

# Lost Productivity Among Full-Time Workers with Mental Disorders

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## Abstract

**Background:** Few studies have systematically compared the relationship between lost work productivity (work impairment) and mental disorders using population surveys.

**Aims:** (1) To identify the importance of individual mental disorders and disorder co-occurrences (comorbidity) as predictors of two measures of work impairment over the past month—work loss (number of days unable to perform usual activities) and work cutback (number of days where usual activities were restricted); (2) to examine whether different types of disorder have a greater impact on work impairment in some occupations than others; (3) to determine whether work impairment in those with a disorder is related to treatment seeking.

**Method:** Data were based on full-time workers identified by the Australian National Survey of Mental Health and Well-Being, a household survey of mental disorders modeled on the US National Comorbidity Survey. Diagnoses were of one-month DSM-IV affective, anxiety and substance-related disorders. Screening instruments generated likely cases of ICD-10 personality disorders. The association of disorder types and their co-occurrences with work impairment was examined using multivariate linear regression. Odds ratios determined the significance of mental disorder prevalence across occupations, and planned contrasts were used to test for differences in work impairment across occupations within disorder types. The relationship between work impairment and treatment seeking was determined for each broad diagnostic group with *t*-tests.

**Results:** Depression, generalized anxiety disorder and personality disorders were predictive of work impairment after controlling for impairment due to physical disorders. Among pure and comorbid disorders, affective and comorbid anxiety–affective disorders respectively were associated with the greatest amount of work impairment. For all disorders, stronger associations were obtained for work cutback than for work loss. No relationship was found between type of occupation and the impact of different types of disorder on work impairment. Only 15% of people with any mental disorder had sought help in the past month. For any mental

disorder, significantly greater work loss and work cutback was associated with treatment seeking, but comparisons within specific disorder types were not significant.

**Discussion:** A substantial amount of lost productivity due to mental disorders comes from within the full-time working population. The greater impact of mental disorders on work cutback compared to work loss suggests that work cutback provides a more sensitive measure of work impairment in those with mental disorders. Work impairment was based on self-report only. While there is evidence for the reliability of self-assessed work loss days, no reliability or validity studies have been conducted for work cutback days. The low rates of treatment seeking are a major health issue for the workforce, particularly for affective and anxiety disorders, which are important predictors of lost productivity.

**Implications for health policies and further research:** Future research should investigate the validity of work cutback, given its importance as a measure of lost productivity in people with mental disorders. Employers need to be aware of the extent to which mental disorders affect their employees so that effective work place interventions can take place. Treatment should be targeted at people with affective and anxiety disorders, particularly where they co-occur. © 2000 John Wiley & Sons, Ltd.

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## Introduction

Mental disorders have been linked with increased numbers of disability days and absenteeism among the employed.<sup>1–7</sup> Kessler and Frank<sup>3</sup> reported that pure affective disorders (that is, affective disorders not occurring in combination with other types of mental disorder) among workers are associated with 24 million decreased productivity days per year. In the USA, the cost of anxiety disorders due to absenteeism and reduced work productivity was \$US4.1 billion in 1990.<sup>8</sup> Absenteeism attributed to depression alone led to annual losses of \$US17 billion.<sup>9</sup>

It is known that effective treatments exist for many mental disorders.<sup>10</sup> Even more promising have been findings of the positive impact and cost-effectiveness of treatment on measures of work productivity. For example, Zhang *et al.*<sup>1</sup> demonstrated that not only did treatment for depression lead to a reduction in the number of days unable to work, but that the magnitude of this reduction was enough to offset the costs of treatment. However, while such findings have important implications, a more immediate need is to obtain representative data on the extent to which particular mental

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disorders are in fact associated with work impairment. Few studies have examined the relationship between work-related disability and mental ill health using standard diagnoses that allow for the comparison between disorders.<sup>1</sup> More importantly, generalizability has been limited by a failure to employ broad population-based samples.

