

Research Article

Patterns of Responding on the Work Ability Index Following a Compensable Injury

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This study provided an updated analysis of the *Work Ability Index* in a sample of 208 individuals undergoing vocational assessment following a compensable personal injury. Participants reported a median of three medical conditions, and the majority (147 out of 208) had between 100 and 354 days off work in the past year. Self-rated physical capacity was typically “rather poor,” while mental capacity was rated as “moderate.” These domains were significantly related. Strong associations were also found between current work ability and estimated work impairment ($\gamma = .869$), and between estimated future work ability and both current work ability ($\gamma = .732$) and estimated impairment ($\gamma = .841$). The analysis, which treated each WAI item as ordinal, revealed coherent internal relationships across items, supporting the relevance of the individual components. These findings underscore the complexity of work ability following injury and challenge the psychometric justification for summing item scores into a total index.

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Introduction

As its name implies, the *Work Ability Index*^[1] provides a holistic overview of a person’s capacity for work. There are 10 questions under seven broad headings that cover (a) a rating of current work capacity; (b) work ability in relation to physical and mental demands; (c) current diagnosed diseases; (d) estimated work impairment due to disease; (e) illness within the last year; (f) estimation of work ability in two years; and (g) three mental capacities over the last three months. Typically, the results have been

summarised by an index which categorises work ability as (a) poor (scores from 7-27), through (b) moderate (scores from 28-36), to (c) good (scores from 37-43) or (e) to excellent (scores from 44-49).

A summary of the data from 29 previous studies indicated an overall mean of 38.94^[2] and in a later report the mean was 39.57 for 58 previously published studies from 2003-2022. For the most part the *Work Ability Index* seems to provide a robust categorisation of self-perceived employment capacity but (a) the interval nature of the scoring was considered questionable^[3]; (b) the potential range of scores is larger than reported by the authors; and (c) it has been noted that the internal consistency of the index may not always be sufficient for high stakes decisions^[4].

Abdollahzadeh, Arastoo, Ghsemzadeh, Montazeri, Ahmadi and Azizi^[5] studied the psychometric properties for the *Work Ability Index* with 236 workers in Iran. Their results supported the discriminant validity of the *Work Ability Index* and suggested three underlying factors: self-perceived work ability, mental resources and disease or limitation. Amongst 1,184 health centre workers in Spain, Mateo Rodriguez, Knox, Hernande, Codina and the esTAR^[6] found two factors - “subjectively estimated work ability” and “ill-health-related ability”. Amongst Italian workers (N=340) exploratory factor analysis indicated a one-factor solution^[7]. They reported differences based on age, sex or night-shift work. In a very large study of 40,000 nurses in Europe, Radkiewicz and Widderszaal-Bazyl^[8] supported the *Work Ability Index* as “internally coherent” but suggested that “sick leave during the past year” (item 5) was meaningless. A distinctive aspect of these studies is that they (and others) quite rightly focus on working populations rather than a compensable injury group which almost certainly has an a priori work disability. Secondly such studies are characterised by the use of interval scores from the *Work Ability Index*.

The purpose of this report is to examine the pattern of responding of persons with a compensable injury on the *Work Ability Index*. This study is the final part of a program of research on the *Work Ability Index* and updates the earlier findings of Athanasou^[9] where a rating of poor work ability was obtained by 49 out of 58 participants. There is no attempt to produce a total score in this report; instead each item is treated as ordinal. The focus is on the responses to each individual question and non-parametric statistics (e.g., contingency coefficient, gamma, Kendall's tau)-b are used to determine whether responses are related. At the outset it was hypothesised that the 10 questions would be positively related.

Method

Participants. The 208 participants (141 males; 67 females) ranged in age from 16 to 68 years with a mean of 45 years. The majority of participants had no formal post-school qualifications (41% – all percentages are rounded) but 37% had a certificate or trade and the remaining 21% had a diploma or degree. They were undertaking a vocational assessment of earning capacity following a compensable personal injury.

The cases comprised 35 motor vehicle accidents, 125 work injuries and 48 general injuries (public liability, medical negligence). The time since their injury averaged 4 years.

Instruments. The complete *Work Ability Index* of Tuomi *et al.*^[1] comprising 10 questions was used and scored according to their protocol to provide an overall index.

Procedure. The *Work Ability Index* was administered orally or visually to each patient following a structured vocational rehabilitation assessment that evaluated education, work history, social background and health factors. It formed part of an assessment that was just under 2 hours in duration.

