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The psychology of injured workers: Health and cost of vocational rehabilitation

Cindy L. Wall · James R. P. Ogloff · Shirley A. Morrissey

Abstract *Background*: In the vocational rehabilitation of injured workers the influence of the worker's personality has been neglected. This is despite there being substantial evidence that in chronic pain certain personality factors are significantly related to poorer outcomes. This is a preliminary study that has examined the relationship between personality factors, personality psychopathology and rehabilitation outcomes in injured workers. *Method*: Data from structured clinical interviews, self report and rehabilitation outcome (cost) were gathered from 36 injured workers with recognized compensation claims for physical and/or psychological workplace injury. *Results*: Personality factors were associated with poorer outcome, particularly cost and health. Individuals with extreme personality traits experienced poorer health and vocational rehabilitation outcomes. The combination of high Neuroticism and low Extraversion which is a pattern often characterized as anxious and socially avoidant was found to be consistently related to poor health outcomes. *Conclusions*: The results indicate that considering the type of personality characteristics of injured workers may have important theoretical and practical implications.

Keywords Personality · Personality disorder · Injured workers · Rehabilitation outcomes

Introduction

Each day over three hundred Australians sustain a work-related injury or illness for which they obtain workers compensation payments [1]. Most people recover well from compensable injuries,

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either of their own volition, or with the assistance of vocational rehabilitation. Unfortunately, a larger percentage of injured workers with compensable injuries demonstrate poorer health outcomes than individuals with similar injuries who do not become involved in the compensation process [2]. Psychological factors attempting to explain this difference appear to minimize at best, and overlook at worst, the influence of personality, and disorders of personality, on the vocational rehabilitation and health outcomes of injured workers. This trend may be problematic in more fully understanding the psychology of the injured worker with delayed functional recovery.

Vocational rehabilitation is an outcome-focused environment of which lay people have very little knowledge until they sustain a workplace injury and are identified as requiring intensive vocational assistance in returning to work. The vocational rehabilitation system requires injured workers to comply with numerous and largely unfamiliar procedures in order to maintain financial entitlements and to facilitate return to work. Often workers have limited knowledge and resources to effect adaptive responding, resulting in increased distress and a strong sense of having little or no control over their situation [3]. Personality differences have the potential to influence transitions into unpredictable new situations where there is a requirement to act in a particular manner, but little information on how to do so [4]. These personality differences may be accentuated by attempts to transform novel, ambiguous, and uncertain circumstances into familiar, clear, and expectable circumstances [4]. One such transition occurs when faced with vocational rehabilitation.

When workers become injured they can be exposed to multiple stressors across physical, psychological, social, and occupational domains, which are likely to accentuate their vulnerability to psychological distress [5]. A compensable injury can be viewed as a complex biopsychosocial phenomenon rather than simply a medical injury and the development of psychiatric disorders as a result of losses associated with injuries on the job is relevant for physical as well as psychological injury [2, 6]. A number of studies have found that psychological factors have the capacity to delay recovery from illness or injury. Mood and anxiety disorders are the most common co-occurring mental illnesses and have been associated with delayed healing of natural wounds [7], multiple chronic pain symptoms [8], diabetes [9], and functional somatic syndromes [10]. Not surprisingly, psychosocial factors have been highlighted as often being more important than physical factors for successful return to work in this population [11], with a call for research to attend to the development of appropriate approaches to work disability which concurrently target both worker and workplace psychosocial risk factors [12].

While the focus for years has been on the workplace there is a need to consider the complex interactions of the worker and the workplace. Personality factors are an essential component in any consideration of the worker, and are relevant to rehabilitation as manifestations of early personality differences may become evident in the face of social discontinuity [4], as is often experienced as a result of work injury. While this indicates a need to consider the individual differences of the person in regard to the contextual factors associated with compensable injury; rehabilitation process; health; and return to work, there is little evidence that this is occurring in the field. Given the potential for mental illnesses and personality disturbances to develop in response to, or become exacerbated by, a workplace injury, their examination should be a central consideration for vocational rehabilitation providers and those involved in facilitating good outcomes for injured workers.

Personality disorders occur when "personality traits are inflexible and maladaptive and cause significant functional impairment or subjective distress" [13]. In addition the presence of a personality disorder is acknowledged as a complicating influence on the treatment of other mental illnesses [14]. Freeman [15] describes this influence as translating to: (a) more intensive in-session work; (b) high utilisation of clinician resources; and (c) overall slower rate of change

than is the case for other clients. The early identification of personality disorder as an essential component of appropriate triage and treatment is encouraged in the mental health field [16] with Widiger (2002) suggesting that including a measure of personality disorder an essential consideration for clinicians and researchers who are concerned primarily with the treatment of an Axis I mental disorder who intend to fully account for the variation in their patient's treatment responsivity [14].

