



Financial hardship, socio-economic position and depression: Results from the PATH Through Life Survey

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ABSTRACT

There is a strong association between financial hardship and the experience of depression. Previous longitudinal research differs in whether this association is viewed as a contemporaneous relationship between depression and hardship or whether hardship has a role in the maintenance of existing depression. In this study we investigate the association between depression and hardship over time and seek to resolve these contradictory perspectives. We also investigate the consistency of the association across the lifecourse. This study reports analysis of two waves of data from a large community survey conducted in the city of Canberra and the surrounding region in south-east Australia. The PATH Through Life Study used a narrow-cohort design, with 6715 respondents representing three birth cohorts (1975–1979; 1956–1960; and 1937–1941) assessed on the two measurement occasions (4 years apart). Depression was measured using the Goldberg Depression Scale and hardship assessed by items measuring aspects of deprivation due to lack of resources. A range of measures of socio-economic circumstance and demographic characteristics were included in logistic regression models to predict wave 2 depression. The results showed that current financial hardship was strongly and independently associated with depression, above the effects of other measures of socio-economic position and demographic characteristics. In contrast, the effect of prior financial difficulty was explained by baseline depression symptoms. There were no reliable cohort differences in the association between hardship and depression having controlled for socio-demographic characteristics. There was some evidence that current hardship was more strongly associated with depression for those who were not classified as depressed at baseline than for those identified with depression at baseline. The evidence of the contemporaneous association between hardship and depression suggests that addressing deprivation may be an effective strategy to moderate socio-economic inequalities in mental health.

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Introduction

There is considerable evidence of a social gradient in the prevalence of common mental disorders including depression: lower socio-economic position is associated with increased risk (Fryers, Melzer, & Jenkins, 2003; Kessler & Cleary, 1980; Lewis et al., 1998; Lorant et al., 2003; Muntaner, Eaton, Miech, & O'Campo, 2004; Power, Stansfeld, Matthews, Manor, & Hope, 2002; Rodgers, 1991; Skapinakis, Weich, Lewis, Singleton, & Araya, 2006; Stansfeld, Head, Fugrer, Wardle, & Cattell, 2003; Weich & Lewis, 1998b, 1998a; Whelan, 1994). The focus of this paper is on financial hardship. Measures of hardship or deprivation assess whether people are excluded from minimally accepted ways of life in society due to

a lack of resources (Whelan, Layte, Maitre, & Nolan, 2001). In contrast to income or poverty measures which infer exclusion from a lack of resources, financial hardship directly assesses the extent to which individuals or households lack goods, facilities or services or are unable to engage in activities (Whelan, 1993). Financial hardship can focus on absolute need, with reference to food, shelter, clothing and medical care (Krieger, Williams, & Moss, 1997; Mayer & Jencks, 1989; Mirowsky & Ross, 1999) or consider deprivation relative to social norms (Townsend, 1979; Whelan et al., 2001). Within the psychiatric literature, indicators of financial hardship have included access to a car, household overcrowding, ownership of household appliances, difficulty paying bills, difficulty purchasing food or clothing, having services/utilities disconnected, and structural housing problems (Lewis et al., 1998; Lorant et al., 2007; Mirowsky & Ross, 2001; Skapinakis et al., 2006; Weich & Lewis, 1998b, 1998a; Whelan, 1993).

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Across the different approaches to the measurement of financial hardship there is consistent evidence that hardship is associated with common mental disorders and psychological distress (Butterworth, Crosier, & Rodgers, 2004; Fryers et al., 2003; Lahelma, Laaksonen, Martikainen, Rahkonen, & Sarlio-Lahteenkorva, 2006; Lewis et al., 1998; Lorant et al., 2007; Mirowsky & Ross, 1999, 2001; Pudrovska, Schiemen, Pearlin, & Nguyen, 2005; Rodgers, 1991; Skapinakis et al., 2006; Weich & Lewis, 1998b; Whelan, 1993, 1994). Hardship has been shown to be robustly and independently associated with depression, and to mediate the relationship between other measures of socio-economic position and depression (Kessler, Turner, & House, 1987; Lewis et al., 1998; Mirowsky & Ross, 1999; Rodgers, 1991; Thomas, Benzeval, & Stansfeld, 2007; Weich & Lewis, 1998b). Difficulties satisfying the basic requirements of daily living because of limited financial resources, such as having problems paying bills, providing food and clothing, or having inadequate housing, may directly impact on mental health, being a source of ongoing worry and stress, causing feelings of demoralisation, entrapment and lack of control, limiting social and educational opportunities and leading to uncertainty about the future (e.g., Brown, 2002; Brown & Moran, 1997; Desjarlais, Eisenberg, Good, & Kleinman, 1995; Kahn & Pearlin, 2006; Mirowsky & Ross, 1999, 2001; Reading & Reynolds, 2001; Ross & Huber, 1985; WHO, 2001).

