

**Does social support modify the effect of disability acquisition on mental health? A longitudinal study of Australian adults**

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## **ABSTRACT**

### **Purpose**

Disability acquisition in adulthood is associated with deterioration in mental health. Social support may act as a “buffer” against poor mental health following disability acquisition. We tested the hypothesis that women and men with low social support experienced larger declines in mental health on acquisition of a disability compared to women and men with high social support.

### **Methods**

We assessed whether social support, measured both prior and subsequent to disability acquisition, modified the association between disability acquisition and mental health using 14 annual waves of data from the Household, Income and Labour Dynamics in Australia Survey. Participants reported at least two consecutive waves of disability preceded by at least two consecutive waves without disability (2200 participants, 15,724 observations). Fixed-effects linear regression models were used to estimate average differences in mental health between waves with and without disability, for women and men separately. We tested for effect measure modification of the association by social support, including a three-way interaction between disability and social support prior and subsequent to disability acquisition.

### **Results**

Though the effects of disability acquisition on mental health were much larger for women, for both women and men there was a consistent pattern of association with social support. There was evidence that social support modified the association between disability acquisition and mental health, with the largest effects for those experiencing a change from high to low social support subsequent to disability and for people with consistently low social support.

### **Conclusions**

These findings highlight the importance of developing new policy and practice strategies to improve the mental health of people with disabilities, including interventions to promote social support at the time of disability acquisition.

## INTRODUCTION

Nearly twenty percent of Australians report a disability, a prevalence similar to other developed countries [1, 2]. People with disabilities are one of the most socioeconomically disadvantaged groups in society [1]. In Australia, as in most other developed countries, people with disabilities are less likely to be employed and complete post-secondary education, have lower income [3], wealth [4] and social support [5] compared to those without disability. Disabled people have poorer physical and mental health than those without disability, and many of the conditions they experience are not directly related to their impairment (e.g. high rates of diabetes and depression for people with intellectual impairments) [2]. There is growing evidence to suggest that the poorer health of people with disabilities is at least partly explained by their disadvantaged living circumstances [6, 7].

According to the International Classification of Functioning, Disability and Health (ICF) framework, disability results from the interaction between health conditions, personal attributes and environmental factors [8].

Environmental factors are included as key determinants of disability in the ICF, therefore recognising the influence of the physical, social and attitudinal environment in facilitating or restricting people's functioning, activities and participation in society [2, 9]. Conceived in this way, characteristics of people's social environment, such as their ability to access social support, may influence the impact of impairments on activity limitations and participation restriction.

Social support refers to people's perceptions of available social resources that are provided to them by other people in either a primary group (small, enduring, intimate, informal, commonly family/close friends) or secondary group (larger, interactions guided by rules, regulations, and hierarchical positions, including work, voluntary, and religious organisations) [10]. There is strong evidence that the receipt of social support is associated with improvements in health [11-13]. There is also some evidence that social support can act as a "buffer" that protects individuals from experiencing poor mental health during times of life stress [12, 14, 15]. Therefore it is plausible that social support may protect people with disabilities against poor mental health. It is also important to note that social support differs between men and women [16], and there is evidence of gender differences in the protective effect of social support [11] and its relationship with health outcomes [17] at a general population level. Therefore the way in which social support buffers the effect of disability acquisition on mental health may also differ by gender.

A number of studies have examined the effect of acquiring a disability on mental health, which consistently reported an increase in psychological distress, depressive symptoms, and a decline in mental health and

wellbeing following disability acquisition [18-22]. However, not all people who acquire a disability experience deterioration in their mental health [7]. The impacts of significant life events, such as the acquisition of a disability, on mental health may depend on individual resources such as personal resilience [23], experience of economic hardship [24], education [21], and social support [25]. The effect of disability acquisition on mental health has been shown to be modified by socioeconomic disadvantage prior to disability acquisition, including low levels of education [21], low wealth [19, 22], and insecure and unaffordable housing [18]. However, few studies have examined whether social support influences the mental health of people who acquire a disability. A study of Australian adolescents examined whether mental health inequalities between people with and without disabilities were modified by social support and found larger mental health inequalities for those with low compared to higher social support [7]. A Finnish study found that increased social support (having good neighbours) and access to instrumental support buffered the effect of receiving a disability pension on mental distress [15]. However, these studies examined existing disability rather than acquisition of disability.