To our knowledge, only two epidemiological studies have systematically compared work impairment among the different types of mental disorder. Both Dewa and Lin<sup>4</sup> and Kessler and Frank<sup>3</sup> measured work loss (number of days unable to perform usual activities) and work cutback (number of days where usual activities were restricted) among pure and comorbid (co-occurring) affective, anxiety and substance-use disorders. While there were differences between the two studies in the disorders contributing to impairment, the most striking finding was that mental disorders had a greater impact on work cutback than on work loss. Dewa and Lin<sup>4</sup> concluded that work impairment related to mental disorders tended to be less obvious, and may be better detected by work cutback. Neither study determined the level of treatment seeking among workers with mental disorders.

The present analysis examined, among those in full-time work, the association of different mental disorders with work loss and work cutback days based on data from the Australian National Survey of Mental Health and Well-Being. It also extended the analysis of Kessler and Frank<sup>3</sup> in two ways. First, we determined whether there were occupational differences in the impact of specific types of mental disorder on work impairment (rather than mental disorders in general). Second, we investigated whether work impairment in those with a disorder was related to treatment seeking.

## Method

### Sample

The sample was drawn from the 10 641 respondents of the Australian National Survey of Mental Health and Well-Being. Modeled on the US National Comorbidity Survey, the Australian National Survey used a stratified multistage area sample of private dwellings (hospitals, nursing homes, hotels, hostels etc and dwellings in remote areas were excluded) across all States and Territories of Australia. From each household, one adult (aged 18 and over) was randomly selected to complete the interview. Interviews were conducted between May and August 1997, with a response rate of 78%. The present analysis was based on the sub-sample of 4579 respondents who were engaged in full-time employment at time of interview. Those employed full-time reported that they had worked (paid or unpaid) in the preceding week, and worked at least 35 hours in a usual working week. Socio-demographic characteristics of the sample are displayed in **Table 1**. As would be expected, in comparison to those not in the full-time workforce, the full-time employed were more likely to be male, below the age of 65, and to have completed a post-school qualification.

## Measures

### Diagnoses

Diagnoses of DSM-IV affective (depression, dysthymia), anxiety (panic with and without agoraphobia, agoraphobia, social phobia, obsessive compulsive disorder, post-traumatic stress disorder and generalized anxiety disorder) and substance-related (substance abuse, substance dependence, alcohol abuse, alcohol dependence) disorders were made. These were generated using the computerised version of the Composite International Diagnostic Interview (CIDI-Auto Version 2.1) which was incorporated into the survey and has been shown to have good reliability and validity.<sup>11</sup> Diagnoses were of current disorders (symptoms had occurred within last month) and exclusion criteria were applied. Also included were screening questions for personality disorders.<sup>12</sup>

### Occupation

Based on a description of the nature of the work performed, occupations were coded according to the Australian Standard Classification of Occupations.<sup>13</sup> Within the survey, these occupations were classed into nine categories. In order to maximize the power of the analysis, these nine categories were collapsed into five broad groups on the basis of task similarity: 'professionals', 'managers', 'tradespersons', 'clerical workers' and 'labourers'.

### Work Impairment

Number of work loss days and number of work cutback days were the measures of work impairment used. Work loss (closely corresponding to absenteeism) was assessed in the survey by asking respondents to estimate the number of days over the past four weeks that they 'were totally unable to work or carry out [their] normal activities because of [their] health'. The item for work cutback (corresponding to reduced productivity while at work) was identical except that it asked how many days, apart from the day/s mentioned previously, they were 'able to work and carry out [their] normal activities, but had to cut down on what [they] did, or did not get as much done as usual because of their health'. These impairment days referred to the past 4 weeks in total and not just days at work. However as this study was restricted to people in full-time employment, the majority of their time is spent working and thus days impaired from 'work and usual activities' was taken as a proxy for absenteeism and lost productivity.

The maximum number of work loss or work cutback days possible was 28. As these days were not specific to mental health, all regression analyses controlled for the presence of work loss or work cutback days directly attributed to self-assessed physical disorders (yes/no questions for the presence of asthma, chronic bronchitis, anaemia, high blood pressure, heart trouble, arthritis, kidney disease, diabetes, cancer, stomach or duodenal ulcer, chronic gallbladder or liver trouble, hernia or rupture).

