

Mental health and labour force status in Australia[#]

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Abstract

In Australia it is estimated that mental illness accounts for around 13 per cent of the total years of healthy life lost to disease yet only 5 per cent of the annual health budget is allocated to services for the mentally ill (Butterworth 2003, Andrews, Hall Teeson and Henderson 1999). There is growing concern regarding the effect of employment, including stress, low-quality work and difficulties in balancing work and family life, and of the effect of unemployment on mental health. This paper uses a summary measure of individuals' mental health to examine the links between mental health and labour market experiences. The measure is based on the summary score typically derived from the SF-36 instrument included in the first 3 waves of the Household Income and Labour Dynamics Australia survey (HILDA), but is adjusted to correct for seemingly undesirable properties of that measure. Simple analysis of labour force transitions over the first three waves of HILDA suggests that entering or remaining in unemployment does not have the deleterious impact upon mental health that might have been expected, while the effect of moving from unemployment to employment is marginal. Greater changes in mental health are associated with movements into and out of the labour force altogether. The estimation of multivariate panel models does find evidence of unemployment contributing to lower mental health for those persons who are participating in the labour force. However, larger differences in mental health are identified among those in employment conditional upon characteristics of their work or attitudes towards their jobs, as is found between those in and out of work.

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1. Introduction

A connection between labour market status and mental health has been long recognised, with the major concern being that time in unemployment negatively impacts upon mental wellbeing. However, the exact nature of the interrelationships between labour market experience and mental health remains unclear and complicated by questions over the direction of causality and heterogeneous impacts across individuals. Further, the relationship may well be changing over time. The last few decades of the 20th Century saw substantial changes in the pattern of participation in the labour force, driven largely by the increase in labour force participation by women. For those in work, these supply-side forces combined with changes in modes of production have resulted in significant changes to the nature of work and the contractual relationship between workers and their employers. A number of important issues relating to the impact of these developments upon people's mental wellbeing have come to the fore, particularly the balancing of work and family; the phenomena of overwork, stress and burn-out of some juxtaposed by under-work and unemployment for others; the growing incidence of households with no working members and the possibility of intergenerational welfare dependency.

There is evidence from cross-sectional data that those in unemployment have lower levels of mental health and higher incidences of mental disorders than those in employment. It must be noted, that there appears to be just as a large differences in mental health among those in employment, conditional on characteristics of their work or their attitudes towards their jobs. Mental health has been linked to work conditions such as work that encompasses high psychological demands and low decision latitude. Job insecurity and unsatisfactory workplace relationships have been noted as risk factors as well as the relatively new phenomena of 'burnout' caused by ever increasing work loads (Berkham and Kawachi, 2000, Field *et al* 2002, Dollard and Winefield 2002).

This paper looks at the relationship between Australians' mental health and their labour force status and the relationship between their mental health and a range of characteristics of the jobs in which they work. The process through which unemployment might impact upon mental health has been considered by both psychologists and economists. It seems reasonable to expect that the deleterious impact of unemployment on mental health would increase with duration, but previous studies indicate that there is no simple, linear relationship with duration (see Flatau, Galea and Petridis 2000, Dockery 2004).

To address such issues the availability of longitudinal data offers considerable advantages. The analysis uses data from the first three waves of the Household Income and Labour Dynamics Australia Survey (HILDA), Australia's first nationally representative household panel survey.¹ The following section briefly discusses what is meant by the term "mental health" and offers an overview of previous evidence relating to the links between mental health, labour force status and employment arrangements. Section 3 provides an overview of the measures of health available in the HILDA survey and section 4 a descriptive overview of the mental health measures

¹ Details on the survey and sampling frame can be found in the HILDA Discussion Paper and HILDA Technical Paper series published jointly by the Melbourne Institute and the Department of Family and Community Services. See <http://www.melbourneinstitute.com/hilda/>.

by labor force status and labour force transitions. Multivariate panel models of mental health are estimated for those either working or looking for work (Section 5) and for those in work conditional on a range of job characteristics (Section 6). Section 7 concludes.

2. Mental health, labour force status and work: a brief overview

What do we mean by 'mental health'

Mental health refers to the extent to which a person's emotions, thoughts and behaviours enable them function effectively as a member of society (Australian Bureau of Statistics (ABS) 1997a: p. 1). According to Butterworth (2003, p. 1):

“Mental health refers to a person's ability to function and undertake productive activities, to develop and maintain meaningful relationships and to adapt to change and cope with adversity. Mental health underlies a person's ability to interact with others and their environment. It represents an individual's sense of wellbeing and competence, and their ability to realize their full potential.”

The prevalence of mental health problems is often used as the basis for measuring mental health among a population. These refer to the diagnosable disorders or incidences in which mental health deteriorates to an extent that it impairs the ability to function productively or socially. Mental illness can be separated into two main categories – psychotic and non-psychotic. Psychosis is a condition caused by any one of a group of illnesses that are known, or thought, to affect the brain causing changes in thinking, emotion and behavior and include schizophrenia and some types of depression. People with psychoses may develop delusions or hallucinations and may be depressed or elated out of all proportion to their life circumstances. The non-psychotic category is a group of mental illness where feelings can become so disturbing and overwhelming that a person has difficulty coping with the day to day activities of their life. These can include some phobias, anxiety and some forms of depression. Many mental illnesses are caused by a physical dysfunction of the brain but it is still uncertain what exactly triggers this. Stress may trigger some mental illnesses or may prolong episodes, but stress can also result from the development of a mental illness (Department of Health and Aged Care 2000).

In Australia it is estimated that mental illness accounts for around 13 per cent of the total years of healthy life lost to disease and that up to 20 percent of adults experience a mental disorder within any 12-month period (Butterworth 2003: p. 1). However, less than half seek any professional help and only 5 per cent of the annual health budget is allocated to services for the mentally ill (Andrews, Hall, Teeson and Henderson 1999, p. 38). Approximately 3 per cent of adults are affected by a severe mental disorder every year. Depression affects around 16 per cent, and anxiety disorders around 10 per cent of Australians at some time in life. (SANE Australia – *Factsheet 13*). This paper utilises a continuous and established measure of mental health, as well as some separate dimensions of mental health, as opposed to the prevalence of diagnosed mental health problems.

