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# Do gender and psychosocial job stressors modify the relationship between disability and sickness absence: An investigation using 12 waves of a longitudinal cohort

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**Objectives** A considerable proportion of the working population reports a disability. These workers may be at risk of adverse outcomes, including longer periods of sickness absence. This study examined the causal effect of disability on sickness absence and the role of psychosocial job stressors and gender as effect modifiers.

**Methods** Data on paid and unpaid sick leave, disability (yes/no) and psychosocial job stressors were available from 2005 to 2017 from the Household, Income and Labour Dynamics in Australia (HILDA) survey. Negative binomial models were used to model the rate of sickness absence in a year.

**Results** In the random effects model, workers with disability had 1.20 greater rate of sickness absence in a year [95% confidence interval (CI) 1.17–1.23, P<0.001] after adjustment for confounders. The rate was slightly lower in the fixed effects model. There was evidence of multiplicative interaction of the effect by gender and job control. The effect of disability on sickness absence was greater among men than women, and higher for people with low job control compared to those with high job control.

**Conclusions** There is a need for more research about the factors that can reduce sickness leave among workers with disabilities.

**Key term** job control; HILDA survey; sick leave; sickness leave; unpaid leave; working condition.

Globally, the prevalence of workers with disabilities is substantial (1) and is projected to increase in many countries worldwide (2). Disability is a complex construct. The most commonly accepted definition disability is based on the International Classification of Functioning, Disability and Health, where disability is an umbrella terms that includes impairments (eg, loss of a limb), limitations (eg, unable to dress independently) and participation restrictions (eg, unable to go to community events) (3). Although statistics vary between countries, evidence suggests that 50–80% of people with disabilities are employed across the OECD (4). In Australia, 53% of people with a disability were employed in 2015 (5). Research suggests that people with disabilities disproportionality experience poorer quality working experiences (6), including being underemployed (7) and reporting unfair pay for the work they do (8). Workers with disabilities are more likely to exit into "not in the labour force" (NILF) and unemployment (9) than those without disabilities. Workers with disabilities may also have a high rate of sickness absence. The rationale for this argument stems from the substantial amount of research demonstrating a relationship between chronic mental or physical health problems and sickness absence (10, 11). In particular, people with mental health disorders have been found to have twice the odds of sickness

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absence (11), while those who suffer from poor physical health and experience pain and injury (12) are at greater risk of taking longer periods of sickness absence.

Gender also appears to be an important factor for consideration in sickness absence (13), which may be connected to greater ill-health burden among women. It is also important to consider that females are also more likely to be primary carers for children or other dependents (14). Thus, females may be taking sickness absence in order to care for others (15). Past research also suggests that workplace-related factors need to be addressed in sickness absence interventions (16). This is because workplace-related factors such as psychosocial job stressors (eg, low job control and high job demands) have been shown to be associated with increased risk of sickness absence (17, 18). However, there is lack of quantitative research on whether targeting these stressors could lead to a reduction in sickness absence among workers with disabilities. Similarly, there is a lack of research on whether the gendered dynamics of sickness absence observed in previous studies are also apparent among workers with disabilities.

Understanding the drivers of sickness absence among at-risks groups such as those with a disability will be of key interest to government and employers, particularly since there has been considerable investment in disability employment programs in many countries around the world (19). In the UK, the cost of sickness absence was estimated to be £9 billion annually in terms of lost productivity, with costs thought to be similar in other OECD countries (20). These costs extend beyond the workplace as sickness absence is predictive of exiting from the labour market onto disability pension (21–23), and thus has direct costs for the government. There are also community and individual costs as sickness absence is strongly correlated with a range of poor health outcomes at a population level, including mortality, depression, and hypertension (24).

The aim of the current paper is to examine the relationship between disability and sickness absence in Australia's working-age population, as well as examining important factors that may modify this association. In particular, we will examine whether being exposed to psychosocial job stressors (eg, low job control, high job demands, low job security, and low fairness of pay) results in greater sickness absence among persons with disabilities. We will also examine the role of gender as an effect modifier of the relationship between disability and sickness absence based on previous research demonstrating that sickness absence is a highly-gendered experience.