### Treatment Seeking

Treatment seeking was scored dichotomously according to whether or not the respondent had sought help from any health professional for a mental problem within the past

Table 1. Socio-demographic characteristics of those in full-time employment compared to the rest of the population

	Full-time employed <sup>a</sup> ( <i>n</i> = 4579) % (s.e.)	Rest of population <sup>b</sup> ( <i>n</i> = 6062) % (s.e.)	OR (95% CI)
Gender			
Male	67.9 (0.6)	33.7 (0.6)	5.28 (4.10–6.80)***
Female	32.1 (0.6)	66.3 (0.6)	1.00
Age			
18–24	13.5 (0.6)	13.5 (0.8)	38.67 (23.37–64.00)***
25–34	28.8 (2.9)	14.6 (1.3)	73.56 (48.29–112.06)***
35–44	26.7 (3.5)	16.2 (1.2)	58.74 (37.03–93.18)***
45–54	22.2 (0.7)	13.6 (2.7)	59.16 (38.74–90.34)***
55–64	7.8 (0.4)	14.7 (3.1)	15.69 (9.66–25.50)***
65+	1.0 (0.2)	27.4 (0.4)	1.00
Marital status			
Married/defacto	67.7 (0.9)	63.0 (1.0)	1.08 (0.86–1.35)
Widowed/separated/divorced	8.0 (0.5)	18.5 (1.6)	0.94 (0.67–1.33)
Never married	24.4 (0.9)	18.5 (1.1)	1.00
Education			
Higher qualification	59.5 (0.9)	37.6 (1.3)	2.00 (1.78–2.25)***
No higher qualification	40.5 (0.9)	62.4 (1.3)	1.00
Urbanicity			
Capital city/other metropolitan	73.9 (1.2)	71.6 (1.4)	0.96 (0.78–1.17)
Large/small rural	11.1 (1.4)	12.8 (1.3)	0.83 (0.62–1.12)
Other rural	15.1 (1.0)	15.6 (1.0)	1.00

\**p* < 0.05.

\*\**p* < 0.01.

\*\*\**p* < 0.001.

OR = odds ratio, CI = confidence interval.

<sup>a</sup>Full-time employment refers to 'usual working hours of at least 35 hours per week'.

<sup>b</sup>Part-time employed, unemployed and those not in the labour force.

month. Treatment seeking was asked in relation to each disorder category.

### Data Analytic Procedures

Due to the complex sample design of the survey, analyses were carried out using SUDAAN (Version 7.5.3) software. Proportions and means were weighted according to the age and sex distribution of the Australian adult population and to account for probability of within-household selection. Standard errors of proportions, odds ratios and regression coefficients were obtained using jackknife repeated replications. Regression coefficients were considered significant at *p* < 0.05 and planned contrasts at *p* < 0.01 (to account for the multiple comparisons). For odds ratios, 95% confidence intervals (CI) were used. In all analyses, work loss days and work cutback days were considered separately.

The relationship between individual disorders and work impairment was investigated with linear regressions for each disorder, predicting work loss and work cutback while controlling for days attributed to physical disorders. For subsequent analyses, individual disorders were combined into four broad categories (affective, anxiety, substance related, and personality disorder) for analysis. The association of each disorder category with work impairment was

determined by multivariate linear regression, with each person with any disorder allocated to one of 11 mutually exclusive disorder categories: pure disorder (diagnosed with one of the four disorder categories only) or comorbid disorder (six possible combinations of two disorder types only, and one category for any three or all four disorder types). All disorder variables were entered as dichotomous predictors (positive/negative for that disorder group). Work loss days and work cutback days were controlled for days lost or cutback due to physical disorders. Socio-demographic variables were not included after initially being entered and failing to reach significance.

Odds ratios were calculated to assess whether certain types of disorder were more prevalent in some occupations than others. These can be interpreted as the likelihood of a worker in that occupation versus another occupation having that disorder. To determine whether the level of work impairment associated with a disorder was associated with occupation, within each disorder mean work loss days and cutback days for each occupation were contrasted with mean work loss or cutback days for the other occupations combined. The relationship between work impairment and treatment seeking among those with a disorder was examined with *t*-tests, to determine whether those who sought help were more disabled than those who had not.