Analysis. In analysing the *Work Ability Index* it is not always recognised that the questions in the index are ordinal and not continuous. Accordingly, in this paper there is a preference for a non-parametric approach to the individual items of the *Work Ability Index*. The emphasis is on (a) the median and range rather than the mean and standard deviation; and (b) where possible the contingency coefficient (chi-square), gamma and Kendall's tau correlation are used. Results were analysed using the *Jamovi* software to provide descriptive statistics^[10]. Further details of the analyses are provided in the Results section.

Results

The interpretation of the results follows the order of the questions in the *Work Ability Index*.

Current work ability compared to highest work ability ever

Current work ability is the opening question and is across a rating scale from 0 to 10. For this injury sample the ratings ranged from 0 to 8 with a median value of 3 indicating quite a low level of current work ability. Indeed, the modal value was 0. The distribution is highlighted in Figure 1.

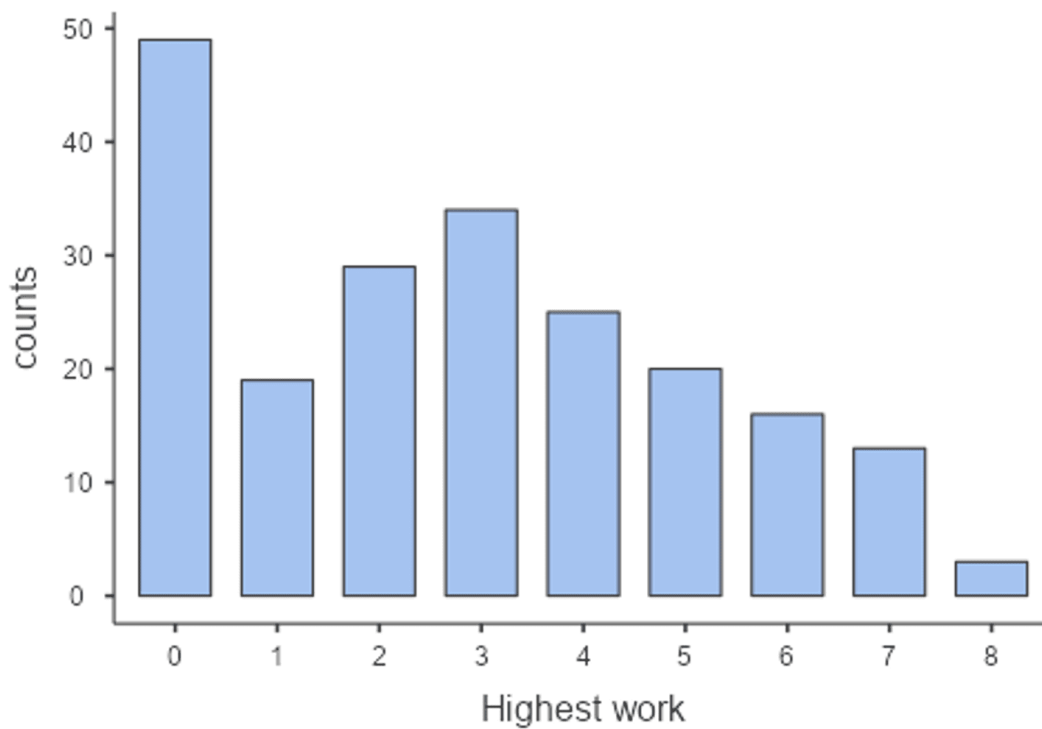


Figure 1. Current work ability compared to highest work ability ever

Work ability in relation to demands

Current work ability with respect to the physical demands of work was rated on a scale from very poor (1) to very good (5). The ratings varied from 1-5 with a median of 2 (i.e., rather poor). The mental demands of work were rated on a similar five-point scale and the median was also 2. The distribution of responses is shown in Figure 2 and tends to indicate greater limitation in physical work ability in this sample.