## *Methods*

### Data source

The Household, Income and Labour Dynamics in Australia (HILDA) survey is a longitudinal, nationally representative study of households established in 2001. It collects detailed information annually from over 13 000 individuals within over 7000 households (25). The initial survey wave began with a large national probability sample of households occupying private dwellings (25). The survey covers a range of dimensions including social, demographic, health and economic conditions using a combination of face-to-face interviews with trained interviewers and a self-completion questionnaire. The response rate for wave 1 was 66% (25). Interviews were sought in later waves with all persons in sampled households who turned 15 years of age. Additional persons have been added to the sample as a result of changes in household composition. Inclusion of these new households is the main way the HILDA survey maintains sample representativeness. A top-up sample of 2000 people was added to the survey in 2011 allowing better representation of the Australian population using the same methodology as the original sample (ie, a three-stage area-based design) (26). The response rates for the HILDA survey are >90% for respondents who have continued in the survey and >70% for new respondents being invited into the study (25). Those who were eligible for the study were working age people who had been employed continuously for ≥3 consecutive waves of HILDA. Only these consecutive waves (≥3) were included in the analysis. As a sensitivity analysis and to test for consistency, we assessed results restricting to workers who reported their employer provided paid sick leave. The flow chart into the study can be seen in figure 1.

The Australian Government Department of Social Services Access provided access to HILDA, and the research conforms to the principles embodied in the Declaration of Helsinki.

### Outcome

The primary outcome was a self-reported measure of days of sickness absence in the 12 months prior to their interview and following the last HILDA survey. This was ascertained through two questions: one on the number of days participants spent on paid sick leave in the last 12 months, and the other asking about days of unpaid leave in the last 12 months. Days of paid and unpaid sick leave were summed and used to calculate an incidence rate (number of sick days in a year/total number of days in a year). The Australian National Employment standards stipulate that permanent employees have a ≥10 paid sick leave days per year. Recognizing that

**Figure 1.** Sample selection.

people with disabilities may require more sick leave than the paid sick leave provided by the employer, we also considered days of unpaid leave within a 12-month period. Paid and unpaid sick leave were summed. Information on paid and unpaid sickness absence is available in HILDA from 2005 onwards.

### Exposure

Disability was determined from the following survey question *"…do you have any long-term health condition, impairment or disability that restricts you in your everyday activities, and has lasted or is likely to last, for six months or more?"*. Specific examples of long-term conditions were shown, such as limited use of fingers or arms, long-term psychological problems, or problems with eyesight that could not be corrected with glasses or contact lenses. Disability was classified as a binary variable (yes/no). As a sensitivity analysis (discussed below), we conducted further analysis on individuals who acquired a disability (incident disability). This included those who had at least two consecutive waves of disability preceded by ≥2 consecutive waves without disability. We also considered a time-invariant definition of disability where we had three groups of disability: consistently reported in all contributed waves of HILDA, time varying reported disability (reported in some contributed waves and not others), and no reported disability in any contributed waves.

### Effect modifiers

Gender (male or female) was collected from 2001 onwards. We considered four main psychosocial job stressors as possible effect modifiers. These were: job control (three items), job demands and complexity (three items), job insecurity (three items), and fairness of pay. All scales were based on a likert scale, where 1 was "strongly disagree" and 7 was "strongly agree". Scale reliabilities for these variables are based on analyses of all waves of data. Job control included: "I have a lot of freedom to decide how I do my own work"; "I have a lot of say about what happens on my job", and; "I have a lot of freedom to decide when I do my work". The scale reliability coefficient for these three items was 0.82. Job demands and complexity included: "My job is complex and difficult"; "My job often requires me to learn new skills", and; "I use many of my skills and abilities in my current job". The scale reliability coefficient was 0.72. Job insecurity included: "I have a secure future in my job"; the company I work for will still be in business 5 years from now", and; "I worry about the future of my job" (which was reverse coded). The scale reliability coefficient was 0.67. Fairness of pay was calculated from one item: "I get paid fairly for the things I do in my job". We dichotomized each total job stressor scale at the 75$^{th}$ percentile to create a binary variable representing those exposed versus non-exposed to each job stressor. We used the most-adverse quartile dichotomization based on previous predictive validation of these measures in relation to health outcomes (27).

### Confounders

Our confounders included age (15–24, 25–29, 30–34, 35–44, 45–54 and 55–64 years), education [less than Year 12 (high school), Year 12, diploma or certificate, bachelors degree or higher], household structure (couple without children, couple with children, lone parent with children, lone person, and other), weekly household income (equivalized), employment arrangement (permanent, casual, fixed term, and self-employed) and a three-level variable capturing occupational skill level defined using the Australian and New Zealand Standard Classification of Occupations: low (eg, sales workers, machinery operators and drivers, laborers), medium (eg, technicians and trade workers, community and personal services workers, clerical and administrative workers), and high (managers, professionals) (28). Gender was

included as a confounder in main effects models, before being assessed as an effect modifier.

