury management, and there have been some components of this model introduced at some levels in most systems. However, the evidence outlined in Chapters 3 and 4 indicates that the full benefits of the model will not be experienced until its entire framework is adopted and integrated into all sectors of a system (Beales, Fried, et al., 2016; Loisel et al., 2005; Pincus et al., 2013). It is suggested that this will require careful and innovative implementation of changes across all contributing sectors—including healthcare, the work environment and the financial compensation schemes—to ensure all appropriate BPS components are incorporated. Evidence defining best practice is pertinent at all levels of a system, yet there remains a significant lack of investigation into best-practice workplace rehabilitation. This doctoral research aims to contributes to this gap in knowledge by identifying what have been proposed as the core components of an efficacious BPS approach, evaluating the effectiveness of a program developed specifically for integration into Workplace Rehabilitation, and investigating the challenges to the implementation of this evidence-based approach.

To achieve this aim, several objectives were developed. The first objective was to review the extensive published literature for current best-practice recommendations and the identified barriers to attaining optimal health and work outcomes. Integral to this review was the requirement to identify evidence that would enable determination of the core components of a potentially efficacious BPS approach. Once determined, it was then appropriate to evaluate the application of a BPS rehabilitation model that had been described to provide those components within a structured implementation framework. The final objective was to focus on the many challenges of implementing all components of an evidence-based BPS approach within the complex context of workplace rehabilitation.

2.2 Research Questions

Following a review of the literature to examine what are some of the core components of efficacious BPS approaches, this study will address the following research questions:

1. Can self-report assessment be used to identify and measure psychosocial risk factors within domains, and thereby provide directional guidance to rehabilitation intervention?
    a. Is the Abilita Rehabilitation Index (ARI) a reliable and valid instrument to identify, measure and categorise the effects of the modifiable psychosocial factors influencing an individual's recovery and RTW?
    b. Is the Abilita Triage Questionnaire (AB-5) able to reliably predict respondents with moderate to high unhelpful psychosocial factor influence, and thereby indicate the need for an ARI assessment?
2. What are the outcomes of integrating a structured BPS model into workplace rehabilitation?
    a. Does implementation of the Abilita assessment, coaching and training model result in a reduction in unhelpful psychosocial factors?
    b. What is the relationship between reduction in unhelpful psychosocial factors and increase in work capacity, as measured using both increased work readiness and increase in hours at work?
    c. How do participants evaluate this approach?
3. What are the benefits and challenges of implementing a structured BPS approach in workplace rehabilitation?

2.3 Outline of Research Program

This doctoral program commenced with researching the published literature on all relevant aspects of work-related injury management, BPS approaches and workplace rehabilitation. Through the duration of the project, the researcher maintained close attention to new developments and publications in these fields, which provided an understanding of current work injury outcomes and contemporary recommendations to improve outcomes, as reported in **Chapter 3**. Further, **Chapter 4** presents a comprehensive understanding of how the BPS model has been applied, and identifies its essential components.

Given that identification and measurement of psychosocial factors is critical to the implementation of a structured BPS approach, the researcher examined the psychometric properties of the ARI assessment early in the project, and reported on the development of that assessment and its psychometric properties in a paper published in the peer-reviewed journal, *Work* (Garton, Murphy, & O'Halloran, 2016). That paper is included in **Chapter 5**. The purpose of developing that instrument was to build on the predictive evidence of previous researchers and focus on developing a tool to inform workplace rehabilitation intervention. The online assessment instrument generates a report designed to both engage the participant in self-help coaching and guide rehabilitation planning, specifically to overcome psychosocial barriers to recovery and RTW. To enable early identification of claimants who would benefit from the ARI assessment because of their potential for moderate to high psychosocial risk factors, the AB-5 triage tool was developed from analysis of ARI assessment data. The development and psychometric properties of that tool are reported in **Chapter 6**.

The body of work underpinning this doctoral research project was initiated many years ago in a WRP practice. The structured BPS Abilita program, including rehabilitation consultant (RC) training, psychosocial assessments and client self-management skills coaching, has since been used by rehabilitation providers in Australia and New Zealand and in an injury management project in Malaysia. ARI assessment data include Initial assessment responses and Impact assessment responses, which are undertaken post-coaching. These data allow analysis of changes in the questionnaire scores, reflecting changes in influential psychosocial factors for each individual, and changes in work capacity at that point in the person's recovery trajectory. **Chapter 7** describes in detail the Abilita Rehabilitation Model and reports on the aggregate change in psychosocial scores and work capacity progress of 423 cases who participated in the workplace rehabilitation programs and completed both an initial and impact ARI assessment.

The final component of this research was undertaken to gain further understanding of the barriers in the industry to the implementation of a structured BPS approach. To achieve this, the researcher analysed the perceived benefits and challenges faced by RCs who have implemented any structured biopsychosocial approach in their workplace rehabilitation programs. This qualitative study is reported in **Chapter 8**. In this manner, the research methods were able to offer greater understanding of the complexities of

implementing a structured BPS approach, than offered using either qualitative or quantitative research alone (Liamputtong, 2013). **Chapter 9** discusses these research findings and their potential contribution to the understanding and application of an efficacious BPS approach within work injury management.

Chapter 3: Work Disability

This chapter provides a review of the literature that was undertaken to identify the effectiveness of current practices in the management of work disability, investigate the research underpinning the development of models of management and best practice, and determine the known barriers to the application of best practice.

3.1 Overview

The individual, industrial and societal burden of work injury is well documented (Collie, Di Donato, et al., 2018; Safe Work Australia, 2018a). In 2012 to 2013, the estimated cost of work-related injury and disease to the Australian economy was AU$61.8 billion, representing 4.1% of gross domestic product. A significant contributor to this cost is increasing work disability; in 2015 to 2016, the median time lost for a serious claim was 32% higher than that in 2006 to 2007, and the median compensation paid was 39% higher. This was despite the rate of serious injury and illness claims having fallen by 28% during the same period. These statistics support the supposition that work safety measures are achieving improved outcomes, yet work injury management procedures have not brought similar progress (Safe Work Australia, 2019).

People with compensable musculoskeletal disorders (injury or disease) (MSKD) often fail to achieve optimal health and work outcomes (Australasian Faculty of Occupational and Environmental Medicine, 2015; Australasian Faculty of Occupational Medicine, 2001; Murgatroyd, Casey, Cameron, & Harris, 2015). Safe Work Australia conducts a biannual survey to measure RTW outcomes, and the 2018 National Return to Work Survey (Social Research Centre, 2018) found the 'current RTW rate'[2] to be just above 80% for most jurisdictions, consistent with the previous survey. Unfortunately, in the 2018 survey, there was also a significant increase (19.6%) in the proportion of unsuccessful RTW attempts.

[2] The 'current RTW rate' is the proportion of workers surveyed who reported having returned to work at any time since their work-related injury or illness.

3.1.1 Complex Problem

This is not a recent problem. In 2001, the Australasian Faculty of Occupational Medicine (Australasian Faculty of Occupational Medicine, 2001) suggested a number of potential causes for the poorer health outcomes of people who are injured and receiving claim compensation, compared with those who suffer similar injuries, yet are not involved in the compensation process, including personal and workplace psychosocial factors and claims management issues and delays. They recommended further research to elucidate the contributing factors (Australasian Faculty of Occupational Medicine, 2001).

In 2002, an international literature review and analysis determined that work disability is a function of organisational, jurisdictional and social influences, rather than being primarily medically determined (Waddell, Aylward, & Sawney, 2002). Following their comprehensive literature review into RTW following injury, Foreman et al. (2006) recommended a research agenda to focus on systems-level interventions, such as payment systems, regulations, education and social marketing, workforce development and training, and practice-based interventions (such as workplace involvement, treatment that addresses psychosocial variables, and coordinated RTW planning). Different research themes were suggested by leading RTW investigators who met at the 2005 Hopkinton Conference on Improving Return to Work Research (Pransky, Gatchel, Linton, & Loisel, 2005). These themes included early risk prediction; psychosocial, behavioural and cognitive interventions; physical treatments; the challenge of implementing evidence in the workplace context; effective methods to engage multiple stakeholders; and identification of outcomes that are relevant to both RTW stakeholders and different phases of the RTW process (2005 p. 453). This extensive list of research objectives reflects the complexity of the problem.

3.1.2 Research Heterogeneity

International research to identify the causes of compensation scheme work disability has been extensive, as detailed by Foreman et al. (2006), yet with minimal consistency in results because of variation in populations, research criteria and methodology. For example, variation in focus has included particular aspects of claims management, workplace interventions, healthcare interventions and psychosocial characteristics, each with different outcome indicators, such as claim duration and cost, work outcomes, and

health or quality-of-life outcomes. Pike, Hearn, & Williams (2016) pointed out that, in their systematic review (of 18 randomised control trials) on the effectiveness of psychological therapies for chronic pain, there was a lack of standardisation of healthcare usage data to measure the outcome. The effects of research heterogeneity and variations in quality were evident in a study from the authoritative Institute for Work and Health, Toronto, Canada, which undertook a systematic review to synthesise evidence on the effectiveness of RTW interventions that assist workers with MSKD and other pain-related conditions to resume work after a period of absence (Franche, Cullen, et al., 2005). The study investigated workplace-based RTW interventions (including healthcare interventions if they were initiated by or integrated into the workplace) and the intervention effectiveness was determined according to effect on work disability duration and quality of life. Having identified 4,124 qualitative and quantitative studies, only 10 were of sufficient quality and relevance (for example, multidisciplinary programs not presented in the workplace were excluded). From this modest number of selected studies, they found strong evidence that offers of work accommodation and contact between healthcare providers and the workplace significantly reduced work disability, and moderate evidence that work disability was reduced by early workplace contact with the worker, ergonomic worksite visits and the presence of a RTW coordinator. However, evidence for sustainability and effect on quality-of-life outcomes was insufficient. Regardless, this was a very comprehensive study reporting useful detail, which has since informed considerable subsequent research. This study also contributed to development of the *Code of Practice for Disability Management* prepared by the National Institute of Disability Management and Research (NIDMAR), Canada, in recognition of the pivotal role of those responsible for managing the RTW process (King, 2004).

Other studies have focused on the ways that outcomes are influenced by the characteristics of the individual receiving compensation for injury. For example, Giummarra et al. (2017) provided evidence of psychosocial factor contribution to poorer RTW outcomes for people who have become work disabled following compensable traumatic injury. Their study (n = 364) found that perceived injustice significantly predicted RTW (Exp(B) = .95, confidence interval [CI] = .92, .98, p = .001, RR = 4.05) and mediated the relationship between compensation and RTW (Exp(B) = .56, CI = .26, 1.20, Sobel's test: p = .006). The researchers recommended greater attention be devoted

to addressing psychological distress and perceived injustice among workers with injury to facilitate smoother transition of RTW.

Briand, Durand, St-Arnaud, & Corbiere (2008, p. 216) selected studies from six systematic reviews that were of high quality and that reported on effective interventions for work rehabilitation of workers with MSKD. They undertook a descriptive content analysis of RTW interventions found in systematic reviews of the literature. They identified that the components of an effective RTW program for MSKD were:

> Central coordination of the worker's return to work, formal individual psychological and occupational interventions, work environmental interventions (including workplace-based interventions and work accommodation), contact between the various stakeholders and interventions to foster concerted action. Briand et al. (2008, p. 216)

The researchers found that programs providing all these components for work rehabilitation were very rare, and determined that this was a result of the complex and multi-causal nature of work disability. Similar to the findings of previous researchers (Foreman et al., 2006; Franche, Cullen, et al., 2005; Waddell et al., 2002), Briand et al. concluded that long-term disability is not simply a consequence of injury or illness, but a result of interactions between the worker and three systems generally described as the healthcare system, the work environment and the financial compensation system.

An update on the Institute for Work and Health 2005 systematic review reported that work disability was reduced by multi-domain interventions encompassing at least two of three broad domains: health-focused, service coordination and work modification interventions (Cullen et al., 2018). This paper focused on RTW outcomes and measured these as reduction in lost time, improved work functioning and reduction in compensation costs. The strength of this study was in its methodology, which followed the systematic review process developed by the Institute for Work and Health, including an integrated stakeholder engagement process, and was undertaken by 17 research experts from Australia, Canada, Europe and the United States. The researchers concluded that the results aligned with a dominant theoretic paradigm in the management of work disability that 'proposes that multi-disciplinary and multi-factorial interventions that seek to address an array of individual and societal factors that influence RTW … [are] likely to be

effective' (Cullen et al., 2018, p. 11). Literature reviews are reliant on published research, and investigations into work disability have tended to primarily consider factors related to claim coordination, workplace issues and treatment approaches. There is a paucity of published research on the effectiveness of varying approaches to workplace rehabilitation, and a lack of inclusion of WRPs as a key stakeholder in the majority of studies. For example, in the 2005 analysis of RTW stakeholders, the researchers considered healthcare professionals only in the role of treatment providers (Franche, Baril, Shaw, Nicholas, & Loisel, 2005). The study found that allied health providers play an important role in supporting pain management strategies for workers by recommending work accommodation and restrictions, and in facilitating communication through ergonomic visits and workplace meetings. However, the authors did not include WRPs as RTW stakeholders or acknowledge that these tasks are within WRPs' normal duties.

3.1.3 Musculoskeletal Injury and Work

Given that injury and musculoskeletal disorders account for 89% of serious work injury claims,[3] these conditions have dominated research interest (Safe Work Australia, 2018a). However, musculoskeletal disorder research has been described as 'often wasteful and lacking clinical relevance', as it does not always achieve changes in clinical practice or patient outcomes (Buchbinder, Maher, & Harris, 2015, p. 1). This has led to the establishment of the Australian and New Zealand Musculoskeletal Clinical Trials Network, with the aim of optimising musculoskeletal health through high-quality collaborative research that has robust methodology, includes all relevant stakeholders and has a plan for implementation and evaluation (Bourne et al., 2018). The Lancet Low Back Pain Series Working Group is a body of international researchers drawn together because low back pain is the leading worldwide cause of long-term work disability. This group have called for action on this global problem (Buchbinder et al., 2018; O'Sullivan, O'Sullivan, & O'Keeffe, 2018) and a key message in this call for action is to:

[3] A 'serious claim' refers to a claim that has received compensation for one week or more for absenteeism from work.

> Use the notion of positive health—the ability to adapt and to self-manage in the face of social, physical and emotional challenges—for the treatment of non-specific low back pain. (Buchbinder et al., 2018, p. 2384)

The National Institute for Health and Care Excellence in the United Kingdom (UK) has prepared low back pain guidelines (O'Sullivan, O'Keeffe, & O'Sullivan, 2017). The key messages in the most recent update include more cautious referral for investigations and treatments, and a clear emphasis on considering psychosocial factors at an early stage and facilitating self-management strategies. Overall, the above research reviews have confirmed the critical role of self-management in the reduction of the disability and suffering associated with MSKD.

Self-management is fundamentally a BPS capability. It requires learning physical, psychological and social skills to improve management of the health condition, maintain important life roles, and manage negative emotions and unhelpful behaviours. This approach requires knowledge, problem-solving skills and self-efficacy (Carnes et al., 2012; Lorig, Ritter, Laurent, & Plant, 2006). It involves choice as explained by veteran BPS researchers Waddell and Aylward (2010); biological, psychological and social factors and the interactions between them influence the course and outcome of any illness. People have choices and bear responsibility for their actions. However, symptoms do not necessarily mean work incapacity and health problems are a matter for healthcare alone—employers must also bear a responsibility and accommodate common health problems (2010).

The workplace can have a significant influence on outcomes in recovery from MSKD (Iles, Wyatt, & Pransky, 2012; Main et al., 2016; Sheehan, Lane, Gray, & Collie, 2019). Employment is an important social and economic determinant of health. In explaining the BPS nature of health and illness, the World Health Organization (2001) identified three determinants of health: the social and economic environment, the physical environment, and the person's individual characteristics and behaviours. The Australasian Faculty of Occupational and Environmental Medicine (2014) has invested considerable effort into bringing together many stakeholders who affirm, and together promote, the importance of work as a determinant of health. Their *Position Statement: Realising the Health Benefits of Work* reports on research showing that the health and wellbeing benefits for people with MSKD who resume work early post-injury are superior compared with those

who remain off work post-injury, that good work is good for mental health, and that early intervention is an effective way to support RTW. The conclusions from each of these rigorous studies affirm that work disability should be reduced when there is a combination of early consideration of psychosocial factors, facilitation of self-management, and the worker being appropriately supported by their employer to avoid reinforcement of pain-related and/or exercise-avoidance behaviours.

This section has reported on the extensive effects of the work disability that follow MSKD (Safe Work Australia, 2018a), and multiple studies recommending that the complex characteristics of the health, work and financial contexts must be understood and managed to achieve a reduction in work disability. This complexity has contributed to heterogeneity in the focus and format of MSKD research, yet there are common conclusions that emphasise the importance of patient self-management, coordinated interventions and workplace support (Collie, 2019; Collie, Lane, et al., 2015; Foreman et al., 2006; Franche, Cullen, et al., 2005).

3.2 Developing Work Injury Management Models

With the goal of reducing the burden of work disability, researchers have attempted to identify the key features necessary to build systems to achieve consistent best-quality injury management and RTW processes. Research has tended to focus on claims management, workplace issues and treatment approaches, with resultant models developed for scheme design, disability management and injury best-practice protocols.

3.2.1 Influence of Scheme Design

Over the past 30 years, there has been research attention devoted to workers' compensation policy and processes to seek to identify scheme features that are essential for achieving improved health and work outcomes. The Compensation Policy and Return to Work Effectiveness (ComPARE) project was established to build an evidence base to support development and implementation of effective RTW policy in Australia (Collie, Lane, et al., 2015). The project's introductory report outlined the results of a review of the different workers' compensation schemes in Australia, reporting strong evidence that scheme design and management have a major influence on claim duration and RTW outcomes. They found that jurisdictional differences remain after considering the effects of other known influential factors, such as age, gender, nature of injury, occupation,

industry, remoteness, service accessibility and socioeconomic status. The report recommended that, as policy and practice are highly modifiable, changes to scheme design and management have the potential to substantially improve outcomes for workers with injury.

The national statistics from Safe Work Australia (2018a) suggest that changes to scheme policy and practice have not yet been effectively implemented and adopted. For example, one successful pilot implemented in workers' compensation claims in Victoria (n = 3,312), with the core components of early reporting, employee-centred case management and removal of barriers to RTW, resulted in a reduction in days of compensation (from 33.5 to 14.1), claim costs (from AU$6,019 to AU$3.913), medical costs and weekly benefits payments (Iles, Wyatt, et al., 2012). It is not unreasonable to postulate that, if this model had since been applied broadly, the national statistics may not indicate stagnant RTW rates. Consideration of the barriers to change in scheme design and management offers fertile ground for further research (May & Casey, 2014).

While the implementation of improvements in scheme design and management is both desirable and feasible (Collie, Lane, et al., 2015), the difficulty remains in matching practical 'ready to use' interventions with defined outcomes (Iles, Long, Ellis, & Collie, 2018). This is a difficulty not only because of the enormous complexity of the system and the multifactorial nature of disability, but also because of lack of clarity and perhaps stakeholder agreement on what constitute desired outcomes, as a result of different interests, values and language (Franche, Baril, et al., 2005; Loisel et al., 2005). Despite the early goals of the HWCA, the harmonisation of Australian systems of income support for people with disabilities has yet to be attained (Collie, Di Donato, et al., 2018). Collie, Di Donato, et al. (2018) advised that, in schemes where healthcare and RTW services are provided, models differ markedly, there is no national source of work disability data, and the quality and content of system databases vary considerably.

To map Australian systems of income support for people with health-related work incapacity, a collaborative partnership of Australian government and corporate organisations commissioned the Cross Sector Project (Collie, Iles, & Di Donato, 2018). This project identified key opportunities to improve the work and health of this population, including information and data sharing, earlier intervention, aligning service

models, engaging and influencing employers, product and benefit design, better system transitions and macro-level policy reform.

3.2.2 Features of Disability Management Models

Costa-Black, Feuerstein, & Loisel (2013) provided a thorough analysis of work disability models contributing to knowledge on work-limiting disability, including evidence of how 'the political, economic, cultural, and workplace environment may interact both positively and negatively with the worker's attitudes and decisions' (2013, p. 90). They concluded that there is a need to build more uniformity and clarity of roles among stakeholders of workplace, healthcare, compensation and personal systems. They stated their belief that the concept of work disability will continue to evolve according to the many contemporary issues faced by society.

Education and training are important tools to build uniformity in competency (Beales, Mitchell, Pole, & Weir, 2016). In 2002, a consortium of Australian injury compensation regulators and insurers established the Personal Injury Education Foundation (PIEF)—a not-for-profit organisation to deliver education and training programs, building on the work of NIDMAR and developing Australian personal injury and disability management qualifications. PIEF is a registered training organisation that provides training for people working in claims management, RTW, rehabilitation and personal injury management (Personal Injury Education Foundation, 2019). This could be an appropriate forum to introduce training to reflect current research findings, such as those recommended by the Cross Sector Project. The body of research into applying insights from behavioural economics also informs capability building for personnel working in injury management. These principles are designed to influence stakeholders' social, cognitive and emotional behaviour and facilitate changes in the way decisions are made by individuals and institutions (Ilieva & Drakulevski, 2018).

Collie (2019) observed that best practice in claims management is shifting from a liability and cost focus to a health- and function-focused client-centred model. This includes better targeting of client needs through psychosocial screening, reformed injury management processes, and an outcome measurement framework to include client health and wellbeing. This approach requires improvement in claims information management systems and data analysis capability (Collie, 2019), which would enable claims models

to become more advocacy based, with a team approach focused on the worker with injury as a whole person and as the customer at the centre of the claim.

Rousmaniere & Fikes (2017) reported that the single greatest roadblock to timely work injury recovery and claims cost control 'is the negative impact of personal expectations, behaviors, and predicaments that can come with the injured worker or can grow out of work injury' (2017, p. 2). The effect of psychosocial issues ranked above all other factors, including RTW accommodation and employee–employer relationship. Psychosocial factors have been increasingly considered in disability management models (Besen, Young, & Shaw, 2014; Edwards, Dworkin, Sullivan, Turk, & Wasan, 2016; Gatchel et al., 2007). A comprehensive evaluation of the evolution of health and disability models focusing on RTW categorised the models in five groups: '(1) biomedical and forensic; (2) psychosocial; (3) ecological/case management and economic; (4) biopsychosocial; and (5) most recent integrative models' (Schultz, Stowell, Feuerstein, & Gatchel, 2007 p. 331). This evaluation found that most models do not adequately accommodate the multiple and complex factors that influence disability, such as personal and workplace psychosocial factors. For this reason, both the biomedical and forensic models, with their biological focus, are applicable in acute healthcare, yet inadequate in the context of occupational disability. Schultz et al found that ecological/case management and economic models tend to capture the complex phenomenon of RTW from a social perspective, yet lack understanding of the effects of the relationship of those characteristics on the individual worker in a disability prevention context.

The psychosocial model focuses on individual responses to injury and has achieved successful outcomes, including reducing the effect of pain and disability in work capacity, particularly when a cognitive-behavioural approach is applied (Schultz et al., 2004). Schultz et al. (2007) described evolution of the BPS model as an integration of biomedical, psychosocial, environmental and ergonomic factors into a systems-based approach. The researchers concurred with others in identifying the BPS model as a superior model for understanding the multidimensional aspects of many health problems and work disability because it recognises the relationships between pain, physical, psychological and contextual factors within a systems-based approach (Gatchel et al., 2007; Schultz et al., 2007; Sullivan, Feuerstein, Gatchel, Linton, & Pransky, 2005).

3.2.3 Difficulties in Implementing Best Practice

Recommendations have been presented for applying best practice in workers' compensation (Atkins & Robinson, 2015; Fronsko, 2008; Iles, Wyatt, et al., 2012; Loisel et al., 2005; May & Casey, 2014) and have commonality in their goal of achieving a fair, efficient and sustainable scheme. A range of requirements are proposed, including administrative efficiencies (Atkins & Robinson, 2015), focus on restoring health and work capacity (May & Casey, 2014), early reporting, employee-centred case management, removal of barriers to RTW (Iles, Wyatt, et al., 2012) and robust legislation and scheme regulation (Fronsko, 2008).

Loisel (2005) described that injury compensation is complex because it is subject to multiple legal, administrative, social, political and cultural challenges, and this complexity may influence the implementation of best practice. For example, the financial incentives within claims management may encourage insurance personnel to exercise their financial authority in a manner that has anti-therapeutic consequences, such as incentivising workers to demonstrate that they have a physical problem (Loisel et al., 2005). During the twenty-first century, laws and regulations have been introduced mandating BPS treatment for pain and disability, where both medical and psychological management are integrated in a single paradigm (Bruns, Mueller, & Warren, 2012; Gatchel et al., 2007; Warren, 2010). This demonstrates convergence in scientific evidence, medical society positions and compensation policies to support the BPS model (Bruns, Mueller, & Warren, 2010).

Beales, Fried, et al., (2016) investigated why biomedical models of care have continued to dominate despite recommended adoption of BPS management. They found that there has been poor uptake of the overarching principles of BPS models of care, including contemporary understanding of pain biology, understanding that work is good for health and wellbeing and is therapeutic, understanding the context of each worker, screening for risk of poor outcomes, ensuring consistent communication and coordination between stakeholders, and empowering the worker. The current suboptimal outcomes for injured workers suggest continuation of the poor uptake of these principles in the compensation environment. Beales, Fried, et al. proposed that a BPS model of care must be integrated into compensable injury management at all levels, including system (macro), organisation (meso) and individual (micro) levels, and at all phases of the claim.

Guidance for implementing research findings was also detailed in a recent report commissioned by the Department of Veteran Affairs, including a list of the important trends in personal injury case management, presented within five domains: strategic approach, service delivery model, claims operating model, evaluating and monitoring, and cross-sector collaboration (Collie, 2019). The strategic approach provides a succinct summary of the requirements for injury management and recommends a customer-centric model co-designed by stakeholders, with a BPS approach recognising that improved client outcomes will benefit the scheme's financial performance.

In considering work disability management from the perspectives of scheme design, disability management and best-practice models, it is apparent that the challenges previously articulated (Foreman et al., 2006; Loisel et al., 2005) to the implementation of evidence-based best practice remain present today. The findings of Beales, Fried, et al. (2016) and Collie (2019) provide important contributions and potential guidelines for integrating effective processes and intervention into scheme design. Their recommendations now present the challenge of implementing customised models using a BPS approach in a manner that addresses the complexity caused by the many levels, phases and players interacting and influencing the processes and outcomes within each scheme.

3.3 Describing the Biopsychosocial Approach

In considering methodology to implement the BPS approach, it is necessary to understand its components, processes and purposes (Engel, 1977; Gatchel et al., 2007; Hulla et al., 2019; Waddell, 1987). The origin of the BPS model in healthcare is generally attributed to Engel (Engel, 1977, p. 129), who promoted it to take account of the missing dimensions of the biomedical model. He hoped that this new model could provide 'a blueprint for research, a framework for teaching, and a design to action in the real world of healthcare' (Engel, 1977, p. 129). In 1987, Professor Gordon Waddell (Waddell, 1987) applied the model to explain that the problem with back pain was more related to the individual's and society's perceptions and reactions to pain than to the common experience of pain, and thus was not adequately explained by the biomedical model. He described inappropriate reactions as including unnecessary avoidance of physical activity and social interactions, absenteeism from work and high healthcare use. Waddell was careful to include the bio-behavioural perspectives of the gate control theory of pain, in which pain is modulated

by mental, emotional and sensory mechanisms (Costa-Black et al., 2013). Gatchel et al., (2007) provided a detailed explanation of the relationship between neuroscience and psychosocial processes, and promoted BPS as the most heuristic approach to managing chronic pain.

The BPS model effectively incorporates the theoretical concept of systems and complex thinking, which is 'built on the premise that most things are connected to most other things and that very few problems can be isolated and treated independently' (Comcare, 2016a, p. 5). In contrast, a traditional biomedical approach follows the linear PICO (patient, intervention, comparison and outcome) framework. This difference in focus ensures that a BPS approach will consider the ongoing relationship between the biological, psychological and social factors, rather than just one element in isolation.

Some practitioners have sought to add an additional construct to BPS. For example, Dr Jennifer Christian (Christian, 2018) recommended the addition of economics to create a BPSE model to acknowledge the role played by financial realities and incentives. Other practitioners have suggested the addition of spiritual, cultural or environmental constructs. The published literature indicates that none of these additions to the term have been broadly adopted. All these constructs are relevant through the lens of a BPS approach and are appropriate to consider when identifying obstacles and planning injury or health management. This holistic understanding of healing and recovery has been understood for centuries and is observed in traditional Indigenous Australians' understanding of health, in which the interplay between physical, emotional, social and spiritual aspects is critical to wellbeing, and is strengthened by the values of bush medicine, which come from the natural environment and with connections to identity (Shahid, Bleam, Bessarab, & Thompson, 2010).

One established application of a BPS approach in injury management is the clinical multidisciplinary pain management programs in which several health professionals of different disciplines coordinate the intervention to improve a patient's function, mood and disability. However, these approaches are inevitably expensive and, despite evidence for good outcomes (Gatchel & Okifuji, 2006), their use has tended to be restricted to longer duration cases, where all earlier interventions have failed. A Cochrane systematic review of 41 randomised control trials (RCTs) examined patients with chronic low back pain (LBP) who attended multidisciplinary BPS programs (Kamper et al., 2014). This

review found that the effect—which was that participants were likely to experience less pain and disability and better work outcomes than those receiving usual care or physical treatment—had only a modest magnitude. Standardised mean differences in the long term were 0.21 (95% CI 0.04 to 0.37) for pain, 0.23 (95% CI 0.06 to 0.4) for disability and 1.87 (95% CI 1.39 to 2.53) for work outcomes. As a result of the time and resources required, Kamper et al. recommended this intervention only for people with indicators of significant psychosocial effect. They found these results to be a factor that drove intervention decisions—specifically the necessity for insurers to balance results against the time and resources required.

In response to these cost drivers and ongoing pain management research, BPS models have evolved in a broad range of clinical and community settings (LeFort, Gray-Donald, Rowat, & Jeans, 1998; Pransky et al., 2005; Sullivan, Ward, et al., 2005; Watson, 2001). In 2012, an international forum on LBP research in primary care considered the BPS model's success over the previous 25 years and concluded that it is sound, yet failures have occurred in how the model has been understood and implemented (Pincus et al., 2013). Pincus et al., reported that multiple physical, psychological and work interventions have been developed and researched, yet rarely have all three components been integrated into one intervention, and at times psychological components have been integrated into general practice or physiotherapy with delivery at suboptimal levels. They found that, in the occupational context, treatment providers often reverted to a biological approach, and that outcome measurements were not consistent across studies. Pincus et al. reported that the lack of communication between systems is a major cause of increased disability. Similarly, in describing the application of the BPS model for the management of problems associated with persistent symptoms, Wade, (2015) rated communication between all people as fundamental to the process. He further emphasised the importance of a client-centred and goal-directed approach, requiring learning by the patient and commitment to practising recommended activities. Synthesis suggests that these researchers have reasoned that holistic system-wide reform is necessary to achieve the paradigm shift of adding BPS to an essentially biomedical approach and include the fundamental evidence-based practices of early diagnostic triage, identification of potential psychosocial and workplace barriers to RTW, good self-management coping, and early return to safe work.

In their critical review of literature, Schultz et al., (2007) found that a BPS model should also ensure valid measurement of psychosocial variables; applicability to diverse musculoskeletal conditions and workers; the ability to be reliably repeated; and the collection of appropriate information so that interventions that evolve from the model actually improve the state-of-the-art related to evaluation, prevention and rehabilitation of occupational disability. This review recognised the importance of using psychosocial data to not only inform immediate individual intervention, but also to ensure sustainability of a best-practice injury management process.

This section has identified that a BPS approach has many necessary components that, when applied efficaciously, achieve early, individualised, holistic injury management that is implemented cooperatively by all parties and empowers the individual.

3.4 Summary

The literature reviewed in this chapter illustrates the complexity of work disability and the consequential research heterogeneity in this growing problem, in which improved RTW outcomes are not being achieved, despite rising costs in compensation schemes. A common finding in the research is that this complexity is due to multiple factors, including the many levels, phases and players interacting and influencing the processes and outcomes within each scheme. Potential solutions through practical implementation recommendations are available, with each requiring commitment to change at all levels in any system seeking to deliver improved disability management services and outcomes (Collie, 2019; Main et al., 2016; Nicholas et al., 2019)

The BPS model has been recognised as the best approach to manage these complexities, yet it has been applied in many guises and achieved varied results, as identified by Pincus et al. (2013). Research into the use of this model agrees that system-wide implementation programs are necessary to optimise its effectiveness (Beales, Fried, et al., 2016; Pincus et al., 2013; Schultz et al., 2007; Wade, 2015). However, system-wide implementation will only be effective if all aspects of the approach are integrated in the appropriate phase. Chapter 4 explores the core components of the BPS model.

Chapter 4: Biopsychosocial Implementation

This chapter is a review of the literature for the purpose of identifying the necessary components for effective application of the BPS approach in work injury management. Early research established the potential of the BPS model (Gatchel et al., 2007; Waddell, 1987) to achieve improved health and work outcomes through its capacity to influence individual, workplace and case management reactions and actions that influence recovery. Ongoing research has investigated methods used in BPS assessment, triage and interventions in the effort to achieve effective implementation of this complex approach.

4.1 Biopsychosocial Assessment

4.1.1 Introduction of the Flags Model

As identified by Pincus et al. (2013) and Schultz et al. (2007), accurate assessment of the key BPS factors influencing the health, wellbeing, recovery and work capacity of an individual is a necessary component of an effective BPS program. The classification of psychosocial factors into coloured flag categories to differentiate their origin and influence was an important step in generating broader stakeholder understanding of the BPS concept (Kendall, Burton, Main, & Watson, 2013, Kendall, Linton, & Main, 1997). Using that classification, psychosocial factors of the individual that are amenable to change are categorised as either 'psychological' (yellow flags, such as fears and unhelpful beliefs) or 'work perceptions' (blue flags, such as having a perceived unsupportive manager). Orange flags relate to psychological disorders, such as depression and post-traumatic stress disorder, and black flags refer to characteristics in the compensation and employer contexts. Red flags are signs of serious pathology. The yellow and blue psychosocial factors include thoughts, beliefs, fears and expectations, and thus are amenable to change.

Application of the flags model is one reason that cognitive behavioural interventions demonstrate strong outcomes in psychosocial models (Schultz et al., 2007). Yellow and blue psychosocial factors yield even stronger influence when orange flags are present, as evidenced by the association between developing chronic pain and the presence of depression or post-traumatic stress disorder (Laisne, Lecomte, & Corbiere, 2013; Mitchell & O'Donnell, 2011; Nicholas, Linton, Watson, & Main, 2011). The flags model

uses clear terminology to describe the different psychosocial constructs applicable to each flag. However, the term ‘psychosocial’ has been applied with different meanings in the work injury context.

4.1.2 Understanding the Term ‘Psychosocial’

The literature reviewed in Chapter 3 contended that the complexity of the work injury environment is a major reason for the lack of progress in reducing work disability (Briand et al., 2008). Loisel et al., (2005) suggested that greater uniformity in language would be helpful to reduce confusion in this environment. The effect of different understandings in language is very evident in the use of the term ‘psychosocial factors’. Some researchers have stated that this term has now been so broadly applied that it is ‘meaningless’ (Blyth, Macfarlane, & Nicholas, 2007; Nicholas et al., 2011, p. 738), as the same term is used to describe different sets of influential factors. For example, ‘psychosocial’ often includes a range of general factors, such as childhood trauma, socioeconomic circumstances, comorbidity and low education (Gragnano, Negrini, Miglioretti, & Corbiere, 2018), while ‘psychosocial support’ refers to family or workplace support (McLinton, McLinton, & Van der Linden, 2017). Meanwhile, ‘workplace psychosocial’ refers to job control, job demands, managing workplace change and so forth (Comcare, 2015a) and ‘pain-specific psychosocial factors’ refer to attitudes and behaviours, such as catastrophising and fear avoidance (Besen et al., 2014). Moreover, psychosocial has also been categorised as being ‘within the individual’ or ‘outside of the individual’ (Sullivan, Feuerstein, et al., 2005).

4.1.3 Psychosocial Variables in Work Injury

The requirement for valid measurement of psychosocial variables is based on empirical evidence that these factors are the predominant contributors to delayed recovery and RTW in MSKD (Edwards et al., 2016; Laisne et al., 2013; Leeuw et al., 2007; Linton & Shaw, 2011; Nicholas et al., 2011; Sullivan, Feuerstein, et al., 2005; Waddell, Burton, & Main, 2003; Wideman & Sullivan, 2011). Edwards et al. (2016) found that various types of psychosocial variables should be considered when predicting outcomes because they provide a multidimensional array of interacting forces that shape long-term pain-related adjustment. However, even studies investigating the evidence of broader BPS factors that contribute to the development of chronic pain have found that individual factors dominate (Mitchell & O'Donnell, 2011). Mitchell & O’Donnell found that the most influential

individual factors include fear and avoidance, catastrophising, guarding, excessive bed rest, negative cognitions and beliefs, low self-efficacy, low readiness to change, helplessness, a lack of acceptance and workplace conflict.

Leading researchers in this field, Nicholas et al. (2011), sought to review the evidence for pain-specific psychosocial factors prognostic of the development of disability following the onset of musculoskeletal pain. They scrutinised 244 studies that were systematic reviews, critical reviews, RCTs or clinical trials published between 2000 and 2009, with a focus on pain syndromes and 'yellow flags'. They finally selected the 28 highest quality studies to investigate the role of psychosocial variables as risk factors for disability (Nicholas et al., 2011). They found that some factors, such as depression, catastrophising, pain intensity and beliefs about pain, are consistently observed to be associated with poor outcomes. Those who catastrophise frequently are depressed, have intense pain, hold fear-avoidance beliefs and are more likely to develop persistent pain problems. However, the role of such yellow flags was not evident in a minority of selected studies. This outcome may have derived from methodological differences in the studies—for example, not all studies selected participants based on psychosocial factors, with some based on time since injury or treatment-seeking behaviour. In these studies, the baseline of psychosocial influence was variable; therefore, opportunity for improvement in these dimensions was low. Importantly, the findings indicated that, when participants were selected because of yellow flags and were provided intervention known to address these factors, good outcomes were achieved. Overall, the study provided evidence of a clear relationship between individual, pain-specific psychosocial factors and future clinical and occupational outcomes (Nicholas et al., 2011, p. 741).

More specifically, through hierarchical linear and logistic regression analyses, Wideman & Sullivan (2011) found that fear of movement is a unique predictor of long-term work disability ($B = 0.063$, $p > .05$), pain catastrophising is a unique predictor of long-term pain intensity ($t = 2.119$, $p > .05$) and pain self-efficacy is a unique predictor of medication use ($t = -2.375$, $p > .05$) in MSKD pain conditions. Psychological theories and models provide explanations of cognitive, emotional and behavioural manifestations of pain (Linton & Shaw, 2011), thereby providing understanding of BPS interactions and their effect on pain and disability. Table 4.1 presents some examples of studies that illustrate psychological constructs shown to contribute to pain and disability.

Table 4.1: Psychological Constructs Affecting Pain and Disability

Construct	Reference	Description
Catastrophizing	Brecht & Gatchel, 2019	Includes rumination, magnification and helplessness; is associated with fear avoidance; and predicts long-term pain intensity.
Emotional Distress	Campbell et al., 2013	May reflect catastrophising, depression, anxiety, kinesiophobia, pain self-efficacy and emotional reactions, and predicts pain intensity and disability.
Fear-Avoidance	Vlaeyen, Crombez, & Linton, 2016	Appraisal of pain as a threat elicits protective fear, leading to avoidance behaviours that maintain pain-related fear.
Pain Self-Efficacy	Nicholas, 2007	Refers to a resilient self-belief system in the face of pain that, when low, is associated with pain-related disability, maladaptive coping, reduced work capacity and medication dependency.
Passive Coping	Mercado, Carroll, Cassidy, & Cote, 2005	Involves maladaptive coping, such us excessive rest or dependency on medication, and predicts disabling pain.
Perceived Injustice	Sullivan et al., 2008	Involves a belief of suffering as a consequence of an injustice and is associated with delayed recovery and RTW.
Work Perceptions	Truchon et al., 2012	Individuals' perceptions about their capacity to work and about workplace characteristics; adverse perceptions predict work disability.

The construct descriptions in Table 4.1, illustrate the extent of influence these constructs may contribute to the pain, disability and distress accompanying MSKD.

Over the past 40 years, there have been many tools developed to identify specific psychosocial variables that are known to be influential in the development of persistent pain and disability in musculoskeletal injury. Established tools included the Pain Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983), Survey of Pain Attitudes (Jensen, Turner, & Romano, 2000), Fear Avoidance Belief Questionnaire (Waddell, 1993), Pain Catastrophising Scale (Sullivan, Bishop, & Pivik, 1995) and Pain Self-Efficacy Questionnaire (Nicholas, 2007). Research into the development and application of these tools has significantly increased understandings of the strength of influence of each of the psychosocial constructs that the tools target.

4.1.4 Psychosocial Variable Measurement

Psychosocial factor research has created debate over assessment methodology for effective identification of these influential factors, with general agreement of the need for

a multimodal approach that includes clinical assessment, interview, observation and self-report questionnaires (Gatchel & Turk, 2008; Kendall et al., 2013). Self-report questionnaires are considered the gold standard for the appropriate measurement of perceived pain and influential beliefs, attitudes and expectations (Dansie & Turk, 2013; Strong, Unruh, Wright, & Baxter, 2002). Without responses to a self-report questionnaire, the assessor is reliant on clinical judgement, and this has been found to be unreliable (Schafer, Prkachin, Kaseweter, & Williams, 2016; Stratil & Swincer, 2012). Stratil and Swincer (2012) found that clinical assessment identifies only 10 to 20% of workers with injury who are at risk of long-term disability, with an equal number of false positives, and concluded that comprehensive self-report risk assessment would better identify those at risk and the specific domains of risk that need to be targeted in an intervention.

In continuing research, Stratil & Swincer, (2017) assessed the psychosocial, workplace and treatment-related risk factors for 3,000 workers at regular intervals for three years, and found that psychosocial risk factors change in intensity and type over the course of an injury. Similarly, Wideman, Adams, & Sullivan, (2009) found that the fear-avoidance model is a dynamic process with a sequential relationship between catastrophising, fear of movement and subsequent functional outcomes. These findings add strength to recommendations for early screening and early management of psychosocial factors to prevent the escalation of their influence on functional capacity.

Multiple questionnaires have been developed for the purpose of identifying candidates at high risk of prolonged disability. A recent modified Delphi study (Sleijser-Koehorst et al., 2019) sought to reach consensus on the most appropriate questionnaire to assess specific psychosocial variables in patients at risk of developing persistent musculoskeletal pain. The panel of 36 experts in medicine, psychology and allied health, reached consensus for the following four psychosocial constructs:

1. fear of movement: Fear Avoidance Beliefs Questionnaire and Tampa Scale (full version or 11-item version)
2. coping: Coping Strategies Questionnaire (initial or revised version) and Chronic Pain Coping Index
3. self-efficacy: Pain Self-Efficacy Questionnaire (full version or two-item version)

4. catastrophising: Pain Catastrophising Scale and revised version of the Coping Strategies Questionnaire (Sleijser-Koehorst, Bijker, Cuijpers, Scholten-Peeters, & Coppieters, 2019, p. 1).

This research recommendation exposes the limitation that four different instruments would need to be administered to identify and measure the effects of each of the most influential psychosocial factors. This could total approximately 70 questions and take 40 or more minutes to complete, which adds burden to both the assessing practitioner and the client. An alternative method is to use a questionnaire developed to capture multiple psychosocial factors. Most questionnaires measure one psychosocial element, yet Kendall et al. (1997) were the first to introduce the multiple-factor approach through the yellow flags concept for managing acute LBP. Subsequently, the Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ) identified patients at risk of developing persistent back pain by canvassing multiple psychosocial risk factors (Linton & Boersma, 2003). This tool has been used in many studies and has good evidence for predicting future work absenteeism due to disability. However, it provides only a single score and thus has limited capacity to inform intervention requirements, yet is too long (24 items) to be used as a quick screening tool for risk segregation purposes. This led to the development of the short-form version, ÖMPSQ-SF (Linton, Nicholas, & MacDonald, 2011). This 10-item tool has now been validated in Australia for use as a screening tool with workers with a range of soft tissue injuries (Nicholas et al., 2018). It provides psychosocial risk measurement in a single score, yet does not provide psychosocial construct detail to inform intervention planning.

4.1.5 Linking Screening to Intervention

Waddell et al., (2003) emphasised that screening is not an end in itself and is only of value if it is linked to the delivery of effective rehabilitation and work-focused interventions. Sullivan, (2013) postulated that the use of psychosocial screening tools can be harmful if not linked to intervention planning, particularly when used for the purpose of diagnosis or adjudication. Most tools provide only a total score that classifies the level of risk of psychosocial factors affecting outcomes, yet does not inform specific intervention requirements. More efficient linking of assessment results to intervention planning could be achieved through a comprehensive tool that screened multiple BPS risk factors and provided subscale ratings (Boersma & Linton, 2005). Typical of this research approach,

Boersma and Linton (Boersma & Linton, 2005) developed subscale scores for the ÖMPSQ. With a sample of 363 ÖMPSQ results, the researchers identified and validated four distinct profiles through cluster analysis: fear avoidant, distressed fear avoidant, low risk and low-risk depressed mood. The subgroups were found to clearly relate to outcomes one year later, with the low-risk groups having virtually no individuals on long-term sick leave, while the fear-avoidant group had 35% and the distressed fear-avoidant group had 62% on long-term sick leave. This study strengthened the importance of psychosocial profiling and the significant opportunities available to develop profiles that will enable tailored intervention for all individuals.

Another commonly used multiple-factor questionnaire, the STarT Back Tool, has only nine questions and was developed to streamline risk factor assessment in primary care settings. It was designed to screen a range of predictive physical and psychosocial constructs, and researchers have found that, as a multidimensional measure, it has greater prognostic strength than single-construct measures (Wideman et al., 2012). It has been used to provide classification of intervention intensity, ranging from primary care management only for low-risk cases, to physiotherapy for moderate-risk cases, and to combination physical and cognitive-behavioural approaches for high-risk cases (Hill et al., 2008). However, it has the limitation of a focus on back pain and does not include work-related factors, such as work satisfaction or RTW expectation.

Another study was undertaken to refine psychosocial screening using a composite instrument to guide intervention, resulting in the Pain Recovery Inventory of Concerns and Expectations (Shaw et al., 2013). This 46-item instrument provides a risk rating and categorises risk as lacking organisational support, emotional distress, or severe pain and activity limitation. It was found a reliable and valid screening measure for working adults with LBP to identify early intervention needs. However, the authors reported substantial correlation among the variables, creating concerns that it may be difficult to judge which factors are the root cause to determine intervention requirement (2013, p. 889). Other tools have shown promising application in clinical settings, yet do not provide adequate response information to support work rehabilitation planning (Lentz et al., 2016; Traeger et al., 2016). For example, the Optimal Screening for Prediction of Referral and Outcome (OSPRO) (Lentz et al., 2016) tool is a 17-item instrument developed for orthopaedic physical therapists to assess psychological factors, including negative mood, fear

avoidance and positive affect/coping, to support decision making in clinical practice. Respondents with elevated vulnerability and decreased resilience are identified with a high degree of accuracy (minimum 85%). Thus, this is a valuable tool to identify specific psychological factors without using multiple questionnaires; however, it has limited applicability in the work rehabilitation context because it does not screen work-related factors.