The labour market and mental health

A considerable amount of research into the psychological effects of unemployment emerged following the Great Depression of the 1930s. There is an extensive literature relating to the psychological effects of unemployment, and an excellent review can be found in Feather (1990). A number of studies attempt to identify psychological stages that a person passes through upon becoming unemployed, such as an initial shock, followed by periods of optimism, pessimism and fatalism. Other studies seek to identify the particular characteristics of the unemployment experience that impact upon an individual's psychological wellbeing. For example, Jahoda's Functional Approach posits that participation in paid employment generates a range of functions in addition to income that are important for psychological wellbeing, such as a time-structure to the day, social interaction, self-identity and purpose (Jahoda 1982). An important observation to be drawn from the literature is that the effect of unemployment is very different for different individuals.

Some of the potential mediating or compounding factors include the availability of financial resources and the ability to legitimise unemployment, such as by those close to retirement age or who take on child-minding activities (Harrison 1976); the level of social support available and the individual's attitudes towards work (work ethic) and their role as a "breadwinner". Warr (1987) notes that the impact of unemployment on middle aged men is much worse than for youth because older men have greater financial responsibilities and a sense of their role as provider, and because work plays a far more important part in their concept of self.

Statistically, the prevalence of mental health disorders has been found across a number of studies to be higher among women, males and females who are not married, welfare recipients and those who are unemployed or not-in-the-labour force relative to those in work. Empirical studies in the international literature have established the presence of a higher incidence of both mental and physical health problems, and lower levels of 'happiness' among the unemployed, (see, for example, Stewart 2001, Waters and Moore 2002, Croft 2002, Graetz 1993, Flatau *et al* 2000, Clark and Oswald 1994). It is more difficult to make claims regarding the direction of causality. Croft (2002) indicates that the relationship between unemployment and mental health is not simple: not all unemployed people suffer reductions in mental health and wellbeing, and full-time employment is not always positive for workers. He quotes Nordenmark and Strandh (Croft, 2002, p. 156) who noted that the adverse effects of unemployment on mental health appear to be mediated by factors including the individual's economic situation, gender, social class, age, marital status, duration of employment, previous unemployment experiences and the degree of psychological investment in work.

The higher incidence of health problems among the unemployed can of course be attributed to those with poorer mental or physical health being more likely to enter unemployment and to have spells of unemployment of longer duration than healthier individuals. Stewart (2001) cites several studies that find the presence of such a "health selection" process into unemployment (p. 782-783), while her own study indicates that entering unemployment due to a health impairment is associated with longer unemployment durations. Both these effects will potentially lead to overestimates of the effect of unemployment on health if they are not adequately

controlled for in estimation techniques. A further complication, omitted variable bias, arises if there are unobservable characteristics correlated with both health status and employment status. With adequate longitudinal data, this may be overcome by estimating fixed effects models where the unobserved characteristic is fixed over time, but not if it is a transitory effect, such as the temporary impact of a life trauma.

In a study based on a longitudinal survey of Australian youth, Graetz (1993) concluded that the health consequences of unemployment are directly contingent on the quality of the employment lost. The benefits of employment are confined to those who find a job they consider satisfying with those in unsatisfying employment reporting the highest levels of health disorder. Similarly, unemployment is estimated to have adverse health consequences only for those who were satisfied in the job they lost, or for those school-leavers who failed to find work at all. Graetz suggests becoming unemployed may even have positive effects relative to staying in an unsatisfying job (1993: 723). Estimating a variety of panel models using the first three waves of the HILDA data, Carroll, on the other hand, finds a large and negative effect of unemployment upon reported life satisfaction.

Although employment is seen to be beneficial to mental health, research has shown that satisfaction with employment enhances psychological growth and self-esteem. Unsatisfactory employment is detrimental to psychological health and is as psychologically damaging as no employment (Winefield, 2000). Modern work trends have seen an increase in the phenomena of overemployment and underemployment. The stress of overwork can lead to not only physical illness such as cardiovascular disease but also to psychological problems such as depression, burnout and breakdowns. The increased costs to the organisation of such varied illness among its employees can negate any short-term cost saving made through downsizing.

For other workers technological advances have led to underemployment. Research has found that those working less than 6 hours per day have 3 times the risk of heart attack than those working an 8 hour day (Sokejima & Kagamimori, 1998). Winefield *et al* (2002) argue however that those working reduced hours may be doing so because they have already suffered the stress of a higher workload. However the overall downsizing of businesses to improve competitiveness or as a result of economic recession are argued to lead to both mental and physical illness (Chang, 2000).

There are multiple theories attempting to describe and explain work stress problems. However the dominant view based on empirical evidence is that work stress and associated mental health issues are “firmly grounded in the way jobs are constructed, constituted and managed.” (Dollard & Winefield, 2002, p.13). The basis of the argument is that work stress arises primarily from the structural or organizational aspects of the work environment. Employment with high levels of demand and a lack of control over decision making and skill use and without appropriate channels through which the associated stress can be relieved causes an accumulation of stress and can result in anxiety, depression and psychosomatic illness as well as physical disorders.

Therefore jobs with high demands and low control such as assemblers, machine paced jobs and service industry employment experience the highest level of stress in

employees. In comparison in jobs where stress is high such as executives and some professionals but there is also a higher level of control or autonomy, overall stress levels amongst employees are lower. A further exacerbating factor to employee stress is social support from within the workplace. Dollar and Winfield conclude that jobs with high demands, low control and low support from supervisors or co-workers carry the highest risk for psychological or physical disorders with increased risk of psychiatric disorder over time, job dissatisfaction, burnout, depression and psychosomatic symptoms (2002 p.14).

To date the literature appears to have given less consideration to the relationship between the effects of non-participation in the labour force on mental health, which of course is of greatest relevance to women. This paper continues in that tradition.

3. Health data available in HILDA

The HILDA Self-Completion Questionnaires include the set of questions that make up the Medical Outcomes Study Short-Form General Health Survey (SF-36), one of the most widely used measures of subjective health. The SF-36 is a self-reported multi-dimensional measure of general health status or quality of life. It is a generic measure, as opposed to one that targets a specific age, disease or treatment group and was constructed to satisfy minimum psychometric standards necessary for group comparisons. The 36 survey items are used to produce an 8-scale profile of functional health and well being scores as well as psychometrically-based physical and mental health summary measures and a preference based health utility index (Ware, 2004).

