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Unemployment and Psychological Well-Being

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CONTENTS

ABSTRACT

Who records the largest drops in life satisfaction when they move into unemployment? Do men experience a larger drop in life satisfaction than women? Do Australians and Americans record a larger drop than Europeans? Using an Australian panel data-set (the Household Income and Labour Dynamics Survey of Australia), this paper finds that the unemployed in Australia report lower life satisfaction than observationally equivalent employed people (holding current income constant). Being currently unemployed is estimated to be equivalent to the loss of $42,100 annual income for men and $86,300 annual income for women. Thus, the drop in life satisfaction, after controlling for unobserved time invariant characteristics, associated with unemployment is larger for women than men. The impact of unemployment on life satisfaction is large compared to the drops in life satisfaction associated with changes in income and disability status. It is found that unemployment is less painful for men in Australia than for men in Germany and the United Kingdom. The paper hypothesises that the large fall in life satisfaction may be the result of a drop in life-time earnings, as well as a 'psychological' effect.

Keywords: well-being, happiness, unemployment
JEL Classifications: I31, J64

1. Introduction

Do the unemployed report lower life satisfaction than the employed? The answer to this question is important because it highlights the costs associated with unemployment (non-pecuniary as well as pecuniary costs). In addition, where there are large costs associated with unemployment, it implies that to lower unemployment, boosting the number of jobs available may be more important than changing work incentives.

Overall the literature estimating the link between unemployment and unhappiness has found a strong association, even once unobserved heterogeneity has been controlled for.[1] Winkelman and Winkelman (1998) found that unemployed men in Germany were 38% less likely to have high life satisfaction than employed men, while Clarke (2003) found that unemployed men in the United Kingdom were 69% less likely to have a high quality of life score.

It has also been consistently found in the literature that the non-pecuniary cost of unemployment considerably out-weighs the lost income. Indeed, Winkelman and Winkelman (1998) highlight that monthly income would need to be increased by a factor of 7 to compensate for a spell of unemployment and other studies have found that income would need to be increased by up to A$100,000 to compensate for being unemployed.

While there is strong evidence for a relationship between unemployment and life satisfaction, an important unanswered question is, does the relationship between unemployment and satisfaction vary by gender?[2] This paper investigates the degree to which unemployment affects life satisfaction differently across gender, as well as across other groups (such as educational status). The comparison of the non-pecuniary versus pecuniary costs of unemployment across groups is potentially important in understanding the different ways to motivate people to change behaviours and the different costs that people face from alternative states.

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[1] See Clarke (2003), Frey and Stutzer (2002). There has also been a related literature looking at the relationship between income and life satisfaction. Work has been done with Australian (see Headey and Wooden (2004)), German (see Frijters et al. (2004)) and American data (see Blanchflower and Oswald (2004)). In addition, Ravallion and Lokshin (2001) examine the relationship between income and subjective economic welfare using an ordered probit that controls for unobserved heterogeneity.

[2] Van Praag and Ferrer-i-Carbonell (2004, p.119) investigate how satisfaction varies by gender. Particularly relevant for this study, they find that there are large differences in job satisfaction by gender, which they conclude are the result in differences in both the job characteristics and the subjective views of those characteristics.

How much variation in the impact of unemployment on life satisfaction is there across countries? This paper compares the non-pecuniary costs of unemployment between Australia, Germany, USA and the United Kingdom. By examining the effect of unemployment on life satisfaction (controlling for unobserved heterogeneity) in Australia, this paper allows a comparison of comparable estimates of the non-pecuniary costs of unemployment between Australia, Germany, USA and the United Kingdom.[3]

As well as examining the differences in life satisfaction by gender and across countries, this paper provides evidence about how much income would be required for an unemployed individual to be at the same risk of low life satisfaction as an observationally equivalent employed person. This is important for understanding the relative importance of the pecuniary versus non-pecuniary costs of unemployment and helps to shed some light on whether money buys you happiness, or if being in a job is more important.

Finally, this paper also seeks to answer the question, why do we observe the large difference in life satisfaction between the employed and the unemployed. Specifically, do the unemployed report lower life satisfaction because they feel socially excluded? As briefly discussed in section 2, do we observe a significant effect of unemployment on life satisfaction because of increased "free" time, because of reputation and self-esteem effects or because of the fall in life-time earnings associated with spells of unemployment?

This study builds on earlier work by using the first three waves of the Household Income and Labour Dynamics Survey of Australia (HILDA) database to investigate whether the unemployed report lower life satisfaction. This paper uses panel data methods to investigate the determinants of life satisfaction, and in particular focuses on the impact of unemployment on life satisfaction holding a variety of factors constant.

The results show that unemployment is associated with significant non-pecuniary costs after controlling for time invariant characteristics. The non-pecuniary costs associated with a shift from employment to unemployment are equivalent to a loss of $42,100 in annual income

[3] To our knowledge, while there has been a considerable research investigating whether unemployment is related to low life satisfaction in a cross-section in Australia (see Headey and Wooden (2004), Dockery (2004)), these studies are not able to control for unobserved heterogeneity. Marks and Fleming (1999) use *The Australian Youth in Transition* panel data-set to investigate the influences of well-being for Australian youth and they find a negative effect of unemployment on well-being. Unfortunately their study is not directly comparable with this study, or many other studies in the economics literature, because they treat well-being as a continuous rather than an ordinal variable and they use an auto-regressive covariance structure rather than the more standard conditional fixed effects method.

for men and $86,300 in annual income for women. Unemployment appears to be less 'painful' for Australian men compared to the effect on German, British and American men, but the female estimates are similar across countries. Controlling for unobserved heterogeneity is important in obtaining unbiased estimates of the effect of unemployment on happiness. While unemployment does lead to increased feelings of social isolation for men, this factor did not appear to be important in explaining the gap in life satisfaction between the employed and the unemployed.

The remainder of this paper is structured as follows. Section 2 discusses why we may observe a relationship between unemployment and psychological well-being. Section 3 discusses the methods. Section 4 discusses the data. Section 5 presents the results and section 6 concludes.

2. Understanding the Relationship between Unemployment and Well-Being

This section presents explanations for a relationship between unemployment and life satisfaction. The section focuses on why there may be a relationship between unemployment and well-being beyond the effect of contemporaneous income. That is, the basic hypothesis we are testing is whether the unemployed are less satisfied than the employed, holding income in the current year constant. Of course, unemployment may lower current life satisfaction because it lowers current income.

2.1 The simple labour-leisure trade-off

According to the simple labour supply model, utility is increasing in leisure (time not spent in paid work) and in income. Therefore we would expect the unemployed to report higher life satisfaction than the employed, holding income constant (because they spend less time in paid work). We assume that disutility is gained from time spent in paid work, because time in paid work involves effort and limits the activities that people could otherwise do. In addition, revealed preference shows that, in general, people only work for positive wages (i.e. they need to be compensated a positive amount to be drawn into work). Put another way, if there were utility to be gained from work, they would be prepared to pay in order to move into employment.

Using these two basic assumptions indifference curves can be drawn that show where people are indifferent between paid work and leisure.[4] Given an exogenous market wage, individuals set their hours of work where they are indifferent between leisure and paid work at the wage rate. The individual will only not work (abstracting from job search behaviour) where the wage rate is so low compared to unearned income, that the individual has higher utility from working zero hours compared to being employed.

2.2 Non-pecuniary costs, reputation and psychological well-being

While the simple labour-leisure remains popular in economics, it abstracts from several important issues in relation to unemployment. The second explanation suggests that there are non-pecuniary costs associated with unemployment. That is, while there may be positive benefits associated with decreased time in paid work, these may be swamped by other factors associated with unemployment. Examples of these non-pecuniary costs come from the psychological literature and from Akerlof (1980).

There is a large empirical psychological literature that investigates the impact of unemployment on psychological well-being. This literature provides some explanations for why there may be a link between unemployment and low life satisfaction. Goldsmith et al. (1996) review studies that find being jobless injures self esteem and fosters feelings of lack of control and helplessness amongst young people. Goldsmith et al. (1996) find using the NLSY, that unemployment damages individual's perceptions of self-worth and current and previous unemployment lower current self-esteem. In addition, their analysis pointed to the fact that joblessness damaged self-esteem by generating feelings of depression.

Akerlof (1980) introduces a theory of social custom.[5] In this model, a reputation component enters negatively into the utility function if an individual breaks a social custom. If being out of work or unemployed involves breaking a social norm or custom, then unemployment may result in a loss of reputation. This loss of reputation leads to a drop in utility. In other words unemployment would be associated with lower life satisfaction.