An important feature of hardship from a methodological perspective is that, unlike many other measures of social position that are relatively stable across the lifecourse, the experience of hardship may fluctuate. Thus, researchers studying hardship are able to evaluate the dynamic effect of changes in socio-economic circumstances over time and potentially differentiate social causation and social selection (Lorant et al., 2007; Skapinakis, 2007). Despite this, few studies have examined the relationship between hardship and depression over time (see Lorant et al., 2003), and most of the existing research has only analysed two waves of data. For example, Weich and Lewis (1998a) reported that baseline hardship (poverty index) was associated with the maintenance of common mental disorders across two measurement occasions (12 months apart), but not with the onset of disorder for those respondents without disorder at baseline. In analysis of the British Psychiatric Morbidity Survey (with follow-up at 18 months), Skapinakis et al. (2006) found that baseline hardship (financial difficulty) was not associated with the onset or maintenance of “any common mental disorder” at wave 2 after controlling for baseline psychiatric symptoms. However analysis restricted to major depression found that baseline hardship was significantly associated with both onset and maintenance (though the maintenance effect was much stronger). A limitation of these two studies, however, is that while they did assess mental health/depression at two points in time, there was no consideration of change in hardship. Rather, they considered the association between hardship at wave 1 and subsequent mental health. Nonetheless, a meta-analysis by Lorant et al. (2003) reached the same conclusion: that socio-economic status generally has a greater effect on depression maintenance than onset.

A different conclusion has been reached by studies using other analytic approaches. Mirowsky and Ross (2001) also analysed data from two time points, but considered hardship at both measurement occasions. They found that persistent hardship (evident in both waves) or recent hardship (only at wave 2) was associated with depression at wave 2 after controlling for depression scores at wave 1 (approximately three years earlier) but that resolved hardship (only at wave 1) was not. Lorant et al. (2007) analysed eight waves of the Belgian Households Panel Survey using fixed-effect models and showed that an increase in hardship (deprivation in their terminology) was associated with increased risk of

depression. Importantly, Lorant et al. found no significant independent effect of lagged (previous) depression. The findings of these later two studies suggest that hardship has an impact on current mental health, that prior hardship is not associated with depression above the effect of current hardship (Lorant et al., 2007), and that the effect of hardship lessens with time (i.e., resolved hardship: Mirowsky & Ross, 2001). The somewhat contradictory findings about hardship being associated with either the maintenance or the contemporaneous experience of depression may simply be a consequence of the different analytic approaches used across studies. Therefore, the major goal of the current study is to examine the relationship between hardship and depression using two waves of data and contrast these different analytic models.

Another topic on which there is mixed evidence in the literature concerns the association between hardship and depression across the lifecourse. Mirowsky and Ross (2001) reported that the relationship between hardship and depression differed across age, and that the association was weaker for older respondents. However, other researchers (e.g., Weich & Lewis, 1998b) have found a consistent effect of hardship across age. A secondary aim of this study, therefore, is to evaluate whether the association between hardship and depression differs across the lifecourse.

In summary, the purpose of this paper is to use data from a large community survey and the methods used in previous research to resolve somewhat anomalous findings in the existing literature about the nature of the association between financial hardship and depression. The specific aims are to i) contrast the contemporaneous association between hardship and depression and the role of prior hardship in the maintenance of depression after controlling for covariates and other measures of social position; and ii) assess the consistency of the relationship between hardship and depression across three birth cohorts.

Methods

Study design

The data used for this analysis are from the Personality and Total Health (PATH) Through Life Study, a large longitudinal community survey measuring the health and well-being of three cohorts from Canberra and the neighbouring town of Queanbeyan in South-eastern Australia. The sampling frame was the electoral roll (registration on the electoral roll is compulsory for Australian citizens). Canberra, the national capital, is a relatively advantaged community with levels of employment, labour-force participation, average weekly earnings and educational attainment considerably higher than the national average (Australian Bureau of Statistics, 2001b, 2001a, 2007). However, around 13% of Canberra households are in the bottom national income quintile and a number of suburbs and local areas across Canberra have a disadvantaged socio-economic profile (Australian Bureau of Statistics, 2001c; Cassells, Vu, & McNamara, 2007). Further, the town of Queanbeyan does not share Canberra's socio-economic advantage and is closer to the national average on a variety of socio-economic measures (Australian Bureau of Statistics, 2001c).

The birth years of the three cohorts included in the PATH study are 1975–1979, 1956–1960, and 1937–1941. The initial interviews were conducted between 1999 and 2001. It is planned to follow up each cohort every 4 years. The current data are largely drawn from the second wave of interviews (conducted between 2003 and 2005) when respondents were aged 24–28, 44–48 and 64–68 years. The wave 1 response rate for each of the three cohorts was 58.6%, 64.6% and 58.3% and the follow-up rates at wave 2 were 89.0%, 93.0% and 87.1%. Overall, 16.4% of the wave 2 non-responders were not able to be located, 11.0% had died since the previous

interview, and the remaining 72.6% refused to participate in the wave 2 interview. Respondent numbers in each of the cohorts at wave 2 were 2139 in the young cohort, 2354 in the mid-aged cohort, and 2222 in the older cohort.