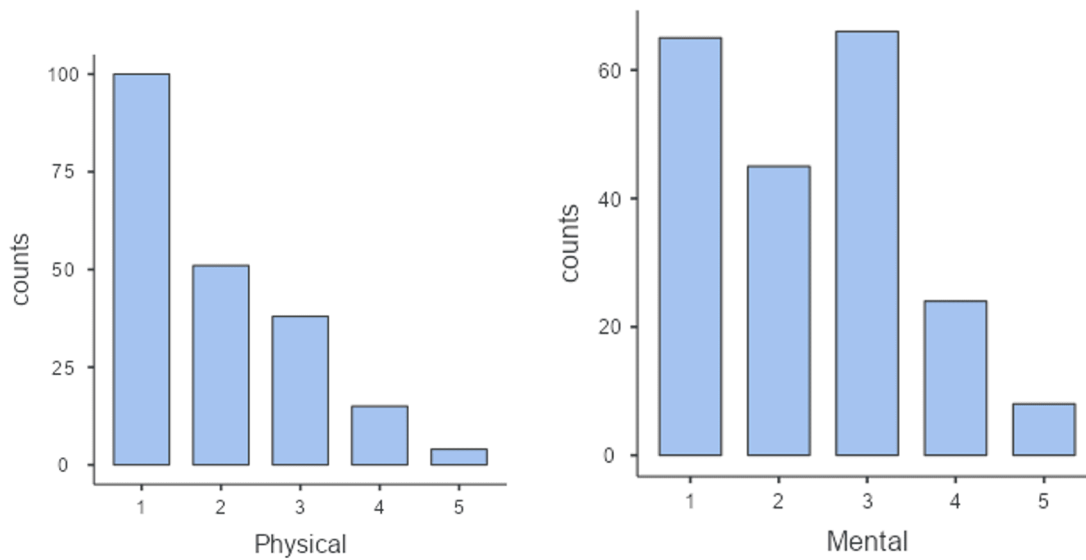


Figure 2. Work ability in relation to physical and mental demands (N=208)

A chi-square test of independence indicated a significant association between physical and mental ability, $\chi^2(16) = 32.7$, $p = .008$. Measures of ordinal association showed a moderate positive relationship (gamma = .367 95%CI [.220,.514] and Kendall's tau-b = 0.266, $p < .001$). There is a low positive association so that as physical work ability decreases then mental work ability tend to decrease.

There is a pattern in which the decrease in work ability is evident both physically and mentally. Current work ability compared to highest work ability ever was related to the extent of physical ability ($\chi^2(32) = 156$, $p < .001$, gamma = .696 95%CI [.595,.797], Kendall's tau-b = 0.557, $p < .001$). Similarly, current work ability compared to highest ever work ability was positively related to mental work ability ($\chi^2(32) = 128$, $p < .001$, gamma = .579 95%CI [.484,.674], Kendall's tau-b = 0.475, $p < .001$).

Current diseases

The current number of conditions diagnosed by a doctor were selected from a list of 14 conditions (injury due to an accident, genitourinary disease, musculoskeletal disease, skin disease, cardiovascular disease, tumour or cancer, respiratory disease, endocrine or metabolic disease, mental disorder, blood diseases, neurological or sensory disease, birth defects, digestive disease/condition, other disorder or disease). The median number of conditions reported was 3 and ranged from 0 to 8. The distribution of current diagnoses is shown in Figure 3.

There is a statistically significant association between the number of diagnoses and physical work ability. It is a statistically significant, moderate negative relationship, shown consistently across the chi-Square, gamma, and Kendall's tau-b statistics: ($\chi^2(32)=47.8$, $p=.0036$); gamma=-.313 95%CI [-.464, -.161]; Kendall's tau-b =-.227). They indicate a low to moderate negative association, that is, as the number of physical or medical diagnoses increases, physical work ability tends to decrease.

On the other hand, this relationship did not hold for mental work ability. The relationship between the number of diagnoses and mental work ability was not statistically significant ($\chi^2(32)=41.6$, $p=.119$; gamma =-.056 95%CI [-.213,.101], Kendall's tau-b = -0.042).

Estimated work impairment due to diseases

There are six choices in the estimated work impairment due to disease. They vary from no hindrance/no diseases. (6), through being able to do one's job but with symptoms (5), a requirement to sometimes (4) or often (3) slow down work pace, to being able to do only part time work (2) or being entirely unable to work (1). As expected, the responses to this question were skewed negatively (see Figure 4) with both the median and mode being "In my opinion I am entirely unable to work."

There is compelling evidence of a strong relationship between "Highest Work Ability" and "Estimated Work Impairment Due to Disease." The gamma value of 0.869 suggests a very strong monotonic relationship.

Furthermore, a similar strong relationship exists between the estimated work impairment due to disease and physical ability ($\chi^2(16)=109$ $p<.001$; gamma =.72 95%CI [.624,.816]; Kendall's tau-b =.546 $p<.001$) as well as with mental ability ($\chi^2(16)=81.4$, $p<.001$; gamma =.638 95%CI [.531,.744]; Kendall's tau-b =.472, $p<.001$). The first, second, third and fifth questions appear to relate to an underlying factor of "work ability."