[4] To get the following result an assumption of diminishing marginal utility from leisure and from income is also required.

[5] Akerlof (1980) defines a social custom to be an act whose utility to the agent performing it in some way depends on the beliefs or actions of other members of the community, sanctioned by loss of reputation should agents not follow that custom.

One question that remains is why, if people bear a non-pecuniary cost of unemployment, such as loss of reputation, they remain there and do not work for a lower wage. Akerlof (1980) also uses his model to explain why involuntary unemployment may occur. Essentially, another social custom is that employers must pay a fair wage to their workers and violations of this fair wage result in disutility to the employer. Thus, while there may be unemployed people willing to work for a lower wage, employers are unwilling to hire these people because of the impact of their loss of reputation from so doing on their utility.

2.3 Discrimination, life-time earnings and human capital

The final explanation for a negative effect of unemployment on well-being (holding current income constant) is that contemporaneous income does not capture the entire lost income associated with unemployment. Unemployment may affect expected discounted life-time earnings (see Pissarides (1993) and Arulampalam (2001)), which in turn may affect current life satisfaction. Lifetime earnings may drop during and after a spell of unemployment because the unemployed worker is not gaining on the job human capital. In addition, because employers may discriminate against those with unemployment experience and because unemployment in the current period may give a signal about future probabilities of unemployment, expected life-time earnings may drop during a spell of unemployment.

In most of the relevant empirical literature only current income is entered into the life satisfaction equation. Unemployment lowers current income because the person is not earning in the current period (although they may receive some unemployment benefits). However, unemployment in the current period may also lower earnings in future periods because it increases the likelihood of suffering unemployment in future periods, thereby lowering earnings in these periods. In addition, periods of unemployment may increase the likelihood of working for a lower wage, because human capital is not being accumulated in employment and employers may discriminate against those people with an unemployment history. Thus, the lost wages in the current period may be quite small compared to the impact of unemployment on life-time earnings.

2.4 Taking stock

Overall, unemployment may affect life-satisfaction and utility through a number of channels. Firstly, unemployment may lower current income, which in turn lowers current life satisfaction. Secondly, unemployment may result in increased 'free' time, which holding income constant may result in higher utility. Thirdly, unemployment may lead to psychological distress, loss of reputation and lower self-esteem, which in turn lowers life satisfaction (holding income constant). Finally, unemployment may affect life-time earnings, as well as current income, and thus we may observe a negative relationship between unemployment and life satisfaction because we have not controlled for permanent income.

As well as unemployment affecting life satisfaction, there may be a variety of other factors that need to be held constant to get unbiased estimates of the impact of unemployment on life satisfaction. For example, having a partner unemployed may be associated with increased likelihood of being unemployed and increased likelihood of reporting low life satisfaction.[6] These factors that may be related to both unemployment and life satisfaction include demographics, overall health and well-being, number of children, marital status, country of birth and location.

The above discussion is represented in equation 1. Life satisfaction in the current period depends on current wages (W_t), current leisure (L_t), reputation and self-esteem (R), future wages ($\beta \sum_{i=t+1}^{n} Wi$) and a range of demographic and other characteristics (X).

$$LS_t = LS(W_t, L_t, R, \beta \sum_{i=t+1}^{n} Wi, X) \quad (1)$$

In equation 1, higher current wages, more leisure, higher reputation and higher discounted future wages are all associated with higher life satisfaction. Unemployment is expected to lower current and future wages, increase leisure and lower reputation. Thus, the sign of unemployment on life satisfaction (holding income and demographics constant) is uncertain and will depend on the relative importance of leisure (+), reputation (-) and future wages (-).

[6] If having a partner unemployed reduces the social norm to work then we would see positive correlation between couple's employment status (see Clarke (2003)).

In this paper, in general, current wages, time invariant characteristics and X will be held constant when estimating the impact of unemployment on life satisfaction. The remaining coefficient on unemployment should be interpreted in terms of the underlying variables – leisure, reputation and self-esteem, and discounted future wages. In addition, variations in the coefficient on unemployment across groups may relate to variations in the value of leisure, the reputation and self-esteem costs and the impact of unemployment on future wages.

3. Estimation Methods

This paper primarily uses panel data methods. Panel data represent repeated observations on the same person over time. They allow us to address issues of heterogeneity and omitted variables, measurement error, dynamics and causality under certain conditions. The dependent variable is life satisfaction, which takes values that range from 0-10. For ordinal variables such as this one, ordered logits and probits are generally used. However, the resultant fixed effects and random effects estimates rely on restrictive assumptions. Because of the restrictive assumptions surrounding the panel data ordered logit we compress the dependent variable into a (0,1).[7] The variable takes a value of 1 if high life satisfaction and 0 otherwise and estimation can be undertaken using Chamberlain (1980)'s conditional fixed effect logit estimation.

Assume the following underlying latent model:

$$Y_{it}^{*} = \alpha_i + x_{it}^{'}\beta + \varepsilon_{it} \qquad \text{i} = 1,.....\text{N}, \quad \text{t} = 1.....\text{T} \tag{2}$$

Where Y_{it}^{*} is a continuous but unobserved index of satisfaction of individual i at time t, $x_{it}^{'}$ is a vector of explanatory variables, and α_i is an idiosyncratic fixed effect (which takes into account differences in underlying satisfaction and unobservable time invariant characteristics). However, importantly we do not observe Y_{it}^{*}, the following is observed:

$$Y_{it} = \begin{cases} 1 & \text{if} \quad Y_{it}^{*} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

[7] Crouchley (1995) shows that estimation on this resulting dependent variable is consistent and does not depend on the choice of the breaking point.

For the standard logistic model (ε_{it} independently logistic):

$$P(Y_{it} = 1 \mid x_{it}, \alpha_i) = \exp(\alpha_i + x_{it}'\beta)/(1 + \exp(\alpha_i + x_{it}'\beta)) \quad (4)$$

Chamberlain (1980)'s conditional fixed effects method estimates coefficients conditional on the number of ones and ignores individuals with no within variation.[8] Chamberlain (1980) shows the joint likelihood for each set of T_i observations conditioned on the number of ones in the set is:

$$P(Y_{i1} = y_{i1}, Y_{i2} = y_{i2}, ..., Y_{iT_i} = y_{iT_i} \mid \sum_{t=1}^{T_i} y_{it}, data) = \frac{\exp(\sum_{t=1}^{T} y_{it} x_{it}'\beta)}{\sum_{\sum_i d_{it} = S_i} \exp(\sum_{t=1}^{T_i} d_{it} x_{it}'\beta)} \quad (5)$$

The function in the denominator is summed over the set of all different sequences of T_i zeros and ones that have the same sum as $S_i = \sum_{t=1}^{T} y_{it}$. By conditioning on the sum of the t observations, we have removed the heterogeneity term. This is the fixed effects model.

A pooled estimation (with the error term logistically distributed) is also undertaken where all the intercepts, α_i, are constrained to be the same. This allows a comparison between the results with and without unobserved heterogeneity. Unconditional maximum likelihood estimation is used in these estimation. This is the pooled model.

Finally, a random effect logit estimator is used and normally distributed individual effects are assumed. This method is used to allow a comparison of results to the less parsimonious fixed effects model. Greene (2003, p.692), provides the following approximation to the log likelihood:

$$\ln L_H = \sum_{i=1}^{n} \{\ln[1/\sqrt{\pi} \sum_{h=1}^{H} \prod_{t=1}^{T_i} w_h \Lambda(q_{it}(x_{it}'\beta + \theta z_h))]\} \quad (6)$$

where H is the number of points for the quadrature, and w_h and z_h are the weights and nodes for the quadrature. Greene (2003, p.693) states that this formulation is found to be a "satisfactory compromise between a fully unrestricted model and the cross-sectional variant that ignores correlation altogether". This is the "random effects model".

[8] Where there is no within variation, the probability of observing the sequence we observe is 100% given the sum of the dependent variable. With two periods of data, where the dependent variable equals 1 in both periods, we see y_{i1}=0 and y_{i2}=0, thus Prob(0,0 | sum=0) = 1.

To review, pooled cross-sectional data do not allow for individual effects on the intercept, whereas fixed effects allows the individual component to enter through the intercept and random effects has the individual component entering through the error term. However, the fixed effects estimator only uses the within group variation in estimation (and in practice within group variation may be limited), while the random effects estimation weights within and between group variation according to where the variation in X and the variation in the error term is. [9]

4. The HILDA Database

4.1 Overview of the HILDA database

For this study an unbalanced panel from the HILDA panel database is used, where individuals selected are present in two consecutive waves.[10] The survey is primarily administered in the second half of each year, with the first wave being collected in the second half of 2001. Currently three waves of data are available (2001, 2002 and 2003). In wave 1, 7682 households were sampled comprising 13,969 members. The household response rate from the survey was 66 per cent. Analysis is restricted to those people who are aged 15-64 years of age, so as to exclude the retired.[11] The HILDA survey is primarily collected for the examination of economic and subjective well-being, labour market dynamics and family dynamics. Because of this it has a variety of variables on well-being, family background, work history, demographics and educational history.