Other instruments focus on work-related factors, yet provide limited screening for psychological constructs (Corbiere, Durand, Negrini, & St-Arnaud, 2017; Truchon et al., 2012). Truchon et al. (2012) developed and validated the Absenteeism Screening Questionnaire to identify workers at risk of being absent from work for more than 182 cumulative days and to inform prevention interventions. It is a 67-item questionnaire, with 22 items found to be predictive of long-term absence from work, including fear-avoidance beliefs related to work, RTW expectations, annual family income before taxes, last level of education attained, work schedule and work concerns. The receiver operating characteristic (ROC) curve was 75% indicting acceptable discriminative ability of the model (2012, p. 27). The instrument was designed to inform interventions that target workplace conditions and individual perceptions about work; however, it is inadequate to inform other influential psychosocial constructs. The Return to Work and Self-Efficacy Scale (ROSES) was developed to assess the obstacles perceived during RTW and consider self-efficacy to overcome those obstacles (Corbiere et al., 2017). The developers described satisfactory psychometric properties for ROSES and advised that it reports on 10 dimensions primarily related to work disability and work participation. This could be valuable in workplace rehabilitation; however, the limitations in applying the tool include its length (97 items); its applicability only to workers returning to the same employer; and that it is a framework for treating practitioners' conversation with the worker, rather than a questionnaire completed independently.

Section 4.1 has reported the results from studies related to BPS assessment, reviewing evidence that psychosocial variables are strong predictors of prolonged pain and disability (e.g. Edwards et al., 2016) and can lead to delayed RTW following injury (e.g. Laisne et al., 2013). In addition to identification of risk rating due to psychosocial factors, it is necessary to identify the contributing psychosocial constructs to guide rehabilitation and workplace interventions (Nicholas et al., 2011; Pincus et al., 2013). Table 4.1 presented

a summary of some of the key psychosocial constructs known to influence pain and work disability. With these processes in mind, the capacity to identify patient subgroups was described as ‘the Holy Grail’ of back pain by the Cochrane Back Review Group (Bouter, Pennick, Bombardier, & Group., 2003). Some single questionnaires that screen multiple psychosocial constructs have been developed for this purpose—and shown to have greater predictive strength and scope than multiple single-construct instruments (Linton et al., 2011; Wideman et al., 2012). A synthesis of studies indicates that identifying questionnaire responses into domains, in addition to risk rating, may be the most effective way to achieve tailored intervention, avoid unnecessary treatment and prevent unnecessary disability (Boersma & Linton, 2005; Corbiere et al., 2017; Sullivan, Adams, & Ellis, 2013).

4.2 Psychosocial Triage

The majority of workers who sustain a MSKD at work do not experience delayed recovery and RTW due to unhelpful psychosocial factors; however, it is important to identify those who are vulnerable to this influence to provide early appropriate assistance, commencing with psychosocial assessment (Kendall et al., 2013). Psychosocial triage provides a risk rating only—it does not identify the psychosocial factors that need to be addressed during intervention (Waddell et al., 2003).

4.2.1 Within Claim Management

Psychosocial screening and triage is now recommended as a role of claim managers (Safe Work Australia, 2018c), which matches best-practice evidence that risk factor identification is best applied at claim commencement to guide resource allocation and appropriate service delivery (Iles et al., 2018). Traditionally, claim triage has been based on claim and demographic information, whereas it is now known that triage information should be drawn from health and psychosocial factors (Safe Work Australia, 2018c). Within Australian Life Insurance, claims assessors now identify Biopsychosocial triggers as the key indicator for rehabilitation intervention, however standardisation of screening methodology has not been established. (Swiss Re, 2016). The use of psychosocial questioning in claim administration requires careful implementation because there is evidence that claim and case management actions can have positive effects on recovery, yet can also impede recovery and lead to mental health concerns, and this has been the

impetus for studies on claims handling processes (Collie, Gabbe, & Fitzharris, 2015). For this reason, it is recommended that claims processes need to create more trusting and helpful relationships with the person on claim (Safe Work Australia, 2018c). Collie, (2019) advised that training for case managers and adjustment of roles and responsibilities are likely to be required when implementing psychosocial screening in any system.

4.2.2 Triage Method

There is no recommended best-practice triage method; however, current evidence supports the use of a validated short psychosocial questionnaire, leading to more comprehensive questionnaires for higher risk clients, to guide selection of the service, support or intervention that matches the identified client-specific risks (Collie, 2019; Nicholas et al., 2019). It is also recommended that psychosocial screening be available at any time during the course of a claim, with recognition that the effects of unhelpful factors may become greater over time and that interventions need to target findings at each phase of disability (Casey & Cameron, 2014; Stratil & Swincer, 2017). Proponents of the flags model advise that all key players involved in injury management should seek to identify and remain alert to psychosocial flags throughout the course of the claim (Kendall, Burton, Main, & Watson, 2013). They advise that it is better to over-identify cases than to allow any to slide into long-term problems, resulting in excessive suffering, risk of unemployment and high healthcare costs. As such, a triage questionnaire needs to have high sensitivity, even if the specificity is low (Kendall et al., 2013; Waddell et al., 2003). Screening should also ensure that the information gained is captured in a structured database and can be used to influence future actions (Collie, 2019).

The importance of clarity in purpose when using psychosocial screening was highlighted in Karan et al.'s (2017) systematic review of 18 studies between 2014 and 2016, which examined prognostic screening in primary care for patients with recent-onset LBP. The researchers found that the seven tested tools were overall poor in assigning risk of developing chronic back pain (ranging from pooled AUC = 0.59 to pooled AUC = 0.69), with greater accuracy in prognosis of poor disability outcome (ranging from pooled AUC = 0.74 to pooled AUC = 0.75) and excellent outcomes for prolonged absenteeism (pooled AUC = 0.83). Karran et al. concluded that, if tools are used for prognostic purposes, it is important to recognise the risk of misclassifying patients, with the consequence of poor care decisions. Very few screening tools have been designed to be used by claim or case

managers, whereas over 40 clinical decision support tools have been developed for use by health professionals (Gross et al., 2016).

The ÖMPSQ-SF (Linton et al., 2011; Nicholas et al., 2018) has demonstrated capacity to accurately select cases of high psychosocial risk and predict number of days to return to pre-injury work to the extent that every one-point increase in the total score predicted reduces the chance of returning to work by 4%. Nicholas et al. (2018) found that high-risk cases had significantly more lost days (median 26.6) than did low-risk respondents (median 10.1). Two important strengths of their study were that participants were not restricted to those with back injury, but included individuals with soft tissue injury in any body location, and the 10-question ÖMPSQ-SF was administered over the telephone by insurance case managers. The protocol for this project has since informed broader implementation of the approach and has had to overcome resistance to changing usual claim and case management practices (Global Access Partners, 2017). The ÖMPSQ-SF is currently being used in pilot programs in Australian workers' compensation settings, in which data analytics achieves the initial claim segmentation, while the second stage involves case manager use of the ÖMPSQ-SF and additional instruments as indicated, and, finally, the interventions are selected to achieve tailored, stepped care service delivery (Collie, 2019). Underpinning these programs is training for case management staff and adjustment to roles and responsibilities.

Another recent Australian study developed the Plan for Action for a CasE (PACE), a 41-question screening tool for claims case managers to garner medical information and responses from the worker and employer, with results linked to six case management pathways (Iles, Sheehan, Munk, & Gosling, 2019). The tool was used within two weeks of injury for 524 claims, and the most commonly identified risks were worker and employer recovery expectations and work capacity certification. Results on the outcome of the case management actions had not been published at time of writing this thesis. This approach attempts to capitalise on the potential for case managers to interact with the worker, employer and health providers. However, case managers did find this approach to be time consuming and were not comfortable asking some of the ÖMPSQ-SF questions. Iles et al., (2019) recommended integration of the tool into existing case management software for increased acceptability. It seems that the recommendations of Waddell et al., (2003)—to cater for the distinction and relation between screening to

identify risk and assessment of the risk factors and intervention requirement—was not a consideration in this project.

In an alternate approach, Gross et al. (2019) used advances in information technology to facilitate the development of a clinical decision support tool using only data algorithms. The Work Assessment Triage Tool (WATT) uses claimant characteristics known to influence RTW outcomes, including demographic, occupational, injury-related, functional and psychosocial factors, to match patients to available interventions. In the initial validation study, Gross et al. (2019) tested the tool using 10 cross-validation procedures, and the WATT accuracy (ROC area = 0.94) was better than human decision making (ROC area = 0.86) for identifying rehabilitation programs leading to successful work outcomes. However, in a large external validation study on claimants with musculoskeletal injuries (n = 28,919), the WATT was found to have lower overall accuracy (0.60, with AUC of 0.50) than human decision making (0.72, with AUC of 0.69) when categorising claimants to an intervention to achieve successful rehabilitation outcomes. The researchers concluded that the WATT algorithm is not yet ready to be used in clinical or claim management decision making.

The lack of successful outcomes for the WATT project may indicate the need to reconsider triage methodology. Based on the currently available research, it may be that the most accurate and effective screening method is for claims administrators to use a brief triage questionnaire to identify those with the potential for psychosocial barriers to recovery, who are then referred to health or rehabilitation professionals for assessment to identify and measure psychosocial factors, with the assessment results designed to guide tailored interventions (Collie, 2019; Nicholas et al., 2011; Waddell et al., 2003).

A synthesis of research pertinent to psychosocial triage suggests a cautionary approach when implementing a triage system. Decisions regarding the purpose of screening, context and role allocation for the task are imperative in the complex environment of work disability (Iles et al., 2018; Karran et al., 2017). In Chapter 6 of this thesis, Table 6.1 provides a summary of the conclusions from a range of studies that have sought to determine best practice in the implementation of psychosocial risk screening. Those recommendations informed development of the Abilita triage tool, and the development and analysis of this tool are reported in Chapter 6.

4.3 Biopsychosocial Intervention

As identified by Pincus et al. (2013), there is no single protocol for the delivery of BPS intervention. Interventions purporting to offer that approach have rarely integrated all three components of the model, and, if they have, their effectiveness has been compromised by inadequate content or dosage (van der Windt et al. 2008). Consequently, available studies have evaluated bespoke methods using different measurements indices, thereby making the synthesis of findings very challenging. This section provides a summary of some of the previous research, with a comparison of the key findings presented in Table 4.1.

4.3.1 Addressing Psychosocial Variables

BPS interventions are designed to address the underlying physical, psychological and social factors contributing to pain, disability and work incapacity. These may be addressed by multiple health services combined with RTW coordination and workplace accommodation or modifications (Institute for Work & Health, 2017). There is potential for each of these components to be provided in a siloed manner, rather than integrated into an effective BPS approach (Pincus et al., 2013), in which the individual gains the skills and capacity to manage unhelpful psychosocial factors through the heuristic process (Gatchel et al., 2007). Interventions to assist the individual to manage psychosocial factors include education about the BPS model of pain, encouragement to remain active, information about appropriate exercises, graded exposure to activities, problem solving, activity planning, mindfulness and motivational interviewing (Mitchell & O'Donnell, 2011). These psychosocial interventions, underpinned by a contextual cognitive behavioural therapy (CCBT) approach, are reported to be effective because they address underlying psychological constructs (see Table 4.1) and achieve reduced anxiety, depression and disability, thereby leading to more effective coping with pain and a more functional life (Besen et al., 2014; Mitchell & O'Donnell, 2011; Pincus et al., 2015).

Some interventions target specific psychosocial constructs, such as fear-avoidance behaviour or catastrophising (Leeuw et al., 2007; Scott, Wideman, & Sullivan, 2014). Scott et al. (2014) evaluated the effects of a seven-week standardised multidisciplinary rehabilitation program designed to reduce patients' level of catastrophising, as measured using the Pain Catastrophising Scale (PCS). Participants had a mean change in PCS score

of 42.80% (standard deviation [*SD*] = 35.69) and those with a reduction in score over 38% had the best RTW outcomes at one-year follow up. Research focusing on specific psychosocial risk factors provides guidance for clinically meaningful change post-intervention.

Cullen et al. (2018) in a systematic review reported that studies evaluating the effectiveness of cognitive behavioural therapy (CBT) in the RTW context have delivered mixed findings. The Cullen review found that only CBT interventions that also included workplace modifications and service coordination components were effective in helping workers with mental health conditions. This finding may align with the principles of CCBT, in which the individual learns how the situation affects the role of thoughts and feelings, and that choices can be made to improve quality of life regardless of those cognitions (McCracken, 2005). Pincus et al. (2015) designed a randomised control study to test the credibility and acceptability of optimised CCBT, against physiotherapy, for avoidant LBP patients. The findings from both patient and therapist data indicated that those randomised to CCBT should also have received physiotherapy. The study concluded that patients should be empowered to make sustainable lifestyle changes within a BPS framework, and treatments should be tailored to individual needs with multiple discipline input.

4.3.2 Psychosocial Influence on Readiness for Return to Work

The 'Readiness for RTW' model recognises that RTW after injury can be a complex and dynamic process (Aasdahl et al., 2017). On that basis, Franche and Krause (2005) provided compelling evidence for the adoption of both 'phase disability' and readiness for RTW approaches when designing interventions. The phase disability analytic strategy is applicable when considering outcomes such as functional ability and pain severity because they have a relationship with time since injury. The readiness for RTW analytic approach is appropriate in considering interventions to match motivation for RTW on the basis of stage of change (Prochaska & Velicer, 1997). For example, when in the 'contemplation' stage, a decisional balance discussion may benefit RTW. Meanwhile, when in the 'preparation' stage, the discussion will focus on actions such as planning for gradual increase in hours or provision of ergonomic aids (Franche & Krause, 2005). Franche and Krause proposed that both processes should guide the choice and timing of

interventions and that, by addressing the correct stage of readiness to work, effective intervention may arrest progress through the phases of disability.

Franche, Corbiere, Lee, Breslin, & Hepburn (2007) went on to develop and validate the Readiness for RTW scale. This 22-item questionnaire was designed to facilitate the offering of stage-specific tailored services to workers with injury. More recently, in a prospective cohort study with a nine-month follow up, Norwegian researchers identified several weaknesses in the Readiness for RTW scale and recommended it not be used for stage allocation in its current form (Aasdahl et al., 2017). In their study, they found that models including readiness for RTW dimensions were generally not as good at explaining work outcomes as a single question on expectation of length of sick leave. However, a limitation of the Aasdahl et al. study is that rehabilitation interventions were not tailored according to stage allocation; rather, the study sought only to evaluate work outcomes based on the Readiness for RTW scale, compared with a single question. Similarly, in a systematic review of 10 eligible studies (from a potential 109), Iles, Davidson, Taylor, & O'Halloran, (2009) found that recovery expectations when measured using a specific single item within three weeks of the onset of non-specific LBP are predictive of work outcome. They recommended identifying the reasons behind that expectation to gain important information to develop effective intervention. Most recently, Hayden et al., (2019) reviewed 4635 references and included 60 relevant studies (n = 30,350) to synthesise evidence on the association between recovery expectations and disability outcomes for people with LBP. The study found moderate-quality evidence that individuals' recovery expectations are strongly associated with future work participation—narrative synthesis: 21 studies; meta-analysis: 12 studies, 4777 participants: odds ratio (OR) 2.43, 95% confidence interval (CI) 1.64 to 3.62 at follow-up times closest to 12 months, using adjusted data (2019, p. 2). Understanding recovery expectations and the assessment and management of all psychosocial factors influencing readiness to RTW is an important role of workplace rehabilitation (Ellis et al., 2010), and often influenced by intervention timing.

4.3.3 Effects of Early Intervention

The timing of BPS intervention does affect potential outcomes (Gatchel et al., 2003; Hoefsmit, Houkes, & Nijhuis, 2012; Lysaght, Donnelly, & Luong, 2010; Nicholas et al., 2011). After reviewing the outcomes from multiple combinations of BPS interventions in

75 studies, Lysaght et al. (2010) found that early intervention was the hallmark of most approaches that were successful; thus, the authors recommended the provision of education and resumption of usual activities immediately post-injury. Gatchel et al., (2003) found that LBP patients who were identified as high risk because of psychosocial factors and who received early intervention displayed statistically fewer indices of chronic pain disability on a wide range of work, healthcare use, medication use and self-report pain variables, relative to the high-risk subjects who did not receive early intervention. Nicholas et al., (2011) analysed 28 systematic and critical reviews and found that, when psychological intervention was provided early and indiscriminately, the outcomes were disappointing, yet when candidates were selected based on yellow flags and provided evidence-based intervention, they achieved good health and work outcomes. Similarly, Schultz et al., (2008) found that, when an integrated, interdisciplinary and multimodal early intervention was provided in a controlled study, at three months, it was found to be redundant for workers who were not at high risk. Meanwhile, by six months, it had achieved significantly better RTW outcomes for the high-risk group, with 87 mean workdays lost at six months, compared with 120 for the usual intervention. Psychosocial data linked the results to reduced fear and catastrophising, understanding back pain, self-efficacy, coping skills and positive expectations for recovery and RTW.

These studies strengthen the case for accurate selection of high-risk claimants soon after injury to invest intervention resources appropriately and economically. Pearce et al., (2009) implemented a strategy using psychosocial screening to identify and provide high-risk cases with physical, psychological and workplace interventions from two weeks. Their study demonstrated significant workers' compensation savings, with the interventions for high-risk cases resulting in 25% lower costs than the usual care for the high-risk group, over a three-year period. Their success led to another two studies from an Australian RCT that demonstrated enhanced RTW outcomes and reduced compensation costs by using a brief screening tool and an intervention protocol designed to address psychosocial obstacles to RTW (Nicholas et al., 2018; Nicholas et al., 2019). This RCT, known as the Work Injury Screening and Early Intervention (WISE) study, used the ÖMPSQ-SF (Linton et al., 2011) to identify psychosocial factors that predict long-term disability and failure to RTW following MSKD. The control groups were managed by 'usual care' and had the same treatments available to them as the study groups. The key difference in the control and study groups was the immediate offer of up

to six psychologist sessions for psychosocial factor management for the study group cases assessed as high risk on the ÖMPSQ-SF, plus immediate focused attention to workplace barriers by the RTW coordinator. At two-year follow up, the study group recorded less than half of the mean lost workdays in the control group, and 30% lower claim costs.

Through that study, Nicholas et al. (2019) provided strong evidence to support the implementation of early risk factor screening and provision of psychological and workplace services to manage high-risk claimants. All high-risk study group participants were offered psychological sessions; however, only 50% took this option, which suggests that the attention to workplace barriers made an important contribution to the positive outcomes. Two limitations were evident in the Nicholas et al. (2019) study: (i) psychosocial profiling was not undertaken prior to intervention referral and (ii) WRPs were not stakeholders in the project. These additions would have enabled broader and more tailored intervention options. The strengths of this study are that it was implemented using the Exploration, Adoption/Preparation, Implementation and Sustainment (EPIS) framework and achieved strong commitment from the funding bodies, including the employer, insurer and regulator. The EPIS framework is discussed in detail in Section 4.4. The funding bodies ceased this project early to enable all hospitals across the state to implement the intervention protocol, thereby providing strong support for the application of this approach in the implementation of BPS programs.

4.3.4 Risk Profiling to Guide Intervention

In 2007, Blyth et al., (2007) recommended that greater clarity of specific psychosocial factors is necessary to determine which intervention is required and to predict realistic results. The potential benefits of undertaking psychosocial profiling prior to referral to an intervention were noted by an international forum formed to evaluate the effectiveness of the BPS model (Pincus et al., 2013). The forum recommended that future research should aim to develop reliable and valid tools to assess patients' psychosocial profile and then refer them to interventions designed to target their specific needs and risk profile. Matched care has been the focus of other research, and was included as one of the three basic BPS models for acute LBP care to prevent chronic disability (Linton et al., 2018). Linton et al. were the first to investigate the advantages and disadvantages of stepped, stratified and matched care. *Stepped care* provides basic treatment for all, with progression to more complex care if basic treatment does not succeed. *Stratified care*

categorises patients based on risk factor level (low, medium or high) and provides different care comprehensiveness. *Matched care* assesses key risk factors and individualises intervention based on patient needs. Linton et al. were unable to recommend a single model for all settings; however, they did find that stepped care ignores complexity, and that both stratified and matched care concur with evidence that triaging for psychosocial risk factors and treating accordingly produces better results. They found that the barriers to implementation of any model derive from the complexity of the environment, including lack of clarity regarding who should be responsible for implementation and lack of training and competencies to manage these models. They concluded that 'moving from a "wait and see" to a proactive screening system linked to interventions targeting patients at high risk is recommended' (2018, p. 4). Sections 4.1.4 and 4.1.5 of this thesis include detail on screening assessments designed to measure specific psychosocial factors and to inform certain aspects of clinical or work interventions. However, none of those tools are able to combine screening for multiple psychosocial constructs and provide psychosocial profiling to inform tailored intervention in a workplace rehabilitation context.

4.3.5 Biopsychosocial Approaches in Different Health Professions

In clinical settings, multidisciplinary BPS rehabilitation (MBR) programs involve a team of therapists from different clinical disciplines to target the physical, psychological and social aspects of injury (Kamper et al., 2014). Evidence from the systematic review by Kamper et al. indicated that patients with chronic LBP will experience moderately less pain (mean difference 0.21), disability (mean difference 0.23) than patients managed with usual care or a physical treatment. The researchers found only moderate to low quality evidence on the effect on work outcomes. Hulla et al., (2019) detailed the multiple biological, physical, psychological and social dimensions of chronic pain, and reasoning to support the need for interdisciplinary BPS interventions to address physical deconditioning, postural control, gait, sleep quality and psychosocial wellbeing.

Carnes et al., (2012) included 46 RCT (N = 8,539) in their systematic literature review to report evidence for the effectiveness of self-management courses for chronic MSKD pain. From their findings, they recommended developing group courses of less than eight weeks duration delivered by health professionals, with a psychological component and further research to establish the most effective course components.

In other clinical settings, practitioners have opted for the addition of BPS principles, including client collaboration in intervention planning, education and self-help skill development, with the aim of providing an alternative to the more expensive multidisciplinary pain programs (Moseley & Butler, 2015; O'Sullivan, Caneiro, et al., 2018). Australian physiotherapists Moseley and Butler (2015) advocated for the importance of health professionals providing patients an explanation of pain neuroscience, yet have found this approach to be uncommon (Moseley, 2003). In addition, Louw, Diener, Butler, & Puentedura,, (2011) found that the inclusion of 'explaining pain' (EP) in an intervention achieved reduction in pain, increased physical performance, decreased perceived disability ($P < .05$) and decreased catastrophising ($P < .05$). Similarly, through an RCT with people with LBP and low recovery expectations, Iles, Davidson, & O'Halloran, (2012) found that, when telephone-based health coaching was added to usual physiotherapy, it significantly improved activity levels and recovery expectations. Analysis of the coaching found that it had addressed key themes in low recovery expectations, titled person, pain, progression, performance and treatment. Another program, 'Back on Track', was developed in the Netherlands and applied in physiotherapy practice for chronic LBP patients with non-complex psychosocial factors (van Erp et al., 2016). Moreover, cognitive functional therapy is an integrated approach to support clinicians—primarily physiotherapists—in applying a clinical reasoning framework to help patients understand their pain and build self-efficacy (O'Sullivan, Caneiro, et al., 2018).

One BPS program now adapted to workplace rehabilitation is Sullivan's (2013) Progressive Goal Attainment Program (PGAP). This activity coaching approach is delivered by various allied health professionals and its primary goal is to facilitate RTW by reducing psychosocial barriers. Through clinical trials, the program has been shown to be effective in reducing catastrophic thinking, fear of movement, perceived injustice and disability beliefs among individuals with a range of pain-related conditions. In studies, the psychosocial factor change has ranged from 20% to 45%. Studies indicate that, compared with other rehabilitation interventions, the PGAP achieves more successful work outcomes, which are maintained when assessed 12 months following the intervention (Sullivan et al., 2013).

This overview indicates that there has been a broad range of BPS interventions studied, which all aimed to address the psychosocial factors that contribute to pain and disability. Psychosocial profiling at assessment has enabled targeted interventions, while early intervention with early attention to these factors has reduced the potential for persistent disability. Self-management skills development is an important feature of all programs, reflecting the heuristic value of the BPS approaches in facilitating claimant self-efficacy and empowerment. Table 4.2 displays the key findings of a sample of studies of the past 20 years that are relevant to BPS interventions.

Table 4.2: Summary Information for BPS Intervention Studies of the Past 20 Years

Reference	Objective	Design	Summary of Findings
Black et al., 2017	Identify association between self-efficacy and RTW outcomes, upper body MSD or psychological injury	Systematic literature review, 6 suitable studies from 836	Higher self-efficacy had consistent positive association with RTW outcomes. Recommend identification of determinants of self-efficacy and process for improving RTW outcomes.
Carnes et al., 2012	Find evidence for characteristics and components of self-management courses for MSKD	Systematic literature review (46) of RCT (*n* = 8,539)	Recommended a group program with health professionals, < 8 weeks duration; a psychological component; and further research to establish effective content.
Cullen et al., 2018	Synthesise evidence on RTW and disability management interventions for MSKD, pain-related and mental health conditions	Systematic review (36)	Interventions should have multiple health foci, service coordination, and work modification components to help reduce lost time.
Franche & Krause, 2005	Develop a conceptual framework to understand worker decisions about RTW	Model proposal	Model to combine phase of disability and readiness to RTW strategies when planning interventions to facilitate RTW.
Gatchel et al., 2003	Compare functional restoration to usual treatment for chronic back pain	RCT with one-year follow up	Functional restoration group achieved significantly fewer indices of chronic pain on work, healthcare and medication use, and self-report.
Global Access Partners, 2017; Nicholas et al., 2018; Nicholas et al., 2019	WISE study: complete early-intervention psychosocial screening to manage high-risk cases with psychological and workplace help	RCT (*n* = 133) with New South Wales (NSW) hospital employees	Early-intervention group with ÖMPSQ-SF reduced from high risk to low risk (58.9, *SD* = 7.6 vs. 35.4, *SD* = 14.8, respectively), *d* = 1.99. Early-intervention group achieved significantly fewer mean lost days of 31.7 (*SD* = 36.7), compared with 66.6 (*SD* = 116.2) for the control group. At 24 months, the mean total cost for the study group was $16,443, and for the control group was $23,405—a 30% difference.
Hayden et al., 2019	Identify evidence between recovery expectations and disability in LBP	Cochrane systematic review, 60 studies (*n* = 30530)	Positive recovery expectations are associated with higher likelihood of RTW and increase in activities. Recommend recovery expectations are considered to improve prognosis and management of LBP.

Reference	Objective	Design	Summary of Findings
Iles, Davidson, et al., 2012	Determine whether telephone coaching improves usual physiotherapy outcomes	RCT (n = 30), five sessions health coaching, with baseline, four- and 12-week outcomes	At 12 weeks, significantly improved activity with Patient-specific Functional Scale (mean difference = 3.0 points, 95% CI 0.7 to 5.4), large effect size (g = 1.1). Recovery expectation significantly improved (mean difference = 3.4 points, 95% CI 1.1 to 5.7), with large effect size (g = 1.2).
Kamper et al., 2014	Determine effectiveness of MBR for chronic LBP	Systematic reviews (41) of RCT (n = 6,858)	Moderate to low evidence that MBR results in reducing pain (mean difference = 0.21) and disability (mean difference = 0.23) more than usual care or physical treatment. Low to moderate evidence for work outcomes.
Linton et al., 2018	Assess relative effectiveness of stepped, stratified and matched care for LBP	Literature-based comparative analysis	*Stepped care* assumes the passage of time is benign and LBP is uncomplicated, without empirical evidence. *Stratified and matched care* are based on psychosocial triage, with treatment targeting identified risk factors. Evidence supports that this approach achieves better results than usual management.
Louw et al., 2011	Examine outcomes from inclusion of EP within an intervention	Systematic review (N = 8)	Reduction in pain, increased physical performance, decreased perceived disability (P < .05) and decreased catastrophising (P < .05).
Lysaght et al., 2010	Examine best-practice rehabilitative strategies for work-related MSKD	Integrative review of 75 articles from 1984 to 2008	Early intervention with education, resumption of work and other activities, behaviour modification and engagement in exercise achieved best RTW outcomes.
Mitchell & O'Donnell, 2011	Identify best-practice psychosocial intervention for chronic pain	Snapshot review based on strength of evidence	Strongest evidence for BPS education, reassurance, remaining active, graded exposure, graded activity and cognitive therapy.
Scott et al., 2014	Determine clinically meaningful change in patient level of catastrophising	Work disabled, whiplash injuries (N = 166) in multidisciplinary program	Mean change in PCS score of 42.80% (SD = 35.69) and those with a reduction in score over 38% had best RTW outcome at one-year follow up.
Nicholas et al., 2011	Determine whether interventions targeting yellow flags achieve better outcomes for LBP	Systematic and critical reviews (n = 28) from 2000 to 2009	When cases are selected based on yellow flags and provided evidence-based intervention, the result is good health and work outcomes.
O'Sullivan, Caneiro, et al., 2018	Evaluate the efficacy of cognitive functional therapy for LBP	Three illustrative case studies and review of cognitive functional therapy trials	Cognitive functional therapy–trained physical therapists provide patients with multidimensional understanding of pain, and achieve better self-efficacy and reduced pain-related distress and disability than usual care.

Reference	Objective	Design	Summary of Findings
Pearce et al., 2009	Complete psychosocial screening at two weeks, with high-risk cases given psychological, physical and workplace interventions	Controlled study: usual work injury (n = 80) compared with early-intervention BPS (n = 80)	Better outcomes and significant workers' compensation savings with early-intervention BPS high-risk cases, resulting in 25% less cost than the usual-care high-risk group.
Pincus et al., 2013	Evaluate BPS model and identify most promising future research	Synthesis of evidence-based reviews	Application of BPS model has been suboptimal. Most promising future is developing reliable and valid psychosocial tools to screen patients and then refer to interventions designed to target their specific needs and risk profile.
Pincus et al., 2015	Test credibility and acceptability of CCBT against physiotherapy for avoidant LBP patients	Randomised controlled feasibility trial	CCBT is acceptable and credible; however, patients may need both CCBT and physiotherapy. Interventions should be individually tailored in a BPS framework.
Schultz et al., 2007	Evaluate models of RTW for MSKD	Critical review of literature	BPS model should have a system and individual focus, have valid measurement of psychosocial variables, have the ability to be reliably repeated, have a self-management approach, manage readiness to RTW, and be applicable to diverse MSKD conditions and workers.
Schultz et al., 2008	Examine outcomes from case management with integrated, interdisciplinary, multimodal early intervention	Controlled study: conventional case management (n = 37) and early-intervention case management (n = 35)	Multimodal early intervention is redundant for moderate-risk cases, yet significant for high-risk cases (87 work days lost compared with 120 at six months), linked to reduced fear and catastrophising, understanding back pain, self-efficacy, coping skills and positive expectations for recovery and RTW.
Sullivan et al., 2013	Determine benefits of PGAP	Clinical studies	Reduced psychosocial barriers by 20% to 45%. Better work outcomes than other rehabilitation, which was maintained at 12 months.
White et al., 2019	Examine the role of social support in RTW for individuals following work-related injury	Systematic review of six databases for 3 questions; included studies (n = 21). Used narrative synthesis approach for analysis.	Social support and integration may influence RTW. Worker-identified barriers and facilitators include contact/communication, person-centred approaches, mutual trust, reaction to injury & social relationships. Moderate relationship between reaction to injury and social integration/ functioning and RTW. No studies on effectiveness of social interventions.

Note: BPS = biopsychosocial; PCS = Pain Catastrophising Scale; CCBT = contextual cognitive behavioural therapy; LBP = low back pain; CBT = cognitive behavioural therapy; RCT = randomised control trial; MSKD = musculoskeletal disorder; RTW = return to work; MBR = multidisciplinary BPS rehabilitation.

The research studies cited in Table 4.2 had different objectives and different outcome measurements, and subsequently offer limited comparison. However, collectively, they provide evidence towards identifying the key components of an authentic BPS intervention for work injury management. The studies listed drew on findings from extensive research, with 13 of the 23 studies being systematic, critical, snapshot or integrative reviews of studies selected for strength of evidence. Another seven of the 22 were controlled trials and five of those were RCTs. A synthesis of the findings from these studies indicates that, in the work injury context, a BPS intervention should include:

- a system and individual focus (3 studies)
- psychosocial risk triage with early intervention for high-risk cases (7 studies)
- identification of key beliefs and behaviours through psychosocial assessment, with application of behavioural change techniques to tailor health and RTW coaching to each individual's psychosocial profile (8 studies)
- social support, trust, and social integration (1 study)
- self-management skill development through education, including pain neuroscience to build self-efficacy (8 studies)
- graded activity, work modifications and workplace coordination (5 studies)
- facilitation of positive recovery expectations and of readiness to work (4 studies)
- effective coordination of all components, with outcomes measured by functional activity, psychosocial responses, and RTW (5 studies).

Table 4.2 indicates that many practitioners and researchers worldwide have had positive experiences with BPS interventions and have sought to measure the benefits and develop best practice (Mitchell & O'Donnell, 2011; Nicholas et al., 2011). However, the table also reflects the findings of Pincus et al. (2013), demonstrating the significant variation in method, which leads to a lack of integration and coordination of all BPS components. This adds evidence to support researchers' recommendations for the development of psychosocial tools designed to screen and profile patients, enabling referral to interventions to target individuals' specific needs and risk profiles (Nicholas et al., 2019; Pincus et al., 2013). When this conclusion is considered alongside evidence of the complexity of the work injury context, as detailed in Chapter 3, it reinforces the need for a structured, system-wide implementation process to coordinate all BPS components, including triage, assessment and intervention.

4.4 Implementation Science

Implementation science has focused on implementing evidence-based innovations in healthcare and education, and is now being used to implement evidence-based work disability programs (Main et al., 2016). There are three overarching aims in this approach: (i) build the processes of translating research into practice, (ii) understand and explain what influences implementation outcomes and (iii) evaluate the implementation. This is a system-wide approach that achieves change at all levels through a phase-based program. The model was clearly defined and illustrated by Mains et al. (2016), with the four phases described as Exploration, Adoption/Preparation, Implementation and Sustainment (EPIS). The context of implementation is described as either 'outer context', which is the social and political environment, or 'inner context', which are the characteristics of the organisation and individuals in the organisation. This intervention protocol was used to implement the WISE study for a pilot study in NSW public hospitals (Nicholas et al., 2019). Using the EPIS framework, the researchers identified five domains to be considered: intervention characteristics, outer setting (regulators and treatment providers), inner setting (workplace), characteristics of the individuals involved and process of implementation. The details and outcomes of this project were discussed in Section 4.3.3. That study has contributed significant knowledge to understanding implementation processes and challenges within injury management settings, and will inform the implementation of future evidence-based BPS programs.

4.5 Biopsychosocial Workplace Rehabilitation

As reported in Chapter 3, over recent years, there have been several comprehensive research reviews designed to provide evidence-based injury management recommendations (Collie, 2019; Cullen et al., 2018; Safe Work Australia, 2019). In 2006, Dunstan & Covic (2006) provided reasoning and evidence to support the implementation of the BPS model within occupational rehabilitation to achieve evidence-linked practice and reduce the costs and suffering of work disability. However, there has since remained a paucity of research into the variations in delivery of workplace rehabilitation, including the effectiveness of integrating BPS assessment and intervention. This should be considered in light of the role that WRPs are expected to play within work injury management.

4.5.1 Rehabilitation Provider Role Definition

In the report 'Vocational Rehabilitation: What Works, for Whom, and When?', prepared for the UK government, Waddell et al. (2010) defined vocational rehabilitation as 'whatever helps someone with a health problem to stay at, return to and remain in work', and viewed it as an idea and an approach, as much as an intervention or a service (2010, p. 5). In this manner, their comprehensive 'best-evidence synthesis' review included studies on routine healthcare and workplace management, in addition to specific vocational rehabilitation studies. By implementing this pragmatic approach, they were able to undertake a comprehensive review of 450 relevant scientific reviews and reports. If they had relied on vocational or occupational/workplace rehabilitation documents, there were only 20 available. The recommendations from the report were comprehensive and direct, and have since shaped the development of vocational rehabilitation in the UK. In summary, they found that vocational rehabilitation is both effective and cost-effective, and achieves strong health and work outcomes. However, it needs to be applied as healthcare within the workplace, take a BPS approach, and be initiated early post-injury/illness. They recommended that structured vocational rehabilitation be underpinned by cognitive behavioural approaches that promote helpful beliefs and behaviours, thereby addressing personal and workplace psychosocial barriers (Waddell et al., 2010). One feature of the review that is critical to this doctoral research is the authors' acknowledgement that vocational rehabilitation is healthcare, yet not treatment. They defined treatment as 'intervention directed to treating pathology or relieving symptoms' (2010, p 11). The authors advised that treatment by itself has very little effect on work outcomes, and that healthcare for workers with injury must incorporate a focus on RTW.

In Australia, WRPs have been required to meet varying jurisdiction service standards (Heads of Workers' Compensation Authorities, 2015). Over the past decade most jurisdictions have required provision of services in line with the workplace rehabilitation model and service provision principles developed by the HWCA (2015) in the 'Guide: Nationally Consistent Approval Framework for Workplace Rehabilitation Providers' (NCAF). WRPs are required to employ allied health professionals, and their role is defined using BPS language: 'Providers identify and address the critical physical,

psychological, social, environmental and organisational risk factors which may have an impact on a worker's ability to successfully recover at work' (2015, p. 4).

Despite this definition, the NCAF document refers only briefly to the application of a BPS model and does not stipulate BPS competencies or mandate psychosocial measurement at assessment or closure. Moreover, it does not encourage cognitive-behavioural approaches to facilitate the development and adoption of self-management skills and strategies. In fact, those guidelines include the interpretation of 'therapeutic counselling' as 'treatment', rather than 'workplace rehabilitation'. This restriction may have been introduced because WRPs also employ personnel who are not allied health professionals to specifically address clients' reemployment needs. New Zealand has overcome this concern by stipulating health and non-health services for rehabilitation providers (Accident Compensation Corporation, 2018). In Australia, the restricting of therapeutic counselling for all WRP employees may have deterred WRP health professionals from providing best-practice BPS services, as have been discussed throughout this chapter.

4.5.2 Australian Workplace Rehabilitation Providers' Application of Best Practice

In reviewing the evolving role of WRPs, it is evident that a number of factors have influenced WRPs' application of best-practice rehabilitation. Vocational rehabilitation became commercial in Australia in the late 1980s, with the advent of legislative changes ensuring entitlement to rehabilitation for compensable personal injury. It emerged with humanistic aims; however, the influence of economic drivers left many workers believing that their wellbeing was secondary to the interests of other stakeholders and scheme profitability (Wales, Matthews, & Donelly, 2010). Wales et al. recommended the development of new and better models to address the contextual determinants of chronic pain. Australian vocational rehabilitation researchers have found that variable levels of training in vocational rehabilitation have resulted in people with complex needs not consistently receiving the services they require to access and maintain employment (Buys, Buys, Kendall, & Davis, 2001; Buys, Matthews, & Randall, 2015). Buys et al. (2015) identified vocational rehabilitation competencies of vocational counselling, personal counselling, professional practice, case management and disability management practice as central to quality service provision, with practitioners needing to focus on

individualised service delivery in which the client has significant control over the decisions regarding their rehabilitation program.

The HWCA (Heads of Workers Compensation Authorities, 2019) have recently reviewed the NCAF and, in November 2019, released the 'Principles of Practice for Workplace Rehabilitation Providers' advising that it replace the NCAF in June 2020. These principles of practice are designed to guide quality service-delivery and include the requirements for WRPs to:

- adopt a BPS approach to build capacity through work participation
- empower workers and employers to achieve the goals of RTW
- deliver outcome-driven workplace-based rehabilitation services
- include an evidence-based approach to service design and delivery
- provide services that result in measurable benefit to the worker and employer.

The principles of administration require competent and qualified professional and appropriate governance processes. Examination of detail of the principles reveals significantly important changes from the NCAF; WRP will now be expected to help workers learn self-management strategies, to address unhelpful beliefs, and to build work readiness and capability. Self-management strategies may be taught by a WRP or a treatment provider, and the prohibition of "therapeutic counselling" has been removed. The principles also acknowledge the best-practice features of 'acting early to assess needs; establish and build work capacity; identify suitable work; and set meaningful goals' (2019, p. 4). However psychosocial measurement has not been included as an example of an objective measure of progress, despite evidence of the value of that data in predicting recovery and work outcomes.

4.5.3 Early Intervention

Early intervention is aspirational and based on evidence that the most cost-effective time to refer to workplace rehabilitation is between four and 12 weeks (Casey, Guy, & Cameron, 2014; Hoefsmit, Houkes, & Nijhuis, 2014; Lysaght et al., 2010). Australian WRPs are dependent on pre-approval from an insurer or agent before they can provide rehabilitation assistance to a worker with injury, and studies have shown that early referrals are uncommon. Casey et al., (2014) reviewed over 9,000 de-identified NSW scheme case records of workers referred to WPR for RTW assistance and found that the

mean time from injury to referral was 22 months, and that 74% of cases referred within 12 months post-injury achieved a positive RTW outcome, compared with a 57% success rate for those referred after 12 months. The data analysed in that study represented a significant proportion of work injury claims in NSW over a five-year period, and, based on the limited criteria compared in the study, the results indicated that the strongest predictor of work status following a WRP program was length of time since injury. Those referred early had the better work outcomes ($p < 0.001$; 0R = 0.971; 95% CI 0.964 to 0.977).

The COMARE Project Team, (2018) found that having a RTW plan prepared within 30 days of an injury increases the odds of RTW by 1.7 times. The Australian Rehabilitation Provider Association has proposed compulsory referral to workplace rehabilitation in NSW to arrest the decline in RTW rates. In that proposal, within three days after case managers triage all cases, those likely to be off work for more than four weeks would be referred to an accredited WRP. This proposal is supported by evidence of return on investment of between AU$28 to AU$32 for every AU$1 invested in workplace rehabilitation (Actuarial Edge, 2019). This should be considered alongside the recent UK qualitative study that found that not all musculoskeletal patients with work difficulties were appropriate for referral to vocational rehabilitation, with some reporting that they had adequate existing support, while others felt that this approach emphasised RTW ahead of addressing specific needs, such as pain management (Sanders, Wynne-Jones, Nio Ong, Artus, & Foster, 2019). Synthesis of these studies adds strength to recommendations for early triage to partition cases with high psychosocial risk and the development of psychosocial tools to profile those cases, thereby enabling early referral to workplace rehabilitation for tailored BPS management.

4.5.4 Tailored Self-management Skill Development

BPS self-management skills coaching in workplace rehabilitation can provide workers with the physical, psychological and social knowledge and strategies to better cope with the pain, distress and disability associated with their injury or illness (Dunstan & Covic, 2006; Johnston, Strong, Gargett, Jull, & Ellis, 2014). In the UK, a community-based self-management course for chronic MSKD pain, named COPERS, was tested in an RCT ($n = 703$) and achieved sustained psychological, social integration, pain acceptance and self-efficacy benefits at six months, but did not show reduced pain-related disability at 12

months (Taylor et al., 2016). The authors considered that the course may have been too brief and may have required additional exercise-based interventions. Other studies have reported psychosocial gains, including reduction in pain catastrophising scores, which have been shown to be a strong predictor for improved RTW (Sullivan, Adams, & Ellis, 2012), and improved pain self-efficacy, which is also linked with strong RTW outcomes, with effect ratios ranging from $d = 1.00$ to $d = 5.26$ (Black, Keegel, Sim, Collie, & Smith, 2017). Similarly, health coaching has been used to achieve changes in health behaviours, health status and health service use through development of self-management skills (Lorig, 1999). In the work rehabilitation context, health coaching should employ evidence-based strategies using a therapeutic counselling approach to engage and motivate clients to better manage their health condition (Huffman, 2016), and particularly to learn to apply these strategies to increase their work capacity.

The characteristics and content of a self-management course influence outcomes and dominate course planning (Carnes et al., 2013). This was considered in 2010, when a team of Australian researchers commenced a trial to evaluate the acceptability, effectiveness and efficacy of adding self-management coaching to vocational rehabilitation for people with chronic compensable MSKD (Ellis, 2009). In another study, Ellis et al. (2010) found that vocational rehabilitation did not have evidence to support its effectiveness for RTW, had received increasing criticism because of rising costs, and was perceived to be too strongly under the influence of economic rationalism (2010, p. 2). The research trial used Stanford University's Chronic Disease Self-Management Program (CDSMP), yet added two extra modules to tailor to the needs of Australian workers with MSKD (Johnston et al., 2014; Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001).

The amended CDSMP was to be implemented in the first Australian published study on the integration of self-management coaching within vocational rehabilitation; however, the trial floundered because of the complex difficulties associated with undertaking field research in vocational rehabilitation (Sheppard et al., 2015). The trial was based on research evidence that participation in a self-help program facilitates readiness to RTW, and the hypothesis that adding self-management to vocational rehabilitation would result in more efficient use of resources, and that this intervention would be acceptable to clients, treatment providers, policymakers and regulators (Johnston, Jull, Sheppard, & Ellis, 2013; Sheppard et al., 2015). Despite considerable academic and industry resources

and regulator participation, the trial was first modified and then ceased prematurely. Valuable lessons were learnt, and the study recommended that the concept and theory of applying self-management coaching in vocational rehabilitation are not flawed. However, the intervention content and format need to be tailored to the client population, adapted to enable targeting of individual barriers and motivators to change, and provided early in the recovery cycle (average 20 months post-injury in this study). Although unsuccessful, this project has helped subsequent researchers to critically evaluate and compare self-management intervention content and protocol to develop and implement effective self-help skills coaching in workplace rehabilitation. On reviewing the content of the amended CDSMP, it is apparent that there was no session that taught participants to understand pain neuroscience. This is contrary to research evidence that provision of this information to clients is an important step in building self-help capacity. The heuristic value of the BPS approach enables individuals to adopt self-management strategies because they have gained understanding of how their feelings, thoughts and actions contribute to the dynamic process and maintenance of pain and disability (Gatchel et al., 2007).

Moseley and Butler, (2015) are Australian researchers who have contributed significant research and professional development to the field of pain neuroscience education. They described Explain Pain (EP) as grounded in behaviour change, yet different from CBT in that it emphasises management of the biological contributions to pain, shifting an individual's belief of pain as an indicator of tissue damage to pain as an alarm for protection, and teaching the concept that perceived danger to body tissue will increase pain, while evidence of safety of the body will decrease pain. A core principle of EP is that pain is a truly BPS phenomenon, as summarised in this statement from Moseley and Butler's critical review:

> EP is a range of educational interventions. EP is grounded in conceptual change and instructional design theory. It increases knowledge of pain-related biology, decreases catastrophizing, and imparts short-term reductions in pain and disability. It presents the biological information that justifies a biopsychosocial approach to rehabilitation. (2015, p. 807)

Injury self-management skills, with their accompanying reduction of unhelpful beliefs and behaviours and pain self-efficacy, are thought to precede work readiness. The readiness for RTW model provides explanation of individual variations in progress within

the phase model of disability (e.g., acute, sub-acute and chronic), accounting for the effect of psychosocial risk factors (Franche & Krause, 2002). The person with injury is seen as the primary agent of change in the rehabilitation and RTW process, with progress in work readiness having the effect of potentially preventing further decline through the disability phases. To build work readiness, self-help skills coaching content is determined according to the identified stage within the readiness for change model (Franche & Krause, 2005; Rollnick, Miller, & Butler, 2008). The studies reported in this section have provided valuable information to support the development of tailored BPS self-management intervention in workplace rehabilitation.

4.5.5 Implementing Biopsychosocial Interventions in Workplace Rehabilitation

There is a paucity of research literature examining the application of a BPS approach in workplace rehabilitation. For example, in their systematic review White et al., (2019) could find no studies to inform their research question; What is the effectiveness of social interventions for RTW? Through other questions, the study found that social support and integration may influence RTW following injury. However they found a lack of consistency in how social factors are conceptualised and measured—and recommended that this data has the potential to advance research and practice in the field of occupational rehabilitation.