### Analysis

At the first stage of analysis, we looked at the descriptive associations (means, frequencies) of disability and sickness absence by the effect modifiers.

We then used negative binominal random and fixed effects (FE) regression to model the relationship between sickness absence and disability as there was evidence of over-dispersion in the outcome variable. Random effects (RE) models model within and between individual variation while RE models only model within individual variation. The coefficients produced from RE models represent a weighted average of the estimates due to the within and between person effects. In our case, the RE coefficients for the effects of disability on sickness absence represent a combination of the relationship observed when we look at disability and sickness absence across (or between) different people and the relationship occurring within persons (eg, changes in disability status and days of sickness absence in a year within the same person over time).

It was not possible to fit these fixed effect models with negative binominal outcomes panel models in commercial statistical packages [such as Stata/SE 15.0 for Mac (64-bit Intel) (StataCorp, College Station, TX, USA], therefore we replicated the FE approach manually by generating the difference scores (ie, deviation from each individuals' mean score for all time-varying covariates) and implemented the model as a RE model. However, this approach estimates within-person effects only because all between-person differences are removed due to lack of variation in subject-specific means). These are referred to as FE models in the paper. Coefficients were transformed into incident rate ratios to ease interpretation.

The possibility that the relationship between disability and sickness absence differed for males and females was assessed by examining the statistical significance of the interaction terms and the results of the likelihood ratio test. This was tested in a negative binomial model. The same approach was used to assess if the relationship differed depending on reporting of psychosocial job stressors. We then used the approach to presenting effect modification results recommended by Knol & VanderWeele (29) and computed effect measure modification on the additive and multiplicative scales. Using this approach, additive effect measure modification was assessed by estimating the relative excess risk of interaction (RERI), which occurs when the effect of the exposure and the effect modifier considered together exceeds the sum of individual effects of the exposure and effect modifier.

$$Additive\ interaction\ term = p_{11} - p_{10} - p_{01} - p_{00}$$

Where $p_{11}$ refers to the probability of the outcome for the exposed when the effect modifier is present.

The multiplicative effect measure modification is measured on the ratio scale and is estimated from the interaction term in the model. It represents the extent to which, on the ratio scale, the effect of the exposure and the effect modifier exceeds the product of the effects considered separately (30).

$$Multiplicative\ interaction\ term = \frac{p_{11}/p_{01}}{p_{10}/p_{00}}$$

Additive effect measure modification is particularly useful when estimating the absolute benefit of interventions on the effect modifier of interest (30).

As both disability and psychosocial job stressors were time varying, a participant could change on one or both of these and still be included in the coefficient for this term. Because of this, we conducted an additional analysis to assess possible differences when we did not allow disability (our exposure) to vary. To do this, we constructed three groups (consistently reported disability, disability reported in some waves and not other and no disability) and this three-level variable was included and modelled in relation to changes in psychosocial job stressors and changes in sickness absence. As a sensitivity analysis, we calculated marginal effects (ie, taking the effects of the log scale) to understand the absolute effect of a given point increase in sickness absence in relation to a point change in the effect modifiers within strata of disability. As noted above, we considered a further sensitivity analysis restricted to workers who reported that their employers provided them with paid sick leave. All analyses were performed using Stata, version 15.1.

## Results

The mean days of sickness absence was higher for people who reported a disability [5.73, standard deviation (SD) 11.41] compared to people who did not report a disability (mean 4.05, SD 7.53). Table 1 also shows the mean days of sickness absence in relation to the effect modifiers in the analytic sample. Females generally had higher sickness absence than men. Workers with lower control and lower reported fairness of pay had more sickness absence than those with higher control. Results are more mixed for job demands and security, as those with low security and demands reported slightly more days of sickness absence in a year. A description of the analytic sample can be seen in table 2.