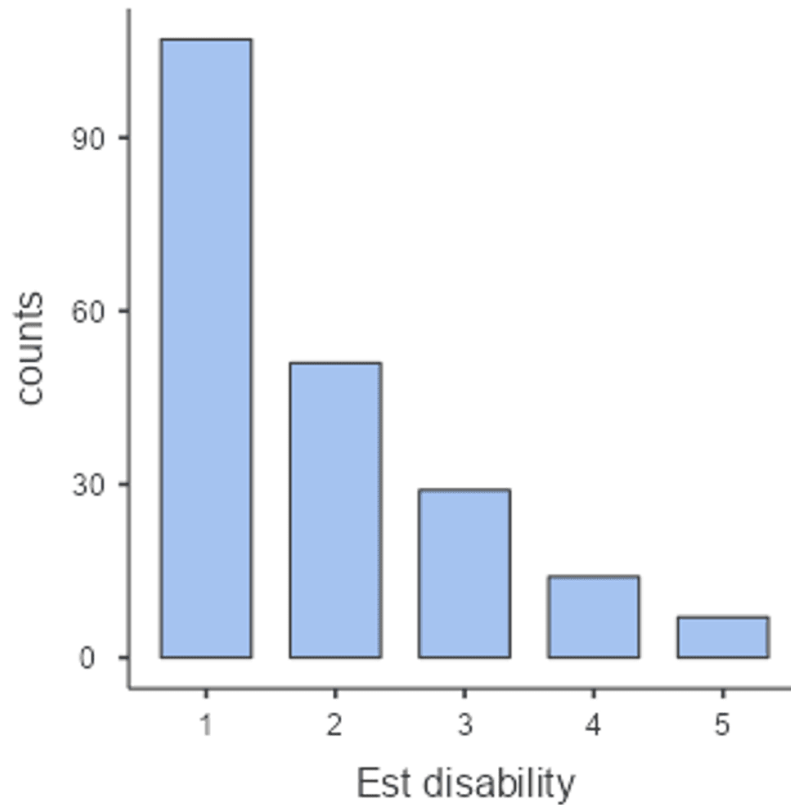


Figure 4. Distribution of estimated work impairment due to disease (N=208)

Illness within last year

Rating of the days off work because of illness within the last year can range from 100 plus days (1), down to 25–99 days (2), then 10–24 days (3), a maximum of 9 days (4) and no days off work (5). Once again, the distribution was positively skewed (see Figure 5), with 147 out of 208 having 100–354 days off work in the last year.

There was a statistically significant relationship between the number of days off work within the last year and (a) current work ability; (b) physical work ability; (c) mental work ability; and (d) estimated disability, but not with the current number of diagnoses (see Table 1 for a summary).

| Factors | χ^2 | gamma | Kendall's tau-b |
|------------------------------|---------------------------|----------------------------|-----------------|
| Highest current work ability | $\chi^2(32)=108, p<.001$ | .739 95%CI [.662,.816] | .506, p<.001 |
| Physical ability | $\chi^2(16)=64.6, p<.001$ | .636 95%CI [.510,.762] | .423, p<.001 |
| Mental ability | $\chi^2(16)=44.7, p<.001$ | .556 95%CI [.417,.695] | .351, p<.001 |
| Number of diagnoses | $\chi^2(32)=47.6, p=.037$ | -.193 95%CI [-.383, -.002] | -.116, p=.051 |
| Estimated work impairment | $\chi^2(16)=144, p<.001$ | .864 95%CI [.812,.916] | .651, p<.001 |

Table 1. Relationships with the number of days off work in the last year

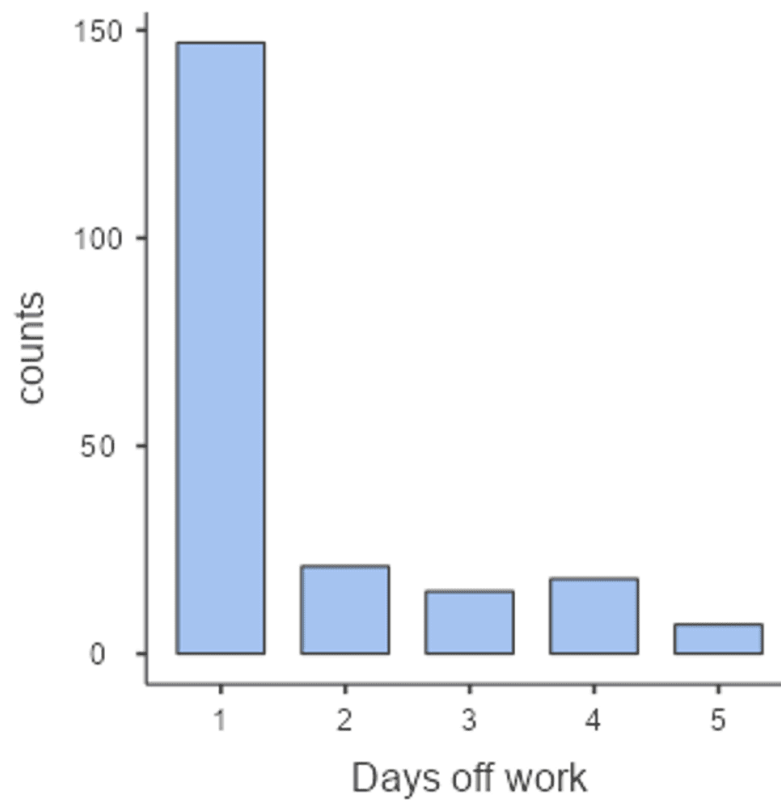


Figure 5. Illness within the last year (N=208). [1=100 plus days, 2=25-99 days, 3=10-24 days, 4=1-9 days, 5=0 days]