4.2 The life satisfaction and unemployment variables

In this literature it is assumed that people are the best judges of their own satisfaction, well-being and utility. The key dependent variable used is life satisfaction. It is based on the

[9] However, consistency of estimates from random effects estimation relies on orthogonality between the intercept term and the explanatory variables.

[10] This survey is funded by the Department of Family and Community Services and administered by the Melbourne Institute of Applied Economic and Social Research. This paper uses HILDA confidentialised data, but the views expressed are solely those of the author and neither FACS nor the Melbourne Institute accept any responsibility for the accuracy or completeness of the research findings.

[11] The age sample was also restricted to 25-55 year olds, rather than the age group 15-64 years used for most of the estimations in this paper (see specification 1, Table A.3.1 for men and Table A.3.2 for women). The age group was restricted to check the sensitivity of the results to the exclusion of those people more likely to be studying and nearing retirement age. When the age group is restricted unemployment is associated with a slightly larger drop in life satisfaction for both men and women.

question: "All things considered, how satisfied are you with your life? Pick up a number between 0 and 10 to indicate how satisfied you are".[12] Because panel data methods are used in this paper, the different anchoring that people use for life satisfaction is controlled for.

Table 1 reports the distribution of life satisfaction and shows that 8% of people report life satisfaction between 0 and 5 (2510 person observations), 57% of people report a score between 6 and 8 (17,580 person observations), and 34% report a score of 9 or 10 (10,508 person observations). Overall, there are similar distributions for men and women, with a small proportion of people reporting low life satisfaction and over half of people reporting life satisfaction of 8 or 9. Table 2 shows that a similar proportion of people report low life satisfaction, albeit with a slight fall in the third wave.

Table 1: Disaggregated life satisfaction by gender

	Males		Females	
	Number	%	Number	%
0	29	0.20	37	0.23
1	28	0.19	36	0.23
2	74	0.51	67	0.42
3	139	0.95	122	0.76
4	229	1.57	213	1.33
5	719	4.92	817	5.11
6	985	6.74	967	6.05
7	2,922	20.00	2,985	18.67
8	4,795	32.82	4,926	30.81
9	2,861	19.58	3,462	21.66
10	1,830	12.52	2,355	14.73
total	14,611		15,987	

Notes: Data is based on the question: how would you rate your life overall. The data is based on the pooled data, with an unbalanced panel. For people aged 15-64 years, for people with valid life satisfaction.

The unemployment variable is based on the ILO definition of unemployment, as those who are not in employment, but who are actively seeking and available for work. The employed are those people who work for pay or profit for 1 or more hours per week. People not in the labour force are not in employment and are not searching for employment. Across

[12] The level of life satisfaction has been shown to be related to risk of suicide, probability of smiling during social interactions; and changes in brain electrical activity and heart rate account for a significant amount of the variance (see Frey and Stutzer (2002)). Moreover the variable has shown to be moderately stable and sensitive to changing life conditions (again see Frey and Stutzer (2002)).

the three years, Table 3 shows that on average 79% of males are in employment, 5% are in unemployment and 16% are not in the labour force. For women, 4% are in unemployment, 65% are employed and 32% are not in the labour force.

Table 2: Life satisfaction by wave and gender: sample size

	wave 1 (2001)	wave 2 (2002)	wave 3 (2003)	pooled (2001-03)
		Numbers in each group		
		Males		
low life sat	433	453	337	1223
high life sat	4,434	4,711	4,248	13393
		Females		
low life sat	469	477	352	1298
high life sat	4,880	5,134	4,681	14695
		% in each group		
		Males		
low life sat	8.9	8.8	7.4	8.4
high life sat	91.1	91.2	92.6	91.6
		Females		
low life sat	8.8	8.5	7.0	8.1
high life sat	91.2	91.5	93.0	91.9

low life satisfaction – satisfaction <=5, restricted to those aged 15-64 years

4.3 Descriptive statistics on unemployment and life satisfaction[13]

Figure 1 shows the proportion of each employment status group that rates their life satisfaction at different levels. The unemployed are more likely to rate their life satisfaction in each of the categories between 1 and 6. Figure 1 also shows that the employed are far more likely to rate their life satisfaction at 8 (over 1/3rd of the employed rate their life satisfaction at this level) and the employed and those not in the labour force are more likely to rate life satisfaction at 9 than the unemployed (over 1/5th of the employed and the not in the labour force rate their life satisfaction at this level).

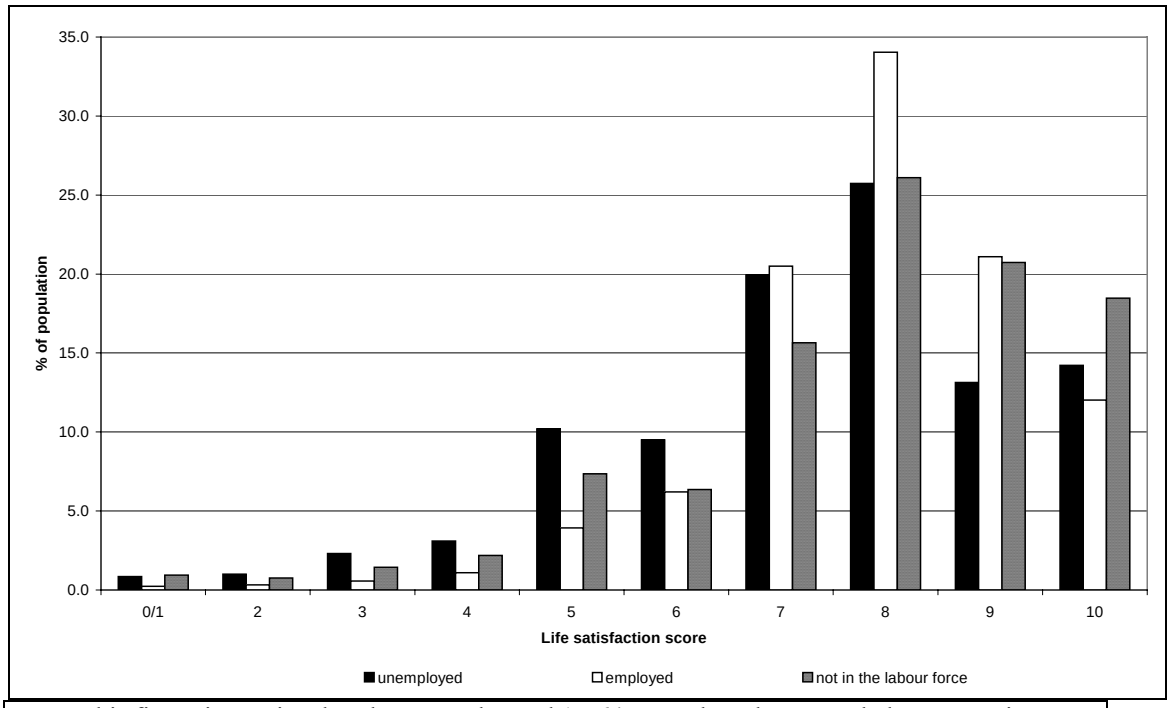
[13] The descriptive statistics presented here are based on a pooled cross-section and the data are unweighted. The descriptive statistics are unweighted to show the properties of the sample used and to provide context for the regression results that are presented later in the paper.

Table 3: Employment status by wave and gender: sample size

	wave 1 (2001)	wave 2 (2002)	wave 3 (2003)	pooled (2001-03)
		Numbers in each group		
		Males		
unemployed	272	249	177	698
employed	3,800	4,087	3,722	11609
not in the labour force	795	828	685	2308
total	4867	5164	4584	14615
		Females		
unemployed	213	224	159	596
employed	3,394	3,622	3,325	10341
not in the labour force	1,742	1,764	1,549	5055
total	5349	5610	5033	15992
		% in each group		
		Males		
unemployed	5.6	4.8	3.9	4.8
employed	78.1	79.1	81.2	79.4
not in the labour force	16.3	16.0	14.9	15.8
		Females		
unemployed	4.0	4.0	3.2	3.7
employed	63.5	64.6	66.1	64.7
not in the labour force	32.6	31.4	30.8	31.6

Notes: only includes those with valid life satisfaction. The unemployment rates with and without this 'invalid' data are similar. Restricted to those people aged 15-64 years

Figure 1: Life satisfaction by employment status



notes: This figure is restricted to those people aged 15-64 years, based on a pooled cross-section.