**Table 1.** Description of sickness absence/unpaid leave and disability by effect modifiers in the analytic sample. [SD=standard deviation]

| | No disability | Disability |
|---|---|---|
| | Mean (SD) | Mean (SD) |
| | 3.18 (5.94) | 4.88 (10.05) |
| Gender | | |
| Male | 2.87 (6.05) | 4.57 (9.90) |
| Female | 3.52 (5.79) | 5.20 (10.20) |
| Control | | |
| Low | 3.82 (6.33) | 5.74 (9.30) |
| High | 3.01 (5.72) | 4.67 (10.03) |
| Demands | | |
| Low | 3.10 (5.69) | 4.83 (9.99) |
| High | 3.35 (6.41) | 4.98 (10.18) |
| Security | | |
| Low | 2.97 (5.58) | 5.16 (10.01) |
| High | 3.28 (5.95) | 4.45 (9.66) |
| Fairness of pay | | |
| Low | 3.59 (5.83) | 5.14 (8.80) |
| High | 3.11 (5.91) | 4.93 (10.31) |

**Table 2.** Sample description. [Adv Dip=advanced diploma; SD=standard deviation]

| | % (Obs=107 128) | Mean (SD) |
|---|---|---|
| Number of days sickness absence | | 3.45 (6.78) |
| Weekly household income | | $1034.95 ($507.20) |
| Disability | | |
| No | 84.24 | |
| Yes | 15.76 | |
| Age group (years) | | |
| 15–24 | 16.66 | |
| 25–29 | 11.42 | |
| 30–34 | 10.73 | |
| 35–44 | 23.1 | |
| 45–54 | 23.96 | |
| 55–64 | 14.13 | |
| Sex | | |
| Male | 52.15 | |
| Female | 47.85 | |
| Household structure | | |
| Couple with no children | 25.6 | |
| Couple with children | 49.04 | |
| Lone parent with children | 7.86 | |
| Lone person | 13.49 | |
| Other | 4.01 | |
| Education | | |
| Bachelor degree or higher | 29.82 | |
| Adv Dip, Certificate or Year 12 | 50.67 | |
| Year 11 or below | 19.5 | |
| Occupational skill level | | |
| Lowest | 22.65 | |
| Medium | 39.04 | |
| Highest | 38.31 | |
| Employment arrangement | | |
| Permanent | 60.83 | |
| Casual/labour hire | 16.89 | |
| Fixed term | 7.84 | |
| Self employed | 14.44 | |

Results of the negative binomial models can be seen in table 3. These show that in both the RE [risk ratio (RR) 1.20, 95% CI 1.17–1.23, P<0.001] and FE (RR 1.16, 95% CI 1.14–1.19, P<0.001) models, disability was associated with a greater number of sickness absence in a year after adjustment (eg, there was a 1.20 and 1.16 times greater rate of sickness absence, respectively, when a person reported a disability). Results were also consistent when we tested a model restricting the sample to people who had acquired a disability (RE model RR 1.27, 95% CI 1.21–1.34, P<0.001; FE model RR 1.26, 95% CI 1.19– 1.34, P<0.001).

Results of the interaction tests using the RE model showed that only gender and job control were significant effect modifiers (both related to the interaction terms in the model and also the likelihood ratio tests). Results of these two models can be seen in table 4. There was a negative multiplicative (but not additive) interaction between disability and gender. As can be seen, there is a greater difference in sickness absence between men with a disability compared to those without (RR 1.24, 95% CI 1.21–1.28) than between women with and without a disability (RR 1.17, 95% CI 1.14–1.21). This was also seen in the marginal effects model which also estimates absolute differences (supplementary material, www.sjweh.fi/show_abstract.php?abstract_id=3865, table S1).

Workers with disability who also had low control had a rate of sickness absence 1.43 times greater (95% 1.38–1.48) than workers with high control and no disability. Low control also had a slightly higher relative effect on sickness absence for people with disability (RR 1.19, 95% CI 1.15–1.24) compared to those without (RR 1.15, 95% CI 1.12–1.17). These results were also apparent when we assessed the marginal effects model (supplementary table S1), in analyses where disability was held constant (supplementary table S2), and also when we restricted analysis to those who had an entitlement to sick leave (supplementary table S3).

## Discussion

The results of this study indicate that psychosocial working conditions, such as low job control, influence the likelihood of taking sickness absence, both among people with and without disabilities. Our research also highlights the role of gender in relation to sickness absence. Reporting a disability (including the acquisition of disability) was associated with 1.2 times greater rate of sickness absence for a person compared to when they did not report a disability.