The Human Research Ethics Committee of The Australian National University approved the study protocol. The survey was conducted by highly trained professional interviewers. To assist respondents identified with serious mental health problems, the interviewers carried information about local crisis and support services and other resources to pass to respondents who requested further information. Counselling on help-seeking was also available from professional staff at the Centre for Mental Health Research. Regular newsletters were used to maintain contact with participants and to provide information and feedback about the results of the project. Further details of the survey including the sampling procedure are reported in Jorm et al. (2003).

Measures

Participants completed the questionnaire on a hand-held computer. The interviewer administered the survey and conducted physical and cognitive tests. Only those measures used in the current analysis are described and are largely drawn from wave 2.

Depression

Two measures of depression, both based on the Goldberg Depression Scale (GDS), were used in this study. The GDS (Goldberg, Bridges, Duncan-Jones, & Grayson, 1988) was included in both waves of the PATH study. The GDS comprises nine items assessing the presence of symptoms of depression in the past month. The continuous GDS score (0–9) was used as a measure of depression symptoms. In addition, a measure of likely depression was used to enable comparison with previous research that has used a categorical measure of depression caseness. A cut-point on the GDS (scores of 7 or greater) was used to produce an estimate of case prevalence consistent with a gold-standard depression instrument based on DSM-IV criteria which was included in wave 2 of the PATH survey (Patient Health Questionnaire; Spitzer, Kroenke, & Williams, 1999).

Covariates

A number of socio-demographic characteristics were included in the analyses, including cohort (age), gender, marital status (married or de facto relationship vs other), and presence of dependent children (aged under 15) in the household. Physical disability (functional impairment due to physical health) was assessed using the physical health score from the SF-12. The RAND scoring method (Hays, 1998) was used. At a population level, the scale is standardized with a mean of 50 and standard deviation of 10, with higher scores indicating better health.

Socio-economic measures

The key independent measure used in the current analysis was based upon four dichotomous hardship items included in wave 2 of the survey that assessed lack of basic goods and opportunities due to a lack of financial resources (*over the past year have the following happened because you were short of money: pawned or sold something; went without meals, unable to heat home, asked for help from welfare/community organisations*). These items were drawn from a module in the Australian Household Expenditure Survey which assessed financial strain (Australian Bureau of Statistics, 2002). The items focus on objective aspects of deprivation, assessing the specific behavioural consequences of a lack of financial resources. In factor analysis of a larger pool of items, Bray (2001) reported that these four items loaded on a single factor. While we consider each

item separately in descriptive analysis, a summary measure representing any experience of hardship (one or more of the individual items) is used in multivariate analysis.

The hardship items were not included in wave 1 of the survey. Instead, we utilise a measure of financial difficulty. Participants were asked whether they (or their family) had gone without things they really needed in the last year because they were short of money. Respondents who answered “yes, often” or “yes, sometimes” were classified as experiencing financial difficulty. This item does not address specific aspects of deprivation and is a more subjective measure than the wave 2 hardship scale. Nonetheless, its inclusion enables comparison of the association of depression with enduring, prior and contemporaneous financial circumstances.

A number of other markers of contemporaneous (wave 2) socio-economic status were used in this analysis to examine the general association between social position and depression and to enable evaluation of the independent contribution of hardship. The specific wave 2 measures included: labour-force status (employed, unemployed or not participating in the labour force); educational attainment (years of full-time education corresponding with highest level of educational attainment) and housing tenure (rental vs mortgage vs other). In addition, a measure of childhood adversity was derived from an item from wave 1 which asked respondents whether they had “grown up in poverty”.

Statistical analysis

Descriptive statistics were initially calculated and simple logistic regression models were used to evaluate the association of depression (estimate of caseness at wave 2) with the measures of financial hardship and socio-economic circumstances. A series of multivariate models assessed the key relationship between current hardship and depression after incorporating the range of demographic, health and socio-economic covariates (cohort/age, gender, relationship status, dependent children, physical functioning, labour-force status, housing tenure, educational attainment, and experience of childhood poverty), previous (wave 1) depressive symptoms, and previous financial difficulty. Subsequent models tested the consistency of the relationship between hardship and depression across the three cohorts, how wave 1 financial difficulty and wave 2 hardship interacted to influence depression (assessed using interaction terms, dummy-coded variables, and testing simple main-effects), and whether depression caseness at wave 1 influenced the association between hardship and wave 2 depression.

Missing data for most of the items examined in this analysis were minimal. One scale (the SF-12 physical functioning scale) had missing data for 2 percent of respondents and a coding error in the computerised questionnaire meant that 7.3 percent of respondents were not asked the wave 1 financial difficulty question. Missing data for all other scales/items were less than 1% of cases. The multiple imputation procedure ICE available in Stata 9.0 was used to impute missing data using the *multiple imputation by chained equations* procedure (Royston, 2004). All variables in the models were used in the imputation process, with five data sets generated for analysis.