In this study, we examined whether social support protects people who acquire a disability from deterioration in mental health. We hypothesised that people with lower levels of social support would experience larger mental health declines than those with higher levels of social support. We examined differences in the magnitude of mental health effects according to categories of social support, measured both prior and subsequent to disability acquisition, and the interaction between them. We also examined whether the associations were different between men and women.

## **METHODS**

### **Data source**

The Household, Income and Labour Dynamics in Australia (HILDA) Survey is a longitudinal nationally representative study of Australian households and individuals, which has been conducted in annual waves since 2001. The original panel included 13,969 individuals from 7682 households, sampled using a national probability sample of private dwellings [26]. Data were collected on a range of life domains from household members aged 15 years and above. In later waves, survey members included all participants from the original panel and household members attaining the age of 15 years, as well as new participants added as a result of changes in household composition if new households were formed by existing survey participants. While original sample members were sample from private dwellings, existing survey members remained part of the

sample and were followed up even if they moved into non-private dwellings such as a residential care home [27]. Response rates were above 75% for initial wave respondents and were above 94% for continuing participants between waves (attrition rate of less than 6% on average). Fourteen waves of HILDA data were included in the analysis (2001-2014).

### **Outcome variable**

Mental health was assessed using the five item Mental Health Inventory (MHI), a subscale of the SF-36 general health survey. The MHI is a measure of general mental health; it assesses symptoms of depression and anxiety and positive aspects of mental health in the previous four weeks. This scale was constructed from the five items that best predicted the summary score of the 38-item Mental Health Inventory used in the Medical Outcomes Study questionnaire and has been shown to have reasonable validity and be an effective screening instrument for mood disorders or severe depressive symptomatology [28, 29]. The MHI is a continuous measure ranging from 0 to 100, with higher scores representing better mental health.

### **Disability measures**

Information on long-term health conditions and disabilities was collected in all waves using a definition derived from the ICF framework [30]. Participants were asked if they had an ‘impairment, long-term health condition or disability which restricts their everyday activities that had lasted, or was likely to last, for a period of six months or more’. Participants who reported a disability were then asked a subsequent question specifying the type of disability, such as of sight, hearing and speech problems; limited use of arms or fingers and feet or legs; or nervous or emotional condition which requires treatment, which allowed us to classify types of impairment into broad categories including sensory and speech, physical, intellectual and psychological impairments.

Participants were defined as having acquired a disability if they did not report a disability for two consecutive waves followed by two consecutive waves with a reported disability, as used in previous studies of disability acquisition [18, 19]. All consecutive waves in which individuals did not report a disability prior to disability acquisition and all consecutive waves reporting a disability subsequent to disability acquisition were included, therefore two or more waves before disability and two or more waves after disability. We used a minimum of two waves with disability so as to exclude people with transient disabilities. If participants reported more than one episode of disability acquisition (4% of the sample), only the first episode was included.

### **Social support**

The HILDA Survey includes questions about perceived social support. These items have been used to create a social support scale in previous studies [14, 31-33]. We constructed a social support scale derived from 10 items which address aspects of emotional support (e.g., *When I need someone to help me out, I can usually find someone; People don't come and visit as much as I would like*). Items were rated on a 7-point Likert scale, and the Cronbach's alpha was 0.84 across all waves. The social support scale was created by reverse coding the items relating to negative social support and averaging the ten items in the scale, to create a measure with higher scores representing greater social support. The continuous scale was strongly positively skewed; therefore we dichotomised it into a binary variable based on a median split (low (1-5.59) and high (5.6-7)). Social support was measured before and after disability acquisition, using data reported one year prior to disability acquisition and one year after.

### **Other variables**

Other variables were considered as potential confounders of the association between disability acquisition and mental health. Age was collapsed into four categories: 15-29, 30-44, 45-59 and 60 years and older.