## Results

### *The Relationship between Mental Disorders and Work Impairment*

**Table 2** presents the prevalence of individual DSM-IV mental disorders and the mean number of work loss and work cutback days associated with each, including the expected work impairment associated with each disorder after controlling for days attributed to physical disorders (from unstandardized linear regression coefficients). Nearly 11% of the full-time work force had suffered from a mental disorder in the past month. Personality disorders (4.8%) were the most common, followed by substance (3.7%), anxiety (2.6%) and affective disorders (2.5%). In the past month, having a current mental disorder was associated with an average of one lost day from work, and three days of reduced performance. Affective and anxiety disorders may have been less common, but they were more disabling, associated with 6 and 4.5 cutback days respectively. Only depression was significantly associated with more work loss days, while depression, generalized anxiety disorder and

personality disorder were significantly associated with more cutback days.

The importance of comorbidity in predicting work loss and cutback days is shown in **Table 3**. Disorder co-occurrences were examined for the disorder categories only (affective, anxiety, substance, personality), as there were too few cases to examine individual disorder combinations. Mean days and economic burden (mean disability days multiplied by number of people with the diagnosis in the Australian population) are provided for each disorder category, with regression coefficients describing the expected increase in work impairment days controlling for days due to physical disorders. Among those with only one type of disorder, affective disorders had the greatest average number of work loss days (mean = 1.6, SD = 0.6) and work cutback days (mean = 5.3, SD = 2.0). The highest levels of impairment were observed among those with multiple disorders; however, not all disorder combinations were equally disabling. Comorbid anxiety–affective disorder had the greatest number of work loss days (mean = 5.7, SD = 1.8) and work cutback days (mean = 7.2, SD = 2.1).

The results of the linear regression for work loss

Table 2. Mental disorders in the full-time workforce: weighted prevalence of DSM-IV disorders, mean work loss and work cutback days, and significance of each disorder as a predictor of work impairment (work loss days and work cutback days)

Disorder <sup>a</sup>	Full-time employed <sup>b</sup> (n = 4579)				
	1-month prevalence % (s.e.)	Work loss days in the past month		Work cutback days in the past month	
		Mean (s.e.)	Beta <sup>c</sup> (s.e.)	Mean (s.e.)	Beta <sup>c</sup> (s.e.)
Depression	2.2 (0.2)	2.37 (0.39)	1.39 (0.38)**	6.42 (1.23)	4.17 (0.90)***
Dysthymia	0.4 (0.2)	1.63 (1.04)	-0.93 (0.56)	3.44 (1.82)	0.20 (1.38)
<i>Any affective</i>	2.5 (0.2)	2.33 (0.34)	1.06 (0.38)**	6.03 (1.12)	3.55 (0.71)***
Panic Disorder	0.2 (0.1)	1.71 (0.87)	0.89 (0.84)	2.99 (1.70)	1.01 (1.19)
Agoraphobia	0.1 (0.0)	0.38 (0.43)	-0.21 (0.44)	2.43 (2.56)	1.43 (2.61)
Social	0.6 (0.2)	2.51 (0.96)	0.55 (1.45)	3.48 (1.83)	1.38 (2.02)
GAD	1.4 (0.3)	1.76 (0.48)	0.76 (0.68)	5.91 (2.36)	3.94 (1.77)*
OCD	0.3 (0.1)	0.12 (0.13)	-0.48 (0.15)	2.99 (2.87)	1.99 (2.88)
PTSD	0.5 (0.1)	2.44 (1.06)	1.45 (1.03)	6.08 (2.05)	4.25 (2.26)
<i>Any anxiety</i>	2.6 (0.5)	1.67 (0.40)	0.64 (0.48)	4.52 (1.13)	2.70 (0.97)**
Alcohol abuse	0.9 (0.2)	0.36 (0.14)	-0.24 (0.16)	0.56 (0.29)	-0.92 (0.34)
Alcohol dependence	2.1 (0.3)	0.68 (0.25)	0.01 (0.23)	1.52 (0.79)	0.18 (0.61)
Drug abuse	0.4 (0.1)	1.05 (1.21)	0.46 (1.20)	2.29 (1.51)	1.05 (1.62)
Drug dependence	0.6 (0.1)	0.54 (0.22)	-0.16 (0.20)	1.72 (0.72)	0.42 (0.83)
<i>Any substance</i>	3.7 (0.4)	0.64 (0.21)	-0.01 (0.16)	1.47 (0.49)	0.09 (0.52)
<i>Any personality disorder</i>	4.8 (0.4)	0.94 (0.22)	0.21 (0.25)	3.19 (0.76)	1.70 (0.69)*
<i>Any mental disorder</i>	10.5 (0.6)	1.07 (0.17)	0.30 (0.18)	3.00 (0.40)	1.57 (0.34)***

