ORIGINAL PAPER

Life satisfaction and the economic and social characteristics of neighbourhoods

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Abstract This paper uses data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey to investigate the association between neighbourhood effects and life satisfaction. We find that neighbourhood measures of social support and interaction and the absence of socio-economic deprivation are positively and significantly correlated with individual life satisfaction. Neighbourhood fixed effects, however, explain only an additional 1.5 to 2.5% of the variance in life satisfaction over the 14% explained by individual characteristics.

1 Introduction

Most governments recognise the importance of community to the welfare of their country as a whole, which is reflected in its recent high political profile in countries such as Australia and the UK. In Australia, the current strategic plan of the Commonwealth Department of Families, Community Services and Indigenous

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Affairs identifies achieving stronger communities as one of the major outcomes for government policy (Headey et al. 2002). In the UK, considerable resources are being directed towards reducing regional measures of social exclusion, such as high crime rates, poor health status and the lack of access to public services (Social Exclusion Unit 2001). Such policy initiatives are based on the notion that well-functioning communities will positively impact upon a range of social and economic outcomes. Empirical economic research in this area, however, has tended to focus principally on whether neighbourhood effects influence the educational or labour market outcomes of residents (e.g. Ginther et al. 2000; Jensen and Seltzer 2000; Oreopoulos 2003; van der Klaauw and van Ours 2003) rather than examining the direct effect of locality on measures of individual well-being.

Likewise, the economics literature on the determinants of life satisfaction (or happiness) has focused predominantly on investigating the contribution of 'internal' characteristics, such as household income, unemployment and marital status (for reviews, see Oswald 1997, Frey and Stutzer 2002, Frijters et al. 2004a, and Clark et al. 2006). The potential for external events and situations to explain variations in subjective well-being have long been recognised (e.g. Wilson 1967) but such 'external' factors have mainly been considered in the context of social comparisons (see Michalos 1985). According to this line of reasoning, assessments of subjective well-being depend on comparisons with various standards, including other people in the reference person's peer group. The simple prediction from this theory is that respondents will typically report feeling happy (unhappy) if the people around them appear relatively worse (better) off. And, there is considerable empirical support for the hypothesis that it is 'relative' rather than 'absolute' income that matters for individual well-being in developed countries (e.g. Clark and Oswald 1996; van Praag and Frijters 1999; Luttmer 2005).

More recently, a number of studies have explored whether there are specific neighbourhood characteristics that influence residents' happiness, as measured by psychological well-being scores. Examples of this type of approach include Belle (1990), Klebanov et al. (1994), Aneshensel and Sucoff (1996), Ross et al. (2000) and Shields and Wheatley Price (2005). A few studies have also incorporated neighbourhood characteristics into multivariate models of life satisfaction (e.g. Schulz et al. 2000; Evans and Kelley 2002). Importantly, most of these studies have not explored whether people are directly affected by the happiness of others around them.

A recent exception is a study by Propper et al. (2005) that explores the influence of neighbourhood effects on mental health in the UK using a similar approach to that employed in this paper. They find that, while some neighbourhood characteristics such as socio-economic disadvantage and residential mobility, are statistically significant, total neighbourhood effects explain only around 1% of the total variance in mental health. Another exception is the study by Shields and Wheatley Price (2005) that explores the extent to which individual measures of psychological well-being and perceived social support are correlated within the household. They find that intra-household effects explain a greater proportion of the total variance in the dependent variables than all the explanatory variables combined, and this is especially so for co-resident females. In addition, other measures of socially contingent well-being, such as local unemployment rates and socio-economic deprivation scores, are found to be important determinants of individual well-being.