To assess the robustness of the current findings, additional sensitivity analyses were conducted. First, the key analyses (Models A and B of Table 3) were repeated without multiple imputation (i.e., using listwise deletion). Second, different methods were used to correct for sample attrition and address possible concerns about the representativeness of the findings (e.g., McGuigan, Ellickson, Hays, & Bell, 1995). Of the 7485 wave 1 respondents, 770 (10.3%) did not complete a wave 2 interview. Wave 1 data were used to construct longitudinal weights based on the inverse of the

probability of inclusion. A multivariate logistic regression analysis predicting wave 2 attrition from the wave 1 characteristics showed that drop-out was associated with being male, not participating in the labour force (though not unemployment), poorer physical functioning, lower levels of educational attainment and not having a spouse/partner. Depression was not independently associated with wave 2 participation. The key analyses were repeated using these longitudinal weights as sample weights in STATA (a procedure with adjusts the relative contribution of individual cases while employing robust variance estimators). Sample attrition was also addressed using Heckman probit models with sample selection (e.g., Cheung, 2001). To address possible concerns about selection bias, seemingly unrelated bivariate probit models were used to estimate the effect of financial hardship (e.g., Sabia, 2004). Finally, we repeated the key analyses using a different outcome measure. The reported analyses used the dichotomised depression measure to promote consistency with much of the previous literature which has considered psychiatric caseness. We also used negative binomial regression models to repeat the key analyses using the count of symptoms on the GDS as the dependent measure. The results of all of these additional models were consistent with the results reported in this paper. Minor discrepancies revealed by these sensitivity analyses are discussed at the end of the Results section.

Results

Table 1 presents data on the characteristics (wave 2 unless noted) of respondents. The individual hardship items and the overall hardship measure demonstrated a consistent pattern with hardship declining with age, being more common among young men than young women, but more common in women than men in the mid and older age groups. The wave 1 financial difficulty measure

showed a broadly consistent pattern across age groups, though the overall prevalence was higher, and men in the young and mid-aged cohorts reported similar levels of financial difficulty. In contrast, the rate of reported childhood poverty was greater for progressively older cohorts. Data on the prevalence of depression were also consistent with expectations, with rates greater for women than men, and declining with increasing age across the three cohorts. Across the two waves, 88.7% of respondents were classified without depression at wave 1 or wave 2, 4.3% were identified as likely depression cases at wave 1 only, 4.5% at wave 2 only, and 2.5% of respondents were classified with depression at both waves.

There was a significant association between the experience of financial hardship and each of the other measures of socio-economic position. Odds ratios indicated that hardship declined with each additional year of education (OR = 0.90), and that the risk of hardship was greater for those who were unemployed (OR = 6.00), in rental accommodation (OR = 5.28) or had reported childhood poverty (OR = 1.40). There was also a significant relationship between the experience of financial difficulty at wave 1 and financial hardship at wave 2 (OR = 5.21).

The univariate relationships between depression and each of the measures of financial hardship and socio-economic circumstance are presented in Table 2. All of the individual elements of financial hardship and the overall hardship measure were associated with an increased likelihood of reporting depression (odds ratios between 4 and 8). Almost a quarter of respondents who experienced any financial hardship were classified with depression compared to 6% of those who did not experience hardship. Many of the other socio-economic measures (e.g., rental housing, unemployment, childhood poverty) had weaker but nonetheless significant associations with current depression. Wave 1 financial difficulty was also significantly associated with wave 2 depression. Controlling for age

Table 1
Descriptive statistics reporting the demographic and socio-economic characteristics, prevalence of hardship and depression for respondents in each of the three cohorts by gender.

	Men			Women		
	24–28	44–48	64–68	24–28	44–48	64–68
N	1013	1103	1147	1126	1251	1075
Demographic						
Married or de facto (%)	49.6	80.8	87.1	56.8	75.2	66.7
Children (<15 yrs) in home (%)	12.3	44.7	1.0	24.7	36.5	0.1
Physical health						
RAND SF-12 (mean score & se)	52.4 (0.20)	51.2 (0.23)	49.9 (0.27)	50.7 (0.23)	50.1 (0.25)	47.7 (0.33)
Socio-economic measures						
Housing ^a						
Mortgage (%)	29.5	56.3	7.1	36.9	52.8	7.3
Own outright (%)	1.8	28.8	84.8	2.0	32.7	82.9
Renting (%)	30.9	10.8	5.9	31.4	12.3	6.7
Labour-force status						
Unemployed (%)	4.3	1.9	0.2	2.6	2.1	0.1
NILF (%)	4.0	4.5	67.5	11.7	11.4	80.4
Years of education (mean years & se)	14.6 (0.05)	14.9 (0.07)	14.4 (0.08)	15.0 (0.05)	14.5 (0.06)	13.5 (0.08)
Childhood poverty (%)	5.9	11.8	17.3	6.9	12.7	12.9
Hardship measures						
Individual items (%)						
Pawned or sold something	8.7	3.4	0.8	6.5	3.9	1.1
Went without meals	8.3	1.9	0.3	5.6	2.7	1.1
Unable to heat home	1.9	0.7	0.1	1.7	1.8	0.8
Help from welfare/community org	4.6	1.6	0.5	4.4	2.1	0.7
Experience any financial hardship (%)	15.6	5.4	1.5	13.0	7.1	3.0
Wave 1 Financial difficulty (%)	23.3	24.4	12.7	29.6	23.7	14.3
Depression measures						
Wave 2 depression (%)	9.8	5.4	2.5	12.2	9.0	2.6
Wave 1 depression (%)	6.8	6.5	2.7	12.2	9.2	3.3

^a Other categories not represented – primarily living with parents or relatives.