The eight scales are physical functioning; role limitations due to physical difficulties (role-physical); bodily pain; general health perceptions; vitality; social functioning; role limitations due to emotional difficulties (role-emotional); and mental health as well as a health transition item. The eight health concepts were selected from 40 included in the Medical Outcomes Study and represent the most frequently measured concepts in widely-used health surveys and those most affected by disease and treatment. The two summary measures of health, the Physical Component Summary and Mental Component Summary, are generated through weighted combinations of the eight factors. The reliability of the 8 scales and 2 summary measures has been estimated using both internal consistency and test-retest methods. The published reliability statistics have exceeded the minimum standard of 0.70 recommended for measures used in group comparisons in more than 25 studies with most exceeding 0.80 (Ware, 2004). Reliability estimates for physical and mental summary scores usually exceed 0.90.

The scores for the 8 scales are available in the HILDA data, calculated from the raw responses to the survey questions in accordance with the SF-36 manual compiled by Ware, Snow and Kosinski (2000). The raw scores from the survey items relating to each scale are summed without weighting or standardization, and the sum transformed into a 0-100 scale. A person-specific score is generated for a scale only if that person has valid responses for at least half of the items that contribute to the scale. Table 1 presents the means of the eight general health scales from HILDA Waves 1, 2 and 3.

Table 1: Mean scores for SF-36 mental health items - HILDA 2001 and 2002

SF-36 Transformed Scales	Wave 1	Wave 2	Wave 3
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Physical dimensions			
Physical functioning	82.5	82.8	83.0
Role-physical	78.7	79.2	78.4
Bodily pain	73.8	74.3	73.2
General health	69.7	69.4	69.0
<i>Physical Component Summary</i>	50.0	50.1	49.9
Mental dimensions			
Mental health	73.7	74.1	74.2
Role-emotional	81.9	83.2	82.8
Vitality	60.6	60.6	60.2
Social functioning	81.4	82.1	81.7
<i>Mental Component Summary</i>	50.0	50.3	50.2

Notes: Number of observations ranges from 12,390 to 13,034 for items for Wave 1; and from 10,950 to 11,629 for Wave 2.

The two component summary scores, the physical component summary score and mental component summary score, are derived from factor analysis of data on the eight scales from a general population and are generally assumed to be country specific. The scales which relate most strongly to the physical dimension of health are the physical functioning, role-physical and bodily pain scales, whereas the mental health, role emotional and social functioning scales relate most strongly to the mental health dimension. The scales of general health and vitality have been shown to load on both dimensions of health. While the eight scales provide a comprehensive profile of health status, it has been argued that the two component summary measures have features that make them more advantageous for clinical trials. These features include better measurement precision, smaller confidence intervals, the elimination of floor and ceiling effects, simpler analysis by reducing the number of statistical tests required and avoiding the problem of multiple testing, and superior (theoretically) responsiveness (Hobart *et al*, 2002).

The HILDA data does not contain component summary scores and for the purposes of this paper they are calculated using weights derived from the Wave 1 population data broadly following the method set out in the Australian Bureau of Statistics' publication *National Health Survey: SF-36 population norms*. A major difference in the construction of the factor scores here is that it is based only on those individual dimensions having a positive correlation with the factor. This prevents the undesirable property in which an individual's mental health summary score will increase simply as a result of deterioration in their physical health, as explained in the Appendix A. Following the national Health Survey (ABS 1997a), the component scores are standardized to have a mean of 50 and a standard deviation of 10 for the Wave 1 population. Appendix A sets out the details of the derivation of the component scores, and also shows that the factor analysis using the HILDA data returns weightings of the individual components very similar to that generated by the ABS from the 1995 National Health Survey population. The means for the generated mental and physical summary scores are also reported in Table 1. By construction the population means for Wave 1 have a value of 50.0 and remain virtually unchanged over the following two waves.

The HILDA self completion questionnaire also included the SF-36 question on health transitions, which asks respondents to rate their health relative to one year earlier. The potential responses are “much better now”, “somewhat better now”, “about the same”, “somewhat worse now” and “much worse now”. A handful of further health items unrelated to the SF-36 are collected through the person questionnaire. These include a rating of satisfaction on a scale from 0 to 10 with a range of aspects of life, of which one is “your health”; and several questions relating to the presence and nature of any long-term health conditions.

4. Mental health and labour force status

This section investigates the mental health of the Australian population using Waves 1- 3 of HILDA, with a focus on the relationship between mental health and labour force status. Table 1 above reported the population means for the SF-36 scales relating to mental health and the mental health component summary score. Table 2 reveals that males score higher, on average, than females on each of the dimensions of mental health, as well as on the summary score in all three years. These differences are highly significant in statistical terms according to standard t-tests.

Table 2: Mean scores for SF-36 mental health items, HILDA 2001 – 2003

(a) Females

SF-36 transformed scale	Wave 1	Wave 2	Wave 3
Mental health	72.7	72.9	73.2
Role emotional	80.6	82.1	81.6
Vitality	58.9	58.8	58.4
Social functioning	80.7	81.2	80.8
<i>MH Component Summary Score</i>	<i>49.4</i>	<i>49.7</i>	<i>49.5</i>

(b) Males

SF-36 transformed scale	Wave 1	Wave 2	Wave 3
Mental health	74.9	75.5	75.4
Role emotional	83.4	84.4	84.1
Vitality	62.5	62.6	62.3
Social functioning	82.3	83.0	82.7
<i>MH Component Summary Score</i>	<i>50.7</i>	<i>51.0</i>	<i>50.9</i>

Table 3 details patterns in the individual mental health scales and in the component summary score by labour force status and several features are prominent. First, employed persons score high on the role-emotional and social functioning scores, consistent with psychological literature which stresses the positive effect of work on one’s self-identity, purpose and social interaction (Jahoda 1982). Second, persons who are not participating in the labour market display low vitality. Finally, the unemployed are characterised by markedly lower scores on the mental health scale. As measured by the component summary score, the employed display significantly better levels of mental health than both the unemployed and those not-in-the-labour force (NILF).

Table 3: Mean scores for SF-36 mental health items, HILDA 2001 and 2002.