A recent research project (Sowden et al., 2018) integrated a vocational advice intervention (VAI) trial into primary care in the UK for patients with work absence due to musculoskeletal pain. The implementation procedures applied in that project have established a good precedent for the implementation of a BPS approach into a system. The researchers conducted a best-evidence literature review, summarised evidence from developmental studies and consulted with stakeholders before developing the assessment, intervention and training requirements for the project. A BPS assessment focused on yellow, blue and black flags in the person's sphere of influence. A BPS intervention aimed to increase activity levels and restore function; change behaviour; shift attitudes, perceptions and beliefs in personal and work life; and involve the employer in providing support. Finally, a four-day training course was provided for healthcare practitioners to deliver the VAI. The results indicated significantly reduced days of work absence for the intervention arm (n = 158) over four months (mean = 9.3 days, SD = 21.7 vs. mean = 14.4 days, SD = 27.7; incidence rate ratio = 0.51; 95% CI 0.26, 0.99; P =0·048) compared to

the control arm (n = 180) and the approach cost £733 less than usual best care (Sowden, Main, van der Windt, Burton, & Wynne-Jones, 2018; Wynne-Jones et al., 2018). The preparation invested into the framework of this trial included extensive research and stakeholder consultation, and demonstrates the attention required to detail to implement an effective BPS program.

Other research teams delivering BPS interventions have also recognised the importance of facilitator training in the implementation process (Patel et al., 2019). Likewise, practitioner training is an important component of the cognitive functional therapy program developed for physiotherapists, in recognition of the need for the clinician to have a good understanding of behavioural psychology, neuroscience, communication skills to explore multiple domains, a strong therapeutic alliance, and a motivational approach to promote behaviour change and build self-efficacy (O'Sullivan, Caneiro, et al., 2018). Studies into the transfer of knowledge and adoption of evidence-based practice have shown that health practitioners seldom adhere to practice guidelines and instead rely on early learnt methods (Sullivan, Feuerstein, et al., 2005). In summarising the requirements to integrate psychosocial and behavioural into rehabilitation programs, Sullivan et al. (2005) stated:

> The development of techniques to maximize adoption and adherence to new treatment protocols will be as important as the development of new intervention approaches themselves. Unless this final objective can be achieved, patients with musculoskeletal conditions will not benefit fully from new knowledge gained through clinical science. (2005, p. 486)

The PGAP is a structured BPS program that includes psychosocial factor assessment, two-day provider training, coaching resources and a standardised course of 10 sessions. Session are delivered weekly and the course terminates early if the client makes rapid progress (Sullivan et al., 2013). For assessment and outcome measurement, the program requires repeated completion of four self-report questionnaires to identify elements of pain catastrophising, pain-related fear, disability beliefs and perceived justice, which may be a limitation and considered burdensome by providers and claimants. Further, education on the physiology of pain is provided in an initial video, but is not promoted as a core component of this activity coaching course. Regardless of those limitations, the PGAP

has demonstrated the value and importance of a structured approach when implementing a BPS program within workplace rehabilitation.

4.6 Summary

This chapter has provided a synopsis of research relevant to applying the BPS model for managing musculoskeletal injury. A synthesis of this research supports recommendations for developing and implementing a customised and structured BPS approach integrated into all levels, all phases and all stakeholders in a work injury management scheme (Beales, Fried, et al., 2016; Schultz et al., 2007). A goal of this literature review was to identify the essential components of an effective BPS approach. The findings indicate that the components, summarised below, include triage, assessment and interventions implemented with consideration of the complexity of the context.

Psychosocial triage should be implemented in claims administration at claim commencement, with the purpose of identifying all cases with the potential for prolonged disability because of the influence of psychosocial factors. At this stage, the purpose is not to identify the composition of those factors, but rather to alert the requirement for full psychosocial assessment (Collie, 2019; Waddell et al., 2003). There are many important considerations when implementing a triage method, such as selection of questions and allocation of the triage role, and these are investigated further in Chapter 6 and presented in Table 6.1.

BPS assessment requires screening of multiple psychosocial constructs, including fear avoidance, emotional distress, catastrophising, passive coping, pain self-efficacy and perceptions about work, as described in Table 4.1. For efficiency, this may require development of a single instrument with responses collated and reported to provide a psychosocial profile to guide intervention planning (Blyth et al., 2007). BPS self-management coaching requires commitment by the individual; therefore, the assessment should be undertaken in a manner that will contribute to client engagement (Mitchell & O'Donnell, 2011; Nicholas et al., 2011).

BPS intervention should implement a cognitive behavioural approach to promote helpful beliefs and behaviours, and should be tailored according to profile findings from the assessment to address personal and workplace psychosocial barriers (Waddell et al., 2010). This does not require a multidisciplinary approach, but should be delivered as

healthcare in the workplace. The purpose of this health coaching is to build self-management capacity; thus, it needs to include pain neuroscience education for the person to understand the potential gains from choosing to change their thoughts and actions (Beales, Fried, et al., 2016). RTW actions and work upgrades should facilitate positive recovery expectations (Hayden et al., 2019), be implemented to match the person's growing self-efficacy (Black et al., 2017) and work readiness (Franche & Krause, 2005). Social support and integration should be considered in the recovery and RTW process (White et al., 2019). Following the intervention, the psychosocial questionnaire should be repeated to measure changes in beliefs and behaviours as a program result, in addition to measures of work outcomes. All components of the program need to be implemented through a well prepared and structured model, including training for all roles, and coordination across the multiple levels of the system, with digital management of the data to enable program monitoring and evaluation (Cullen et al., 2018; Franche & Krause, 2002; Waddell et al., 2010). A summary of studies on BPS intervention is presented in Table 4.2.

WRPs are health professionals who are ideally positioned to deliver many of these BPS components. However, under Australian regulatory requirements, they have not been authorised to provide the full suite of BPS services because they were prohibited from 'therapeutic counselling'. Self-management skill coaching requires therapeutic behaviour change intervention, which, if integrated into Workplace Rehabilitation, may achieve superior scheme outcomes. Therefore, this newly authorised WRP function, may assist the integration of an efficacious BPS program into the injury management systems.

Chapter 5: Abilita Assessment

Chapter 4 identified that many psychosocial assessment instruments have been developed and validated to measure the effects of the psychosocial constructs known to influence the level of pain and disability experienced by a person recovering from MSKD. Important constructs to be measured include fear-avoidance behaviours, emotional distress, self-efficacy to manage pain and coping capacity (see Table 4.1). Each instrument screens beliefs, behaviours and expectations known to indicate the presence of the target risk factor. Typically, a high score on an instrument is predictive of prolonged disability and delayed recovery because of the unhelpful influence of the psychosocial construct. Given that these beliefs, behaviours and expectations are amenable to change by the acquisition of new knowledge and investment in behavioural changes, it is important to be able to identify and measure these constructs to aid health professionals to facilitate recovery (Linton & Shaw, 2011).

The review of literature in the previous chapter found that, to measure the effect of more than one influential psychosocial construct, multiple instruments must be completed, and this may be burdensome for both the respondent and assessing consultant. Chapter 4 also reported the findings of various Australian and international researchers who have recommended the need to develop and validate psychosocial instruments that can measure multiple factors of psychosocial risk and provide results in a format that will guide rehabilitation intervention requirements (Boersma & Linton, 2005; Linton et al., 2018; Nicholas et al., 2011; Sullivan et al., 2013). The multidimensional instruments discussed in Chapter 4 were not developed to suit workplace rehabilitation requirements and are not appropriate in that context for various reasons—for example, they were in a clinical or inappropriate format (Corbiere et al., 2017), did not inform work perceptions (Hill et al., 2008), only informed work conditions (Truchon et al., 2012) or used uncertain subscale discrimination (Shaw et al., 2013). Therefore, it is necessary to develop a single instrument with the capacity to screen multiple personal and work-related psychosocial responses and provide results in a manner that guides WRP actions.

This chapter describes the development of an instrument, the ARI, designed to measure the multiple factors that are barriers to RTW following musculoskeletal injury, and to

report these factors within BPS domains to guide workplace rehabilitation planning. It addresses the first question of the research project:

1. Can self-report assessment be used to identify and measure psychosocial risk factors within domains, and thereby provide directional guidance to rehabilitation intervention?

    a. Is the ARI a reliable and valid instrument to identify, measure and categorise the effects of the modifiable psychosocial factors influencing an individual's recovery and RTW?

The research for Question 1 constituted analysis of an existing collection of non-identifiable data comprising outputs from the ARI. This study received ethics approval from the Faculty of Human Ethics Committee on 10 December 2013 as a negligible risk project (reference no. FHEC13/250). Authorisation for use of the database was provided by the proprietor, Abilita Services Pty Ltd—see Appendix 1.

The principal author was responsible for study conception, design of the instrument, evaluation methodology and writing of the publication. All authors critically reviewed, read and approved the final manuscript.

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A practical tool to improve outcomes in Work Injury Management

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Abstract.
BACKGROUND: Psychosocial factors have the greatest influence on work rehabilitation outcomes yet effective and efficient systems to manage these factors are not widely utilized in Work Injury Management.
OBJECTIVE: To report on the development and validation of a comprehensive assessment tool with practical utility in identifying and measuring the biopsychosocial factors which are barriers to return to work and community.
METHODS: Literature search identified many instruments designed to identify the presence of psychosocial factors impacting recovery and return to work following musculoskeletal injury. This research aimed to match assessment with intervention. In clinical practice over a 5 year period, this led to development of a composite questionnaire, the Abilita Rehabilitation Index, which was trialed with 43 adults participating in Occupational Rehabilitation. The validation data are based on the results of 957 case records of Occupational Rehabilitation participants.
RESULTS: Examination of Cronbach coefficient alpha of the instrument indicates strong internal consistency (0.90) and factor analysis supports satisfactory construct validity of the domains (subscales) with factor loading scores ranging from 0.73 to 0.90.
CONCLUSION: There is evidence that the proprietary Abilita Rehabilitation Index is a valid and reliable instrument to identify and measure the influence of psychosocial factors impacting an individual's recovery and return to work. Automated reports generated from this tool provide an evidence-based resource to identify risk and support rehabilitation planning in Work Injury Management.

Keywords: Return to work, musculoskeletal disorders, psychosocial factors, pain, biopsychosocial

1. Introduction

Effective Work Injury Management requires the use of appropriate activities and procedures that ensure a timely, safe and durable return to suitable work for injured workers. It includes psychosocial approaches in addition to traditional bio mechanical approaches [1]. The development of the Flags Model [2] provided the first widely accepted biopsychosocial assessment framework for musculoskeletal injuries. It introduced the wide range of biological, psychological and social (work, environmental and cultural) factors that are both predictive of risk of work absence and influential in development of prolonged pain behaviour and disability. In practice this model resulted in classification of injured workers as 'low risk' or 'high risk' but did not provide specific information to aid intervention planning.

The biopsychosocial model has been applied with varying protocols over many years and this may have weakened its acceptability and perceived value. In 2012, an international forum considered its success over the previous 25 years, and concluded that the biopsychosocial model is sound however failures have occurred in how it has been understood and applied [3]. Multiple physical, psychological

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and work interventions have been developed and researched but rarely have all three components been integrated into one intervention. In 2005 Loisel et al. [4] described the multiple legal, administrative, social, political and cultural obstacles that contribute to the complexity of disability-related work absence. These researchers reasoned that a holistic system-wide reform is necessary to achieve the paradigm shift of adding biopsychosocial to an essentially biomedical approach; to include the fundamental evidence-based practices of early diagnostic triage, identification of potential psychosocial and workplace barriers to return to work, good self-management coping, and early return to safe work [4].

In 2006, the South Australian Government commissioned a study of *Facilitators and Barriers to Return to Work* [5] in order to inform ongoing research requirements. This study also concluded that work disability and return-to-work are multi-determined outcomes and that they cannot be accurately predicted just from knowledge of the medical or physical condition. This review recommended that to achieve optimal return-to-work outcomes, reform is required within systems and via reduced use of unreliable or invalid interventions.

In 2009 in response to this accumulation of evidence, the biopsychosocial approach was promoted by the Australian and New Zealand Heads of Workers Compensation Authorities and Heads of Compulsory Third Party Insurance Schemes [6]. Biopsychosocial approach guidelines were prepared, advising that negative psychosocial factors are associated with poor prognosis, and recommending the use of tools to screen for "yellow flags"[1] [7]. Guides are published in most jurisdictions in Australia and New Zealand, for example NZ Acute Low Back Pain Guidelines [8] WorkCover NSW Soft Tissue Injury [9], Clinical Framework for the Delivery of Health Services (Vic) [10].

The lack of improvement in health and work outcomes is visible in SafeWork Australia's [11] most recent key information report in which Workers Compensation claim costs (2011/12) across Australia equaled $7.8 billion. Their Return to Work Survey [12] reports 2013/14 Current Return to Work Proportion as averaging 77% across Australian jurisdictions and New Zealand, and the 3-month stable[2] RTW proportion was 61% in both Australia and New Zealand. There are indications of some jurisdictions trending improvement on previous years, however the overall results and lack of durability in return to work, highlight the need for further consideration of current practice.

The model of rehabilitation practice applied in Australia is dependent on scheme policy and the interpretation of that policy by insurers, employers and rehabilitation service providers [13, 14]. Rehabilitation may be managed by employer injury management personnel or by referral to external rehabilitation and health providers. The Nationally Consistent Approval Framework for Workplace Rehabilitation Providers (WRP) (Australian and New Zealand) [14] stipulates that in their role, Rehabilitation Provider staff will *identify and address* the psychosocial barriers, risks and strengths influencing return to work, and their decisions are to be evidence-based with assessments that demonstrate the need for recommended services. Modifiable worker factors with consistent evidence across two or more health conditions are; emotional distress, negative enduring psychology/personality factors, negative health and disability perception, decreased physical activity, lack of family support, poor general health, increased functional disability, increased reported pain and fatigue, and lack of motivation to return to work [15]. Self-report questionnaires are considered the gold standard for the proper measurement of perceived pain [16] and influential beliefs, attitudes and expectations. Dunstan et al. [17] confirmed that injured worker's beliefs and attitudes, assessed using a Theory of Planned Behaviour model, accurately identified influences on future work expectation and outcomes (79.2% sensitivity, 86.4% specificity).

The *early* identification of the presence and extent of influence of psychosocial factors is essential for their effective management. Casey [18] reviewed over 9,000 de-identified WRP case records specifically referred for return to work assistance and concluded that duration of disability is a significant determinant in positive RTW outcomes. Regardless, in this cohort there was a mean of 22 months (SD = 35) time from injury to referral.

[1] Yellow flags are personal psychosocial factors associated with unfavourable clinical outcomes and the transition to persistent pain and disability.

[2] "3-month stable" is defined as the proportion of injured workers who were working, either part-time or full-time, at the time of the survey and had been back at work for at least 13 weeks on a regular basis [12].

Internal locus of control (ILC) is significantly linked to perceived bodily pain, and interventions in vocational rehabilitation designed to provide participants with a 'toolbox' to help them take responsibility for their own well-being and health, result in increased ILC [19]. There is robust evidence to support calls for a paradigm shift in workers compensation systems to include the combination of early intervention protocols with the provision of coping skills training and information to claimants [20].

Given the evidence supporting this approach, it is necessary to consider the reasons that Work Injury Management systems have not achieved consistent, effective biopsychosocial assessment and intervention. The barriers to the implementation of a best-practice model are multiple [4] and despite numerous evidence-based guidelines there is little indication of adherence to these guidelines. Primary challenges include the commercial reality of time and resources required to administer questionnaires [35], lack of incentive to implement change due to financial limitation of service requests [13], and imprecise intervention recommendations [4]. Importantly, Waddell, Burton and Main emphasized that screening is not an end in itself and is only of value if it is linked to the delivery of effective rehabilitation and work-focused interventions [22].

The lack of specific work-injury-management training for Rehabilitation Consultants is a compounding factor. Appropriate clinical training is a necessary requirement for early graduate occupational therapists and physiotherapists to move into the field of work injury management and prevention [23]. Sullivan et al. [24] reported that practice guidelines are rarely employed by health professionals, concluding; "The development of techniques to maximize adoption and adherence to new treatment protocols will be as important as the development of new intervention approaches themselves. Unless this final objective can be achieved, patients with musculoskeletal conditions will not benefit fully from new knowledge gained through clinical science." (p. 486).

The expectation of different stakeholders will influence any injury management approach [25] as will the effectiveness of their co-operation and communication. Employer representatives and external rehabilitation providers often hold differences in work-related beliefs [26]. Potentially, the application of structured biopsychosocial protocols delivering standardized assessment reports and coaching interventions would mitigate the impact of differences in stakeholder rehabilitation expectations.

The evidence outlined in this introduction highlights the need for better quality resources to support Work Injury Management personnel to achieve early identification of injured workers at risk of prolonged disability, and to ensure those workers receive information and coping strategies appropriate to their individual requirements. These resources will need to include protocol and training strategies [24]. The Abilita Rehabilitation Index (ARI) was developed in response to this need, and is supported by training resources and a coaching course with which Rehabilitation Consultants assist their clients to learn strategies to overcome personal and social barriers to recovery and return to work. The purpose of the current study is to examine the psychometric properties of the ARI and its capacity to support the requirements of this new model for Work Injury Management.

2. Materials and methods

2.1. Abilita Rehabilitation Index (ARI)

The ARI was developed as a single, comprehensive assessment tool designed to meet specific criteria. That is, a measure that was:

i. Appropriate for a population whose primary characteristics are pain behaviour and work disability as a consequence of musculoskeletal injury or illness.
ii. Based on reliable evidence that the included factors either predict or influence the onset of persistent pain, disability or delayed return to work.
iii. Constructed from items or whole scales with established psychometric strength.
iv. To include domains that represent constructs which are evidence-based, meaningful to the respondent population and inform the preparation of a self-help coaching plan with the goal of durable return to work.
v. Supported by software to deliver automated reports with calculated scores and risk ratings and the collation of items into domains.
vi. Repeatable, and with subsequent reports comparing scores and ratings with those from the initial report.

The developers of the ARI drew on the Initiatives on Methods, Measurement and Pain Assessment in Clinical Trials (IMMPACT) [27, 28] who publish consensus recommendations on outcomes assessment in clinical trials for chronic pain. It was of particular importance to define and construct domains that fitted with psychosocial-factor evidence for the target population and that primarily contain *factors amenable to change*. The core outcome domains recommended by IMMPACT are: (1) ratings of pain intensity, (2), physical functioning, (3) emotional functioning, (4) participant ratings of improvement and satisfaction with treatment, (5) symptoms and adverse events, (6) participant disposition. The first three assessment domains were selected to be included in the ARI. The fourth domain is included in the ARI outcome measure, and the remaining two domains are addressed during user training.

Six attitudinal constructs were judged by the developers to be relevant to the ARI; these are Pain, Function, Emotions, Coping, Confidence and Work Perceptions. A seventh domain, Occupational Factors, was created to include a variety of work-related risk factors that are primarily not amenable to change. As both modifiable and non-modifiable factors are predictive of risk of prolonged pain and of work disability, both components are included in the ARI, to gain an accurate measure of risk. However as the primary purpose of this questionnaire is to inform self-management skills coaching, the *majority of questions and domain content comprise factors that are amenable to change*. These influential psychosocial factors are surveyed by the questionnaire, and represented in the ARI domains as summarized in Table 1.

Table 1
Construct summary of ARI domains

Domain	Construct summary
Pain	Pain perceptions.
Function	Perception of functional capacity in exercise & daily activities.
Emotions	Level of psychological distress.
Coping	Preference for active or passive coping strategies.
Confidence	Sense of control in life including pain self-efficacy.
Work Perceptions	Perception of capacity to work.
Occupational Factors	Multiple factors regarding worker and workplace characteristics that inform risk, many of which are not usually subject to change.

Evidence supporting these constructs was identified through comprehensive research, including studies cited in the following domain evidence summaries.

i) Pain

A pain rating is not an objective measure, it is simply a measure of the extent to which a particular person reports his or her pain, and it is open to subjective influences including the level of distress [29]. A higher level of reported pain is associated with catastrophizing and higher catastrophizing[3] is positively associated with fear-avoidance beliefs [31]. Pain-related fear is more disabling than pain itself [32] and fear of pain is the strongest predictor of activity avoidance and disability [33]. A person's understanding of pain strongly influences their coping capacity and recovery [34].

ii) Function

Initial levels of pain ratings and perceived functional limitations are well known predictors of work disability [24]. Fear of movement has been shown to be a predictor of disability levels [35]. There is strong evidence that continuing usual activities as normally as possible (including work activities) despite pain is associated with better outcomes than is traditional medical treatment and rest [36].

iii) Emotions

Depression increases the risk of prolonged work disability associated with musculoskeletal conditions [37]. Psychological constructs are established predictors of poor rehabilitation outcome, and the combining of important psychological elements is more useful than isolating them, in both identifying high-risk respondents and in informing tailored intervention [38].

iv) Coping

Passive coping has been found to be a strong, independent risk factor for disabling neck and/or back pain [39]. Helplessness has been significantly associated with poorer outcomes in Whiplash Associated Disorders [40]. After early screening for disability risk factors, intervention strategies can be improved by focusing on coping with job factors, pain coping strategies, and expectations for recovery [41].

[3]Catastrophizing is defined as "a particular response to pain symptoms that includes elements of rumination, magnification and helplessness" (p.9) and predicts pain intensity and medication dependency [30].

v) Confidence
Self-efficacy is an important determinant of clinical [42] and occupational outcome of back pain [43, 44]. Improved self-efficacy predicts successful RTW at 6 months post carpal tunnel surgery [45].

vi) Work Perceptions
The strongest workplace predictors of low back pain work disability appear to be worker perceptions, including of physical work demands, organisational support, and fears of re-injury [46]. Workplace conditions and individual perceptions about work could be as important as anxiety, depression, pain intensity or functional disability in predicting and preventing work disability [47].

vii) Occupational factors
This domain does not represent a single attitudinal construct; it comprises multiple worker and workplace characteristics that are not necessarily related, are primarily not amenable to change and are known to increase the risk of prolonged work disability, including type of work, claim history, age and education of worker. [5, 48]

2.2. *Instrument development*

A sequential, stepped approach [49] was followed to develop the assessment instrument and pilot test it with an appropriate population sample before offering it to Occupational Rehabilitation Providers. This study has utilized the pre-existing set of de-identified ARI records which have been entered and securely stored as electronic data.

From 2001 to 2008, the first author of this study coordinated research within a Rehabilitation Provider practice located in the Northern Territory of Australia, to develop a structured, evidence-based and work-focused pain self-management coaching course suitable for delivery within Occupational Rehabilitation. That research included the utilization of validated self-report questionnaires for the purpose of both initial assessment, and measurement of change following the coaching course, in reported pain, coping, function and self-management approach.

As a result of literature review and practice-based research, it was concluded that the assessment objectives could be achieved using a single comprehensive questionnaire which incorporated the Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ) [50] and the Pain Self-Efficacy Questionnaire (PSEQ) [44] in their entirety. In addition, twenty six items were selected from other valid and reliable questionnaires in order to meet the twin objectives of providing an initial measure of risk of long term pain and disability, and provide information from which to chart an appropriate intervention. The goal in selection of questions to inform the Abilita domains was not to achieve a compact and highly homogenous set but more to ensure that the domains were content valid to meet the construct purpose. There is evidence to suggest that the pursuit of high levels of intra-correlation within the domains may be evidence of question redundancy rather than utility [51].

The questionnaire, the Abilita Rehabilitation Index is presented in four sections. Section 1: *About You*; contains 16 items including demographic, education, lifestyle and employment questions, and two "readiness to work" questions derived from Motivational Interviewing research [52]. Most Section 1 items are in Verbal Rating Scale format with responses assigned a numerical value. Section 2: *Managing Your Injury* is comprised of 14 Likert scale items which have been used in various forms in different questionnaires. Section 3: *Örebro Musculoskeletal Pain Screening Questionnaire* and Section 4: *Pain Self Efficacy Questionnaire*. Both ÖMPSQ and PSEQ are included in their entirety with the kind permission of their authors.

The ARI incorporates items originally scored on varying scales and with differing scoring orientation, for example ÖMPSQ rates question responses on an 11 point Likert scale, on which for some questions, a high score represents a favorable condition and with others the high score is unfavourable. Responses to the PSEQ and Section 2 questions are rated on a 7 point Likert scale. With all PSEQ questions a high score is favorable. *Higher aggregate ARI score indicates higher risk of persistent pain and disability*.

A notable feature of the ARI is that software delivers the questionnaire online, stores all inputs in a secure database, and transforms the raw data to calculate the individual domain ratings, the ARI aggregate score and total scores for the ÖMPSQ and PSEQ. These outputs and relevant case data are incorporated in the ARI Initial Report which is immediately available online to the consultant administering the assessment. A second report delivered concurrently, the ARI Profile Report, includes detailed characteristics within each domain for the specific purpose of aiding the Rehabilitation Consultant to prepare a plan for self-management coaching tailored to individual requirements.

At completion of the coaching component of the injured worker's rehabilitation program, the respondent completes the questionnaire online once again, to measure change. This results in generation of the ARI Impact Report providing comparison with initial scores. An additional four questions gain the participant's rating of benefit and satisfaction with the intervention; recommended as the fourth of the IMMPACT core domains [49]. The ARI questionnaire may be completed twice more resulting in the generation of the Review1 and Review2 Reports.

2.3. Participants

During 2006 to 2008, the ARI questionnaire was trialled in a pilot study within an Occupational Rehabilitation practice. Respondents ($N = 43$) had sustained a musculoskeletal injury and were receiving rehabilitation and compensation under workers compensation, disability, motor accident or military compensation schemes. The mean duration for the 43 cases from date of injury to date of initial assessment was 271 weeks, with median of 185 weeks and ranged from 17 to 1565 weeks. Respondents ages ranged from 20 to 59 years, with a mean of 41.3 (SD:10.48). Females comprised 44% of the trial participants. At the time of initial assessment, 49% were not at work, 28% were working part time and 23% were working full time.

Having established that the tool had satisfactory face validity properties for use within regular rehabilitation service provision it was made available to willing parties in other jurisdictions in Australia and New Zealand from 2009.

Data utilized in this study are from the Initial questionnaire database derived from 957 respondents, accumulated between January 2009 and October 2014. This population was comprised of working age people with musculoskeletal injury receiving rehabilitation and compensation under worker's compensation, disability, motor accident or military compensation schemes. Mean duration of claim from date of injury to date of initial assessment was 109 weeks, with median of 44 weeks and range of 2 to 1181 weeks. Respondent ages ranged from 18 to 71 years, with mean age of 43.9 (SD = 11.12), 58% were female. At the time of initial assessment, 47% were not at work, 28% were working part time and 25% were working full time.

Records indicate that participants had experienced a variety of musculoskeletal injuries. Respondents reported their experience of pain according to the *ÖMPSQ question: Where do you have pain?* 36% reported multiple pain sites, 10% lower back/lower limb, 17% other two sites combined, and those with a single pain site reported; upper limb 10%, lower back 11%, lower limb 10%.

2.4. Procedure

Specific training was mandatory for Rehabilitation Consultants in order for them to access the Abilita Assessment website to ensure consistency in introduction of the online self-report questionnaire to participants. Consultant adherence to this process was facilitated by the web-based assessment questionnaire and automated, standardized reports, minimizing time required and negating both observer error and bias. Participant error was minimized by the consistent web-based presentation of the questionnaire and by introduction to the assessment by a trained Consultant. Respondent bias was minimized by the varied question orientation, and the scattered location throughout the instrument of the multiple questions informing each domain. Respondents knew that their actual responses remained confidential and this provided additional protection against participant misinformation.

2.5. Acceptability

Acceptability was assessed through a survey of Rehabilitation Consultants who had administered the instrument tool to evaluate if it was viewed, by themselves and respondents, as useful to their purposes. This survey was conducted using online survey facility "Survey Monkey" responses to 7 statements were received from 35 active Abilita Consultants. The statements were: *Most clients found the questions relevant to them; Most clients found the online format acceptable; Most clients found the domain chart provided an accurate representation of the impact of their injury; I find the assessment format (online and automatic reports) easy to administer, in return for the amount of information collected; I have found the assessment process (questionnaire and discussion of Initial report) helps to engender clients' trust and engagement in my rehabilitation proposal; I have found the Abilita Reports useful in planning rehabilitation;* and *I have found the Abilita reports valuable in communicating with treatment providers, employers and insurers in relation psychosocial influences*. Responses to the survey were rank ordered in

the form: Disagree, Mostly disagree, Mostly agree, Agree.

2.6. Data analysis

Reliability and validity analysis have been conducted using IBM SPSS Statistics V21 software. Reliability was assessed by examination of internal consistency (Cronbach's alpha coefficient). Concurrent validity was assessed by examining correlations between the ARI and the ÖMPSQ and PSEQ. These are two established measures of attitudes that influence pain, coping and work disability [44, 50]. Where the sample was of sufficient size (Validation data), construct validity was assessed through analysis of the ARI's factor structure (factor analysis). This study was approved by the Faculty Human Ethic Committee at La Trobe University.

3. Results

The primary outputs for the Abilita Rehabilitation Index (ARI) are the ARI scores, the 7 domain ratings and the aggregate scores for the ÖMPSQ and PSEQ. Rating for the domain Occupational Factors was not included in the data analysis because this domain is designed to record a set of categorical variables known to increase the risk of persistent work disability [5] that are not necessarily related. The raw responses from the other six domains have been transformed to standardize orientation and weight. These scores and ratings are the variables included in data analysis for this study.

The responses to questions that inform the domains are on a Likert scale and therefore constitute ordinal data. The raw score of each of the questions in the domains is transformed by the software to have equal weight and the same orientation. The domain scores are sums of the questions which have been transformed and factored to a rating from 0 to 4, and can therefore be treated as continuous variables.

3.1. Trial data

The measure of internal consistency, Cronbach Alpha coefficient, was calculated as 0.86 for the overall questionnaire. Cronbach Alpha coefficient calculations for the individual domains are shown in Table 2.

In this small sample ($N = 43$), the domain Cronbach's alpha scores ranged from 0.61 to 0.82.

Results of correlations with both ÖMPSQ and PSEQ were high; *ÖMPSQ ($r = 0.88$, $p = 0.01$) and PSEQ ($r = -0.88$, $p = 0.01$)*. This result provided evidence of concurrent validity of the ARI.

3.2. Validation data

The descriptive statistics for the 957 responses are in Table 3. These continuous variables are described in terms of mean, median, range and standard deviation.

Factor loading within each of the six domains was established using principal component analysis with orthogonal rotation and subject to Eigenvalue >1. The purpose of this analysis was not to seek reduction in the number of items informing each domain as all items were selected to provide particular information to aid rehabilitation intervention. The aim of this analysis was to establish that each question loads onto a principal component for that domain. A mean factor score is presented in Table 4 in lieu of publication of the identity and number of questions informing each domain as these constitute part of the intellectual property claimed in this instrument. That information can be made available for genuine research purposes; interested researchers should contact the first author directly.

Table 2
Trial data Cronbach's alpha scores for domains ($N = 43$)

Domain	Cronbach's alpha
Pain	0.61
Function	0.82
Emotions	0.82
Coping	0.64
Confidence	0.78
Work perceptions	0.69

Table 3
Descriptive statistics for aggregate and domain scores ($N = 957$)

Measure	Mean	Median	Range	SD
ARI score (max 200)	108.7	110	9–191	36.36
DOMAIN rating				
Pain	2.7	2.8	0.00–4.00	0.81
Function	2.2	2.3	0.00–4.00	0.86
Emotions	1.9	1.9	0.00–4.00	1.04
Coping	2.3	2.4	0.00–4.00	0.76
Confidence	2.1	2.1	0.00–4.00	1.04
Work Perceptions	2.0	2.0	0.00–4.00	0.97
OMPSQ (max 210)	121.0	121	13–207	32.85
PSEQ (max 60)	30.7	31	0–60	14.54

Table 4
Construct validity and internal consistency of questions that inform the domains ($N = 957$)

Domain inputs	Mean factor loading for questions that inform each domain	Cronbach's alpha
Pain questions	0.87	0.84
Function questions	0.69	0.81
Emotions questions	0.81	0.87
Coping questions	0.59	0.70
Confidence questions	0.86	0.87
Work Perceptions questions	0.77	0.64

Table 5
Factor scores for domains that inform the ARI

Domain	Factor loading	Item/adjusted total correlation
Pain	0.73	0.63
Function	0.88	0.80
Emotions	0.76	0.66
Coping	0.86	0.78
Confidence	0.90	0.84
Work perceptions	0.80	0.70

The ARI score was assessed for Construct Validity via Factor Analysis and Internal Consistency (Cronbach's alpha). The Cronbach score for the total ARI was 0.90. Individual domain factor scores are set out in Table 5.

The factor scores were obtained by principal component analysis with orthogonal rotation, and subject to Eigenvalue >1, accounting for 67.5% of the total variance. The purpose of analysis was to confirm that the domain variable all load onto the principal component. Item/adjusted total correlations (which excluded the relevant domain from the total for each correlation) are also represented in Table 5. These correlations varied from 0.63 to 0.84 with two domain correlations below 0.7, although still moderately high at 0.63 (Pain) and 0.66 (Emotions).

As expected, the results of correlations with ÖMPSQ and PSEQ were high; *ÖMPSQ ($r = 0.93$, $p = 0.01$) and PSEQ ($r = -0.88$, $p = 0.01$).* This confirmation of concurrent validity also provides initial predictive validity of the ARI as these two instruments have strong capacity to predict pain-related disability [44, 50].

3.3. Acceptability survey

Responses to the Acceptability Survey were rank ordered in the form: Disagree, Mostly disagree, Mostly agree, Agree. Results indicate a high level of acceptability to both participants and users with 99% of respondents selecting 'Agree' or 'Mostly Agree' to all seven acceptability attributes of the questionnaire.

4. Discussion

Accurate assessment of psychosocial factors associated with pain and disability can assist in the design of individually-tailored rehabilitation services [53]. The ARI was developed to provide both assessment of psychosocial risk indicative of persistent pain and disability, and sufficient reporting to inform an Occupational Rehabilitation intervention to reduce that risk. The current research aimed to assess the reliability and validity claims of the ARI. Results from this study indicate that this instrument does have acceptable psychometric characteristics and therefore the capacity to support its purpose.

The contribution of psychosocial factors in the persistence of pain and disability, and the superior results attainable from evidence-based biopsychosocial approach to rehabilitation, are well documented [24]. This paper brings much of that evidence to focus on a measurement approach that serves the dual purpose of establishing a baseline risk rating for each participant and for providing a chart for the design of individually-tailored rehabilitation intervention. The key to implementation of this new Occupational Rehabilitation model is the development of a valid set of domains that add dimension to a biopsychosocial assessment risk rating. An important strength of the ARI domains definition and content is that they were refined with selection, trial and review of items, in Occupational Rehabilitation practice.

Results from the current study, using data collected over a 5 year period, have provided psychometric support for the scale. The ARI was developed through selection of appropriate questions to inform the domains and statistical testing followed a correlational design. Once sufficient data were available, validity was assessed through analysis of the ARI factor structure and by examination of the ARI's relationships with validated measures of attitudes that influence pain, coping and work disability. The ARI's concurrent validity was reflected in high correlations (in expected directions) with both ÖMPSQ and PSEQ.

The questions that inform each domain are varied in number with each cluster of questions demonstrating satisfactory, above 0.7, mean factor scores for all other than the question clusters for Function (0.69)

and Coping (0.59). The Coping score may be a result of the breadth of contributing questions, which are included to capture the wide range of factors influencing this domain. Internal consistency of each domain was demonstrated through satisfactory (above 0.7) Cronbach's alpha results for all domains other than Work Perceptions (0.64). The coefficient range for domains was from 0.64 to 0.87. The domain Work Perceptions was retained because it provided essential information for intervention design, and because the overall Cronbach's Alpha result for the entire tool, including that domain, was strong. These domains inform the ARI, and all domains had strong factor loading, ranging from 0.73 to 0.90. These results indicate satisfactory construct validity both for the ARI and within each domain. The sample size of 957 adds strength to the stability and results from this study.

The initial Abilita assessment delivers the Rehabilitation Consultant immediate scored reports of practical value to communications with client, customer and treating practitioners. The ARI Impact Report, generated from repeat assessment after coaching, enables a comparison with the initial scores and domain ratings. After an appropriate intervention [19], it is no longer the baseline psychosocial factors that predict RTW outcome but rather the reduction in these factors [21]. The ARI Impact Report records both the change in influential factors and change in work status. A separate, comprehensive study by the current researchers is focusing on the results from Abilita Coaching, including the relationship between change in ARI score and work outcomes. This research will provide further opportunity to evaluate the predictive validity of the ARI.

5. Conclusion

The composite assessment instrument utilized in this study, the Abilita Rehabilitation Index, has high utility within the closely-regulated sphere of Occupational Rehabilitation. It provides guidance for the development of best-practice biopsychosocial rehabilitation intervention with the potential to contribute to a reduction in persistent pain, distress and work disability as a consequence of musculoskeletal injury. This model, set in the context of return to work rehabilitation, is ideally placed to deliver earlier work readiness and more durable return to work outcomes.

Further research is now required to more extensively test the utility of this approach and its capacity to consistently facilitate improved and sustained return to work post injury.

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Conflict of interest

This article reports part of the Master's thesis in Applied Science of P. Garton. P. Garton is the Managing Director of Abilita Services Pty Ltd which holds the intellectual property rights of the Abilita Rehabilitation Index. Professor G. Murphy and Dr P. O'Halloran declare they have no conflict of interest.

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Chapter 6: Abilita Triage

Chapter 5 demonstrated that the ARI has acceptable psychometric properties to identify and measure the psychosocial factors that negatively influence an individual's recovery and RTW following musculoskeletal injury. As discussed in Chapter 4, it is appropriate for psychosocial triage to be undertaken early in claims administration to identify those claimants who are vulnerable to this risk. This chapter reports on the design and analysis of a brief questionnaire, the AB-5, developed from the ARI for the purpose of predicting likelihood of negative influence by psychosocial factors, and therefore appropriateness for referral for completion of an ARI. This study sourced data from a secondary database, with authorisation from the proprietor, Abilita Services Pty Ltd (see Appendix 1). This chapter addresses Part b of Research Question 1:

1. Can self-report assessment be used to identify and measure psychosocial risk factors within domains, and thereby provide directional guidance to rehabilitation intervention?

    b. Is the AB-5 able to reliably predict respondents with moderate to high unhelpful psychosocial factor influence, and thereby indicate the need for an ARI assessment?

This chapter commences with a summary of the research evidence to outline the recommended key characteristics and considerations for a triage screening tool and its application. This is followed by the background to the AB-5 and its relationship to the ARI, the method used to develop and validate the tool, and the results of the study. Finally, this chapter presents a final discussion on its potential application.

6.1 Triage Research Evidence

In Chapter 4, the synthesis of research showed strong evidence that psychosocial factors are the predominant predictors of the potential for ongoing disability following work-related MSKD, and that early identification and management of those risk factors results in improved health and work outcomes and reduced claim costs e.g. (Collie, 2019; Linton & Shaw, 2011; Mitchell & O'Donnell, 2011; Nicholas et al., 2018).

A recent best-practice statement on identifying the risk factors for delayed RTW categorised risks into four categories: injury, work, individual and scheme specific. Individual risk factors were then categorised into demographic, BPS and prior history (Iles et al., 2018). This best-practice statement recommended that BPS screening is best applied early in the claim management phase to guide resource allocation and proactive service delivery. However, Iles et al., (2018) acknowledged that BPS screening information is complex to collect, record and interpret. Studies over the past 20 years have demonstrated that many factors influence the value and efficacy of early BPS screening for the purpose of guiding rehabilitation intervention. Table 6.1 provides a summary of the findings from a range of studies that have sought to determine best practice in the implementation of BPS risk screening.

Table 6.1: Summary of Recommendations for BPS Risk Screening

Source	Scope	Conclusions
(Waddell et al., 2003)	Conceptual and scientific review to prepare recommendations for UK Department for Work and Pensions risk screening	Key considerations should include: ease of implementation, addressing the ability to distinguish between screening for high risk and identifying psychosocial factors, and screening is only valuable if used to direct support to those who need it. Should be linked to development of more effective rehabilitation interventions. No screening is 100% accurate. Early screening should be inclusive.
(Nicholas et al., 2011)	Systematic and critical reviews (n = 28) from 2000 to 2009 to reappraise the utility of yellow flags	When cases are selected based on yellow flags and provided evidence-based intervention, the result is good health and work outcomes. Future research needs to develop a system to match interventions to yellow flags.
(Kendall et al., 2013)	Preparation of a guide to manage psychosocial obstacles	Psychosocial obstacles can be more important than biomedical factors. Everyone should be alert to psychosocial flags (employers, clinicians, occupational health and case managers). Identify flags in steps—start simple and then delve deeper. Selection measures must have high sensitivity, even if they have low specificity.
(Nicholas, McGuire, & Asghari, 2015)	Developing and validating a reliable two-item version of PSEQ	A two-item tool is less burdensome than the 10-item questionnaire. PSEQ-2's validity and internal consistency were found to be sound and suitable for clinical and research settings to identify the construct of self-efficacy in daily activities, despite pain.
(Collie, Sheehan, Lane, Gray, & Beck, 2018)	Conference presentation on injured workers' claims experience	Claims management action may impact worker outcomes: workers who report a positive claims experience are up to three times more likely to achieve positive RTW outcomes than those reporting a negative or neutral claims experience.
(Sullivan, 2013)	Editorial on clinical value of psychosocial screening	Screening can be harmful if used for diagnosis or adjudication; this has led to challenges regarding the authenticity of the person's condition.
(Karran et al., 2017)	Systematic review and meta-analysis on accuracy of screening instruments	LBP screening instruments in primary care are poor at identifying higher risk of chronic pain, but accurate at identifying poor disability outcomes and prolonged absenteeism. Apply caution in basing care management decisions on initial screening.
(Global Access Partners, 2017)	Strategic round table to discuss how to implement best practice	The WISE protocol demonstrated that early screening and early psychological and workplace intervention improve RTW; this was a two-step process with early screening to identify risk and further assessment to identify personal obstacles. May not produce same results broadly if implemented poorly. All parties must cooperate or the whole system can be imperilled. Case managers and RTW coordinators must be prepared to adopt new practice protocol.

Source	Scope	Conclusions
(Iles et al., 2018)	Preparation of best practice in risk identification for delayed RTW	Risk identification best applied at claim commencement to guide resource allocation and appropriate service delivery to achieve optimal RTW outcome. There is a large body of evidence on which factors predict risk, yet very limited evidence on how to implement the risk identification process. It is necessary to analyse and understand a system to determine a suitable risk identification process to suit the context.
(Safe Work Australia, 2018c)	Best-practice framework for managing psychological claims	Claims processes need to create more trusting and helpful relationship with the person on claim. Triage is a role for claim managers and should be based on health and psychosocial data, not claims data.
(Collie, 2019)	Report commissioned by Department of Veteran Affairs to improve compensation claims process	Recovery is dependent on BPS interactions at individual, organisational and systems levels. Client segmentation should link delegate capability with client complexity. Risk factor identification guides allocation of resources and appropriate service delivery. Requires risk screening to stream clients, with early psychosocial assessment of high-risk cases to support tailored intervention. Responses should be captured in a structured database to influence future actions. Training for case managers and adjustment of roles and responsibilities are likely to be required in any system.
(Nicholas et al., 2018)	RCT (n = 213) to examine predictive capacity of ÖMPSQ-SF	ÖMPSQ-SF can predict high psychosocial risk and number of days to RTW, with every one-point increase in score predicting a reduced chance of RTW by 4%. Suitable for any body location, not only back pain. Suitable for administration by trained insurance case managers. The tool is long for an initial screening with 10 items. It provides early identification of risk, and then the claimant requires additional psychosocial factor assessment.

Note: PSEQ = Pain Self-Efficacy Questionnaire; ÖMPSQ-SF = Örebro Musculoskeletal Pain Screening Questionnaire—Short Form.

The publications presented in Table 6.1 indicate that there are many factors to consider when implementing psychosocial triage. Nine of the 12 studies found it important for psychosocial triage to be undertaken for the purpose of identifying those at high risk of delay to thereby enable referral for full psychosocial assessment to provide results to guide tailored intervention (Collie, 2019; Global Access Partners, 2017; Iles et al., 2018; Karran et al., 2017; Kendall et al., 2013; Nicholas et al., 2011; Nicholas et al., 2018; Sullivan, 2013; Waddell et al., 2003). Five of the studies emphasised the importance of early screening for psychosocial factors (Collie, 2019; Global Access Partners, 2017; Iles et al., 2018; Nicholas et al., 2018; Waddell et al., 2003) to ensure that the appropriate intervention is provided as soon as possible. Four studies emphasised that the triage questionnaire should be brief and acceptable to both the claims administrator and claimant (Collie, Sheehan, et al., 2018; Global Access Partners, 2017; Nicholas et al., 2015; Waddell et al., 2003). Waddell et al. (2003) and Nicholas et al. (2011) recommended that, although brief, the triage tool must screen for more than one psychosocial construct to be inclusive, and needs high sensitivity to minimise the risk of missing individuals who may then slide into long-term problems. Other studies found that the triage will need to be presented to claimants in a manner that engenders trust, and this may require adjustment to claim personnel roles and responsibilities, with consideration of personnel competencies and training requirements (Collie et al., 2018; Safe Work Australia, 2018b). For optimal success, the triage process should be integrated into usual injury management practice within that system, with commitment and collaboration at all levels and sectors, including the workplace, insurer, and health and rehabilitation services (Collie, 2019; Iles et al., 2018).

These findings indicate that, when implementing psychosocial triage, considerations must include the timing of the claim process, purpose of screening, acceptability of the method to assessor and respondent, content of the questionnaire, sensitivity of the results, manner of presentation and personnel responsible for screening, training requirements and effectiveness of the implementation process in the organisation or system.

6.2 Background to Abilita Triage Tool

Musculoskeletal injuries are the most common work-related injuries, with the majority requiring little time off work; therefore, a structured BPS intervention is not necessary in

all cases. However, psychosocial risk factor assessment is the most effective way to identify those individuals who are at risk of delayed recovery and RTW (Nicholas et al., 2019). From 2008, a small number of WRPs and government agencies used the ARI in conjunction with Abilita coaching and training courses to implement a structured BPS approach into injury management and rehabilitation processes (Garton et al., 2016). This was undertaken under a license agreement with Abilita Services Pty Ltd. The details of the coaching and training components of the Abilita program are reported in Chapter 7, along with the BPS and work outcomes for the participants of that rehabilitation approach.

The ARI had returned minimal variation in results across varying jurisdictions and between male and female participants (Chapter 7), providing preliminary evidence of its suitability within a range of sociodemographic settings. The Abilita triage tool (AB-5) was developed to provide a brief screening instrument for use by case and claim managers to determine which cases to refer for ARI assessment. The AB-5 was designed to build time and cost efficiencies into the process of Abilita program implementation within an injury compensation scheme.

6.3 Objectives

The primary objective was to develop a brief screening tool with questions from the ARI that would best predict if an initial ARI rating would exceed a threshold that indicated that psychosocial factors were contributing to delayed recovery and RTW, and subsequently identify those who would benefit from completing an initial ARI assessment. To screen for the key BPS constructs reported in the ARI, the AB-5 questions would need to be representative of the ARI domains: function, emotions, coping, confidence and work perceptions (see Chapter 5).

Further, the triage tool would need to be suitable for administration by non-health professionals during an early post-injury conversation, with immediate recommendation report. Research evidence has found that the style of claim or case management has the capacity to either support or hinder the recovery and RTW of the person on claim (Collie, Sheehan, et al., 2018). Therefore, the tool needed to be non-threatening to both parties, easy to ask and respond to, and able to build trust in their relationship.

6.4 Methods

The dataset used for development of the tool comprised the pre-existing initial ARI scores (n = 333) available at that time at (https://abnet.abilita.net.au/Abilita.Web/), the Abilita assessment website. The data population encompassed working-age people, diagnosed with a variety of MSKDs, and receiving rehabilitation and compensation under injury compensation schemes. Details of the participant characteristics were reported in Chapter 5. The methods used for development and validation of the tool were based on the procedures of previous researchers (Feuerstein et al., 2005; Hill et al., 2008). Development and testing of the tool were achieved using two separate datasets. The development process is outlined in Figure 6.1.

