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The role of financial hardship, mastery and social support in the association between employment status and depression: Results from a longitudinal cohort study

Running head: Employment status and depression

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Abstract

Objective: There is robust epidemiological and clinical evidence of the harmful effects of unemployment on psychological wellbeing, but the mechanisms through which this occurs is still strongly debated. In addition, there is even less evidence on the impact of underemployment on mental health. Utilising longitudinal data collected from a cohort of 20 – 24 year olds, the present study examines a range of employed states and investigates the role of mastery, financial hardship and social support in the relationship between labour status and depression.

Method: Responses were from the PATH Through Life Project: A representative, community based survey conducted in Canberra and Queanbeyan (NSW) in Australia, where respondents (n = 2,389) in the early twenties were followed for eight years. Depression was measured using the self-report Goldberg Depression Scale.

Results: The analyses identified unemployment and underemployment as significant predictors of depression, compared to their employed counterparts. Both unemployment and underemployment remained significantly correlated with depression even after accounting for socio-demographic, economic and psychological variables. Social support, financial hardship and a sense of personal control (mastery) all emerged as important mediators between unemployment and depression.

Conclusion: Both unemployment and underemployment were associated with increased risk of depression. The strength of this relationship was attenuated but remained significant after accounting for key variables (mastery, financial hardship and social support) and extensive socio-demographic and health covariates, indicating that no or inadequate employment contributes to poorer mental health over and above these factors.

Keywords

Unemployment, depression, financial hardship, epidemiology, mastery

Strengths and Limitations:

- Use of large longitudinal cohort data with a high response rate.
- The data allowed for the analysis of the independent effects of employment status and depression after controlling for sociodemographic and health factors.
- The limitations were as follows: Self-reported health and mental health measures; different measures of financial hardship/difficulty utilized in wave 1; the findings come from a community sample and require further research to confirm the generalizability for a national sample; lack of data on duration of un/under-employment.

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Introduction

Understanding the relationship between social factors and mental health has long been of interest for mental health service providers and, social and economic policy. It has been well established that those who are not employed, or those who are unable obtain “good quality” employment, are at significantly higher risk for poorer mental and physical health [1-5]. Research has identified a number of pathways through which unemployment may be related to poorer mental health outcomes, including a disruption to daily routine, lower self-esteem, adoption of health-threatening coping behaviours, and a higher level of stress [6]. This has been further clarified through the identification of the protective mechanisms inherent in obtaining gainful employment. Employment fulfils material and psychological needs such as financial security, social inclusion, and encourages regular social and mental activity [7]. However, recent literature has also highlighted that jobs that are perceived as unsatisfying, stressful and offer little autonomy do not always protect physical and mental health, and have been associated with comparable health outcomes as unemployment [8, 9].

Theory and research evidence suggests that the effects of unemployment on depressive symptomatology may be mediated by financial hardship and the related psychological experience of poor personal control over one’s life [4, 10]. The focus of this paper is to investigate the extent that financial hardship and a sense of personal control may mediate the relationship between employment status and depression, after taking into account other relevant social and physical factors [11]. Of particular interest is to compare the experience of underemployment and unemployment with the fulltime employment, not just between groups but also considering within-person change. Research thus far has demonstrated that underemployment is typically associated with lower levels of health and wellbeing [12-14]. Therefore, failure to account for this group could lead to an underestimation of the harmful effects seen in inadequate employment settings, or could fail

1
2
3 to identify what might be some of the beneficial effects of even minimal employment
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5 compared to no employment at all.
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8 Financial loss is an inevitable outcome of unemployment [15]. Measures of financial
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10 hardship or deprivation usually assess whether people are unable to provide basic necessities
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12 for themselves, their family or other dependents due to a lack of resources [1, 16]. Over a
13
14 seven year period, Lorant and colleagues (2007) showed that subjective financial strain and
15
16 high scores on the deprivation index were associated with increases in both depressive
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18 symptoms and incidence of major depression across annual waves. The study found that
19
20 changes in income or employment were less strongly associated with changes in depressive
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22 symptoms or major depression than poverty and hardship measures [17]. These findings have
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24 been demonstrated amongst other groups, including: families [18], adults [19, 20], single
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26 mothers [21, 22] and among young unemployed persons [23]. Financial hardship is thus
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28 considered to be one of the main pathways through which employment status affects
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30 depression.
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34 This is consistent with the neo-material perspective, which argues that indices of
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36 deprivation such as owning a car or a house should be incorporated into research on the
37
38 social epidemiology of psychiatric disorders [11]. Neo-material scholars argue that it is the
39
40 material risk and lack of protective factors linked to poverty – such as, poor housing, poor
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42 diet, drugs, environmental and workplace hazards, lack of access to healthcare – that
43
44 determine most social inequalities in health [11, 24]. In contrast, the psychosocial theoretical
45
46 perspective argues that financial hardship affects overall mental health through undermining
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48 an individual's sense of mastery, which in turn renders an individual more vulnerable
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50 depression [25, 26]. This psychological approach emphasizes individuals' perceptions of
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52 relative standing in income distribution and perceived stress to explain the social gradient in
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54 mental health [11, 24].
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Mastery is commonly used as a measure of control, defined Pearlin and Schooler (1979) as the perception that events are under one's own personal control, rather than under the control of external forces. Financial hardship or strain is typically considered to contribute to low mastery through providing a sense that there is great difficulty in changing circumstances in major domains of life [27], as well as actual control over one's life (i.e. choice over what neighbourhood to live in or payment of medical treatment) [28]. It is thus hypothesized that that lower socioeconomic status imbues an individual with a sense that they experience relative disadvantage [25, 28]. However, not all individuals who are exposed to stressors or financial hardship experience deterioration in physical and psychological functioning [29, 30]. Research has shown that a sense of mastery can both directly reduce psychological distress and can also act as a buffer against deleterious effects of stressful life events [31, 32], such as poor physical health [32]; and economic hardship [31, 32].

Similarly, high levels social support are also thought to 'buffer' or mitigate the effects of stressful life events on mental health [33]. Unemployed individuals who experience greater social connectedness may perceive unemployed induced stressors to be more manageable, protecting declines in mental health [34]. Though social support might attenuate the effects of stress and financial hardship on mental health, those who are of low socio-economic status or who are unemployed typically report lower social support levels [35, 36]. Furthermore, research has demonstrated that not only does social support confer resilience to stress, but that unemployment stress is actually exacerbated by low levels of social support [37]

The current study seeks to explore the relationship between employment circumstances and mental health in one cohort followed across eight years and three waves of data collection. Compared with much of the previous research in this area, this study will incorporate a category of "underemployment" in addition to unemployment, and those who are "Not in the labour force" (NILF), and an employed category. Specifically, the study seeks

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2
3 to measure the extent to which a sense of mastery, financial hardship and social support
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5 mediate the relationship between employment status and depression, after taking into account
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7 potential confounding socio-demographic and health factors.
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9 10 **Method**

11 12 *Data source and sample*

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14 The data used for this analysis are from the Personality and Total Health (PATH)
15
16 Through Life Project. PATH follows three cohorts of respondents from Canberra and the
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18 neighbouring town of Queanbeyan (initial interviews conducted between 1999 and 2001),
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20 and assesses the health and wellbeing. The sampling frame was the electoral roll (registration
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22 on the electoral roll is compulsory for Australian citizens), with the initial participation rate
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24 was 56.6%. The current study is restricted to the youngest PATH cohort (birth years: 1975 –
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26 1979) who were aged 20 to 24 years at the initial interview. This resulted in a total possible
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28 sample of 2404 participants. Three waves of data were collected with 4 year intervals
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30 between intervals, and were interviewed over 1 year; all respondents were sent a letter
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32 outlining the purpose of the research and, if they were willing to participate, they were then
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34 interviewed by a professionally trained interviewer. The wave to wave response rate for this
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36 sample at each wave of subsequent data collection was 89% (Wave 2) and 82% (Wave 3).
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38 Participants who did not respond at one wave may still return for a later wave. The Human
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40 Research Ethics Committee of The Australian National University approved the study
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42 protocol. The survey was conducted by highly trained professional interviewers. Further
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44 details of the survey included the sampling procedure are reported elsewhere (Anstey et al.,
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46 2011).
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51 52 *Survey Procedure*

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54 Participants completed the questionnaire on a laptop computer. An interviewer took each
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56 participant through the first set of questions, demonstrating how to enter responses into the
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3 personal computer. The interviewer conducted the physical and cognitive tests. The
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5 components of the questionnaire relevant to the present study are outlined below. Unless
6
7 stated otherwise, measures were collected at each wave.
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9 10 *Measures*