Significantly more impaired in relation to people without that disorder:

\*p < 0.05.

\*\*p < 0.01.

\*\*\*p < 0.001.

<sup>a</sup>Affective, anxiety and substance-related disorders are current DSM-IV diagnoses as assessed by the CIDI-Auto scoring algorithm. Personality disorders refer to potential cases of ICD-10 personality disorders as assessed by a screening instrument.

<sup>b</sup>Full-time employment refers to 'usual working hours of at least 35 hours per week'.

<sup>c</sup>Represents unstandardized linear regression coefficients interpretable as the number of work impairment days associated with that disorder compared to people without that disorder. Coefficients are controlled for work impairment days due to physical disorders.

Table 3. Importance of mental disorder comorbidity as a predictor of work impairment in full-time workers

Mutually exclusive disorder categories <sup>a</sup>	1-month prevalence % (s.e.)	Work loss days in the past month <sup>b</sup>			Work cutback days in the past month <sup>c</sup>		
		Mean (s.e.)	Beta <sup>d</sup> (s.e.)	Economic burden <sup>e</sup> ('000)	Mean (s.e.)	Beta <sup>d</sup> (s.e.)	Economic burden ('000)
<i>Pure</i>							
Affective	1.1 (0.1)	1.6 (0.6)	0.41 (0.46)	102	5.3 (2.0)	2.92 (1.02)*	340
Anxiety	1.0 (0.3)	0.6 (0.2)	-0.06 (0.19)	37	2.7 (0.9)	1.54 (0.84)	168
Substance	2.8 (0.3)	0.6 (0.3)	0.03 (0.25)	102	1.2 (0.4)	0.10 (0.50)	205
Personality	3.2 (0.3)	0.9 (0.3)	0.26 (0.27)	176	2.4 (1.2)	1.41 (1.28)	469
<i>Comorbid</i>							
Anxiety-affective	0.4 (0.1)	5.7 (1.8)	4.05 (1.85)*	146	7.2 (2.1)	5.51 (2.11)*	184
Anxiety-substance <sup>f</sup>	0.1 (0.0)	1.1 (0.7)	—	5	0.6 (0.7)	—	3
Affective-substance	0.2 (0.1)	0.4 (0.3)	-0.32 (0.31)	5	4.4 (1.8)	3.08 (1.78)	59
Affective-personality	0.3 (0.1)	1.9 (1.4)	1.33 (1.34)	30	6.9 (4.5)	2.86 (1.71)	109
Anxiety-personality	0.6 (0.1)	0.2 (0.1)	-0.43 (0.12)	6	4.5 (4.8)	2.48 (3.73)	150
Substance-personality	0.3 (0.1)	0.1 (0.1)	-0.46 (0.1)	2	0.6 (0.6)	-0.21 (0.64)	12
3 or 4 disorder types	0.5 (0.1)	0.7 (0.1)	0.41 (0.77)	68	1.3 (0.2)	3.88 (2.57)	210

All disorder combinations are in the linear regression models, so significance indicates more impairment in relation to those without a disorder:

\* $p < 0.05$ .