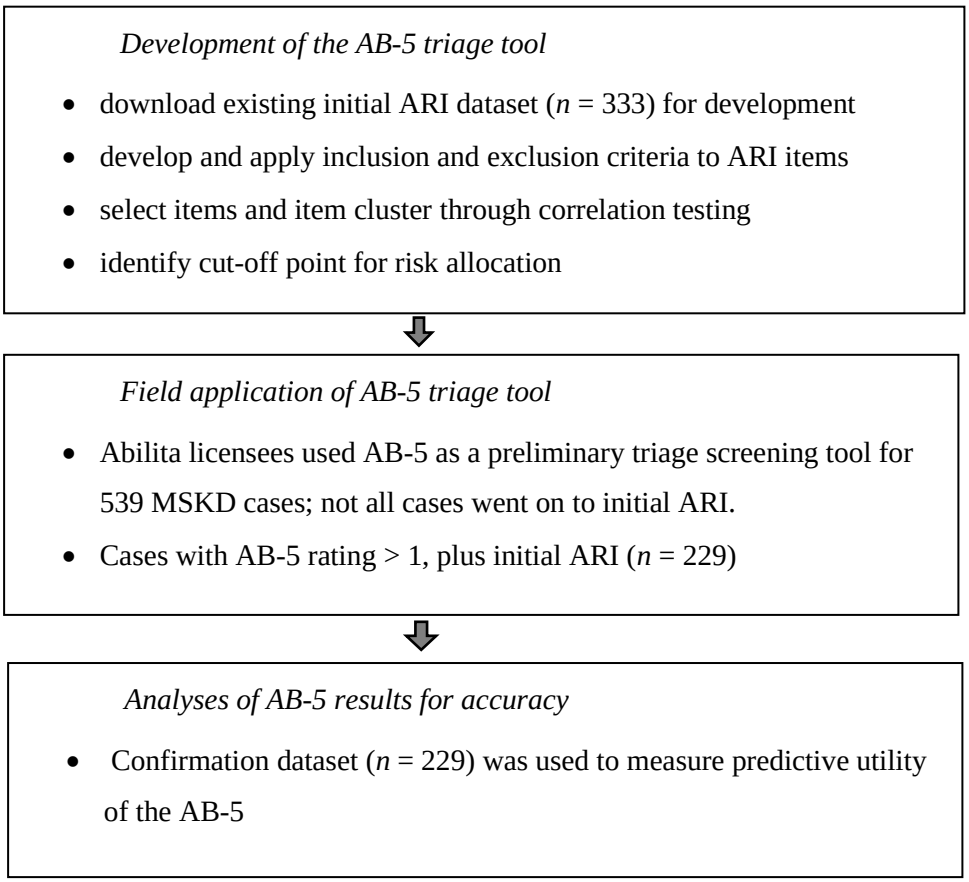


Figure 6.1: Flow Chart of AB-5 Development Process

6.4.1 Item Inclusion and Exclusion Criteria

To achieve inclusivity of the ARI psychosocial constructs, one question was drawn from each of the selected five domains of the ARI questionnaire: Function, Emotions, Coping, Confidence and Work perceptions. Those domains reflect the characteristics of

psychosocial constructs, including fear avoidance, emotional distress, passive coping, pain self-efficacy and work expectations. All items in these domains are amenable to change and are influential to perceptions of pain and disability (Garton et al., 2016). Ratings of severity of pain do not accurately reflect potential for disability (Feuerstein et al., 2005; Nicholas et al., 2011); thus, items from the 'pain' domain were not included. The domain of 'occupational factors' records work and demographic elements that are largely not amenable to change; therefore, items from that domain were excluded.

All ARI questions of the remaining five domains were considered appropriate to consider for inclusion in the brief tool, as all had been selected from standardised questionnaires that had undergone rigorous testing, including item analysis (Garton et al., 2016). The questionnaires from which the ARI questions were drawn were the ÖMPSQ (Linton & Boersma, 2003a); Pain Self-Efficacy Questionnaire (PSEQ) (Nicholas, 2007); Tampa Scale for Kinesiophobia (Woby, Roach, Urmston, & Watson, 2005); General Health Questionnaire (Goldberg & Hillier, 1979); Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 2004); Roland Morris Disability Questionnaire (Roland & Fairbank, 2000); and Fear-Avoidance Beliefs Questionnaire (Waddell, 1993).

Exclusion criteria were considered independently by two researchers familiar with the ARI, and finalised through discussion and reference to the original questionnaire studies listed above. As reported in Chapter 5, the ARI questionnaire was completed independently in an online form and demonstrated acceptability to respondents. In contrast, the triage questions were to be administered orally, in the context of a conversation early in a claimant–claim manager relationship. Therefore, it was considered important to exclude any questions that could be deemed difficult to ask or respond to, such as those that could infer a mood disorder or lack of motivation to recover or resume work, contain a more complex concept, or focus on the severity of pain. These criteria contributed to providing claimants with a positive claims experience through their interaction with the claim manager (Collie, Sheehan, et al., 2018).

To minimise acquiescence bias and provide both a positive and negative stance, the triage questionnaire would preferably include items of both orientations, where some questions with a high raw score indicated higher risk and some with a high score indicated lower risk (Robson, 2002, p. 294). Questions of short length would have priority over longer, more complex questions to minimise the likelihood of misunderstanding. Given that the

triage questions were to be asked orally during a conversation, the process was more in the nature of an interview, for which Robson (2002, p. 275) recommended that length and complexity should be considered. The 26 available items from the five selected domains were scrutinised against the exclusion criteria by the research team. This resulted in rejection of 16 items, with 10 items identified as possible for inclusion in the triage tool.

6.4.2 Item and Item Cluster Selection

The 10 remaining items in the selection pool were transformed to achieve equal weighting and uniform orientation, and each were analysed for item–total correlation with their total domain rating. This analysis strategy was based on that of researchers who developed two-item questionnaires from 10-item instruments and selected items with the highest item–total correlation (Jensen, Keefe, & Lefevre, 2003; Nicholas et al., 2015). Statistical item–total correlation then compared all possible five-item combinations with the initial ARI ratings to identify the highest correlating five-item cluster. The output from this analysis is shown in Table 6.4.

6.4.3 Scoring and Cut-off Point

In the ARI questionnaire, the questions were presented and scored on either a seven- or 11-point Likert scale. The responses were transformed to achieve equal weighting and orientation for rating and reporting purposes. The ARI ratings (1 – 4) were established from the ARI maximum score of 200 as follows: $1 < 50$, $50 \leq 2 < 100$, $100 \leq 3 < 150$ and $4 \geq 150$). The threshold at which psychosocial factors were likely to contribute to persistent pain, disability or delay in RTW was above ARI rating 1. During development of the ARI, this predictive cut-off point was established through correlation with ÖMPSQ and PSEQ scores based on evidence developed through comprehensive research using these instruments (Garton et al., 2016; Linton & Boersma, 2003a; Nicholas, 2007). To simplify questioning and responding to the AB-5 triage tool, it was determined that questions would be presented on a five-point Likert scale, with a maximum aggregate score of 20. To equate to the ARI rating 1, the AB-5 ratings were set at low, $1 < 5$, with higher ratings set at medium $5 \leq 2 < 13$ and high ≥ 13.

6.4.4 Confirmation Sample

After development, the AB-5 triage tool was administered by Abilita licensee case management personnel within employers and insurers and by RCs within WRPs. Between December 2014 and December 2018, the AB-5 triage tool was used by 18 Abilita licensees with 539 working-age people diagnosed with a variety of MSKDs and receiving rehabilitation and compensation under a compensable injury scheme. Each case registered on the Abilita assessment website was automatically assigned a sequential record number, described as the case ID, which allowed the AB-5 data to be matched to Initial ARI assessment data. These data provided the opportunity to test the accuracy of the AB-5 against initial ARI ratings for each case with both records.

The records of 229 cases were available for statistical testing of the predictive utility of the triage tool. From the 539 total AB-5 results, 310 cases did not have a matching ARI assessment. One potential explanation for this is that a low AB-5 rating (< 2) had been recorded for 110 of those cases and therefore the case manager may have been satisfied that the Initial ARI assessment was not required. However, a further 200 cases with a medium or high AB-5 rating did not have a matching Initial ARI assessment; the reasons for this are unknown to the researcher as many practice factors influence case managers' decisions and these factors were not explicitly reported. Only 'date of birth' and 'date of injury' were available in the AB-5 data set and therefore further analysis to determine differences between these and cases with ARI assessment, was not possible.

Once the tool had been developed, it was written into the Abilita assessment software at www.abnet.abilita.net.au, so that it would be available for any case registered.

6.4.5 Administration Protocol

The AB-5 tool was introduced to Abilita licensees with a recommended administration protocol and an online training course. This design criteria reflected evidence that claim and case management actions influence recovery and RTW outcomes, and that risk screening should be used to only provide support for claimants, and could be harmful if used for diagnosis or adjudication purposes (Collie, Sheehan, et al., 2018; Sullivan, 2013). To standardise the approach taken by Abilita licensees, the protocol document (Appendix 2) was made prominent on the assessment website to remind users of the recommended questioning procedure, which sought to build trust between the parties. An online training

course was prepared and made available, outlining the Abilita BPS approach, including details about the ARI and the self-management coaching course (detailed in Chapter 7). The Abilita license agreement included a clause on quality assurance, requiring licensees to maintain the quality and integrity of the program, including maintaining training currency and adhering to training recommendations. This aligned with evidence that the development of clear competency requirements and implementation protocols is necessary to ensure the delivery and standardisation of new evidence-based psychosocial interventions (Sullivan, Feuerstein, et al., 2005).

Software on the website recorded the individual question scores, calculated the total score and generated a brief report. The AB-5 report was designed to recommend that all cases with total score of 5 or above (rating 1) be referred for an initial ARI assessment. AB-5 ratings were classified as low, medium or high and presented in the report, as displayed in Table 6.2. The categories of medium and high were included to offer further guidance to the recommendation. The primary purpose of the instrument and report was to advise the assessor if the person's responses indicated potential risk of delayed recovery. This design criteria reflected evidence that it is important to differentiate between risk screening and assessment to identify and measure psychosocial risk factors that will require attention within rehabilitation management (Waddell et al., 2003).

Table 6.2: AB-5 Report Recommendations

Rating	Recommendation
Low	Referral for Abilita initial assessment is not indicated at this time
Medium	Referral for Abilita initial assessment is recommended
High	Referral for Abilita initial assessment is strongly recommended

6.4.6 Data Analysis

As outlined in Figure 6.1, the secondary dataset used to develop the AB-5, was downloaded by the researcher from the ARI database housed in the secure proprietary website, www.abnet.abilita.net.au, and accessed only by Abilita administrators. The ABnet software recorded data only when all items on a questionnaire had been completed; therefore, there were no missing data and the full initial ARI assessment dataset (n = 333) was available for analysis. Statistical analysis was conducted using IBM SPSS Statistics V25.

Descriptive statistics of the five ARI domains of the development dataset are shown in Table 6.2, providing measures of central tendency and variability. Following reduction of the item pool according to the selection criteria, item–total correlations identified the highest correlating items and highest correlating five-item cluster.

The confirmation sample (n = 229) was downloaded from the ARI database housed in the secure proprietary website www.abnet.abilita.net.au following field application of the tool. AB-5 data were matched to the initial ARI assessment data for each case. Product–moment correlation (Pearson's r) was used to establish the statistical relationship between the AB-5 rating and initial ARI rating. Sensitivity and specificity were calculated to determine the utility of the AB-5 tool to predict an initial ARI rating above 1 for this cohort. The tests identified the number of cases that were true positives, false positives, true negatives and false negatives. The sensitivity value was measured by the true positives (those in which the AB-5 rating correctly predicted an initial ARI above 1) divided by the sum of true positives and false negatives. Specificity was measured by the true negatives (those where the AB-5 rating correctly correlated with a rating below initial ARI rating 1) divided by the sum of true negatives and false positives.

6.5 Results

6.5.1 Domains Data from Development Dataset

The descriptive statistics of the domain ratings for the initial ARI dataset (n = 333), used to develop the tool, provide measures of central tendency and variability, and are shown in Table 6.3. Response scores to each question (n = 26) in the selected domains were transformed to a rating from 0 to 4, and the total of the questions was represented in each domain.

Table 6.3: Descriptive Statistics of Initial ARI Domain Ratings

Domain	Minimum	Maximum	Mean	SD
Function	0.00	4.00	2.38	0.83
Emotions	0.00	4.00	2.18	1.03
Coping	0.00	4.00	2.45	0.74
Confidence	0.00	4.00	2.39	0.97
Work perceptions	0.00	4.00	2.07	0.94

In Table 6.3, the SD shows a relatively similar amount of variation between domain ratings, indicating that the mean was representative of the data, with the greatest variance in the domain ‘emotions’ and least in the domain ‘coping’.

6.5.2 Item Selection

The 26 items from the five selected domains were scrutinised according to the selection criteria, resulting in rejection of 16 items. Items identified as unacceptable for inclusion queried mood (3 questions), pain focus (4 questions) or a complex concept (4 questions), or may have implied lack of motivation (5 questions). Examples are included in Table 6.4

Table 6.4: Exclusion Criteria Item Samples

Exclusion criteria	Sample Item
Mood	How tense or anxious have you felt in the past week
Pain focus	Physical activity makes my pain worse
Complex concept	Do you feel happy in general
May imply lack of motivation	Because of my pain I lie down to rest more often

The remaining questions met the inclusion criteria as suitable for oral administration early in a claimant–claim administrator relationship. For the remaining 10 items, item–total correlation was measured to identify those with the highest correlation to their full domain aggregate. Table 6.5 presents these results (n = 333).

Table 6.5: Item–Total Correlation with Domain Rating

Q No.	Item	*r*	Domain
Q6	I can walk for an hour	-0.699	Function
Q7	I can do ordinary household chores	-0.780	Function
Q8	I can do the weekly shopping	-0.757	Function
Q9	I can sleep at night	-0.678	Function
Q13	I am unable to relax	0.772	Emotions
Q18	I count more on my doctors and treatment providers to decrease my pain than I do on myself	0.651	Coping
Q22	I can cope with my pain without medication	-0.675	Coping
Q23	I have found everything getting on top of me	0.683	Confidence
Q28	I can do light work for an hour	-0.761	Work perceptions
Q29	I can do some form of work, despite the pain (‘work’ includes housework, paid work and unpaid work)	-0.797	Work perceptions

Note: Correlation (r) is significant at 0.000 (two-tailed).

Examination of Table 6.5 shows that all items had moderate to strong correlation with their domain (as previously found in development of the ARI), confirming that all were statistically suitable for consideration. However, with 16 items rejected according to the exclusion criteria, two domains were left, with only one question within the item pool. To meet the study objectives, it was necessary to include one item from each domain and then calculate which constellation of items had the largest correlation with the ARI. Given that limitation, there were 16 possible clusters of five questions. All possible cluster subset totals were correlated with the initial ARI rating using a Pearson correlation coefficient. The results are presented in Table 6.6.

Table 6.6: Item–Total Correlation for Each Item Cluster with ARI Rating

Cluster	Question Numbers	Correlation with ARI
Cluster A	6 + 13 + 18 + 23 + 28	.880*
Cluster B	6 + 13 + 18 + 23 + 29	.905*
Cluster C	6 + 13 + 22 + 23 + 28	.885*
Cluster D	6 + 13 + 22 + 23 + 29	.907*
Cluster E	7 + 13 + 18 + 23 + 28	.896*
Cluster F	7 + 13 + 18 + 23 + 29	**.915***
Cluster G	7 + 13 + 22 + 23 + 28	.900*
Cluster H	**7 + 13 + 22 + 23 + 29**	**.917***
Cluster I	8 + 13 + 18 + 23 + 28	.893*
Cluster J	8 + 13 + 18 + 23 + 29	.911*
Cluster K	8 + 13 + 22 + 23 + 28	.899*
Cluster L	8 + 13 + 22 + 23 + 29	**.915***
Cluster M	9 + 13 + 18 + 23 + 28	.890*
Cluster N	9 + 13 + 18 + 23 + 29	.904*
Cluster O	9 + 13 + 22 + 23 + 28	.896*
Cluster P	9 + 13 + 22 + 23 + 29	.909*

Note: n = 333, * correlation is significant at 0.01 (two-tailed).

Inspection of Table 6.6 reveals that Cluster H, which contained items Q7, Q13, Q22, Q23 and Q29, correlated best with the initial total ARI rating, with a Pearson correlation coefficient of 0.917. This was closely matched by Clusters F and L, with correlations of 0.915. These both shared questions Q13, Q23 and Q29 with Cluster H, while Cluster F had Q18 substituted for Q22, and Cluster L had Q8 substituted for Q7. Both Q18 and Q8 were less preferable based on the selection criteria.

The reliability of the five Cluster H items was examined using Cronbach's α coefficient (0.76), which suggested that they related to one another and demonstrated acceptable internal consistency. Therefore, the five items in Cluster H were finalised as the Abilita triage questions, and the screening instrument was given the title AB-5. The questions and domain from which they were derived are listed in Table 6.7.

Table 6.7: AB-5 Triage Questions

Number	Domain	Question
7	Function	I can do ordinary household chores
13	Emotions	I am unable to relax
22	Coping	I can cope with my pain without medication
23	Confidence	I have found everything getting on top of me
29	Work perceptions	I can do some form of work, despite the pain ('work' includes housework, paid work and unpaid work)

6.5.3 Measuring the Predictive Utility of the Abilita Triage Questionnaire

Using the confirmation dataset (n = 229), Pearson's correlation between the AB-5 triage rating and the initial ARI rating was r = .561 (p = 0.01). The predictive actual and false results of AB-5 for the confirmation data are shown in Table 6.8.

Table 6.8: Actual and False AB-5 Results (n = 229)

Predicted	Actual		Total
	Yes	No	
Yes	202	7	209
No	6	14	20
Total	208	21	229

Sensitivity and specificity values were calculated from these results to determine the AB-5 predictive utility. In this context, sensitivity refers to the ability of the test to identify those people who would score above ARI rating 1 when they completed an ARI questionnaire. The results are presented in Table 6.9.

Table 6.9: Sensitivity and Specificity Values (*n* = 229)

Statistic	Value
Sensitivity	94%
Specificity	46%
Positive predictive value	97%
Negative predictive value	30%

Table 6.9 displays the sensitivity and specificity data, showing high sensitivity (94%) and confirming that the AB-5 had a high predictive capacity for this cohort. The modest specificity (46%) resulted in a negative predictive value of 30%.

6.6 Discussion and Conclusion

6.6.1 Summary

The purpose of this study was to develop a brief triage questionnaire from the ARI to be used as a MSKD screening tool for the purpose of indicating suitability for referral for a full Initial ARI assessment. Statistical testing found that the AB-5 was able to correctly predict (sensitivity 94%) if a respondent's Initial ARI rating would exceed the threshold that indicates that psychosocial factors are contributing to delayed recovery and RTW. In this study, the AB-5 was used by existing Abilita licensees and thus only administered to cases already considered potentially at risk by the case manager. Consequently, the percentage of positive results was greater than would be expected if the AB-5 was administered to all new claimants. For this study cohort, 6% of the total cases were incorrectly classified as not at risk. To manage this potential outcome, the AB-5 protocol was amended to advise users to repeat screening at two weeks or later for any case assessed as low risk, yet not progressing as expected.

Development of the AB-5 tool contributed a valuable component to the proposed Abilita BPS model being developed to suit workplace rehabilitation. It added triage capacity to development of the ARI assessment, which identifies and measures psychosocial risk factors and reports the results within domains to inform tailored BPS intervention.

6.6.2 Comparison with Results from Previous Research

To this researcher's knowledge, this is the first psychosocial triage instrument developed with direct linkage to a comprehensive psychosocial assessment instrument. The research

studies referenced in the introduction to this chapter (Table 6.1) reveal that numerous factors will influence the implementation of a triage screening process within any compensation scheme. These include considerations of the purpose of screening, personnel responsible for screening, sensitivity of the results, acceptability of the method to the assessor and respondent, training requirements and effectiveness of the implementation process within an organisation or system (Collie, 2019; Iles et al., 2018; Safe Work Australia, 2018c). This study indicates that the AB-5 has the capacity to assist in the delivery of some of those factors, including the requirements to be brief and potentially acceptable to both the claims administrator and claimant, segregate those at high risk of delay to be referred for a psychosocial assessment that will provide results to guide tailored intervention, screen for more than one psychosocial construct, and have high sensitivity. The AB-5 implementation process includes an administration protocol and training course to support the achievement of administration in a manner that engenders trust (Safe Work Australia, 2018c). The online presentation of the tool enables direct linkage to the ARI and development of a database for the purposes of monitoring individual progress and continual improvement of the risk assessment processes (Collie, 2109).

Researchers in this field have acknowledged that a short screening triage tool cannot be 100% accurate and that there will always be some false positives and some false negatives (Waddell, 2003). Given that the purpose of screening is to identify those at risk because of psychosocial responses indicative of the potential for ongoing pain and suffering, it is of greater concern to miss someone who is at risk than to be over-inclusive. Thus, researchers recommend that such a measure needs to have high sensitivity and could have lower specificity (Kendall et al., 2013; Nicholas et al., 2011; Waddell et al., 2003). In this study, the AB-5 was tested in a population of people with high potential for psychosocial risk factors and was found to be have a sensitivity of 94%. To manage the risk of false negatives, the AB-5 protocol recommends that case managers repeat the questionnaire for any case that does not progress as expected, despite recording an initial low AB-5 rating.

6.6.3 Potential Study Limitations

This study relied on data sourced from a secondary database; therefore, study requirements, such as completion of the ARI assessment for all AB-5 medium- and high-risk cases, were not designed into data collection. As a consequence, potential data from

310 case records were unavailable to the confirmation sample because claim and case managers within the Abilita licensees chose not to refer them for ARI assessment, including 200 cases with medium or high AB-5 rating. Furthermore, the study population was primarily people who were considered by case managers as having high potential for psychosocial risk factors. However, notwithstanding the effect of potential biases, the confirmation sample of 229 was adequate to complete some preliminary statistical validation tests. Further research will be beneficial to evaluate the influence of this potential bias.

The reliance on a secondary data base for development of this triage tool—and accompanying restrictions in data collection—also prevented the opportunity for a second point in time test from which to calculate test-retest reliability. However, these preliminary positive results justify the use of this tool in further experimental studies.

Application of the AB-5 is limited to employer and insurer settings where the ARI is also used either by an in-house RC or through referral to an Abilita-licensed WRP. It is not designed to use as a stand-alone triage assessment in which the respondent is not provided an opportunity to complete the ARI.

6.6.4 Potential Implications

The development of a triage tool linked to a comprehensive psychosocial assessment has the potential to reduce the number of compensable musculoskeletal cases allowed to develop entrenched and disabling psychosocial barriers to recovery and RTW (Kendall et al., 2013; Nicholas et al., 2011). This model offers a more efficient screening and assessment process than psychosocial triage that is not directly linked to an assessment and tailored intervention. However, the development of an effective triage tool does not guarantee implementation of an effective risk screening process. As identified in the referenced research, the implementation of an effective BPS approach, including triage screening, will require integration into usual injury management practice, with commitment and collaboration at all levels and sectors of the system, including the workplace, insurer and health and rehabilitation services.

6.6.5 Future Research

This study provides some preliminary evidence to support the AB-5 as an effective psychosocial triage tool. Future research with other work injury samples is needed to verify the benefits of using both the AB-5 and ARI. The combination of these tools—in which the triage tool selects high-risk claimants and the assessment instrument identifies and measures the risk factors into BPS domains—offers some of the core components of the proposed Abilita Rehabilitation Model, with the potential to meet current best-practice injury management recommendations (Collie, 2019; Iles et al., 2018; Linton et al., 2018).

Chapter 7: Abilita Rehabilitation Model

BPS factors play a major role in recovery and RTW following compensable musculoskeletal injury. Chapter 5 described the development of the ARI—a 61-item assessment to identify and measure the BPS factors that may negatively contribute to a person's recovery and RTW outcomes (Garton et al., 2016). A triage tool was then developed to determine which people are vulnerable to that risk, and who would subsequently benefit from completing an ARI assessment. The development of that triage tool, the AB-5, was reported in Chapter 6.

The literature reviewed in Chapter 4 revealed that an important and currently unmet BPS rehabilitation goal is the development of a standardised intervention model that can be designed to be tailored to address the issues identified in a BPS assessment (Linton et al., 2018). This chapter describes the implementation of the ARI and AB-5 assessment tools and the integration of a self-management coaching intervention into workplace rehabilitation. These components offer the opportunity to develop a BPS rehabilitation model built as a system of resources to enable the efficient and effective application of best-practice evidence into RTW rehabilitation.

Previous research has confirmed that an intervention, regardless of its evidence base, is unlikely to be adopted broadly without an effective implementation protocol, including competency development (Sullivan, Feuerstein, et al., 2005). This study describes an implementation process designed to address that recognised requirement. The details of Abilita coaching—including the content of the self-help coaching course, consultant training and the implementation procedure—are described in the methods section of this chapter. The feasibility of this intervention was evaluated by measuring change in BPS responses, work readiness and work hours, and through participant evaluation responses. These and other findings are reported in the results section and explored further in the discussion chapter to consider the limitations of the study, the effects of aspects of the model on the results, and the implications for the broader application of this approach.

7.1 Objective

This study used secondary data from the ARI database to evaluate the potential effect on outcomes of integrating BPS assessment and self-help skills coaching into workplace

rehabilitation. These components potentially constitute a BPS rehabilitation model (Figure 7.1) in which the AB-5 triage tool may be used to identify 'at risk' workers, the ARI assessments with reports providing BPS domain ratings could inform intervention requirements, a modularised self-help coaching course could be tailored according to the assessment profile, and consultant training could support delivery of the recommended coaching process and parallel RTW actions. Access to the ARI database was authorised by the proprietor, Abilita Services Pty Ltd (Appendix 1), and provided the opportunity to undertake practice-based research which contributed to the development of best-practice models (Crooke & Olswang, 2015).

This chapter addresses the second research question of this doctoral thesis:

2. What are the outcomes of integrating a structured BPS model into workplace rehabilitation?

    a. Does implementation of the Abilita assessment, coaching and training model result in a reduction in unhelpful psychosocial factors?

    b. What is the relationship between reduction in unhelpful psychosocial factors and increase in work capacity, as measured using both increased work readiness and increase in hours at work?

    c. How do participants evaluate this approach?

Three hypotheses were generated for this investigation. First, it was predicted that, when RCs used the ARI assessment, self-help coaching course and consultant training in the recommended coaching process and parallel RTW actions, they would assist their clients to reduce the effects of unhelpful BPS factors. Second, it was hypothesised that these gains would build participants' physical and psychological capability, resulting in increased work readiness and increased work capacity. Third, it was hypothesised that the resources comprising this rehabilitation model would facilitate delivery of services that were perceived as beneficial by the participants.

7.2 Methods

7.2.1 Research Design

This quantitative study employed a practice-based research design (Crooke & Olswang, 2015) to provide an opportunity to test whether the Abilita system was effective and able to engage stakeholders positively. It was retrospective research using analysis of an existing collection of non-identifiable data from the ARI database, as described below. A limitation of retrospective research is that the intervention and outcome variables are restricted by the data collected. However, this can also be a strength of practice-based research, as it captures routine practice priorities and preferences, and may offer research results that are more relevant and generalisable than those from experimental research (Crooke & Olswang, 2015). The comprehensive database provided an opportunity to evaluate application of the Abilita Rehabilitation Model from a variety of perspectives, including shifts in psychosocial responses, in work capacity, and participant evaluation. The study received ethics approval for analysis of this secondary data source on 29 August 2017 from the Human Ethics Subcommittee in the College of Science, Health and Engineering as a negligible risk project (reference no. S17-149).

7.2.2 Abilita Rehabilitation Index Database

The ARI database is housed in the secure proprietary website, www.abnet.abilita.net.au, and accessed only by Abilita administrators. Each case record includes fields for:

- case data (e.g., date of birth, gender, date of injury, injury type and location, and first language)
- work data (e.g., insurer, employment, certified work capacity, usual and current work hours, and date of RTW)
- personal data (e.g., postcode, if born in this country, level of education, time with current employer, previous claims, living alone or not, and pain location and duration)
- psychosocial data (beliefs, behaviours and expectations related to managing pain and managing work).

Data entries were made by employees of a licensee and by their clients referred for rehabilitation services. Licensees accessed this website to register a case and administer

an ARI assessment, which may have included an AB-5 triage assessment (Chapter 6) or an initial or impact ARI assessment (Chapter 5). The assessment software generated a case ID number and the person's name was not recorded. The licensee entered case and work data and their client entered the personal and psychosocial data by selecting a choice in either a drop-down box or on a Likert scale for each item. This may have been completed on the licensee's computer or remotely in response to an online invitation. Once all questions were completed, the assessment software calculated scores, applied algorithms to collate responses into BPS domains, and generated results reports.

7.2.3 Participants

A total of 1,737 initial ARI assessment records for respondents were available for analysis in the ARI assessment database for the enrolment period (defined as the years 2008 to 2018) and were found to fulfil the inclusion criteria, which were as follows:

1. people of working age
2. people diagnosed with MSKD
3. people who had received rehabilitation and compensation under workers' compensation, disability, motor accident or military compensation schemes
4. people who had completed the initial questionnaire for the ARI for musculoskeletal injury.

7.2.4 Origin of Database Data: Case Jurisdiction

The Initial ARI dataset (n = 1,737) was collected by 87 RCs employed by 16 Abilita licensees working in various injury compensation systems, involving different jurisdictions. Comcare was the largest scheme represented and the data were listed separately from those of the states and territories. Table 7.1 provides information about each state or territory, as well as Comcare, and the descriptive statistics are presented in the results Table 7.5.

Table 7.1: Jurisdictions Represented in Initial ARI Dataset

Jurisdiction	Scheme Representation	No. of Cases	No. of Abilita Licensees	Comments
Comcare	Commonwealth employees, self-insured private entities	606	6	From all states and territories
NSW	Workers' compensation, motor accident compensation	451	5	
South Australia (SA)	SA public sector employees	178	3	Primarily from two SA government pilot projects
Northern Territory (NT)	Workers' compensation, motor accident compensation, military compensation	66	1	Earliest data
Other	e.g., Tasmania, Western Australia, Queensland, life insurance, etc.	110	6	Small numbers from each state or scheme
New Zealand (NZ)	Accident Compensation Corporation	111	1	
Malaysia	Motor accidents	215	1	RCT at University of Putra Malaysia (UPM); ARI translated into Bahasa Malaysia

Note: RCT = randomised control trial.

As evident in Table 7.1, the largest number of cases was under Comcare case management and provided workplace rehabilitation services by six different providers across several states and territories. The UPM RCT was a one-year project to test the effect of a BPS intervention, compared with usual care, for people with compensable physical injuries. This was undertaken by a PhD candidate and is yet to be published.

7.2.5 Materials and Procedure

7.2.5.1 Abilita Program

The Abilita program's assessment, training and coaching resources provided the material and procedures used in this study, and are described below. The Abilita program was developed in a clinical practice by a multidisciplinary team of health professionals, including an occupational therapist, physiotherapist, rehabilitation counsellor, clinical psychologist and psychologist, to develop a community-based pain management program in the NT. The six-person team initially met regularly over a three-month period to develop the core components drawn from each discipline, and, over the next seven years, the current researcher coordinated the team's delivery and refinement of the coaching

course to help participants acquire the knowledge and skills to reduce the suffering and disability accompanying pain following MSKD. On confirmation of the program's assessment (ARI) and course (Restore) effectiveness, training courses were prepared with the intention of enabling the Abilita program to be delivered by any RC with allied health qualifications. All three components—assessment, training and coaching resources—were packaged as the Abilita program and offered by licence agreement to workplace rehabilitation providers from 2008. Abilita licenses were acquired by 18 small or medium WRPs, one national WRP and two reinsurers to apply in rehabilitation management, as well as one university and three commonwealth and state government departments seeking injury management solutions through pilot project research. Figure 7.1 displays a flowchart outlining the materials and procedures of the Abilita Rehabilitation Model as recommended for implementation in workplace rehabilitation for this study.

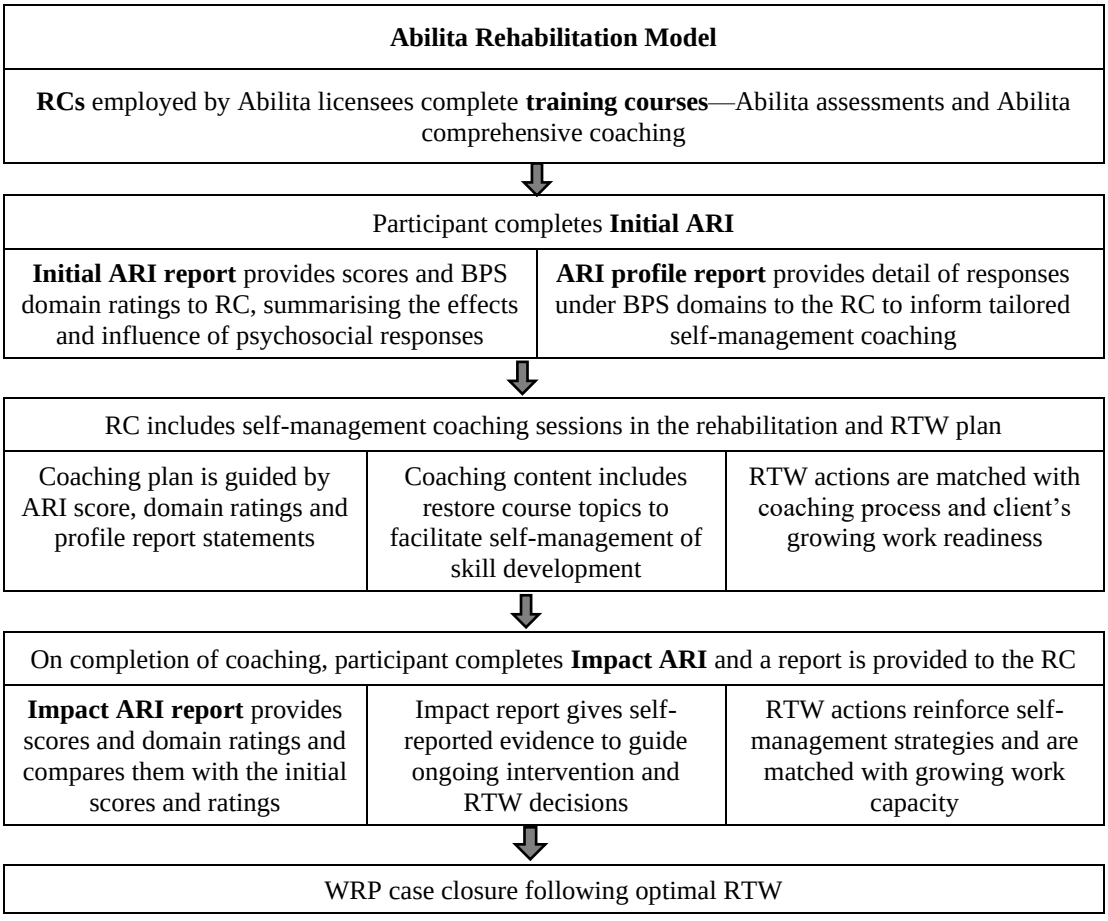


Figure 7.1: Flowchart Depicting Abilita Rehabilitation Model

7.2.5.2 Abilita Training

Prior to using the Abilita resources, RCs employed by Abilita licensees were required to complete the professional development courses—Abilita Assessments and Abilita Comprehensive Coaching—either in a workshop setting or through an e-learning platform. Previous research has identified that appropriate protocols and training are essential to maximise the opportunity for healthcare practitioners to adopt and adhere to any new intervention (Sullivan, Feuerstein, et al., 2005). The aim of the training courses was to assist RCs to use the Abilita assessments and coaching resources as an integrated component of their rehabilitation programs, and thereby apply therapeutic behaviour change techniques to facilitate clients' adoption of strategies to reduce the effect of pain and disability. Through the Abilita assessments course, RCs learnt the implications of ARI domain ratings as presented in the ARI reports, as well as the recommended self-help knowledge and strategies that could assist individuals to overcome specific barriers in each domain.

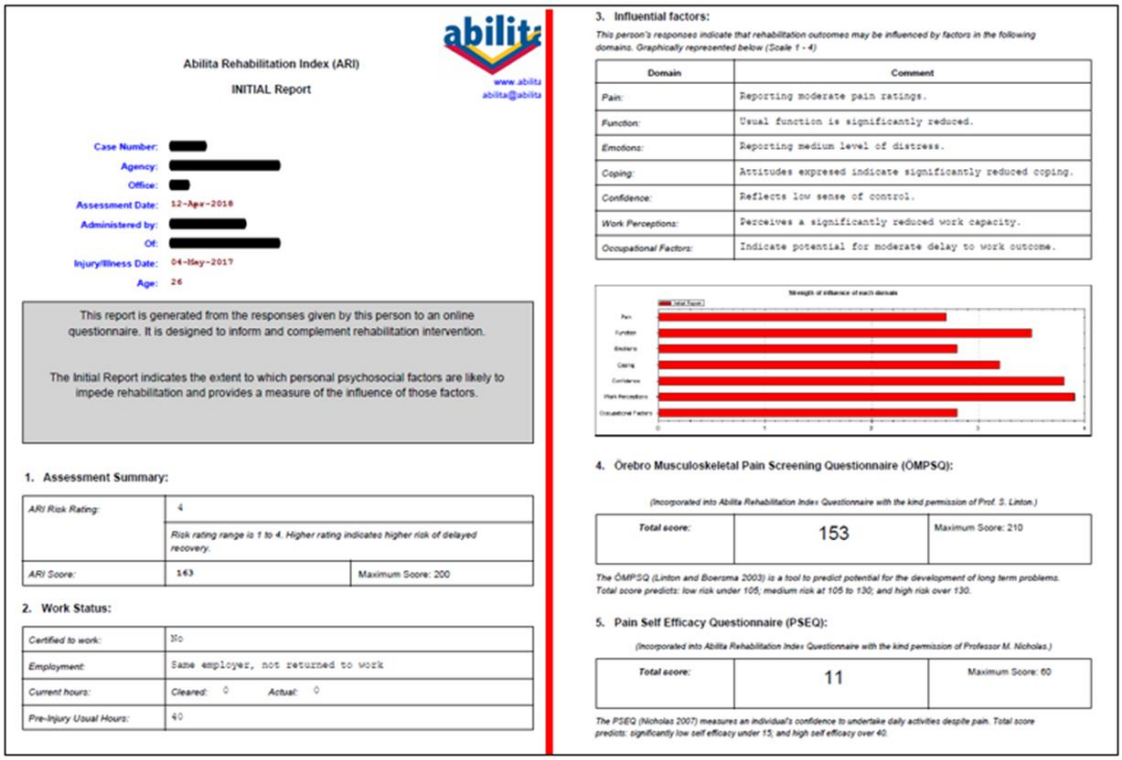
The comprehensive coaching course comprised four units: (i) Abilita coaching process, (ii) Restore course, (iii) implementing coaching and (iv) RTW rehabilitation. The foundation module, Abilita coaching process, covered the therapeutic process including motivational interviewing, behaviour change therapies and adult learning. It was designed to encourage client engagement and BPS insight, and clients' willingness to choose to invest time and effort into building their own self-help skills. For example, RCs were taught to use the stages of change from the transtheoretical model of behaviour change to evaluate participants' readiness to adopt different self-help strategies, and to apply coaching accordingly (Prochaska & Velicer, 1997). Module 2, comprised the coaching content and resources for the Restore self-management course. Further course details are presented in the section *7.2.5.5 Abilita Coaching*. Module 3 provided guidance for planning and delivery of the Restore course, while Module 4 provided guidance to match RTW actions with coaching progress. The overall goal of the comprehensive coaching course was to build RCs' competencies to help their clients develop readiness for RTW through accepting new knowledge and adopting self-help strategies to build self-efficacy in managing pain, distress and disability. Following completion of this training, RCs commenced using the ARI assessment with clients to obtain the Abilita initial and profile reports to begin integrating Abilita coaching into their rehabilitation plans.

7.2.5.3 Abilita Initial Report

RCs asked a client to complete an Initial ARI if the referral had come from a case manager who had completed an AB-5 triage assessment (see Chapter 6) or if they had established an agreement from the referring customer (employer or insurer) to use the ARI at their discretion during assessment and preparation of an employee's/claimant's rehabilitation and RTW plan.

The RCs' Abilita assessment training included recommendations on how to introduce the questionnaire to a client in a manner that maximised trust and engagement and facilitated honest and unaided completion of the questions. The ARI questionnaire was offered to the participant by the RC either face-to-face or by remote invitation. The remote invitation was time restricted for internet security purposes. As described in Chapter 5, the participant questionnaire, ARI, is a 61-question, self-report questionnaire incorporating the ÖMPSQ and PSEQ in their entirety, as well as 26 items selected from other valid and reliable questionnaires (Garton et al., 2016).

Once the ARI questionnaire was completed online, the initial report was automatically generated for the RC. An image of the two-page report for a case sample is provided in Figure 7.2, while full-page images are available in Appendix 3. The report included the aggregate scores of the ARI, ÖMPSQ and PSEQ; domain ratings in quartiles; and work data. The domain ratings were displayed in a chart, which RCs were encouraged to discuss with the client as a resource to facilitate client insight and engagement, and to support collaborative planning of the BPS coaching intervention. A higher rating in a domain indicated that the responses to those questions reflected beliefs, behaviours and expectations that could potentially contribute to the individual's increased reports of pain and disability. To support the RCs' discussion with each participant, the Abilita assessment training provided a sample of an explanation of each domain. The recommended domain descriptions are displayed in Table 7.2.



Abilita Rehabilitation Index (ARI)

INITIAL Report

www.abilita
abilita@abilita

Case Number: [redacted]
Agency: [redacted]
Office: [redacted]
Assessment Date: 12-Apr-2018
Administered by: [redacted]
Of: [redacted]
Injury/Illness Date: 04-May-2017
Age: 26

This report is generated from the responses given by this person to an online questionnaire. It is designed to inform and complement rehabilitation intervention.

The Initial Report indicates the extent to which personal psychosocial factors are likely to impede rehabilitation and provides a measure of the influence of those factors.

1. Assessment Summary:

ARI Risk Rating:	4	
	Risk rating range is 1 to 4. Higher rating indicates higher risk of delayed recovery.	
ARI Score:	143	Maximum Score: 200

2. Work Status:

Certified to work:	No
Employment:	Same employer, not returned to work
Current hours:	Cleared: 0 Actual: 0
Pre-Injury Usual Hours:	40

3. Influential factors:

This person's responses indicate that rehabilitation outcomes may be influenced by factors in the following domains. Graphically represented below (Scale 1 - 4)

Domain	Comment
Pain:	Reporting moderate pain ratings.
Function:	Usual function is significantly reduced.
Emotions:	Reporting medium level of distress.
Coping:	Attitudes expressed indicate significantly reduced coping.
Confidence:	Reflects low sense of control.
Work Perceptions:	Perceives a significantly reduced work capacity.
Occupational Factors:	Indicate potential for moderate delay to work outcome.

4. Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ):

(Incorporated into Abilita Rehabilitation Index Questionnaire with the kind permission of Prof. S. Linton.)

Total score:	153	Maximum Score: 210

The ÖMPSQ (Linton and Boersma 2003) is a tool to predict potential for the development of long term problems. Total score predicts: low risk under 105; medium risk at 105 to 130; and high risk over 130.

5. Pain Self Efficacy Questionnaire (PSEQ):

(Incorporated into Abilita Rehabilitation Index Questionnaire with the kind permission of Professor M. Nicholas.)

Total score:	11	Maximum Score: 60

The PSEQ (Nicholas 2007) measures an individual's confidence to undertake daily activities despite pain. Total score predicts: significantly low self efficacy under 15; and high self efficacy over 40.

Figure 7.2: Image of Two-page Initial ARI Report

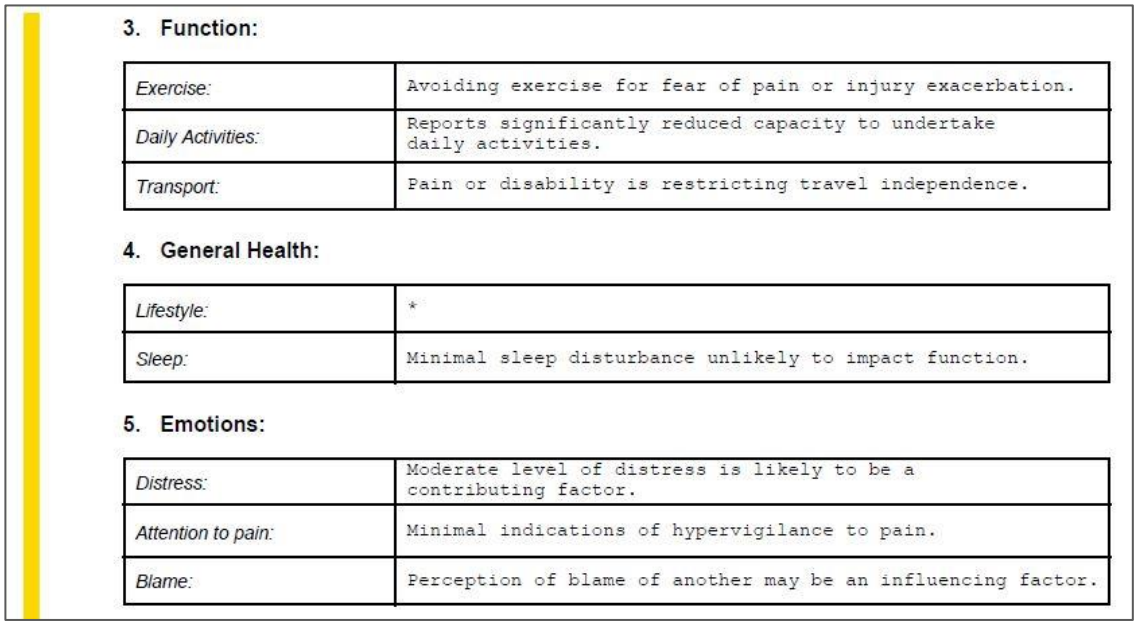
Table 7.2: Recommended Domain Descriptions

Domain	Explanation of Each Domain
Pain	Indicates how much you find that pain is interfering in your life. People who learn about the process of pain in their body can reduce this effect through using a range of different strategies.
Function	This is your expression of the effect of pain on daily activities. There are self-management strategies that can help increase your capacity for home, work and recreational activities; exercise; sleep; and travel.
Emotions	This domain rates your level of distress. By learning different, helpful ways of responding to stressful circumstances, you can reduce levels of pain and distress.
Coping	This reflects how difficult you are finding the management of daily challenges. It may be that you feel reliant on medication or treatment providers, or that you struggle to handle what comes your way.
Confidence	This reflects how overwhelmed you are feeling, as opposed to feeling optimistic and with a sense of being in control of life. By learning additional strategies to manage your pain, you can regain a stronger sense of control.
Work perceptions	This reflects your level of concern about being able to safely do your work.
Occupational factors	This domain is related to other workplace factors that are known to affect RTW after injury or illness, such as your age and options for alternative duties.

7.2.5.4 Abilita Profile Report

The Profile report was generated at the same time as the Initial report, providing additional detail from participant questionnaire responses to enable the RC to tailor the

intervention to address identified psychosocial barriers and use identified enablers to optimise the participant's coping capacity and resilience. During coaching training, the RCs identified patterns in the profile report responses to indicate thoughts and behaviours that have been found to contribute to pain and disability, such as fear avoidance and passive coping responses. An extract of a section of the Profile report for the case is presented in Figure 7.3, while the full profile report is attached in Appendix 4.



3. Function:

Exercise:	Avoiding exercise for fear of pain or injury exacerbation.
Daily Activities:	Reports significantly reduced capacity to undertake daily activities.
Transport:	Pain or disability is restricting travel independence.

4. General Health:

Lifestyle:	*
Sleep:	Minimal sleep disturbance unlikely to impact function.

5. Emotions:

Distress:	Moderate level of distress is likely to be a contributing factor.
Attention to pain:	Minimal indications of hypervigilance to pain.
Blame:	Perception of blame of another may be an influencing factor.

Note: * Indicates that an important influence has not been detected through question responses.