Treating personality disordered clients is considered complex because it involves practically life-long patterns of pervasive, entrenched behaviour [14]. The interplay between personality disorders and workplace injuries has traditionally lead to dispute regarding whether the injury or the personality disorder is responsible for sustaining disability [5]. This view coupled with the assumption that personality disorder must be a pre-existing condition and thereby not a compensable element of the work injury, may have discouraged the pursuit of personality research in the vocational rehabilitation population. However research evidence from the area of chronic pain offers a compelling argument for rethinking this approach and extending Widiger's advice to those involved in vocational rehabilitation and workplace injury management, not only in regard to psychological injury, but particularly for physical injuries sustained in the workplace.

Until recently "normal" personality research and personality disorder research were largely independent. Normal personality investigation was traditionally the realm of psychologists, while investigations into personality disorder remained in the lap of psychiatry. The dominant diagnostic system for personality disorder–the Diagnostic and Statistical Manual of Mental Disorders, fourth edition text revised (DSM-IV-TR) [17] conceptualizes mental illnesses as discrete medical conditions with distinct boundaries between normality and illness. Personality disorders are addressed on Axis II of the DSM-IV TR and reflect the categorical approach to assessment and diagnosis common to medicine. While it is accepted that a categorical model benefits the conceptualizing and communicating of disorders – with much information conveyed by a single diagnostic label [18] the debate regarding the clinical utility and adequacy of a categorical system of diagnosis in accurately reflecting the nature of personality disorder has long persisted and shift toward a dimensional approach continues to gain momentum. According to Livesley [19] there is mounting criticism being leveled at those in the field reluctant to accept the need for new approaches to classification with support growing elsewhere in the psychological arena for a transition from a categorical to a dimensional personality theory, model, and taxonomy.

In conceptualizing personality disorders as extremes of normal personality Costa and Mc-Crae's [20] Five Factor Model (FFM) of personality provides a dimensional representation of personality traits, which has enabled the mapping of five broad factors of personality across cultures, health conditions, Axis I disorders, and Axis II personality disorders. The FFM is seen by many as offering an opportunity to better understand normal and disordered personality functioning and may be of particular value in the assessment and planning of vocational rehabilitation for injured workers.

The FFM consists of the five broad trait dimensions of Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C) [20]. A meta-analysis of 33 studies exploring personality and the symptoms of a variety of clinical disorders [21] revealed a pattern of high N, low E, low C, and low A to be associated with clinical symptoms. For example, high N has been associated with depression [22, 23] anxiety disorders and adjustment to stressful life events [23]. Dysthymia, agoraphobia, obsessive compulsive disorder, and social phobia have been associated with the specific trait combination high N and low E [22]. Patterns of personality traits associated with medical conditions has revealed that N is a potent predictor of somatic complaints and that simultaneously measuring N, researchers and practitioners can begin to gauge the likelihood that somatic complaints are true indicators of disease [24].

DSM-IV personality disorder classifications also share a pattern of High N, low E, and low A [24]. While it is assumed that diagnosable personality disorders in the workplace are relatively rare, Cotton [25] contends that it is common to find individuals with extremes of normal personality traits but who would not meet the full criteria for a diagnosis of personality disorder. He also suggests that individuals exhibiting extreme traits are strongly represented in long-term compensation claims. This poses some interesting questions:

1. Are workers with extreme personality traits more likely to experience poor vocational health and rehabilitation outcomes than those with less extreme traits? and
2. Are there particular personality profiles associated with poor versus good health and rehabilitation outcomes for injured workers?

The current study explored the potential relationship between personality and the health and vocational rehabilitation in 36 injured workers post rehabilitation. Personality was assessed by (1) identifying the presence or otherwise of DSM-IV personality disorder; (2) compiling personality trait profiles according to the Five-Factor Model (FFM); and (3) rating degree of personality dysfunction along a continuum. In the first instance, the relationships of personality disorder (PD) with health and cost were investigated, where it was expected that those meeting PD criteria would have poorer health and greater rehabilitation costs than those who did not meet PD criteria. Secondly, the trait profile of injured workers was mapped with the anticipation that a trait profile of high N, low E, low C, low A, common to a wide range of clinical symptoms, would be apparent for those reporting poorer health and demonstrate higher rehabilitation costs than those with alternative trait profiles. The role of broad ranging personality dysfunction was then explored by investigating the relationship between ratings of dysfunction and outcome, it was expected that individuals experiencing high personality dysfunction, which may not satisfy any one particular DSM-IV criteria, would report poorer health and have higher rehabilitation costs than those with lower levels of dysfunction. Finally we were interested in whether the categorical and dimensional approaches to personality could be combined to conceptualise a continuum of personality functioning, and if so, how this would relate to health and cost outcomes. It was anticipated that individuals identified as having highly dysfunctional personality style evident by meeting criteria for a DSM-IV personality disorder with additional high personality dysfunction would demonstrate significantly poorer health outcomes and have more expensive vocational rehabilitation programs, when compared with those identified as having extremely functional personality style (a combination of no DSM-IV personality disorder, and low personality dysfunction).