11 12 ▪ Depression

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14 The outcome measure analysed in this study was the Goldberg Depression Scale
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16 (Goldberg et al. 1988), a nine-item scale measuring experience of a particular symptom of
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18 depression (e.g., loss of weight, lack of energy) in the prior four weeks. Total scores for
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20 depression are calculated by summing the number of items endorsed providing a continuous
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22 score of 0 to 9. This total was dichotomized so that a score of seven or greater indicated the
23
24 presence of likely depression (1), and below seven represented no depression (0). The
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26 Goldberg Depression Scales has been previously validated for detecting depression caseness
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28 [38].
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30 31 32 ▪ Mastery, Financial Hardship/Difficulty and Social Support

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34 Mastery was measured by Pearlin's Mastery Scale (Pearlin & Schooler, 1978), which
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36 is a seven-item scale used to assess the degree to which individual's believe that their life is
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38 under their control by indicating the degree to which they agree or disagree with statements
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40 such as 'There is really no way I can solve problems I have' or, 'I have little control over the
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42 things that happen to me.' Scores range from 7 to 28, with higher scores indicating higher
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44 mastery. Although a cut-off point has not been established, generally, a score of 21 or less
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46 indicates the likelihood that one perceives that their life is directed by forces outside of their
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48 control [39]. Therefore this measure was dichotomised accordingly.
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52 Financial hardship assessed four core components of objective deprivation drawn
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54 from the Australian Household Expenditure Survey (Australian Bureau of Statistics, 2012).
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56 The questions pertaining to financial strain asked participants the following: Over the past
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3 year have the following happened to you because you were short of money – 1) pawned or
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5 sold something 2) went without meals, 3) unable to heat home, d) asked for help from
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7 welfare/community organisations. Participants endorsing one or more of these items were
8
9 categorised as experiencing financial strain. The hardship items were not included in Wave 1,
10
11 instead a measure of financial difficulty was utilized which asked participants if they had
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13 gone without things they really needed in the last year because they were short of money.
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15 Participants who answered “yes, sometimes” and “yes often” were categorised as
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17 experiencing financial strain. While this does not constitute an objective measure of
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19 deprivation, it allows comparison of the association of depression with financial
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21 circumstances.
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25 Finally, a social support measure that assessed the level of positive social supports
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27 from friends and family (high versus low) and conflict from friends and family (high versus
28
29 low) was included. These interactions were assessed using two sets of five items, each
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31 applied to both friend and family relationships (Schuster, Kessler & Aseltine, 1990). These
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33 measures were dichotomized at the 50th percentile, with the bottom 50% representing low
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35 positive social support and the top 50% representing high positive social support from family
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37 and friends, and the reverse for negative social support – the bottom 50% representing high
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39 conflict and the top 50% representing low conflict.
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43 ▪ Employment status and covariates
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45 Based on participants’ reports, employment status was categorised as ‘fulltime/part-
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47 time employed’, ‘part-time employed but looking for full-time employment’, ‘unemployed’
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49 and, ‘not in the labour force’ (NILF). Other demographic, social and physical measures that
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51 were utilized as covariates for the analyses included: gender, age, years of education,
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53 marital/partner status, any dependent children, physical health and social support (friends and
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55 family). Marital status was categorised into ‘cohabiting relationship’, i.e. married or defacto,
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3 'divorced/separated/widowed' and 'never married'. Education was categorised into 'finished
4 Year 12' and 'not finished Year 12'. Participants were categorised into "have at least one
5 dependent child" and "no children". Physical health was measured using the 12-Item Short
6 Form Health Survey [SF-12; 40] , with higher scores indicating better health.
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10 11 *Statistical analyses*

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14 Descriptive statistics of the socio-demographic and economic circumstances of the
15 respondents were calculated by gender and age (Table 1). Simple logistic regression was then
16 utilized to assess the association of depression with the demographic and socio-economic
17 characteristics (Table 2). Eight separate longitudinal random intercept multivariable logistic
18 regression models were used to examine predictors of depression for individuals who were
19 unemployed, PTLFT, NILF and employed. Moderating variables included social support,
20 financial hardship/deprivation and a sense of personal control. Covariates included age,
21 gender, marital status, physical health, and dependent children (Table 3). Finally, the
22 'explained fraction' approach (Whitehead et al., 2000) was used to calculate the proportion of
23 the relationship between employment status and depression that was explained by important
24 mediating variables (i.e. financial hardship, mastery, social support and the socio-
25 demographic variables). Table 4 shows the percent reduction in odds ratios for employment
26 status (comparing models 4, 5, 6 and 8 with model 3), which is calculated by contrasting the
27 OR before (ORa) and after (ORb) the addition of the mediating variables by applying the
28 following formula: $(ORa-1) - (ORb-1)/(ORa-1)$.
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48 Missing data for most of the items examined in this analysis were minimal. Most
49 participants (n = 6521) had complete data at both baseline and follow-up. In wave 2, 265
50 participants (11%) had dropped out of the survey, and 426 participants (17%) had dropped
51 out by wave 3. Cases were with minimal data were minimal (ranging from 0 to 1.1% for
52 individual items). The statistical models used all available data; those with missing data were
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3 excluded. Previous sensitivity analysis conducted on the data by Butterworth et al. (2009)
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5 showed that attrition was not independently associated with depression, but was associated
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7 with being male, not participating in the labour force (although not unemployment), poorer
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9 physical functioning, lower levels of educational attainment and not having a spouse/partner.
10

11 **Results**

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13
14 Table 1 presents descriptive data on the respondents across wave 1, 2 and 3 by gender. As
15
16 expected, unemployment rates were highest at wave 1 (ages 20-24 years) and declined across
17
18 the following two waves (ages 24-28 and 28-32 years). Table 2 demonstrated the univariate
19
20 relationships between the measure of depression and a number of socio-demographic,
21
22 economic and psychological measures. Around a fifth of respondents who were unemployed
23
24 were classified as being depressed, compared to only 9% of those who were employed. The
25
26 prevalence of depression amongst the “underemployed” was also nearly double of the
27
28 prevalence rates of those who were employed at 17%. The odds ratios for both
29
30 unemployment and PTLFT indicated a greater likelihood of depression (OR = 2.35; OR =
31
32 1.80) compared to employed. Experiencing financial hardship (OR = 2.50) and a low sense of
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34 mastery (OR = 5.82) each demonstrated a strong association with depression
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39 Table 3 presents a series of separate multivariate logistic regression models conducted to
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41 examine the association between employment circumstance and depression, while controlling
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43 for a number of demographic, physical health, socio-economic and psychological variables.
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46 Model 1 demonstrated that the association between unemployment and depression
47
48 remained significant (OR = 2.40) after controlling for gender. There was also an association
49
50 between PTLFT and depression (OR = 1.79). In model 2, when age is incorporated into the
51
52 model, the odds ratios of both unemployment and PTLFT work increased (OR = 2.49; OR =
53
54 1.89). Model 3 demonstrates that this association between unemployment and depression
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56 (OR = 2.13), and PTLFT and depression (OR = 1.75), remained significant after controlling
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3 for all the covariates. In addition to the experience of unemployment and PTLFT
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5 employment, being separated/divorced or never being married, lower physical function, not
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7 having finished Year 12, aged 24 – 28 years, and being female all showed an independent
8
9 association with depression.

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11 The next three models consider the role of key explanatory covariates. Model 4 included
12
13 the social support measures (family and friends). These measures did not appear to impact the
14
15 association between PTLFT employment and depression which remained significant at (OR =
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17 1.75), while the association between unemployment and depression decreased but remained
18
19 significant (OR = 1.91). Low positive family, low positive friend, and high negative friend
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21 support were all associated with increased odds of having depression.
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25 Model 5 included a measure of financial hardship, which was associated with over double
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27 the odds of depression (OR = 2.17). After controlling for financial difficulty, the odds ratio
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29 between unemployment and depression, and between PTLFT employment and depression,
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31 decreased but both remained significant (OR = 1.88; OR = 1.62). Model 6 incorporated
32
33 Pearlin's measure of Mastery. After controlling for sense of mastery, the association between
34
35 unemployment and depression decreased but remained significant (OR = 1.80). Similar to
36
37 Model 4, accounting for the measure of mastery did not impact the association of depression
38
39 with PTLFT (OR = 1.73). In Model 7, both mastery and financial hardship were included in
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41 the model. This saw a further reduction in the odds ratio between depression and
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43 unemployment (OR = 1.64) and between depression and PTLFT (OR = 1.60).
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47 Model 8 incorporated all the variables. The odds of depression when unemployed
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49 decreased further (OR = 1.55) when compared to being employed, while the association
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51 between depression and PTLFT did not change significantly. Having a low sense of personal
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53 control over one's life showed the highest odds of depression.
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3 Finally, Table 4 quantifies the change in odds ratios for the unemployed and PTLFT
4 work, following the addition of key mediating variables. For example, the explained fraction
5 showed 51% of the difference between unemployed and employed individuals in the
6 prevalence of depression was explained by the socio-demographic, social support, mastery
7 and financial hardship measures, compared to only 21% of the explained fraction of
8 difference between PTLFT and employed individuals. Considered separately, the inclusion of
9 financial hardship accounted for 28% and 17% of the association of depression with
10 unemployment and PTLFT work respectively. While the mastery and social support
11 measures also mediated the relationship between unemployment and depression, they did not
12 account for much of the association between PTLFT and depression.
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25 Discussion