Table 4 shows the proportion of each group that rates their life satisfaction at 6 or above by gender and duration of unemployment. A very similar proportion of men and women who are employed rate their life satisfaction at 6 or above (93.7% for men and 94.0% for women), while a higher proportion of women who are not in the labour force rate their life satisfaction as above 6 out of 10 (88.8% for women compared to 83.8% of men). A higher proportion of the male unemployed rate their life satisfaction positively, with 81.4% of unemployed women rating their life satisfaction as high, compared to 83.5% of male unemployed. Interestingly, this difference is driven by male short-term unemployed reporting a higher incidence of high life satisfaction (84.7% of short-term unemployed men compared to 81.6% of short-term unemployed women).

Table 4: % with low life satisfaction by employment status

	Males	Females
short-term unemployed	84.7	81.6
long-term unemployed	78.7	80.2
all unemployed	83.5	81.4
employed	93.7	94.0
nlf	83.8	88.8

Notes: LTU = unemployed for 12 months or more. The sample is all people aged 15-64 years.

Table 5 looks at the stability of the proportions of each group that rate their life satisfaction as high. The proportions of the employed and out of the labour force with high life satisfaction are quite steady over the three waves (albeit with a small drop in the proportion of the male not in the labour force category in the second wave), because of the large sample sizes. However, with the unemployed, the proportion that rates their life satisfaction as above 5 has more apparent random variation for women. The proportion that rate their life satisfaction as high is similar for the male out of the labour force and male unemployment categories and female unemployed are more likely to report low life satisfaction than female not in the labour force.

Table 6 shows how changes in unemployment status are correlated with life satisfaction status, across three categories – unemployment in-flow, out-flow and stock. There is a high proportion with high life satisfaction status in both periods. However, the unemployment in-flow was more likely to record a drop in life satisfaction (8.8% of the

unemployment in-flow had high satisfaction in the first period and low satisfaction in the second period). In contrast, the out-flow were more likely to record a rise in satisfaction (9.9% of the unemployment out-flow had low satisfaction in the first period and high satisfaction in the second period).

Table 5: % with high life satisfaction by wave and employment status

	wave 1 (2001)	wave 2 (2002)	wave 3 (2003)
	Males		
unemployment	84.6	81.5	84.8
employment	93.0	93.6	94.4
not in the labour force	84.2	82.6	85.0
	Females		
unemployment	77.5	83.5	83.7
employment	93.6	93.6	94.9
not in the labour force	88.4	88.2	90.0

Notes: high life satisfaction – life satisfaction at 6 or above, includes people aged 15-64 years

Table 6: % with low life satisfaction by in-flow/ out-flow

	u in-flow	u out-flow	u stock
low-low	7.4	7.5	10.2
low-high	8.2	9.9	9.2
high-low	8.8	5.7	9.2
high-high	75.6	76.9	71.4
total numbers	512	650	196

Notes: u in-flow – not unemployed at t-1, unemployed at t; u out-flow – unemployed at t-1, not unemployed at t, u stock – unemployed at t-1 and unemployed at t, people aged 15-64 years

Table 7: % of transitions between states

		LS status at t+1		
		1-5	6-8	9-10
LS status at t	1-5	3.2	4.7	0.7
	6-8	3.7	42.9	11.6
	9-10	0.6	11.0	21.7

Notes: unit of observation - observations with 2 consecutive valid records
total number of transitions: 6513
LS – life satisfaction transition rates. people aged 15-64 years

Tables 7 and 8 show further detail about the flows into and out of various states. Table 7 shows that almost half of all observation pairs (42.9%) were of life satisfaction being

between 6 and 8 in both periods, 3.2% of observations had life satisfaction being 5 or below in both periods, and 9.7% of records had life satisfaction low in one period and high in other period. Table 8 shows that 1546 people became disabled and 1213 overcame a disability, 555 became married (or cohabiting) and 443 people ended a marriage (or a cohabitation) and did not start another relationship.

Table 8: Flows between various states

Variable	Number of observations
unemployment in-flows	512
unemployment out-flows	650
high life in-flow	1019
high life out-flow	903
disability in-flow	1546
disability out-flow	1213
marriage in-flow	555
marriage out-flow	443
university quals in-flow	111
university quals out-flow	0

notes: people aged 15-64 years

4.4 Other variables included in the analysis

The estimation includes a range of other factors that may be correlated with both unemployment and life satisfaction, in particular, factors that may affect both the probability of unemployment and life-time earnings (which may have an independent effect on life satisfaction). These variables include disability, level of education, age, region and marital status.

Appendix 1 reports the variable means used in my estimating sub-sample from HILDA. All the variables are of the expected size. The average age is 39.0 years, 65% of people are married or cohabiting, 19% are disabled, 72% are employed, 24% are not in the labour force and 4% are unemployed. Other important mean statistics are that 92% of people report life satisfaction of 6 or above out of 10, 61% of people live in cities, 77% of people are Australian born and the average annual household income in thousands of dollars (2001 dollars) is $55,240.

Appendix 2 reports the correlations between several psychological and health measures available and between several socio-economic variables in HILDA. There is a high degree of correlation between the health measures, with correlations between the good life

satisfaction variable and good health being 0.21, good emotion being 0.54 and good social connection being 0.22. The correlations between unemployment and other socio-economic variables are relatively low, with negative correlations between unemployment and income, age; and a positive correlation between disability and unemployment.

5. Results

Section 4 showed that the unemployed are more likely to report low life satisfaction and a fall in satisfaction seems to be associated with a move into unemployment, and a rise in satisfaction associated with a move out of unemployment. To examine the degree to which the differences in life satisfaction are being driven by observed and unobserved characteristics, the results from the pooled logit and random and fixed effect logit estimations using the unbalanced panel data from HILDA are next presented.[14]

5.1 The relationship between unemployment and life satisfaction for men

The first results are from a logit where the dependent variable equals 1 if life satisfaction is greater than 5, and 0 otherwise. This estimation is based on pooled person-year observations and does not allow for the correlation in life satisfaction across years on the same individual (see specification (1) in Table 9). All the coefficients in Table 9 are odds ratios. That is, a coefficient greater than 1 implies as the explanatory variable increases in size there is a higher likelihood of reporting good life satisfaction. Men and women are examined separately because in the random effects and pooled specifications the equality of coefficients between men and women was rejected at the 1% level of significance.

The first result emerging from specification (1) is that for men, holding income, age, region and time constant, being unemployed rather than employed is associated with a 44% lower probability of reporting high life satisfaction. Men not in the labour force were 46% less likely to report high life satisfaction than the employed (the size of the not in the labour force effect was similar between those who were marginally attached and those who were not at all attached to the labour force). Men with higher household income reported higher life satisfaction, for every additional $1000 additional annual household disposable income there

[14] The fixed effects estimate with a balanced sub-panel of HILDA can be seen in specification (2) in Table A.3.1 and Table A.3.2. The main results with the larger unbalanced panel hold with the balanced sub-panel. That is, unemployment is associated with lower life satisfaction and the effect seems larger for women than for men.

was a 0.7% increased probability of reporting higher life satisfaction.[15] In the pooled cross-section having a partner unemployed for males was associated with a 38% lower probability of reporting high life satisfaction. Consistent with the earlier literature married people, younger people, and people without disabilities are more likely to report higher life satisfaction. Pooled cross-section estimation does not allow for correlation over time in individuals' explanatory and dependent variables and hence it is inefficient.

Specification (2) in Table 9 reports results from a random effects estimator which allows for a time invariant component (assumed to be normally distributed) in the error term. The results are again presented as odds ratios. The estimates from the random effects model are very similar to the pooled results.[16] Unemployment and not in the labour force (holding current household income constant) are both associated with a lower probability of having high life satisfaction compared to the employed (although with the random effects estimator the probability drops by even more). Being married, not disabled or having a partner not unemployed are all associated with higher probabilities of reporting higher life satisfaction.