Materials and methods

Participants

Participants were 36 (18 male and 18 female) injured workers who had completed vocational rehabilitation during 2000–2003 and responded to an invitation to take part in the study. Participation was restricted to those who had received workers' compensation and had participated in vocational rehabilitation. Injury type was open to both physical and psychological injuries, excluding head injury. Age of participants ranged from 24 to 63 years, with an average age of 49 years. Demographic information is presented in Table 1. Participants responded directly to the researcher by returning their contact details by post or telephone. Of an estimated 900 eligible participants, 79 responses were received, representing an 8.8% response rate. This included 33 respondents who agreed to participate and provided information about their injury and their

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Table 1 Participant Demographics by Gender

	Male ($n = 18$)		Female ($n = 18$)	
	Frequency	Percent	Frequency	Percent
Work status				
Not working	5	27.8	3	16.7
Some work	4	22.2	5	27.7
Full time work	8	44.4	10	55.6
Missing data	1	5.6	0	0
Compensible injury				
Physical	16	88.9	10	55.6
Psychological	2	11.1	5	27.8
Physical & psychological	0	0	3	16.7
Perceived recovery				
Not recovered	7	38.9	5	27.8
Partially recovered	7	38.9	10	55.6
Fully Recovered	3	16.7	2	11.8
Missing data	1	5.6	1	5.6
Satisfaction level				
Very satisfied	2	11.1	4	22.2
Satisfied	5	27.8	4	22.2
Neutral	0	0	0	0
Dissatisfied	3	16.7	4	22.2
Very dissatisfied	7	38.9	6	33.3
Missing data	1	5.6	0	0
Legal action (LA) regarding this injury				
Not considering LA	5	27.8	8	44.4
LA is an option	1	5.6	2	11.1
Have consulted lawyers	3	16.7	1	5.6
LA in progress	4	22.2	0	0
LA completed	1	5.6	3	16.7
unknown	4	22.2	4	22.2

degree of satisfaction with the current system but subsequently chose not to complete questionnaires. Given the low response rate participants were compared for representativeness with a sample of 125 vocational rehabilitation cases for the same time frame who had attended one of the participating rehabilitation providers. Demographically the groups were similar for age, gender, and injury type. However comparing their rehabilitation outcomes, there was a significant disparity in the average cost for participants, with the rehabilitation providers sample averaging $2000 per client, while the average cost for those in the study was $7500 per participant. Only four participants had programs of less than three months duration, suggesting that those who participated in this study were representative of the chronic end of the vocational rehabilitation population and could be described as long-term compensation claimants.

Procedure

Recruitment was via four Northern Territory Rehabilitation Providers, radio and print media. Invitations to participate were forwarded to eligible injured workers who had completed rehabilitation. A suitable interview time and location was arranged for the 36 workers who agreed to participate fully. Nine participants from remote localities had questionnaires mailed to them with self-addressed envelopes and were interviewed by telephone.

Participants were interviewed using the Structured Clinical Interview for Axis II Personality Disorders (SCID-II), completed the General Health Questionnaire 28 (GHQ 28), and the NEO Five Factor Inventory (NEO- FFI), and were also asked to describe their rehabilitation experience. Participants were assigned a rating of current level of functioning on the Global Assessment of Functioning (GAF) Scale, with higher scores indicative of better functioning. A data request and a release of information document signed by the participant at the conclusion of the session were forwarded to the participant's most recent rehabilitation provider.

Dimensional assessment of personality traits

The NEO- five factor inventory (NEO-FFI)

The NEO-FFI is a 60 item questionnaire based on the five factor model of personality [24]. Respondents are asked to endorse the degree to which each statement best represents their opinion on a 5-point Likert-type scale ranging from "strongly agree" to "strongly disagree". The scales of the NEO-FFI measure traits that approximate normal bell-shaped distributions' therefore, few individuals should obtain extremely high or extremely low scores [24]. Reliability and validity of the NEO-FFI has been demonstrated for both college and adult populations [24].

Categorical assessment of personality disorder

Structured clinical interview for DSM-IV Axis II personality disorders (SCID-II).

The SCID-II is a semi-structured diagnostic interview for assessing the ten DSM-IV Axis II personality disorders as well as Depressive Personality Disorder and Passive-Aggressive Personality Disorder. From the interview, personality disorder diagnosis on Axis II is derived through rating each criteria as either: "?" – Inadequate information, "1" – Absent or false, "2" – sub-threshold, "3" - Threshold or True. If threshold responses recorded meet diagnostic requirements, as specified in DSM-IV, then a diagnosis of personality disorder is made. Adequate reliability and validity of SCID-II has been demonstrated [26] with satisfactory internal consistency co-efficients (.71–.94) demonstrated [27]. Concurrent validity of the SCID-II, when compared with other personality questionnaires has also been satisfactorily demonstrated [28].