Employment status was measured as employed (working for pay at least one hour per week, unemployed (those who are actively seeking employment or currently unable to find work), not in the labour force (not actively seeking employment)). Household disposable income was calculated by summing the income components for all adults in the household, with imputed values computed for missing variables using the methods described elsewhere (20% imputed values for observations in the sample) [34]. Household disposable income was equivalised using the modified Organisation for Economic Co-operation and Development (OECD) scale [35] and converted to quintiles of the Australian population distribution using statistics published by the Australian Bureau of Statistics [36]. We also included education (postgraduate or bachelor degree; diploma or certificate; completion of secondary education; non-completion of secondary education), household structure (couple with no children; couple with children; lone parent with children; lone adult; other) and relationship status (married or de facto; separated, divorced, widowed; single).

### **Statistical analysis**

Mean MHI scores were presented for age, relationship status, household structure, education, employment and income by disability status. Mean MHI scores were also summarised by categories of social support prior and post disability by disability status and gender. For each individual, a mean MHI score was computed for waves in which they reported a disability and waves in which they did not report a disability (within-person means,

pooled across time). These means were then averaged to represent the overall mean MHI score (between-persons) by disability status.

We used longitudinal linear regression models with fixed-effects estimators to estimate the association between disability acquisition and mental health. All analyses were stratified by gender, with results presented separately for men and women. Coefficients from the models describe average within-person differences in MHI scores between waves in which individuals reported no disability and waves in which they reported disability. Because they estimate within-person effects, fixed-effects models remove bias from measured and unmeasured time-invariant confounding [37]. We controlled for age, employment status, household income, education, household structure and relationship status as potential time-varying confounders.

To assess whether the association between disability acquisition and mental health varied by social support, we included a product term between disability acquisition, prior social support, and social support subsequent to disability, and assessed whether there was statistical evidence of effect measure modification with either social support variable (or both simultaneously) using the P values of the product terms and likelihood ratio tests for interaction. We also included interaction terms between disability and age based on a priori hypotheses that the effect of disability acquisition on mental health is likely to differ by age, which was confirmed by likelihood ratio tests from comparisons of models with and without interaction terms.

All analyses were conducted in Stata/SE 12 [38], using the xtreg command with fixed-effects estimators and robust standard errors, and the lincom command for linear combination of coefficients to compute effect estimates and 95% confidence intervals for categories of social support. The data were extracted from HILDA using the Add-On package PanelWhiz for Stata [39].

### **Sensitivity analyses**

We conducted a sensitivity analysis to test the robustness of our findings. We excluded people in the sample who reported psychological impairments (defined as nervous or emotional condition which requires treatment or any mental illness which requires help or supervision). People with psychological impairments are likely to report poorest mental health and there is evidence that they have low levels of social support [5], therefore it is possible that having a psychological impairment may modify the effect, in that the relationships between disability, social support and mental health may differ for this subgroup of individuals compared to other types of impairment.

## RESULTS

There were 2679 persons (20,798 observations) who met our criteria for disability acquisition. Complete data were available for 82% of individuals, resulting in a final analytic sample of 2200 persons (15,724 observations), including 1233 women and 967 men. The mean number of observations (contributed annual waves of data) per person was 7. Further details of sample selection and missing data are in Figure 1.

--- Figure 1 ---

At baseline entry into the analytic sample (first wave reporting no disability), over a third of the sample were younger than 45 years, and nearly a third were aged 45 to 59 years and another third were 60 years or older (Table 1). More than half of the sample were women (56%), 65% were in a relationship, 42% had not completed secondary education and 58% were employed. There were 22% in the highest income quintile while 19% were in the lowest.

--- Table 1 ---

Table 1 also shows the average MHI scores for waves before and after disability acquisition for each covariate. The MHI score was lower in waves when disability was reported than before disability acquisition (71.2 versus 74.5). Both before and after disability acquisition, MHI scores were positively associated with age and higher for men than women. There were distinct socioeconomic gradients in the MHI scores, with lower mental health in more disadvantaged groups (people who were single, lone parent families, low education, unemployed, and low income) compared to higher socioeconomic groups.