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27 This study examined employment status and its association with depression in one
28 cohort from the PATH study across three waves, taking into account both unemployed and
29 “underemployment”. While this study did not directly seek to evaluate the psychological
30 theories of unemployment, it did assess two key factors thought to mediate the effects of
31 employment status: a sense of personal control and financial hardship. The multivariate
32 logistic regression confirmed that both under-employment and unemployment were
33 associated with increased risk of depression compared to being employed after controlling for
34 all other measures, including educational attainment, marital status, dependent children, and
35 gender. A key finding of this study was the increased risk of depression that under-
36 employment has, which supports previous research [13]. However, the odds of depression for
37 the PTLFT compared to the employed group remained largely unaffected by the inclusion of
38 covariates across the different models, except for age and financial hardship. After
39 accounting for all variables the odds of depression for underemployment (OR = 1.59) was
40 comparable to the odds of depression for the unemployment (OR = 1.55).
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3 Another key study finding is that social support, financial hardship and a sense of
4 personal control are all important determinants of the association between unemployment and
5 depression. This provides support for the impact of both manifest and latent benefits of work
6 for mental health. The increased risk of financial hardship and deprivation is a salient
7 characteristic in the experience of unemployment. Perhaps this reflects the effect of absolute
8 poverty, but perhaps a more likely explanation is the inability to participate in the generally
9 accepted standards of society [15]. Therefore, hardship can be conceptualised as analogous to
10 psychological aspects of unemployment, especially related to a reduced sense of personal
11 control over one's future and perceived opportunities. The association between
12 unemployment and depression was also moderated by levels of support from family and
13 friends. Social support may be influential in affecting how unemployed people react to their
14 situation and their capacity to deal with it, in providing a 'buffer' from the negative effects of
15 unemployment [41]. However, it may also indicate a loss of social connection through the
16 workplace and the importance of maintaining social connection/inclusion for those who are
17 out of the workforce.

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36 While the PTLFT group also showed poorer mental health than those otherwise
37 employed, the current findings showed a distinct set of moderating factors. Importantly, these
38 results also lend support for the distinction between latent and manifest benefits of work. It
39 could be argued that even inadequate levels of employment participation may nonetheless
40 provide individuals with some of these benefits. The evidence that social support and a sense
41 of personal control were not important mediators in the association between PTLFT status
42 and depression supports this argument. In contrast, hardship was identified as a significant
43 mediator of this association, suggesting that the inadequate remuneration associated with
44 underemployment is a determinant of the poorer mental health of those who are seeking
45 increased working hours. These findings do require further investigation in the context of our
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3 previous research showing poor quality work may be associated with poorer mental health
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5 than unemployment [8].
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7 *Strengths and Limitations*

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10 There are a number of strengths associated with this study and the use of the PATH
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12 dataset. The large sample size, random selection from the population, and longitudinal design
13
14 contribute to the high statistical power and limited sampling bias [42]. Furthermore, the
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16 prospective longitudinal design following respondents, initially aged in their early 20s over 8
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18 years, allowed the analyses to consider age differences within the same cohort. However, this
19
20 study has a number of limitations. Most notably were the different measures used for
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22 financial hardship, whereby the measure for the first wave was a subjective measure of
23
24 financial difficulty, and the measure for the second and third wave sought to provide a more
25
26 objective measure of hardship. As per the study conducted by Butterworth and colleagues
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28 (2009) using these different measures, each was strongly associated with depression, were
29
30 strongly interrelated, and did not differ significantly in prevalence rates. Another potential
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32 limitation was the use of “part-time employed, looking for full-time work” as a marker of
33
34 underemployment. Without further information around hours, quality and stability of the
35
36 part-time work the respondents in this group may be quite heterogeneous in terms of social
37
38 and economic circumstances. This is beyond the scope of the current project, but is an
39
40 important topic for future research. Finally, another potential limitation is that participants
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42 drawn from the Canberra/Queanbeyan region may not be representative of the broader
43
44 Australian population due to relatively higher levels of educational attainment and higher
45
46 socio-economic status. Therefore it is important that this research is replicated at a national
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48 level.
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52 *Implications for policy and practice*

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These findings sit within the broader research field in seeking to understand the mechanisms through which employment status contributes to mental health outcomes, and has clinical and social policy relevance. In the face of unemployment and financial hardship, having a low sense of mastery is likely to strongly increase the odds of developing depression in comparison to those individuals who are able to maintain a sense of personal control over their life [4, 43, 44]. Those with a high sense of mastery, may be able to adopt positive coping strategies, such as focusing on the employment situation that is amenable to change, or implementing a problem-solving approach [43, 45]. Policy and clinical programs that seek to encourage social inclusion and workforce participation should focus on providing experiences for mastery, as well as access to social relationships, which are both seemingly constrained when facing unemployment (Heckhausen et al., 2010). The findings support the continuation of interventions to assist people with mental health problems to find and sustain employment, but they also suggests that a focus is on underemployment is needed to prevent mental health problems.

Conclusion

This study shows that the effects of unemployment and underemployment on depression are not completely explained by socio-demographic, -economic and psychosocial factors. There is something unique about the experience of inadequate employment that contributes to poorer mental health over and above financial hardship and a loss of personal control over one's life. However, it should also be noted that unemployment does not automatically equate with poor mental health. Rather, unemployment in comparison to employment increases the risk of experiencing the conditions that contribute and perpetuate psychological distress, i.e. relative poverty, financial stress, loss of personal control and autonomy, poor social support. In order to apply this research on a national level, these results need to be replicated using longitudinal data collected from all around Australia.

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3 Further research should consider the effect that protracted unemployed periods might have on
4 an individual's mental health, and how mastery and financial hardship might moderate this
5 experience. Looking specifically at welfare receipt and the job search experience may also
6 elucidate some of the unique experiences that contribute to the poor mental health of the
7 unemployed. However, it is clear that research needs to recognise the heterogeneous effects
8 of different types of inadequate employment. Research should seek to more comprehensively
9 define employment states, such underemployment and length of time an individual is
10 unemployed, to fully understand the role that employment can play in protecting or reducing
11 an individual's mental health.
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23
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27
28
29

30 **Contributors**

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32 LC and PB were both involved in the conception and design of the study. LC conducted the primary statistical
33 analysis and drafted the manuscript, under the supervision of PB. PB provided statistical expertise and revision
34 of the manuscript. Both approve and take responsibility for the final manuscript.
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45 **Competing Interests**

46
47 None declared
48

49 **Data Sharing**

50
51 Data for the study is from the PATH Through Life 20s cohort. Further information including a list of
52 publications is available at <http://crahw.anu.edu.au/research/projects/personality-total-health-path-through-life>.
53
54 There is no open access to the data set, but strategic collaborations are welcome and contact information is
55 available on the website for interested parties to learn more about formal application procedures.
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Table 1. Descriptive statistics reporting health, socio-economic, demographic and psychosocial characteristics of respondents across the three waves.

	Wave 1 (20–		Wave 2 (24–		Wave 3 (28–	
	24yrs)		28yrs)		32yrs)	
	Male	Female	Male	Female	Male	Female
<i>N</i>	1162	1242	1013	1126	920	1058
Employment status (%)						
- Employed	81.24	79.22	89.72	84.07	94.35	85.35
- Unemployed	6.74	5.11	4.25	2.58	2.28	1.80
- PT looking FT	4.58	4.79	2.08	1.69	.43	.95
- NILF	7.43	10.88	3.95	11.65	2.93	11.91
Marital status (%)						
- Married	18.58	27.84	22.04	30.19	42.61	48.25
- Never married	81.16	70.45	76.19	65.98	52.07	46.83
- Divorced/Separated/Widowed	.26	1.70	1.78	3.83	5.33	4.92
Education (%)						
- Did not finish Year 12	7.78	7.39	5.64	5.35	4.35	4.84
Dependent Children (%)						
- Have dependent children	6.23	13.88	15.91	26.27	36.41	46.50
Physical health						
- RAND SF12 (mean score & sd)	52.31 (6.5)	50.81 (7.2)	52.36 (6.1)	50.66 (7.6)	51.8 (6.5)	50.3 (8.2)
Financial Difficulty (%)						

1	- Facing financial difficulty	24.35	30.24	15.61	13.02	7.74	9.11
2							
3	sometimes or often (w1),						
4							
5	experience hardship (w2 +						
6							
7	w3) ^s						
8							
9							
10							
11	Mastery (%)						
12							
13	- Low sense of mastery score	33.94	40.86	35.98	41.29	35.56	38.18
14							
15	(Pearlin's scale)						
16							
17							
18	Depression (%)						
19							
20	- High score (indicating	7.19	12.27	9.80	12.15	8.92	10.98
21							
22	clinical depression)						
23							
24							

^sw1 = wave1, w2 = wave 2, w3 = wave 3

Table 2. Prevalence of depression and univariate relationship between depression and various socio-economic, demographic and psychological measures.