Dimensional assessment of personality dysfunction

In addition to the categorical interpretation of personality disorder obtained from the SCID-II this study explored the use of summing the SCID-II item ratings to produce a dimensional interpretation of degree of personality dysfunction. This (to the author's knowledge) is the first time that personality dysfunction has been explored in this way, and this particular strategy was employed to create a variable reflecting a continuum of personality dysfunction including sub-clinical levels of personality dysfunction, rather than the typical categorical indication of presence or otherwise of meeting criteria for one or more specific personality disorders

Assessment of health and functioning

Global assessment of functioning scale (GAF)

The Global Assessment of Functioning scale (GAF) provides a rating of psychological, occupational, and social functioning. The GAF has been shown to be a reliable and valid measure

of psychiatric disturbance in individuals suffering severe mental illness [29] as well as those seeking outpatient treatment [30].

The general health questionnaire – 28 (GHQ-28)

The GHQ-28 [31] is a 28-item self-administered screening test focusing on the psychological components of ill-health which is aimed at detecting psychiatric disorders among respondents in community settings and non-psychiatric clinical settings. There is an extensive body of research indicating a positive relationship between GHQ score and physical ill-health [32]. In this study the GHQ-28 was used to broadly reflect the current psychological and physical health status of injured workers. It was chosen for its four factor structure of: (A) somatic symptoms, (b) anxiety and insomnia, (C) social dysfunction, and (D) severe depression, providing a state measure of areas of psychological distress. A likert method of scoring was adopted which assigned a rating of 0, 1, 2, or 3 to participants responses thereby indicating that scale scores of 8 or higher, and total scores of 29 or greater, reflect poorer current health and high state psychological distress. Validity studies indicate a high degree of stability in the factor structure over time [31].

Vocational rehabilitation outcome

Information on the outcome of the participants vocational rehabilitation programs were collected from their most recent vocational rehabilitation provider. For the purpose of this study vocational rehabilitation outcome has been restricted to cost of program and is the amount billed by the rehabilitation provider to the insurance company. These costs related primarily to case management, and included any internal services the rehabilitation provider supplied, such as a work capacity evaluation, vocational rehabilitation assessment and/or counselling, worksite visits, and ergonomic assessments. Costs for medical services, medico-legal reports, and other treatment and rehabilitation expenses – such as prior programs, physiotherapy, hydrotherapy, psychotherapy or counselling, equipment, travel, and study or retraining, are kept by insurers and were not available for this study.

Results

Initial analysis

Data were analysed using SPSS version 14 statistical software [33]. An alpha level of .05 was used for all statistical tests. Statistical procedures relevant to exploring relationships between variables were adopted, given the exploratory nature of the study and the relatively small sample size.

Health status, symptom profile and rehabilitation outcomes of injured workers at time of assessment

Participants' health status at the time of assessment was measured using the GHQ-28, with higher scores indicative of poorer health. Ten participants (28%) reported a GHQ-28 total score of 29 or higher suggesting that they were experiencing considerable ill health post rehabilitation. The symptom profiles and rehabilitation outcomes for this group presented in Table 2 show higher mean scores on all GHQ-28 subscales than both the good health group and the results for the entire sample. Independent t-tests revealed that the poor health group displayed statistically

Table 2   Health status symptom profile and rehabilitation outcomes of injured workers

	Whole sample ($n = 36$)		Poor current health GHQ $= 29$ or above ($n = 10$)		Good current health GHQ $= 28$ or below ($n = 26$)	
	Mean	SD	Mean	SD	Mean	SD
Health outcomes:						
Somatic symptoms	5.44	3.5	9.00*	3.16	4.8	2.56
Anxiety & insomnia	6.30	4.78	12.20*	3.22	4.04	3.01
Social dysfunction	8.00*	3.79	11.30*	5.31	6.73	1.99
Severe depression	2.75	4.16	8.20*	4.21	0.65	1.20
GHQ total	22.39	12.77	40.70*	5.50	15.35	5.68
GAF	71.30	14.32	61.80	12.66	74.96	13.39
Rehabilitation Outcomes						
Cost ($)	7516.22	6106.91	12801.10	5052.67	5483.57	5249.05

*indicates high levels of psychological distress.

significant higher mean functional impairment on the GAF scale, $t(34) = -2.68$, $p = .00$, as well as greater mean rehabilitation cost, $t(34) = 3.78$, $p = .01$, than those reporting good health outcomes.