Estimation of own work ability in 2 years

This question asked “Do you believe, according to your present state of health, that you will be able to do your current job two years from now?” and the answers ranged from Unlikely (1), Not Certain (4) to Relatively certain (7). A majority believed that it was unlikely (N=95) or they were not certain (N=84) whether they would be able to work two years from now (see Figure 6).

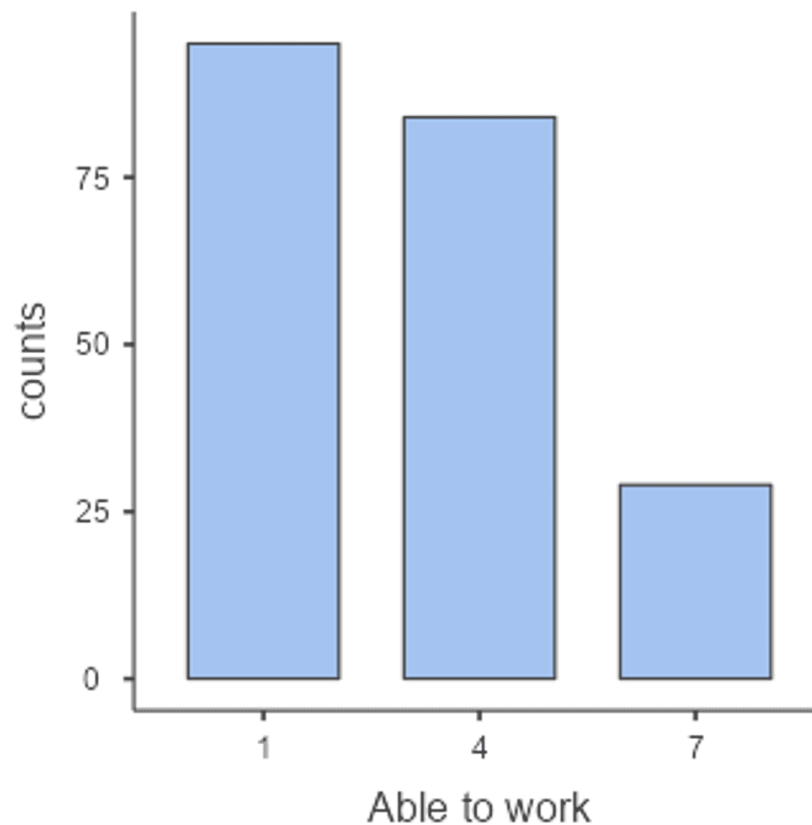


Figure 6. Illness within the last year (N=208). [1=unlikely, 4=not certain, 7=relatively certain]

The estimate of ability to work two years from now was related significantly to the estimated work impairment (gamma.841) and the rating of current work ability (gamma.732) – see Table 2 for a summary.

| Factors | χ^2 | gamma | Kendall's tau-b |
|------------------------------|---------------------------|----------------------------|-----------------|
| Highest current work ability | $\chi^2(16)=126, p<.001$ | .732 95%CI [.643,.822] | .556, p<.001 |
| Physical ability | $\chi^2(8)=74.3, p<.001$ | .696 95%CI [.582,.809] | .492, p<.001 |
| Mental ability | $\chi^2(8)=58.3, p<.001$ | .519 95%CI [.379,.659] | .364, p<.001 |
| Number of diagnoses | $\chi^2(16)=27.4, p=.037$ | -.288 95%CI [-.451, -.125] | -.200, p<.001 |
| Estimated work impairment | $\chi^2(8)=123, p<.001$ | .841 95%CI [.767,.915] | .623, p<.001 |
| Illness within last year | $\chi^2(8)=71.9, p<.001$ | .782 95%CI [.674,.890] | .501, p<.001 |

Table 2. Estimation of work ability in two years

Mental capacities

The last section of the *Work Ability index* contains three questions concerning mental capacities. The first question is: “Considering the last three months: Have you been able to enjoy your regular daily activities?” and the answers are rated on a scale from never (0) through rather seldom (1), sometimes (2), rather often (3) and often (4). The distribution of answers is skewed and shown in Figure 7.