	Current Depression (%)	Univariate Odds ratio (95% CI)
Employment status		
- Employed	9	
- Unemployed	21	2.35 (1.71 – 2.72)
- PT looking FT	17	1.80 (1.20 – 2.72)
- NILF	17	1.74 (1.35 – 2.23)
Gender		
- Male	9	
- Female	12	1.44 (1.18 – 1.75)
Marital status		
- Married	8	
- Never married	11	1.37 (1.13 – 1.67)
- Divorced/Separated/Widowed	23	3.14 (2.14 – 4.60)
Education		
- Finished Year 12	10	
- Did not finish Year 12	18	1.92 (1.41 – 2.63)
Dependent Children		
- No children	10	
- Have dependent Children	12	1.15 (.95 – 1.39)
Physical health		
- RAND SF12		.91 (.91 – .93)
Financial Difficulty/Hardship		

1	-	No	8	
2				
3	-	Yes	21	2.50 (2.08 – 2.98)
4				
5				
6				
7		Mastery		
8	-	High	4	
9				
10	-	Low	21	5.82 (4.79 – 7.06)
11				
12				
13				
14		Social support friends (positive)		
15	-	Low	14	2.06 (1.75 – 2.44)
16				
17	-	High	7	
18				
19				
20		Social support family (positive)		
21	-	Low	16	2.06 (1.74 – 2.45)
22				
23	-	High	8	
24				
25				
26				
27		Social support friends (conflict)		
28	-	Low	7	
29				
30	-	High	12	1.64 (1.36 – 1.98)
31				
32				
33		Social support family (conflict)		
34	-	Low	7	
35				
36	-	High	12	1.63 (1.36 – 1.95)
37				
38				
39				
40				
41		Age/Wave		
42	-	Wave 1 (20-24yrs)	10	
43				
44	-	Wave 2 (24-28yrs)	11	1.15 (.97 – 1.38)
45				
46	-	Wave 3 (28-32yrs)	10	1.05 (.88 – 1.25)
47				
48				
49				

Table 3. Results of a multivariable logistic regression analyses for predictors of depression

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Labour-force status								
(reference: employed)								
<i>Part-time looking for full-time work</i>	1.79 (1.19 – 2.70)	1.89 (1.25 – 2.87)	1.75 (1.13 – 2.70)	1.75 (1.12 – 2.74)	1.62 (1.04 – 2.52)	1.73 (1.10 – 2.71)	1.60 (1.01 – 2.53)	1.59 (1.00 – 2.53)
<i>Unemployed</i>	2.40 (1.74 – 3.32)	2.49 (1.80 – 3.62)	2.13 (1.50 – 3.00)	1.91 (1.34 – 2.72)	1.88 (1.32 – 2.68)	1.80 (1.25 – 2.88)	1.64 (1.14 – 2.38)	1.55 (1.06 – 2.25)
<i>NILF</i>	1.65 (1.29 – 2.13)	1.67 (1.30 – 2.14)	1.25 (.95 – 1.66)	1.23 (.92 – 1.64)	1.13 (.85 – 1.52)	1.16 (.86 – 1.55)	1.06 (.79 – 1.44)	1.06 (.78 – 1.44)
Gender (men reference)	1.42 (1.16 – 1.73)	1.41 (1.16 – 1.72)	1.28 (1.05 – 1.56)	1.54 (1.27 – 1.88)	1.30 (1.06 – 1.52)	1.22 (.99 – 1.49)	1.24 (1.00 – 1.52)	1.39 (1.13 – 1.71)
Age (reference: 20 – 24 yrs)								
<i>Age 24 – 28 years</i>		1.22 (1.02 – 1.44)	1.20 (1.00 – 1.45)	1.24 (1.02 – 1.52)	1.37 (1.13 – 1.66)	1.22 (1.00 – 1.48)	1.37 (1.12 – 1.69)	1.40 (1.13 – 1.73)
<i>Age 28 – 32 years</i>		1.13 (.94 – 1.35)	1.04 (.85 – 1.24)	1.01 (.88 – 1.36)	1.26 (1.01 – 1.56)	1.06 (.86 – 1.33)	1.26 (1.00 – 1.59)	1.28 (1.01 – 1.62)

1		1.08		1.11	1.05	1.06
2		1.70 (.85	.99 (.78			
3	Dependent children	(.84 –	(.86 -	(.81 -	(.82 -	
4		- 1.29)	- 1.28)			
5		1.39)	1.43)	1.35)	1.36)	
6						
7						
8	Marital Status					
9	(partner/spouse					
10	reference)					
11						
12						
13						
14						
15		1.47	1.45	1.43	1.46	1.41
16	<i>Never Married</i>	(1.18 -	(1.16 –	(1.14 -	(1.16 -	(1.12 -
17		1.84)	1.82)	1.79)	1.84)	1.78)
18						
19						
20						
21						
22						
23						
24	<i>Separated/Divorced/</i>	3.29	3.12	3.07	3.18	2.96
25		(2.18 -	(2.04 –	(2.03 -	(2.07 -	(1.92 –
26	<i>Widowed</i>	4.97))	4.76)	4.65)	4.88)	4.59)
27						
28						
29						
30	RAND SF-12 Physical	.92 (.91	.93 (.92	.93 (.92	.93 (.92	.93 (.92
31	Function	- .93)	- .93)	- .94)	- .94)	- .94)
32						
33						
34						
35						
36	Did not finished Year 12	1.58	1.41	1.43	1.43	1.32
37	(finished Year 12	(1.13 -	(1.01 –	(1.02 -	(1.02 -	(.93 -
38	reference)	2.21)	1.98)	2.00)	2.02)	1.86)
39						1.79)
40						
41						
42	Social Support					
43						
44						
45	<i>Low positive family</i>		1.59			1.32
46	<i>support</i>		(1.32 –			(1.09 -
47			1.91)			1.60)
48						
49						
50						
51	<i>High conflict family</i>		1.13			1.03
52	<i>support</i>		(.89 –			(.81 -
53			1.42)			1.31)
54						
55						
56						
57						
58						
59						
60						

1	<i>Low positive friend</i>	1.92		1.50
2				
3	<i>support</i>	(1.59 –		(1.27 –
4				
5		2.32)		1.82)
6				
7				
8	<i>High conflict friend</i>	1.44		1.32
9				
10	<i>support</i>	(1.14 –		(1.05 –
11				
12		1.81)		1.69)
13				
14				
15	Economic measures	2.17	1.99	1.87
16				
17	<i>Financial</i>	(1.78 –	(1.62 –	(1.51 –
18				
19	<i>Difficulty/Hardship</i>	2.65)	2.45)	2.30)
20				
21			4.71	4.57
22				4.05
23				
24				
25	Pearlin's Mastery Scale		(3.85 –	(3.74 –
26				(3.30 –
27			5.75)	2.45)
28				4.98)
29				
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31				
32				
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Table 4. Fraction of difference between unemployed (and PTLFT) and employed persons in the presence of depression

Unemployed versus Employed		PTLFT versus Employed	
Mediating Variable	Depression	Mediating Variable	Depression
Social support only	19	Social support only	1
Financial Hardship only	28	Financial Hardship only	17
Mastery only	29	Mastery only	3
Socio-demographic, social support, financial hardship, mastery	51	Socio-demographic, social support, financial hardship, mastery	21

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Pg. # & paragraph #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Noted in title and abstract p. 1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	p. 1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	p. 2
Objectives	3	State specific objectives, including any prespecified hypotheses	p.4 paragraph 7
Methods			
Study design	4	Present key elements of study design early in the paper	p. 5 paragraph 8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	p. 5 paragraph 8/9
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	p. 5 paragraph 8/9 – reference for detailed sampling provided in study
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	p. 6/7 paragraph 11/15
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	p. 6/7 paragraph 11/15
Bias	9	Describe any efforts to address potential sources of bias	p. 8 paragraph 17
Study size	10	Explain how the study size was arrived at	NA
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 6/7 paragraph 11/15
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	p. 8 paragraph 16
		(b) Describe any methods used to examine subgroups and interactions	NA
		(c) Explain how missing data were addressed	p. 8 paragraph 17
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed	
		(e) Describe any sensitivity analyses	p. 8 paragraph 17

Results			Page # & paragraph #
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Table 1.
		(b) Give reasons for non-participation at each stage	See above for attrition rates amongst groups – p. 8 paragraph 17
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	p. 9 paragraph 17
		(b) Indicate number of participants with missing data for each variable of interest	Minimal - p. 8 paragraph 16
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	Follow up is 4 years, documented throughout manuscript
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	See results tables – table 1
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	See results in tables – 95% CI
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Table 4.
Discussion			
Key results	18	Summarise key results with reference to study objectives	p. 11/12 paragraph 25/27
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	p. 12 paragraph 28
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	p. 13 paragraph 30
Generalisability	21	Discuss the generalisability (external validity) of the study results	p. 14 paragraph 31
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	p. 15

For peer review only

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The role of financial hardship, mastery and social support in the association between employment status and depression: Results from an Australian longitudinal cohort study

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The role of financial hardship, mastery and social support in the association between employment status and depression: Results from an Australian longitudinal cohort study

Running head: Employment status and depression

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Abstract

Objective: There is robust epidemiological and clinical evidence of the harmful effects of unemployment on psychological wellbeing, but the mechanisms through which this occurs is still strongly debated. In addition, there is even less evidence on the impact of underemployment on mental health. Utilising longitudinal data collected from a cohort of 20 – 24 year olds, the present study examines a range of employed states and investigates the role of mastery, financial hardship and social support in the relationship between labour status and depression.