In terms of social support, the proportion people reporting low social support was greater for men, with 44.4% of men reporting low social support both before and after disability acquisition compared to 36.5% of women (Table 2). For both women and men, social support declined after disability acquisition. For women, 13.9% experienced a decline in social support between waves before and after disability acquisition, compared to 16.9% of men. MHI scores were lower following disability acquisition than preceding disability acquisition, lower for women compared to men, and lower for those with low social support. For example, for women with



high social support before and low social support after disability acquisition, their pooled MHI scores in all waves preceding disability 74.0 compared to 65.5 in waves following disability acquisition.

--- Table 2 ---

### **Regression analyses**

There was statistical evidence of an additive three-way interaction between disability and social support prior and social support subsequent to disability acquisition (test for interaction:  $p < 0.001$ ), therefore interaction terms were included between disability acquisition and social support in the regression models.

--- Table 3 ---

We quantified the deterioration in mental health between waves in which women and men did not report a disability and the waves in which they did, according to their reported level of social support before and after disability. Though the effects of disability acquisition on mental health were much larger for women, for both women and men there was a consistent pattern of association with social support. The effect of disability acquisition on mental health was greatest for women and men who experienced a change from high to low social support. For women, those who experienced a decline in social support had a 12.5 point difference in MHI score between waves preceding and following disability acquisition (-12.5, 95% CI -14.7, -10.2) compared to a six point decline for those with high social support both before and after disability (-6.4, 95% CI -8.3, -4.4) (Table 3). The excess effect on mental health of declining social support was greater than six points (interaction term: -6.1, 95% CI -7.9, -4.4). There was also a very large mental health deterioration for women who had low social support both before and after disability acquisition (-7.8, 95% CI -9.7, -5.9). For men, the largest effect was for those who experienced a decline in social support (-6.8, 95% CI -9.2, -4.4), followed by those with consistently low social support (-4.8, 95% CI -7.0, -2.6), and the smallest effect for those with consistently high social support (-2.5, 95% CI -4.7, -0.3).

### **Sensitivity analysis**

Results were robust to the sensitivity analysis. Exclusion of people with psychological impairments attenuated the results slightly although the gradient was still evident; the magnitude of the reduction in MHI in the high to

low social support group was 11 points (-11.1, 95% CI -13.6, -8.7) compared to six points among people in the high to high social support group (-6.2, 95% CI -8.3, -4.1) for women and there was a six point reduction for men in the high to low group (-5.9, 95% CI -8.4, -3.5) compared to a two point reduction in the consistently high social support group (-1.9, 95% CI -4.2, 0.3) (Table S1).

## DISCUSSION

The magnitude of the effect of disability acquisition on mental health was much larger for women than men, but there was a consistent pattern of association with social support for both women and men. There was evidence of effect measure modification by social support: the magnitude of change in mental health following disability acquisition varied greatly according to social support before and after disability acquisition. People whose social support changed from high to low experienced the greatest negative effects of disability, followed by people who had consistently low social support and those who remained with high social support following disability acquisition. The smallest negative effect was seen for people who experienced improvement in social support. This could suggest that social support acted as a protective factor for mental health. However, it is important to interpret these effects in conjunction with the mean MHI score within each subgroup. Though those experiencing consistently low social support did not experience the largest mental health declines, their mental health scores were substantially lower than the other groups, both before and after disability acquisition.

Consistent with our hypothesis, people with low social support *subsequent* to disability acquisition experienced the poorest mental health. People who changed from high to low social support experienced the largest declines, and people with consistently low social support, despite having smaller magnitude of decline, experienced the poorest mental health. Contrary to our hypothesis, high levels of social support *prior* to disability acquisition did not protect against mental health deterioration.

Our findings are consistent with studies in Finland and Australia, which found that social support buffered the effect of having a disability on poor mental health [7, 15]. This study builds on existing research by examining disability acquisition – incident rather than prevalent disability – and by investigating the effect of social support before and after disability acquisition, to better understand the causal relationships between disability, social support and mental health. These results suggest social support subsequent to disability acquisition buffers the adverse impacts of disability acquisition on mental health, which may be explained by provision of emotional

support to prevent negative emotional and behavioural responses [11], or through informational and instrumental support, for example access to information related to health or access to health care [11].