Personality disorders, traits, and degree of personality dysfunction of injured workers at time of assessment

Personality disorders

One third of the participants ($n = 13$) satisfied DSM-IV Axis II Personality Disorder (PD) criteria when assessed categorically using the SCID-II ratings. Nine of these individuals had suffered a physical workplace injury and had not received any psychological treatment as a component of their rehabilitation. Personality disorder diagnoses obtained by the group were obsessive-compulsive ($n = 10$) avoidant ($n = 3$) depressive ($n = 3$) paranoid ($n = 1$) and borderline ($n = 1$). Nine participants satisfied one personality disorder diagnosis, three participants' satisfied two diagnoses, and one participant satisfied three personality disorder diagnoses.

Personality traits

The five factor profile of injured workers was investigated by converting participants' raw scores on the NEO-FFI scales to T-scores, enabling the classification of the level to which each trait is reflected in this group of injured workers (see Table 3). Participants trait profile showed marked deviations from the normal curve as can be seen in Fig. 1. In particular, results indicate a trend toward high levels of Neuroticism ($M = 20.31$, SD $= 9.8$); a greater frequency of extreme (high and low) levels of both Extraversion ($M = 26.6$, SD $= 5.81$) and Openness ($M = 29.03$, SD $= 6.50$); lower levels of Agreeableness ($M = 30.36$, SD $= 6.97$), and higher levels of Conscientiousness ($M = 34.7$, SD $= 7.96$) than would be expected in a normal population.

Degree of personality dysfunction

Participants' SCID-II responses were summed to create a continuum of personality dysfunction ranging from 99 to 153 ($M = 119.75$, SD $= 14.72$). Pearson Product-Moment Correlation co-efficient identified a significant positive correlation between personality dysfunction scores and

Table 3 NEO-FFI personality traits of injured workers ($N = 36$)

| Traits: | Level of Trait (*T*Score Range) | | | | |
| | V Low (< 35) | Low (35–44) | Average (45–55) | High (55–64) | V High (> 65) |
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Neuroticism	3 (8.3)	6 (16.7)	12 (33.3)	6 (16.7)	9 (25.0)
Extraversion	4 (11.1)	6 (16.7)	13 (36.1)	12 (33.3)	1 (2.8)
Openness	1 (2.8)	10.(27.8)	6 (16.7)	14 (38.9	5. (13.9)
Agreeableness	6 (16.7)	9 (25.0)	12 (33.3)	5 (13.9)	4 (11.1)
Conscientiousness	3 (8.3)	4 (11.1)	11 (30.6)	14 (38.9)	4 (11.1)

levels of trait Neuroticism ($r = .40$, $p < .05$); as well as significant negative correlations with levels of Extraversion ($r = -.44$, $p < .01$) and Agreeableness ($r = -.42, p < .05$).

DSM –IV Axis II personality disorder and health outcomes

The hypothesis that individuals in the PD group would have significantly poorer health and functioning than those without PD (no-PD group) was partially supported by the data (see Table 4). Independent samples t-tests conducted to compare the general health and global functioning scores of the two groups found that the mean GAF for the PD group was significantly lower compared to the no-PD group, $t(34) = 2.4$, $p = .02$. This finding supported the expectation that injured workers with a diagnosis of personality disorder experience significantly poorer global functioning post rehabilitation.

DSM –IV Axis II personality disorder and rehabilitation cost

Independent samples t-tests were used to explore the relationship between personality disorder and cost of vocational rehabilitation. Despite the quite large monetary differences in mean
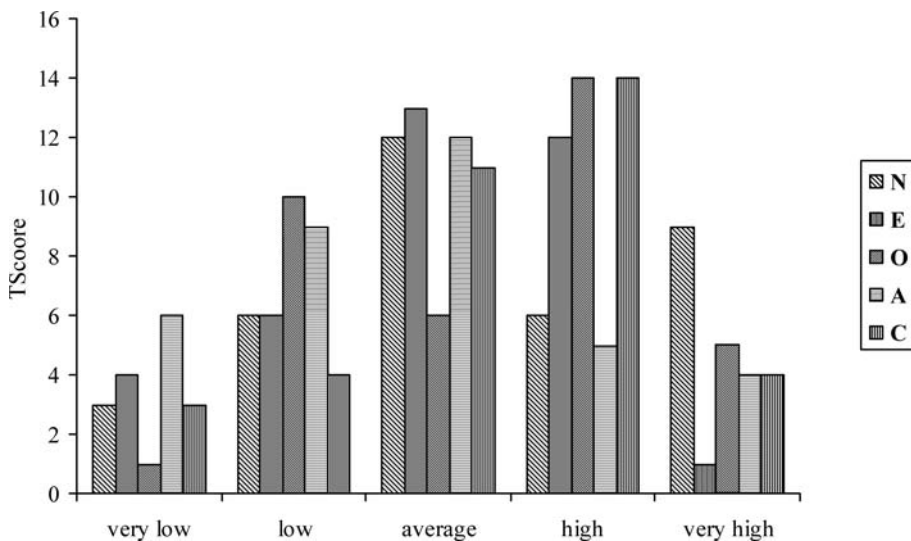

Fig. 1 Injured workers five-factor trait profile of neuroticism, extraversion, openness, agreeableness, and conscientiousness.