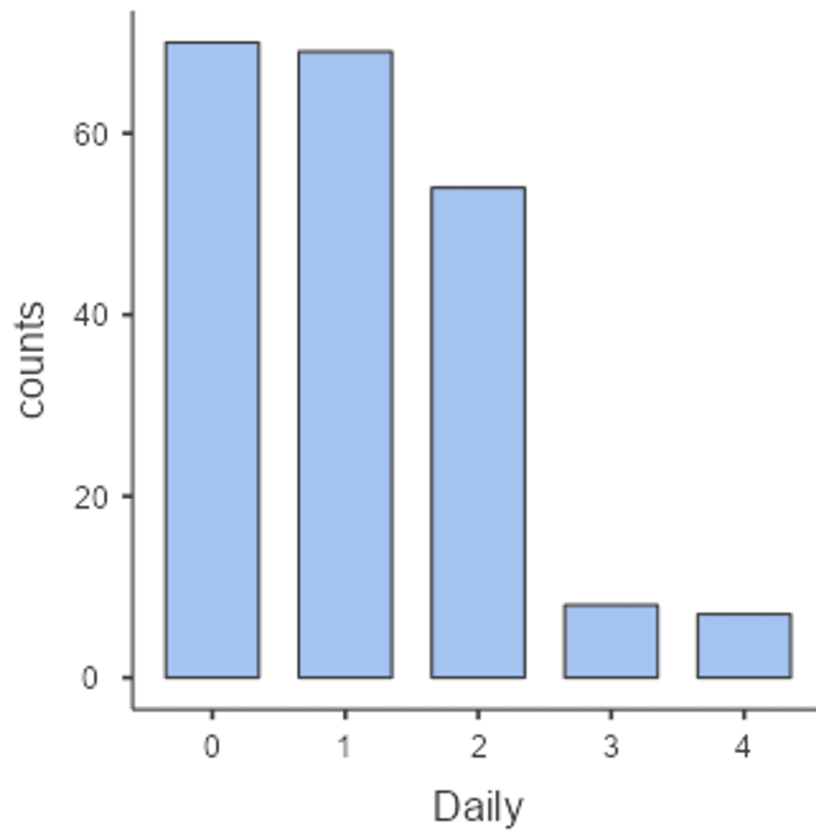


Figure 7. Able to enjoy regular daily activities from never (0) to often (4) (N=208).
(0=never; 1=rather seldom; 2=sometimes; 3=rather often; 4=often)

The second question is: “Considering the last three months: Have you been active and alert?” It is rated on the same five-point scale from never to often. The distribution of answers is shown in Figure 8.

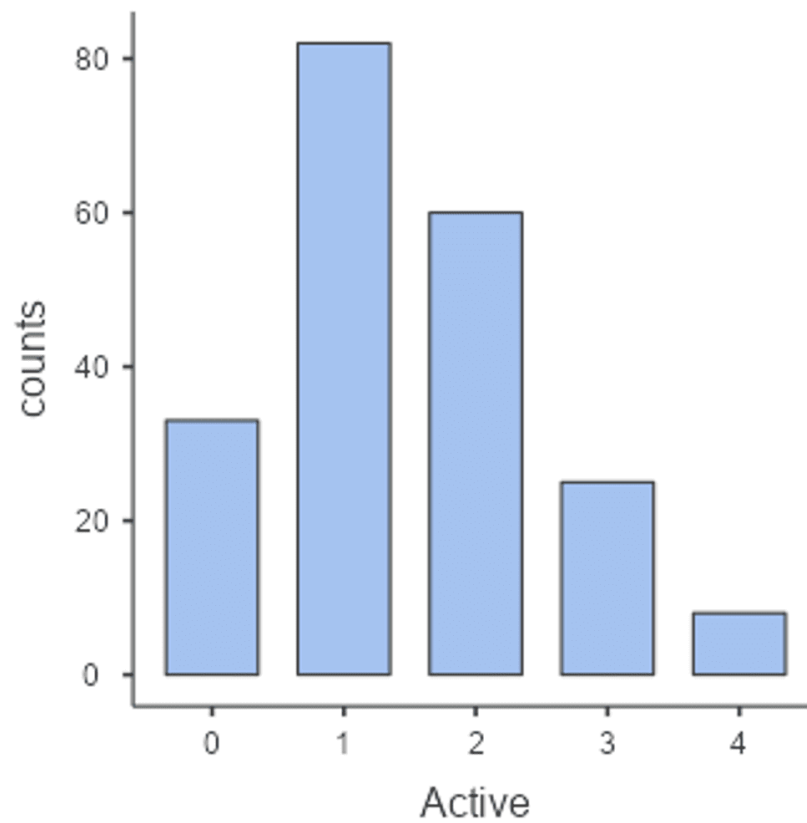


Figure 8. Active and alert from never (0) to often (4) (N=208). (0=never; 1=rather seldom; 2=sometimes; 3=rather often; 4=often)

The third question is: “Considering the last three months: Have you felt yourself to be full of hope about the future?” and again it is rated on the same five-point scale from never to often. The distribution of answers is quite skewed and shown in Figure 9.