There were substantial differences in the magnitude of the effect for women and men. The effect of disability on mental health was about two-fold higher in women than men, across all categories of social support. The observed gender difference may relate to psychological attributes related to vulnerability to life events [40] and differences in stress responses which may make women more vulnerable to poor mental health [41].

Interestingly, the difference in the relative magnitude of the effect according to social support categories was similar between women and men.

In this paper, we examined within-person change in mental health and observed substantial and clinically significant levels of change. People whose social support changed from high to low following disability acquisition had a seven (men) to 13 point (women) (~50 to 80% of one standard deviation) reduction in their mental health, substantially exceeding a three-point difference on the scale considered clinically meaningful [42]. By comparison, within-person change in mental health associated with the onset of unemployment in the general population is in the range of 2-4 points on the MHI scale [14].

This study has a number of strengths. First, it is based on a large population-based longitudinal survey in which 2200 people acquired a disability over 14 years. Second, causally-robust fixed-effects regression was used to control for time-invariant confounding and important time-varying confounders were adjusted for. Third, we used a comprehensive measure of social support measured before and after disability acquisition.

There are also potential limitations, including unmeasured confounding, dependent misclassification bias and selection bias. The fixed-effects analysis mitigates against time-invariant confounding including unmeasured variables (e.g., negative affectivity) and dependent misclassification bias, whereby misclassification of the exposure and the outcome are correlated, because it estimates within-person effects. There is potential for unmeasured time-varying confounding, however we controlled for key socioeconomic characteristics that were thought to be the most important potential confounders. Selection bias arising from missing data is another potential limitation, but loss to follow-up in HILDA was low (<10% for most waves). The use of a short five-item questionnaire to measure mental health, in contrast to a more comprehensive questionnaire, means that it does not serve as a diagnostic tool for mental health disorders. Rather, the MHI scale of the SF-36 has proved to be a successful screening tool for mood disorders and severe depressive symptomatology in the general population [28], making it a good instrument to measure general mental health and wellbeing for use in

population surveys. We could not examine differences in the association by impairment type or severity of disability. Information on type of impairment was asked of participants who reported a long-term health condition; however we lacked power to examine associations for different types of impairments, and questions relating to severity of disability were included in only three waves of the survey (2004, 2009 and 2013). Finally, HILDA is likely to under-represent people with severe disabilities and communication impairments for whom social support may be even more important. We used a single broad question asked in HILDA to define disability, and as a result, the prevalence of disability is much higher than the prevalence estimated in other surveys such as the Survey of Disability Ageing and Carers (SDAC), an Australian survey which uses a much more lengthy and comprehensive tool to define disability (27.2% in HILDA 2012 versus 21.2% for the population aged 15 years and above in SDAC 2012) [43]. The use of a more inclusive and broader question in our sample is likely to pick up relatively milder cases of disability, which may underestimate the effect of disability acquisition on mental health as well as the influence of social support.

## **CONCLUSIONS**

This analysis found that social support is an important resource that protects individuals against the negative mental health effects of disability acquisition. People who experienced a decline in social support and those with consistently low social support were particularly vulnerable to poor mental health subsequent to disability acquisition. Furthermore, we found that the effects of disability acquisition on mental health were of much greater magnitude for women than for men. The magnitude of the mental health effects associated with low social support, combined with the modifiability of social support, highlights the importance of these findings for developing new policy and practice strategies to support people at the time of disability acquisition, and to promote social support for people with disabilities.