Figure 7.3: Image of Extract from Profile Report

7.2.5.5 Abilita Coaching

The RCs were advised to use the Initial and Profile reports to plan tailored self-help skills coaching. The coaching plan was guided by the ARI initial score, domain ratings and statements in the Profile report. Abilita training recommended that all cases with ARI ratings of 2, 3 or 4 be offered coaching intervention. RCs were advised to anticipate between three and eight one-hour coaching sessions, with individuals with higher ARI ratings requiring the most hours. However, this was also dependent on approval from the insurer for the recommended coaching sessions.

This approach to rehabilitation planning can be illustrated by reference to the sample reports provided in Figures 7.2 and 7.3 and in the appendices. The Initial report shows an ARI rating of 4, score of 163 and all domains rated above 2, with the greatest psychosocial influence from the domains of Work Perceptions, Confidence and Emotions. The

responses in the Profile report suggest the potential for fear-avoidance behaviours (Function), emotional distress (Emotions), perceived injustice (Emotions), passive coping (Coping), low pain self-efficacy (Coping) and unhelpful work perceptions (Work Perceptions and Occupational Factors). The psychosocial responses that potentially enable recovery include low catastrophising (Pain and Emotions), minimal sleep disturbance (general health) and work expectations (Work Perceptions). These results suggest that this case would require comprehensive coaching with the RC delivering this program, according to the recommendations below.

The Abilita Restore coaching course included coaching content and resources to support RC's in assisting their clients build self-management capacity through knowledge and practical strategies. The first topic introduced the course and set the coaching agenda in collaboration with the client. The second topic presented the physiology of pain in layperson's terms and in a conversational manner to help the person relate to physiological concepts, such as the role of normal body chemicals in heightening or dampening pain. The third topic detailed the BPS concept by helping the client identify and map the BPS context of their injury in all aspects of their life. The remaining topics provided education and activities to facilitate learning of specific self-help strategies to apply at home and work, related to emotional responses, physical strategies, relaxation and mindfulness, choices, and maintaining change. A participant workbook with content on each topic was provided to each client. The coaching content was tailored according to the client's assessed needs and delivered over a 2 to 6 weeks period depending on the amount of coaching required.

These topics were consistent with previous findings regarding the best instructional elements in pain self-management programs with a RTW goal, which include strategies to reduce pain and discomfort, dealing with thoughts and feelings, increasing activity, making informed decisions and communicating effectively (Carnes et al., 2013; McCracken, 2005; Nicholas, Molloy, Tonkin, & Beeston, 2000; Shaw et al., 2012). The content was also consistent with EP interventions in that it aimed to shift the individual's conceptualisation of pain as a marker of damage to a marker of a perceived need to respond protectively (Moseley & Butler, 2015). The overall goal was to assist individuals to understand the biological information that justifies the BPS approach and to adopt psychological, physical and social skills and strategies to build self-efficacy and work

readiness. This self-management coaching was integrated into each client's rehabilitation and RTW plan and could be delivered anywhere suitable to both parties. Occasionally, sessions were conducted via telephone or video conferencing.

7.2.5.6 Abilita Impact Report

On completion of coaching, RCs were able to arrange for their clients to complete the Impact ARI questionnaire online. The Impact questionnaire was identical to the Initial questionnaire with the addition of 3 questions for the respondent to provide evaluation of the rehabilitation service. The Impact report was then automatically generated and included both Initial and Impact aggregate scores of the ARI, ÖMPSQ and PSEQ, domain ratings, and work data to provide pre and post coaching comparison. Figure 7.4 presents an example of the impact domain chart, illustrating shift in domain ratings post-coaching. This was extracted from the impact report for the case who's Initial and Profile reports were provided in Figures 7.2 and 7.3 and discussed in the section *7.2.5.5 Abilita Coaching*. A full-page image of this report is available in Appendix 5.

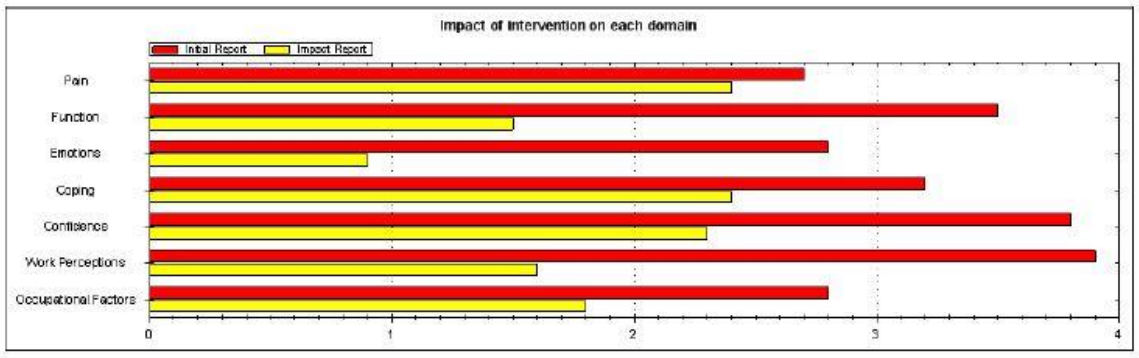


Figure 7.4: Domain Chart Extracted from Impact Report

7.2.5.7 Return to Work Rehabilitation

The Abilita program was designed to be integrated into workplace rehabilitation to enable the RC to select the timing of RTW actions to suit client work readiness. This approach is consistent with evidence that successful RTW or increase in hours and duties at work is contingent on the person believing that they have an adequate level of physical and psychological capability, including autonomy in management of symptoms (Franche & Krause, 2005). Two questions in the ARI were drawn from research using motivational interviewing (Rollnick et al., 2008, p. 60) and directly queried the respondent's readiness to RTW. The 'importance' question queried the individual's knowledge, beliefs and

attitudes about *why* they should RTW, while the 'confidence' question queried their knowledge, beliefs and attitudes about *how* they could safely RTW. When the 'importance' response was low in the initial assessment, Abilita coaching recommended that the client would benefit from educative input. For a low 'confidence' response, problem-solving assistance was recommended (Rollnick et al., 2008). The consultant training resources included a table of 'readiness and RTW actions' to guide workplace interventions to support safe and durable RTW.

7.2.6 Measures

The effectiveness of integrating the Abilita program into workplace rehabilitation programs was measured through changes in psychosocial responses, the relationship between those changes and work capacity, and participant evaluation.

7.2.6.1 Abilita Rehabilitation Index

RCs measured changes in participant psychosocial responses by administering the ARI on two occasions (see below). The psychometric properties of the ARI instrument at initial assessment were reported in Chapter 5 (Garton et al., 2016) with internal consistency confirmed by Cronbach's alpha of 0.90 and the construct validity of the domains supported by factor loading scores ranging from 0.73 to 0.90. Abilita training recommended re-administering the ARI at the end of the planned coaching intervention and at a minimum re-test interval of four weeks to reduce the influence of rehearsal in responses and provide opportunity for change in state and response shift (Polit, 2014). Previous researchers have found that change in beliefs, behaviours and expectations is an important precursor to the reduction of pain, distress and disability (Edwards et al., 2016; Wideman & Sullivan, 2011). Shift in the domains of Pain, Function, Emotions, Coping, Confidence and Work Perceptions reflects change in self-reported perceptions related to physical, psychological, social and work capacity. The domain of Occupational Factors primarily comprises elements over which the respondent has minimal control; therefore, that domain was not included in this study's measurement of psychosocial shift.

7.2.6.2 Work Readiness

Progress in the participants' development of work readiness following coaching was measured by comparing responses to the two readiness questions in the ARI questionnaire

during initial and impact assessment. The participants were asked to respond to these two questions on a scale from 0 to 10, with the orientation of a higher score reflecting a more favourable attitude:

i. How important is it for you to return to work or increase hours or duties at work?
ii. How confident are you that you can safely return to work or increase hours or duties at work?

7.2.6.3 Work Capacity Following Coaching

For many participants, a primary goal of rehabilitation was to achieve an increase in work capacity. When administering the initial and impact ARI assessments, RCs recorded the respondent's employment status and actual work hours. Abilita training advised RCs that the impact report would provide evidence of self-reported progress to support general practitioner decision making regarding medical certification for work capacity. Consequently, the Abilita Impact data included work status and work hours upon completion of coaching, but not usually after certification for final work upgrade. These data, along with work readiness questions, were used to evaluate preliminary work gains following the coaching intervention and to examine the relationship between a shift in psychosocial scores and shifts in work hours.

7.2.6.4 Participant Evaluation

An important objective of this structured BPS rehabilitation approach was to help RCs in the process of implementing rehabilitation services perceived as helpful by the participants. When completing the impact ARI questionnaire, the participants were asked two evaluation questions that provided data to measure client satisfaction and perceived helpfulness of the intervention.

7.2.7 Data Analyses

Data were extracted from the ARI database on the Abilita assessment website at https://abnet.abilita.net.au/Abilita.Web/, for the years 2008 to 2018. Data analyses were conducted using IBM SPSS 25.0 (Laerd Statistics, 2015b). There were four stages of data analyses using three data subsets. Data recorded from the initial ARI assessment were described as *initial data*, while *impact data* included both the initial and impact ARI assessment data recorded after the intervention, and the dataset from which progress in

development of work capacity could be calculated was described as *work data*. The strategy for data analyses is outlined in Figure 7.5.

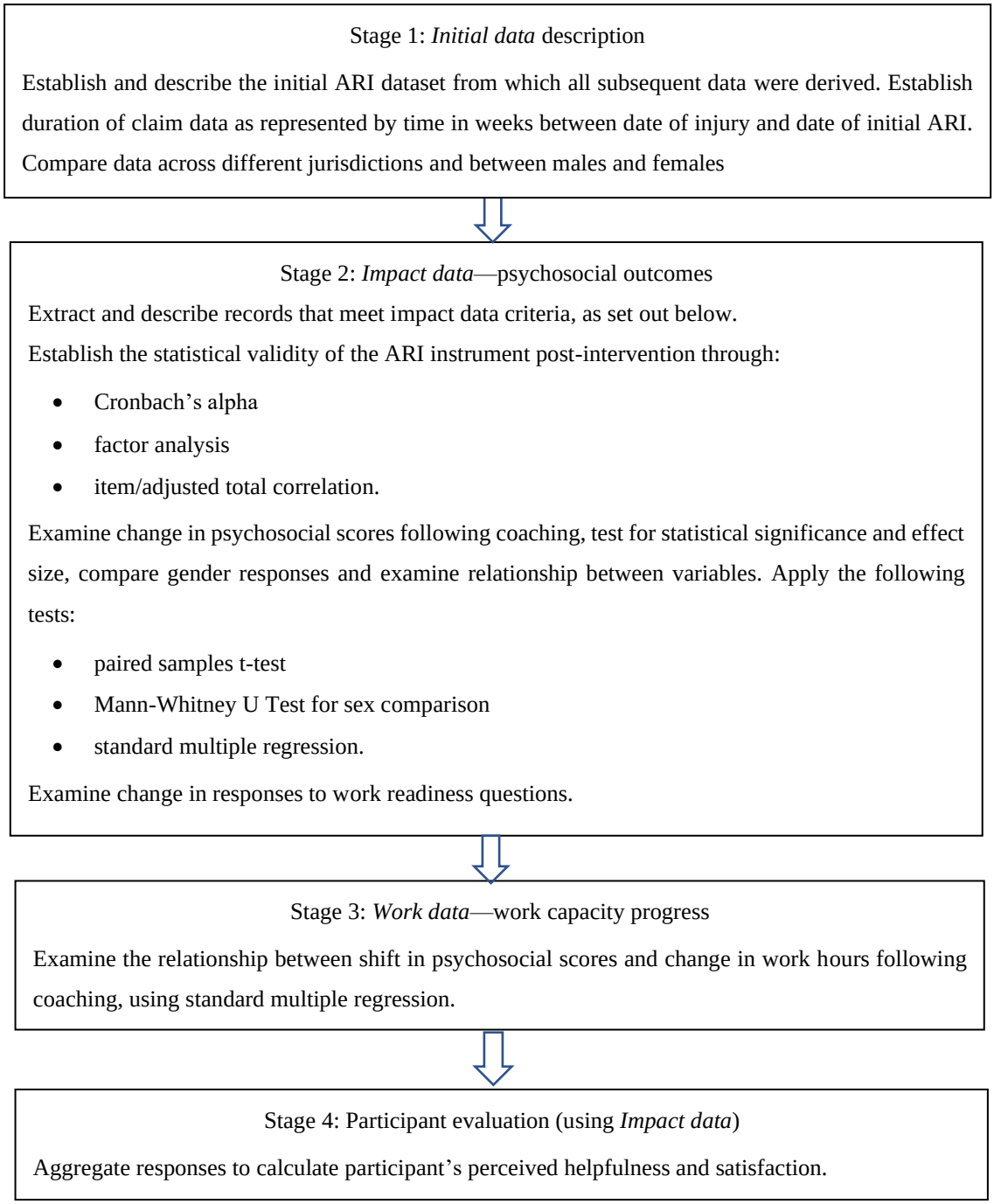


Figure 7.5: Flowchart Depicting Planned Strategy for Analysing Results

7.2.7.1 Stage 1: Initial Data Description

The aim of the first stage was to prepare the *Initial data* from which all subsequent data were derived. The data were collected at the time of the initial ARI assessment for each participant. Personal and psychosocial data included both ordinal and nominal data and were entered by the participant and saved only if all items were completed; therefore, there were no records with missing values. Case and work data included dates and text and had been entered by a licensee representative; there were errors in these data. Eighteen records showed the time between the date of injury and date of initial ARI assessment to be zero or negative, thereby suggesting that the initial ARI was administered either on or before the date of injury, and indicating a date entry error. These cases were excluded because they could not be used for calculation of the duration of claim (DoC). The DoC data were then adjusted for outliers, and 24 cases had DoC greater than 3 SD and were considered outliers and subsequently removed (Johnson & Kuby, 2012). This resulted in a net number of records in the Initial ARI dataset of N = 1,737. The descriptive statistics of the Initial data are shown in Table 7.4 and jurisdiction case demographics are shown in Table 7.5. A Mann-Whitney U test was run to determine difference in ARI scores between males and females. This test was selected for sex comparison because when the work dataset was entered, for paired sample T-test, SPSS v25 found there was a violation of normality with respect to sex and recommended using a non-parametric test.

7.2.7.2 Stage 2: Impact Data—Psychosocial Outcomes

To examine psychosocial outcomes from implementing this rehabilitation model, a subset of all cases with both Initial and Impact ARI data were extracted from the initial data (*n* = 1,737) to create the *impact data*. Abilita protocols recommended coaching be considered for participants with ARI ratings 2, 3 or 4, and 119 initial data records showed ARI rating 1; thus, coaching would not have been considered and they did not have Impact ARI data. Impact ARI data were unavailable for approximately 66% of records with the potential to receive coaching, thereby reflecting the effects of practice considerations overriding research considerations in a retrospective study (Crooke & Olswang, 2015). Verbal reports from WRPs revealed three common reasons for the lack of impact ARI data for these records: (i) the RC did not include coaching recommendation in the rehabilitation plan if anticipating no approval, (ii) the insurer did not approve

coaching in the rehabilitation plan and (iii) the RC did not consider completing the impact ARI necessary or feasible because of time limitations once the client had returned to work. The total number of records with both initial and impact scores to 31 December 2018 was $n = 556$.

To achieve the objective of measuring the effectiveness of a program that included Abilita self-management coaching, cases without that coaching were removed. This included 108 records that were control (usual care) cases from the UPM RCT, where no Abilita coaching was offered and published results of that RCT were anticipated. Six other cases were recorded as receiving non-Abilita intervention, and four cases rejected at the request of the licensee as invalid responses because of unforeseen elevation in participant distress at the time of assessment, such as following advice of job loss. A further 15 cases were established as outliers under the 3 SD rule (Johnson & Kuby, 2012). After exclusion of those records, the impact ARI subset used for analysis included 423 cases.

Participant characteristics for the impact data were extracted and are presented in Table 7.6. A repeat evaluation of the *psychometric properties* of the ARI instrument was undertaken using the Impact data as an opportunity to confirm the instrument's construct validity and internal consistency. Tests included factor analysis, Cronbach's alpha and item/adjusted total correlation. These results are reported in Table 7.7.

Shifts in ARI, ÖMPSQ and PSEQ scores were analysed by comparing initial and impact score means, SD and percentage gain, and are displayed in Table 7.8. A paired-samples t-test was undertaken to test the statistical significance and effect size of change in ARI score following the coaching intervention. *Effect size (d)* is a measure of the strength of a finding, independent of sample size, when comparing two means. According to Cohen (Cohen, 1992), a small effect is defined as $d = 0.20$, a medium effect as $d = 0.50$ and a large effect as $d = 0.80$. These results are presented in Table 7.9. A Mann-Whitney U test was run to determine difference between males and females for shift in ARI scores from Initial to Impact assessment.

Standard multiple regression analysis was conducted to test the relationship between the dependent variable (Impact ARI score) and various independent variables (IVs). The selected IVs were the data fields available in the secondary database that had most potential to influence the dependent variable (DV) and included both factors that were

specific to a participant and factors that could be affected by case manager decisions. The participant-particular IVs were:

- *Initial ARI score:* a continuous variable whose values were the participants' responses at initial assessment
- *age of participant* at date of Initial ARI: a continuous variable
- *employment status* at date of Initial ARI; an ordinal variable based on the Comcare (Comcare, 2015b) 'return to work' hierarchy, as shown in Table 7.3.

Table 7.3: Employment Status Classification

Code	Employment Classification
1	Same employer, usual job
2	Same employer, usual job with restrictions
3	Same employer, different job
4	Same employer, different job with restrictions
5	Same employer, not returned to work
6	Different employer, usual job
7	Different employer, different job
8	Different employer, different job with restrictions
9	Work placement
10	No employer, not at work

The case management-influenced IVs were:

- *DoC*: the time in weeks between the date of injury and date of Initial ARI, which was a continuous variable
- *lapse time* between the date of completing coaching and date of Impact ARI: a continuous variable.

The magnitude of both variables could be influenced by case management decisions. There is evidence that early intervention achieves better outcomes (Casey et al., 2014; Gatchel et al., 2003; Nicholas et al., 2018).

Data were prepared prior to analyses, requiring exclusion of the 13 records of the Impact dataset (n = 423) because they did not record the date of completion of the intervention (n = 410) and therefore lapse time could not be determined. The standard multiple regression procedure was run with the dataset of 410 cases. Two outliers were identified

in the studentised deleted residuals field, with both cases having an abnormally large shift in ARI score. These were removed (n = 408). The IVs 'age of participant' and 'lapse time' demonstrated a significance of $p > .05$, with 95% CI ranging from a negative value to a positive value. Neither IV was statistically significant, and the CI challenged the requirement for linearity (Laerd Statistics, 2015a); thus, they were dropped from the analysis.

The key assumptions associated with using multiple regression were satisfied for the remaining three IVs. There was linearity, as assessed by partial regression plots and a plot of studentised residuals against the predicted values. There was independence of residuals, as established by a Durbin-Watson statistic of 1.85. There was homoscedasticity, as assessed by visual inspection of a plot of studentised residuals versus unstandardised predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentised deleted residuals with a value greater than 3 SD, no leverage values greater than 0.2 and no values for Cook's distance above 1. The assumption of normality was met, as assessed by visual examination of a Q-Q plot (Tabachnick & Fidell, 2013). The standard multiple regression procedure with three IVs was run to provide the test results.

Change in work readiness was calculated using a paired-samples t-test, which provided a comparison of the Initial and Impact ARI responses to the two work readiness questions, to test whether there was a statistically significant change in responses following coaching.

7.2.7.3 Stage 3: Work Data—Work Capacity

Both Initial and Impact data included records for employment status, certified work capacity, usual and current work hours, and date of RTW. As described in *Measures 7.2.6.2*, Abilita Impact data included work status and work hours upon completion of coaching, but not usually after certification for final work upgrade. Critically, these data did not include work hours achieved at the time of closure of the case by the WRP, thereby limiting work outcome analyses to assessment of the preliminary trend in change.

To obtain a measure of *change in work hours* following coaching, the Impact dataset (n = 410) was reduced to include only those cases with potential to change. First, given the work hour data were missing for the 97 Impact data records of the UPM licensee, those

records were removed. The dataset remaining was n = 313. Seventy-three participants were undertaking full-time work at the time of both the Initial and Impact assessments, thereby recording no regression nor increase in work hour change. Thus, they were also excluded, thereby reducing the dataset to n = 240. The final set of *work data* (n = 240) was then used to obtain an indication of gains in work hours following coaching. Although the secondary Abilita database did not include final work hours at completion of RTW rehabilitation, the *Impact work hours* indicated the trend in building work capacity during a rehabilitation program. A Mann-Whitney U test showed a significant difference in the increase in Impact work hours between males and females.

The relationship between *Impact work hours* and the IVs was established using standard multiple regression analysis to assess the degree of influence of the IVs (Tabachnick & Fidell, 2013). The selected IVs were the data fields available in the secondary database with most potential to influence the DV:

- *Initial work hours:* a continuous variable from a minimum of zero with no established maximum
- *Employment status at initial assessment*, an ordinal variable as per the ranking order in Table 7.3, because research suggests that remaining employed and at work improves RTW outcomes (Wyatt & Tyler, 2017)
- *Percentage shift in ARI score:* a continuous variable derived from the formula (Initial ARI score − Impact ARI score) / Initial ARI score × 100, as previous research indicates that a reduction in unhelpful beliefs, expectations and behaviours will facilitate RTW (Black et al., 2017)
- *Sex*: a categorical variable, coded female 1 and male 2, incorporated based on a statistically significant difference in Impact actual work hours between males and females.
- *DoC in weeks* because early interventions have been found to achieve better work outcomes (Hoefsmit et al., 2012).

The standard multiple regression procedure found that the IVs of DoC (weeks) and employment status at initial assessment failed the tests for linearity and significance score (p > .05) (Berry, 1993). The expected assumptions were satisfied for the remaining two IVs. There was linearity, as assessed by partial regression scatterplots and a plot of studentised residuals against the predicted values. There was independence of residuals,

as established by a Durbin-Watson statistic of 2.125. There was homoscedasticity, as assessed by visual inspection of a plot of studentised residuals versus unstandardised predicted values. Examination of the regression output table, revealed that all correlations between IVs were less than .7 and each collinearity statistic of 'tolerance' was greater than 0.1, thereby indicating no evidence of multicollinearity (Tabachnick & Fidell, 2013). There were fifteen studentised deleted residuals with a value greater than 3 x SD, which were removed (Johnson & Kuby, 2012). There were no centred leverage values greater than 0.2 or values for Cook's distance above 1. The assumption of normality was met, as assessed by visual examination of a Q-Q plot. The standard multiple regression procedure with three IVs provided the test results for the 225 cases.

7.2.7.4 Stage 4: Participant Evaluation

Participant evaluation of the helpfulness of the coaching and overall satisfaction with the course was calculated from the aggregation of responses to two evaluation questions in the impact ARI questionnaire. The questions and response options were:

i. Have the coaching and learning sessions helped you deal more effectively with your injury? Answer: not at all, partly met my expectations, fully met my expectations, or more than I expected.
ii. Please rate your overall satisfaction with the course: very unsatisfied, mostly unsatisfied, mostly satisfied or very satisfied.

This calculation was undertaken using the full impact dataset (n = 423).

7.2.7.5 Control of Type I and Type II Errors

Type I or α errors occur if the null hypothesis is rejected when it is actually true in the population, and Type II or β errors occur if the researcher fails to reject the null hypothesis when it is actually false in the population. Uncertainty cannot be eliminated completely in empirical research; therefore, it is important to set an acceptable balance between Type I and Type II errors in advance of statistical testing (Banerjee, Chitnis, Jadhav, Bhawalkar, & Chaudhury, 2009). For tests in this study, α was set at 0.05 which enabled a power of 0.80. A correction for multiple comparisons was not undertaken in order to obtain a reasonable balance between Type I and Type II errors because analyses were typically interpreted within a small *family* rather than collectively (Keppel, 1991). Levels

of statistical significance and effect size were calculated for change in scores pre- and post-intervention. The sample sizes of the impact data (n = 423) and work data (n = 240) were adequate to maintain the level of power, given that the degree of homogeneity in the cohort was typical of the target population, and the analysis plan was not complex and did not involve multiple subgroups (Green, 1991). The dataset included adequate fields to test potential outcome-moderating variables, such as initial score, intervention time and lapse time to outcome score.

7.3 Results

7.3.1 Stage 1: Initial Data Description

The descriptive statistics of the Initial data are shown in Table 7.4 and include the primary outputs of the Initial ARI assessment; ARI score, seven domain ratings and aggregate scores for the ÖMPSQ and PSEQ. The orientation of scoring varied in that a *higher* score indicated a higher risk of delayed recovery and work disability for ARI and ÖMPSQ, and a *lower* PSEQ score indicated a higher risk of delayed recovery because of low self-efficacy in managing activities with pain.

Table 7.4: ARI, ÖMPSQ, PSEQ and Domain Data for Initial ARI

Descriptive Statistics for Initial Data Scores and Domain Ratings (n = 1,737)				
	Mean	**SD**	**Median**	**Range**
ARI (max. 200)	106	35.6	106	1–192
ÖMPSQ (max. 210)	119	32.8	119	9–207
PSEQ (max. 60)	32	14.1	32	0–60
Domain ratings (max. 4.00)				
Pain	2.67	0.79	2.80	0.00–4.00
Function	2.18	0.85	2.20	0.00–4.00
Emotions	1.83	1.03	1.80	0.00–4.00
Coping	2.26	0.73	2.30	0.00–4.00
Confidence	1.99	1.04	1.90	0.00–4.00
Work perceptions	1.94	0.96	2.00	0.00–4.00
Occupational factors	1.63	0.63	1.70	0.10–3.60

Note: ARI = Abilita Rehabilitation Index; ÖMPSQ = Örebro Musculoskeletal Pain Screening Questionnaire; PSEQ = Pain Self-Efficacy Questionnaire.

Inspection of Table 7.4 reveals that means and medians for the total ARI and the two included questionnaires, ÖMPSQ and PSEQ, were approximately in the middle range for each instrument. There were some outliers seen in the broad range of scores for all instruments. The ARI predicts a negligible risk for unhelpful psychosocial factors under 50, low risk at 50 to 99, medium risk at 100 to 149 and high risk at 150 and over (Garton et al., 2016). The ÖMPSQ score predicts low risk of long-term problems under 105, medium risk at 105 to 130, and high risk over 130 (Linton & Boersma, 2003b). The PSEQ predicts significantly low pain self-efficacy under 15, and high self-efficacy over 40 (Nicholas, 2007). The highest rating domain was 'pain' and the greatest variance was seen in 'emotions' and 'confidence'.

A Mann-Whitney U test was run to determine if there were difference in Initial ARI score between males and females. The scores (n = 1737) for females (mean rank = 867.30) were not statistically significantly different to males (mean rank = 870.78), U = 378,447.000, z = .145, p = .885.

7.3.1.1 Jurisdiction Comparison of Initial Abilita Rehabilitation Index Assessment

A comparison of the ARI Initial results per jurisdiction was undertaken to test the reliability of the instrument across populations in different compensation contexts. The Initial data were collected in six primary jurisdictions, with a small number of cases from various other jurisdictions, as detailed earlier in Table 7.1. Table 7.5 displays the descriptive statistics for the data and includes DoC and participant characteristics of age and gender.

Table 7.5: Descriptive Statistics for Initial ARI Data per Jurisdiction

Jurisdiction	No. of Cases	Mean DoC (Weeks)	Age			Gender	ARI Initial Score (Max. 200)			
			Mean	Range	SD	% Female	Mean	Median	SD	Range
All Cases	1,737	104	43	17–71	11	49%	106	106	36	1–192
Comcare	606	222	44	18–71	11	61%	101	104	36	1–187
NSW	451	97	44	22–66	11	43%	112	117	40	9–192
SA	178	123	47	24–63	8	65%	110	109	32	12–179
NT	66	224	41	20–59	10	36%	126	126	30	62–182
Other	110	166	43	20–63	11	37%	107	110	39	4–177
NZ	111	53	42	18–70	13	74%	101	101	33	12–168
UPM	215	28	33	18–58	8	16%	98	99	16	49–154

Note: DoC = duration of claim; ARI = Abilita Rehabilitation Index; UPM = University of Putra Malaysia.

Inspection of Table 7.5 reveals that, except for the UPM data, there was reasonable consistency in ARI scores and SD, with a broad range of scores across the various jurisdiction sample populations. Participants had a wide range of ages in all jurisdictions. Female participants were under-represented in both the NT and UPM cohorts and records, which may reflect employment-sector characteristics—in the NT, many participants were military personnel or employed in heavy physical jobs, and, in Malaysia, all participants had sustained injury because of road traffic accidents. A visual inspection of the data indicates a variation in referral time for this rehabilitation intervention across the jurisdictions with the highest DoC (NT) associated with the highest ARI mean score (126); however, this trend did not translate across the DoC comparisons. The mean DoC was 104 weeks and the median was 34 weeks, with a significant difference evident in the table data.

7.3.2 Stage 2: Impact Data—Psychosocial Outcomes

As a subset of the Initial assessment dataset, the population of the Impact data were working-age people who were diagnosed with MSKD and receiving rehabilitation and compensation under workers' compensation, disability, motor accident or military compensation schemes, as presented in Table 7.5. Table 7.6 presents the Impact data participant characteristics.

Table 7.6: Participant Characteristics for Impact Data

Participant Characteristics for Impact Data (*n* = 423)		
	n	**%**
Female	281	52
Age in years, mean (SD)	41 (12)	
Location of injury		
Head	1	0
Neck	4	1
Upper back	3	1
Lower back	41	10
Upper limb	64	15
Lower limb	66	16
Other	20	4
Two or more sites	102	24
Three or more sites	122	29
Education		
University	73	17
Trade	91	22
Higher school certificate/matriculation/leaving	151	36
Early to mid-high school	96	23
Primary school	12	3
Work hours at initial assessment		
Full usual hours	82	19
> 50% usual hours	64	15
< 50% usual hours	43	10
Not at work	234	55
DoC		
< 12 weeks	56	13
≥ 12 weeks < 26	100	24
≥ 26 weeks < 52	103	24
≥ 52 weeks < 105	68	16
≥ 105 weeks	96	23
Mean all cases (med)	92 (39)	100

Inspection of this table reveals that the participants had experienced a variety of musculoskeletal injuries and more than half reported two or more sites of injury. The mean age of 42 and SD of 22 revealed a wide participant age range, with males and females equally represented. Senior high school was the highest education achieved by the majority, and 55% were not at work at the time of initial assessment. Only 13% had

been assessed within 12 weeks post-injury, so early referral was not common in this study, and the mean DoC was 92 weeks, with a median of 39 weeks. Otherwise, this broad range of injury, age, education and work status characteristics was typical of the population of claimants referred to WRPs (Casey et al., 2014). The Abilita Rehabilitation Model was designed to support tailoring of programs to accommodate this broad variation in participant characteristics.

7.3.2.1 Confirmatory Analyses of Abilita Rehabilitation Index Psychometric Properties

Examination of the psychometric properties of the ARI instrument were undertaken for the Impact dataset by repeating the analysis process adopted in Garton et al., (2016) (see Chapter 5). Tests included factor analysis, Cronbach's alpha and item/adjusted total correlation to confirm the instrument's construct validity and internal consistency. Cronbach's alpha for the impact ARI extracted from the six domains was 0.94. The factor scores were obtained by principal component analysis with varimax rotation and subject to Eigenvalue > 1, accounting for 77.2% of the total variance. The purpose of this analysis was to confirm that the domain variables all loaded onto the principal component. Item/adjusted total correlations (which excluded the relevant domain from the total for each correlation) are presented in Table 7.7.

Table 7.7: Scores for Domains Contributing to Impact ARI Score (*n* = 423)

Domain	Factor Loading	Item/Adjusted Total Correlation
Pain	0.85	0.79
Function	0.91	0.86
Emotions	0.82	0.75
Coping	0.89	0.84
Confidence	0.93	0.90
Work perceptions	0.87	0.80

Table 7.7 displays that the item/adjusted total correlations varied from 0.79 to 0.90. In comparison, at initial assessment (reported in Chapter 5), the item/adjusted total correlations varied from 0.63 to 0.84 and Cronbach's alpha for the total ARI was 0.90 at initial ARI and increased to 0.94 at impact ARI. This analysis confirmed that the instrument had strong internal consistency and satisfactory construct validity.

7.3.2.2 Shifts in Impact Scores

The impact Abilita report included scores for the two additional psychometric tools, the ÖMPSQ and PSEQ. A higher score indicated a higher risk of delayed recovery and work disability for ARI and ÖMPSQ, while a lower score indicated a higher risk for PSEQ. Table 7.9 displays the descriptive statistics, including the means, SD and percentage gain for the ARI, ÖMPSQ and PSEQ. Percentage gain was calculated to present a comparison of shifts, while correcting for the large difference in scale associated with the PSEQ.

Table 7.8: Descriptive Statistics for Initial and Impact Score Comparisons

Descriptive Statistics and Percentage Gain for ARI, ÖMPSQ and PSEQ (*n* = 423)					
Measure	**Initial**		**Impact**		**% Gain *M***
	M	***SD***	***M***	***SD***	
ARI (max. 200)	114.18	29.73	77.72	37.42	32
ÖMPSQ (max. 210)	125.90	27.06	99.12	34.85	21
PSEQ (max. 60)	28.94	12.64	39.61	13.44	28

Table 7.8 indicates that, at impact assessment, there was a reduction in mean scores for the ARI and ÖMPSQ and an increase in mean score for the PSEQ. All instruments indicated that unhelpful beliefs, expectations and behaviours reduced following coaching. The percentage gain was greater for the ARI, which may reflect the additional constructs assessed by the full instrument and demonstrate the instrument's responsiveness—that is, its capacity to detect change in the domain constructs (Mokkink et al., 2018). A paired-samples t-test was used to determine whether there was a statistically significant change in ARI score following the coaching intervention. Table 7.9 displays the SPSS output from the test, which returned the paired means and SD from which the Cohen's effect sizes were calculated.

Table 7.9: Paired-samples Test and Effect Size for ARI

		Paired Differences						
		M	***SD***	**95% CI of diff**	***t***	***df***	**Sig.**	***d***
Pair 1	Initial ARI score − impact ARI score	36.46	27.59	(34, 39)	27.17	422	.000	1.32

Note: sig. = significance (two-tailed); CI = confidence interval for difference.

Examination of the data in Tables 7.8 and 7.9 shows the reduction in ARI score (*M* 114 – 78) is significant (p = .000) with a large (> 0.8) Cohen's effect size of d = 1.32.

A Mann-Whitney U test was run to determine if there were difference in shift in ARI score after coaching between males and females. The scores (n = 409) for females (mean rank = 212.79) were not statistically significantly different to males (mean rank = 196.62), U = 19,231.500, z = -1.382, p = .167.

7.3.2.3 Standard Multiple Regression

A standard multiple regression analysis was run to predict the impact ARI score from initial ARI score, age of participant, DoC, employment status and lapse time. As reported in the data analysis, the data screening prior to analyses resulted in a dataset of 408, and the first multiple regression resulted in rejection of the IVs of 'age of case' and 'lapse time'. The multiple regression model significantly predicted the impact ARI score (F(3, 404) = 160.56, p < .05). All three variables added significantly to the prediction (p < .05). The R^2 for the overall model was 0.54 with an adjusted R^2 of 0.54 indicating that the model accounted for 54% of the variance in the Impact ARI score, and a large effect (Cohen, 1988). The regression coefficients and standard errors are displayed in Table 7.10.

Table 7.10: Summary of Multiple Regression Analysis Involving Predictors of Impact ARI Score (n = 408)

Variable	B	SE_B	β
Constant	-23.80	5.06	
Initial ARI	0.79	0.05	0.63*
DoC	0.03	0.14	0.14*
Emp. status	1.91	0.48	0.14*

Note: *p < .05; B = unstandardised regression coefficient; SE_B = standard error of the coefficient; β = standardised coefficient.

As presented in Table 7. 10, the coefficients B2 to B4 were positive, which meant that an increase in any of these IVs would result in an increase in the mean impact ARI score, which in turn reduced the amount of shift in the ARI score. However the coefficient B3 (DoC) was small (0.03) indicating that the model was not influenced to any great degree by that independent variable.

7.3.2.4 Shifts in Work Readiness

Participants' progress in developing work readiness following coaching was measured by comparing Initial and Impact responses to the two readiness questions in the ARI questionnaire. Paired-samples t-tests were used to determine whether there was a statistically significant change in either of the two work readiness questions following the coaching intervention.

Table 7.11 displays the descriptive statistics, and the SPSS output from the paired-samples tests for the 'Importance' and 'Confidence' questions (n = 423), which returned the paired means and SD from which the Cohen's effect sizes were calculated for each score.

Table 7.11: Descriptive Statistics, Paired-samples Test, & Cohen Effect size for Work Readiness Questions

		Descriptive		Paired-samples			Cohen
		M	***SD***	***M***	***SD***	***Sig***	***d***
Importance	Initial	8.55	2.19	-0.15	2.10	.133	.07
	Impact	8.70	2.09				
Confidence	Initial	4.84	6.56	-1.72	2.72	.000	0.63
	Impact	3.04	2.70				

Note: sig. = significance (two-tailed).

The data in Table 7.11 reveal that most participants believed that it was *important* for them to RTW or increase hours or duties at work at the initial assessment (M = 8.55) and this increased negligibly at the impact assessment (M = 8.70). However, *confidence* to safely RTW or increase hours or duties at work was lower (M = 4.84) and more dispersed (SD = 3.04) at the initial assessment, thereby reflecting greater uncertainty in the population regarding *how* to safely RTW. Inspection of data in the Table suggested there was a slight increase in confidence responses at the impact assessment following coaching (M = 6.56) and no significant difference between the Initial and Impact responses for the Importance question (M 8.55 – 8.70), p = .133. However, there was a statistically significant positive shift in Initial to Impact responses for the Confidence question (M

4.84 – 6.56), p = .000. The change in Confidence responses had a moderate effect size (d = 0.63).

7.3.3 Stage 3: Work Capacity at Impact Assessment

Data for actual work hours at the Initial and Impact assessments were used to examine the relationship between shifts in psychosocial scores and shifts in work hours following coaching.

A Mann-Whitney U test was run to determine if there were differences in Impact work hours achieved between males (n = 79) and females (n = 146). The scores (n = 225) for females (mean rank = 127.92) were statistically significantly higher than for males (mean rank = 85.42), U = 3588.000, z = -4.791, p = .000.

7.3.3.1 Standard Multiple Regression

A standard multiple regression analysis was run to predict the Impact work hours from sex, the Initial work hours and the percentage of shift in ARI score. As reported in the data analysis, data screening prior to analyses resulted in a dataset of 240, and the first standard multiple regression procedure resulted in rejection of the IVs of DoC (weeks) and employment status. The multiple regression model significantly predicted Impact work hours (F(3, 221) = 59.76, p < .05), with R^2 = 0..45 and adjusted R^2 = 0.44, indicating that the model accounted for 44% of the variance in the impact actual work hours. The regression coefficients and standard errors are displayed in Table 7.13.

Table 7.12: Summary of Multiple Regression Analysis Involving Predictors of Impact Actual Work Hours (n = 225)

Variable	B	SE_B	β
Constant	12.93	3.08	
Gender	-3.89	1.80	-.12*
Initial hours of work	.51	.08	.37*
% ARI shift	.14	.03	.23*

Note: *p < .05; B = unstandardised regression coefficient; SE_B = standard error of the coefficient; β = standardised coefficient.

As presented in Table 7.13, the coefficients *B3*and *B4* were positive, which meant that an increase in either IV would result in an increase in the mean impact hours of work, thereby resulting in an improved work outcome.

7.3.4 Stage 4: Participant Evaluation

Analysis of the participant responses to evaluation questions in the Impact dataset provided an opportunity to assess participants' perceived benefit and satisfaction with the program. Table 7.14 provides the results of the evaluation questions included in the Impact assessment.

Table 7.13: Participant Evaluation

Participant Evaluation (*n* = 423)			
Have the coaching and learning sessions helped you deal more effectively with your injury?		Please rate your overall satisfaction with the course.	
Not at all	12	Very unsatisfied	5
Somewhat helpful	96	Mostly unsatisfied	12
Generally helpful	172	Mostly satisfied	239
Very helpful	143	Very satisfied	167

Table 7.14 indicates that 97% of the participants found the course 'somewhat helpful', 'generally helpful' or 'very helpful' in learning to manage their injury, and 96% were 'mostly satisfied' or 'very satisfied' with the coaching course. This high rating contributes to evidence that the self-management coaching integrated into the rehabilitation and RTW program was valued by the participants.

7.4 Discussion

7.4.1 Summary

This study sought to evaluate the feasibility and potential effectiveness of integrating a model of BPS assessment and self-help skills coaching into workplace rehabilitation. The model provided resources to help RCs assist their clients to reduce the unhelpful influence of BPS factors, so they could build self-efficacy and work readiness during the rehabilitation and RTW program. This study described the model as a 'structured' BPS rehabilitation program to emphasise that key components were considered integral to the model. These components were the ARI assessment with reports providing BPS domain

ratings; a modularised self-help coaching course; and consultant training in the assessment, recommended coaching process and parallel RTW actions. The results indicated that the three study hypotheses were correct for the following reasons: (i) when RCs used the key components of the model, they were able to assist their clients to reduce the effects of unhelpful BPS factors; (ii) these gains resulted in increased work readiness with the limited work-data indicating progress in building increased work capacity; and (iii) the rehabilitation model was evaluated positively by the participants.

The analysis of shift in ARI score following coaching revealed statistically significant gains with the potential to be clinically meaningful (d = 1.32). Clinical meaningfulness was not able to be measured in this retrospective study. Although there is no clear consensus on a single definition of clinically meaningful differences (Keefe, Kraemer, Epstein, & Leon, 2013), in this context, the minimally clinically important difference (MCID) may be the most appropriate measure for future studies. The MCID is the smallest change in an outcome that an individual perceives as important (Benaim, Blaser, Leger, Vuistiner, & Luthi, 2019).

Regression analyses identified a predictive equation to account for 54% of the variance in impact ARI score, based on the Initial ARI score, DoC and employment status. This revealed that participants with a high Initial ARI score achieved less shift than did participants with a lower Initial ARI score, and those who participated in the intervention earlier post-injury achieved a greater shift in ARI score than did those with later intervention, while those who were at work at the Initial ARI tended to achieve a stronger shift than did those who had not returned to work or were unemployed. These results concur with previous research findings and current best-practice recommendations for early intervention and remain-at-work intervention when possible (Australasian Faculty of Occupational and Environmental Medicine, 2015). Regardless, the average shift of 32% in ARI score (see Table 7.8) suggested a significant reduction in unhelpful beliefs, expectations and behaviours across the population. This result suggested that cases referred early post-injury and while remaining at work were likely to achieve greater reduction in unhelpful beliefs, expectations and behaviours, which could be an important contributor to the improved vocational outcomes observed by other researchers (Lysaght et al., 2010).

The Abilita domains appear to have been an important component of this model, which may be a consequence of the information they provided the RCs. The domains of Pain, Function, Emotions, Coping, Confidence and Work perceptions informed the potential for multiple psychosocial constructs that drove reports of pain and disability. The factor scores were consistent across the domains and the item/adjusted total correlations were all above 0.7. There was strong internal consistency for the total Impact ARI (Cronbach α coefficient 0.94). The responses to the work readiness question on 'confidence' shifted significantly at the Impact ARI, thereby indicating that the coaching may have helped build participants' work readiness. Whereas response to the work readiness question on 'importance' were high at Initial and shifted minimally at Impact, suggesting that RTW was already a priority for this sample.

Analysis of initial ARI data (n =1737) found the questionnaire equally suitable for males and females, with no statistically significant difference in their responses. Furthermore there was no statistically significant difference between male and female responses to the coaching intervention, as measured by the shift in ARI score at Impact assessment (n = 410). However analysis based on sex did find that work hours achieved following coaching (n = 225) were statistically significantly higher for females than for males.

Both Initial hours and percentage shift in ARI score positively influenced Impact work hours following coaching.

The study results provided support for the third hypothesis. Even with the coaching delivered by a variety of RCs, the participant evaluation responses, as seen in Table 7.14, indicated that 97% of the participants found the course to be helpful in managing their injury and 96% were satisfied with the course.

7.4.2 Comparison with Results from Previous Research

As reported in Chapters 3 and 4, previous research has identified many of the qualities of injury management that contribute to positive health and work outcomes for workers with injuries. Another recent study demonstrated application of these best-practice features in a work injury management program (Nicholas et al., 2019); however, that study focused on the roles of RTW coordinators and treatment providers. In contrast, the current study is the first study (to the researcher's knowledge) to evaluate such a model applied in

workplace rehabilitation. The Abilita Rehabilitation Model appears to offer many of the qualities described as best practice, including:

- a triage process to achieve early identification of high-risk cases (Waddell et al., 2003)
- the use of a psychometric tool to identify and quantify key beliefs and behaviours (Nicholas et al., 2011; Pincus et al., 2013)
- self-management coaching tailored to each individual's psychosocial profile (Linton et al., 2018)
- the use of an educative and behavioural change approach (Moseley & Butler, 2015; O'Sullivan, Caneiro, et al., 2018)
- a workplace focus (Cullen et al., 2018; Kendall et al., 2013)
- the development of resources and training to maximise adoption and adherence by consultants (Sullivan, Feuerstein, et al., 2005)
- the ability to be implemented early post-injury
- the development of a database to record baseline, progress and outcome BPS variables, which are believed to be the most significant predictors in RTW rehabilitation (Collie, 2019; Laisne et al., 2013).

It is noteworthy that another study that was unsuccessful in integrating self-help coaching into workplace rehabilitation did not include pain education as a core coaching component (Sheppard et al., 2015). The results of the present study appear to demonstrate the importance of including an explanation of pain as 'the biological information that justifies a biopsychosocial approach to rehabilitation' (Beales, Fried, et al., 2016; Moseley & Butler, 2015).

Increased self-efficacy and increased work readiness have been linked to improved RTW outcomes (Abma, Amick, van der Klink, & Bultmann, 2013; Black et al., 2017) and this study has contributed evidence to extend previous research findings with indications of benefits gained as a consequence of matching intervention to assessment results. The Abilita domain of 'Confidence' informs aspects of self-efficacy, optimism and a sense of control in life, and the 'Work perceptions' domain reflects perceptions of capacity to manage work.

There have been several calls for development of programs in which BPS intervention is matched to the worker's psychosocial profile (Linton et al., 2018; Pincus et al., 2013). The present study's results support the inclusion of an assessment to quantify risk and subscales to clarify BPS obstacles with direct linkage to coaching intervention to be integrated into a RTW rehabilitation program. The ARI domains were an innovation that appears to have contributed to this objective, which may reflect their functionality to deconstruct the complex web of BPS factors into identifiable and measurable subscales and to link these to intervention recommendations.

7.4.3 Potential Study Limitations

The limitations of a study must be considered if they have the potential to influence the quality of the findings or ability to answer the research questions. For this study, the limitations primarily related to the use of secondary data for the correlational and change analysis, rendering conclusions more tentative than if an RCT or some form of comparison data were employed. Thus, this was a preliminary study on a complex rehabilitation model, and not all variables influencing the results could be controlled.

Without the option of control group data to compare outcomes, it was difficult to eliminate all alternative explanations for the findings such as passage of time or value of focused attention. The structured components of the program reduced the likelihood of alternative explanations including the pre- and post-intervention assessment, intervention protocol and RC training courses. The results indicated that these measures may have been effective, including the statistically significant shift in all assessment scores and domain ratings, the large effect size for all shifts, measurement of the influence of the IVs, social impact measured in the relationship with ARI score shift and increase in work hours, positive subjective evaluation by participants, and confirmation that lapse in time following coaching did not affect the outcomes.

The participant evaluation responses were positive regarding the value of the coaching sessions however the questions did not clarify if that benefit related to managing injury at work or in aiding return to work.