Table 2

Prevalence of depression and univariate relationship (odds ratios, standard error and significance) between depression and various measures of financial hardship and socio-economic circumstance.

	Current depression (%)	Univariate Odds ratio (95% CI)	Controlling for age and sex Odds ratio (95% CI)
Any financial hardship (w2)			
Yes	24.1	5.40 (4.28–6.81)	4.19 (3.30–5.33)
No	5.6		
Pawned or sold something			
Yes	20.5	3.78 (2.76–5.17)	2.87 (2.09–3.95)
No	6.4		
Went without meals			
Yes	33.5	7.81 (5.79–10.55)	5.96 (4.38–8.12)
No	6.1		
Unable to heat home			
Yes	33.2	6.68 (4.11–10.85)	5.43 (3.31–8.92)
No	6.6		
Help from welfare/community org			
Yes	22.7	4.17 (2.83–6.16)	3.13 (2.11–4.65)
No	6.6		
Reported childhood poverty			
Yes	8.9	1.37 (1.04–1.79)	1.70 (1.28–2.24)
No	6.7		
Not completed high school			
Yes	7.7	1.13 (0.85–1.50)	1.75 (1.29–2.37)
No	6.9		
Housing tenure: renting			
Yes	11.1	1.92 (1.54–2.38)	1.39 (1.10–1.75)
No	6.1		
Labour-force status			
Employed	7.1		
Unemployed	20.9	3.47 (2.21–5.46)	3.05 (1.93–4.81)
Not in labour force	5.8	0.80 (0.64–1.00)	2.40 (1.82–3.17)
Wave 1 financial difficulty			
Yes	13.8	3.02 (2.48–3.67)	2.60 (2.13–3.17)
No	5.0		

and sex (last column of Table 2) reduced the strength of the association between many of the socio-economic measures and wave 2 depression, though there was a strengthening of the effect for childhood poverty, not completing high school and being out of the labour force (reflecting the cohort or sex-specific profile of these measures).

Table 3 presents a series of multivariate logistic regression models examining the relationship between financial hardship and depression after controlling for the demographic, physical health and socio-economic covariates and wave 1 depression symptoms. Model A demonstrated that the association between wave 2 financial hardship and depression was significant (OR = 2.01) after controlling for all of the covariates. In addition to the experience of hardship, younger age, not having a partner, poorer physical functioning, unemployment and lower levels of educational attainment were also independently associated with depression. Wave 1 financial difficulty was also a significant predictor of wave 2 depression in this model (OR = 1.55). In contrast to the previous results, not participating in the labour force, housing tenure and childhood poverty were not independently associated with depression in the multivariate models.

Model B incorporated the measure of baseline depressive symptoms, which was strongly associated with the estimate of caseness at wave 2. Wave 2 financial hardship remained significantly associated with depression in this model, though the measure of wave 1 financial difficulty was no longer significant.

Educational attainment and partner status were also non-significant once the measure of wave 1 depression symptoms was included in the model. Model C examined whether the association between current hardship and depression differed across the three age groups examined. Although risk of depression declined with increasing age, the effect of hardship was consistent across the three age cohorts examined, with neither of the interaction terms significant.

Model D examined the interaction between wave 1 financial difficulty and wave 2 financial hardship. This interaction term was significant. Subsequent simple main effect models showed that wave 1 financial difficulty was significantly associated with the risk of wave 2 depression for those respondents who did not report financial hardship at wave 2 (OR = 1.73, 95% CI: 1.34–2.23), whereas wave 1 financial difficulty was not associated with wave 2 depression for those who did experience financial hardship at wave 2 (OR = 1.09, CI: 0.66–1.79). Another way of examining this association, consistent with the approach of Mirowsky and Ross, is presented in Model E in which the combination of wave 1 financial difficulty and wave 2 financial hardship was dummy-coded. The reference category used was financial hardship at wave 2 only (i.e., recent hardship). This analysis demonstrated that those respondents who experienced recent hardship had a greater risk of current depression than those who did not experience either financial difficulty or hardship, and those who only reported wave 1 financial difficulty (resolved hardship in Mirowsky and Ross terms). There was no difference in the risk of depression amongst those who experienced recent hardship (wave 2 only) or persistent hardship (at both waves 1 and 2). Further analysis showed that those who only experienced financial difficulty at wave 1 did have a significantly elevated risk of depression at wave 2 compared to those who reported no hardship or financial difficulty (OR = 1.48, CI: 1.14–1.93).