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## **CONFLICT OF INTEREST**

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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## FIGURE LEGEND

**Fig.1** Flow diagram of sample selection and missing data

**Table 1** Characteristics of sample (at baseline entry into the analytic sample, n=2200 persons) and pooled MHI scores in all waves preceding disability and all waves following disability acquisition (observations=15,724)

Characteristics	Distribution in the sample		Mean pooled MHI score Mean (SD)	
	n	%	Measured in waves preceding disability	Measured in waves following disability
Whole Sample	2200	100.0	74.5 (15.1)	71.2 (16.5)
Age group (years)				
<30	347	15.8	69.5 (16.7)	63.6 (18.9)
30-44	533	24.2	71.7 (15.5)	66.3 (17.8)
45-59	658	29.9	73.8 (14.7)	69.7 (16.4)
60+	662	30.1	79.7 (13.6)	76.2 (14.7)
Sex				
Women	1233	56.1	72.9 (15.6)	69.6 (16.6)
Men	967	44.0	76.9 (14.1)	73.2 (16.2)
Relationship status				
Married/de facto	1426	64.8	75.5 (14.7)	72.7 (15.9)
Separated/divorced/widowed	430	20.0	73.6 (16.3)	69.7 (17.6)
Single	344	15.6	69.6 (16.2)	63.3 (18.9)
Household structure				
Couple no children	808	36.7	77.5 (14.4)	74.5 (16.0)
Couple with children	807	36.7	72.7 (15.4)	68.4 (16.7)
Lone parent with children	183	8.3	68.6 (17.6)	63.7 (19.1)
Lone person	326	14.8	72.7 (16.7)	69.1 (18.6)
Other	76	3.5	71.3 (16.7)	65.8 (18.7)
Education				
Bachelor/postgraduate degree	409	18.6	75.4 (13.7)	73.3 (15.0)
Diploma/certificate	613	27.9	75.5 (14.6)	71.8 (16.7)
Completed secondary	259	11.8	71.5 (15.8)	68.1 (17.6)
Not completed secondary	919	41.8	73.9 (15.9)	70.1 (17.2)
Employment				
Employed	1278	58.1	74.3 (14.5)	70.9 (16.0)
Unemployed	80	3.6	65.2 (19.5)	59.3 (21.7)
Not in the labour force	842	38.3	75.2 (16.4)	71.0 (18.3)
Income				
Q5 - High	489	22.2	76.5 (14.7)	73.8 (15.8)
Q4	440	20.0	74.9 (15.4)	72.1 (16.8)
Q3	443	20.1	74.2 (16.1)	70.3 (18.0)
Q2	409	18.6	74.1 (16.1)	69.7 (18.7)
Q1 - Low	419	19.1	73.9 (17.2)	69.5 (18.6)

**Table 2** Pooled MHI scores for all waves preceding disability and all waves following disability acquisition, by category of social support before and after disability acquisition.

Social support one year before disability acquisition	Social support one year after disability acquisition							
	High				Low			
			Pooled MHI score				Pooled MHI score	
	n	%	Mean (SD)	Mean (SD)	n	%	Mean (SD)	Mean (SD)
		Preceding disability	Following disability			Preceding disability	Following disability	
Women (n=8978 observations)								
High	490	39.7	79.9 (11.9) <sup>a</sup>	77.5 (13.1)	171	13.9	74.0 (14.1)	65.5 (16.8)
Low	122	9.9	72.8 (14.1)	73.4 (14.1)	450	36.5	64.8 (16.2)	61.5 (16.3)
Men (n=6746 observations)								
High	270	27.9	84.2 (9.9)	82.6 (10.4)	163	16.9	80.7 (10.1)	73.8 (15.2)
Low	105	10.9	78.6 (13.7)	77.1 (15.0) <sup>b</sup>	429	44.4	69.7 (14.6)	66.2 (16.5)

<sup>a</sup> This corresponds to the mean of women’s pooled MHI scores in all waves preceding disability for those who reported high social support one year before disability and high social support one year after disability acquisition

<sup>b</sup> This corresponds to the mean of men’s pooled MHI scores in all waves following disability for those who reported low social support one year before disability and high social support one year after disability acquisition

**Table 3** Linear fixed-effects regression coefficients for the within-person difference in MHI score between waves preceding and following disability acquisition, presented by social support categories before and after disability acquisition with coefficients for the interaction terms