Table 4 Outcomes for personality disorder versus no personality disorder groups

| | Personality disorder ($n = 13$) | | No personality disorder ($n = 23$) | | |
	Mean	SD	Mean	SD	Sig.
Health Outcomes					
GAF	64.08	12.57	75.39	13.85	.02*
GHQ	24.23	14.38	21.35	12.01	.52
Rehabilitation Outcome					
Cost	9620.72	6592.48	6326.71	5615.13	.12

*$p < .05$. two-tailed.

cost between the two groups, the difference failed to reach statistical significance $t(34) = 1.6$, $p = .12$.. While the PD group costs were substantially higher than those of the no-PD group, the small sample size resulted in the expected relationships between personality disorder and vocational rehabilitation cost not reaching statistical significance. Nonetheless, the results were in the expected direction and the findings approached significance.

Personality traits and health and rehabilitation costs

The anticipated relationship of personality traits of high Neuroticism; low Extraversion; low Agreeableness; and low Conscientiousness with poor health outcomes was supported by Pearson Product-Moment Correlation co-efficient. Significant positive correlations were found between Neuroticism and GHQ-28 total ($r = .42, p < .05$), anxiety and insomnia ($r = .48, p < .01$), and severe depression ($r = .48, p < .01$). Neuroticism negatively correlated with the GAF ($r = -.37$, $p < .05$) suggesting, not surprisingly, that higher levels of neuroticism were associated with greater functional impairment. Extraversion was found to negatively correlate with anxiety and insomnia ($r = -.44, p < .01$) and social dysfunction ($r = -.33, p \leq .05$). By contrast extraversion positively correlated with GAF ($r = .42, p \leq .05$), indicating lower extraversion to be associated with poorer health and increased global impairment. A negative correlation was found between social dysfunction and both trait Agreeableness ($r = -.42, p \leq .05$) and Conscientiousness ($r = -.53, p \leq .01$), suggesting more disagreeable and rigid personality styles to be related to greater social impairment. A strong association was found between trait Neuroticism and rehabilitation outcomes. Scores on the NEO-FFI Neuroticism scale positively correlated with the cost ($r = .37, p < .05$) of vocational rehabilitation.

   Further exploration of the influence of high Neuroticism (N) was conducted using independent samples t-tests. As shown in Table 5 the high/very high N range (NEO-FFI T Score > 55) displayed statistically significant differences in mean scores on all health and rehabilitation outcome measures except for the GHQ-28 somatic symptoms scale, when compared with those with low or average level Neuroticism. Those scoring in low/very low Extraversion range (NEO-FFI T Score < 45) had statistically significant differences in mean scores for the GHQ total, $t(34) = 2.43$, $p = .02$, severe depression, $t(34) = 2.2$, $p = .05$, and GAF, $t(34) = -2.4$, $p = .02$, respectively, than those falling in the average/high range for Extraversion. A significant difference in mean scores for those in the low/very low Agreeableness range was evident only for the GHQ social dysfunction scale, $T(34) = 2.8$, $p = .01$, which was higher when compared with average/high scorers. Those scoring in the low/very low Conscientiousness range had significantly higher mean scores for GHQ anxiety and insomnia, $t(34) = .16$, $p = .03$, GHQ social dysfunction, $t(34) = 3.4$, $p = .01$, and GHQ total, $t(34) = 2.6$, $p = .01$,than those scoring in the average/high range for Conscientiousness. This supports the expectation that high N, Low

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Table 5 Outcomes for high trait neuroticism versus low/average trait neuroticism

| | High N ($n = 15$) | | Low/Av N ($n = 21$) | | |
	Mean	SD	Mean	SD	Sig.
Health Outcomes					
GAF	64.07	12.70	76.48	13.36	.01**
GHQ (total)	30.13	11.66	16.85	10.67	.00**
Somatic symptoms	6.4	2.58	4.76	3.95	.17
Anxiety & Insomnia	9.07	4.22	4.33	4.22	.00**
Social Dysfunction	9.60	4.10	6.86	3.12	.04*
Severe Depression	5.07	4.71	1.09	2.81	.01**
Rehabilitation Outcome					
Cost	10921.57	5951.39	5083.82	5055.89	.00**

*$p < .05$. two-tailed.

**$p < .01$. two-tailed.

E, Low A, and Low C are related to poorer health functioning post rehabilitation, but indicate that only High N is statistically significant in relation to cost of rehabilitation.