Method: Responses were from the PATH Through Life Project: A representative, community based survey conducted in Canberra and Queanbeyan (NSW) in Australia, where respondents (n = 2,404) in the early twenties were followed for eight years. Depression was measured using the self-report Goldberg Depression Scale, with the likely presence of depression being indicated by scores 7 or greater.

Results: The analyses identified unemployment and underemployment as significant predictors of depression, compared to their employed counterparts. Both unemployment and underemployment remained significantly correlated with depression even after accounting for socio-demographic, economic and psychological variables. Social support, financial hardship and a sense of personal control (mastery) all emerged as important mediators between unemployment and depression.

Conclusion: Both unemployment and underemployment were associated with increased risk of depression. The strength of this relationship was attenuated but remained significant after accounting for key variables (mastery, financial hardship and social support) and extensive socio-demographic and health covariates, indicating that no or inadequate employment contributes to poorer mental health over and above these factors.

Keywords

Unemployment, underemployment, depression, financial hardship, epidemiology, mastery

Strengths and Limitations:

- Use of large longitudinal cohort data with a high response rate.
- The data allowed for the analysis of the independent effects of employment status and depression after controlling for sociodemographic and health factors.
- The limitations were as follows: Self-reported health and mental health measures; different measures of financial hardship/difficulty utilized in wave 1; the findings come from a community sample and require further research to confirm the generalizability for a national sample; lack of data on duration of un/under-employment.

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Introduction

Understanding the relationship between social factors and mental health has long been of interest for mental health service providers and, social and economic policy. It has been well established that those who are not employed, or those who are unable obtain “good quality” employment, are at significant risk for poor mental and physical health.[1-5] Research has identified a number of pathways through which unemployment may be related to poorer mental health outcomes, including a disruption to daily routine, lower self-esteem, adoption of health-threatening coping behaviours, and a higher level of stress.[6] This has been further clarified through the identification of the protective mechanisms inherent in obtaining gainful employment. Employment fulfils material and psychological needs such as financial security, social inclusion, and encourages regular social and mental activity.[7] However, recent literature has also highlighted that jobs that are perceived as unsatisfying, stressful and offer little autonomy do not always protect physical and mental health, and have been associated with comparable health outcomes as unemployment.[8 9]

Theory and research evidence suggests that the effects of unemployment on depressive symptomatology may be mediated by financial hardship and the related psychological experience of poor personal control over one’s life.[4 10] The focus of this paper is to investigate the extent that financial hardship and a sense of personal control may mediate the relationship between employment status and depression, after taking into account other relevant social and physical factors.[11] Of particular interest is to compare the experience of underemployment and unemployment with fulltime employment, not just between groups but also considering within-person change. Research thus far has demonstrated that underemployment is typically associated with lower levels of health and wellbeing.[12-14] Therefore, failure to account for this group could lead to an

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3 underestimation of the harmful effects seen in inadequate employment settings, or could fail
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5 to identify beneficial effects of even minimal employment compared to no employment at all.
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8 Financial loss is an inevitable outcome of unemployment.[15] Measures of financial
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10 hardship or deprivation usually assess whether people are unable to provide basic necessities
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12 for themselves, their family or other dependents due to a lack of resources.[1 16] Over a
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14 seven year period, Lorant and colleagues[17] showed that subjective financial strain and high
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16 scores on the deprivation index were associated with increases in both depressive symptoms
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18 and incidence of major depression across annual waves. The study found that changes in
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20 income or employment were less strongly associated with changes in depressive symptoms or
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22 major depression than poverty and hardship measures.[17] These findings have been
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24 demonstrated amongst other groups, including: families,[18] adults,[19 20] single
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26 mothers,[21 22] and among young unemployed persons.[23] Financial hardship is thus
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28 considered to be one of the main pathways through which employment status affects
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30 depression.
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34 This is consistent with the neo-material perspective, which argues that indices of
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36 deprivation such as owning a car or a house should be incorporated into research on the
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38 social epidemiology of psychiatric disorders.[11] Neo-material scholars argue that it is the
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40 material risk and lack of protective factors linked to poverty – such as, poor housing, poor
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42 diet, drugs, environmental and workplace hazards, lack of access to healthcare – that
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44 determine most social inequalities in health.[11 24] In contrast, the psychosocial theoretical
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46 perspective argues that financial hardship affects overall mental health through undermining
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48 an individual's sense of mastery, which in turn renders an individual more vulnerable to
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50 depression.[25 26] This psychological approach emphasizes individuals' perceptions of their
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52 relative standing in the income distribution and perceived stress to explain the social gradient
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54 in mental health.[11 24]
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Mastery is commonly used as a measure of control, defined by Pearlin and Schooler[27] as the perception that events are under one's own personal control, rather than under the control of external forces. Financial hardship or strain is typically considered to contribute to low mastery through providing a sense that there is great difficulty in changing circumstances in major domains of life,[28] as well as actual control over one's life (i.e. choice over what neighbourhood to live in or payment for medical treatment).[29] It is thus hypothesized that that lower socioeconomic status imbues an individual with a sense that they experience relative disadvantage.[25 29] However, not all individuals who are exposed to stressors or financial hardship experience deterioration in physical and psychological functioning.[30 31] Research has shown that a sense of mastery can both directly reduce psychological distress and can also act as a buffer against deleterious effects of stressful life events,[32 33] such as poor physical health;[33] and economic hardship.[32 33]

Similarly, high levels social support are also thought to 'buffer' or mitigate the effects of stressful life events on mental health.[34] Unemployed individuals who experience greater social connectedness may perceive unemployed induced stressors to be more manageable, protecting declines in mental health.[35] Though social support might attenuate the effects of stress and financial hardship on mental health, those who are of low socio-economic status or who are unemployed typically report lower social support levels.[36 37] Furthermore, research has demonstrated that not only does social support confer resilience to stress, but that unemployment stress is actually exacerbated by low levels of social support.[38]

The current study seeks to explore the relationship between employment circumstances and mental health in one cohort followed across eight years and three waves of data. Compared with much of the previous research in this area, this study will incorporate a category of "underemployment" in addition to unemployment, and those who are "Not in the labour force" (NILF), and an employed category. Specifically, the study seeks to measure the

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2
3 extent to which a sense of mastery, financial hardship and social support mediate the
4 relationship between employment status and depression, after taking into account potential
5 confounding socio-demographic and health factors.
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9 10 **Method**

11 *Data source and sample*

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14 The data used for this analysis are from the Personality and Total Health (PATH)
15 Through Life Project. PATH follows three cohorts of respondents from Canberra and the
16 neighbouring town of Queanbeyan (initial interviews conducted between 1999 and 2001),
17 and assesses the health and wellbeing. The sampling frame was the electoral roll (registration
18 on the electoral roll is compulsory for Australian citizens over the age of 18 years), and the
19 initial participation rate was 56.6%. Three waves of data were collected with 4 year intervals
20 between each wave. All respondents were sent a letter outlining the purpose of the research
21 and, if they were willing to participate, they were then interviewed by a professionally trained
22 interviewer. The wave to wave response rate for this sample at each wave of subsequent data
23 collection was 89% (Wave 2) and 82% (Wave 3). Participants who did not respond at one
24 wave may still return for a later wave. The Human Research Ethics Committee of The
25 Australian National University approved the study protocol. Further details of the survey
26 including the sampling procedure are reported elsewhere.[39] The current study is restricted
27 to the youngest PATH cohort (birth years: 1975 – 1979) who were aged 20 to 24 years at the
28 initial interview. This resulted in a total possible sample of 2404 participants.
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47 *Survey Procedure*

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49 Participants completed the questionnaire on a laptop computer. An interviewer took each
50 participant through the first set of questions, demonstrating how to enter responses into the
51 personal computer. The interviewer conducted physical and cognitive tests. The components
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of the questionnaire relevant to the present study are outlined below. Unless stated otherwise, measures were collected at each wave.