A final analysis replicated the analytic approach used by Skapinakis et al. (2006) and Weich and Lewis (1998b). This analysis essentially repeated Model B separately for respondents classified as non-cases at wave 1 ($n = 6259$) and those likely depression cases at wave 1 ($n = 456$). For respondents identified as non-cases, wave 2 financial hardship was associated with caseness at wave 2 (OR = 1.77, CI: 1.24–2.51) while the association of wave 1 financial difficulty with wave 2 depression was non-significant (OR = 1.23, CI: 0.92–1.63). For those respondents who were classified as cases at wave 1 neither the wave 2 financial hardship measure (OR = 1.55, CI: 0.89–2.70) nor the wave 1 financial difficulty measure (OR = 0.91, CI: 0.58–1.43) was associated with wave 2 depression. Comparing the results for these two groups, the non-significance of the financial hardship measure for those with depression at wave 1 seems to reflect both a slight reduction in the magnitude of the effect (1.77–1.55) and a decrease in precision of the estimate, perhaps reflecting the relatively small number of wave 1 cases. Even in models excluding the measure of wave 2 financial hardship, wave 1 financial difficulty was not significantly associated with wave 2 depression for either those with (OR = 0.96, CI: 0.61–1.50) or those without depression at wave 1 (OR = 1.30, CI: 0.98–1.72).

Additional sensitivity analyses were conducted which replicated the results presented in Models A and B of Table 3 (results available on request). For all sensitivity analyses (using data without imputation, application of longitudinal weights, probit models with sample selection, bivariate probit models and negative binomial regression), Model A demonstrated a significant effect of wave 2 financial hardship and wave 1 financial difficulties on depression. For all but the negative binomial regression and Heckman probit models, the inclusion of wave 1 depression symptoms in Model B explained the significant association between wave 1 difficulties and wave 2 depression. The negative binomial regression and

Table 3
Odds ratios (and 95% confidence intervals) from a series of logistic regression models assessing the relationship of depression with financial hardship (bold indicates significance).

	Model A	Model B	Model C	Model D	Model E
Gender (men reference)	1.15 (0.93–1.42)	1.03 (0.83–1.29)	1.04 (0.83–1.29)	1.03 (0.83–1.29)	1.03 (0.83–1.29)
Age group (20's)					
40's	0.58 (0.46–0.74)	0.63 (0.49–0.81)	0.64 (0.48–0.84)	0.64 (0.5–0.82)	0.64 (0.50–0.82)
60's	0.12 (0.08–0.18)	0.19 (0.12–0.30)	0.21 (0.14–0.33)	0.20 (0.13–0.30)	0.20 (0.13–0.30)
Dependent child(ren)	0.85 (0.64–1.11)	0.81 (0.61–1.08)	0.81 (0.61–1.08)	0.82 (0.62–1.08)	0.82 (0.62–1.08)
Partner/spouse	0.70 (0.56–0.88)	0.79 (0.63–1.01)	0.79 (0.62–1.00)	0.79 (0.62–1.01)	0.79 (0.62–1.01)
RAND SF-12 physical function	0.91 (0.90–0.92)	0.93 (0.92–0.94)	0.93 (0.92–0.94)	0.93 (0.92–0.94)	0.93 (0.92–0.94)
Years of education	0.94 (0.9–0.99)	0.96 (0.91–1.01)	0.96 (0.91–1.02)	0.96 (0.91–1.01)	0.96 (0.91–1.01)
Labour-force status (employed)					
Unemployed	1.73 (1.04–2.89)	1.82 (1.06–3.12)	1.80 (1.05–3.09)	1.83 (1.07–3.12)	1.83 (1.07–3.12)
NILF	1.11 (0.8–1.53)	1.03 (0.73–1.45)	1.03 (0.74–1.45)	1.05 (0.74–1.47)	1.05 (0.74–1.47)
Housing tenure					
Mortgage	0.96 (0.73–1.25)	0.95 (0.72–1.25)	0.97 (0.73–1.27)	0.95 (0.72–1.24)	0.95 (0.72–1.24)
Rent	0.88 (0.66–1.16)	0.85 (0.64–1.13)	0.85 (0.64–1.14)	0.85 (0.64–1.13)	0.85 (0.64–1.13)
Childhood poverty	1.24 (0.91–1.68)	1.17 (0.85–1.60)	1.16 (0.85–1.60)	1.18 (0.86–1.61)	1.18 (0.86–1.61)
Financial hardship (w2)	2.01 (1.52–2.67)	1.66 (1.23–2.23)	1.79 (1.25–2.57)	2.28 (1.48–3.52)	
Financial difficulty (w1)	1.55 (1.24–1.94)	1.14 (0.90–1.44)	1.15 (0.91–1.46)	1.29 (0.99–1.67)	
Goldberg score at wave 1		1.42 (1.36–1.49)	1.42 (1.36–1.49)	1.42 (1.36–1.49)	1.42 (1.36–1.49)
Age × hardship					
40 × hardship			0.94 (0.52–1.72)		
60 × hardship			0.27 (0.06–1.32)		
Wave 1 financial difficulty × wave 2 hardship				0.55 (0.31–0.99)	
Financial hardship/difficulty					
Only wave 2 (ref)					
Not either					0.44 (0.28–0.68)
Wave 1 only					0.56 (0.36–0.88)
Wave 1 and wave 2					0.71 (0.42–1.19)

Heckman models also showed a substantial reduction in the effect of wave 1 financial difficulty following the inclusion of wave 1 depression symptoms (e.g., the IRRs declined from 1.22 to 1.06, and probit coefficients from 0.22 to 0.13) but the effect remained significant, reflecting the greater sensitivity of these models. There were a number of other differences in these models in the effects of the covariates. For example, the effect of partner/spouse status remained significant and the effect of unemployment failed to reach significance. Nonetheless, these sensitivity analyses confirmed the pattern of results reported in Table 3.