Our findings indicate that workers with disabilities take more sickness leave than those who do not have disabilities, which is an unsurprising finding given the literature we cite above. However, as an advance on previous research, we demonstrate within-persons changes in sickness absence in relation to the presence of a disability. This indicates the likely causal effect of disability on sickness absence after controlling for other time

**Table 3.** The relationship between disability and days of sickness absence among those who are employed in all waves, within a 12-month period, negative binomial regression models, HILDA (2005–2017). Persons=14,432, observations=107,128. Average waves per person 7.4. [CI=confidence interval; IRR=incidence rate ratio.]

| | Random effects model | | | Fixed effects model | | |
|---|---|---|---|---|---|---|
| | IRR | 95% CI | P-value | IRR | 95% CI | P-value |
| Disability | | | | | | |
| No | 1 | | | 1 | | |
| Yes | 1.20 | 1.17–1.23 | <0.001 | 1.16 | 1.14–1.19 | <0.001 |
| Age group (years) | | | | | | |
| 15–24 | 1 | | | 1 | | |
| 25–29 | 1.15 | 1.12–1.19 | <0.001 | 1.15 | 1.11–1.19 | <0.001 |
| 30–34 | 1.13 | 1.09–1.16 | <0.001 | 1.19 | 1.14–1.24 | <0.001 |
| 35–44 | 1.06 | 1.03–1.09 | <0.001 | 1.28 | 1.21–1.35 | <0.001 |
| 45–54 | 0.92 | 0.89–0.95 | <0.001 | 1.31 | 1.23–1.40 | <0.001 |
| 55–64 | 0.82 | 0.79–0.85 | <0.001 | 1.30 | 1.21–1.40 | <0.001 |
| Sex [a] | | | | | | |
| Male | 1 | | | | | |
| Female | 1.26 | 1.24–1.29 | <0.001 | 1 | | |
| Weekly household income | 1.03 | 1.02–1.03 | <0.001 | 1.04 | 1.03–1.04 | <0.001 |
| Household structure | | | | | | |
| Couple with no children | 1 | | | 1 | | |
| Couple with children | 0.97 | 0.94–0.99 | 0.002 | 0.91 | 0.89–0.94 | <0.001 |
| Lone parent with children | 1.00 | 0.96–1.03 | 0.837 | 0.97 | 0.92–1.01 | 0.171 |
| Lone person | 0.99 | 0.96–1.01 | 0.315 | 0.98 | 0.95–1.02 | 0.340 |
| Other | 1.01 | 0.97–1.05 | 0.672 | 0.98 | 0.93–1.03 | 0.349 |
| Education | | | | | | |
| Bachelor degree | 1 | | | 1 | | |
| Year 12 | 0.89 | 0.87–0.91 | <0.001 | 0.81 | 0.77–0.86 | <0.001 |
| Year 11 or below | 0.80 | 0.78–0.83 | <0.001 | 0.84 | 0.78–0.91 | <0.001 |
| Occupational skill level | | | | | | |
| Lowest | 1 | | | 1 | | |
| Medium | 1.09 | 1.06–1.11 | <0.001 | 1.03 | 1.00–1.06 | 0.063 |
| Highest | 1.05 | 1.02–1.08 | 0.002 | 1.05 | 1.01–1.09 | 0.006 |
| Employment arrangement | | | | | | |
| Permanent | 1 | | | 1 | | |
| Casual/labour hire | 0.28 | 0.27–0.29 | <0.001 | 0.40 | 0.39–0.41 | <0.001 |
| Fixed term | 0.84 | 0.82–0.86 | <0.001 | 0.89 | 0.87–0.92 | <0.001 |
| Self employed | 0.11 | 0.11–0.12 | <0.001 | 0.32 | 0.30–0.33 | <0.001 |

[a] Sex omitted in fixed effects model as it was time invariant.

**Table 4.** The relationship between disability and days of sickness absence among those who are employed in all waves, within a 12-month period, negative binomial random effects regression models, HILDA, 2005–2017, interaction terms for gender and control. Models were adjusted for weekly household income, sex, education, occupational skill level, age group, household structure, employment arrangement. Persons=14,001, observations=93,225. Average waves per person 7.4. [RR=risk ratio]

| | Male | Female |
|---|---|---|
| Disability | | |
| No | 1 | 1.27 (1.24–1.29) |
| Yes | 1.24 (1.21–1.28) | 1.49 (1.44–1.54) |
| RR for disability within gender | 1.24 (1.21–1.28) | 1.17 (1.14–1.21) |
| Interaction on the additive scale | -0.02 (-0.07–0.03) | |
| Interaction on multiplicative scale | 0.94 (0.91–0.98) | |
| | High job control | Low job control |
| Disability | | |
| No | 1 | 1.15 (1.12–1.17) |
| Yes | 1.20 (1.16–1.23) | 1.43 (1.38–1.48) |
| RR | 1.20 (1.16–1.23) | 1.25 (1.21–1.29) |
| Interaction on the additive scale | 0.09 (0.03–0.14) | |
| Interaction on multiplicative scale | 1.04 (1.00–1.09) | |