Measures

▪ Depression

The outcome measure analysed in this study was the Goldberg Depression Scale,[40] a nine-item scale measuring experience of a particular symptom of depression (e.g., loss of weight, lack of energy) in the prior four weeks. Total scores for depression are calculated by summing the number of items endorsed providing a continuous score of 0 to 9. We drew upon the results of previous research assessing the validity The Goldberg Depression Scales to identify an appropriate cut point to classify likely depression in this study.[41] This previous research, also based upon PATH data, assessed depressive episodes according to the International Classification of Diseases (ICD-10) using the World Health Organisation (WHO) Composite International Diagnostic Interview (CIDI) as criterion. The results showed high concordance between scores on the Goldberg Depression Scale and depression diagnosis, and good discrimination between cases and non-cases. The analysis supported the use of a score of seven or greater on the Goldberg Depression Scale to indicate the presence of likely depression (1). For this analysis, therefore, the total score was dichotomized so that a score of seven or greater indicated the presence of likely depression (1), and below seven represented no depression (0). For ease of reading we often use the term ‘depression’ through this report, but acknowledge this is more accurately defined as ‘likely depression’.

▪ Mastery, Financial Hardship/Difficulty and Social Support

Mastery was measured by Pearlin’s Mastery Scale,[27] which is a seven-item scale used to assess the degree to which individual’s believe that their life is under their control by indicating the degree to which they agree or disagree with statements such as ‘There is really no way I can solve problems I have’ or, ‘I have little control over the things that happen to

me.’ Scores range from 7 to 28, with higher scores indicating higher mastery. Although a cut-off point has not been established, generally, a score of 21 or less indicates the likelihood that one perceives that their life is directed by forces outside of their control.[42] Therefore this measure was dichotomised accordingly.

Financial hardship assessed four core components of objective deprivation drawn from the Australian Household Expenditure Survey.[43] The questions pertaining to financial strain asked participants the following: Over the past year have the following happened to you because you were short of money – 1) pawned or sold something 2) went without meals, 3) unable to heat home, 4) asked for help from welfare/community organisations. Participants endorsing one or more of these items were categorised as experiencing financial strain. The hardship items were not included in Wave 1, instead a measure of financial difficulty was utilized which asked participants if they had gone without things they really needed in the last year because they were short of money. Participants who answered “yes, sometimes” and “yes often” were categorised as experiencing financial strain. While this does not constitute an objective measure of deprivation, it allows comparison of the association of depression with financial circumstances.

Finally, a social support measure that assessed the level of positive social supports from friends and family (high versus low) and conflict from friends and family (high versus low) was included. These interactions were assessed using two sets of five items, each applied to both friend and family relationships.[44] These measures were dichotomized at the 50th percentile, with the bottom 50% representing low positive social support and the top 50% representing high positive social support from family and friends, and the reverse for negative social support – the bottom 50% representing high conflict and the top 50% representing low conflict.

- Employment status and covariates

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3 Based on participants' reports, employment status was categorised as 'fulltime/part-
4 time employed', 'part-time employed but looking for full-time employment', 'unemployed'
5 and, 'not in the labour force' (NILF). Other demographic, social and physical measures that
6 were utilized as covariates for the analyses included: gender, age, years of education,
7 marital/partner status, any dependent children, physical health and social support (friends and
8 family). Marital status was categorised into 'cohabiting relationship', i.e. married or defacto,
9 'divorced/separated/widowed' and 'never married'. Education was categorised into 'finished
10 Year 12' and 'not finished Year 12'. Participants were categorised into "have at least one
11 dependent child" and "no children". Physical health was measured using the 12-Item Short
12 Form Health Survey [SF-12; 45] with higher scores indicating better health. As the SF-12
13 measure is not a key variable and our preliminary analysis showed a linear relationship with
14 the measure of depression, this was included in the model as a continuous variable
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30 *Statistical analyses*

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32 Descriptive statistics of the socio-demographic and economic circumstances of the
33 respondents were calculated by gender and age. Simple logistic regression was then utilized
34 to assess the association of depression with the demographic and socio-economic
35 characteristics. Eight separate longitudinal random intercept multivariable logistic regression
36 models were used to examine predictors of depression for individuals who were unemployed,
37 PTLFT, NILF and employed. Moderating variables included social support, financial
38 hardship/deprivation and a sense of personal control. Covariates included age, gender, marital
39 status, physical health, and dependent children. Finally, the 'explained fraction' approach[46]
40 was used to calculate the proportion of the relationship between employment status and
41 depression that was explained by important mediating variables (i.e. financial hardship,
42 mastery, social support and the socio-demographic variables). The change in odds ratios for
43 the unemployed and PTLFT work were quantified by calculating the percent reduction in
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odds ratios after the addition of the key mediating variables. This was calculated by contrasting the OR of the model before (ORa) (Model 3) with the OR after (ORb) (Models 4, 5, 6 and 7) each of the mediating variables were added by applying the following formula: $((ORa - 1) - (ORb - 1)) / (ORa - 1)$.

Most participants (n = 6521) had complete data at both baseline and follow-up. In wave 2, 265 participants (11%) had dropped out of the survey, and 426 participants (17%) had dropped out by wave 3. Cases with missing data were minimal (ranging from 0 to 1.1% for individual items). The statistical models used all available data; those with missing data were excluded. Previous sensitivity analysis conducted on the data by Butterworth et al.[1] showed that attrition was not independently associated with depression, but was associated with being male, not participating in the labour force (although not unemployment), poorer physical functioning, lower levels of educational attainment and not having a spouse/partner.

Results

Table 1 presents descriptive data on the respondents across wave 1, 2 and 3 by gender. Unemployment rates were highest at wave 1 (ages 20-24 years) and declined across the following two waves (ages 24-28 and 28-32 years). Table 2 demonstrated the univariate relationships between the measure of depression and a number of socio-demographic, economic and psychological measures. Around a fifth of respondents who were unemployed were classified with likely depression, compared to only 9% of those who were employed. The prevalence of depression amongst the “underemployed” was also nearly double of the prevalence rates of those who were employed at 17%. The odds ratios for both unemployment and PTLFT indicated a greater likelihood of depression (OR = 2.35; OR = 1.80) compared to employed. Experiencing financial hardship (OR = 2.50) and a low sense of mastery (OR = 5.82) each demonstrated a strong association with depression

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3 Table 3 presents a series of separate multivariate logistic regression models conducted to
4 examine the association between employment circumstance and depression, while controlling
5 for a number of demographic, physical health, socio-economic and psychological variables.
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10 Model 1 demonstrated that the association between unemployment and depression
11 remained significant (OR = 2.40) after controlling for gender. There was also an association
12 between PTLFT and depression (OR = 1.79). In model 2, when age is incorporated into the
13 model, the odds ratios of both unemployment and PTLFT work increased (OR = 2.49; OR =
14 1.89). Model 3 demonstrates that this association between unemployment and depression
15 (OR = 2.13), and PTLFT and depression (OR = 1.75), remained significant after controlling
16 for all the covariates. In addition to the experience of unemployment and PTLFT
17 employment, being separated/divorced or never being married, lower physical function, not
18 having finished Year 12, aged 24 – 28 years, and being female all showed an independent
19 association with depression.
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32 The next three models consider the role of key explanatory covariates. Model 4 included
33 the social support measures (family and friends). These measures did not appear to impact the
34 association between PTLFT employment and depression which remained significant at (OR =
35 1.75), while the association between unemployment and depression decreased but remained
36 significant (OR = 1.91). Low positive family, low positive friend, and high negative friend
37 support were all associated with increased odds of having depression.
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45 Model 5 included a measure of financial hardship, which was associated with over double
46 the odds of depression (OR = 2.17). After controlling for financial difficulty, the odds ratio
47 between unemployment and depression, and between PTLFT employment and depression,
48 decreased but both remained significant (OR = 1.88; OR = 1.62). Model 6 incorporated
49 Pearlman's measure of Mastery. After controlling for sense of mastery, the association between
50 unemployment and depression decreased but remained significant (OR = 1.80). Similar to
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3 Model 4, accounting for the measure of mastery did not impact the association of depression
4 with PTLFT (OR = 1.73). In Model 7, both mastery and financial hardship were included in
5 the model. This saw a further reduction in the odds ratio between depression and
6 unemployment (OR = 1.64) and between depression and PTLFT (OR = 1.60).
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11 Model 8 incorporated all the variables. The odds of depression when unemployed
12 decreased further (OR = 1.55) when compared to being employed, while the association
13 between depression and PTLFT remained largely unchanged. Having a low sense of personal
14 control over one's life showed the highest odds of depression.
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19 Finally, Table 4 quantifies the change in odds ratios for the unemployed and PTLFT
20 work following the addition of key mediating variables. For example, the explained fraction
21 showed 51% of the difference between unemployed and employed individuals in the
22 prevalence of depression was explained by the socio-demographic, social support, mastery
23 and financial hardship measures, compared to only 21% of the difference between PTLFT
24 and employed individuals. Considered separately, the inclusion of financial hardship
25 accounted for 28% and 17% of the association of depression with unemployment and PTLFT
26 work respectively. While the mastery and social support measures also mediated the
27 relationship between unemployment and depression, they explained little of the association
28 between PTLFT and depression.
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43 **Discussion**

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45 This study examined employment status and its association with depression in one
46 cohort from the PATH study across three waves, taking into account both unemployed and
47 “underemployment”. While this study did not directly seek to evaluate the psychological
48 theories of unemployment, it did assess two key factors thought to mediate the effects of
49 employment status: a sense of personal control and financial hardship. The multivariate
50 logistic regression models confirmed that both under-employment and unemployment were
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3 associated with increased risk of depression compared to being employed after controlling for
4 all other measures, including educational attainment, marital status, dependent children, and
5 gender. A key finding of this study was the increased risk of depression that under-
6 employment infers, which supports previous research.[13] However, the odds of depression
7 for the PTLFT compared to the employed group remained largely unaffected by the inclusion
8 of covariates across the different models, except for age and financial hardship. After
9 accounting for all variables the odds of depression for underemployment (OR = 1.59) was
10 comparable to the odds of depression for unemployment (OR = 1.55).