The smaller impact sample size was a consequence of the nature of secondary data collection, in which practice considerations override research considerations (Liamputtong, 2013). Unexpected attrition of 66% may have been a consequence of the complex context in which the WRPs were operating and the tight constraints of service delivery models that limit innovation, specialisation and the role of WRPs (Australian Rehabilitation Providers Association, 2018; Heads of Workers Compensation Authorities, 2015). However, it is possible that some biases may have influenced the results; therefore, the preliminary nature of this study must be acknowledged. Despite the smaller size of the Impact sample (n = 423) and work sample (n = 240), these samples were homogeneous (gender ratio, age range, DoC and initial ARI score) within the initial sample.

The lack of collection of data at WRP rehabilitation closure was a limitation of the study, and consequently work outcome measurement relied on the data collected when the Impact assessment was completed upon completion of coaching, which may have been prior to medical certification for work upgrade. This limited analyses to evaluation of progress toward increased work capacity and has prevented the measurement of actual work outcomes at rehabilitation completion.

Another possible limitation of this retrospective practice-based study was the lack of measurement of RCs' degree of adherence to the training and protocol recommendations—that is, the degree of 'treatment fidelity' is unknown (Borrelli et al., 2005). The effect of this risk was reduced by the manner of data collection, in which only trained RCs operating under a license agreement had access to the secure assessment website. Licensees accepted responsibility to manage quality assurance of delivery of the Abilita Program in accordance with the licence terms and conditions. Further, the model relied on the professional judgement of the consultants to plan the most effective program in collaboration with each client, rather than strict adherence to intervention recommendations. The self-management coaching course was developed so that discipline-specific knowledge and skills were not required for delivery of any course content to suit delivery by RCs in workplace rehabilitation. The Abilita assessment reports, coaching course and training modules facilitated standardisation in approach; however, it is possible that differences between consultants may have influenced the results. The results from different licensees or RCs were not compared because the many

factors influencing their practice were unavailable to inform explanations for variation across licensees and/or individual RCs.

Further, dose-effect analyses of the coaching protocol could not be reliably undertaken because the specific number of hours coaching was sometimes determined by external factors such as insurer approval of costs. This was a consequence of the study of an innovation in Workplace Rehabilitation; future research design should collaborate with all stakeholders to enable dose-effect analyses.

7.4.4 Potential Implications

Given the design limitations considered above, the results of this preliminary study provide support for the hypotheses that reduction in unhelpful beliefs, expectations and behaviours (measured by a shift in ARI score) facilitated increase in participants' work capacity (measured as impact work hours and work readiness). Multiple regression also revealed that reduction in psychosocial factors was influenced less by duration of claim than initial ARI score and employment status, suggesting the intervention was valuable for both early and long term cases.

7.4.4.1 Generalisability

Crooke and Olswang (Crooke & Olswang, 2015) suggested that practice-based research contributes generalisable knowledge to a larger audience because it is ecologically valid, perceived as relevant by practitioners and represents a 'real-world laboratory' to test system improvements. There were several indicators that the final study population was reasonably representative of compensable injury claimants. This study population (n = 423) was representative of a population with a variety of musculoskeletal conditions, equal gender representation, wide age and education ranges, and data collected from various compensation jurisdictions. The two characteristics that may be atypical are the percentage of participants who were not at work at the time of the Initial ARI (55%) and the time passed since injury to the Initial ARI (mean 92 weeks, med 39 weeks). These two characteristics place the vast majority of the study population at higher risk of never returning to work (Cocker, Sim, Kelsall, & Smith, 2018). The potential for such an outcome was evident in the standard multiple regression analyses demonstrating that those participants with a shorter DoC and those who had remained in employment achieved the strongest psychosocial and work outcomes. Despite the design limitations

of this study and the adverse circumstances of the participants, the overall mean shift in ARI score of 32%, suggests that the results may be generalised across MSKD injury management populations. Analyses also found that the neither age nor sex of the participant moderated response to the intervention measured using the shift in impact ARI score.

7.4.4.2 Coaching Content and Delivery

Notwithstanding the preliminary nature of the data, the achievement of mean reduction in all BPS domains suggests that the self-management coaching successfully targeted individual needs. The results indicate that the information gained from the domain results in the Initial ARI reports was important in achieving that objective. The protocol for delivery of the coaching included selecting needs-based topics presented in a behaviour change framework and the recommendation that all participants be assisted to understand the physiology of pain and the BPS context of their injury. Future research could validate this methodology by collecting fidelity data such as details of Rehabilitation Consultant, coaching plan, hours and duration of coaching for each case.

7.4.4.3 Early Intervention

The importance of early intervention in achieving reduced unhelpful psychosocial factors was indicated in the regression analysis for the impact ARI score. Analyses showed that cases referred early post-injury and while still at work were more likely to achieve greater reduction in ARI score. Further, the regression analysis for actual work hours found that a greater percentage of shift in ARI score was associated with higher actual work hours at impact assessment. It is important that the work hours in this study were recorded prior to completing the rehabilitation program and maximum achieved hours; however, these data do indicate potential work gains. These findings extend previous research findings that the optimal time of referral to workplace rehabilitation is between four and 12 weeks (Lysaght et al., 2010). The Abilita data also showed that the mean coaching time for DoC < 12 weeks was 4.8 hours, and was 6.1 hours for all other DoC categories. These data were extracted as means from the ‘number of coaching hours’ field in the dataset, which was entered by the consultant at the impact ARI. This result adds evidence that, in a BPS approach, early referral for coaching is both more effective and less costly when priced on an hourly basis. These findings contribute to the body of knowledge currently

informing claim management and workplace rehabilitation practices (Collie, 2019; Heads of Workers Compensation Authorities, 2019; Iles et al., 2018).

7.4.4.4 Implementation Incentives

These results add evidence for scheme designers to consider changes that will incentivise delivery of structured BPS rehabilitation, such as requiring the collection of digital BPS data to record influential claimant beliefs, expectations and behaviours at baseline, progress and outcome points. Psychosocial variables are believed to be the most significant predictors in RTW rehabilitation (Laisne et al., 2013; Nicholas et al., 2011) and the Abilita Rehabilitation Model builds a database recording these at baseline, progress and outcome. These data can be accumulated only when self-report questionnaires canvasing participant beliefs, expectations and behaviours are included in the rehabilitation program. Although many schemes now recommend a person-centred approach with the aim to build claimant self-efficacy and empowerment (Safe Work Australia, 2018c), few stipulate that this will require behaviour change interventions to support claimant acquisition of self-management skills and strategies. These restrictions may limit the feasibility of applying a structured BPS approach broadly within workplace rehabilitation. Regulators could strengthen the quality of injury management systems by requiring all compensation agents and service providers to demonstrate evidence of applying all components of a BPS approach, including capability building for personnel, as a component of the approval process (Collie, 2019).

7.4.5 Future Research

This BPS model constitutes an application of *healthcare within the workplace*, which has been found to be valuable for strong RTW outcomes (Cullen et al., 2018; Waddell et al., 2010). Role behaviour consistent with the tenets of the BPS model is a natural fit for the health professionals employed by WRPs. Yet, in this study, the limited number of cases that were able to progress through coaching to impact assessment suggests that WRPs may have been restrained by the regulatory interpretation that *therapeutic counselling* constitutes treatment (Heads of Workers Compensation Authorities, 2015). The recent

HWCA review of the WRP guidelines has provided an opportunity to address this barrier to the implementation of best-practice BPS programs.

A randomised controlled study is the logical next step to test whether the results of this study are confirmed when this model is implemented in a deliberate and more controlled manner. This would have the potential to ensure earliest intervention through psychosocial risk triage; ensure that self-management coaching is provided as required; ensure that impact ARI is completed for all cases; and offer a wider range of evaluation opportunities, including comparison control data. The work outcome data in this study were limited to increase in hours post-coaching, whereas work hours at rehabilitation closure are required for accurate work outcomes. Additional outcomes could be considered, as suggested by Young et al. (2016) in their review of workplace outcomes in work disability prevention. They found that numerous outcome measures were used in previous research, depending on the type of work disability and the purpose of the research, such as whether the research was undertaken for employer cost analysis or for a scientific study of an intervention. Future studies using the Abilita program would make a valuable contribution by considering alternate work outcome measurements, such as productivity, presenteeism, durable RTW and cost savings.

In this preliminary study, the analysis of shift in ARI scores following coaching revealed statistically significant gains with a large effect size (d = 1.32). The potential for this change to be clinically meaningful was supported by the subjective nature of the ARI items contributing to the score, and the positive participant evaluation (96% satisfaction). In a controlled study, additional data could be collected to further develop the predictive potential of the Initial ARI score and to measure the MCID. The predictive potential of the Initial ARI score and domain ratings could be evaluated by recording details of components of the coaching plan, hours and dates for each participant. This would enable analysis of their relationship with the Impact ARI score, with consequent potential to predict the quantity of intervention required to achieve the desired Impact ARI reduction and work outcome. The collection of additional data from other tools, such as measures for quality-of-life or health outcomes (McDowell, 2006), in addition to work outcomes, would assist in quantifying clinically meaningful change for ARI scores.

7.5 Conclusion

This preliminary analysis of implementing a structured BPS rehabilitation model in workplace rehabilitation suggests the potential for positive outcomes. The results reported in this chapter need to be considered with caution due to the study limitations, however they do provide some preliminary support for the three hypotheses of the study, indicating that the use of standardised assessment, coaching and training resources can result in a reduction in unhelpful BPS factors, increase work readiness and work hours, and provide a level of service delivery that achieves satisfactory evaluation from participants. The replication of results using a stronger design, such as an RCT, would assist in the development of effective implementation processes. Early indications are that the Abilita Rehabilitation Model is fit for purpose and, if implemented more broadly, may contribute to improved current health and work outcomes for workers with injury. Such benefits have the potential to lead to improvements in participants' quality of life and reduction in disability-related costs to the participants, the compensation scheme and the community.

Compensable injury research has tended to focus on the claims and workplace environments or treatment arenas. This study contributes to the very limited published research on programs to enhance workplace rehabilitation service delivery, in which WRPs implement a structured BPS model. Further studies based on the current model are now justified to better inform injury and disability management research.

Chapter 8: Biopsychosocial Rehabilitation Experience

The literature reviewed for this thesis and discussed extensively in Chapters 3 and 4 identified that people with compensable MSKD often fail to achieve optimal health and work outcomes (Social Research Centre, 2018) and that the strongest health and work outcomes are achieved when individuals are managed using a BPS approach (Black et al., 2017; Kendall et al., 2013; Loisel et al., 2005; Sullivan, Feuerstein, et al., 2005; Waddell et al., 2003). Chapters 5, 6 and 7 described the components of the Abilita program, which was developed to integrate BPS assessment and self-help skills coaching into workplace rehabilitation. It comprises a comprehensive set of assessment, coaching and training resources and has been implemented by a small number of WRPs. This chapter investigates the benefits and challenges experienced by the RCs during their implementation of this structured BPS rehabilitation program.

Australian WRPs are required to identify and address the psychosocial barriers, risks and strengths influencing RTW, and their decisions are to be evidence based, with assessments demonstrating the need for recommended services (Heads of Workers Compensation Authorities, 2015). In practice, there have been few specific requirements or incentives for RCs to implement the components of BPS rehabilitation, including the use of self-report instruments to assess personal psychosocial barriers or behaviour change interventions to manage these risk factors during the RTW process, as discussed in detail in Chapter 4.

8.1 Objective

The aim of this research was to determine the perceived benefits and challenges experienced by RCs when they attempted to integrate a structured BPS approach into workplace rehabilitation. This study addressed the third research question for this doctoral thesis:

3. What are the benefits and challenges of implementing a structured BPS approach in workplace rehabilitation?

The researcher developed this question in response to observed variation in the application of BPS rehabilitation and from the review of literature, which indicated

problems in the interpretation and implementation of the BPS approach and in knowledge transfer to implement this new paradigm (Pincus et al., 2013; Sullivan, Feuerstein, et al., 2005). Chapter 4 discussed relevant studies and identified the important components of an effective BPS approach, and concluded that a well-coordinated and structured design and implementation process for the program would be necessary for its successful integration into workplace rehabilitation.

Given that the research question rated the experience and perceptions of RCs, qualitative methods were well suited to this study and enabled the researcher to interview and learn from the RCs currently applying a BPS approach in RTW rehabilitation. The researcher had experienced multiple challenges while facilitating the integration of a comprehensive BPS approach into workplace rehabilitation; therefore, she was motivated to learn how other RCs have tackled this complex problem.

8.2 Method

8.2.1 Participants

8.2.1.1 Ethical Considerations

A human ethics application was completed and submitted to the Human Ethics Subcommittee in the College of Science, Health and Engineering. The study was assessed as low risk and as complying with the National Statement on Ethical Conduct in Human Research. The approval reference number is S17-149 (Appendix 6). Informed consent was obtained from all participants prior to their participation in the study. All information collected that could identify participants remains confidential in secure storage and will be disposed of in a secure and safe manner, as per the requirements detailed in the La Trobe Research Data Management Policy.

8.2.1.2 Study Inclusion

To be included in this study, participants needed to have experienced applying a structured BPS approach in workplace rehabilitation, demonstrated by applying that approach with five or more rehabilitation clients. This study used the term ‘structured’ BPS rehabilitation to emphasise that key components were considered integral to the model. This study defined a structured BPS approach as essentially including *self-report*

psychosocial factor assessment and self-help skill development, integrated into a rehabilitation and RTW plan. The approach could follow any format or use any BPS resources or products. The participants needed to be able to provide informed consent and be willing to participate in a 30-minute telephone interview. The participants were excluded if they had not completed their rehabilitation qualifications in Australia or had not worked in Australian workplace rehabilitation.

8.2.1.3 Participant Recruitment

This research used purposive sampling to identify which people to interview, as this allowed the selection of RCs who had experience in delivering BPS rehabilitation and were thus able to provide crucial information that could not easily be obtained through other channels (Liamputtong, 2012). Given that this study sought to recruit participants who were working in different workers' compensation jurisdictions, it was necessary to employ a national recruitment strategy. This was achieved through arrangements with key professional associations whose membership included RCs—the Australian Rehabilitation Providers Association, Australian Society of Rehabilitation Counsellors, Rehabilitation Counselling Association of Australasia and Occupational Therapy Australia.

Contact was initially made with the associations through a telephone call, prior to sending an email describing the research (Appendix 7) and requesting distribution of an 'Invitation to Participate' form (Appendix 8) to their memberships. This proved to be a protracted process while each association completed their required procedures to authorise support for the research request; however, all did provide valuable support by promoting the opportunity to participate in their newsletters emailed to members.

In total, twenty-five RCs responded to the recruitment efforts of their professional association. Of those, 3 were new graduates and did not meet the selection criteria, 1 withdrew their offer, 3 were unable to make time for the interview, and 5 did not respond to emails sent to arrange interview. Thirteen RCs met the selection criteria, with recruitment through the Australian Rehabilitation Providers Association (four), Australian Society of Rehabilitation Counsellors (five), Rehabilitation Counselling Association of Australasia (four) and Occupational Therapy Australia (zero). The recruitment strategy supported the requirement for purposive sampling and the deliberate

selection of individuals with experience delivering a BPS approach. Data saturation was achieved, as the sample size of 13 participants provided sufficient data to allow the research questions and aims to be thoroughly addressed and each theme to be clearly defined and supported by ample extracts (Liamputtong, 2012). The resultant information-rich interviews offered in-depth understanding and insights into the research question.

8.2.1.4 Informed Consent

Informed consent was obtained from all participants prior to interview (Appendix 9), including approval to audio record the interview. The Participant Information Statement (Appendix 10) advised participants of their right to withdraw from the study at any time and to have their data withdrawn by completing the 'Withdrawal of Consent Form' (Appendix 11) within four weeks of their interview.

8.2.1.5 Participant Demographics

The RCs comprised 12 women and one man. Gender imbalance was predicted for this study because of the higher number of women employed as RCs. All participants obtained their required health professional qualifications in Australia and were working with different agencies and in different locations across Australia, though one was employed in Norway (Table 8.1).

Table 8.1: Rehabilitation Consultants' Geographical Locations

RC Location	*n*
Queensland	3
NSW	3
Australian Capital Territory	1
Victoria	1
SA	2
NT	2
Norway	1

There was a wide range of variation in years of rehabilitation experience (Table 8.2), and the number of clients with whom each consultant had worked using a BPS approach ranged from 30 to over 2,000. They were currently working or had experienced working in many Australian systems of income support for people with work disability.

Table 8.2: Rehabilitation Consultants' Years of Experience

RC Experience (Years)	*n*
1–4	4
5–14	6
15–30	3

The RCs had followed varied pathways to achieve their current rehabilitation tertiary qualifications, including completion of undergraduate courses in occupational therapy, rehabilitation counselling, psychology, exercise physiology, behaviour science and nursing, and postgraduate courses, including a Master of Rehabilitation Counselling, Master of Occupational Therapy, Master of Social Work and Graduate Diploma in Rehabilitation Studies. Their studies were completed at various Australian Universities, including Sydney University, Griffith University, James Cook University, University of Queensland, University of South Australia and La Trobe University.

The additional professional development courses that the RCs reported as enhancing their capacity to apply a BPS approach included motivational interviewing (Rollnick et al., 2008), cognitive behaviour therapy (Hoffman & Hayes, 2018), acceptance and commitment therapy (Harris, 2009), solution-focused therapy (Ratner, George, & Iveson, 2012), EP (Butler & Moseley, 2007), the Flinders model (Battersby, Harris, Smith, Reed, & Woodman, 2015), the PGAP (Sullivan et al., 2013) and the Abilita program. Only three participants had undertaken Abilita program training as detailed in Chapter 7.

8.2.2 Data Collection

8.2.2.1 Interview Procedure

On receipt of the 'Invitation to Participate' from a professional association, interested RCs expressed their interest via an email to the principal researcher. The participants were then emailed the 'Participant Information Statement' and 'Consent Form' and asked to nominate days and times that would suit them for the 30-minute interview. Those who met the inclusion criteria and returned the Consent Form were enrolled as participants, and a mutually convenient time was nominated for the telephone interview, and the interview questions (Appendix 12) were provided.

Thirteen interviews were conducted between January and October 2018. Most interviews took approximately 40 minutes, and all ranged between 30 and 50 minutes in duration, with some participants being more expansive in their responses to each question. To ensure accurate collection of participant responses, the interviews were conducted through a Skype telephone call recorded with Amolto Call Recorder, which saved each interview as an MP3 file. One interview was conducted face-to-face in the participant's office, which was recorded using a Rode microphone and saved as an MP3 file.

Prior to the interview, the participants were advised that this would be a semi-structured interview in which the questions would guide the discussion and spontaneity was welcome. The interview questions were designed by the researcher, and the open-ended question style allowed for 'unexpected turns and or digressions that follow informants' interest or knowledge' (Johnson & Rowlands, 2012). The 12 interview questions (Appendix 13) canvased six categories of interest, as shown in Table 8.3, with one sample question for each category. The researcher recorded notes after each interview, which helped identify emerging issues. In response to this process, after the first two interviews, the researcher also sought the RCs' opinion on what other parties understand the term 'biopsychosocial' to mean in the context of rehabilitation service delivery.

Table 8.3: Interview Categories of Interest with Sample Questions

Interview Category of Interest	Sample Question
Training and experience	Did your discipline training prepare you to implement a structured BPS approach?
Psychosocial assessment	What psychometric tools did you use?
Self-management coaching	How did you build a client's self-help skills in managing their pain and injury?
Outcome measures	How were outcomes measured? (choice of six responses, including 'other')
Challenges	What challenges did you face in implementing this approach?
Stakeholder responses	How did your clients respond to this approach?

The initial questions provided an opportunity for the participants to describe their professional background and attitude towards using a BPS approach, which was valuable in establishing rapport. It was of particular interest to note the enthusiasm expressed by participants regarding a BPS approach, with several describing the frustration and disappointment that they had experienced in previous work environments. The participants were willing to express strong opinions to the interviewer, which often

conveyed the importance they placed on helping their clients to improve their lives through empowerment. Another common interest was expression of frustration towards other stakeholders in injury management, who were seen to hinder clients' progress through lack of understanding of the importance of applying a BPS approach.

8.2.2.2 Field Notes

Field notes were recorded after each interview, which summarised the points and attitudes most strongly expressed by each participant, including the challenges experienced. These observations provided contextual information that was valuable during data analysis (Phillippi & Lauderdale, 2017).

8.2.3 Data Analysis

To achieve rigour and value, qualitative research must be situated within a methodological or theoretical framework (Carter & Little, 2007; Liamputtong, 2012). The methodology determines the methods used to record and analyse data, which must suit the research purpose and ensure that the data can be shown to have been interpreted with insight and not prejudice. Qualitative approaches are diverse and often complex, and *thematic analysis* is seen as a foundational method providing core skills to conduct many forms of qualitative analysis. The researcher used thematic analysis methodology for this study to identify, analyse and report patterns or themes within the data (Braun & Clarke, 2006). This was conducted within a *constructionist framework*, in which the thematic analysis was *inductive* and data driven. This allowed broader meaning to be theorised as underpinning what was actually articulated, within the context of the researcher's previous research and experience (Braun & Clarke, 2006, p. 85). Thematic analysis at the *latent level*, as opposed to explicit level, 'starts to identify or examine the underlying ideas, assumptions, and conceptualisations—and ideologies—that are theorised as shaping or informing the semantic content of the data' (Braun & Clarke, 2006, p. 84). Braun and Clarke (Braun & Clarke, 2006, p. 87) provided a guideline for conducting thematic analysis (Table 8.4) and advised that this must be applied with flexibility and with recognition that this is not a linear processes, but a more recursive process.

Table 8.4: Phases of Thematic Analysis (Braun & Clarke, 2006)

Phase	Process
1	Familiarising oneself with the data
2	Generating initial codes
3	Searching for themes
4	Defining and naming themes
5	Producing the report

8.2.3.1 Phase 1: Familiarising Oneself with the Data

The researcher transcribed all interviews and found that hearing the interviews, without being in the conversation, allowed meaning and patterns to begin to emerge. The transcriptions were rechecked for accuracy and re-read many times, allowing the researcher to achieve immersion in the data and for understanding to develop (Liamputtong, 2012). As the researcher repeatedly read the transcripts, she highlighted interesting comments and made marginal notes that were later used in the coding cycle. The transcribed interviews were de-identified and numbered. In this report, participants are referred to by number, such as 'P6'. All information collected that could identify participants remains confidential.

8.2.3.2 Phase 2: Generating Initial Codes

The researcher examined all responses to each question asked of participants and compiled a comprehensive coding table in Microsoft Word (Table 8.5), including extract summaries. The researcher worked through the full dataset and devoted attention to each item either with an original initial code or by applying an already developed code. This technique also enabled the researcher to count the frequency of codes, which was later useful in verifying the themes. Saldana's (Liamputtong, 2013, p. 368) definition of coding describes the approach to the initial coding phase: 'a word or short phrase that symbolically assigns a summative, salient essence-capturing and/or evocative attribute for a portion of language based or visual data'.

8.2.3.3 Phase 3: Searching for Themes

Through working with the transcripts, field notes and coding table, the researcher was able to see and name patterns in the data. Colour coding was used to distinguish these and

to trace them across the full dataset, including to identify data extracts. The researcher reviewed the data to look for data that could be coded in more than one way, and, during this phase, the researcher looked closely to see connections between the codes, including whether anything tended to be associated with or caused by something else (Liamputtong, 2012). This resulted in sorting the different codes into many potential themes, which were subsequently refined as meanings and relationships were identified between themes and subthemes.

8.2.3.4 Phase 4: Reviewing the Themes

The researcher generated a thematic map (Figure 8.1), which helped link themes and subthemes and see that they bound in a meaningful way and that there was a clear distinction between each theme (Braun & Clarke, 2006). Themes were checked against the original dataset, and the final themes and subthemes were settled when their significance became clear as an interpretation of the knowledge, values and processes that are central to applying a BPS approach in workplace rehabilitation. Further rereading of the data confirmed that theoretical saturation had been reached with no new codes or themes emerging. The researcher was satisfied that the overall story of the benefits and challenges that the RCs experienced in implementing structured BPS in workplace rehabilitation had emerged.

8.2.3.5 Phase 5: Define and Name the Themes

This method of analysis resulted in the identification of themes and subthemes that related to one another and, as a framework, provided insight into both the benefits and main challenges faced in implementing structured BPS in workplace rehabilitation. As a result of the complex nature of the work rehabilitation process, there were several options for names of the themes. The themes and subthemes were reviewed by a second researcher and the names were finally selected on the basis that they would provide the reader with a sense of what the theme was about.

Table 8.5: Coding Sample

RC	Extract Summary	Initial Codes	Subtheme	Theme
P2	Self-help education should be included in all activities	Applying pain strategies	Psychosocial rehabilitation	Dilemma in building client self-help capacity
P3	Examine the top five domains and always include the pain and BPS domains, and then include the next three domains with client agreement	Explain pain and BPS Collaborative planning	Accepting BPS responsibility	Dilemma in building client self-help capacity
P3	Data are collected, but RCs want to do more with the data	Accumulating psychosocial data	Measurements incentivise	Balancing professional values and key performance indicators (KPIs)
P4	Some life insurers only want us to conduct interviews during assessment	Limited BPS assessment knowledge	BPS integration required	BPS approach limited by misunderstandings
P9	Compensation mitigates against BPS	Time and cost limitations	Rehabilitation provider choices	Balancing professional values and KPIs

8.2.3.6 Phase 6: Produce the Report

The final phase of this method provided the opportunity to tell the complicated story of these data in a concise, coherent and interesting manner, within and across the themes (Braun & Clarke, 2006). It provided an opportunity to give voice to the study participants, focus on the challenges, relate the strategies used by the participants and relay ideas that could contribute to finding a solution to this research question.

8.2.4 Credibility Checks

Qualitative research needs to demonstrate rigour if it is to be evaluated as trustworthy Lincoln and Guba (Carter & Little, 2007) developed qualitative rigour criteria ‘as a translation of the more traditional terms associated with quantitative research: internal validity to credibility, external validity to transferability, reliability to dependability and objectivity to confirmability’ (2007, p. 149; Liamputtong, 2012, p. 25). Applying that criteria, *credibility* or authenticity was demonstrated in this study by the purposive selection of participants for their knowledge and unique characteristics relevant to this topic, thereby ensuring that the research was genuine, reliable and authoritative. The rich dialogue extracts demonstrate *transferability* and the capacity to inform and facilitate insight into related contexts. *Dependability* is evident in the description of the research

method, providing a logical and traceable audit and decision trail, and *confirmability* is demonstrated in the clear linkage between the data (transcribed interviews) and themes reported in the results (Carpenter & Suto, 2008).

8.3 Findings

The analysis process resulted in identification of four main themes shaping the RCs' BPS practices when implementing a BPS approach in workplace rehabilitation. The identified themes (and subthemes) were titled as follows:

1. BPS Approach is limited by misunderstandings (need to build BPS competency, treatment providers may hinder BPS, and integration into system required)
2. Considerations in gathering BPS information (self-report tools help, benefits outweigh time cost, and accommodating customer requirements)
3. Dilemma in building client self-help capacity (psychosocial rehabilitation, accepting BPS responsibility, and interdisciplinary BPS rehabilitation)
4. Balancing professional values and KPIs (measurements incentivise, rehabilitation provider choices, and professional values satisfied).

Figure 8.1 is a thematic map presenting the four themes, their subthemes and the identified relationships.

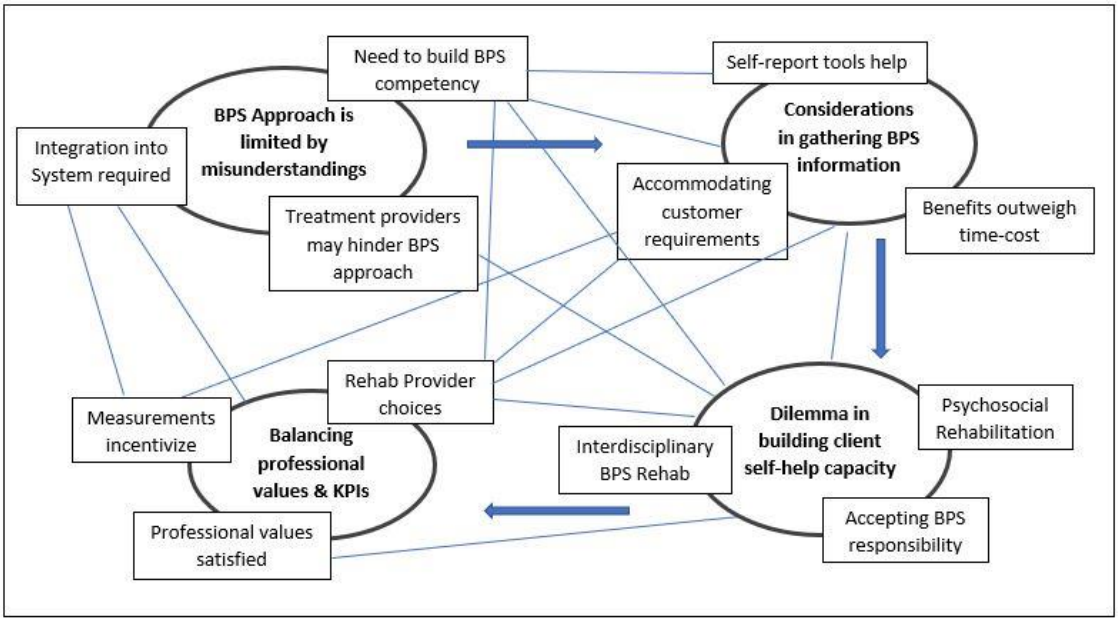


Figure 8.1: Thematic Map of Themes, Subthemes and Relationships

The thematic map in Figure 8.1 displays the complex relationship between the themes that influenced RCs as they implemented a BPS approach. The first theme, 'BPS Approach is limited by misunderstandings', influenced all themes thereafter, and the subthemes were not only relevant to their parent theme, but also influenced other themes. For example, 'rehabilitation provider choices', as a subtheme of 'a balance of professional values and KPIs', also had an important influence on the three other themes.

8.3.1 Theme 1: Biopsychosocial Approach is Limited by Misunderstandings

At the commencement of each interview the participant's understanding of a BPS approach was canvased to identify if they concurred with the study's definition of a structured BPS approach as essentially including self-report psychosocial factor assessment and self-help skills development integrated into a rehabilitation and RTW plan. All participants agreed with that definition; however, several participants commented that they were 'not doing it as applied in the definition of structured BPS, but more by taking a BPS approach' (P1). All considered the BPS approach as integral to the way they worked, as P2 explained:

> I see BPS as a framework that has to be collaborative and shaped around clients' needs, then I get to identify the BPS barriers going on in their lives. I work within BPS, but also use it.

P4 commented: 'I apply it to everything, even a basic workstation assessment'. Another common attitude was expressed by P8: 'My whole approach to rehab is using a biopsychosocial approach. My attitude is to empower them, not to control them'. Analysis of the data provided insight into the effect of the variations in stakeholder interpretation and application of the BPS model. This effect was expansive, influencing the behaviours of the claim and case management personnel, medical and allied health practitioners, rehabilitation providers, employers and recipients of rehabilitation services. This effect was drawn out in the three subthemes.

8.3.1.1 Subtheme: Need to Build Biopsychosocial Competency

All RCs stated that, through their tertiary education, they were introduced to the BPS model and some felt they had gained good knowledge of interviewing techniques and the use of psychometric tools. P14 reported that systems theory and knowledge of the World

Health Organization's (2001) three determinants of health (the social and economic environment, physical environment, and person's individual characteristics and behaviours) and how each interrelate and affect each other were valuable in consolidating this understanding. However, for the majority, their tertiary education was inadequate training to confidently implement BPS rehabilitation in practice. P9 stated:

> There needs to be more on implementation of a BPS system in tertiary learning. Lots of allied health [practitioners] learn theory, but not how to apply it to people's lives. There's definitely a gap in the academic system. A whole subject on BPS would be good.

The majority of RCs stated that their capability in applying a BPS approach was consolidated through their work. P7 felt that her Master of Rehabilitation Counselling was 'pretty good' in teaching BPS, and stated: 'However, I don't think you really realise how effective it is and how much information you get about barriers until working with a real live human being' (P7).

On-the-job training and mentoring was important for many, yet this depended on their employer's approach. For example, P7 was critical of her first employer: 'In my first job, we were providing services—not focused on making them [clients] independent, but rather doing everything for them'. The participants indicated that the style of rehabilitation provider service delivery was largely determined by the requirements of the workers' compensation scheme. P11 stated: 'I left uni[versity] thinking I would use tools and know what I am doing, to find my first employer only used a brief interview template'. P11 explained this by saying that the insurers 'think we should be using our own judgement, that psychometric tests are not the flavour of the month and they do not want to see the results'.

A few participants commented that there was a tendency for RCs from the physical disciplines, such as physiotherapy and exercise physiology, to lack psychosocial understanding, and for those who trained as psychologists to limit their focus to psychological aspects, without acknowledging the importance of pain physiology. This was expressed by P3 as follows:

> I think OTs [occupational therapists] are naturally well suited to this model—it is how we think and what we learnt. It may be missing from EP [exercise

> physiology] and physio[therapy] courses. We get units about the impact in day-to-day activity and they don't. Psychs [psychologists] tend to focus too much on the psych issues, not recognising the physiology. There needs to be a unit on [the] BPS model or a few lectures for all health professional degrees.

The RCs had pursued their own research to build their BPS knowledge. They expressed disappointment at the lack of research and professional development available specifically guiding BPS workplace rehabilitation. Some expressed the need for more BPS resources:

> I think having the right resources is quite important. I'm not sure I have enough to adequately monitor people and find out if the plan is working. It would be good to have an accurate record to confirm if we have been helpful to them. (P13)

The forms of professional development considered the most valuable included mental health courses and experience, communication techniques, facilitation of behaviour change, understanding and explaining pain, and structured BPS assessment and coaching. Motivational interviewing was rated highly by the RCs, with the strategies being used both in collaborative development of the rehabilitation plan and in encouraging adoption of self-management skills throughout the program. Ensuring a high level of BPS skill and capacity among all allied health personnel was a challenge for those with supervisory capacity:

> We have quality assurance checks on reports, but we can't be in all interviews, [though] we do have interview templates for consistency and provide internal training. However, external training in BPS would be good, but I've not seen much out there. I'd be happy to fund staff. (P11)

8.3.1.2 Subtheme: Treatment Providers May Hinder Biopsychosocial Approach

According to most RCs, treatment providers' understanding of a BPS approach is variable. Some focus only on the technicalities of their discipline, whereas '[e]ven when treating, it should never be just about the symptoms—it should be about the whole person. That approach doesn't always happen' (P4). The majority of RCs spoke of variability in

insurance personnel understanding of BPS and some considered that allied health treatment providers may have contributed to insurer BPS misunderstanding:

> Siloed allied health practitioners are part of the problem—they are costly and insurers react by counting sessions … siloed interventions have contributed to insurers believing that this is BPS. BPS is much more to do with a holistic collaborative approach … so this has been detrimental for everyone. (P5)

General practitioner BPS understanding was also considered variable, although many RCs reported mutually respectful relationships with local general practitioners who recognised the benefits of BPS. Unfortunately, the RCs consistently reported evidence of lack of BPS understanding among medical specialists: 'Medico-legal psychiatrists still use the word "malingering" for someone who is stuck and does not know how to get out of the system. Very, very few people fit it' (P5). These assessments were observed by several participants to be very destructive to both the client and the rehabilitation process.

8.3.1.3 Subtheme: Integration into System Required

Overall, the RCs spoke of the BPS understandings of scheme regulators, insurers and employers as having a common and important influence on their service delivery; therefore, these understandings are examined here under the one subtheme. There was a general feeling that understanding of BPS among insurers was '[a] mixed bag and not well understood by people who are not health professionals' (P3), with acknowledgment that there had been some increase in BPS training for claims personnel. Several RCs commented that insurers often implemented an incomplete BPS approach, and all consultants viewed insurers' interpretation of BPS as critical to how they were able to present and/or deliver their rehabilitation services:

> Interpretation of BPS comes from the rehab team working with case managers in the insurer. How that translates between case manager and clientele is the gap—they are under-resourced from a rehab perspective. I know one insurer did case manager training on understanding biopsychosocial, understanding and identifying flags, and the services and providers that could support different barriers. I think that is working well. Others throw the biopsychosocial idea around, but don't integrate it into case management with any structure or rigour. (P9)

Some consultants reported a positive change in recent years in regulator and insurer acceptance of some of the principles of BPS rehabilitation: 'Insurers are becoming more aware and open to understanding how social engagement and community wellness can lead to recovery' (P9). P11 discussed insurers in NSW in response to recent scheme initiatives:

> When we recommend what is needed for a durable outcome, those insurers are now saying yes, have taken on a changed approach and are addressing psychosocial needs and doing case manager training.

P10 commented that 'ReturnToWorkSA has made a huge change … we're expected to take a holistic approach … under the old scheme, people always feared being cut off'. Concurrently, others witnessed regular staff change among insurers:

> There is big turnover in insurer staff and so little knowledge retention. Even with successful outcomes, it is still a struggle—everyone wants a quick fix. This is not a quick fix, it is a sustainable fix, and it takes time to get people on that journey with us. (P3)

The RCs observed that their implementation of BPS rehabilitation programs for individual workers had influenced employer organisations, and some now referred workers for self-management coaching to prevent the development of a compensable injury, while others engaged the consultants to implement wellness programs with a BPS approach across their company. Some RCs noted that the 'Health Benefits of Good Work' campaign[4] had contributed to the advent of these programs.

8.3.1.4 Theme 1 Summary

'BPS Approach is limited by misunderstanding' emerged as a dominant factor and thus an important theme influencing RCs' experience and BPS rehabilitation practice. These RCs were committed to the BPS approach and characterised by a desire to work within a scientific framework. It seems that tertiary institutions are equipping health and rehabilitation graduates with theoretical BPS understanding, but not practical application knowhow. That aspect has been learnt on the job, where the application of BPS reflects

[4] A campaign initiated by the Australasian Faculty of Occupational and Environmental Medicine.

the values of the rehabilitation provider company and their mode of meeting the requirements of the purchasers of their services.

Education and training programs have provided stakeholders with understanding of the need to consider psychological and social factors in rehabilitation intervention. However, less attention has been devoted to the integration of a structured and rigorous biopsychosocial approach within injury management schemes.

8.3.2 Theme 2: Considerations in Gathering Biopsychosocial Information

Examination of participant responses revealed consistency in the RCs' aims when undertaking an initial assessment. They sought to gain an understanding of the person's response to their injury and all aspects of the person's life that were influenced by or contributing to their pain and disability. This is consistent with an effective BPS approach and not only gathers the information essential to implement a meaningful rehabilitation plan, but also makes clear to the client that the consultant is genuinely interested in them, their life and their recovery, and not just in their capacity to resume work (Health Services Group, 2012).

Most participants spoke of the importance of developing a therapeutic relationship at initial assessment and of commencing planning for independence at that time. Research has shown that this is the critical time to engage the person in understanding BPS aspects of injury and to shift from external solution seeking towards ownership and responsibility for recovery (Health Services Group, 2012). To do this, the RCs mostly used a semi-structured interview and selected psychometric tools, with agreement that the key element is development of trust: 'Trust is most important to getting people engaged' (P9). Consistent with this concern:

> Relationship building is the key. That takes time—we need to build rapport and trust to get people on board. We're not here to tick boxes—we're concerned about them and want them to recover. (P10)

8.3.2.1 Subtheme: Benefits Outweigh Time Cost

The participants reported that each rehabilitation provider company has their own initial interview template, with this standardisation designed to capture key information and

promote consistency in assessment across staff. The benefits of a semi-structured interview with clients were articulated by P5:

> to build rapport quickly, which is essential in the therapeutic relationship. I consider readiness, confidence, mental health, relationships, previous therapy. To share what has gone on before is very important—hearing their narrative and where they're stuck. Language is critical in understanding. (P5)

Many of the RCs reported that a BPS initial interview can be very time consuming and requires commitment, experience and creativity to implement effectively:

> Compensation mitigates, from a cost perspective, the ability to be completely holistic in the way we assist people in their recovery. However, I've been fortunate to be exposed to certain service industries where long-term care and cost have been more appropriate to allow us to adopt the BPS model. So, I've been able to integrate it into my own practice and different businesses over the past 20 years. (P9)

Time limitation was repeatedly reported as a major challenge, particularly at assessment, when the RC not only needs to gain critical BPS information, but must also gain the client's trust and willingness to collaboratively work towards building their self-management skills and independence. However, most consultants believed that this investment in time during the initial interview was essential in their job: 'Relationship building is the key and it takes time. Applying the BPS model is hugely important, and we need to understand that people come with baggage' (P10).

8.3.2.2 Subtheme: Self-report Helps

Psychometric instruments are used in rehabilitation to identify and measure a person's attitudes, beliefs, expectations and behaviours in relation to their injury or illness and recovery (Dansie & Turk, 2013). They are an important component of BPS assessment to provide baseline measurements and, when undertaken immediately prior to the initial interview, can provide information that supports a reduction in interview time: 'I always use results from the assessments in my conversation with clients' (P3).

The RCs used a wide variety of self-report psychometric tools. A total of 25 instruments were listed, with the four most commonly used being the Depression and Anxiety Scale,

ÖMPSQ, Life Satisfaction Indicators (LSI) and PSEQ. The RCs' reasoning for using these tools was primarily to support intervention planning, as evidenced by the following comments:

> I try to have a good clinical objective framework. (P2)

> We use an Abilita assessment, whichever is relevant—the physical or psychological questionnaire. (P4)

> These results help prepare the plan … it helps to have numerical understanding of areas we need to focus on. (P11)

At times, clients queried the relevance of psychosocial questions in the tools. In those circumstances, the RCs still encouraged clients to complete them, as reported by P6: 'Sometimes the client finds some questions irrelevant … but we often pick up things that are important, even if they don't think so'. This was reinforced by P5: 'It may not be related to the injury, but it may be the key to opening the door to them managing pain and injury'. Pain-based questionnaires were commonly used because ''[p]ain is a predominant driver in management of claims—we need to understand and address those barriers from a BPS perspective before going on to other barriers' (P9). Some RCs described role delineation in the initial assessment process, in which they commonly used vocational assessment instruments, while other psychometric tools were used by psychologists. At times, the RCs had access to the results of the other psychometric tools; however, this did not always occur in some workplaces.

8.3.2.3 Subtheme: Accommodating Customer Requirements

Specific psychometric tools may be required by customers for their clients. One insurer required the Goal Attainment Scale and LSI to be completed for all clients. Other tools were then used at the discretion of the RC. According to P2: 'The LSI is beneficial—it gives areas to focus on, and we do it every six months for clients, and that may be for up to four years'. Three RCs reported that some insurers had discouraged the use of psychometric tools, with the view that experienced consultants should not need to use tools to assess a client, and that the only outcome measurement required is RTW. This attitude may have also influenced the RCs, including one participant who did not rate the

use of psychometric tools as important in her own practice, although acknowledged the value of psychosocial measurement:

> Sometimes we ask for an Örebro … we have a close relationship with workers, so normally it's confirmation of what we know—it puts a number on, so we can compare in the future. But, in any case, if we are doing our job, we should know if they're improving or not improving. (P10)

Several consultants advised that they used a psychometric tool that they considered valuable in an assessment, even if costs were not covered by the insurer. One participant reported 'the need to step around the instructions of an insurance company to attend to client needs' (P5). This was particularly the case when the RC was expected to address only a client's redeployment needs. In the circumstances of responding to a vocational assessment referral, P11 commented:

> I always start with OSI [Occupational Search Inventory] to start the conversation about work values, then we have our own vocational assessment tool with questions regarding family circumstances, social support, life goals, cultural values, medical conditions, medications, and their physical and psychological capacity.

8.3.2.4 Theme 2 Summary

The second theme that emerged was 'considerations in gathering BPS information', which reflected the important role of the initial assessment in shaping RCs' experience and BPS rehabilitation practice. A BPS assessment could be very time consuming, particularly if psychometric tools were not effectively used, and the consultants predominately relied on gathering information from the interview. Time limitation was a commercial driver in workplace rehabilitation.

Discipline-specific role definition was a barrier to some RCs' capacity to assess for all relevant elements of a client's response to injury. However, most of the consultants were using psychometric tools effectively to learn about their clients' beliefs, behaviours and expectations and to include those results in collaborative intervention planning with their clients. Some commented on the value of tools as a means of overcoming the obstacle of limited time, as stated by P5:

> An Abilita assessment is a short cut into understanding where the person is, as sometimes it takes a long time to get to that point, and we need an approach to get there quickly.

8.3.3 Theme 3: Dilemma in Building Client Self-help Capacity

A fundamental component of BPS rehabilitation is the development of good self-management coping (Nicholas, 2007). All the RCs viewed this as a primary outcome of their involvement with each client. They recognised that, by assisting clients to achieve a stronger locus of control, the client would gain both improved quality of life and increased work capacity. They considered this factor when establishing rehabilitation goals with each client:

> We make sure people are empowered, those goals are their goals—we are not creating goals for them, we only value add to their journey. (P9)

> Our aim is for self-determination and independence, so we need to ensure they've got the means for self-management or know where to go to get it. (P12)

The RCs and their clients determined program goals based on the BPS needs identified in the initial assessment:

> With results of the self-report tools, I talk with them and say 'this is what I see as areas of priority—what do you see?'. If they agree, we run with it. I don't try to do too much—it overwhelms and confuses them. (P3)

Similarly: 'Those [questionnaire] results inform how I approach rehab and things I will recommend, especially when reporting pain, to know which direction and which other professionals to get involved' (P13). Despite all RCs proclaiming their commitment to assisting clients' to build self-help skills, many commented on the need to avoid any indication that they were providing treatment, and the need to 'be creative in terminology' (P8) in rehabilitation plans. They were managing restrictions in their role imposed by the expectations of others, particularly the insurers who were purchasing their services. Analysis of the interviews identified three different approaches taken by the RCs to deliver interventions to build client self-management commitment and capacity, while managing this restriction. These

approaches were named as the following subthemes: ‘psychosocial rehabilitation’, ‘accepting BPS responsibility’ and ‘interdisciplinary BPS rehabilitation’.

8.3.3.1 Subtheme: Psychosocial Rehabilitation

Some workers’ compensation regulators and insurers and life insurers are now promoting a psychosocial approach to rehabilitation, supporting non-work-related recommendations that improve functioning and recovery through community participation and quality-of-life activities. When working with this approach, the RCs collaboratively prepared a plan according to the scheme template, which could include a medical management goal, psychosocial goal and vocational goal. They focused on assisting the individual to return to or commence meaningful activities and to learn strategies to manage pain while undertaking those activities: ‘I encourage pain management through meaningful activities and distraction’ (P2). The focus in this approach was identifying the interests of their clients and thereby motivating them to resume or begin new activities, knowing that increased participation would build physical, psychological and social strengths:

> Clients don’t realise we are doing biopsychosocial rehab, but they do respond well to psychosocial activities, which might be horse riding, guitar lessons, fishing lessons or getting involved in volunteer or training that is not vocational. (P1)

In this approach, the RCs discussed pain management strategies with their clients as they built their participation in community and wellbeing activities. They did not explain the physiology of pain to their clients, preferring to refer clients to a treatment provider for that information. They variously reported that they were not confident in providing the explanation, they believed that clients found the information more credible when delivered by a treatment provider; and they did not want to overstep disciplinary boundaries. Three participants applied this approach to their rehabilitation practice:

> For pain, we build it into day-to-day case management—we look at strategies to overcome it, we use psychoeducation if needed—for example managing sleep or medication management—but not in [a] treatment way because we are not treatment providers, we are case managers. It’s not structured—it evolves depending on client needs. (P1)

However, the RCs did recognise the importance of this step and each made a similar comment to P8:

> People definitely do better if they have had a good explanation of pain. It's the same with any injury—if they understand what is happening to them, they cope better. It's all about empowerment.

P8 described using the technique of *change talk* from motivational interviewing counselling to influence attitudes towards pain:

> When they say 'my pain is 7 out of 10', I say, 'that's really good—what strategies have you used to make sure your pain is not 9 out 10? Why are you down at 7?'. And you can see people pause to think about that.