In this paper, we investigate the empirical association between life satisfaction and neighbourhood effects using data from the first wave of the Household, Income and Labour Dynamics in Australia (HILDA) Survey. We fit empirical models that predict individual differences in overall life satisfaction separately for male and female. By using the clustered nature of the sample where we observe individuals residing in 488 census collection districts (CDs), we attempt to establish the empirical importance of neighbourhood effects. We find that neighbourhood fixed effects can only explain around an additional 1.5 to 2% of the latent variance in individual life satisfaction over and above the 14% explained by individual economic and social characteristics. We then match a number of neighbourhood characteristics from the population census and a range of neighbourhood perception factors reported in the survey data. We find that the factor most strongly positively associated with life satisfaction is the extent of neighbourly social interaction and support. Some measures of social deprivation and exclusion are negatively correlated with our dependent variable, whereas more tangible perceptions of the neighbourhood appear unimportant.

The paper is structured as follows. In Section 2, we describe the data that we analyse and define our main variables of interest. The empirical framework and modelling issues are outlined in Section 3. Our findings are discussed in Sections 4, and Section 5 concludes.

2 Data and definitions

2.1 Data source

The data we use comes from a relatively new panel study, the HILDA Survey. Described in more detail in Watson and Wooden (2002, 2004), the HILDA Survey is based on similar studies conducted in both Germany and the UK (the German Socio-Economic Panel, GSOEP, and the British Household Panel Survey, BHPS, respectively) and is a nationally representative survey covering all household members aged 15 years or older. The data are collected annually via a combination of personal face-to-face interviews and self-completion questionnaires, with the first wave collected between August and December 2001. Nearly 14,000 individuals completed the first wave of the survey, and the household response rate of 66% is comparable to other international panel studies. Although there were four waves of data from the HILDA Survey available for analysis at the time of writing, we only use data from the first wave in this paper. The reasons for this are discussed at the end of this section.

A key feature of the HILDA Survey and one that marks it as distinctive from the BHPS, the GSOEP and other national surveys that have been used in the life satisfaction literature is that the sample is clustered by locality. Households were selected into the sample by a multi-stage process. First, a random sample of 488 CDs based on the 1996 census boundaries was selected from across Australia, each of which consists of approximately 200 to 250 households. Second, within each of these CDs, all dwellings were fully enumerated and a sample of 22 to 34 dwellings randomly was selected depending on the expected response and occupancy rates

within each area. Third, given that dwellings can contain multiple households, rules were devised for the selection of households within dwellings.[1] In this paper, we use the full sample of individuals comprising of 6,594 males and 7,309 females who report the required information.[2]

2.2 Defining neighbourhoods

The 488 CDs provide a natural unit for defining localities in our sample. Importantly, we refer to them as neighbourhoods rather than communities, as clearly these boundaries [drawn by the Australian Bureau of Statistics (ABS) for the purpose of managing the collection of census data] do not necessarily equate with actual communities. However, as these CDs are small (approximately 250 households on average), with the exception of a few sparsely populated CDs in more remote rural regions, their members are clearly neighbours in the sense that they live in close proximity to each other. The notion of 'community' is perhaps broader (Cox 1995) and need not be constrained by distance and geography.[3] Nevertheless, it is the attachment to place that has been most important in defining community (see Gauntlett et al. 2000). Furthermore, the types of policy interventions typically considered are invariably concerned with changing the way local communities function. Hence, neighbourhoods, as we have defined them in our data, are clearly an important level of analysis when considering policy options and their effects.

2.3 Defining the dependent variable—life satisfaction

The life satisfaction question asked in the HILDA Survey is virtually the same as that asked of respondents in the GSOEP and the BHPS and in cross-country surveys, such as the World Values Survey and the Euro-Barometer Survey. This question has been widely used as a measure of individual well-being or happiness in the recent economics literature (for example, Winkelmann and Winkelmann 1998; Clark et al. 2001; Frijters et al. 2004a, b; Clark et al. 2006). The exact question asked is "All things considered, how satisfied are you with your life?" The possible responses are ordinal in nature and range from 0 to 10. A visual aid in the form of a show card was shown to respondents to graphically portray the scale respondents were to use in answering this question. Only the extreme values on the scale were labelled, with a score of 0 described as 'totally dissatisfied' and a score of 10 as 'totally satisfied'.