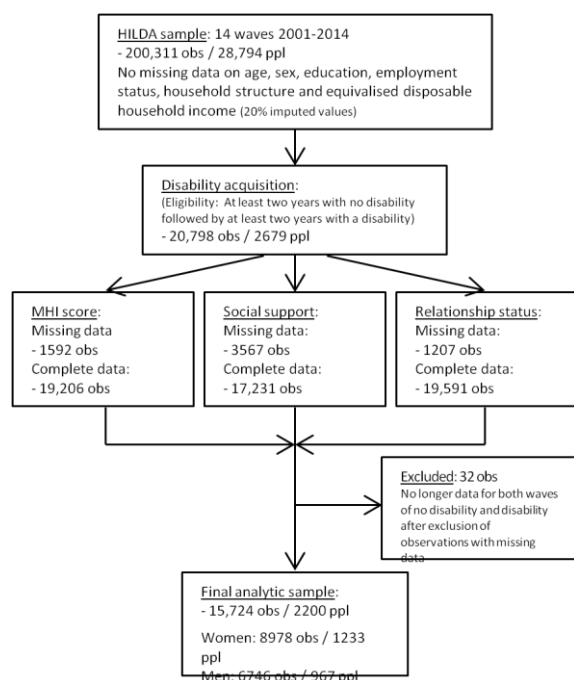
Social support one year before disability acquisition	Social support one year after disability acquisition					
	High			Low		
	coeff	95% CI	P value	coeff	95% CI	P value
Women (n=8978 observations)						
Linear regression coefficient <sup>a</sup>						
High	-6.4	-8.3, -4.4	<0.001	-12.5	-14.7, -10.2	<0.001
Low	-4.4	-6.9, -1.9	0.001	-7.8	-9.7, -5.9	<0.001
Interaction term <sup>b</sup>						
High	0			-6.1	-7.9, -4.4	<0.001
Low	2.0	0.0, 4.0	0.055	-1.4	-2.7, -0.1	0.030
Men (n=6746 observations)						
Linear regression coefficient <sup>a</sup>						
High	-2.5	-4.7, -0.3	0.027	-6.8	-9.2, -4.4	<0.001
Low	-2.7	-5.3, -0.1	0.043	-4.8	-7.0, -2.6	<0.001
Interaction term <sup>b</sup>						
High	0			-4.3	-6.1, -2.5	0.001



Low -0.2 -2.2, 1.8 0.858 -2.3 -3.7, -0.9 <0.001

<sup>a</sup> Adjusted for age, household structure, marital status, education, employment, quintiles of equivalised household disposable income and age\*disability product term

<sup>b</sup> The coefficient represents the additional effect of disability acquisition on mean MHI score within-persons for each category of the change in social support variable compared to the reference category (high social support prior and post disability)



**Table S1** Linear fixed-effects regression coefficients for the within-person difference in MHI score between waves preceding and following disability acquisition excluding those acquiring a psychological impairment, presented by social support categories before and after disability acquisition with coefficients for the interaction terms

	Social support one year after disability acquisition					
	High			Low		
Social support one year before disability acquisition	coeff	95% CI	P value	coeff	95% CI	P value
<b>Women (n=8226)</b>						
Linear regression coefficient <sup>a</sup>						
High	-6.2	-8.3, -4.1	<0.001	-11.1	-13.6, -8.7	<0.001
Low	-2.8	-5.5, -0.2	0.035	-7.0	-9.2, -4.9	<0.001
Interaction term <sup>b</sup>						
High	0			-5.0	-6.8, -3.2	<0.001
Low	3.3	1.3, 5.3	0.001	-0.9	-2.2, 0.4	0.180
<b>Men (n=6442)</b>						
Linear regression coefficient <sup>a</sup>						
High	-1.9	-4.2, 0.3	0.097	-5.9	-8.4, -3.5	<0.001
Low	-2.3	-5.0, 0.4	0.095	-4.0	-6.3, -1.8	<0.001
Interaction term <sup>b</sup>						
High	0			-4.0	-5.8, -2.2	<0.001

Low	-0.4	-2.4, 1.6	0.720	-2.1	-3.5, -0.7	0.003
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<sup>a</sup> Adjusted for age, household structure, marital status, education, employment and quintiles of equivalised household disposable income

<sup>b</sup> The coefficient represents the additional effect of disability on mean MHI score within-persons for each category of the change in social support variable compared to the reference category (high social support prior and post disability)