SF-36 Item & Labour force status	Wave 1	Wave 2	Wave 3
Mental health			
Employed	75.0	75.6	75.8
Unemployed	68.4***	68.2***	67.4***
Not in the labour force	72.0***	72.1***	72.0***
All	73.7	74.1	74.2
Role emotional			
Employed	86.5	87.7	87.9
Unemployed	76.1***	79.4***	77.4***
Not in the labour force	74.2***	75.0***	73.4***
All	81.9	83.2	82.8
Vitality			
Employed	62.4	62.7	62.4
Unemployed	62.2	61.4	60.6*
Not in the labour force	57.3***	56.6***	56.2***
All	60.6	60.6	60.2
Social functioning			
Employed	85.3	86.1	85.9
Unemployed	77.7***	78.8***	76.0***
Not in the labour force	75.0***	75.1***	74.4***
All	81.4	82.1	81.7
MH Summary Score			
Employed	51.4	51.7	51.7
Unemployed	48.1***	48.5***	47.7***
Not in the labour force	47.7***	47.7***	47.4***
All	50.0	50.3	50.2

Notes: ***, ** and * denote the mean for the unemployed/NILF is statistically different from the mean for the employed at the 1, 5 and 10 percent levels, respectively, according to the standard t-test.

As discussed, the inferior outcomes observed for unemployed persons relative to employed persons may come about for two reasons. First, those with poorer mental health may find it more difficult to secure employment, and thus find themselves with higher unemployment rates relative to the wider population. In this view, mental health problems cause unemployment. Alternatively, being unemployed may result in deterioration in individuals' mental health — that is, the direction of causation runs from labour force status to mental health status. Of course, these two effects may also act in concert.

Repeated observations on individuals allow tests to distinguish between these two competing explanations. One simple test is to look at whether or not mental health scores have increased or decreased for individuals in different labour market states. For simplicity the analysis from here concentrates on the mental health summary score. Table 4 reports the mean change in individuals' mental health summary scores from the previous year conditional upon labour force status in Waves 2 and 3. A positive figure indicates that, on average, mental health of people in that category had increased. For the (continuing) sample overall there is in fact a fall in measured

mental health from Wave 2 to Wave 3. The mental health of people out of the labour force at the time of the interview had deteriorated in the past 12 months in both Wave 2 and Wave 3. No deterioration from the previous year is identified for persons who became or remained unemployed. This does not support the view that time in unemployment or becoming unemployed, of their own, lead to deteriorating mental health. Rather the initial picture is consistent with the view that the lower relative mental health of those in unemployment is due to persons with lower initial mental health being more likely to be observed in unemployment. Dropping out of the labour force, or continued time out of the labour force, does seem to be associated with deteriorating mental health.

Table 4: Change in SF-36 mental health summary score from previous year by current labour force state, Waves 2 and 3, HILDA.

Current labour force status	Wave 2	Wave 3
Employed	0.27 ***	-0.14
Unemployed	0.60	0.40
NILF	-0.37 **	-0.44 ***
All	0.08	-0.22 ***

Notes: ***, ** and * denote the figure is statistically different from the zero for at the 1, 5 and 10 percent levels, respectively, according to the standard t-test.

The unemployed at the time of one interview include persons who had become unemployed since the previous year and who remained unemployed from the previous interview (though not necessarily continuously between). A more detailed picture can be gained by looking at changes in the mental health scores conditioned upon transitions in labour force status between waves 1, 2 and 3 (Table 5). Again there is no evidence that either remaining in unemployment or entering unemployment has any significant negative impact on mental wellbeing. This holds whether one enters unemployment from employment or from outside the labour market. Again deterioration in mental health is more strongly associated with either leaving or remaining outside of the labour force. Re-entering the labour force and securing work has a clear association with improved mental health. It should be noted that the sample sizes for transitions involving unemployment as the source or destination state are not as large as those involving transitions to and from the employed and the NILF states.

Table 5: Change in SF-36 mental health component summary score – means by labour force transition from Wave 1 to Wave 2, HILDA.

	Observations	From Wave 1 to Wave 2	From Wave 2 to Wave 3	From Wave 1 to Wave 3
Employed to:				
Employed	5377-5569	0.24 **	-0.17 *	0.22 *
Unemployed	75-113	-0.03	-0.25	-0.31
NILF	342-503	-0.39	-0.34	-1.76 ***
Unemployed to:				
Employed	152-182	-0.92	0.13	2.05
Unemployed	72-108	1.08	0.90	1.22
NILF	82-95	-0.55	-0.55	-1.26
NILF to:				
Employed	327-477	1.31 ***	0.33	1.38 ***
Unemployed	85-104	0.80 **	0.70	0.46
NILF	2409-2638	-0.35	-0.45 ***	-0.86 ***
All	9071-9531	0.08	-0.22 ***	-0.11

Notes: ***, ** and * denote statistically different from zero at the 1, 5 and 10 percent levels, respectively, according to the standard t-test.

Labor market transitions from time t to time t+1, conditional upon mental health at time t, can also provide some evidence on cause and effect. Table 6 shows that of people employed at one interview, those with the lowest mental health are more likely to have become unemployed and also more likely to have dropped out of the labour force when next interviewed. Generally, the probability of a worker from Wave 1 having become unemployed or leaving the labour force by the following year decreases as we move into quintiles of better (measured) mental health, although the relationship is not strictly monotonic. The figures are similar for the transitions by Wave 2 workers, though in this case the likelihood of becoming unemployed or leaving the labour force does decline monotonically with the quintile of the component summary score. This provides clear evidence that some portion of the association observed between low mental health and being unemployed arises through the lower average pre-existing mental health of those who become unemployed. Presumably in more extreme cases this arises through a mental health problem leading directly to unemployment. The same applies to lower observed mental health of persons outside the labour force, relative to employed persons.

Table 6: Transitions from employment given quintile of mental health component summary score: Waves 1 and Wave 2.

Mental Health Quintile	Wave 1 to Wave 2 (%)		Wave 2 to Wave 3 (%)	
	Unemployed	NILF	Unemployed	NILF
1. (Lowest 20%)	3.1	8.1	3.1	8.9
2. (20-40%)	2.0	6.1	1.6	6.7
3. (Middle 20%)	2.1	5.6	1.5	5.3
4. (60-80%)	0.7	4.0	1.2	4.2
5. (Top 20%)	1.6	6.4	0.9	4.0
All employed	1.9	6.0	1.6	5.8

Notes: number in each quintile ranges from 1347 to 1408 for Wave 1-Wave2 and from 1228 to 1263 for Wave 2 to Wave 3.