\*\* $p < 0.01$ .

\*\*\* $p < 0.001$ .

<sup>a</sup>Disorders were entered in the linear regression analyses as dichotomous variables (present/absent) for both pure and comorbid types.

<sup>b</sup> $R^2 = 0.139$ .

<sup>c</sup> $R^2 = 0.187$ .

<sup>d</sup>Represents unstandardized coefficients interpretable as the number of work impairment days associated with that disorder controlling for all other disorder types and for impairment days due to physical disorders.

<sup>e</sup>Calculated by multiplying mean days by number of people with current diagnoses in the Australian population. Refers to number of days in thousands.

<sup>f</sup>Due to small case numbers anxiety-substance was not entered into the regression analyses.

days revealed that comorbid anxiety-affective disorder was associated with an expected increase of four impairment days. In terms of work cutback days, diagnoses of pure affective and comorbid anxiety-affective disorders were associated with an expected increase of 2.9 and 5.5 days respectively. All disorders had consistently larger positive associations with work cutback days than with work loss days.

### The Role of Occupation

The prevalence of mental disorder types by occupation and work impairment days by occupation are presented in **Tables 4** and **5**, respectively. Prevalence of any current mental disorder ranged from a low of 8.5% for professionals to a high of 12.9% for tradespersons. The prevalence of affective, anxiety and personality disorders did not vary significantly across occupation, but substance-related disorders were 1.8 times more likely (95% CI = 1.04–3.25,  $p < 0.05$ ) among tradespersons than other occupations. Work impairment days were compared across occupations within each disorder, to determine whether disorders were associated with different levels of impairment for different occupations. No contrasts were significant, indicating that a given disorder type is associated with similar levels of impairment regardless of occupational status.

### The Relationship Between Work Impairment and Treatment Seeking

Treatment seeking was very low in the full-time workforce, with only 15% of people with a mental disorder having sought help for their mental health problems in the preceding month. Treatment seeking for specific disorders varied by diagnosis, with higher rates among people with affective (35%) or anxiety disorders (30%), but virtually non-existent for substance (2%) and personality (5%) disorders. Across disorder categories those who sought help were significantly more disabled on both work loss ( $t = -2.63$ ,  $df = 501$ ,  $p < 0.05$ ) and work cutback ( $t = -3.11$ ,  $df = 501$ ,  $p < 0.01$ ) than those who had not sought treatment. Within disorder categories, treatment seekers also reported more disability; however no comparisons reached significance.

### Discussion

#### The Relationship Between Mental Disorders and Work Impairment

For both individual mental disorders and different disorder co-occurrences, affective and anxiety disorders were found to be important predictors of lost productivity in full-time

Table 4. DSM-IV mental disorder prevalence by occupational status in full-time workers. Odds ratios refer to likelihood of diagnosis compared to the rest of the occupations combined

Disorder prevalence for full-time workers by occupational status ( $N = 4579$ )					
Disorder	Managers $n = 541$ % (s.e.) OR (95% CI)	Professionals $n = 1640$ % (s.e.) OR (95% CI)	Tradespersons $n = 681$ % (s.e.) OR (95% CI)	Clerical $n = 1024$ % (s.e.) OR (95% CI)	Labourers $n = 693$ % (s.e.) OR (95% CI)
Affective	3.7 (1.3) 1.6 (0.65, 4.09)	1.8 (0.5) 0.6 (0.34, 1.24)	2.4 (0.7) 1.0 (0.49, 1.96)	2.6 (0.6) 1.1 (0.58, 1.89)	2.9 (0.8) 1.2 (0.62, 2.41)
Anxiety	3.1 (2.0) 1.2 (0.32, 4.78)	2.1 (0.5) 0.8 (0.45, 1.24)	2.9 (0.7) 1.1 (0.65, 2.00)	3.2 (0.7) 1.4 (0.57, 3.27)	2.0 (1.1) 0.7 (0.27, 2.05)
Substance	1.6 (0.7) 0.4 (0.15, 1.10)	2.9 (0.5) 0.7 (0.41, 1.19)	5.8 (1.6) 1.8 (1.04, 3.25)*	3.8 (0.6) 1.0 (0.62, 1.71)	4.5 (1.3) 1.3 (0.8, 2.25)
Personality	5.4 (1.6) 1.1 (0.58, 2.27)	3.8 (0.7) 0.7 (0.39, 1.25)	5.6 (1.3) 1.2 (0.72, 2.02)	6.1 (0.9) 1.4 (0.96, 2.08)	4.0 (0.9) 0.8 (0.48, 1.35)
Any disorder	10.1 (2.6) 1.0 (0.52, 1.76)	8.5 (1.0) 0.7 (0.50, 1.01)	12.9 (1.7) 1.3 (0.93, 1.91)	12.3 (1.2) 1.3 (0.96, 1.66)	10.2 (1.5) 1.0 (0.69, 1.34)