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[1] These rules stipulated that where a dwelling contained three or fewer households, all such households should be sampled. Where there were four or more households occupying one dwelling, all households had to be enumerated and a random sample of three households obtained (based on a predetermined pattern).

[2] We drop 18 individuals for whom no life satisfaction measure is available and a further 48 cases where the other required information is incomplete. We are, thus, able to use over 99.5% of the original sample.

[3] For example, is a community defined by residence in a street, group of streets, suburb or town? Further, does it even make sense to restrict membership of a community to the residents of that community? What about people who work or participate in other activities within that locality? The question of how to geographically demarcate a local community remains, and we are unable to explore alternative definitions with the available data.

Importantly, over 99.8% of the respondents to the HILDA Survey answered this question, so there is little potential for bias due to item non-response.

The distribution of responses to the life satisfaction question for the complete sample is provided separately for males and females in Fig. 1. As can be seen, responses are highly skewed towards higher levels of satisfaction, with the modal response being 8, and the average being 8.02 and 7.90 for males and females, respectively. Nearly 40% of the Australians report their life satisfaction to be 9 or 10, which is considerably higher than that reported by the British and German panel respondents. The means and standard deviations for all of the other variables included in the analysis are reported in the Appendix (Table 5). For the sake of brevity, we do not discuss them in this paper.

2.4 Explanatory variables—'internal characteristics'

In our choice of 'internal' explanatory variables, we closely follow the recent life satisfaction literature (e.g. Clark and Oswald 1994; Frey and Stutzer 2000; Helliwell 2002; Di Tella et al. 2003; Frijters et al. 2004a, b, 2006). That is, we explore a set of individual characteristics that can reasonably be expected, given previous studies, to impact on life satisfaction. This choice of variables also builds on those used in the psychology literature (see, for example, the collected works in Kahneman et al. 1999). The standard set of control variables capture age, marital status, family and health status, ethnic and immigrant background, highest educational qualification, employment status, annual household income (in log form) and housing type. We also construct an interaction term between being unemployed and the level of unemployment in the neighbourhood in order to explore the 'social norm' hypothesis (Clark and Oswald 1994; Clark 2003). In addition, we include dummy variables indicating if the household income data was missing and whether the respondent reported negative household income (mostly the self-employed and owner-managers).
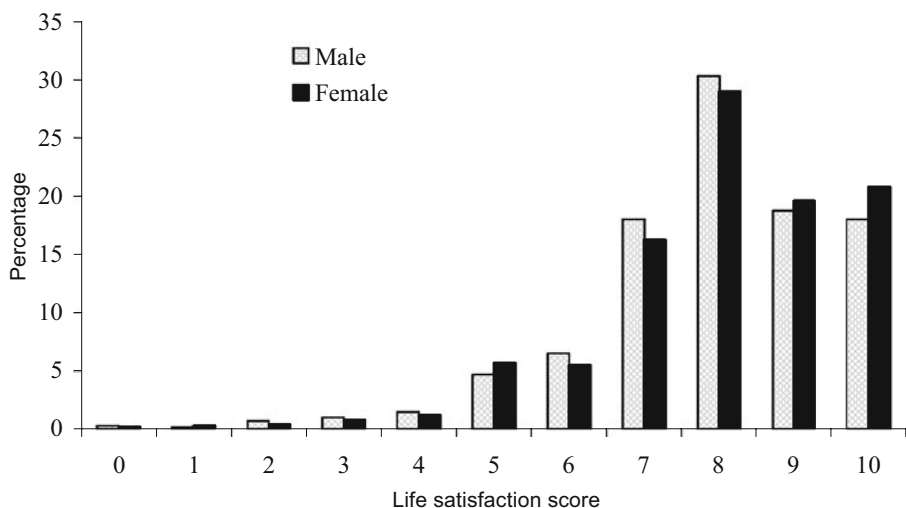
Fig. 1 Distribution of life satisfaction by gender