5. The mental health of persons in the labour force – panel estimates.

The preceding analysis indicates that there are significant mental health issues for persons who are outside the labour force. However, there are many reasons why persons do not participate in the formal labour force and the average figures presented will conceal differences between a wide variety of individual situations. They may be retired, in full-time education or training, disabled, looking after dependent children or in other carer roles. Some may simply prefer not to work and be able to afford not to, while others wish to work but for one reason or another are not actively looking for work. Indeed, some will not be participating in the labour force due to mental illness.

While many of these issues are worthy of investigation, the remainder of this paper investigates the mental health of those in the labour force. By definition it is known that these people are either working or wanting to work and actively trying to find a job. The current section estimates multivariate models of mental health using the sample of all persons in the labour force, enabling comparison between the unemployed and employed. More precisely the sample is restricted to persons of working age (15-64 years) who are in the labor force but not at school or other full-time study and the dependent variable used is the mental health component summary score discussed above. In the next section the sample is further restricted to persons in employment in order to concentrate in detail on the effects of job characteristics on individuals' mental health.

Data from Waves 1-3 of HILDA are pooled and random-effects, linear regression panel models fitted.² The panel models take account of repeat observations on individuals. Consider the following model in which i denotes individuals within the sample and t denotes time periods (in this case Waves 1, 2 and 3 of the survey).

$$(1) \quad MH_{it} = \alpha + \beta X_{it} + \nu_i + \varepsilon_{it}$$

Mental health is specified to be a function of a constant term and a set of covariates, X , some of which may be time varying, with associated vector of coefficients to be estimated, β . The error term has two components: ν_i which is specific to each individual and constant over time; and ε_{it} which is assumed iid across individuals and time. Through the individual specific error term, the panel model assists in controlling for unobservable fixed-individual effects and also for some of the endogeneity between the covariates and the mental health score. For example, while a person with lower underlying mental health may be more likely to become unemployed, repeat observations on the same individual in different labour market states will allow estimation of the independent effect of being in unemployment on that individual's mental health, with their lower underlying level of mental health captured by a negative ν_i .

A note of caution is warranted. As there are only three waves of data available, the ability of the model to accurately estimate individual specific effects will be limited, particularly when for some of the covariates there may be little change between waves

² More precisely, the xtreg model in STATA 9.0 with random effects is used.

and for many individuals there are only one or two observations. In each of the models reported in Table 7, the average number of observations on each individual is 2.2. Further, contemporaneous events may impact upon both mental health and unemployment, which are not reflected in the fixed individual specific component of the error term. For example, a negative life event or illness in one year leading to reduced mental health and unemployment, or a deterioration in mental health between surveys leading to unemployment, will still result in an overestimate of the direct effect of unemployment on mental health. ‘Reverse causation’ is also likely to apply in the case of some of the other covariates, such as persons with lower mental health being less likely to be married or less wealthy. This means their coefficients technically cannot be interpreted as a direct effect between the explanatory variable and mental health, however one would still want to include such covariates as controls when estimating the independent effect of labor market experience.

All independent variables used in the models in Table 7 are one/zero dummies with the exception of the continuous age variable and its square. The estimated coefficients suggest that males, persons who are married or living in de facto relationships and from English speaking backgrounds have higher levels of mental health. Indigenous Australians have markedly lower measured mental health. Living in a major city and having lived in a sole-parent household at age 14 are also estimated to impact negatively upon mental health. No significant effect for level of education is identified. In magnitude, the most pronounced effect is the association between self-assessed level of prosperity and mental health. Recalling the component summary score is standardized to have a mean of 50 and standard deviation of 10, it can be seen that the estimated effect of being ‘poor/very poor’ as opposed to ‘very comfortable’ is to reduce the score by around 8, almost a full standard deviation.³ Note again, the likelihood of this also reflecting the impact of lower mental health upon wealth accumulation and income.

To assess the mental health of those in unemployment model 7.1 utilises only 2 variables relating to labour force status – whether employed part-time and whether unemployed – along with the omitted comparison state of full-time employment. The estimated coefficient on being unemployed is -1.427 and highly significant. Thus the implied effect of being unemployed as opposed to working full-time is roughly the same as the effect of being separated as opposed to married. In model 7.2 the state of unemployment is further distinguished according to duration of the current spell. With three waves of data only, there is limited scope to exploit the longitudinal nature of the data in the estimation of the effects of long-term unemployment, since there will be few observations of long-term unemployed in labour market states other than that of unemployment. This aside, the estimates imply an initial deleterious effect of becoming unemployed, which abates as the duration of the spell increases up to a point of around 1 year, after which mental health again starts to deteriorate with further time in unemployment.

³ This set of dummy variables is based upon a question in which respondents indicated whether, given their current needs and financial responsibilities, they and their family are 1. prosperous, 2. very comfortable, 3. reasonably comfortable, 4. just getting along, 5. poor or 6. very poor. The variables used are recoded to very comfortable (1 or 2), comfortable (3), getting by (4), or poor/very poor (5 or 6).

Table 7: Panel regression model of mental health component summary score, random effects, HILDA 2001-03.