Personality dysfunction and health outcomes

The relationship between the degree of personality dysfunction of injured workers (summed SCID- II), general health (GHQ-28) and psychosocial functioning (GAF) was investigated using Pearson Product-Moment Correlation co-efficient. Support for the predicted association between greater personality pathology and poorer global functioning and poorer general health was indicated. There was a significant negative correlation between personality dysfunction and GAF ($r = -.62, p < .01$). While diagnostic interviews were not conducted for Axis 1 disorders (e.g., co-morbid anxiety or depression), a relationship between mental illness symptoms and greater personality dysfunction was indicated by positive correlations between degree of personality dysfunction and respectively; severe depression ($r = .48, p < .01$), anxiety and insomnia ($r = .47$, $p < .01$), and total GHQ ($r = .49, p < .01$). This indicated that a positive association between levels of personality dysfunction and levels of anxiety and depressive symptomatology existed in this sample.

Personality dysfunction and rehabilitation cost

The relationship between the degree of personality dysfunction and the cost of vocational rehabilitation was investigated using Pearson Product-Moment Correlation co-efficients. A significant positive correlation for personality dysfunction and cost ($r = -.64$) $p < .01$, was indicated. Independent samples t-test presented in Table 6, revealed a significant difference in mean cost for the high personality dysfunction group compared to the low personality dysfunction group, $t(34) = -3.2, p = .00$, supporting the expected relationship between personality dysfunction and rehabilitation costs.

Dimensional/categorical interactions

Cross-tabulating the absence or presence of DSM-IV personality disorder with high versus low personality dysfunction identified two extreme groups based on personality functioning.

Table 6 Outcomes for high versus low personality dysfunction groups

| | High personality dysfunction (n = 18) | | Low personality dysfunction (n = 18) | | |
	Mean	SD	Mean	SD	Sig.
Health Outcomes					
GAF	64.44	11.13	78.17	11.13	.01**
GHQ	27.89	13.98	16.89	14.10	.01**
Rehabilitation Outcome					
Cost	10421.93	6531.33	4610.50	4030.44	.01**

$*p < .05$. two-tailed.

$**p < .01$. two-tailed.

Group 1 (highly dysfunctional) consisted of 10 individuals with a personality disorder and a high level of personality dysfunction. Group 2 (highly functional) consisted of fifteen individuals without personality disorder and low levels of personality pathology. Chi-square test for independence determined that the proportion of injured workers in the highly dysfunctional group was significantly different to those in the highly functional group; χ^2 (1, N = 36) = 5.9; $p < .05$.

Functional versus dysfunctional personality

Consistent with the findings described above, differences between heath (GHQ) and functioning (GAF) scores for the two extreme groups of personality functioning were explored using independent samples t–tests. As anticipated, GHQ mean scores for the highly dysfunctional group were significantly higher, indicating poorer general health, compared to the highly functional group, $t(23) = -2.1$, $p = .04$ (see Table 7). A significant difference was also found for the GAF ratings between the highly dysfunctional group and the highly functional group $t(23) = 3.8$, $p = .01$, indicating an association between greater personality dysfunction and poorer global functioning. A significant difference was found in the average cost of rehabilitation for the highly dysfunctional group and the highly functional group $t(23) = -3.1$, $p = .01$.

Table 7 Outcomes for functional versus dysfunctional personality style groups

| | Dysfunctional Personality Style (n = 10) | | Functional Personality Style (n = 15) | | |
	Mean	SD	Mean	SD	Sig.
Health Outcomes					
GAF	60.20	9.60	78.40	14.53	.01**
GHQ	27.90	14.43	17.87	9.26	.04*
Rehabilitation Outcome					
Cost	11560.94	6290.89	4901.93	4361.23	.01**

$*p < .05$. two-tailed.

$**p < .01$. two-tailed.

Discussion

The findings of the present study indicate an association between the personality of injured workers with compensable injuries and their health outcome and vocational rehabilitation costs, as assessed post rehabilitation. Support is also found for the usefulness of adopting a dimensional or more descriptive approach to personality as opposed to categorical approach. This may have direct relevance for the assessment and planning and delivery of vocational rehabilitation for workers' compensation claimants.

The sample of injured workers who participated in this study were characteristic of long term compensation claimants, one third of which were found to satisfy DSM-IV TR criteria for one or more personality disorders. While the number of participants satisfying PD criteria is much greater than would be expected, it is comparable with the rates of PD consistently reported in the chronic pain literature where Axis II personality disorders have been found to range from 37% [34] to 60% [35]. Given what is known regarding the nature and costs associated with personality disorder, this group was hypothesized to experience poorer health and incur more expensive rehabilitation programs. Interestingly it was found that meeting DSM-IV criteria for personality disorder meant poorer global functioning for the individual but did not necessarily translate to significantly more expensive vocational rehabilitation outcomes. One possible reason for this finding is related to the traditional criticism of limited clinical utility of PD diagnosis – in that individuals can experience a narrow range of dysfunction which satisfies PD diagnostic criteria but may not translate to broad functional impairment. A second explanation may have to do with the average age of participants (49) as it is accepted that individuals with personality disorder often experience less disruption from their symptoms as they age - a view which was consistent with anecdotal participant comments during interview. Finally, the assessment process was based on self-report, and given that individuals with PD tend to view their behaviour as reasonable and their difficulties as external to, and independent of, their behaviour [15], it allows for the possibility that those meeting PD criteria may in fact be an under-identified in this study.