Importantly, in the context of explaining the variance in life satisfaction, there is an extensive body of psychological research that has established the importance of personality traits (see Diener and Lucas 1999; Lykken and Tellegen 1996). The approach used in recent panel data studies has been to assume that these traits are fixed for an individual and thus, can be differentiated out using repeated observations on an individual (see, for example, Clark 2003; Frijters et al. 2004a, b, 2006). Given that we use only a cross-sectional sample, however, this approach is not open to us. In an attempt to capture a substantial amount of the differences in personality, we make use of information in our data that may pick up some of this unobserved individual heterogeneity. These variables are the self-assessed importance of religion to the individual, the degree of suspicion about the interview (as assessed by the interviewer), the length of time horizon for savings and investment decisions, and whether the respondent was living with both of their own parents at age 14. Additionally, we include a variable indicating whether or not the individual was interviewed in the presence of other household members as a means of identifying whether this might potentially influence responses.

2.5 Explanatory variables—some 'external characteristics'

We are able to distinguish between residential locations according to both state and remoteness in our empirical models. For the Australian states and territories, we construct dummy variables that are designed to control for regional and state-government-level effects. Remoteness is based on the accessibility/remoteness index for Australia (ARIA) developed by the National Key Centre for Social Applications and used by the ABS (see ABS 2001). ARIA essentially provides a measure of how far localities are from population centres where people can access goods, services and opportunities. Following the ABS, we classified all CDs into four bands according to their ARIA scores—major cities (base category), inner regional Australia, outer regional Australia and remote Australia.[4]

In Table 1, we present the mean values of reported life satisfaction in our sample, for males and females separately and for each state and territory of Australia, and according to the four bands of the ARIA score. Life satisfaction scores are highest in Tasmania and lowest in the Australian Capital Territory (ACT) for both genders, with the range being around 0.2 for males and 0.6 for females. Interestingly, life satisfaction levels rise for both males and females the more remote they are from major population centres, with males (females) living in remote areas having life satisfaction scores on average about 0.4 (0.5) higher than those living in metropolitan areas.

In later models, we also examine the role of residential duration, using information on the number of years at the current address and the income of individuals relative to others in their neighbourhood. The latter relates to the growing literature that finds that social comparisons are important in explaining well-being (see, for example, Clark et al. 2006; Luttmer 2005). To calculate a measure of relative income, we deflate the weekly household income value reported

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[4] There are two further bands—very remote Australia and migratory areas—which none of the CDs selected in the HILDA sample fall into.

Table 1 Descriptive portrait of life satisfaction in Australia by gender: regional and neighbourhood (census) characteristics

	Male		Female	
	Mean	Standard deviation	Mean	Standard deviation
New South Wales	7.89	1.68	8.03	1.67
Victoria	7.96	1.64	8.00	1.70
Queensland	7.84	1.66	7.96	1.69
South Australia	7.98	1.73	8.15	1.59
Western Australia	7.82	1.75	7.99	1.50
Tasmania	8.03	1.77	8.22	1.66
Northern Territory	7.90	1.40	7.84	1.38
ACT (Canberra)	7.84	1.33	7.64	1.74
Major cities	7.81	1.65	7.90	1.64
Inner regional	7.99	1.72	8.15	1.66
Outer regional	8.12	1.67	8.25	1.73
Remote	8.22	1.68	8.39	1.45
Neighbourhood characteristics (census)				
Unemployment rate (<5%)	8.03	1.45	8.13	1.50
Unemployment rate (≥20%)	7.95	1.86	7.90	1.85
Lone parents (<5%)	8.03	1.44	8.12	1.53
Lone parents (≥20%)	7.62	2.06	7.71	1.83
Immigrants (<5%)	8.03	1.44	8.13	1.53
Immigrant (≥20%)	7.60	1.70	7.74	1.69
Home ownership (<40%)	7.62	1.85	7.76	1.73
Home ownership (≥80%)	7.98	1.58	8.12	1.58
Professionals (<5%)	7.82	1.90	7.91	1.81
Professionals (≥20%)	7.89	1.52	8.01	1.51
Over 64 years (<5%)	7.89	1.60	7.98	1.60
Over 64 years (≥20%)	7.99	1.69	8.02	1.79

in the 2001 HILDA Survey data to the 1996 prices, and then compare it to the mid-point of the median household weekly income band for the neighbourhood. We are, therefore, assuming that the relative income distribution has remained largely unchanged within neighbourhoods over this 5-year period. Two dummy variables are constructed to identify individuals in relatively low-income households (less than 50% of neighbourhood median income, approximately) and relatively high-income households (more than 200% of neighbourhood median income, approximately).