One issue with the pooled and random effects estimators is that they do not allow for correlation between the time invariant unobserved characteristics and whether currently unemployed. Where such a correlation exists we will get biased estimates, and we now therefore turn to Chamberlain's conditional fixed effect (CFE) estimator. One issue with this estimator is that, where a correlation does not exist, the CFE estimator will be inefficient.[17]

[15] Individual disposable income, equivalised household income and the log of household disposable income were included in estimation separately and were found to have less explanatory power than raw household disposable income (all converted to A$2001). The size of the income effect increased for men when only households earning less than A$100,000 were included (by a factor of 2), but the effect became smaller for women. The interaction between household income and a dummy for having more income than $100,000 was not significant at any reasonable level of significance. The effect of income on life satisfaction was not sensitive to the exclusion of households with negative income.

[16] At the 0.1% level of significance the hypothesis that there is no panel level variance can be rejected for both men and women. For men rho equals 0.565 and for women rho equals 0.544, thus highlighting the importance of panel level variance and the fact that the random effects estimator is preferred over the pooled estimator.

[17] Importantly the precision of estimates is determined by the number of movements into and of employment and unemployment and into and out of high life satisfaction. There were 252 male unemployment in-flows and 340 male unemployment out-flows. Similarly there were 476 male flows into high life satisfaction and 444 male flows into low life satisfaction.

Table 9: Male unemployment and life satisfaction (odds ratios)

	(1) Pooled Life S. >5	(2) Random Life S. >5	(3) Fixed Life S. >5	(4) Duration Life S. >5	(5) Ferrer Life S. $>\mu_{ls}$	(6) Social Life S. >5
unemployment	0.562**	0.412**	0.680	0.454**	0.694*	0.695
	[3.07]	[3.34]	[1.11]	[2.60]	[1.96]	[1.03]
nlf	0.539**	0.369**	0.657	0.390**	0.887	0.706
	[4.86]	[5.47]	[1.48]	[5.11]	[0.80]	[1.19]
income000	1.007**	1.008**	1.009	1.008**	1.001	1.008
	[3.55]	[3.85]	[1.47]	[3.73]	[0.96]	[1.32]
$income000^2$	1.000	1.000	1.000	1.000	1.000	1.000
	[1.81]	[1.46]	[1.22]	[1.39]	[0.25]	[1.16]
marry	3.224**	5.760**	2.649**	5.544**	2.964**	2.641**
	[9.35]	[9.95]	[3.25]	[9.68]	[5.88]	[3.20]
disability	0.546**	0.490**	0.955	0.494**	0.866	0.953
	[5.58]	[5.07]	[0.24]	[4.99]	[1.60]	[0.25]
child	0.961	0.960	1.006	0.966	0.999	0.975
	[0.83]	[0.62]	[0.04]	[0.53]	[0.01]	[0.16]
part_unemp	0.620	0.599	0.708	0.597	0.984	0.701
	[1.79]	[1.43]	[0.86]	[1.44]	[0.08]	[0.86]
age	0.928	0.909		0.917		
	[1.80]	[1.68]		[1.53]		
age^2	1.001*	1.001*		1.001*		
	[2.28]	[2.17]		[2.00]		
soc. integration						2.177**
						[4.84]
unemploy. exp.				0.944*		
				[2.06]		
currently ltu				1.079		
				[0.16]		
school/ COB controls	yes	yes	no	yes	no	no
person/year obs	8834	8834	1301	8830	6704	1301
person obs		3228	460	3227	2337	460
Pseudo R2	0.11	0.08	0.03	0.080	0.01	0.05
Hausman test		6.59				
(df)		(11)				

Notes: Results are presented as odds ratios. Specifications (3), (6) are estimated using Chamberlain's conditional fixed effects. Specification (2), (4) are estimated using random effects (test for rho=0 rejected at 1% in all RE estimations). Hausman test in (2) testing for unbiased RE. Pooled logit standard errors adjusted for clustering at a person level. Specification (5) allows for individual specific thresholds (see Ferrer-i-Carbonell and Frijters (2001)). The data is for 15-64 year olds and for an unbalanced panel.
**sign. at the 1% level, *sign. at the 5% level. absolute value of z statistics in brackets.
Base category: employed, unmarried, no disability, no children, partner not unemployed, living in remote area, Australian born. Male and female coefficients have been estimated separately because test for equality of coefficients was rejected at the 1% level in the random effects and pooled estimation. Region and time dummies are also included in estimation.

Specification (3) in Table 9 presents results using the basic fixed effects estimator, with results again presented as odds ratios.[18] When the time invariant unobserved characteristics are controlled for the probability of the unemployed reporting high life satisfaction increases relative to the employed and there is no longer a statistically significant difference between the unemployed and the employed. The unemployed are 32% less likely to report high life satisfaction than the employed in the fixed effects estimation, compared to 56% in the random effects estimation. However, the unemployed coefficient has a high standard error. When unobserved heterogeneity is controlled for, the coefficients on not in the labour force and marriage also drop in size, but remain of the same sign.

An interesting question with the fixed effects estimator is whether the effect of moving into unemployment on life satisfaction has the same effect as moving out of unemployment. It may be thought that job loss may have larger effects on life satisfaction than job gain. Because of the small sample size the results from the in-flow compared to the out-flow models were estimated on the male-female combined model (allowing for interactions on not in the labour force and disability). Overall, there was found to be little difference in the effect of unemployment on life satisfaction in the in-flow compared to the out-flow (odds ratios within 0.05 percentage points of one another).

In summary when unobserved heterogeneity is controlled for the impact of unemployment on life satisfaction drops in size, but remains the same sign, which is consistent with the results from the international literature, see Clark et al. (2001). A similar result was also found with this data where the life satisfaction variable was treated as a continuous variable and an OLS fixed effect model was run. The effect of unemployment on life satisfaction, holding current income constant, as mentioned in section 2 above may be driven by a 'reputation effect' or an effect of unemployment on future earnings.

The Hausman test reported at the bottom of specification (2) highlights that we cannot reject the hypothesis that the random effects estimates are unbiased. The Hausman test below specification (2) potentially suggests that for men our preferred results should be the random

[18] The base category is also allowed to change from employment to full-time employment (see specification 3 of Table A.3.1 and Table A.3.2). With a base of full-time employment, the gap in the coefficients on unemployment between men and women increases further. That is, the female unemployed are 58% less likely to report high life satisfaction compared to full-time employed women, while the male unemployed are 32% less likely to report high life satisfaction compared to the male full-time employed.

effects results in specification 2 because random effects is efficient and the test suggests that they are unbiased.

Unemployment history and whether currently long-term unemployed are now included as controls in specification 4 of Table 9.[19] The purpose of including these controls is to examine whether or not there is scarring associated with unemployment (i.e. past spells of unemployment reduce life satisfaction) and whether or not people adjust to spells of unemployment (i.e. currently long-term unemployed increases life satisfaction). There is little impact of duration effects on life satisfaction for men. But an experience of unemployment prior to the current spell is associated with lower life satisfaction (each additional year of unemployment history for men is associated with a 6% lower probability of reporting high life satisfaction). In addition, the effect of unemployment on life satisfaction falls in this specification, highlighting that the probability of being currently unemployed is positively correlated with past unemployment status.

Some caution should be observed in reading too much into the coefficient on unemployment history. It may be that the unobserved time invariant characteristics related to life satisfaction are also correlated with the unemployment history coefficients, leading to potentially a bias in the estimate. However, because unemployment history is strictly increasing and because long-term unemployment (unemployment greater than a year) is also included in the estimation, there would not be enough variation in the unemployment history measure to get reliable estimates from the fixed effects estimation.

Next in specification 5 of Table 9 results using the methodology from Ferrer-i-Carbonell and Frijters (2004) are presented. These allow for the cut point in the conditional fixed effect estimation to vary across individuals, thus allowing for more variation in the dependent variable.[20] This methodology increases the sample size from 1301 person-year

[19] This specification is based on a random effects model because unemployment history for most records will be time invariant, or increase similar to a time trend. In addition, the affect of long-term unemployment is likely to identified off a small number of observations.

[20] The Ferrer-i-Carbonell and Frijters (2004) statistic is as follows:

$$p[I(Y_{i1} > k_i)..., I(Y_{iT} > k_i) \mid \sum_t I(Y_{it} > k_i) = c] = \frac{e^{\sum_{t=1}^{T} I(Y_{it} > k_i) x_{it}\beta}}{\sum_{Y \in S(k_i c)} e^{\sum_{t=1}^{T} I(Y_{it} > k_i) x_{it}\beta'}}$$ with 0<c<T and where s(k_i, c_i) denotes the set of all the possible combinations of $Y_{i1},\ldots Y_{iT}$ for which $\sum I(Y_{iT}>k_i)=c_i$, where c_i denotes the number of times that general satisfaction is above the barrier k_i. In this paper k_i is defined to be at the individual's mean score for life satisfaction. Put simply, a mean life satisfaction score is calculated, where the

observations with the fixed effects model in specification 3, and from 3192 with a higher life satisfaction cut-point (see appendix 3) to 6704 person-year observations.[21] Most of the increased sample size is concentrated at the higher end of the life satisfaction scale.