The emergence of obsessive compulsive personality disorder (OCPD) as the most prevalent PD category satisfied is noteworthy as it has been suggested that OCPD is the least functionally impairing of the personality disorders [36]. This finding offers tentative support for further investigation of the interaction between worker, and "system" as many participants in this group described a strong sense of procedural injustice in their workers' compensation and rehabilitation experiences and chose particular courses of action in response to this perceived violation of expectations and beliefs. It appears that individuals with these characteristics – while previously functioning well in the workplace may have struggled with the systemic demands of compensation and vocational rehabilitation. This can be considered in line with previous suggestions that individuals are most likely to encode and interpret new material in ways consistent with their base personality when confronted with this material in stressful and demanding circumstances [4]. It is not surprising, therefore that injured workers with OCPD features described experiencing the process as more highly adversarial, and potentially increasing susceptibility to secondary psychological distress, than those without OCPD characteristics.

Dimensionally, positive associations between levels of personality dysfunction and high levels of anxiety and depression evident from the findings, in both psychological and physical workplace injuries is of importance. The relationship found between high personality dysfunction and rehabilitation costs reinforces the need to revise the biomedical approach to injury management. When compared with the influence of categorical PD alone, the dimensional component exerted considerable influence in strengthening the associations between personality and outcomes –

increasing the evidence for the limitation of a categorical approach to work injury. The degree of personality dysfunction, while found to exert an influence on outcome, shares many of the limitations of the categorical model including limited clinical utility. It is important to recognise that while a strong association was evident, the direction or causality can not be inferred from these finding given the research design employed.

This study found that the trait perspective has much to offer vocational rehabilitation. Long-term claimants exhibiting an overall five-factor profile of high N, low E, and a trend toward low A and low C were found to experience greater social dysfunction, greater psychological distress and are more likely to suffer symptoms of depression, anxiety and high personality dysfunction than those who do not display this profile. This was an anticipated outcome supporting previous research mapping the five factor model onto mental and physical illnesses [21]. High N had previously been labeled a potent predictor of psychological vulnerability [24], with high N individuals typically possessing low stress tolerance and heightened emotionality. The trends in the current findings offer tentative support for this association – however replication with larger samples is required.

The two main limitations of the present study are: (1) the small sample size which is likely to be a reflection of a combination of the transient population of the Northern Territory and the inherently adversarial nature of workers' compensation, and (2) the limited rehabilitation outcome data available through rehabilitation providers. Problems related to the small sample size include the likelihood that particular personality style or traits are over or under represented; that caution must be used when extrapolating these findings to other vocational rehabilitation populations; and that the likelihood of Type II error is increased. While the small sample size potentially limits generalisablity of the current findings, the participants were found to be similar to a comparative sample of 125 rehabilitation participants; the trends observed in the data move in the expected direction and are also consistent with those reported in the literature reviewed. The restricted sample reflecting primarily longer-term workers compensation claimants and more importantly those who were willing to take part may have reduced the range of personality traits exhibited. The rehabilitation cost data is an under-estimate as it related only to the most recent rehabilitation program, and approximately one third of participants reported having more than one previous compensation claim and/or program not to mention those who had engaged in litigation in regard to their workplace injury. Despite the above limitations this research is novel and provides an indication, given the trends observed, of an exciting and potentially valuable field of investigation with theoretical and applied relevance.

This research suggests that: (1) individuals with extreme personality traits experience poorer health and higher rehabilitation costs post rehabilitation, and (2) distinct five-factor personality profiles were identified in association with good versus poor health and rehabilitation outcomes for injured workers. A trait perspective may offer a dimension of analysis to the rehabilitation and compensation fields if it can remove itself somewhat form the political argument of both sides – i.e. blame the worker, blame the workplace or system. In that context the approach used in the present study appears to less stigmatizing than a personality disorder diagnosis; is related to intensity and cost of rehabilitation; provides information on coping skills and interpersonal tendencies of injured worker useful in facilitating effective rehabilitation processes; and can be assessed by appropriately trained psychologists as part of the initial rehabilitation assessment process.

Future research using a prospective or longitudinal research design, larger sample size, incorporating collaborating data sources, and securing the assistance of a large insurer and/or rehabilitation provider would be beneficial in further investigating the trends observed in this exploratory study.

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