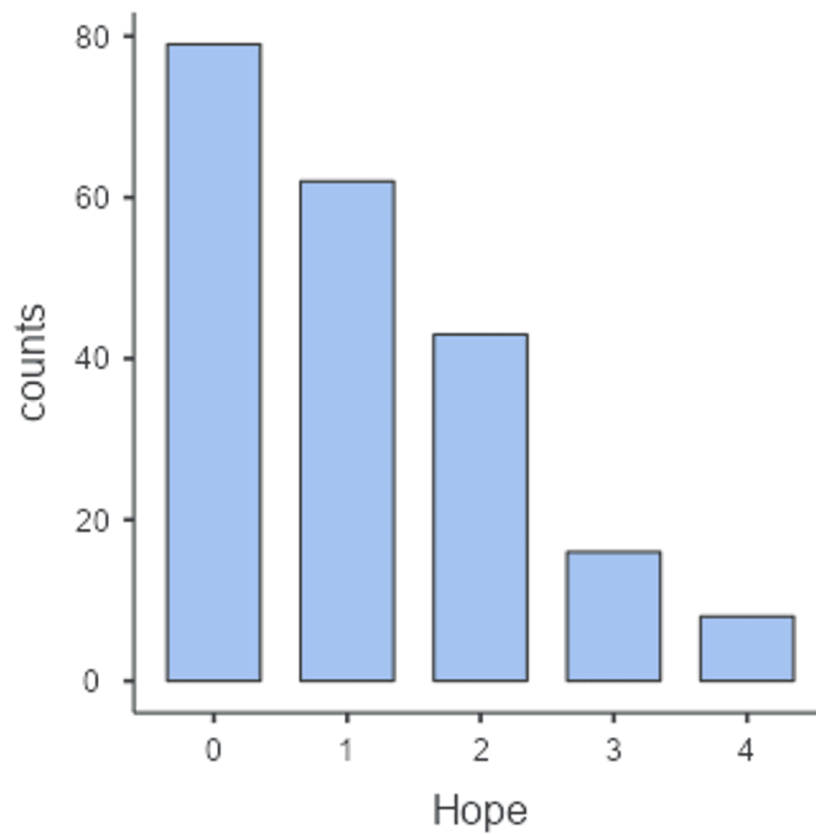


Figure 9. Full of hope about the future from never (0) to often (4) (N=208).
(0=never; 1=rather seldom; 2=sometimes; 3=rather often; 4=often)

The resulting gamma coefficients for the three questions are summarised in Table 3. The questions are moderately and positively related, indicating some underlying general factor in the mental capacities.

| Mental capacity | Daily activities | Active-alert | Hope |
|--------------------------|------------------|--------------|------|
| Regular daily activities | - | | |
| Active and alert | .668 | - | |
| Full of hope | .598 | .584 | - |

Table 3. Interrelations between mental capacities on the Work Ability Index

The final set of results examines the relationship between the three mental capacity questions and the seven preceding questions. The results are summarised for the three mental capacities in Table

Table 4. Interrelations between mental capacities and other work ability questions

| Work ability questions | Daily activities | Active-alert | Hope |
|---|----------------------------|---------------------------|---------------------------|
| Current work ability | $\chi^2(32)=115, p<.001$ | $\chi^2(32)=82.8, p<.001$ | $\chi^2(32)=79.8, p<.001$ |
| Physical ability | $\chi^2(16)=71.4, p<.001$ | $\chi^2(16)=76.9, p<.001$ | $\chi^2(16)=36.0, p=.003$ |
| Mental ability | $\chi^2(16)=54.6, p<.001$ | $\chi^2(16)=44.4, p<.001$ | $\chi^2(16)=57.4, p<.001$ |
| Number of diagnoses | $\chi^2(32)=65.9, p<.001$ | $\chi^2(32)=50.9, p=.018$ | $\chi^2(32)=39.7, p=.165$ |
| Estimated work impairment | $\chi^2(16)=178.5, p<.001$ | $\chi^2(16)=83.5, p<.001$ | $\chi^2(16)=41.9, p<.001$ |
| Illness within last year | $\chi^2(16)=56.9, p<.001$ | $\chi^2(16)=71.3, p<.001$ | $\chi^2(16)=27.2, p=.039$ |
| Estimation of work ability in two years | $\chi^2(8)=86, p<.001$ | $\chi^2(8)=73.2, p<.001$ | $\chi^2(8)=49.6, p<.001$ |