\* $p < 0.05$ .

Note: OR = odds ratio, CI = 95% confidence interval.

Table 5. The relationship between DSM-IV mental disorders and work impairment by occupational status in full-time workers: mean (standard error) work loss and work cutback days. Work loss and work cutback did not vary significantly by occupation for any disorder

Work impairment for full-time workers by occupational status ( $N = 4579$ )					
Disorder	Managers $n = 541$ Mean (s.e.)	Professionals $n = 1640$ Mean (s.e.)	Tradespersons $n = 681$ Mean (s.e.)	Clerical $n = 1024$ Mean (s.e.)	Labourers $n = 693$ Mean (s.e.)
Affective					
Loss	2.2 (0.8)	2.7 (1.2)	2.6 (1.2)	2.2 (0.9)	2.2 (1.0)
Cutback	5.5 (1.9)	6.4 (2.6)	8.5 (3.7)	6.9 (2.2)	3.4 (3.0)
Anxiety					
Loss	1.9 (0.6)	1.9 (0.9)	1.5 (1.0)	1.7 (0.7)	1.2 (1.6)
Cutback	3.0 (0.8)	6.5 (3.3)	3.4 (2.4)	5.1 (2.0)	6.5 (7.2)
Substance					
Loss	0.5 (0.2)	0.1 (0.2)	1.0 (0.6)	0.7 (0.2)	0.4 (0.1)
Cutback	2.4 (0.8)	0.3 (0.3)	0.7 (0.5)	1.7 (1.2)	1.3 (0.9)
Personality					
Loss	0.5 (0.2)	2.1 (1.2)	0.8 (0.5)	0.9 (0.2)	1.1 (0.7)
Cutback	2.8 (1.3)	2.3 (0.7)	3.3 (1.6)	3.8 (2.5)	3.4 (4.5)
Any disorder					
Loss	0.8 (0.2)	1.9 (0.7)	1.2 (0.5)	1.1 (0.3)	0.8 (0.3)
Cutback	3.0 (0.8)	3.6 (0.9)	2.2 (0.9)	3.6 (1.4)	2.6 (2.5)

workers. Our finding that affective disorders were associated with the greatest amount of work loss and cutback days among people with only one disorder, and that the affective-anxiety disorder combination had the greatest number of work loss days among people with either single or comorbid disorders replicated the results of Kessler and Frank.<sup>3</sup> Unlike Kessler and Frank,<sup>3</sup> however, we found affective-anxiety disorders to also have the largest amount of work cutback (seven days on average). The fact that the affective-anxiety combination was associated with significantly greater cutback

days than having three or all four disorder types suggested that type of comorbid combination was a stronger predictor of impairment than comorbidity *per se*.

Similar to Kessler and Frank,<sup>3</sup> all disorders had consistently stronger positive associations with work cutback than with work loss. This is also in line with the findings of Greenberg *et al.* that 88% of work place costs due to anxiety disorders occurred in the form of lost productivity while at work, as opposed to absenteeism. The majority of studies looking at impairment in relation to mental health tend to use days

lost or absent rather than days cutback.<sup>1,2,6,9,14</sup> Dewa and Lin,<sup>4</sup> however, have proposed that days cut back are a better reflection of the impact of mental disorders in the workplace. Our findings are consistent with this view and indicate that work cutback days among full-time workers are a more powerful measure of lost productivity due to mental disorders.