P1 reported that, when helping a client with fear-avoidance behaviour, 'from our end, we use motivational encouragement and refer to other disciplines for pain education'. P2 explained that her clients responded well to community engagement activities because they were accustomed to structured work activities and preferred 'therapy through doing not through talking', and would accept strategies such as mindfulness if presented in ways that 'sit with their own values'. Moreover, P2 stated that '[m]ore social interaction is good for them, good for their pain. Those at home are much worse off than those that get out'. P8 also stated that '[c]lients respond very well to this approach. All I do is listen—people just want to be heard'. However, client engagement and commitment to building self-management skills were not assured: 'Client motivation is the biggest barrier. Those that have success do so because of their own volition' (P2). Further, P8 stated: 'It's difficult when BPS insight is lacking for their injury, pain and recovery. This especially happens with men who don't respond well to counselling'. The RCs felt that additional resources would be valuable to them in implementing a more structured BPS approach: 'Resource packs would help on managing pain, talking about sleep hygiene, etcetera. We need a BPS toolkit!' (P1).

8.3.3.2 Subtheme: Accepting Biopsychosocial Responsibility

Some of the RCs always provided an explanation of pain and of the BPS model so that their clients gained insight into the influential BPS factors in their own life and the biology of how those factors interact and result in increased or decreased pain:

> I always include physiology of pain explanation. Explaining pain and BPS gets buy-in, but they need time to digest it. We see people with entrenched beliefs and behaviours, so it is challenging to them and difficult to accept the change in concept. So many have been told 'it is in your head' without clarification of 'in your brain'. (P3)

These consultants recognised that all clients hold beliefs and knowledge about their pain and may have been confused by conflicting information:

> I ask them what they know, I then affirm or explain newer pathways. Knowledge is power. They need to understand why they need to do things a certain way to get better. We get quick wins by focusing on managing pain in what's important in their life, then they are happy to move on to work. Once they see you actually care what they think, they move forward faster. (P4)

This sentiment was similarly expressed by another consultant:

> You must start with the science of pain to build their confidence. The knowledge of neuroplasticity achieves their buy-in and allows you to work collaboratively and allows 'stuckness' to shift. (P5)

These RCs also always explained the BPS model to their clients: 'Practitioners may understand BPS, but it will not work if the person is left behind and has not clicked to what it is about for them' (P5). This subtheme encompassed the group of participants who were described as 'accepting BPS responsibility' because they were confident in explaining pain and BPS to their clients and were willing to take responsibility to ensure that this understanding was achieved. They worked in a less formal interdisciplinary manner:

> I go to treatment sessions with people, so they see the treatment provider and I are on the same page—it shows we are communicating and planning together. Lots of people appreciate that—it shows you are a team. (P4)

Five participants applied this approach to their rehabilitation practice, three participants had completed Abilita training, one participant had completed EP training, and another participant was comfortable discussing pain because of many years of experience with a family member's chronic pain.

8.3.3.3 Subtheme: Interdisciplinary Biopsychosocial Rehabilitation

The third approach used by RCs to achieve client commitment to self-management was participation in a more formal interdisciplinary model. Five participants worked within this rehabilitation approach. Interdisciplinary team members included various allied health professionals—typically, occupational therapists, psychologists, exercise physiologists, physiotherapists and rehabilitation counsellors. One member of that team—usually a physiotherapist or exercise physiologist—would take responsibility for providing the explanation of pain to all clients.

Each of the interdisciplinary teams included pain education in their programs: 'Educating about understanding their own bodies is always paramount' (P9). P6 explained that, in their interdisciplinary team, a physiotherapist presented a regular group pain explanation session that was attended by all clients:

> Understanding pain helps them to be confident in their own self-management. It seems that once they better understand why we use our approach, we understand the same thing, and I experience that I can push them further to manage their pain better. (P6)

P6 explained that all clients attended four mandatory education sessions to help build their self-management capacity. She stated that: 'They seem to like this structured approach. Some say it feels like it is professional—they are in a program to understand what they need to do and how' (P6). Interdisciplinary program time was also allocated to explain the BPS model to achieve client commitment:

> People are often introspective when in the middle of this, and not seeing clearly, so education of each piece [bio-psycho-social] is warranted so they see where they fit in and where our support will take them. (P6)

P7 worked in an interdisciplinary team and did not provide pain management counselling; rather, this was undertaken by the exercise physiologist and P7 was careful 'not to step over discipline lines'. She then examined the client's daily routine and reinforced the pain education by asking the client to nominate which strategies they would use to overcome identified barriers. Another participant advised that, after the pain explanation, her role as RC was to encourage the client to apply that knowledge in activities of daily living and

psychosocial and work activities. When applying a BPS interdisciplinary model, team members tended to attend to client needs from their discipline perspective, regularly reflect and review progress as a team with the client, and measure psychosocial outcomes in addition to work outcomes.

8.3.3.4 Theme 3 Summary

Analysis of the data revealed that the RCs were implementing the BPS component of building their clients' self-management capacity under different service delivery approaches in response to different interpretations and ways of managing role responsibilities and boundaries. The RCs experienced a 'dilemma in building their client's self-help skills' because of the prescribed role of RCs—as health professionals, they sought to facilitate durable cognitive and behaviour change within clients, yet perceived that some regulators and insurers required them to achieve that outcome in a manner that avoided perception of providing 'treatment'.

All RCs applied some form of a BPS approach, including assessment to gain BPS information, collaborative planning and attempts to facilitate empowerment and self-efficacy. They all used therapeutic competencies to gain their clients' trust, demonstrating genuine interest and initially focusing on the needs that the client had given priority. All acknowledged the value of clients understanding the science of pain in the BPS construct to understand why the actions being recommended were necessary, and thus maintain the motivation required for long-term commitment to building self-management capacity. However, some consultants believed they would be overstepping role boundaries if they provided this information to their clients. Therefore, not all delivered a structured self-management coaching program to their clients. Those that did always commenced with an explanation of pain, as is recommended by best practice and supported by the statement that explaining pain presents 'the biological information that justifies a biopsychosocial approach to rehabilitation' (Moseley & Butler, 2015).

8.3.4 Theme 4: Balancing Professional Values and Key Performance Indicators

Analysis of the interviews highlighted the considerable influence of rehabilitation outcome expectations on the implementation of workplace BPS rehabilitation. The

subthemes that emerged and contributed to this category were ‘measurements incentivise’, ‘professional values satisfied’ and ‘rehabilitation provider choices’.

8.3.4.1 Subtheme: Measurements Incentivise

The majority of RCs reported that the most dominant influence on their capacity to provide BPS rehabilitation was the expectations of their customers, which reflected the requirements of each compensation scheme. This was driven by the scheme’s defined rehabilitation policy and by the outcome measurements collected. One participant was satisfied with ‘increased work capacity’ as the only requirement in her jurisdiction because recent changes had resulted in both incentives for claimants to RTW and the expectation that rehabilitation would take a holistic and BPS approach. Schemes with a psychosocial rehabilitation policy required the RCs to provide measurements from repeat administration of initial assessment tools, such as the Goal Attainment Scale and LSI, and the RCs viewed this as a valuable driver to implement meaningful psychosocial activities for each client. However, these tools do not screen beliefs, behaviours and expectations relevant to injury management and pain, and thus do not contribute to building BPS understanding or preparing a tailored self-management plan.

Some schemes were viewed as incentivising minimalist intervention for non-durable work outcomes. Several consultants commented that rehabilitation providers are ‘marked on stats, and those are not that you have made improvement in the person’s life, just that you have got them back to work, and the quicker the better’ (P12). Through consistent use of self-report questionnaires, some RCs had collected much more data than were requested by insurers. They viewed these data as providing measurements of quality of life, self-management progress and work readiness. Many would like these data to become a mandatory scheme requirement: ‘Using psychometric tools should be mandatory for everyone at the beginning and then at select points down the line, and that should be used as a measurement of progress’ (P7).

The RCs who applied a structured BPS approach believed that the collection of long-term psychosocial data would demonstrate that far greater sustainability in outcomes is achieved when this approach is applied, compared with other models of service delivery. They recognised that the results at the end of a program may not reflect the full future gains made by a client:

> Because of the chronic nature of our clients, we may not see dramatic reduction in score, but we have seen an increased understanding in the ability to deal with stress and anxiety in pain. (P9)

They believed that these BPS skills 'are skills for life and can be applied to any setting in the future' (P5). Some RCs provided anecdotal reports of how the rehabilitation program had contributed to changing a person's life after program completion. Several RCs believed that increased requirements to collect BPS data before the program, during the program and upon program conclusion would incentivise WRPs to deliver customer-centric BPS programs that would assist clients to build sustainable self-management skills, with sustainability confirmed by the post-program data.

8.3.4.2 Subtheme: Professional Values Satisfied

All RCs reported being strongly motivated to continue their current approach to rehabilitation because of the very positive responses of their clients. Many were working with clients with chronic conditions who had previous unsatisfactory rehabilitation experiences:

> They say 'thank you, this has been very different to others—you've taken the time to get to know me and understand my circumstances'. (P11)

> Our clients are happy—they give good feedback and lots write that they've had a good outcome. (P4)

However, at times, clients initially challenged the approach taken by the RC and were reluctant to participate in rehabilitation:

> Clients also want a quick fix—they want quick action and to move on. They are usually confused as to why they are there and what we will offer, but then say, 'I can see you know what you are doing because no one asked those questions before and they're relevant'. (P3)

One RC described 'lack of motivation' as a barrier to building self-help skills, while another RC managed resistance by stepping back and waiting until the client was ready to approach her. Several participants discussed the importance of using a BPS approach

to work with complex and resistant clients, and of the therapist skills essential to engage clients in the BPS rehabilitation process:

> Having an open mind and being curious—these are traits of an allied health therapist that are not easily discernible during training, but they are the aspects that make a difference in taking BPS approach and need to be learned. And to tune in to language and work with resistance, not butting heads with it, [but] rather taking an underlying philosophy of seeing goodness in people, using a carrot, not a stick, and gaining trust early. This works far more often. (P5)

Most importantly, all the RCs valued assisting people to become independent again:

> I am passionate about what I do—the self-empowerment model is very important to me. (P9)

> I value the empowerment model, allowing clients to find their voice again, from being stuck on medication to being able to make choices. (P5)

They viewed this independence as most significantly reflected in good work outcomes, which were a source of pride for the RCs:

> This is 100% satisfying, especially getting a job-detached person into work after two years. (P7)

> Our clients are very happy, partly due to the meaningful work we get for them. (P2)

8.3.4.3 Subtheme: Rehabilitation Provider Choices

A WRP business—like any other—establishes a unique organisation culture, and inevitably this will be compatible with the values of some employees and not others, and will encourage or discourage RCs from applying a comprehensive BPS approach. Most of the RCs stated that WRPs can find themselves in a difficult position because they are dependent on insurers for their livelihood, while attempting to facilitate their clients' journeys through very difficult periods of their lives:

> Rehabilitation providers need to achieve harmony between meeting both the insurer requirements and working in the interests of the client. (P5)

> we need to use terminology that will get approval, like ‘psychoeducation’ and ‘work readiness activities’—nothing that sounds treatment orientated. (P1)

Some RCs had experienced employment in which they perceived that the WRP wanted ‘immediate, not sustainable results, and would say “just get on with job seeking, you’re not their psychologist”’ (P12). P12 was now employed by a different WRP and reported:

> I prefer to always do holistic counselling, as opposed to time constrained or with focus on just one area. Definitely we provide the best service by understanding all aspects of the person.

Many Australian WRPs now promote that they implement a BPS approach; however, the participating RCs felt that the BPS approach was neither understood nor implemented consistently across the industry:

> Perhaps the term ‘biopsychosocial’ is a problem—it’s also humanist, holistic and customer centred. But also, many are doing the industry a disservice by applying it loosely and insufficient in approach. (P5)

Some RCs were critical of previous employers or other WRPs, who they saw as promoting the application of a BPS approach without providing adequate training and resources for a structured and consistent approach or ensuring accountability through measurement:

> We can implement it because we have experienced people in our team trained in Abilita and the BPS model. This is what we do, this is our induction norm, and our admin audits help to keep us on track. (P4)

Competing with the commitment to BPS training and resources was the option to deliver easier services:

> Other clinical services are more straightforward, with established referral pathways and insurers are happy to pay, whereas, with this, we have to do a lot more work to get people on board and keep them on board. (P3)

Regardless, the RCs clearly believed that the benefits of this approach outweighed the barriers. One RC was a company owner who had chosen to persist with the approach, stating:

> The challenge is cost. It takes time to do this and, as a boutique provider competing against big national companies who charge very lean, assess quickly and are process driven, our costs are more, as we give more time. However, we are going to stick with what works. (P4)

8.3.4.4 Theme 4 Summary

The fourth theme that emerged was 'balancing professional values and KPIs', which was another dominant factor that was important in shaping RCs' experience and BPS rehabilitation practice. Any service provider must inevitably aim to meet the KPIs of their customer. The metrics required by compensation schemes and their insurers primarily focus on work outcomes and rehabilitation duration and cost. The majority of RCs viewed this as the major driver for WRPs' choice of service delivery model, at the detriment of gains in psychosocial outcomes that have the capacity to demonstrate important progress for the individual.

The rehabilitation providers who chose to apply a structured BPS approach collected self-report data that provided metrics for perceived physical and psychological function, self-efficacy and work readiness. These qualities are known to be important predictors of health and work outcomes, and thus would be invaluable rehabilitation KPIs for any workers' compensation scheme (Laisne, Lecomte, & Corbiere, 2012). The RCs in this study unanimously agreed that the BPS approach provided superior rehabilitation experience and outcomes for their clients, their customers and themselves.

8.4 Discussion

8.4.1 Summary

This study sought to identify the benefits and challenges experienced by RCs during their implementation of a structured BPS approach. For the purposes of this study, the researcher defined a structured BPS approach as essentially including self-report

psychosocial factor assessment and self-help skill development, integrated into a rehabilitation and RTW plan.

The RCs described well-defined *benefits* from the implementation of a structured BPS approach. They found that using a BPS approach during assessment was the most effective way to develop the client's trust and to learn the BPS factors affecting each individual. They considered that the addition of self-report instruments assisted this process, with specific resources such as the ARI enabling efficient gathering of key information that was otherwise often not disclosed during the initial interview. An effective BPS assessment enabled them to tailor rehabilitation interventions, including self-help skills coaching, resulting in client benefits of improved self-efficacy, increased independence and increased work capacity. This process led to improved service delivery outcomes and a high level of professional satisfaction. The *challenges* varied for RCs, largely according to the requirements of each compensation scheme and the knowledge and attitudes of other parties. The most common challenges related to lack and misunderstanding of the BPS approach within the industry, limited time to spend with clients because of cost restraints, service delivery structures and expectations, role definitions between disciplines, and limited access to BPS training and resources. These challenges indicate that the factors contributing to the implementation of this approach are system wide, company specific and within individuals.

Thematic analysis of the interviews resulted in the identification of four main themes shaping the BPS practices of RCs: (i) BPS approach is limited by misunderstandings, (ii) considerations in gathering BPS information, (iii) dilemma in building client self-help capacity and (iv) balancing professional values and KPIs. The themes and subthemes present a framework of key factors and their relationships (Figure 8.1), as they influence the application of structured BPS rehabilitation in workplace rehabilitation. They offer explanation regarding both the successes and obstacles of BPS implementation.

8.4.2 Comparison with Results from Previous Research

Previous studies have found that an effective BPS approach in work injury management has the potential to assist clients to gain improved self-efficacy in managing their pain and injury and increased independence, leading to improved quality of life, work capacity and potential for sustainable work outcomes (Black et al., 2017; Kendall et al., 2013;

Loisel et al., 2005; Sullivan, Feuerstein, et al., 2005; Waddell et al., 2003). This study found that RCs reported similar client benefits. This may be the first qualitative study to investigate the perceptions of workplace RCs on the topic of BPS rehabilitation.

This study found that factors perceived by the RCs' as negatively affecting the provision of structured and effective BPS workplace rehabilitation were system wide, company specific and within individuals. For example, they spoke of the need for improved BPS education opportunities in all sectors and the potential benefits of schemes mandating psychosocial assessment and outcome measures. Previous researchers have recommended that, for a BPS approach to be effective, it must be implemented at all levels within a scheme (Pincus et al., 2013). Beales, Fried, et al. (2016) reported that an effective BPS model of care will need to be integrated at the macro-level across the system, at organisational or meso-level, and for everyone at the individual or micro-level.

Similarly, this study found that the *BPS approach is limited by misunderstanding* (Theme 1) and this has a direct and potentially unhelpful relationship with RCs' *considerations in gathering BPS information* (Theme 2) during the initial assessment—such as influencing decisions regarding the use of psychosocial instruments and the time available for the initial interview. The RCs also reported the influence of BPS misunderstanding in Theme 3, *dilemma in building client self-help capacity*, with some stakeholders interpreting self-help coaching as a role restricted to treatment providers. A consequence of that restriction was then reflected in *balancing professional values and KPIs* (Theme 4) because the consultants all reported being driven by a desire to facilitate client empowerment. The implementation of improved BPS education opportunities at all levels of a scheme may reduce these potential barriers to the implementation of a structured BPS approach in workplace rehabilitation.

Beales, Mitchell, et al. (2016) investigated the effects of a potential scheme change by providing brief BPS education to insurance workers. The researchers found that this positively influenced case manager beliefs about back pain and claim management behaviours, such as improved communication with clients. Similarly, the consultants interviewed in the current study had observed situations in which increased understanding of BPS rehabilitation led to positive changes in the compensation scheme expectations of WPRs. In those situations, RCs were now expected to implement a holistic rehabilitation approach, evaluate 'whole of person' needs, and implement individualised strategies to

enable each person to develop self-efficacy and independence. The RCs reported that this had enabled them to more easily use a BPS approach, within the constraints of the WRP approval requirements, and had resulted in a positive change to the rehabilitation experience of their clients.

However, even with these changes, most schemes do not require WRPs to use psychometric tools during assessment or as outcome measurement. Yet the RCs who routinely used psychometric assessment tools strongly valued the benefits they reaped in terms of saving time, providing key client information and measurement. These tools supported their initial interview; guided intervention planning, allowing them to tailor self-help coaching; aided communication and collaboration; and provided objective outcome evidence for accountability. Previous studies have demonstrated similar benefits of using psychometric tools for managing musculoskeletal injury and RTW (Hill et al., 2008; Sullivan, 2013). Other researchers have shown that BPS assessment requires both interview and psychometric tools—self-report psychometric tools to identify and measure the person's key influential BPS responses, and an interview to build rapport and trust and discuss the questionnaire responses (Shaw, MacKinnon, McWilliam, & Sumsion, 2004). The routine use of psychometric tools meets another important recommendation for scheme improvement—improved data collection (Collie, Iles, et al., 2018).

The issues around the use of assessment tools reflect an important relationship between the themes that emerged in this study: *considerations in gathering BPS information*, *dilemma in building client self-help capacity* and *balancing professional values and KPIs.* The RCs advised that self-report psychometric instruments were an important vehicle to introduce pain and BPS education into their initial interview. In one scheme, goal and lifestyle tools were required; however, these tools do not screen responses to injury or pain and thus do not contribute to the pain and BPS education process.

This study found that the delivery of a structured BPS process was dependent on commitment by the WRP to provide specialised BPS training and resources to their professional staff, which also ensured that different allied health personnel would work in an interdisciplinary manner, rather than being 'discipline siloed'. A similar recommendation was made by researchers in 2005:

> Challenges to effective secondary prevention of work disability include developing competencies to enable a range of providers to deliver interventions, standardization of psychosocial interventions, and maximizing adherence to intervention protocols. (Sullivan, Feuerstein, et al., 2005)

8.4.3 Strengths and Limitations

The participant cohort was a strength of this study because the RCs were in different geographical locations, had varied education and professional development backgrounds, and had a wide range of experience in workplace rehabilitation settings and personal injury compensation schemes. Overall, their responses indicated that they held a common belief regarding the value and purpose of their work, had strong professional ethics, were driven to build their knowledge for evidence-based practice, and had chosen (and remained) in their vocation because it enabled them to assist other people to improve their lives. The number of participants (13) was a potential limitation; however, data saturation was achieved resulting in no new information or possible further coding, and sufficient information to replicate the study (Fusch & Ness, 2015). Further, because of the interviewees' relevant experience, their contributions provided information-rich interviews.

The RCs volunteered to participate in this study because they valued working with a BPS approach, whereas others may prefer to work in a more traditional, disciplinary-specific service delivery model. Therefore, the participant population does not represent the preferences and attitudes of Australian RCs as a group, which is a limitation to application of the study findings beyond RC's who value this approach.

8.4.4 Potential Implications

This study highlights the gap in research into models of care for workplace rehabilitation. The response data indicate that all participants in this study sought to deliver best-practice workplace rehabilitation and recognised that this would be a BPS approach. Most considered this approach to include identification and measurement of the BPS factors influencing a client's response to injury and RTW, and facilitation of self-efficacy in managing their pain and injury through self-help coaching integrated into the RTW rehabilitation plan. The findings suggest that the facilitation of an effective BPS approach in workplace rehabilitation does require a structured approach. In this study, the detail of

that structure varied, yet appeared to constitute a quality managed process that included adherence to a consistent and standardised assessment methodology, with a collaborative plan development method suitable to engage clients, and an established pathway with coaching resources to support each client to develop self-help knowledge and strategies. For some WRPs, the goal was for that process to be integrated into all rehabilitation and RTW programs and to be evaluated by using psychometric tools for baseline, progress and outcome measurements. This was achieved by consultants using the Abilita assessment, coaching and training resources, and that structure suggests that other WRPs who attempt to integrate the BPS approach into their service delivery have identified a model of care that is closely aligned to the Abilita Rehabilitation Model, as investigated in Chapter 7.

The study also highlights the influence that scheme legislation and policy have on the application of an effective BPS approach. To work within this BPS process, all consultants acknowledged the need to employ therapeutic techniques to engage, motivate and educate clients to generate the cognitive and behavioural changes necessary for adoption of self-management skills. However, most RCs were also wary of any action that could be interpreted as treatment, even though they all had professional qualifications to apply therapeutic skills. The underpinning cause for this dilemma appears to originate from the NCAF (Heads of Workers Compensation Authorities, 2015), which has been in place over the past decade and has recently been reviewed, as reported in Chapter 4. It contained contradictory advice, as it requested WRPs to undertake BPS assessment and simultaneously directed them to not use their professional competency of therapeutic counselling to assist clients to manage those influential BPS factors. The responses of participants in this study suggest that the wording in this legislative instrument has undermined WRPs' ability to openly implement comprehensive BPS models of service delivery. This appears to have directly contradicted the evidence that individual-specific BPS risk factor identification and management is a critical RTW intervention (Beales, Fried, et al., 2016; Iles et al., 2018).

A third implication is the breadth of education that seems to be required across all levels of compensation schemes. BPS training is recommended for insurance personnel in best-practice guidelines (Collie, 2019; Safe Work Australia, 2018c), yet the findings from this study suggest that understanding of the BPS model for many stakeholders is incomplete.

Consultants advised that disruption to the delivery of BPS rehabilitation was at times caused by other health professionals. This included allied health practitioners with a narrow discipline focus, and general practitioners and medico-legal specialists with a strong biomedical focus. They considered that a BPS approach was misrepresented or misinterpreted by many within the industry, including insurers, health professionals and rehabilitation providers, and that this has consolidated the challenges to delivering effective and structured BPS rehabilitation. They indicated that this issue includes lack of awareness of the critical importance of each client understanding the BPS elements of their injury. Other researchers have demonstrated that a key component in a BPS intervention is explanation of the physiology of pain, so that the individual understands how the biological, psychological and social elements interact to heighten or dampen their symptoms (Traeger et al., 2014). Without this understanding, there is little reason for a person in pain to be motivated and committed to the cognitive and behavioural changes necessary to build durable self-management skills (Moseley & Butler, 2015).

8.4.5 Future Research

Further investigation into the themes and subthemes (Figure 8.1) that emerged from this study may build greater insight into the challenges influencing the application of a structured BPS approach within workplace rehabilitation. The findings of this study indicate that improved BPS education could be useful in all sectors, including for health professionals. A survey of the strength of BPS training in undergraduate courses could assist educators to better equip allied health and rehabilitation professionals with the skills, resources and expertise to deliver structured BPS rehabilitation.

This study identified three distinct workplace rehabilitation service delivery structures promoted as BPS. The researcher labelled the three approaches of ‘psychosocial rehabilitation’, ‘accepting BPS responsibility’ and ‘interdisciplinary BPS rehabilitation’ as subthemes under the theme of ‘dilemma in building client self-help capacity’. Many factors appeared to cause the development of these very different approaches, including scheme requirements, BPS understanding among WRPs and other stakeholders, and WRP business choices. Further research is necessary to fully evaluate the benefits and results of these and any other different approaches to BPS rehabilitation. Further, a study of the factors that influence the practice decisions of Australian WRPs may add knowledge to

the real and perceived barriers to the integration of a comprehensive and structured BPS approach.

8.5 Conclusion

This study has identified some of the key perceived benefits and challenges of RCs regarding the integration of a comprehensive BPS approach into workplace rehabilitation. As with the studies discussed in Chapter 4, it was found that, despite acknowledgment within health and compensation sectors of the evidence supporting BPS rehabilitation, there has been very mixed and truncated application of the approach. The findings suggest that the benefits of this evidence-based approach have not been secured in workplace rehabilitation because of inadequate BPS understanding and application, WRP difficulties in achieving efficiency during assessment, WRPs' dilemma regarding how to facilitate their clients' self-help capacity, and variations in WRP service delivery in response to balancing professional values and KPIs.

This study provides some preliminary support for the importance of implementing the BPS approach in a structured manner to achieve the required qualities during the assessment, intervention and therapeutic processes. For an effective and structured BPS approach to become fundamental to rehabilitation service delivery, it appears there is a need for more accurate education of all stakeholders, including recognition of the critical importance of providing pain and BPS education to individuals with injury.

Replication of these findings in future studies may result in consideration of amendments to compensable injury scheme design to facilitate the delivery of structured BPS rehabilitation. The study may assist industry leaders and researchers to recognise the important gaps in knowledge regarding workplace rehabilitation. Future research building on the findings of this study may contribute further explanation regarding why compensation scheme data continue to indicate disappointing health and work outcomes, despite increasing costs.

Chapter 9: Discussion and Conclusion

The purpose of this chapter is to synthesise the research presented in this doctoral dissertation and consider how it has contributed to the body of knowledge pertaining to the implementation of an effective BPS approach within work injury management. This chapter includes a brief summary of the thesis, a synthesis of the research findings, the study's theoretical and practical implications, a consideration of the study's strengths and limitations, suggestions for future research and the study conclusion.

9.1 Summary of Research

The researcher's motivation to facilitate a comprehensive BPS approach within workplace rehabilitation was triggered by observations of workers with MSKD commonly experiencing poor health and work outcomes because of the influence of unhelpful psychosocial factors (Blyth et al., 2007; Edwards et al., 2016). This is a well-documented problem and research has built an extensive body of knowledge to explain its extent and effects, investigate potential contributing factors and test various management approaches (e.g. Collie, Di Donato, et al., 2018; Foreman et al., 2006; Nicholas et al., 2011; Pransky et al., 2005). That literary resource was the basis for preparing Chapter 3 to discuss current approaches to managing work disability, and Chapter 4 to explore the BPS approach in detail and identify its core components. This inspired development of the psychosocial factors assessment, ARI, which was reported in Chapter 5. This was followed by the design and analysis of a brief triage questionnaire developed from the ARI for the purpose of predicting individuals' appropriateness for referral for ARI assessment, as presented in Chapter 6. Chapter 7 provides preliminary evaluation of the feasibility and effectiveness of integrating the Abilita assessment tools and a self-management coaching intervention into workplace rehabilitation. Finally, Chapter 8 reported on a qualitative study that sought to identify the benefits and challenges experienced by RCs during their implementation of any structured BPS rehabilitation program into workplace rehabilitation. A summary of the purpose and key findings of these studies is presented in Table 9.1.

Table 9.1: Summary of Findings of Each Chapter

Chapter	Purpose	Key Findings
3. Literature review: work disability	To gain an understanding of the effectiveness of current management of work disability in compensable injury schemes and of observed challenges and recommended models of management and best practice	Current management is not achieving improved RTW outcomes. Research synthesis recommends developing customised methods to implement BPS evidence-based models to accommodate the complexity caused by the many levels, phases and players interacting and influencing the processes and outcomes in each scheme.
4. Literature review: BPS research	To determine the BPS features that have been identified as core components to effective application of the BPS approach in work injury management	Key BPS components include BPS triage screening, psychosocial assessment, capacity to match assessment to intervention, tailored self-management skills coaching and a workplace focus. All components should be implemented through a structured model, including training and coordination, across multiple levels of a system, as well as digital data management.
5. Quantitative investigation: ARI instrument	To determine if the comprehensive questionnaire, ARI, is a reliable and valid tool to screen multiple psychosocial factors and report them in BPS domains to inform workplace rehabilitation	The ARI is a reliable and valid instrument to identify and measure the influence of the psychosocial factors affecting recovery and RTW. The automated reports provide an evidence-based resource to identify risk and support workplace rehabilitation planning.
6. Quantitative investigation: AB-5	To determine if a brief triage questionnaire can reliably predict potential psychosocial risk and the need to complete an ARI questionnaire	AB-5 was able to reliably predict if a respondent's initial ARI rating would exceed the threshold indicating recommendation for referral for initial ARI assessment to identify and measure influential psychosocial factors.
7. Quantitative investigation: Abilita Rehabilitation Model	To evaluate the potential effectiveness of using the ARI, self-management coaching and consultant training in workplace rehabilitation to reduce unhelpful BPS factors and facilitate increased work capacity	Preliminary findings in application of the Abilita Rehabilitation Model in workplace rehabilitation resulted in improvements in reduction of ARI score (measuring psychosocial factors), improvement in work readiness and increased work hours associated with higher % shift in ARI score
8. Qualitative investigation: BPS rehabilitation in practice	To gain a deeper understanding of the benefits and challenges experienced by RCs during their integration of a BPS program into workplace rehabilitation	The effective delivery of a BPS approach by RCs was dependent on their own and other parties' *BPS understanding*, which influenced *considerations during BPS assessment*, contributed to a *dilemma in building client self-help capacity* and was moderated by the need to *balance professional values with KPIs*.

9.2 Synthesis of this Research

This thesis sought to present evidence to support the hypothesis that applying a comprehensive and structured BPS approach in workplace rehabilitation would achieve better outcomes for people with compensable MSKD. The literature reviewed in Chapter 3 confirmed that workers' compensation outcomes have remained stagnant and poor for decades (Safe Work Australia, 2018b; Social Research Centre, 2018), which suggests that current practices are not providing a solution to the problem. Many of the studies reviewed concurred in recognition that the complex characteristics of the health, work and financial contexts must be understood and managed to achieve a reduction in work disability (Briand et al., 2008; Collie, Lane, et al., 2015; Costa-Black et al., 2013; Cullen et al., 2018). The complexity of this context has led to studies targeting specific sectors, such as claim management practice, compensation scheme policy and workplace factors that influence RTW outcomes, or healthcare management of musculoskeletal injury. Consequentially, numerous recommendations for improved management of the problem target change in one sector, such as models of care for MSKD to guide treatment providers (O'Sullivan et al., 2017), or employer actions that will optimise RTW (Franche, Cullen, et al., 2005; Sheehan et al., 2019). However, the more comprehensive studies argue that resolution of the problem requires the development of customised system-wide solutions to implement BPS evidence-based models to accommodate the complexity caused by the many levels, phases and players interacting and influencing the processes and outcomes within each scheme (Beales, Fried, et al., 2016; Loisel et al., 2005).

As a consequence, Chapter 4 continued the review of extant literature to identify the factors that are considered most valuable in applying an effective BPS approach in work injury management. Previous researchers have established the capacity of BPS approaches to positively influence the worker, workplace, healthcare and case management actions that influence recovery and RTW (Gatchel et al., 2007; Hulla et al., 2019; Pincus et al., 2013). This literature review found that, to achieve efficacious implementation of this complex approach in workplace rehabilitation, injury management systems need to include claims management triage on the basis of psychosocial risk, identification and measurement of multiple influential psychosocial constructs using a self-report assessment that is repeatable and contributes to a digital database, and health coaching tailored to the individual's assessed psychosocial profile to build self-

management capacity and work readiness. Moreover, the approach needs to be implemented in the injury management system in a coordinated and structured manner, with a workplace focus, consideration of social support, and integration of healthcare into the workplace. The implementation of this structured and resource-rich BPS approach would require training for stakeholders at all levels of the system to optimise knowledge transfer and adoption and adherence to the new intervention protocol (Main et al., 2016; Sullivan, Feuerstein, et al., 2005).

BPS training for all stakeholders would need to include an explanation of the importance of workers with injury learning to understand the BPS model and the contributions that negative affect, unhelpful cognitions and physical deconditioning have to the dynamic process and maintenance of pain and disability (Gatchel et al., 2007). This knowledge gain would provide the motivation necessary for each worker to choose to adopt self-management strategies and drive recovery and RTW (Louw et al., 2011; Moseley & Butler, 2015). However, this key to the success of the BPS approach was found to be absent from the recommendations of influential documents on methods to improve RTW outcomes, such as those by Atkins & Robinson (2015) and Safe Work Australia (2019).

Leading researchers in this field have suggested that, to overcome the enormity of the work disability problem, it is necessary to develop competencies in a range of providers to deliver standardised and matched-care BPS interventions (Linton et al., 2018; Sullivan, Feuerstein, et al., 2005). RCs employed by WRPs are allied health professionals and are ideally positioned to deliver many of the identified BPS components. However, under current Australian regulatory requirements, they have not been authorised to provide the full suite of BPS services that they are qualified to deliver (Heads of Workers Compensation Authorities, 2015) and that, if integrated into workplace rehabilitation, may contribute to improved scheme outcomes. It emerged from the literature review that there was minimal investigation of WRPs' role, practices and influence in injury management, despite extensive use of these services in all compensable jurisdictions.

Recognition of the potential for WRPs to contribute to an effective BPS approach in an injury management scheme led to development of the self-report instrument, the ARI. This was designed to survey multiple psychosocial constructs that have been shown to be barriers to recovery and RTW following MSKD, and to report these within BPS domains to guide self-management skills coaching. This tool differs from existing instruments

available to WRPs, which either canvass only one psychological construct (Nicholas, 2007), or, if assessing multiple constructs, only provide a total score (Linton & Boersma, 2003). The ARI provides WRPs with a potentially more efficient and effective method of identifying the psychosocial factors that need to be addressed within a workplace rehabilitation plan. The quantitative study reported in Chapter 5 used the ARI database and was able to confirm the reliability and validity of the instrument (Garton et al., 2016).

To support WRPs and their customers to identify claimants with the potential for delayed recovery because of unhelpful psychosocial factors, the next research step was to develop the brief triage questionnaire, AB-5. This was achieved by identifying the cluster of ARI questions that met acceptability selection criteria and had a total score with highest correlation to the initial ARI rating. The AB-5 differs from many existing triage questionnaires by distinguishing triage screening from psychosocial assessment (Waddell et al., 2003). That is, it was not designed to identify and measure the influential psychosocial factors; rather, its purpose is to assist claims administrators to segregate those claimants who may be vulnerable to this risk and would subsequently benefit from completion of an ARI assessment. The results of this preliminary study found the AB-5 triage questionnaire to be reliable for this purpose, with 94% sensitivity.

The third quantitative study of this investigation evaluated the potential feasibility and effectiveness of integrating this comprehensive and structured BPS approach into workplace rehabilitation. That study included the following components:

- ARI to identify and quantify key beliefs, expectations and behaviours and report them in BPS domains
- a modularised self-management coaching course that could be tailored to each individual's BPS profile
- consultant training in the recommended coaching process, coaching topics and RTW actions to match client progress.

The ARI was re-administered post-coaching to measure change, with the results providing an opportunity to evaluate the effectiveness of this model. Participant characteristics of the post-coaching impact data (n = 423) indicated a variety of musculoskeletal injuries, equal gender representation, and wide age and education ranges. Moreover, 55% of participants were not attending work at the time of the initial

assessment. Further, only 13% had been assessed within 12 weeks post-injury, so this study included many long-term claimants with a mean time to assessment of 92 weeks (med 39 weeks) post-injury.

The first hypothesis of the study expected that the effectiveness of the coaching intervention would be indicated through a positive shift in participants' psychosocial responses. This was supported by the results finding a mean ARI score shift of 32%, which was both statistically significant and of a large effect size (d = 1.32), with no statistically significant difference between males and females. Given that the data were participant responses to questions reflecting their beliefs, expectations and behaviours, they provided subjective evaluation of these changes, thereby suggesting potentially clinically meaningful change for the participants. Multiple regression analysis was conducted to examine the relationship between a set of IVs and the impact ARI score, finding that 54% of variance was accounted for by the initial ARI score, length of time since injury and employment status. These results concur with current best-practice recommendations for early, remain-at-work interventions (Safe Work Australia, 2019). However in this study, the reduction in psychosocial factors was influenced less by duration of claim than initial ARI score and employment status, suggesting the intervention was potentially valuable for both early and long term cases.

The second hypothesis was that a shift in ARI score would result in increased work capacity, measured through an increase in work readiness and increased work hours. Work readiness was included as a measure of work capacity because it has been identified as an important precursor to successful RTW. The shift in the work readiness question ('How confident are you that you can safely return to work or increase hours or duties at work?') was statistically significant, with a moderate effect size (d = 0.63). The study design did not provide for final work outcomes however participants were found to have gained an increase in work hours following coaching. For females, the increase in work hours were statistically significantly higher than for males. Multiple regression analysis showed that both initial hours and percentage shift in ARI score positively influenced impact work hours following coaching. This extends previous research findings that a reduction in psychosocial risk factors augments RTW outcomes (Besen et al., 2014; Nicholas et al., 2019).

The final hypothesis of this study was that the structured resources in the Abilita Rehabilitation Model—including ARI, self-management coaching resources and consultant training—would enable RCs to deliver a service that was valued by participants. This outcome was indicated by participant evaluation questions within the impact questionnaire, in which 97% of participants found the course helpful in learning to manage their injury, and 96% were satisfied with the coaching course.

The study provides preliminary evidence to support a rehabilitation model in which the Abilita components, assessment reports with domain ratings, and recommended coaching process and content are integrated into workplace rehabilitation. The Abilita program reports, training and protocols appear to have optimised the likelihood of RCs adopting and adhering to the assessment and coaching process. A future prospective designed study is necessary to confirm that these findings are repeatable and to collect additional outcome data.

Finally, this investigation sought to identify the benefits and challenges experienced by RCs during their implementation of any structured BPS rehabilitation program into workplace rehabilitation. For the purposes of this study, the researcher defined a structured BPS approach as essentially including self-report psychosocial factor assessment and self-help skill development, integrated into a rehabilitation and RTW plan.

For this qualitative study, the researcher interviewed 13 RCs from different geographical locations with varied education and professional development backgrounds and a wide range of experience in workplace rehabilitation settings and personal injury compensation schemes. Through thematic analysis, the researcher was able to identify, analyse and report patterns and themes within the data, and four main themes emerged. First, the application of effective BPS was limited by misunderstanding of the approach within injury management schemes, including by health professionals. Second, when assessing clients, most RCs preferred to use self-report tools and interview, and to have ample time to build the client's trust and engagement. Third, the RCs were driven by a desire to facilitate independence within their clients, and most recognised that client understanding of the neuroscience of pain helped them build self-help capacity. Finally, the RCs chose and valued the BPS approach over any other rehabilitation method, and found that application challenges related to industry expectations of their role. A thematic map

(Figure 8.1) helped link the themes and subthemes and demonstrate coherence within them and distinctions between them. The themes and subthemes potentially present a framework of key factors and their relationships as they influence the application of a structured BPS approach within workplace rehabilitation.

The findings of this qualitative study reinforce previous findings in this investigation, including that the BPS model appears to be broadly misunderstood, which results in limitations in understanding how to apply an effective BPS approach within injury management. Clarification of those misunderstandings was not a purpose of this investigation. However, one limitation may relate to a perception that a BPS approach involves providing interventions to a passive participant to address the physical, psychological, social and work-related aspects of their disability, with psychosocial barriers identified and used to inform the intervention, but not to educate the person. In contrast, an important goal of the approach is to assist the person to become empowered to better manage their health condition (Health Services Group, 2012). Therefore, a worker with injury needs to understand the complexities of the BPS model to know how the choices they make will either facilitate or hinder their recovery and RTW. For this to be executed by all parties, in all processes and at all levels of an injury management scheme, it seems that a concerted improvement in BPS education, training and implementation strategies is necessary.

In summary, this thesis presents preliminary evidence to support the contention that the application of a comprehensive and structured BPS approach in workplace rehabilitation would achieve better outcomes for people with compensable MSKD. The theoretical and practical implications of this research are discussed in the following two sections.

9.3 Theoretical Implications

The theoretical implications of this research are discussed in this section in relation to considerations when assessing psychosocial constructs, and when developing policy for the implementation of a BPS approach.

9.3.1 A View of Biopsychosocial Constructs

The Abilita domains may have introduced a new way to conceptualise BPS assessment. The BPS model acknowledges that the responses of an individual to injury or illness may

influence their recovery, contribute to their pain and disability, and contribute to their RTW outcome (Beales, Fried, et al., 2016). Several important psychosocial constructs have been described to explain these biological, psychological and social interactions. These were detailed in Table 4.1 and include the fear-avoidance model (Vlaeyen et al., 2016), catastrophising (Wideman & Sullivan, 2011), emotional distress (Campbell et al., 2013), passive coping (Mercado et al., 2005), perceived injustice (Sullivan et al., 2008), pain self-efficacy (Nicholas, 2007; Wideman & Sullivan, 2011) and work perceptions (Truchon et al., 2012). The underlying psychosocial constructs are not discrete—they interact and overlap, and their cumulative influence is a more effective prognostic indicator than scores on individual scales (Wideman et al., 2012).

These constructs informed the development of the ARI domains of Pain, Function, Emotions, Coping, Confidence and Work Perceptions, as reported in Chapter 5. In this manner, the multiple evidence-based psychosocial processes believed to drive pain and disability are canvassed in one psychometric tool. This extends previous research that suggested that 'a measure of multi-dimensional, prognostic complexity is associated with greater predictive strength and scope than several single-construct measures' (Wideman et al., 2012). The visual representation of the domains in the Abilita Initial report offers both the assessor and respondent an opportunity for insight into the BPS factors of most significance to that individual. The Profile report adds detail for each domain to assist the consultant to develop a tailored self-management coaching plan, as illustrated in Chapter 7. Following coaching, the Impact report provides a measure of the effectiveness of that intervention in changing the influence of those key psychosocial constructs, as seen in the domain chart. This researcher is unaware of any other self-report instrument that offers that presentation of the influential BPS factors.

9.3.2 Biopsychosocial Implementation

Similar to the findings reported in previous studies, this research found that the successful implementation of an effective BPS approach into injury management is influenced by individual, organisation and system factors (Briand et al., 2008; Collie, 2019; Foreman et al., 2006; Loisel et al., 2005). Previous studies advised that evidence-based models and practices must be implemented at all levels of a scheme, for all stakeholders, and during all phases of the claim process. The present study contributes new information to knowledge in this field by providing detail of those influential factors within the context

of workplace rehabilitation. Through a literature review, three quantitative studies and one qualitative study, this doctoral research has contributed evidence of the potential benefits of implementing a structured and well-resourced BPS model within workplace rehabilitation.. This dissertation has described in detail the evidence-based components of an effective BPS approach to address psychosocial variables, including workplace issues specific to the person. However, a comprehensive and effective BPS approach in Injury Management also requires appropriate management of the critical factors within workplaces and compensation systems that impact return to work. The consideration of this detail will support integration of the BPS model into any injury management scheme at all levels, phases and for all stakeholders.

9.4 Practical Implications

9.4.1 Limitations in Biopsychosocial Understanding

A synthesis prepared from the plenary sessions of the 2012 XII International Forum on LBP Research in Primary Care (Pincus et al., 2013) provided an integrated review of the knowledge and effectiveness of the BPS model over the previous 25 years. The authors found that the model had not achieved the anticipated results because of failures in how it had been understood and applied (2013). This doctoral research has found evidence of ongoing limitations in understanding the model.

There is broad agreement of the need to apply a BPS approach in injury management, with recognition that multiple and interacting biological, psychological, social and work factors all contribute to the worker's injury experience (Beales, Fried, et al., 2016; Costa-Black et al., 2013). The current research has found an important gap in application of a BPS approach: there is little evidence of recognition that the individual experiencing the injury must understand the BPS processes and consequences, and subsequently understand the choices that only they can make. That understanding occurs when the person is offered the opportunity to learn basic physiological processes in the body, the process of experiencing pain, and the production and role of nerve impulses and body chemicals in response to the threat of pain. This neuroscience knowledge empowers individuals to understand that what they do, think and feel will dampen or enhance their pain and distress. Studies in knowledge transfer (Shaw et al., 2010, Shaw, 2012) have found that principles for effective communication including—engagement, needs-based

and accessible information, simplification, and applicability to daily context—are the most effective methods for health professionals to assist patients to use, explore and act on knowledge. Similarly, the techniques of transformative learning recognise that adult learners need to understand the meaning of their experience and will generate their own interpretations, rather than act on the purposes, beliefs, judgements and feelings of others (Mezirow, 2009). Pain education improves participation in a BPS program and subsequently needs to be a core and early component (Moseley & Butler, 2015).

The importance of this client education is often absent in studies, even in papers demonstrating the benefit of interventions that manage psychosocial barriers (Black et al., 2017), promoting a BPS approach as best practice (Health Services Group, 2012) or promoting consumer-centric models (icare, 2018). They do include the need for individuals to develop self-management skills and strategies, acknowledging that clients who achieve a stronger locus of control gain both improved quality of life and increased work capacity. However, they do not state the need for clients to understand BPS processes and pain neuroscience. This omission may be based on the expectation that treatment providers offer the information; however, that cannot be guaranteed (Moseley, 2003). All participants from the qualitative study in Chapter 8 believed that, once a client had been taught the process of pain, they were more engaged and committed to developing self-management skills. Despite this, not all RCs provided the information to their clients, either because of lack of confidence or because they did not consider it their role. For RCs, this role dichotomy was instigated by the NCAF, which recommended that WRPs identify and manage unhelpful psychosocial barriers, while simultaneously prohibiting them from including ‘therapeutic counselling’ in their services (Heads of Workers Compensation Authorities, 2015). Several of the consultants from the study discussed being careful with the terminology they used in rehabilitation plans to overcome this restriction. Those RCs, described under the subtheme of ‘accepting BPS responsibility’, always ensured that their clients gained pain neuroscience and BPS knowledge, and reported greater client engagement and less resistance than those described under the subtheme of ‘psychosocial rehabilitation’.

From the qualitative study it emerged that the RCs did not learn this core component of the BPS approach in their undergraduate training, but only in postgraduate professional development courses or through on-the-job experience. They were provided only

theoretical understanding in their tertiary training. The participants also reported wide variability in BPS understanding, not only in claim management, but also among allied health and medical practitioners. They reported that some health professionals focused only on the techniques of their discipline and misunderstood a BPS approach as 'care provided by multiple disciplines'. They considered it not uncommon for medical specialists to imply that psychosocial barriers were indications of malingering, rather than evidence of the need for BPS intervention. These findings indicate that universities offering medical, allied health and rehabilitation courses could assist in improving BPS understanding by including evidence of the benefits to recovery when individuals understand the interactions of BPS components and pain neuroscience.

The RCs indicated that most schemes now promote their adherence to a BPS approach, as do most insurance agents and WRPs. However, they reported considerable variation in interpretation, such as in the use of psychometric tools, psychosocial data collection, the provision of pain education, building self-management skills and work readiness, and the expectations and restrictions of services according to professional discipline. An example of limited application in more than one scheme is the interpretation that a BPS approach constitutes developing psychosocial wellbeing through community participation, with no requirement for providers to assist the claimant to understand how bio-psycho-social interactions dampen or enhance the experience of pain.