Table 4a. chi-square

| Work ability questions | Daily activities | Active-alert | Hope |
|---|-----------------------------|------------------------------|-----------------------------|
| Current work ability | .529 95%CI [.420,.639] | .548 95%CI [.643,.822] | .441 95%CI [.325.558] |
| Physical ability | .581 95%CI [.460,.702] | .614 95%CI [.643,.822] | .365 95%CI [.221,.508] |
| Mental ability | .439 95%CI [.311,.567] | .370 95%CI [.235,.505] | .423 95%CI [.290,.555] |
| Number of diagnoses | -.134 95%CI [-.287,.018] | -.147 95% CI [-.300,.005] | -.128 95%CI [-.272,.016] |
| Estimated work impairment | .542 95%CI [.406,.678] | .641 95%CI [.55,.747] | .429 95%CI [.290,.567] |
| Illness within last year | .465 95%CI [.289,.642] | .562 95% CI [.417,.708] | .347 95%CI [.175,.519] |
| Estimation of work ability in two years | .567 95%CI [.426,.707] | .601 95%CI [.476,.731] | .545 95%CI [.408,.682] |

Table 4b. gamma

| Work ability questions | Daily activities | Active-alert | Hope |
|---|------------------|--------------|--------------|
| Current work ability | .421 p<.001 | .437 p<.001 | .353 p<.001 |
| Physical ability | .425 p<.001 | .443 p<.001 | .264 p<.001 |
| Mental ability | .325 p<.001 | .275 p<.001 | .317 p<.001 |
| Number of diagnoses | -.101 p<.001 | -.111 p=.053 | -.095 p<.001 |
| Estimated work impairment | .391 p<.001 | .457 p<.001 | .309 p<.001 |
| Illness within last year | .288 p<.001 | .346 p<.001 | .214 p<.001 |
| Estimation of work ability in two years | .393 p<.001 | .417 p<.001 | .381 p<.001 |

Table 4c. Kendall's tau-b

Conclusions

This study reinforces the internal coherence of the *Work Ability Index* in assessing self-perceived work capacity after a compensable injury. Strong and consistent associations were observed between various components of the *Work Ability Index* - particularly between current work ability, perceived physical and mental demands, estimated work impairment, and future work expectations. One question “number of diagnoses” did not always have a statistically significant relationship with other items, such as the number of days off work in the last year, or work ability in two years.

In summary the modal value of current work ability compared to best ever work ability was zero (on a scale from zero to 10). Physical ability for work also had a mode of very poor (on a scale from very poor to very good). Mental ability for work was positively skewed from moderate to very poor. The median number of conditions reported was three and reached a maximum of 8. Estimated work impairment due to diseases was typically stated as: “In my opinion I am entirely unable to work.” The modal number of days off work in the last 12 months was 100 -354 days. In terms of future aspirations, only around 29 out of 208 were relatively certain that they would be working in two years’ time. Finally mental capacities were materially reduced, especially ability to engage in regular daily activities and hope for the future [see Figure 9]. The results point to a population which has unique characteristics and which differs markedly from a working population.

The approach taken in this paper also drew attention to psychometric limitations of the *Work Ability Index*, particularly the assumption that it yields a valid and interpretable total score. The heterogeneity in item formats and scales (e.g., ranges from 0–10, 1–5, 1–7) makes summation problematic. Differences in unit scaling and a lack of demonstrated interval-level measurement weaken the argument for using a composite index as a precise metric of work ability. Even within a single item, the assumption of equal-interval scaling is questionable—for example, the difference between a 0 and 1 may not be equivalent to that between a 9 and 10.

In light of these limitations, this report adopted a non-parametric and item-wise approach, emphasizing the utility of individual *Work Ability Index* components rather than a composite score. While this reduces simplicity, it enhances validity and interpretive clarity. Future studies should explore alternatives to simple score summation and investigate the test–retest reliability and structure of each item in the *Work Ability Index* in working as well as injury populations. For those working in rehabilitation, possibly the saddest aspect of these results is found in the final question which asks: “Considering the last three months, have you felt yourself to be full of hope about the future?” Only 8 out of 208 answered “often.”

Statements and Declarations

Funding

None.

Conflicts of interest

There is no competing interest and the author has no financial disclosure.

Ethics

This research was conducted in accordance with the Privacy Act 1988 and the Australian Code for the Responsible Conduct of Research.

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Declarations

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Potential competing interests: No potential competing interests to declare.