	Model 7.1		Model 7.2		Model 7.3	
	Coefficient	P> z	Coefficient	P> z	Coefficient	P> z
Constant	52.900	0.00	52.993	0.00	51.105	0.00
Male	1.193	0.00	1.164	0.00	1.351	0.00
Age (in years)	-0.067	0.14	-0.071	0.12	-0.048	0.28
Age squared	0.001	0.04	0.001	0.03	0.001	0.12
Marital status:						
Never married	-1.068	0.00	-1.129	0.00	-0.920	0.00
Married or de facto	—		—		—	
Separated	-1.538	0.00	-1.498	0.00	-1.589	0.00
English 1 st language	—		—		—	
Not 1 st and: English good	-0.860	0.00	-0.840	0.00	-0.823	0.00
Not 1 st and: English poor	-1.194	0.12	-1.287	0.11	-0.943	0.21
Aboriginal or Torres St. Islander	-1.615	0.01	-1.558	0.01	-1.836	0.00
Lived in sole-parent home, age 14	-0.804	0.00	-0.819	0.00	-0.781	0.00
Qualifications						
No post-school qualifications	—		—		—	
Low qualifications	-0.087	0.71	-0.037	0.87	0.052	0.82
Medium qualifications	0.051	0.81	0.107	0.62	0.177	0.41
High qualifications	0.044	0.85	0.092	0.70	0.357	0.12
Prosperity (self assessed)						
Very comfortable	1.153	0.00	1.158	0.00	0.968	0.00
Comfortable	—		—		—	
Getting by	-2.238	0.00	-2.235	0.00	-2.029	0.00
Poor/very poor	-6.874	0.00	-6.994	0.00	-6.507	0.00
Live in major city	-0.484	0.00	-0.487	0.00	-0.319	0.03
Employed full-time	—		—			
Employed and:						
Low job satisfaction					-2.535	0.00
Medium job satisfaction					—	
High job satisfaction					2.052	0.00
Very high job satisfaction					2.982	0.00
Employed part-time	-0.134	0.39	-0.138	0.37	-0.190	0.21
Unemployed	-1.427	0.00			-0.385	0.17
Unemployed: 0-3 weeks			-2.269	0.00		
4 to 12 weeks			-1.308	0.00		
13 to 52 week			-0.796	0.08		
More than 1 year but <2 years			-2.597	0.00		
2 years or more			-0.928	0.41		
Observations	20678		20513		20678	
Individuals	9590		9519		9590	
Wald Chi-square ($p>\chi^2$)	1119.62	(0.00)	1111.22	(0.00)	1824.89	(0.00)
Degrees of Freedom	18		22		21	
R ² - Within individuals	0.012		0.013		0.031	
- Between individuals	0.107		0.107		0.150	
- Overall	0.082		0.082		0.120	

Notes: In each model maximum observations per individual=3, minimum=1 and average=2.2. The variation between waves for individuals accounts to 40-45% of total variation.

The final model in Table 7 further distinguishes employed persons according to their self-reported level of satisfaction with their jobs. In the HILDA survey employed persons were asked ‘all things considered, how satisfied are you with your job’ using an 11 point scale ranging from totally dissatisfied (0) to totally satisfied (10). The distribution is highly skewed towards the ‘more satisfied’ side of the scale and hence the responses are recoded as a set of dummy variables representing low job satisfaction (persons indicating from 0 to 4), medium job satisfaction (5 to 7), high job satisfaction (8 to 9) and very high job satisfaction (corresponding to 10 – completely satisfied). The results indicate that those people working in jobs with which they have low satisfaction, representing around 6 percent of employees, have even lower mental health than those who do not have jobs at all.

To identify which of the individual dimensions of the mental health summary component score is most influenced by unemployment, the models are re-estimated using as the dependent variable the individuals’ scores for the mental health, role-emotional, vitality and social functioning scales. The results indicate that the association between unemployment and the component summary score is driven primarily by the effect on the role emotional and social functioning scales, and to a lesser extent on the mental health scale. The role emotional scale relates to limitations in roles due to emotional difficulties. The impact of unemployment is actually partly offset by an increase in vitality relative to those in work. All individual components contribute to the pattern observed over the duration of the unemployment spell. Even the positive effect on vitality is greatest for those unemployed from 13 to 52 weeks.

6. The mental health of workers – panel estimates.

Restricting the sample to employed workers only, the model set out in (1) above is estimated with inclusion among X_{it} of a wider range of variables relating to the characteristics of individuals’ jobs. Among the variables included were dummy variables representing occupation at the 1 digit ASCO level.⁴ As these proved insignificant and the estimated coefficients small, they are not included in the reported models. Hopefully this reflects that differences between jobs in the different occupational categories are well captured in the other variables included. As with the models reported in Table 7, variables capturing the level of qualification were again insignificant and have also been excluded. From Table 8, it can be seen that the results relating to individual characteristics in the models for employed persons are consistent with those discussed in the previous section, and comment is refined to variables relating to individuals’ employment situations.

The more parsimonious Model 8.1 shows working part-time and working shift-work or some other form of non-standard hours to be associated with marginally lower mental health. Oddly, workers who hold more than one job display marginally higher mental health, while no significant effect is found for the length of time someone has been in their current job. Another surprising result is that having a casual employment contract is actually associated with higher mental health. Generally casualisation of the workforce is viewed as a source of deterioration in workers’ employment arrangements attributable to deregulation. Though the findings here do

⁴ ASCO – Australian Standard Classification of Occupations. See ABS 1997b.

not directly support this, perhaps the main mechanism through which this effect is thought to occur is reduced job security, which is controlled for separately and indeed the indication is that lower job security is associated with lower mental health. The variables included to capture job security are based on individuals' own perceptions of the likelihood that they will lose their job in the coming 12 months. On the whole workers view their jobs as quite secure. Around 14 per cent estimate that they have between a 10 and 50 per cent chance of losing their job, and only around 10 per cent see themselves as having a better than even chance of losing their jobs. Workers in both these categories display significantly lower mental health, and the effect is quite large. A very pronounced association between mental health and job satisfaction is again evident.

The set of explanatory variables is expanded in model 8.2 in two ways. In addition to distinguishing between full-time and part-time jobs, information on preferred hours is incorporated. Many part-time workers may in fact be quite content with the number of hours available to them, and for these people no negative effect of being of part-time status would be expected as they are not 'underemployed'. On the other hand, the problem of 'overwork' and 'burn-out' — attributable to full-time employees working very long hours has been a major concern. Consistent with this it is found that working full-time while preferring to work less hours is associated with a sizeable fall in mental health. The default or comparison category here is full-time workers who are content with the number of hours they normally work. The greater impact of working excessive hours (relative to preferences) occurs among part-time workers. Note that the full estimated impact for part-time workers is represented by the sum of the estimated coefficients on the part-time variable and the variable for preferring less hours (-1.6). While this effect is quite large, it relates to less than 3 per cent of workers, while around 28 per cent of workers are full-time workers who say they would prefer to work fewer hours. A problem of underemployment among part-time workers contributing to inferior mental health does not stand out from the results.

The effect of job satisfaction is also investigated in more detail in model 8.2. In place of the series of dummy variables relating to overall job satisfaction, ratings (from 0 to 10) with various aspects of one's job are added, including satisfaction with pay, job security, the work itself and the flexibility to balance work and non-work commitments. The ratings of satisfaction with 'the hours you work' was not included given the presence of the variables relating to actual and preferred working hours. Each of the satisfaction ratings has a positive correlation with the mental health summary score as expected. The dominant effect, however, comes from satisfaction with the actual work one does.