However, that information is critical to an effective BPS approach; therefore, all health and rehabilitation professionals must be confident and resourced to offer this information to all clients. Moreover, all claim and case management personnel need to hold the knowledge, so that their conversations naturally concur and reinforce that information. This finding suggests that those with the responsibility for implementing a BPS program within any injury management system should ensure that this requirement is documented in the process and that BPS education is provided for all involved, at all levels of the system.

9.4.2 Consider Context When Applying a Biopsychosocial Approach

In clinical pain management settings, the BPS approach is presented as a combination of medical, physical, psychological and social therapies, with the aim of addressing all the factors that influence the pain experience. In that context, outcome measures are used to

evaluate service and outcomes for individuals experiencing chronic pain, and the Electronic Persistent Pain Outcome Collaboration (Australian Health Services Research Institute, 2019) has developed a standard set of data items and assessment tools for that purpose.

Most personal injury claimants do not find themselves in specialist pain management settings. Most are medically managed by their general practitioner, with intervention provided by local allied health practitioners and a rehabilitation provider involved as per the policy of the jurisdiction. In this context, the individual's time in each session is limited by service delivery and economic constraints, and it is in these circumstances that the concept of BPS requires an easily understood and meaningful description. In the study reported in Chapter 7, the Abilita domains were used to support RC conversations with clients, thereby providing an opportunity to normalise BPS responses and to discuss their interactions, such as by linking a high rating 'Emotion' domain to understandable 'fears' that limit activity and contribute to a high rating in 'Function' (note: high domain ratings indicate a greater unhelpful influence of responses). This resource may be equally valuable to other community-based health professionals such as general practitioners and allied health clinicians.

Research underlying the psychological constructs contributing to pain and disability has been invaluable to help health practitioners understand the BPS processes affecting their patients. However, it can be interpreted that such research has reignited the biomedical model by providing tests to 'diagnose' psychosocial condition. This leaves the health practitioner in the position of explaining to the client that, for example, 'catastrophising', 'fear avoidance' and low 'pain self-efficacy' are the underlying causes of their suffering. This is akin to taking blood tests and diagnosing iron deficiency as the underlying cause of fatigue. However, the BPS conversation is much more difficult, and has been found to be a major barrier to the implementation of BPS care (Broberg, Boyd, & Backer, 2017). This predicament may only be overcome when an understanding of 'bio-psycho-social' interactions becomes accessible to non-health-professional members of the community. The Abilita domains were conceived to achieve BPS reconceptualisation for that purpose. Their names are common terms and the chart is a visual representation of the influence of the person's responses within those broadly understood concepts. Abilita licensees reported that this engenders ownership of responses and willingness of clients to discuss

the effect of those responses and to engage in a rehabilitation program aimed at reducing their contribution to suffering (Garton et al., 2016).

Preliminary results from implementation of the Abilita Rehabilitation Model in Chapter 7 indicate that this assessment methodology contributed positively to the intervention process and outcomes. Further, the results suggest that the other two core components of the model—self-management coaching and consultant training—made positive contributions. Those components also stand on the evidence of previous research. The content of the coaching course was drawn from documented strategies known to help individuals develop improved coping and self-management skills (Butler & Moseley, 2007; McCracken, 2005; Nicholas et al., 2000; Thorn, 2004), modified to suit the context of workplace rehabilitation.

The stated goals of Abilita coaching were reduction of pain, improved physical function, reduction of emotional distress, improved coping capacity, increased confidence and self-efficacy, reduced reliance on medication/treatments, increased activity at home and in community, and returning to or staying at work. The developers considered that the coaching process was critical to achieving these goals in the context of work rehabilitation, and they subsequently distilled key learning from previous practitioners and researchers to build the training course specifically for RCs. Abilita coaching was built on lessons from BPS vortex (Bruns & Disorbio, 2005), Explain Pain (Moseley, 2003), neuroplasticity (Doidge, 2007), health behaviour change (Prochaska & Velicer, 1997), motivational interviewing (Rollnick et al., 2008), CCBT (McCracken, 2005) and adult learning (Knowles, Holton, & Swanson, 2005).

Taken together, this application of research evidence suggests that the Abilita Rehabilitation Model constitutes an innovation in injury management. It has achieved this by explicitly linking the relationship between multiple psychosocial constructs that are assessed using a psychometrically sound instrument, a therapeutic process to build capacity within working-age adults, and a self-management coaching resource. In this manner, the BPS model has been structured and resourced to suit the context of workplace rehabilitation. When considered alongside the evidence of limited BPS understanding across the sector, it appears that the structure and resources of this model could inform the implementation of an efficacious BPS approach within any injury management system.

9.4.3 An Option for Biopsychosocial Triage

Australian data for work outcomes following musculoskeletal injury indicate that approximately 80% of people will successfully RTW, yet that the greatest cost to any scheme derives from managing those who do not (Social Research Centre, 2018). Therefore, to manage the burgeoning economic, personal and community burden of work injury, it is essential that those at risk of delayed recovery are detected and provided earlier appropriate management. Studies have shown that psychological and social/environmental factors are strong predictors of persistent work disability and that the longer people are absent from work, the poorer their work outcome (Nicholas et al., 2019). Chapter 6 highlighted evidence supporting the multiple factors that need to be considered when using a psychometric screening questionnaire based on the BPS approach to achieve early effective triage of high-risk cases. That research led to the innovation of the discriminative brief screening tool, AB-5, directly linked to the comprehensive psychosocial assessment, ARI.

Other researchers have demonstrated that instruments containing nine or 10 questions are able to accurately predict high-risk cases when administered early post-injury (Hill et al., 2008; Nicholas et al., 2018). For both the ÖMPSQ-SF (10 items) and the STarT Back Tool (nine items), a higher score indicates a higher risk and the need for more intensive intervention and/or combinations of interventions. As noted in Chapter 4, for both tools, the number and nature of items is inadequate to interpret which psychosocial constructs are driving the persistent pain and disability; therefore, additional psychometric tests are required prior to commencement of tailored intervention. To reduce the time required at triage screening, other researchers have validated the efficacy of short versions of established psychometric tools, such as the PSEQ (Nicholas et al., 2015) and PCS (McWilliams, Kowal, & Wilson, 2015. The limitation of using short-form instruments as triage tools is that they screen for only one construct. In contrast, the AB-5 triage tool has the potential to consider multiple risk factors and thus capture the majority of people who are at risk, regardless of which psychosocial process is most influential. Within the Abilita Rehabilitation Model, the triage tool only adjudicates the need (or not) for administration of the ARI. This concurs with findings from eminent scientists on the importance of distinguishing between screening for high-risk cases and identifying the psychosocial factors that need to be addressed (e.g. Waddell et al., 2003).

The development of a triage tool linked to a comprehensive psychosocial assessment supports recent recommendations for use of a validated short psychosocial questionnaire, leading to more comprehensive questionnaires for higher risk clients, to then guide selection of the service, support or intervention that is matched to the identified client-specific risks (Collie, 2019; Linton et al., 2018).

9.4.4 Benefits of Early Intervention

Early intervention provides an opportunity to generate early changes in a person's beliefs, behaviours and expectations that are influential in their recovery. The results presented in Chapter 7 indicated that early intervention contributed to improved outcomes in applying the Abilita Rehabilitation Model. The study found that individuals referred early had the greatest shifts in ARI score, and those with the greatest shift in ARI score achieved the highest work hours following the intervention. These results support best-practice recommendations for early, remain-at-work interventions (Australasian Faculty of Occupational and Environmental Medicine, 2015) and extend previous findings that a reduction in psychosocial risk factors augments RTW outcomes and that these factors are more amenable to change when addressed early post-injury (Wideman et al., 2009).

9.4.5 Removal of Restrictions to the Role of Workplace Rehabilitation Providers

The studies reported in Chapters 7 and 8 found that Australian regulatory requirements have limited the capacity of WRPs to deliver full and effective BPS services. This was primarily a consequence of the position that 'therapeutic counselling' is treatment and inappropriate for WRPs, thereby restraining the use of self-management skills coaching. This position was in direct contrast with the findings of the only comprehensive study on the essential qualities of vocational rehabilitation (Waddell et al., 2010), which found that vocational rehabilitation needs to be applied as healthcare within the workplace, implement a BPS approach, be initiated early, and be underpinned by cognitive behavioural approaches (Waddell et al., 2010).

Australian WRPs are predominantly qualified health professionals who are ideally positioned to contribute to this approach. Therefore, the new Principles of Practice for Workplace Rehabilitation Providers potentially now offers WRP the incentive to train and resource their consultants to deliver structured, comprehensive and unrestricted BPS rehabilitation services.

9.4.6 Challenges to Biopsychosocial Implementation

The findings of this investigation align with previous research that noted that the implementation of best-practice BPS models is complex because it is subject to multiple legal, administrative, social, political and cultural challenges, and influenced by individual, organisation and system factors (Collie, Iles, et al., 2018; Costa-Black et al., 2013; Loisel et al., 2005). The qualitative study reported in Chapter 8 identified RCs' challenges as follows: the BPS approach is limited by inadequate understanding and application at all levels, multiple considerations when undertaking BPS assessment, dilemmas related to building client self-management capacity, and balancing professional values and WRP key performance indicators.

Similarly, Chapter 7 reported the process and outcomes from implementation of the Abilita Rehabilitation Model. The relatively small Abilita Impact assessment data appeared to be primarily a consequence of the complex context and tight constraints of WRP service delivery. This suggests that, despite promotion of support for BPS approaches in workplace rehabilitation, incentives for innovations have not been implemented in compensation systems or payer procurement processes.

This range of challenges reflects the influence of individual, organisational and system factors, and suggests that, for full and effective integration of the BPS model into injury management schemes, it may be necessary to stipulate principle-based policies. The current research indicates that some of those policies would need to address data collection, usage and management standards; early intervention; the requirement for and procedures to implement all components of a BPS approach, including assessment tools and intervention resources; role clarification and appropriate training for all stakeholders; and the addition of BPS metrics to outcome requirements.

The introduction of those policies may incentivise development of programs, such as the Abilita Rehabilitation Model, and their quality assurance could be managed by requiring evidence of the inclusion of the BPS components that demonstrated contribution to an efficacious approach in this research program. For example, the alternate program developed by a previous Abilita licensee (Sheppard & Frost, 2016) could be effectively evaluated using these standards. Comparable attention to implementation detail and

program structure has been applied in the UK and was reported in the study by Sowden et al., (2018) for the Vocational Advice Intervention.

9.5 Strengths and Limitations

This is the first investigation of the benefits of applying a structured BPS model within workplace rehabilitation in Australia which is an important public health concern. A major strength is the breadth of the work, including identification of the core components of efficacious BPS approaches, three quantitative studies detailing and measuring the application of the core components of the model, and a qualitative study investigating the challenges to implementing BPS approaches. This included investigation of a well-resourced workplace rehabilitation BPS model, grounded in evidence, that has the potential for application in future research projects. The resources include a triage tool, psychosocial assessment, a self-management coaching course, and training courses, and could thus form the basis of a structured BPS model in any injury management system, when supported by required implementation processes as previously discussed.

The development of the comprehensive psychosocial assessment tool, ARI, contributes to the small number of tools in which the responses to multiple evidence-based psychosocial processes that drive pain-related and disability behaviour are surveyed in the one instrument. A strength of this research was the introduction of the Abilita domains, which have added a new conceptualisation of BPS assessment by providing functionality to deconstruct the complex web of BPS factors into identifiable and measurable subscales, and link them to intervention recommendations. An additional strength in this research was the extraction of a triage tool from the ARI, as this innovation offers a streamlined claim management process linking risk classification with BPS assessment and intervention planning. This is the first triage tool developed to link directly to a comprehensive psychosocial self-report questionnaire, leading to a tailored BPS intervention with workplace rehabilitation.

A limitation of the quantitative study investigating the application of the Abilita Rehabilitation Model (Chapter 7) was the reliance on retrospective data, which meant there was no opportunity for a control group, randomisation, or quality control and standardisation of the intervention. During data collection, practice requirements were given priority over study requirements, which caused study limitations, particularly for

measuring work outcomes. In contrast, a controlled study could be designed with measured comparison of the final work outcomes and claim costs to those generated by usual care. Those metrics were unavailable for the present study. This retrospective study included minimal service delivery data, which would be valuable in future studies to enable comparison of other influential variables on outcomes. A strength of the secondary database was its distribution, as the data were collected from a broad cross-section of compensable claims in terms of geography, jurisdiction, participant characteristics and RCs, which suggests that the study's preliminary results may be generalisable. The sample size (n = 423) was sufficient to meet the requirements of the statistical tests undertaken in SPSS, including multiple regression analysis.

The qualitative analysis of challenges faced by RCs when applying a BPS approach was drawn from a relatively small sample of 13 participants. However, the RCs were in different geographical locations, had varied education and professional development backgrounds, were employed by different agencies, and had a wide range of experience in workplace rehabilitation settings and personal injury compensations schemes, and saturation was reached. The analysis provided a deeper insight into the challenges and complexity of applying a structured BPS approach and led to additional considerations for its successful implementation.

9.6 Directions for Future Research

This dissertation has provided preliminary evidence of the benefits attainable from the application of a structured and resource-rich BPS approach integrated into workplace rehabilitation. This study and other research have identified that implementation challenges have hindered the full and effective application of evidence-based practice into injury management systems. As discussed in previous sections of this chapter, this may be achieved only when implementation occurs at all levels of a scheme, for all stakeholders, and during all phases of the claim process. Thus, the next phase of research for the implementation of this model will need to be a trial of this approach within a specific injury management scheme.

9.6.1 Non-randomised Control Trial

Notwithstanding the strengths of this doctoral investigation, further research needs to be undertaken to verify the findings of application of the Abilita Rehabilitation Model. The

next phase could be achieved through a controlled, non-randomised study to compare two models of injury management. The objective would be to determine if early management of workers with MSKD using the Abilita Rehabilitation Model would yield better long-term outcomes than usual care. A detailed implementation plan would need to be developed to ensure implementation at all levels, for all contributors and at all phases. The WISE project had similar objectives, and that methodology could provide a suitable template (Main et al., 2016; Nicholas et al., 2019). Randomised allocation of participants would not be possible, as contributors at all levels of the intervention would need to complete training appropriate to their role in delivery of the protocol. The study could be implemented with a workers' compensation insurance agent using two case management teams—one for designated intervention workplaces and the other for designated control workplaces. The sample populations would need to be comparable, such as those in a large public sector department. The WISE study determined an adequate sample size of 110 people per group to allow for variations in lost time for high-risk cases and possible dropouts.

To ensure blinding of the control team, an independent research assistant could screen all participants using the AB-5 triage tool to provide categorisation of level of risk for the purpose of the study. Control case managers would not be advised of the result and would adhere to usual jurisdiction recommendations for the management of MSKD claims. The intervention case managers would follow the Abilita Rehabilitation Model with referral of all medium to high cases to an Abilita-trained WRP. The case managers would be trained to use the AB-5 and would do so for any case initially assessed as low risk, and where indications emerged later of potential delay in recovery or RTW. In this manner, BPS triage would be used as required throughout the duration of any claim (Kendall et al., 2013). WRPs would manage all referred cases according to the Abilita Rehabilitation Model protocol of assessment and self-management coaching integrated into the RTW program. The initial ARI would be administered at the WRP initial assessment for each participant, while the impact ARI would be administered within two weeks of completing coaching. Ideally, several WRPs would participate in this study to suit the geographical requirements of participants. Additional outcome measures for both the control and intervention could include lost time from work over a two-year period and claim costs over that time. These data would be available within the insurance agent's records.

The results of this study could provide adequate evidence of the efficacy of the model and determine the feasibility of its broad-scale implementation, as well as clarification of process details for optimisation of the rollout. This controlled study would provide the opportunity for additional investigation, including analysis of other variables that may influence outcomes, such as participant and/or workplace characteristics. It would also offer fertile ground for qualitative analysis of participant and contributor responses to both the intervention and control processes.

9.6.2 Measurement of Meaningful Abilita Rehabilitation Index Change

The reliability and validity of the ARI were initially examined in the study reported in Chapter 5 (Garton et al., 2016). The results of its application in the Abilita Rehabilitation Model in Chapter 7 established early indications of sensitivity to change following self-management coaching, tested as statistically significant with an effect size of $d = 1.32$. The ARI's predictive and evaluative capacity are supported by inclusion of both the ÖMPSQ and PSEQ, for which predictive and evaluative capacity have been established (Linton & Boersma, 2003a; Nicholas, 2007). Future research is now required to quantify the level of change in ARI score that relates to clinically meaningful change.

The Minimally Clinically Important Difference (MCID) is useful to determine because it is the smallest change in an outcome that an individual perceives as important (Benaim et al., 2019). The MCID of the ARI could be determined using the anchor-based method, in which patients rate their global change on a seven-point scale, and could then be compared using the distribution method to derive the minimal detectable change and ensure reliability, and matched against expert opinion (Copay, Subach, Glassman, Polly, & Schuler, 2007). A systematic review of studies of chronic pain found that the MCID is close to half a standard deviation, or one point on a seven-point scale. Studies have also found that the initial or baseline score has an effect on the MCID (Transport Accident Commission, 2019). Establishment of the MCID for the ARI would provide case managers and health professionals a gauge on which to base expectations of the influence of change following a shift in ARI score.

9.6.3 In Public Healthcare

This research found that the Abilita Rehabilitation Model constitutes an innovation in injury management achieved through the provision of structure and resources to suit

implementation of a BPS approach in the context of workplace rehabilitation. Those resources include ARI assessment with domains and self-management coaching content, which may also provide efficiencies in managing MSKD unrelated to work injury. Future research could be undertaken in the context of health and rehabilitation providers supporting a disability support pension population who are aiming to better integrate into society and re-enter the workforce.

9.6.4 Abilita Rehabilitation Model in Other Conditions

The BPS approach is recommended best practice for psychological claims in the Australian workers' compensation sector to identify barriers and implement appropriate interventions tailored to the person on claim (FSC & KPMG, 2019; Safe Work Australia, 2018c). A future research study could investigate the effectiveness of applying the Abilita Rehabilitation Model for the management of psychosocial factors associated with psychological injury or illness. This would be undertaken using the ARI-Psychological Injury (ARI.PI) and associated screening triage tool, AB-7. These tools were developed subsequent to the Abilita musculoskeletal instruments and are currently being applied in workplace rehabilitation in Australia and NZ.

9.7 Conclusion

This body of work has uncovered the challenges that have hindered the effective implementation of the BPS model within work injury management. It has created new relationships between aspects of scientifically established knowledge and, in doing so, has built and demonstrated the feasibility of an innovative BPS rehabilitation model. The insights gained through this research provide the basis for defining the knowledge, resources and processes required to yield the extensive benefits available from an efficacious BPS approach. Those potential benefits are manifest in the literature cited and some are reflected in the findings of the studies in this research program. These benefits are multifarious and include BPS and work gains for workers with injury, work efficiencies and satisfaction for RCs and claim and case managers, required patient outcomes for health professionals, resilient workers for employers, reduction in costs for claim administrators, and significant improvements in scheme outcomes.

However, this research has suggested that those benefits will be achieved only when a comprehensive, structured and well-resourced BPS program is implemented into a

scheme. Gaps in BPS knowledge have the capacity to undermine any program. This research found that the most significant knowledge gap is lack of recognition that the person with injury must be provided education about BPS responses, processes and effects, including pain neuroscience. This information explains and justifies the BPS approach and thereby attains the person's understanding and willingness to engage in rehabilitation actions to build self-efficacy. It is inadequate for all other parties to have that understanding, yet not the individual, given that, ultimately, the individual chooses how to respond to their injury.

Other factors emerged as important components for the implementation of a reliable BPS program. Collaboration in the approach would need to be developed at all levels of a scheme, including with frontline health practitioners, consulting medical specialists, rehabilitation providers, insurance personnel, employer personnel and those involved in industrial relations and litigation within the scheme. The scheme would need to: design incentives to ensure that this approach is implemented at all levels; include early intervention; psychosocial triage screening; identification and measurement of psychosocial risk factors; matching of psychosocial profiles to interventions; self-management skill development; preparation of work readiness and matching RTW actions with work readiness; reassessment of psychosocial factors to measure BPS progress; and monitoring and management within a digital database. This research was unable to identify a current program in Australian injury compensation schemes that includes all these components. Thus, perhaps the BPS Model needs to be conceptualised, taught and promoted as 'the whole is greater than the sum of its parts' – this may build recognition of the need to integrate the whole model at all levels of a scheme, for all stakeholders, and during all phases of the claim process.

Appendices

Appendix 1: Letter of Authorisation

Abilita Services Pty Ltd
GPO Box 3048
Darwin NT 0801
Tel: 08 8988 9677
Email: abilita@abilita.net.au
Website: www.abilita.net.au
ABN: 63123091298

6 November 2013

Faculty Human Ethics Committee
Faculty of Health Sciences
LaTrobe University

To Whom it May Concern,

Abilita Services Pty Ltd is proprietor of the ABnet database, which stores the responses to questionnaires administered within the Abilita Program, and has granted permission for Pamela Lorraine Garton to use that data for her research project.

Yours Sincerely
ABILITA SERVICES PTY LTD

Peter Garton
Director

Appendix 2: Abilita Triage Questionnaire Protocol

AB-5 Protocol

Utility: AB-5 identifies if a person is likely to experience persistent incapacity due to unhelpful psychosocial factors. These potential obstacles can then be identified and measured using the comprehensive, self-report Abilita Assessment. The purpose of this risk screening is to provide support for respondents and is not to be used for diagnosis or adjudication purposes.

The **validity** of AB-5 has been tested through statistical analysis of the ABnet database, by extracting responses to these 5 questions from the full ARI questionnaire and comparing them to the total questionnaire score for each case. There is a correlation between AB-5 and ARI scores with sensitivity rating of 94%. A small number of 'at risk' cases will be missed therefore we recommend repeat screening at 2-weeks or later, for any case assessed as Low-risk yet not progressing as expected.

Reliability of AB-5 is dependent on presentation of the questions in a manner that is comparable to presentation of the full questionnaire. Therefore, it is important to explain the purpose of the tool and to reassure the respondent that their responses remain confidential. The circumstance, in which the triage screen is offered, should ensure the person will respond honestly and without concern.

Delivery: The questions can be asked in either a phone conversation or an interview, and at your first contact or later. They should be introduced after you have established comfortable communication with the person, have clarified your role and responsibilities and heard the person's immediate concerns.

Here is an example of a conversation to introduce the questions

"It is important that you and I put in place rehabilitation actions that will be of most benefit to you. There are 5 questions that I would like to ask you, that will help me to understand the impact that this injury is having in your life. I will enter your answers into a form on the computer and then generate a recommendation that will help with our rehabilitation planning.

Your answers remain confidential, we only print a copy of the recommendation. Can I ask those questions now?

These are 5 statements, and I would like you to tell me on a scale of Zero to Four, how much you agree or disagree with each statement. Zero means that you totally disagree and 4 means that you totally agree.

Is your answer 0, 1, 2, 3, or 4 to the statement 'I am unable to relax'?

And again on a scale of 0 to 4, "I can do ….." Continue for the remaining statements.

"Thank you for responding to those questions".

You may generate the report immediately and discuss the recommendation with the person. If not, advise them when you will call again (within 24 hours) to discuss the results.

If you then want to recommend an Abilita Assessment, we suggest you say:

"The recommendation from your responses indicates that you will benefit from completion of an Abilita assessment questionnaire. This assessment helps to clarify how this injury is impacting in your life and helps us identify just what rehabilitation support will help speed your recovery. You will be asked to complete the questionnaire online; your responses will remain confidential and the Consultant will provide you with a copy of the report. Are you happy for me to arrange this assessment with an Abilita trained Assessment Consultant?

Read **AB-5 FAQ** in the ABnet **Help** section for hints on AB-5 delivery and on utilization of the AB-5 report.

Appendix 3: Abilita Rehabilitation Index Initial Report

Abilita Rehabilitation Index (ARI)

INITIAL Report

www.abilita.net.au
abilita@abilita.net.au

Case Number: [redacted]
Agency: [redacted]
Office: [redacted]
Assessment Date: 12-Apr-2018
Administered by: [redacted]
Of: [redacted]
Injury/Illness Date: 04-May-2017
Age: 26

This report is generated from the responses given by this person to an online questionnaire. It is designed to inform and complement rehabilitation intervention.

The Initial Report indicates the extent to which personal psychosocial factors are likely to impede rehabilitation and provides a measure of the influence of those factors.

1. Assessment Summary:

ARI Risk Rating:	4	
	Risk rating range is 1 to 4. Higher rating indicates higher risk of delayed recovery.	
ARI Score:	163	Maximum Score: 200

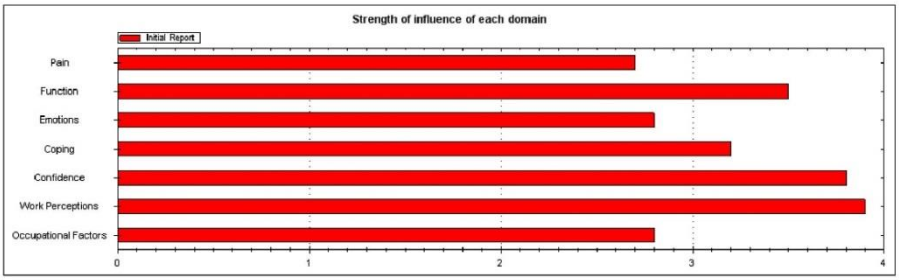
2. Work Status:

Certified to work:	No
Employment:	Same employer, not returned to work
Current hours:	*Cleared:* 0 *Actual:* 0
Pre-Injury Usual Hours:	40

3. Influential factors:

This person's responses indicate that rehabilitation outcomes may be influenced by factors in the following domains. Graphically represented below (Scale 1 - 4)

Domain	Comment
Pain:	Reporting moderate pain ratings.
Function:	Usual function is significantly reduced.
Emotions:	Reporting medium level of distress.
Coping:	Attitudes expresed indicate significantly reduced coping.
Confidence:	Reflects low sense of control.
Work Perceptions:	Perceives a significantly reduced work capacity.
Occupational Factors:	Indicate potential for moderate delay to work outcome.



4. Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ):

(Incorporated into Abilita Rehabilitation Index Questionnaire with the kind permission of Prof. S. Linton.)

Total score:	153	Maximum Score: 210

The ÖMPSQ (Linton and Boersma 2003) is a tool to predict potential for the development of long term problems. Total score predicts: low risk under 105; medium risk at 105 to 130; and high risk over 130.

5. Pain Self Efficacy Questionnaire (PSEQ):

(Incorporated into Abilita Rehabilitation Index Questionnaire with the kind permission of Professor M. Nicholas.)

Total score:	11	Maximum Score: 60

The PSEQ (Nicholas 2007) measures an individual's confidence to undertake daily activities despite pain. Total score predicts: significantly low self efficacy under 15; and high self efficacy over 40.

Appendix 4: Abilita Rehabilitation Index Profile Report

www.abilita.net.au
abilita@abilita.net.au

Abilita Rehabilitation Index (ARI)

PROFILE Report

Case Number: [redacted]
Agency: [redacted]
Office: [redacted]
Assessment Date: 12-Apr-2018
Administered by: [redacted]
Of: [redacted]
Injury/Illness Date: 04-May-2017
Age: 26

This report is generated from the responses given by this person to an online questionnaire. It is designed to inform and complement rehabilitation intervention.

The Profile Report describes some of the key personal psychosocial factors that are likely to influence this individual's rehabilitation. Knowledge of these factors enables rehabilitation practitioners to tailor intervention to enhance the individual's own resilience and to target potential barriers to recovery and return to work.

It is essential that all parties using this report have undertaken Abilita training.

[*] Indicates that an important influence has not been detected through question responses.

1. Risk Rating:

Summary:	Responses indicate a high risk of delayed recovery with potential for persistent disability. This person will benefit from a biopsychosocial coaching program in addition to required treatment.

2. Pain and Treatment:

Pain duration:	This pain experience is already of long duration.
Pain ratings:	Reporting moderate pain ratings.
Sites of pain:	Reporting localized pain only.
Pain expectation:	Low expectation that pain will become persistent
Medication:	*

3. Function:

Exercise:	Avoiding exercise for fear of pain or injury exacerbation.
Daily Activities:	Reports significantly reduced capacity to undertake daily activities.
Transport:	Pain or disability is restricting travel independence.

4. General Health:

Lifestyle:	*
Sleep:	Minimal sleep disturbance unlikely to impact function.

5. Emotions:

Distress:	Moderate level of distress is likely to be a contributing factor.
Attention to pain:	Minimal indications of hypervigilance to pain.
Blame:	Perception of blame of another may be an influencing factor.

6. Coping:

Coping style:	Indicating very limited use of self-management strategies.
Relationship with pain:	Indicating some confidence to reduce pain independently.
Self Efficacy:	PSEQ score indicates low self-efficacy in performance of daily activities despite pain.

7. Confidence:

Sense of control:	Indications of a strong sense of being overwhelmed.
Optimism:	Moderately low sense of optimism.
Self-blame:	*
Self-identity:	Moderate impact on self-identity.

8. Relationships:

Family Support:	Perceives good understanding and support from family.
Socialising:	Usual social activity has significantly reduced.

9. Work Perceptions:

ÖMPSQ prediction:	ÖMPSQ predicts very high potential for development of long term problems.
Work capacity:	Perceives significantly reduced work capacity.
Expectation:	Expects to be working in 3 months
Readiness (Importance):	Places minimal importance on increasing or returning to work.
Readiness (Confidence):	Has low confidence on increasing or returning to work.

10. Occupational Factors:

Education:	*
Age:	*
Income:	Reduced income may be an incentive to return to work.
Days missed:	Extensive work absence may indicate higher risk.
Employment duration:	Long duration of this employment may favourably influence outcome.
Work accommodation:	Has not been offered modified work.
Type of work:	Type of work has strong potential to influence return to work outcome.
Job satisfaction:	Not satisfied with job.
Blame:	Perception of blame of employer may influence attitude to return to work.
Compensation Claim:	*

Appendix 5: Abilita Rehabilitation Index Impact Report

Abilita Rehabilitation Index (ARI)

IMPACT Report

www.abilita.net.au
abilita@abilita.net.au

Case Number: [redacted]
Agency: [redacted]
Office: [redacted]
Assessment Date: 23-May-2018
Administered by: [redacted]
Of: [redacted]
Injury/Illness Date: 04-May-2017
Age: 27

This report is generated from the responses given by this person following the rehabilitation intervention and therefore provides a measure of the impact of that intervention on the psychosocial factors that had been identified in the Initial Report.

It is essential that all parties using this report understand the principles of biopsychosocial rehabilitation.

1. ARI Risk Rating Review:

Comparison of the Psychosocial factors provides an indication of progress in the reduction of their influence on rehabilitation outcomes. Favourable impact is indicated by lower scores.

Assessment Date:	**Initial:** 12-Apr-2018	**Impact:** 23-May-2018	**Gain**
ARI Risk Rating:	4	2	44%
ARI Score (max. 200):	163	92	

2. Work Status:

Assessment Date:	**Initial:** 12-Apr-2018	**Impact:** 23-May-2018
Certified to work:	No	Yes with Restrictions
Employment:	Same employer, not returned to work	Same employer, usual job with restrictions
Current hours:	*Cleared:* 0 *Actual:* 0	*Cleared:* 9 *Actual:* 9
Pre-Injury Usual Hours:	40	

3. Rehabilitation:

Self-care skill development:	Abilita Coaching

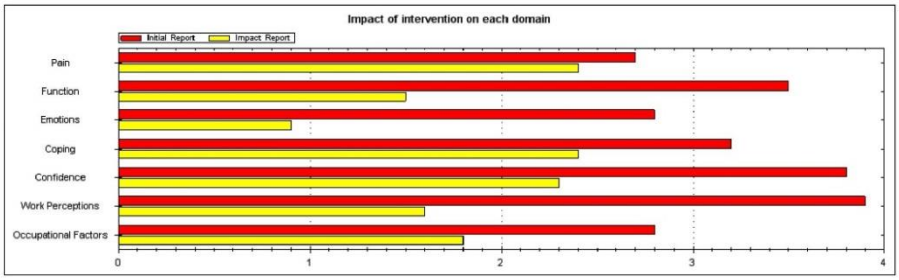
4. Claimant Evaluation of rehabilitation:

Helpful to recovery progress:	Very helpful
Helped to build self-care skills:	Very helpful
Overall satisfaction:	Very satisfied

5. Review of Influential factors:

A review of the factors that had been identified as influential to rehabilitation outcomes reveals the following analysis of claimant responses within each domain. The graph provides a comparison of each domain response with those initially reported in the INITIAL Report.

Domain	Comment
Pain:	Reporting moderate pain ratings.
Function:	Usual function is mildly reduced.
Emotions:	Reporting minimal distress.
Coping:	Attitudes expressed indicate moderately reduced coping.
Confidence:	Reflects moderately reduced sense of control.
Work Perceptions:	Perceives a mildly reduced work capacity.
Occupational Factors:	Indicate potential for minimal delay to work outcome.



6. Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ):

(Incorporated into Abilita Rehabilitation Index Questionnaire with the kind permission of Prof. S. Linton.)

Initial Assessment score:	153	Maximum Score: 210
Impact Assessment score:	102	Favourable impact is indicated by lower score.

The ÖMPSQ (Linton and Boersma 2003) is a tool to predict potential for the development of long term problems. Total score predicts: low risk under 105; medium risk at 105 to 130; and high risk over 130.

7. Pain Self Efficacy Questionnaire (PSEQ):

(Incorporated into Abilita Rehabilitation Index Questionnaire with the kind permission of Professor M. Nicholas.)

Initial Assessment score:	11	Maximum Score: 60
Impact Assessment score:	41	Favourable impact is indicated by higher score.

The PSEQ (Nicholas 2007) measures an individual's confidence to undertake daily activities despite pain. Total score predicts: significantly low self efficacy under 15; and high self efficacy over 40.

Appendix 6: Ethics Approval

Dear Paul O'Halloran,

The following project has been assessed as complying with the National Statement on Ethical Conduct in Human Research. I am pleased to advise that your project has been granted ethics approval and you may commence the study.

Application ID: S17-184
Application Status/Committee: Science, Health & Engineering College Human Ethics Sub-Committee

Project Title: What are the benefits, and the challenges in the implementation of a structured biopsychosocial approach in Workplace Rehabilitation.

Chief Investigator: Paul O'Halloran

Other Investigators: Gregory Murphy, Pamela Lorraine Garton

Date of Approval: 08/11/2017
Date of Ethics Approval Expiry: 04/04/2019

The following standard conditions apply to your project:
- Limit of Approval. Approval is limited strictly to the research proposal as submitted in your application.
- Variation to Project. Any subsequent variations or modifications you wish to make to your project must be formally notified for approval in advance of these modifications being introduced into the project.
- Adverse Events. If any unforeseen or adverse events occur the Chief Investigator must notify the UHEC immediately. Any complaints about the project received by the researchers must also be referred immediately to the UHEC.
- Withdrawal of Project. If you decide to discontinue your research before its planned completion, you must inform the relevant committee and complete a Final Report form.
- Monitoring. All projects are subject to monitoring at any time by the University Human Ethics Committee.
- Annual Progress Reports. If your project continues for more than 12 months, you are required to submit a Progress Report annually, on or just prior to 12 February. The form is available on the Research Office website. Failure to submit a Progress Report will mean approval for this project will lapse.
- Auditing. An audit of the project may be conducted by members of the UHEC.
- Final Report. A Final Report (see above address) is required within six months of the completion of the project.
You may log in to ResearchMaster (https://rmenet.latrobe.edu.au) to view your application.
If you have any further questions, please contact the Human Research Ethics team through the following email address: humanethics@latrobe.edu.au

Appendix 7: Recruitment Email to Associations

Hello…

Thank you agreeing to review the information regarding this research project and to consider our request to invite your members to participate.

Our project is titled: *"What are the benefits, and the challenges in implementing a structured biopsychosocial approach in Workplace Rehabilitation?"*

This research will provide participants an opportunity to contribute to the science that supports the improvement of Workplace Rehabilitation service delivery.

As you know, research literature in the fields of pain management and occupational rehabilitation reveal that the strongest health and work outcomes are achieved when individuals are managed using a biopsychosocial (BPS) approach. Please see the *Reference list below.

Australian WRPs are required to identify and address the psychosocial barriers, risks and strengths influencing RTW, and their decisions are to be evidence-based with assessments demonstrating the need for recommended services (Ref ii, HWCA 2015). In practise, there are very few specific requirements or incentives for RCs to use self-report instruments to assess personal psychosocial barriers or to implement behaviour-change interventions to manage these risk factors during the RTW process.

The findings of this project will document the benefits and challenges of implementing a structured Biopsychosocial approach into Workplace Rehabilitation, providing evidence for both industry and researchers, to formulate policy and procedures to facilitate the implementation of an effective biopsychosocial approach. Armed with this evidence, universities could ensure that Allied Health and Rehabilitation students are equipped with the skills, resources and expertise to deliver these services.

We are interviewing RCs who have in the past or are currently implementing a structured biopsychosocial approach in their work. For this study, we define structured BPS approach as essentially including self-report psychosocial factor assessment and self-help skill development, integrated into a rehabilitation and RTW plan. This may follow any format or use any BPS resources or products.

We would be very appreciative if you would offer your members an opportunity to participate in this research by distributing the attached Invitation Email.

This research is being conducted by the School of Public Health, La Trobe University. Research team members are Dr Paul O'Halloran, Professor Gregory Murphy and Pam Garton (study reference: S17-184). This project contributes to the PhD study being undertaken by Pam Garton who is also a founder and proprietor of the Abilita Program which provides structured BPS assessment and coaching resources.

If you would like to discuss this research, please contact Pam Garton at plgarton@students.latrobe.edu.au or call 0417 811894.

Pam Garton

PhD Candidate

COLLEGE OF SCIENCE, HEALTH AND ENGINEERING
SCHOOL OF PSYCHOLOGY and PUBLIC HEALTH

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*References:

I. Black, O., Keegel, T., Sim, M. R., Collie, A., & Smith, P. (2017). The Effect of Self-Efficacy on Return to work Outcomes for Workers with Psychological or Upper-Body Musculoskeletal Injuries: A Review of the Literature. J Occup Rehabil.
II. HWCA. (2015). Guide: Nationally Consistent Approval Framework for Workplace Rehabilitation Providers. Australia: Heads of Workers Compensation Authorities.
III. Loisel, Buchbinder, R., Hazard, R., Keller, R., Scheel, I., van Tulder, M., & Webster, B. (2005). Prevention of work disability due to musculoskeletal disorders: the challenge of implementing evidence. J Occup Rehabil, 15(4).
IV. Pincus, T., Kent, P., Bronfort, G., Loisel, P., Pransky, G., & Hartvigsen, J. (2013). Twenty-five years with the biopsychosocial model of low back pain-is it time to celebrate? A report from the twelfth international forum for primary care research on low back pain. Spine, 38(24).

Appendix 8: Invitation to Participate

COLLEGE OF SCIENCE, HEALTH AND ENGINEERING
SCHOOL OF PSYCHOLOGY and PUBLIC HEALTH

Mailing address
La Trobe University
Victoria 3086 Australia

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latrobe.edu.au

MELBOURNE CAMPUSES
Bundoora
Collins Street CBD
Franklin Street CBD

REGIONAL CAMPUSES
Bendigo
Albury-Wodonga
Mildura
Shepparton

INVITATION TO PARTICIPATE

Would you like to participate in research that will benefit Workplace Rehabilitation?

We are conducting research into the application of a **structured biopsychosocial (BPS) approach** in Workplace Rehabilitation for people with musculoskeletal injury.

Research title: *"What are the benefits, and the challenges in implementing a structured biopsychosocial approach in Workplace Rehabilitation?"*

We are interviewing RCs who have in the past or are currently, implementing a structured biopsychosocial approach in their work. For this study, we define structured BPS approach as essentially including self-report psychosocial factor assessment and self-help skill development, integrated into a rehabilitation and RTW plan. This may follow any format or use any BPS resources or products.

If you have applied such an approach, with 5 or more clients, we invite you to participate in this research. Participation will involve a **30-minute telephone interview** at a time convenient to you.

This research is being conducted by the School of Public Health, La Trobe University. Research team members are Dr Paul O'Halloran, Professor Gregory Murphy and Pam Garton (study reference: S17-184).

This project contributes to the PhD study being undertaken by Pam Garton who is also a founder and proprietor of the Abilita Program.

Please express your interest in participating in this research by emailing Pam Garton at plgarton@students.latrobe.edu.au and we will send you the Participant Information Statement and Consent Form so you may decide whether or not to participate.

If you would like to discuss this research, please contact Pam Garton on 0417 811894.

Pam Garton

PhD Candidate

COLLEGE OF SCIENCE, HEALTH AND ENGINEERING
SCHOOL OF PSYCHOLOGY and PUBLIC HEALTH
La Trobe University
Victoria 3086 Australia

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E plgarton@students.latrobe.edu.au
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Appendix 9: Informed Consent Form

LA TROBE UNIVERSITY

COLLEGE OF SCIENCE, HEALTH AND ENGINEERING
SCHOOL OF PSYCHOLOGY and PUBLIC HEALTH

Mailing address
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Victoria 3086 Australia

T + 61 3 9479 5607
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Bundoora
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Franklin Street CBD

REGIONAL CAMPUSES
Bendigo
Albury-Wodonga

CONSENT FORM

Research project:

"What are the Benefits and the Challenges in the Implementation of a Structured Biopsychosocial Approach in Workplace Rehabilitation?"

Study reference: S17-184

"I …… have read and understood the participant information statement and consent form, and any questions I have asked, have been answered to my satisfaction. I agree to participate in the project, realising that I may withdraw at any time. I agree that research data provided by me or with my permission during the project may be included in a thesis, presented at conferences and published in journals on the condition that neither my name nor any other identifying information is used.

I understand that the research team will audio record the interviews; I agree to be recorded for this purpose."	Yes No

Participant Signature

Name of Participant

Signature of Participant

Date

Researcher Signature

Name of Researcher

Signature of Researcher

Date

Appendix 10: Participant Information Statement

COLLEGE OF SCIENCE, HEALTH AND ENGINEERING

SCHOOL OF PSYCHOLOGY and PUBLIC HEALTH

PARTICIPANT INFORMATION STATEMENT

Research project:

"What are the Benefits and the Challenges in the Implementation of a Structured Biopsychosocial Approach in Workplace Rehabilitation?"

Research team: Study reference: S17-184

- Dr Paul O'Halloran, School of Public Health, La Trobe University
- Professor Gregory Murphy, School of Public Health, La Trobe University
- Pam Garton, PhD candidate, School of Public Health, La Trobe University. Contact plgarton@students.latrobe.edu.au

Research overview

We are conducting research into the application of a structured biopsychosocial (BPS) approach in Workplace Rehabilitation for people with musculoskeletal injury.

This is driven by two themes emerging from international research; firstly, that optimal outcomes are achieved when workers are managed using a BPS approach[5] and secondly that there have been difficulties in how the BPS approach has been understood and applied[6].

We are interviewing rehabilitation consultants who have in the past or are currently implementing a structured biopsychosocial approach in their work.

This project contributes to the PhD study being undertaken by Pam Garton who is also a founder and proprietor of the Abilita Program which provides structured BPS assessment and coaching resources. This project receives no external funding.

Research participation

Participation in this research study is voluntary. If you decide to take part and later change your mind, you are free to withdraw from the study with 4 weeks after your interview.

If you decide you want to take part in the research study, you will be asked to:

- Read this information carefully (ask questions if necessary);
- Sign and return the attached consent form;
- Retain this Participant Information Statement and a copy of the signed consent form.
- Participate in a telephone interview at a time that is convenient to you. This should take approximately 30 minutes to complete. During the interview, you will be asked questions about the benefits, and challenges of implementing this approach including

[5] Loisel et al, *Prevention of work disability due to musculoskeletal disorders; the challenge of implementing evidence*. J Occup Rehab, 2005

[6] Pincus et al, *Twenty-five years with the biopsychosocial model of low back pain – is it time to celebrate? A report from the twelfth international forum for primary care research on low back pain*. Spine 2013.

self-report psychosocial factor assessment and self-care skill development, integrated into a rehabilitation and RTW plan.

To ensure we collect the responses accurately, we seek your permission to record the interview using an audio recorder. If you would like to participate but do not wish to be recorded, please make this selection in the Consent Form.

What happens to the information you provide?

By signing the consent form you consent to the research team collecting and using the information you provided for the research study.

All information will be de-identified and used anonymously. The information will contribute to a PhD thesis and to a paper to be prepared for journal publication.

These data will be securely stored electronically for 5 years after the project's completion.

We will provide a transcript of your interview for you to review for accuracy, prior to inclusion of your information into the study.

You will be provided a summary of the results and detail of any publications.

Potential benefits of this research

It is evident from jurisdiction reporting and international scientific research that people with compensable musculoskeletal injury often fail to achieve optimal health and work outcomes. This research is to examine whether the application of a structured BPS approach provides an opportunity to improve outcomes. Participation in this research will enable you to contribute to science that supports the improvement of Workplace Rehabilitation service delivery.

Withdrawal from the research

You have the right to withdraw from active participation in this project at any time. You may also request that data arising from your participation are not used in the research project provided that this right is exercised within four weeks of the completion of your participation in the project. You are asked to complete the "Withdrawal of Consent Form" or to notify a researcher by email or telephone that you wish to withdraw your consent for your data to be used in this research project.

There will be no disadvantages, penalties or adverse consequences for not participating or for withdrawing from the research.

Complaints about the research

If you have any complaints or concerns about your participation in the study that the researcher has not been able to answer to your satisfaction, you may contact the Senior Human Ethics Officer, Ethics and Integrity, Research Office, La Trobe University, Victoria, 3086 (Phone: 03 9479 1443, Email: humanethics@latrobe.edu.au). *Please quote the application reference number S17-184.*

Further questions

Any questions regarding this project may be directed to Dr Paul O'Halloran of the School of Public Health, La Trobe University on telephone number 1300 5287623 or Pam Garton on 0417 811894

Appendix 11: Withdrawal of Consent

Mailing address
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SCHOOL OF PSYCHOLOGY and PUBLIC HEALTH

WITHDRAWAL OF CONSENT FORM

Research project:

"What are the Benefits and the Challenges in the Implementation of a Structured Biopsychosocial Approach in Workplace Rehabilitation?"

Study reference: S17-184

I wish to **WITHDRAW** my consent to participate in this research study described above and understand that such withdrawal will result in no disadvantages, penalties or adverse consequences. I would like any information which I have provided for the purpose of this research study withdrawn.

Participant Signature

Name of Participant

Signature of Participant

Date

This Withdrawal of Consent form should be forwarded to:

Name:	*Pam Garton*
Email:	*plgarton@students.latrobe.edu.au*
Phone:	*0417 811894*
Postal Address:	*P.O. Box 221, Humpty Doo, NT 0836*

Appendix 12: Interview Questions

"What are the Benefits and the Challenges in the Implementation of a Structured Biopsychosocial Approach in Workplace Rehabilitation?"

For this study, we define a structured biopsychosocial (BPS) approach as essentially including self-report psychosocial factor assessment and self-help skill development, integrated into a rehabilitation and RTW plan. This may follow any format or use any BPS resources or products.

1. Did your discipline training prepare you to implement a structured Biopsychosocial approach?
2. Did you undertake additional training to implement this approach?
3. How many clients, over how many years, have you assisted using a structured BPS approach?
4. What psychometric assessment tools did you use?
5. How did you build a client's self-help skills in managing their pain and injury?
6. How was this intervention structured so that it was consistent yet tailored for each client?
7. How were outcomes measured?
    a. Repeat of psychometric assessment tool/s
    b. Work outcomes
    c. Participant evaluation questionnaire
    d. Your observations
    e. Program time and costs
    f. Other, please describe.
8. What challenges did you face in implementing this approach?
9. What would have made the implementation of this approach easier for you?
10. How did your clients respond to this approach?
11. How did payers of your services respond to this approach?
12. Did you gain professional satisfaction from using this approach?
13. Other comments?

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