Discussion

This study examined material hardship in three cohorts of Australian adults living in and around the city of Canberra. Overall, we found that, in the past 12 months, around 7.5% of respondents had experienced at least one of the markers of deprivation examined in this study. These included having to sell their possessions, going without meals, being unable to heat their home or asking for help from a welfare organisation due to a shortage of money. Canberra is a relatively advantaged community according to a range of socio-demographic indicators (Australian Bureau of Statistics, 2007). This is confirmed when the current findings are compared to identical data collected through a national survey (see Butterworth et al., 2004) which found rates of hardship of 13.6% amongst similarly aged respondents (results available on request). Although hardship may be less prevalent in Canberra, the current results indicate that prosperity and access to financial resources are not equally shared by all survey respondents (Cassells et al., 2007). The experience of hardship was also associated with age. Around 14% of those in the youngest cohort experienced hardship, and this declined to just over 2% of the oldest cohort. It is anticipated that

the experience of deprivation will have significant personal consequences, directly causing suffering and stress for the survey respondents and their families (e.g., Desjarlais et al., 1995; Mirowsky & Ross, 1999; WHO, 2001).

The analysis confirmed that financial hardship was associated with depression. Wave 2 hardship was more strongly associated with depression caseness at wave 2 than any of the other measures of socio-economic position including educational attainment, unemployment, childhood poverty, housing tenure and prior financial difficulty. Current financial hardship remained independently associated with depression after controlling for demographic characteristics, measures of socio-economic position, and prior depression symptoms. By contrast, the effect of wave 1 financial difficulty was explained by the inclusion of baseline depression symptoms.

We found no evidence that the relationship between hardship and depression varied with age. The consistency in the effect of hardship across age groups differs from an earlier study (Mirowsky & Ross, 2001; though see Weich & Lewis, 1998b). This could reflect the use of different measures of hardship and depression, or the different sampling methods and populations. Given the narrow-cohort design of the PATH study, the oldest respondents in the current analysis were aged 68 years. The moderating effect of age may not be linear and may only be evident for the oldest old. Alternatively, the current results may be due to cohort differences as the Mirowsky and Ross study was conducted approximately 10 years prior to the PATH study. The moderating effect of age may reflect the specific experiences of an older cohort who personally experienced the deprivation associated with the Great Depression. We acknowledge that the cohort design of the current study does not provide for a comprehensive test of age differences in the effect of hardship and further investigation is warranted.

The primary goal of this study was to examine temporal aspects of the association between hardship and depression as the different analytic approaches that have been used in the literature have produced results that are difficult to reconcile. Some researchers (Skapinakis et al., 2006; Weich & Lewis, 1998a) have reported that baseline hardship is more strongly associated with the maintenance of mental disorders (i.e., evident amongst respondents with disorders at baseline) than the onset of a new episode of mental illness (those respondents without disorder at baseline). Other longitudinal research has suggested that it is the contemporaneous relationship between hardship and depression that is most important and that the association between hardship and depression declines as the interval between measurement increases (Lorant et al., 2007; Mirowsky & Ross, 2001). On this issue we found that the association between wave 2 hardship and wave 2 depression was greater than that between wave 1 financial difficulty and wave 2 depression, and that persistent and recent hardships were more strongly associated with depression than resolved hardship. The predictive power of wave 1 hardship (financial difficulty in this analysis) was largely explained by the inclusion of baseline depression symptoms. However, it may be that controlling for baseline mental illness overadjusted for the effect of hardship. That is, to the extent that baseline hardship is associated with baseline depression, approaches which control for prior depression may adjust out the effects of prior hardship (see discussion in Skapinakis et al., 2006). In fact, controlling for prior depression symptoms may eliminate or reduce the effects of a range of stable characteristics and thereby limit the ability to interpret between-person differences in socio-economic circumstances.

We did find some evidence of an effect of wave 1 financial difficulties on wave 2 depression. Compared to those who reported no financial difficulty/hardship at either wave, respondents who only experienced financial difficulty at wave 1 did have an elevated risk of depression at wave 2, though this effect was much less than that of current hardship. It may be that this reflects an underlying vulnerability, perhaps tied to less secure employment. We also demonstrated, albeit weakly, that the relationship between financial hardship and depression was dependent upon earlier depression status. The experience of hardship at wave 2 was more strongly associated with current depression for those respondents who were not depressed at wave 1 than for those respondents who were identified with depression at baseline. We do not want to over interpret this finding as the difference was marginal but it does support the possible role of hardship in the onset of depression. However, the long interval (four years) between measurement occasions limits the conclusions we can draw about the continuity of depressive symptoms between waves or the timing of the onset of depression and hardship during the previous four years (see Skapinakis et al., 2006). The current results do provide a contrast to recent UK studies (Skapinakis et al., 2006; Weich & Lewis, 1998a) which concluded that hardship was associated with the maintenance of depression. We found that the experience of financial difficulties at wave 1 was not independently associated with wave 2 depression for those who were cases or non-cases at wave 1. The apparent discrepancy between previous and current findings may reflect methodological and analytic differences. The previous studies employed an epidemiological approach which examined the effect of exposure (i.e., financial hardship) on a subsequent depression and did not evaluate the role of current hardship. It may be, given the shorter interval between measurement occasions in these studies (12 and 18 months), that wave 1 hardship was more strongly associated with wave 2 hardship (i.e., reflecting continuity in financial circumstances over time). In the current study, we not only controlled for current financial hardship but also the longer time interval may have reduced the continuity in individual