Given the small size of the census districts, it seems reasonable to assume that duration at the current address is a good approximation of the duration of residence in the neighbourhood. The inclusion of residential duration in the life satisfaction models provides a simple test of the robustness of the estimated roles of the neighbourhood characteristics, controlling for the likelihood that individuals who continue to live in a neighbourhood might invest more heavily in social contacts and networks (DiPasquale and Glaeser 1999).

2.6 Explanatory variables—census-derived neighbourhood characteristics

In our data, we have available a range of other information that may also capture 'external' or neighbourhood characteristics that may be associated with individual self-reported life satisfaction. Using data from the Australian population census, we

can derive a number of CD-specific characteristics, including commonly used indicators of social deprivation and exclusion. Unfortunately, the census is only conducted every 5 years in Australia, so there is no variation in these measures over the time frame of the available waves of the HILDA Survey.

These variables are the percentage of the adult CD population who were

(a) Unemployed (neighbourhood range from 1.6 to 34.5%)
(b) Lone parents (range from 0.8 to 33.7%)
(c) Immigrants from non-English-speaking countries (range from 0.7 to 68.6%)
(d) Living in owner- or purchaser-occupied housing (as a proportion of all private dwellings; range from 1.1 to 96.1%)
(e) Working in a professional occupation in their main job (as a proportion of the employed; range from 2.7 to 42.4%)
(f) Aged 65 years or over (range from 0.4 to 73.1%)

A simple descriptive portrait of the differences in life satisfaction according to these characteristics is provided in the lower panel of Table 1. It shows that, on average, individuals in neighbourhoods where the proportion of unemployed, lone parents or immigrants from non-English-speaking countries is highest have lower reported life satisfaction levels than those living in areas where these proportions are lowest. Conversely, average life satisfaction levels are higher where the proportions of home ownership, professionals and persons over 64 years old are highest.

2.7 Explanatory variables—HILDA-derived neighbourhood characteristics

We are also able to construct other measures of neighbourhood characteristics by aggregating individual responses, using both male and female respondents within each CD, to questions (asked in the HILDA Survey) about the local neighbourhoods in which respondents reside. Based on similar questions occasionally included in the British Social Attitudes Survey, respondents were asked to rate the frequency with which they observe different types of events and behaviours occurring in their 'local neighbourhood'. Responses were scored on a 5-point-labelled scale, ranging from 1 'never happens' to 5 'very common'. In addition, a 'don't know' response option was also provided.[5]

The events and behaviours were as follows:

(a) Neighbours helping each other out
(b) Neighbours doing things together
(c) Loud traffic noises
(d) Noises from airplanes, trains or industry
(e) Homes and gardens in bad condition
(f) Rubbish and litter lying around

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[5] The incidence of 'don't know' responses ranged from 1% (for rubbish and litter lying around) to 11% (for neighbours helping each other out) of the sample. Such cases were excluded in the construction of neighbourhood averages. The neighbourhood measures are calculated using the pooled sample of males and females.

(g)   Teenagers hanging around the streets
(h)   People being hostile or aggressive
(i)   Vandalism and deliberate damage to property
(j)   Burglary and theft

We aggregate the scores for a and b by neighbourhood to construct a measure of 'neighbourly interaction and support', ranging from 2 to 10. Similarly, we aggregate c–f to obtain a measure of 'local disamenity' that ranged from 4 to 20. Finally, aggregating g–j provides us with a measure of 'insecurity in the neighbourhood' (4 to 20). As with the average life satisfaction, there is a great deal of heterogeneity across the 488 neighbourhoods with the actual observed minimum and maximum of these scores being, respectively, 3.00 and 9.08 for interaction and support, 6.71 and 16.00 for local disamenity, and 6.29 and 16.41 for insecurity. On average, around 30 respondents per neighbourhood were used to calculate these measures. The results from a separate principal components analysis clearly supported these groupings.