varying and invariant factors. Furthermore this effect was still evident when we restricted the sample to people who acquired a new disability. An obvious reason for these results is connected to a worsening of health conditions (10, 11). However, there are a range of factors that may influence sickness absence outside an individual's health. In particular, discrimination, stigma and bullying have been reported to be elevated among employed people with disabilities compared to those without disabilities (31). Previous research has shown a link between the experience of these types of adverse workplace experiences and greater likelihood of sickness absence (32, 33, 34). Hence, people with disabilities may be more exposed to stressors such as discrimination and bullying in workplace settings, and these may contribute to greater likelihood of taking sickness absence.

Another pertinent factor is low job control, which we found was predictive of sickness absence. We found that this was especially important to people with a disability (ie, there was a 1.24 times greater rate of taking sickness absence among people with disabilities experiencing low control compared to people with disabilities who reported high job control). There is a considerable

amount of research demonstrating the importance of job control as both a determinant of sickness absence (34) and other health outcomes (35). Hence, we would suggest that providing workers with disabilities a greater amount of control of where, how, and when they work might be a useful way of addressing sickness absence. This may include allowing people the flexibility of working from home for a proportion of their working time, as well as providing some flexibility over what they are doing within their working day.

Our results also highlight the role of gender as a factor when considering the relationship between disability and sickness absence. Confirming previous research, we found that women were more likely to take sickness absence leave than men (13). However, results shifted once we considered the role of disability. We found that males with disabilities were more likely to take sickness absence than males without disabilities, and this difference was greater on the multiplicative scale than what we found for women. The different working life of men and women must be acknowledged here. In general, men are less likely to have periods out of the workforce (36). Men are also less likely to take sickness absence (18). In converse, the working life of women may be more disrupted as, in general, women are disproportionately responsible for looking after dependents and have other domestic responsibilities (36). On the basis of this, it is possible that disability has a greater impact on the working life of men leading to a stronger impact on sickness absence. This difference may be less obvious for women who are already likely to be more likely to take sick leave than men. However, the relative size of effect is small and so it would be premature to base reforms on these findings. These findings need further investigation in other datasets.

One of the first limitations of this research concerns the conceptual and methodological difficulty in separating disability from sickness absence. In this study, we attempted to address this through careful research design, such as using different definitions of disability and using FE modelling approaches. The disability acquisition analysis we conducted demonstrated an effect on sickness absence following disability onset. We also examined the impact of disability after this was held constant within a person. Regardless of these methodological approaches, we acknowledge that this is still a limitation, both conceptually and methodologically. Notwithstanding, there is a growing number of studies demonstrating the effect of employment conditions on the health of people with disabilities (eg, 37, 38). Hence, we would argue that our results are still important and have validity. It is also important to acknowledge likely differences based on the severity and type of impairment a person has, which we did not have the power to examine in this analysis. Other limitations are related to the fact that the data was self-reported, hence there is the possibility of misclassification bias. In saying this, we attempted to control for this by using a FE model to contrast within-person differences across the comparison groups. A FE model does this by holding stable factors constant, hence a person is able to act as their own control. There are many other important psychosocial aspects of the work environment that were not included in HILDA (eg, social support and bullying at work) that could also influence the relationship between disability and sickness absence. Further while classification of these psychosocial job stressors is based on previous research (27) and the use of relative measures (eg, upper quartile) is common (eg, relative poverty), future research should examine whether critical points can be identified so that absolute measures can be used (39).

In stating these limitations, there were also several strengths in this study. This included the ability to examine within-person effects controlling for time-invariant confounders that may have otherwise biased results. Further, we were able to include the entire spectrum of the employed population as we considered both paid and unpaid leave from work. This is particularly important in Australia as casual and self-employed persons do not usually have entitlement to paid sick leave.

In conclusion, this study highlights the role of both individual (eg, gender) and work-related (eg, job control) factors on the relationship between disability and sickness absence. From a prevention perspective, we would suggest that allowing people greater ability to have control of where, how and, when they work may be a way to address sickness absence. This might be particularly important for people with disabilities, especially given increased governmental emphasis on improving employment of people with disabilities internationally (19). There is also some evidence to suggest the role of clinical support and graded activities (eg, slow integration back into work) as a way to reduce sickness absence (16), although more research on intervention and prevention of sickness absence is needed.

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### Conflict of interest

The authors declare no conflicts of interest.

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