Finally, to explore potential added stresses created by combining employment and family, the same model is estimated restricting the sample to workers who live with one or more children, and thus are either sole-parents or adult members of a couple-family with children. The results are in fact surprisingly unchanged for this group. Having never been married has a larger detrimental effect on mental well-being for those with children. In terms of job characteristics, the only difference of note appears to be a lesser negative impact associated with working part-time for people with children. The effects of mismatch between actual and preferred working hours does not seem to impact any more strongly upon people with children.

Table 8: Panel regression model of workers' mental health component summary score, random effects, HILDA 2001-03.

	All employed (Model 8.1)		All employed (Model 8.2)		With resid. children (Model 8.3)	
	Coefficient	P> z	Coefficient	P> z	Coefficient	P> z
Constant	51.815	0.00	46.414	0.00	46.143	0.00
Male	1.328	0.00	1.221	0.00	1.259	0.00
Age (in years)	-0.053	0.24	-0.054	0.24	-0.037	0.73
Age squared	0.001	0.14	0.001	0.11	0.001	0.67
Marital status:						
Never married	-1.087	0.00	-1.120	0.00	-1.920	0.01
Married or de facto	—		—		—	
Separated	-1.488	0.00	-1.297	0.00	-1.214	0.00
English 1st language	—		—		—	
Not 1 st and: English good	-0.856	0.00	-0.846	0.00	-0.553	0.09
Not 1 st and: English poor	-1.781	0.04	-1.812	0.04	-2.263	0.03
Aboriginal or Torres St. Islander	-1.772	0.01	-1.816	0.01	-2.190	0.02
Lived in sole-parent home, age 14	-0.762	0.00	-0.721	0.01	-0.695	0.06
Prosperity (self assessed)						
Very comfortable	0.962	0.00	0.933	0.00	1.174	0.00
Comfortable	—		—		—	
Getting by	-1.989	0.00	-1.978	0.00	-1.589	0.00
Poor/very poor	-6.398	0.00	-6.505	0.00	-5.736	0.00
Live in major city	-0.183	0.22	-0.182	0.22	-0.204	0.32
Employed full-time						
- and prefer less hours			-0.990	0.00	-0.766	0.00
- and prefer more hours			-0.405	0.12	-0.601	0.15
Employed part-time	-0.294	0.07	-0.628	0.00	-0.351	0.20
- and prefer less hours			-1.017	0.00	-1.051	0.01
- and prefer more hours			-0.239	0.30	-0.116	0.70
Holds multiple jobs	0.532	0.01	0.426	0.04	0.505	0.07
Works non-standard hours	-0.433	0.00	-0.468	0.00	-0.505	0.01
Tenure (years)	-0.002	0.82	-0.009	0.33	-0.009	0.51
Contract is fixed-term	0.127	0.54	0.097	0.64	-0.385	0.21
Contract is casual	0.417	0.02	0.416	0.03	0.478	0.07
Job security (prob of losing job in next 12 months)						
- less than 10%	—		—		—	
- 10 to 50%	-0.992	0.00	-0.907	0.00	-0.599	0.01
- greater than 50%	-1.261	0.00	-0.904	0.00	-0.941	0.00
Has supervisory responsibilities	-0.014	0.91	0.003	0.98	0.026	0.88
Employed and:						
Low job satisfaction	-2.484	0.00				
Medium job satisfaction	—					
High job satisfaction	1.945	0.00				
Very high job satisfaction	2.872	0.00				
Satisfaction with [0-10]						
- total pay			0.121	0.00	0.134	0.00
- job security			0.181	0.00	0.151	0.00
- the work itself (what you do)			0.448	0.00	0.468	0.00
- flexibility to balance work and non-work commitments			0.187	0.00	0.168	0.00

Continued over/

Table 8 (continued)			
	All employed (Model 8.1)	All employed (Model 8.2)	With resid. children (Model 8.3)
Observations	19636	18633	9213
Individuals	9116	8883	4393
Wald Chi-square ($p > \chi^2$)	1738.61	0.00	1644.64
Degrees of Freedom	25	30	30
R ² - Within individuals	0.0345	0.03	0.0299
- Between individuals	0.1442	0.1454	0.1251
- Overall	0.1188	0.1191	0.1035

Notes: In each model maximum observations per individual=3, minimum=1 and average=2.2. The variation between waves for individuals accounts to 40-45% of total variation.

7. Conclusion

The prevalence of mental health problems or disorders is receiving growing recognition as a problem in modern society. In turn, it is known that the situations individuals face with respect to their labour force status and employment arrangements impact significantly upon their mental wellbeing. Like a number of recent papers (Carroll, 2005; Dockery, 2004; and Dockery, forthcoming), this paper explores the relationships between labour market experience and wellbeing, but with a specific focus upon mental health.

Direct cross-sectional comparisons show that persons in employment do have better mental health than either the unemployed or those who are not participating in the labour force. This could be a result of (a) lower initial mental health reducing a person's chance of being in employment; (b) the state of non-work causing deterioration in mental health relative to the employed; (c) a third factor which contemporaneously impacts upon mental health and employment opportunity; or some combination of these three. Transition analysis can help to distinguish between the competing explanations. Over the first three waves of HILDA, there is little evidence that remaining in unemployment or becoming unemployed causes a reduction in mental health. Rather it is movement between employment and non-participation in the labour force that is associated with significant changes in mental health. Supporting this story, it is found that workers with lower mental health scores are significantly more likely to become unemployed or drop out of the labour force in the following year than those with good mental health.

In contrast, multivariate panel models do support the presence of a negative impact of unemployment upon mental health, though again this cannot be distinguished from explanation (c) of an unobserved factor impacting jointly upon mental health and the likelihood of being employed. It must also be noted that the shortness of the panel inhibits the ability of the estimation method to efficiently control for individual effects. Indeed the models are able to explain very little of the observed variation in mental health over time for the same individual. To provide some context, the estimated effect of being unemployed on mental health is similar in magnitude to that of being separated as opposed to partnered, but is less than a quarter of the size of the effect of having a self-assessed prosperity level of 'poor or very poor' as opposed to 'comfortable'.