The first overall result from the Ferrer-i-Carbonell and Frijters (2004) method is that the coefficient on unemployment remains less than 1 (and the effect of unemployment on life satisfaction becomes slightly smaller for men). The effect of not in the labour force on the probability of being in a worse life satisfaction category drops with this methodology. Although the Ferrer-i-Carbonell and Frijters (2004) method allows the use of the whole distribution of life satisfaction in estimation, it is interesting that only unemployment and marriage are significant.

Finally, specification 6 in Table 9 reports estimates including an extra explanatory variable - whether the person feels socially isolated. The purpose of this is to investigate whether unemployment has a negative effect on life satisfaction because of feelings of social isolation. However, when social isolation is included there is little change to the coefficient on unemployment for men, but men who feel socially connected are over twice as likely to report high life satisfaction.[22]

A final question that has been examined by Clark (2003) is whether local area unemployment rates affect the costs of unemployment. This research areas seeks to answer the question, are social norms affected by unemployment rates and do these norms in turn then affect the non-pecuniary costs of unemployment? Clark (2003) finds some evidence that where others are unemployed this lowers the effect of unemployment on life satisfaction. Estimations for this paper showed that unemployment did have a larger effect on life satisfaction for those in higher socio-economic areas (and this result was significant at the 5% level for women in the fixed effects model). This result is consistent with the reputation costs

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life satisfaction score is above the mean the dependent variable takes a value of 1, otherwise the dependent variable takes a value of 0.

[21] The cut-off in the level of the explanatory variable, life satisfaction, was also allowed to move from greater than 5 to greater than 7 – see specification (4) from Table A.3.1 for men and Table A.3.2 for women. The results using the alternative cut-point are broadly similar to the results from the estimates using the cut-point at 5. However, the effect that female happiness is more sensitive to unemployment than male happiness is not robust to the choice of cut-point.

[22] Specification (5) in Table A.3.1 and Table A.3.2 shows that the factors that are related to low life satisfaction are also related to low social connection. The impact of unemployment on social connection is similar for men to that with a high life satisfaction dependent variable. While for women the impact of unemployment on high social connection is very small and not statistically significant.

of unemployment being higher in high socio-economic areas. Interestingly, partner's employment status, previously having a high income, having high educational qualifications, age and being foreign born all have little effect on the probability of reporting high life satisfaction.

5.2 The relationship between unemployment and life satisfaction for women

As stated above, men and women are examined separately because in the random effects and pooled specifications we could reject the hypothesis of equality of coefficients between men and women at the 1% level of significance. Table 10 reports the results of estimating 6 specifications for women. In the first 3 estimations where the dependent variable is 1 if life satisfaction is greater than 5, women who are unemployed are less likely to report high life satisfaction compared to the employed, and the size of the effect of unemployment on life satisfaction is greater than for males. This result suggests that potentially the effect of unemployment on life satisfaction is greater for women than men in Australia. The following sub-sections discuss in detail the results from each specification.

In the pooled (specification 1, Table 10) and random effects estimation (specification 2, Table 10) the signs and sizes of the coefficients on unemployment differ between men and women. In the female random effects specifications, female unemployed are 69% less likely to report high life satisfaction compared to female employed, while the comparable figure for the male unemployed is 59%.

Turning to the impact of being out of the labour force on life satisfaction, women who are not in the labour force are 35% less likely to report high life satisfaction, while males not in the labour force are 63% less likely to report high life satisfaction. One potential explanation for this difference is that being out of the labour force is more of an involuntary state for men compared to women (since potentially more women choose to be not in the labour force as they raise children).

The impact of being married, having high household income and not having a partner unemployed increase the probability of reporting high life satisfaction more for men than women. On the other hand the effect of disability and age (u shaped) on life satisfaction is greater for women than it is for men in the random effects specifications. However, in the

random effects estimation it should be noted that the only coefficients significantly different at the 1% level between men and women are disability and not in the labour force.

Specification 3, Table 10 reports the fixed effects estimators for women. The coefficient on unemployment changes in size for women when we control for unobserved heterogeneity.[23] This suggests that unobserved time invariant characteristics explains some of the gap in life satisfaction between the unemployed and the employed for women. The female unemployed are now 49% less likely to report high life satisfaction compared to employed women, while women not in the labour force are 39% less likely to report high life satisfaction compared to employed women. In addition, the fixed effect estimations show the effect of income on life satisfaction increases in size.

With the Hausman tests for unbiased coefficients on the random effects estimators (see specification (2)), at the 1% level we can reject the hypotheses of no fixed effects and of unbiased random effects coefficients for women. Thus, the preferred estimator for women is the fixed effect estimator (specifications (3)).

Specification 4, Table 10 reports the random effects female estimates taking into account unemployment history and whether currently long-term unemployed. The unemployed (for a given unemployment history) are 69% less likely to report high life satisfaction, the same as when unemployment history and whether long-term unemployed are excluded. Recall that for men the effect of unemployment on life satisfaction drops by 4 percentage points when unemployment history is included.

Interestingly for both men and women the longer the unemployment history the greater the probability of reporting low life satisfaction. This suggests that those people who have an unemployment history are less likely to report high life satisfaction, consistent with a scarring effect of unemployment. On the other hand the long-term unemployment coefficient is not significant, suggesting little of a duration effect on life satisfaction.

[23] There were 260 female unemployment in-flows and 310 female unemployment out-flows. Similarly there were 543 female flows into high life satisfaction and 458 female flows into low life satisfaction.

Table 10: Female unemployment and life satisfaction (odds ratios)

	(1) **Pooled** Life S. >5	(2) **Random** Life S. >5	(3) **Fixed** Life S. >5	(4) **Duration** Life S. >5	(5) **Ferrer** Life S. > μ_{ls}	(6) **Social** Life S. >5
unemployment	0.375**	0.311**	0.513*	0.310**	0.760	0.551*
	[5.50]	[5.04]	[2.23]	[4.67]	[1.73]	[1.96]
nlf	0.750**	0.646**	0.612*	0.658**	1.029	0.657
	[3.19]	[3.53]	[2.30]	[3.37]	[0.31]	[1.95]
income000	1.003*	1.003	1.008	1.003	1.002	1.009
	[2.18]	[1.90]	[1.17]	[1.82]	[1.84]	[1.36]
income000^2	1.000	1.000	1.000	1.000	1.000	1.000
	[0.91]	[0.37]	[1.01]	[0.33]	[0.27]	[1.23]
marry	2.815**	4.595**	3.109**	4.484**	1.856**	2.935**
	[10.68]	[11.52]	[4.29]	[11.32]	[4.28]	[4.04]
disability	0.363**	0.312**	0.742	0.316**	0.985	0.793
	[11.21]	[9.67]	[1.77]	[9.56]	[0.18]	[1.34]
child	1.039	1.029	0.755	1.019	0.929	0.731
	[0.88]	[0.50]	[1.70]	[0.32]	[0.99]	[1.86]
part_unemp	0.934	1.103	1.277	1.159	1.186	1.298
	[0.29]	[0.31]	[0.70]	[0.46]	[0.98]	[0.74]
age	0.918**	0.898*		0.906*		
	[2.63]	[2.48]		[2.25]		
age^2	1.001**	1.001**		1.001**		
	[3.14]	[2.96]		[2.69]		
soc. integration						2.051**
						[5.14]
unemploy. exp.				0.920**		
				[2.73]		
currently ltu				1.659		
				[1.02]		
school/ COB controls	yes	yes	no	yes	no	no
person/year obs	10929	10929	1699	10927	8613	1699
person obs		3932	590	3932	2983	590
Pseudo R2	0.10	0.07	0.04	0.07	0.01	0.07
Hausman test		92.30**				
(df)		(11)				

Notes: see Table 9 notes

The final two specifications from Table 10 reveal contrasting results for women compared to men. The results from the Ferrer-i-Carbonell and Frijters (2004) methodology are presented in specification 5 of Table 10. For women the effect of unemployment on life satisfaction drops when the full life satisfaction scale is taken into account (in contrast to men

where there was little effect). Thus, suggesting that potentially the differences between men and women in life satisfaction are sensitive to the break-point.

Specification 6 reports results when level of social integration is included. The effect of unemployment on life satisfaction drops slightly for women, suggesting that social integration does play a small role in explaining why female unemployed appear to have lower life satisfaction. In addition, there is a large and significant effect of social integration on life satisfaction, a result also found for men.