### *The Role of Occupation*

Occupation had a negligible association with both disorder prevalence and the level of impairment associated with different disorders. The one exception was a higher rate of substance-use disorders found among tradespersons. These results are consistent with Dewa and Lin,<sup>4</sup> who also obtained similar total prevalence and similar prevalences across all occupations. However Kessler and Frank,<sup>3</sup> using the same interview as used in the Dewa and Lin study, reported varying rates of affective, anxiety and substance-use disorders, and also a greater impact of mental disorders in general on work cutback among professionals. The present study did not use as detailed occupational clusters as the other two analyses, but this would not seem to account for the lack of an effect given that Dewa and Lin,<sup>4</sup> who did use detailed occupational clusters, also did not find an effect.

### *The Relationship Between Work Impairment and Treatment Seeking*

Although there was a relationship between treatment seeking and work impairment for mental disorders on the whole, both work loss and work cutback were not related to treatment seeking when each disorder was considered separately. This was most likely a result of the small case numbers within each disorder category and the large variances surrounding work loss and work cutback days. The most notable finding was that only 15% of people with a mental disorder had sought help for their mental health problems in the preceding month. These data indicate a need for further investigation into the relationship between work-related disability and treatment seeking, particularly barriers to obtaining treatment such as stigma.<sup>15</sup>

### *Limitations*

Unlike the National Comorbidity Survey, work loss and work cutback in the Australian National Survey referred to those days due to health in general, rather than mental health in particular or to the use of alcohol and drugs. To account for this, we adjusted for work loss and cutback days directly attributed to physical disorders in the regression analyses. Work impairment was also based on self-report only. One study has provided evidence for adequate reliability of self-assessed work loss days;<sup>16</sup> however, to our knowledge, none have attempted to examine the reliability or validity of work cutback. Previous literature has highlighted problems (such as recall bias) that are associated with retrospective self-reports, particularly in people with mental disorders.<sup>3,4</sup>

The recall period in the present study was short (28 days) to control for this. Future studies, however, could usefully look at the relationship between objectively measured lost productivity<sup>17–19</sup> and that which is self-reported, particularly in terms of work cutback.

### *Conclusion and Implications*

The strong relationship between unemployment and poor mental health<sup>20–22</sup> encourages the assumption that the employed labour force consists of society's most healthy and productive members. We have shown, however, that, despite their better mental health, a considerable amount of lost productivity in the working population is associated with mental disorders. In the Australian full-time workforce, the anxiety and affective disorders alone are associated with more than 20 million work impairment days annually, mostly occurring in the form of work cutback days. When we take into account also personality and substance-related disorders, lost work productivity due to mental disorders contributes a loss of \$US1.4 billion (\$AUD2.7 billion) each year. This is based on the calculation by Kessler *et al.*<sup>23</sup> of one cutback day being roughly equivalent to 40% of one work loss day in terms of lost productivity, and accords to the average wage received by a full-time employee in 2000.<sup>24</sup> Of concern is that people with mental disorders in the full-time workforce are largely going untreated. Furthermore, while overall the more impaired were more likely to seek help, it is not clear whether there are diagnostic differences in this relationship.

In terms of research, more needs to be known about work cutback days. As a broad measure it appears to have important distinctions from total disability days, but it is comparatively difficult to quantify and less easily translated into economic loss. The large variance observed for this measure (and also for work loss) is a likely contributor to some of the null results, and should be a consideration in studies where case numbers may be small. Until ways of validating work cutback are obtained, it will be hard to gain a true estimate of the economic impact of mental disorders. Nevertheless, the fact that most of the lost productivity attributed to mental disorders occurs while the employee is at work suggests that the repercussions of these disorders are underestimated.

If employers were more aware of the economic consequences of the impact of mental disorders on their employees, the work place could provide an ideal setting for mental health promotion and prevention. Our findings indicate that such intervention programs should target the affective and anxiety disorders, particularly where they co-occur.

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