circumstances. Further, when considered another way, the previous evidence of an association between wave 1 hardship and the maintenance of depression from wave 1 to wave 2 also provides an indication of the strength of the contemporaneous relationship between wave 1 hardship and wave 1 depression. On the whole, therefore, we consider that the body of evidence supports the importance of the contemporaneous relationship between hardship and depression, the serious adverse personal and psychological effects of deprivation, and the possible role of hardship in aetiology of depression. In evaluating the effect of exposure to financial hardship, the interval between survey occasions is likely to be critical and research is needed using a shorter time interval. We also consider that further longitudinal analysis, including explicit comparison of within- and between-person effects of socio-economic circumstances (including hardship), is necessary to progress research in this area and provide insight into the relative importance of long-term, cumulative, enduring and time-varying socio-economic circumstances on mental health (e.g., Lynch, Kaplan, & Shema, 1997; Muntaner et al., 2004; Power et al., 2002; Pudrovska et al., 2005).

We contend that hardship measures have significant benefits over the use of income or poverty measures as an indicator of exclusion. Income is notoriously difficult to measure as it may be derived from multiple sources, embraces contributions and dependencies of multiple household members, requires assumptions about resource sharing among household members, may be subject to inaccuracy in reporting, and reluctance to disclose in interviews. Similarly, income and poverty measures ignore the role of other potentially buffering resources including economic factors such as wealth, assets, and credit and non-economic resources such as support from family members (Krieger et al., 1997; Whelan et al., 2001). Hardship measures also seek to ensure that the absence of goods or opportunities is due to a lack of resources rather than a reflection of personal taste or preferences. The measure of hardship in the current study was similar to Whelan's (1993) primary deprivation and Mirowsky and Ross' (2001) economic hardship in that it focused upon basic necessities. It is interesting that, of the individual hardship items, the strongest association with depression was evident for food insecurity and heating. These items may index more fundamental aspects of deprivation and may be associated with a greater sense of hopelessness and lack of control (e.g., Pearlin, Lieberman, Menaghan, & Mullan, 1981). Financial difficulty was more prevalent than financial hardship (21.1% vs 7.5%), particularly in the oldest cohort. This is likely to reflect the more subjective nature of the financial difficulty item, which was based on self-assessment and comparison of financial circumstances whereas the hardship items specifically measured the impact of a lack of resources.

The study had several limitations. Most obviously, we utilised different measures of hardship at each survey occasion and this may have introduced error in the measurement of this key construct. However, each measure was strongly associated with depression, they were strongly interrelated, and they each demonstrated a relatively consistent demographic profile. Another limitation is that, while the measure of depression was drawn from a widely used and validated instrument, it was a self-completion measure and clinical interview represents the gold standard (see Lorant et al., 2007; Skapinakis et al., 2006; Weich & Lewis, 1998b). The use of the GDS, a screening instrument, may have identified respondents who reported depressive symptoms but would not have been classified with depression through a clinical interview and therefore introduced another form of measurement bias. The use of the GDS in this study, therefore, may have weakened the observed association between social disadvantage and depression (Lorant et al., 2007; Weich & Lewis, 1998b). We recommend greater

focus and comparison of dimensional and categorical depression measures in future research. It is also important to recognise the timing of the measurement occasions and the long interval between survey waves. As discussed, it cannot be argued with any certainty that consistency in depression status at both waves represents continuity or maintenance of a single episode rather than distinct episodes. Conversely, respondents may have developed and recovered from an episode between waves, and yet for this analysis be considered consistently free of depression. Skapinakis et al. (2006) argued that limitations such as this could have introduced selection and measurement bias in their study, without being certain of the direction of this bias. This is even more likely to be the case with the current study given the longer interval between waves. Further, we did not consider lifetime or history of depression prior to the study period and therefore cannot rule out social selection as an explanation. Selection bias and attrition may also limit the generality of the findings and have led to an underestimate of the strength of the effect of hardship. However, we used a range of analytic techniques to correct for such biases. Finally, the measure of hardship may be a proxy for other significant life events, such as divorce, relationship dissolution, or job loss/redundancy and, therefore, caution is needed in inferring causal relationships.

The general consistency in the patterning of depression and hardship across age and gender provides prima facie evidence of a potentially important relationship. Mirowsky and Ross (1999) are amongst those, for example, who have proposed that the experience of hardship explains the socio-economic gradient in health. The results here suggest that hardship may have an important role in the development of depression and may explain much of the effect of social position. This supports the relevance of social policy interventions to efforts to promote mental health (e.g., Jenkins, 2001) as hardship may be more readily addressed by policy changes than other risk factors (Lorant et al., 2007; Muntaner et al., 2004).

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