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21 Another key study finding is that social support, financial hardship and a sense of
22 personal control are all important determinants of the association between unemployment and
23 depression. This is consistent with theories that posit that mental health is enhanced by both
24 the manifest (e.g., direct financial) and latent (e.g., interpersonal and psychological) benefits
25 that arise from work.[47 48] The increased risk of financial hardship and deprivation is a
26 salient characteristic in the experience of unemployment. Financial hardship may influence
27 mental health by limiting the capacity of unemployed individuals to fully participate in the
28 generally accepted standards of society.[15] As such, hardship may be conceptualised as
29 analogous to the psychological aspects of unemployment, reducing one's sense of personal
30 control over the future and perceived opportunities. The association between unemployment
31 and depression was also moderated by levels of support from family and friends. Social
32 support may influence how unemployed people respond to their situation and their capacity
33 to deal with it, providing a 'buffer' from the negative effects of unemployment.[49] For some
34 individuals, limited social support from friends and family may be compensated by social
35 connections in the workplace. For such individuals, the impact of job loss may be greater.

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While the PTLFT group also showed poorer mental health than those otherwise employed, the current findings showed a distinct set of moderating factors. Importantly, the

1
2
3 pattern of results observed for this group also lend support for the distinction between latent
4 and manifest benefits of work. Evidence that social support and a sense of personal control
5 were not important mediators of the association between PTLFT status and depression
6 suggests that even inadequate levels of employment may provide individuals with some
7 access to these latent benefits. In contrast, hardship was identified as a significant mediator of
8 this association, suggesting that the inadequate remuneration associated with
9 underemployment is a determinant of the poorer mental health of those who are seeking
10 increased working hours.
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20 *Strengths and Limitations*

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23 There are a number of strengths associated with this study and the use of the PATH
24 dataset. The large sample size, random selection from the population, and longitudinal design
25 contribute to the high statistical power and limited sampling bias.[39] Furthermore, the study
26 design, following respondents initially aged in their early 20s over 8 years, focuses our
27 attention on the consequences of employment for a key age group. However, this study has a
28 number of limitations. Most notably were the different measures used for financial hardship,
29 whereby the measure for the first wave was a subjective measure of financial difficulty, and
30 the measure for the second and third wave sought to provide a more objective measure of
31 hardship. As per the study conducted by Butterworth and colleagues[1] using these different
32 measures, each was strongly associated with depression, were strongly interrelated, and did
33 not differ significantly in prevalence rates. Another potential limitation was the use of “part-
34 time employed, looking for full-time work” as a marker of underemployment. Without
35 further information around hours, quality and stability of the part-time work the respondents
36 in this group may be quite heterogeneous in terms of social and economic circumstances.
37 This is beyond the scope of the current project, but is an important topic for future research.
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3 region may not be representative of the broader Australian population due to relatively higher
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5 levels of educational attainment and higher socio-economic status. Therefore it is important
6
7 that this research is replicated at a national level.
8

9 10 *Implications for policy and practice*

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12 These findings sit within the broader research field in seeking to understand the
13
14 mechanisms through which employment status contributes to mental health outcomes, and
15
16 has clinical and social policy relevance. In the face of unemployment and financial hardship,
17
18 having a low sense of mastery is likely to strongly increase the risk of depression in
19
20 comparison to those individuals who are able to maintain a sense of personal control over
21
22 their life.[4 50 51] Those with a high sense of mastery, may be able to adopt positive coping
23
24 strategies, such as focusing on the employment situation that is amenable to change, or
25
26 implementing a problem-solving approach.[50 52] Policy and clinical programs that seek to
27
28 encourage social inclusion and workforce participation should focus on providing
29
30 experiences for mastery, as well as access to social relationships, which are both seemingly
31
32 constrained when facing unemployment.[53] The findings support the continuation of
33
34 interventions to assist people with mental health problems to find and sustain employment,
35
36 but they also suggests that a focus is on underemployment is needed to prevent mental health
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38 problems.
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42 43 *Conclusion*

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45 This study shows that the effects of unemployment and underemployment on
46
47 depression are not completely explained by socio-demographic, -economic and psychosocial
48
49 factors. There is something unique about the experience of inadequate employment that
50
51 contributes to poorer mental health over and above financial hardship and a loss of personal
52
53 control over one's life. However, it should also be noted that unemployment does not
54
55 automatically equate with poor mental health. Rather, unemployment in comparison to
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3 employment increases the risk of experiencing the conditions that contribute and perpetuate
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5 psychological distress, i.e. relative poverty, financial stress, loss of personal control and
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7 autonomy, poor social support. In order to apply this research on a national level, these
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9 results need to be replicated using longitudinal data collected from all around Australia.
10
11 Further research should consider the effect that protracted unemployed periods might have on
12
13 an individual's mental health, and how mastery and financial hardship might moderate this
14
15 experience. Looking specifically at welfare receipt and the job search experience may also
16
17 elucidate some of the unique experiences that contribute to the poor mental health of the
18
19 unemployed. However, it is clear that research needs to recognise the heterogeneous effects
20
21 of different types of inadequate employment. Research should seek to more comprehensively
22
23 define employment states, such as underemployment and the length of time an individual is
24
25 unemployed, to fully understand the role that employment can play in protecting or reducing
26
27 an individual's mental health.
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38

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40
41 LC and PB were both involved in the conception and design of the study. LC conducted the primary statistical
42
43 analysis and drafted the manuscript, under the supervision of PB. PB provided statistical expertise and revision
44
45 of the manuscript. Both approve and take responsibility for the final manuscript.
46

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54

55 **Competing Interests**

56
57 None declared

58 **Data Sharing**

Data for the study is from the PATH Through Life 20s cohort. Further information including a list of publications is available at <http://crahw.anu.edu.au/research/projects/personality-total-health-path-through-life>. There is no open access to the data set, but strategic collaborations are welcome and contact information is available on the website for interested parties to learn more about formal application procedures.

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Table 1. Descriptive statistics reporting health, socio-economic, demographic and psychosocial characteristics of respondents across the three waves.

	Wave 1 (20–		Wave 2 (24–		Wave 3 (28–	
	24yrs)		28yrs)		32yrs)	
	Male	Female	Male	Female	Male	Female
<i>N</i>	1162	1242	1013	1126	920	1058
Employment status (%)						
- Employed	81.24	79.22	89.72	84.07	94.35	85.35
- Unemployed	6.74	5.11	4.25	2.58	2.28	1.80
- PT looking FT	4.58	4.79	2.08	1.69	.43	.95
- NILF	7.43	10.88	3.95	11.65	2.93	11.91
Marital status (%)						
- Married	18.58	27.84	22.04	30.19	42.61	48.25
- Never married	81.16	70.45	76.19	65.98	52.07	46.83
- Divorced/Separated/Widowed	.26	1.70	1.78	3.83	5.33	4.92
Education (%)						
- Did not finish Year 12	7.78	7.39	5.64	5.35	4.35	4.84
Dependent Children (%)						
- Have dependent children	6.23	13.88	15.91	26.27	36.41	46.50
Physical health						
- RAND SF12 (mean score & sd)	52.31 (6.5)	50.81 (7.2)	52.36 (6.1)	50.66 (7.6)	51.8 (6.5)	50.3 (8.2)
Financial Difficulty (%)						

1	- Facing financial difficulty	24.35	30.24	15.61	13.02	7.74	9.11
2							
3	sometimes or often (w1),						
4							
5	experience hardship (w2 +						
6							
7	w3) ^s						
8							
9							
10							
11	Mastery (%)						
12							
13	- Low sense of mastery score	33.94	40.86	35.98	41.29	35.56	38.18
14							
15	(Pearlin's scale)						
16							
17							
18	Depression (%)						
19							
20	- High score (indicating	7.19	12.27	9.80	12.15	8.92	10.98
21							
22	clinical depression)						
23							
24							

^sw1 = wave1, w2 = wave 2, w3 = wave 3

Table 2. Prevalence of depression and univariate relationship between depression and various socio-economic, demographic and psychological measures.