5.3 Translating life events into income

A natural next question is how big is the effect of unemployment on life satisfaction. This section asks the question: how much annual income would someone who is unemployed need to be given to have the same risk of experiencing high life satisfaction as someone who is employed? The estimates are reported in Table 11. This allows a comparison between the effect of unemployment on life satisfaction and the effect of income on life satisfaction.[24]

The first row of Table 11 shows that a man who is unemployed at the survey date would need $42,100 *additional* annual household disposable income to have the same life satisfaction as an employed man. For women the effect of unemployment on life satisfaction is greater and the effect of income on life satisfaction is smaller. Hence women require $86,300 increased household disposable income to compensate for being unemployed at the survey date.

While these results appear large, a number of important issues should be borne in mind. Firstly, large compensating income variations have been found elsewhere, as will be illustrated below. Secondly, a number of other factors have very large effects in terms of lost income. For example, being married is worth more than $100,000 of annual income for both men and women. Indeed the large amount of income required to compensate for unemployment, reflects the small effect of income on life satisfaction and the relatively large effect of unemployment on life satisfaction. Finally, there are relatively large standard errors

[24] Taking the scenario that for every $1000 the probability of reporting life satisfaction increases by 5% and that unemployment lowers life satisfaction by 50%. In this case for the individual to have the same probability of reporting high life satisfaction between income and life satisfaction they would need to be given $(1.05)^{14.2}=2$, thus the person would need to be compensated $14,200.

on the impact of unemployment on life satisfaction and so imprecision does surround the estimates.

Table 11: Annual household compensation required for life events (000's)

	males		females	
	central	confidence interval	central	confidence interval
current unemployment*	42.1	-32.3 - 116.5	86.3	10.4 - 162.2
marriage*	106.5	42.3 - 170.8	146.8	79.8 - 213.8
disability*	5.0	-35.4 - 45.5	38.6	-4.2 - 81.4
1 year of unemployment in past**	7.6	0.4 - 14.9	25.9	7.3 - 44.5
university**	75.7	17.5 - 134	148.2	35.2 - 261.2
born in non-English speaking country**	158.6	108.4 - 208.8	231.8	132.3 - 331.3

Includes people aged 15-64 years.
* Based on fixed effect estimates in tables 9 and 10.
**Based on Random effects estimates given in tables 9 and 10 (to allow time invariant characteristics).
Income measure is based on central estimates of the effect of annual household income on life satisfaction.
The estimates are based on 2001 A$.
Calculated as follows $x = \ln(1/OR_{unemp}) / \ln(OR_{inc})$

The next interesting point to note from Table 11 is the compensation required for an unemployment history (from the random effects estimator). For men, having a year of unemployment history since beginning in the labour force requires an income gain of approximately $7,600 to have the equivalent life satisfaction. For women, this unemployment history effect is worth $25,900. However for both men and women this is significantly less than the effect of university qualifications on life satisfaction. The size of the effect of unemployment suggests either that unemployment earlier in one's life leaves a lasting psychological impression. An alternative explanation is that, all else equal including current income, unemployment history is associated with lower future income, or less wealth (i.e. potentially from lower past income).

5.4 International comparisons

Table 12 compares these result with the previous literature. Firstly, to our knowledge no study using Australian data has used fixed effects estimation to examine the relationship

between unemployment and life satisfaction. Marks and Fleming (1996) treated the well-being measure as continuous and assumed an autoregressive correlation of variables over time. Headey and Wooden (2004) use OLS with cross-sectional data and Dockery (2004) uses an ordered probit.

All the studies with Australian data found large significant effects of unemployment, usually with unemployment being one of the more important factors. Looking at gender differences in the effect of unemployment on life satisfaction, Marks and Fleming (1996) find a larger effect for males in earlier cohorts but not for later cohorts, while Headey and Wooden (2004) and Dockery (2004) either do not examine this issue, or find no substantive difference. When comparing the relative sizes of income, the equivalent income loss associated with unemployment estimated in the current study is broadly similar to both the Headey and Wooden (2004) and the Dockery (2004) estimates.

Next consider how the effects of unemployment vary by country reported in the lower panels of Table 12. The effect of unemployment on life satisfaction for men appears smaller in Australia than elsewhere, while the effect of unemployment appears similar for Australian women compared to overseas women. While in Australia male unemployed are 32% less likely to have high life satisfaction, in Germany they are 38-61% less likely to have high life satisfaction and in the UK they are 69% less likely to have a high life score. In comparison, in Australia, women are 49% less likely to have high satisfaction, while in Germany they are 54% less likely to have high life satisfaction and in the UK they are 49% less likely to have high life satisfaction.

The income losses associated with unemployment appear similar in Australia to elsewhere, albeit with a slightly smaller effect for men. While in Australia, men require $42,100 annual compensation, in Britain they cannot be compensated (because of no effect of income on life satisfaction), while in Germany they require A$105,100 annual compensation and in the US they require A$141,600 per year.

The smaller effect of unemployment on life satisfaction for Australian men may potentially be because in Australia unemployment carries less stigma than elsewhere. This small ‘stigma’ cost may in turn then result in a smaller drop in life satisfaction, perhaps because of a direct effect on self-esteem as well as a less direct effect through a smaller drop in life-time earnings associated with a spell of unemployment.

Table 12: Comparisons of the relationship between unemployment and life satisfaction

Study	unobserved heterogen.	odds difference (males)*	odds difference (females)*	income difference (males)	income difference (females)
		Australia			
This study	yes, fixed effect	32% less likely to have high LS	49% less likely	A$42,100 annual household income	A$86,300
Marks and Fleming (1996)	yes, AR covariance	3-5 units less on psych. score (0-100 scale) than not unemployed	see males	no individual income measure used.	see males
Headey and Wooden (2004)	no, OLS	LS lower by 3.9 points (out of 10) compared to NLF	see males	A$94,700 annual household income	see males
Dockery (2004)	no, ordered probit	larger effect than being married	see males	from 'just getting along' to 'reasonably comfortable'	see males
		Germany			
Winkelman & Winkelman (1998)	yes, fixed effect	38% less likely to have high LS	na	737% increase in *monthly* income	na
Clark et al. (2001)	yes, fixed effect	61% less likely to have high LS	54% less likely	A$105,100 in annual income	A$25,800 in annual income
Frijters et al. (2004)	yes, fixed effect	0.45 lower LS than full-time employed (scale 1-10).	0.57 lower LS	82% increase in monthly income	106% increase in monthly income
		UK and US			
Clark (2003) (UK data)	yes, fixed effect	69% less likely to have high GHQ score	49% less likely	n/a – negative income effect on LS in published results	see males
Blanchflower & Oswald (2004) (UK data)	no, ordered logit	77% less likely to be in a higher LS category	50% less likely	no income measure available	see males
Blanchflower & Oswald (2004) (US data)	no, ordered logit	60% less likely to be in a higher LS category	46% less likely	annual household income A$141,600	A$97,900

Notes: * compared to employed unless otherwise specified. Headey and Wooden (2004) and Marks and Fleming (1996) treat life satisfaction as a continuous variable. Income calculated using the formula in Table 11 notes. Conversion of other studies estimates to 2001 Australian dollars is available from author on request.

6. Conclusion and Discussion

Using the HILDA database and panel data methods, this paper showed that unemployment is associated with lower life satisfaction (holding income constant). This paper is the first using Australian data which has controlled for unobserved heterogeneity and

which has not assumed that life satisfaction is cardinal. Our results show that the unemployed have unobserved characteristics associated with both lower life satisfaction and unemployment, and that these characteristics should be held constant to get an unbiased estimate of the effect of unemployment on life satisfaction. Around one half of the gap in life satisfaction between the employed and the unemployed in the pooled model can be 'explained' by unobserved, time invariant factors.

Relative to the effects of income on life satisfaction, the adverse effect of unemployment on life satisfaction is large. Indeed to 'compensate' for the effect of unemployment on life satisfaction, men would need to be given an additional $42,100 while women would need to be given $86,300. Moreover, there was found to be an effect of past unemployment on current life satisfaction. This could relate to either the long-term scarring effects of unemployment, or the fact that past unemployment is either related to lower wealth, or to lower expected future earnings (holding current income constant).

Another interesting finding was the gender difference in life satisfaction. In particular, men out of the labour force were more likely to report low life satisfaction, and women who were disabled were more likely to report low life satisfaction. The latter result could either relate to the severity of the condition, or the way that the conditions affect life satisfaction.