Part of the inconsistency in findings between the more simple transition analysis and the multivariate panel models may be explained by the changes in mental health over the duration of the unemployment spell. Consistent with studies of the impact of unemployment on other aspects of wellbeing (see Flatau *et al* 2000, Dockery 2004), the negative impact of unemployment on mental health is not a monotonic one with respect to duration. There appears to be an initial negative ‘shock’, which then abates before mental health begins to deteriorate again. Thus over some intervals mental health will be observed to improve with duration of unemployment.

Differences in mental health between those in ‘good’ and ‘bad’ jobs are also larger than the average differences observed between the employed and unemployed. Working non-standard hours and job insecurity are found to reduce mental health. No evidence is found of under-employment impacting upon the mental health of part-time workers, but problems of ‘overwork’ are readily identifiable. This equally affects the small number of part-time workers who would prefer to work less hours, but is widespread in the form of full-time workers who would prefer to work fewer hours. In this sample, almost 30 percent of all workers fall into the category of full-time workers who would prefer to work less hours. Satisfaction with the actual type of work being done, which presumably equates to undertaking challenging and enjoyable work, appears to be a particularly important characteristic of employment for promoting good mental health.

Much more still needs to be done to improve our understanding of the nexus between unemployment and mental health. Another important area which needs to be addressed is the maintenance of mental health for persons who are not participating in the labour force. The transition analysis reveals significant falls in mental health for persons who remain out of the labour force from one year to the next, as well as significant improvements for those who return to the employed labour force. A second interesting avenue of further investigation is the labour market pathways of those with low mental health, who appear to have more rapid transitions between labour market states. This is particularly so if having low mental health is a relatively fixed rather than transient state. In the panel models, most of the variation in mental health is attributable to variation between individuals rather than variation over time within individuals.

Appendix A: Generation of the mental and physical component summary scores

To generate the mental health and physical health component summary scores (MCS and PCS), a factor analysis of the eight scales confirms the presence of two common factors within the HILDA data which are highly correlated with the SF-36 mental health and physical health dimensions as expected. More specifically, the principal components method with a varimax rotation with SAS software is used. Table A1 reports the “loadings” associated with each of the individual eight scales for the two factors when the analysis is run using the HILDA Wave 1 and Wave 2 data. Also reported are the loadings from the ABS’ analysis of the National Health Survey data (ABS 1997a: p. 31). It can be seen that a very similar patterns of responses are evident within the data from HILDA and within the data from the much earlier National Health Survey.

Table A1: Standardised factor scoring coefficients - factor analysis performed on the eight SF-36 transformed scales

SF-36 Transformed Scales	HILDA Wave 1	HILDA Wave 2	ABS National Health Survey 1995
<i>Mental Health Factor</i>			
Mental health	0.488	0.483	0.488
Role-emotional	0.323	0.316	0.359
Vitality	0.299	0.310	0.271
Social functioning	0.243	0.228	0.265
General health	0.051	0.068	0.053
Bodily pain	-0.095	-0.116	-0.124
Role-physical	-0.124	-0.117	-0.134
Physical functioning	-0.235	-0.225	-0.244
<i>Physical Health Factor</i>			
Physical functioning	0.449	0.444	0.473
Role-physical	0.368	0.365	0.382
Bodily pain	0.338	0.357	0.368
General health	0.196	0.180	0.190
Social functioning	0.019	0.032	-0.013
Vitality	-0.053	-0.065	-0.019
Role-emotional	-0.109	-0.103	-0.150
Mental health	-0.271	-0.270	-0.271

The scoring coefficients generated from the factor analysis of the Wave 1 data can be applied to the SF-36 transformed scales for each individual to calculate individual specific mental health and physical health factor scores. This is the approach followed by the ABS (1997a). These factor scores were then transformed to have a mean of 50 and standard deviation of 10. Initially this same methodology is applied, using the “baseline” scoring coefficients from the Wave 1 data to generate the factor scores from the responses to the SF-36 items in both the Wave 1 and Wave 2 surveys. This seemed preferable to using coefficients generated from latter waves or to using coefficients generated from the pooled data, as attrition from the survey may be correlated with one or more of the eight health scales. Using later data rather than baseline data would tend to normalize the summary scores towards the patterns of

responses observed for individuals with the least likelihood of dropping out of the survey or otherwise not responding to the necessary questions.

However, in investigating the change in the mental health summary score by age, it became evident that the summary scores derived in this method have an undesired property. Mental health measured in this way actually increases for the aged – not because of improvements in the components relating to mental health, but because of deteriorations in the physical health components upon which the factor score is negatively correlated. Thus, with no change in any of the components positively associated with mental health, if an individual’s bodily pain, role-physical or physical functioning scores were to deteriorate then this would result in an improvement in their mental health summary score. It seems clear that this results in some distortion of the underlying changes compared to what is intended to be measured. As a result, for this paper the mental health and physical health summary component scores are constructed using only the factor scoring coefficients relating to the positive factor correlations (the first-listed five factors in Table A1 for both summary scores). As before, the summary scores are then transformed to have a mean of 50 and standard deviation of 10. This results unfortunately in some loss of comparability with other studies but would seem to result in more sensible measures.

Table A2 reports the means by age group for the individual SF-36 scales and the new summary scores. It can be seen, using this definition, that mental health remains relatively stable over the life cycle, while physical health deteriorates markedly from age 55, particularly with respect to the physical functioning and role-physical dimensions.

Table A2: SF-36 health scales and mental- and physical-health summary scores; means by age, HILDA Wave 1.

	15-24	25-34	35-44	45-54	55-64	65 plus
Mental health scales						
Mental Health	71.7	73.3	72.7	74.2	74.6	76.6
Role emotional	83.1	84.4	83.3	83.4	80.4	74.5
Vitality	62.7	60.8	60.3	60.5	61.1	58.3
Social functioning	82.6	83.1	82.5	81.7	80.0	77.5
<i>MH summary score</i>	<i>50.1</i>	<i>50.4</i>	<i>50.1</i>	<i>50.2</i>	<i>49.9</i>	<i>49.0</i>
Physical health scales						
Bodily pain	79.9	79.4	76.9	72.4	66.9	63.4
General health	73.4	74.5	72.1	68.9	64.7	61.0
Physical functioning	91.6	90.0	88.4	82.9	74.1	60.7
Role Physical	88.3	86.9	84.6	78.8	70.4	55.0
<i>PH summary score</i>	<i>53.3</i>	<i>52.9</i>	<i>52.0</i>	<i>49.8</i>	<i>46.7</i>	<i>42.2</i>

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