	Current Depression (%)	Univariate Odds ratio (95% CI)
Employment status		
- Employed	9	
- Unemployed	21	2.35 (1.71 – 2.72)
- PT looking FT	17	1.80 (1.20 – 2.72)
- NILF	17	1.74 (1.35 – 2.23)
Gender		
- Male	9	
- Female	12	1.44 (1.18 – 1.75)
Marital status		
- Married	8	
- Never married	11	1.37 (1.13 – 1.67)
- Divorced/Separated/Widowed	23	3.14 (2.14 – 4.60)
Education		
- Finished Year 12	10	
- Did not finish Year 12	18	1.92 (1.41 – 2.63)
Dependent Children		
- No children	10	
- Have dependent Children	12	1.15 (.95 – 1.39)
Physical health		
- RAND SF12		.91 (.91 – .93)
Financial Difficulty/Hardship		

1	-	No	8	
2				
3	-	Yes	21	2.50 (2.08 – 2.98)
4				
5				
6				
7		Mastery		
8	-	High	4	
9				
10	-	Low	21	5.82 (4.79 – 7.06)
11				
12				
13				
14		Social support friends (positive)		
15	-	Low	14	2.06 (1.75 – 2.44)
16				
17	-	High	7	
18				
19				
20		Social support family (positive)		
21	-	Low	16	2.06 (1.74 – 2.45)
22				
23	-	High	8	
24				
25				
26		Social support friends (conflict)		
27	-	Low	7	
28				
29	-	High	12	1.64 (1.36 – 1.98)
30				
31				
32		Social support family (conflict)		
33	-	Low	7	
34				
35	-	High	12	1.63 (1.36 – 1.95)
36				
37				
38		Age/Wave		
39	-	Wave 1 (20-24yrs)	10	
40				
41	-	Wave 2 (24-28yrs)	11	1.15 (.97 – 1.38)
42				
43	-	Wave 3 (28-32yrs)	10	1.05 (.88 – 1.25)
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Table 3. Results of a multivariable logistic regression analyses for predictors of depression

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Labour-force status								
(reference: employed)								
<i>Part-time looking for full-time work</i>	1.79 (1.19 – 2.70)	1.89 (1.25 – 2.87)	1.75 (1.13 – 2.70)	1.75 (1.12 – 2.74)	1.62 (1.04 – 2.52)	1.73 (1.10 – 2.71)	1.60 (1.01 – 2.53)	1.59 (1.00 – 2.53)
<i>Unemployed</i>	2.40 (1.74 – 3.32)	2.49 (1.80 – 3.62)	2.13 (1.50 – 3.00)	1.91 (1.34 – 2.72)	1.88 (1.32 – 2.68)	1.80 (1.25 – 2.88)	1.64 (1.14 – 2.38)	1.55 (1.06 – 2.25)
<i>NILF</i>	1.65 (1.29 – 2.13)	1.67 (1.30 – 2.14)	1.25 (.95 – 1.66)	1.23 (.92 – 1.64)	1.13 (.85 – 1.52)	1.16 (.86 – 1.55)	1.06 (.79 – 1.44)	1.06 (.78 – 1.44)
Gender (men reference)	1.42 (1.16 – 1.73)	1.41 (1.16 – 1.72)	1.28 (1.05 – 1.56)	1.54 (1.27 – 1.88)	1.30 (1.06 – 1.52)	1.22 (.99 – 1.49)	1.24 (1.00 – 1.52)	1.39 (1.13 – 1.71)
Age (reference: 20 – 24 yrs)								
<i>Age 24 – 28 years</i>		1.22 (1.02 – 1.44)	1.20 (1.00 – 1.45)	1.24 (1.02 – 1.52)	1.37 (1.13 – 1.66)	1.22 (1.00 – 1.48)	1.37 (1.12 – 1.69)	1.40 (1.13 – 1.73)
<i>Age 28 – 32 years</i>		1.13 (.94 – 1.35)	1.04 (.85 – 1.24)	1.01 (.88 – 1.36)	1.26 (1.01 – 1.56)	1.06 (.86 – 1.33)	1.26 (1.00 – 1.59)	1.28 (1.01 – 1.62)

1		1.08	1.11	1.05	1.06
2		1.70 (.85	.99 (.78		
3	Dependent children	(.84 –	(.86 -	(.81 -	(.82 -
4		- 1.29)	- 1.28)		
5		1.39)	1.43)	1.35)	1.36)
6					
7					
8	Marital Status				
9	(partner/spouse				
10	reference)				
11		1.47	1.45	1.43	1.46
12		1.41	1.38		
13	<i>Never Married</i>	(1.18 -	(1.16 –	(1.14 -	(1.16 -
14		(1.84)	(1.82)	(1.79)	(1.84)
15		1.78)	1.75)		
16		3.29	3.12	3.07	3.18
17	<i>Separated/Divorced/</i>				
18	<i>Widowed</i>	(2.18 -	(2.04 –	(2.03 -	(2.07 -
19		4.97))	4.76)	4.65)	4.88)
20		4.59)	4.89)		
21	RAND SF-12 Physical	.92 (.91	.93 (.92	.93 (.92	.93 (.92
22	Function	- .93)	- .93)	- .94)	- .94)
23					
24	Did not finished Year 12	1.58	1.41	1.43	1.43
25	(finished Year 12	(1.13 -	(1.01 –	(1.02 -	(1.02 -
26	reference)	2.21)	1.98)	2.00)	2.02)
27		1.86)	1.79)		
28	Social Support				
29					
30	<i>Low positive family</i>		1.59		1.32
31	<i>support</i>		(1.32 –		(1.09 -
32			1.91)		1.60)
33					
34	<i>High conflict family</i>		1.13		1.03
35	<i>support</i>		(.89 –		(.81 -
36			1.42)		1.31)
37					
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1	<i>Low positive friend</i>	1.92		1.50
2				
3	<i>support</i>	(1.59 –		(1.27 –
4				
5		2.32)		1.82)
6				
7				
8	<i>High conflict friend</i>	1.44		1.32
9				
10	<i>support</i>	(1.14 –		(1.05 –
11				
12		1.81)		1.69)
13				
14				
15	Economic measures	2.17	1.99	1.87
16				
17	<i>Financial</i>	(1.78 –	(1.62 –	(1.51 –
18				
19	<i>Difficulty/Hardship</i>	2.65)	2.45)	2.30)
20				
21			4.71	4.57
22				4.05
23				
24				
25	Pearlin's Mastery Scale		(3.85 –	(3.74 –
26				(3.30 –
27			5.75)	2.45)
28				4.98)
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Table 4. Percentage of difference between unemployed (and PTLFT) and employed persons in the prevalence of depression

Unemployed versus Employed		PTLFT versus Employed	
Mediating Variable	Depression	Mediating Variable	Depression
Social support only	19	Social support only	1
Financial Hardship only	22	Financial Hardship only	17
Mastery only	29	Mastery only	3
Social support, financial hardship, mastery	51	Social support, financial hardship, mastery	21

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Pg. # & paragraph #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Noted in title and abstract p. 1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	p. 1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	p. 2
Objectives	3	State specific objectives, including any prespecified hypotheses	p.4 paragraph 7
Methods			
Study design	4	Present key elements of study design early in the paper	p. 5 paragraph 8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	p. 5 paragraph 8/9
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	p. 5 paragraph 8/9 – reference for detailed sampling provided in study
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	p. 6/7 paragraph 11/15
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	p. 6/7 paragraph 11/15
Bias	9	Describe any efforts to address potential sources of bias	p. 8 paragraph 17
Study size	10	Explain how the study size was arrived at	NA
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 6/7 paragraph 11/15
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	p. 8 paragraph 16
		(b) Describe any methods used to examine subgroups and interactions	NA
		(c) Explain how missing data were addressed	p. 8 paragraph 17
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed	
		(e) Describe any sensitivity analyses	p. 8 paragraph 17

Results			Page # & paragraph #
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Table 1.
		(b) Give reasons for non-participation at each stage	See above for attrition rates amongst groups – p. 8 paragraph 17
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	p. 9 paragraph 17
		(b) Indicate number of participants with missing data for each variable of interest	Minimal - p. 8 paragraph 16
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	Follow up is 4 years, documented throughout manuscript
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	See results tables – table 1
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	See results in tables – 95% CI
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Table 4.
Discussion			
Key results	18	Summarise key results with reference to study objectives	p. 11/12 paragraph 25/27
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	p. 12 paragraph 28
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	p. 13 paragraph 30
Generalisability	21	Discuss the generalisability (external validity) of the study results	p. 14 paragraph 31
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	p. 15

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