While the relationship between income and unemployment and life satisfaction was not statistically significantly different across genders, it was consistently found that unemployment had a greater effect on lowering life satisfaction for women. While this result is by no means the usual finding in the literature, Frey and Sulzberger (2002) state that neither is it consistently found that the impact of unemployment is greater for men[25]. Traditionally, it may have been thought that because male reputation and self-esteem was more likely to be linked to their employment, unemployment would have a more adverse impact for them. However, with the increasing participation of women in the labour force, it may be increasingly the case that women's self-esteem is also closely related to their employment. Thus the effect of unemployment may be larger for women than it once was. Arguably, the historical findings of a greater effect for men are of less relevance now than more recent studies into this relationship, as shown by the larger effect for men of unemployment on life

[25] Indeed Frijters et al. (2004) using German data also find a larger effect of unemployment on life satisfaction for women.

satisfaction for earlier cohorts in Marks and Fleming (1996), but little difference for later cohorts.

With employment playing an increasing role in the reputation of women (and potentially less of role for men, as their participation rate drops), what are some other explanations for a gender difference in the effect of unemployment on life satisfaction? Clarke (2003) found that people with the largest drops in life satisfaction when they moved into unemployment tended to move out of unemployment fastest. It may be that the men who find unemployment has the biggest effect on their satisfaction move more rapidly in to employment than women. Women who are searching for employment may face greater barriers to moving into employment, such as problems with child-care, and this may explain why we find a lower *average* level of satisfaction for female unemployed.

Another important finding from this paper was the relatively small contribution that income played on life satisfaction compared to other factors such as marriage, employment status and social connection. This suggests that, if Government's interest is in the well-being of the population, they should consider factors well beyond what is captured in aggregate income measures.

Finally, while there does appear to be a significant effect of unemployment on life satisfaction there also appears to be considerable variation in the effect. In particular, there is a relatively large effect of unemployment on life satisfaction, but there is also a large standard error. Put another way, from the descriptive statistics, we saw that while being unemployed increases the risk of low life satisfaction, most people who change employment status do not change their broad level of life satisfaction.

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Appendix 1: Means of key variables in the HILDA survey (people aged 15-64 years)

	Description	mean
age	age at survey	39.03
lifesat	life satisfaction on scale 1 to 10	7.84
marry	=1 if married or cohabiting	0.65
disability	=1 if disabled	0.19
male	=1 if male	0.48
nlf	=1 if not in the labour force	0.24
emp	=1 if employed	0.72
unempl	=1 if unemployed	0.04
ltu	=1 if long-term unemployed	0.01
empl	number of years spent in employment	18.61
unemploy	number of years spent in unemployment	0.61
stu	=1 if short-term unemployed	0.03
child	number of children	1.39
uni	=1 if university qualifications	0.21
tert	=1 if non-university tertiary qualifications	0.37
yr12	=1 if year 12 completed	0.12
lowsch	=1 if no year 12 completed	0.31
ausb	=1 if Australian born	0.77
engb	=1 if born in major English speaking country	0.10
forb	=1 if born in non-major English speaking country	0.13
malechild	interaction between male and child	0.59
partner_age	partner's age	42.83
partner_sex	partner's sex – 1 if male, 0 otherwise	0.48
part_unemp	=1 if partner unemployed	0.02
part_emp	=1 if partner employed	0.47
part_nlf	=1 if partner nlf	0.14
good_social*	=1 if social function score>50/100, 0 otherwise	0.79
good_life	=1 if life satisfaction score>5/10, 0 otherwise	0.92
good_emotion**	=1 if emotional function score>50/100, 0 otherwise	0.83
good_health	=1 if self reported health >=4/5, 0 otherwise	0.87
city	=1 if live in city	0.61
region	=1 if live in region	0.37
remote	=1 if live in remote area	0.02
income000	annual household disposable income (top coded) in thousands in 2001 dollars.	55.24

* 10 questions on social functioning were recoded as required, raw scale scores were calculated by summing across the items in the same scale; and these raw scores were transformed to a 0- 100 scale.
** 10 questions on emotional functioning were recoded as required, raw scale scores were calculated by summing across the items in the same scale; and these raw scores were transformed to a 0- 100 scale. Both the social functioning and the emotional functioning scales were created by the HILDA production team using: Ware JE, Snow, KK, Kosinski, M. (2000), SF-36 Health Survey: Manual and Interpretation Guide.

Appendix 2: Correlations

Table A.2.1: Correlations between psychological health measures variables

	good_life	good_health	good_emotion
good_health	0.209**		
good_emotion	0.250**	0.137**	
good_social	0.220**	0.250**	0.638**

notes: for people aged 15-64 years
**significant at the 1% level

Table A.2.2: Correlations between social, economic and demographic variables

	hhincome	age	disability
age	-0.025**		
disability	-0.129**	0.200**	
unempl	-0.075**	-0.105**	0.023**

notes: for people aged 15-64 years
**significant at the 1% level

Appendix 3: Supplementary Results

Table A.3.1: Male unemployment and life satisfaction – extended results (odds ratios)

	(1) **Prime** Life S. >5	(2) **Balanced** Life S. >5	(3) **Ftbase** Life S. >5	(4) **High life** Life S. >7	(5) **Good social** Social >50
unemployment	0.676	0.847	0.688	0.512*	0.732
	[1.02]	[0.45]	[1.04]	[2.56]	[1.21]
nlf	0.736	0.594	0.664	0.851	0.816
	[0.94]	[1.72]	[1.37]	[0.75]	[0.99]
income000	1.01	1.008	1.009	0.999	1.001
	[1.49]	[1.21]	[1.48]	[0.48]	[0.75]
income000^2	1.000	1.000	1.000	1.000	1.000
	[1.22]	[1.09]	[1.22]	[0.06]	[1.29]
marry	2.970**	2.727	2.647**	2.399**	1.587*
	[3.14]	[3.19]**	[3.25]	[3.73]	[1.97]
disability	0.978	1.004	0.954	0.811	1.009
	[0.11]	[0.02]	[0.25]	[1.59]	[0.07]
child	0.987	0.947	1.007	1.054	1.086
	[0.08]	[0.32]	[0.04]	[0.50]	[0.71]
part_unemp	1.119	0.583	0.709	0.705	1.032
	[0.23]	[1.28]	[0.86]	[1.02]	[0.10]
part-time			1.030		
			[0.11]		
person year obs	1032	1177	1301	3192	2634
person obs	367	398	460	1111	923
Pseudo R2	0.03	0.03	0.03	0.02	0.02

Notes: dependent variable: report life satisfaction >5 (0-10 scale), except (5) where social >50, (4) where Life Satisfaction>7.
Specifications estimated using Chamberlain's conditional fixed effects.
**sign. at the 1% level, *sign. at the 5% level. absolute value of z statistics in brackets.
Base category: employed, unmarried, no disability, no children, partner not unemployed, living in remote area, (except in (3) where the base category is full-time employed).
Male and female coefficients have been estimated separately because test for equality of coefficients was rejected at the 1% level in the random effects and pooled estimation.
All models include region and time controls.

Table A.3.2: Female unemployment and life satisfaction – extended results (odds ratios)

	(1) **Prime** Life S. >5	(2) **Balanced** Life S. >5	(3) **Ftbase** Life S. >5	(4) **High life** Life S. >7	(5) **Good social** Social >50
unemployment	0.474*	0.482	0.421*	0.752	1.017
	[2.23]	[2.30]*	[2.54]	[1.23]	[0.07]
nlf	0.618*	0.601	0.493*	1.183	0.933
	[2.02]	[2.30]*	[2.57]	[1.27]	[0.50]
income000	1.002	1.006	1.008	1.004	1.002
	[0.28]	[0.93]	[1.21]	[1.88]	[0.82]
$income000^2$	1.000	1.000	1.000	1.000	1.000
	[0.27]	[0.92]	[1.06]	[1.32]	[1.22]
marry	2.963**	3.087	3.098**	1.935**	1.374
	[3.78]	[4.12]**	[4.27]	[3.34]	[1.56]
disability	0.920	0.644	0.749	0.875	0.674**
	[0.41]	[2.45]*	[1.70]	[1.09]	[3.26]
child	0.758	0.695	0.763	0.825	0.944
	[1.59]	[2.10]*	[1.64]	[1.72]	[0.52]
part_unemp	1.010	1.310	1.258	1.669*	0.798
	[0.03]	[0.74]	[0.65]	[2.09]	[0.89]
part-time			0.744		
			[1.26]		
person/ year obs	1327	1581	1699	3900	3485
person obs	462		590	1345	1212
Pseudo R2	0.05	0.05	0.05	0.02	0.02

Notes: see Table A.3.1 notes.