In Fig. 2, we provide plots of the average life satisfaction levels for individuals living in neighbourhoods with the various neighbourhood characteristic scores. It clearly shows that life satisfaction is positively correlated with a greater sense of neighbourly social interaction and support, but negatively associated with increases in our measures of local disamenity and insecurity in the neighbourhood. The differences in life satisfaction levels between those living in neighbourhoods with the most desirable and least desirable characteristics are, however, not particularly large. In each case, the range in average life satisfaction scores is around 0.5. The empirical analysis that follows will attempt to separate the direct influence of these neighbourhood characteristics from other potentially confounding factors.

By using several waves of HILDA Survey data, we could observe individuals moving across census districts and, thereby, identify the effects of these neighbour-
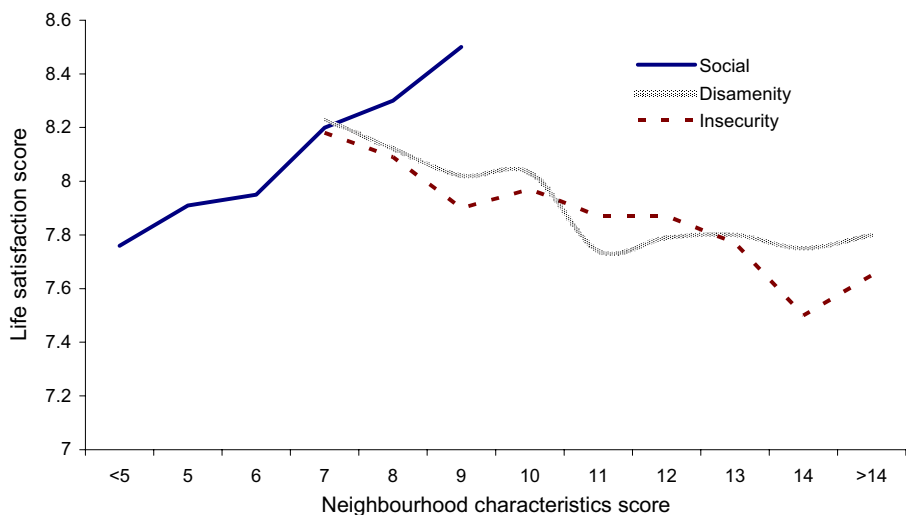
Fig. 2   Average life satisfaction by neighbourhood characteristics (HILDA derived)

hood characteristic measures on life satisfaction. There are two problems with this idea in practice. First, the number of movers in any 1 year is likely to be quite small, implying that many survey waves would need to be available to obtain a sufficiently large sample of residential location changes. Second, and most seriously, the HILDA Survey only samples individuals in approximately 1.5% of all census districts. This implies that the vast majority of individuals changing residential location are likely to move to a census district outside the sampling frame of the HILDA Survey. When followed, they would, therefore, become the only observations on which to base the average response for these derived neighbourhood characteristics. As a result of this and the fact that our census-derived neighbourhood characteristics are time invariant, we use only the first wave of HILDA Survey data. Consequently, in our empirical models, we are not able to simultaneously allow for neighbourhood fixed effects and time-varying neighbourhood characteristics.

3 Empirical framework

Following the recent economics literature that has investigated the determinants of life satisfaction or happiness, we specify a life satisfaction function of the form

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\begin{aligned}
\text{LS}_{ij}^* &= \beta_0 + X_{ij}'\beta_1 + \mu_j + \varepsilon_{ij} \\
\text{LS}_{ij} &= k \Leftrightarrow LS_{ij}^* \in [\lambda_k, \lambda_{k+1}],
\end{aligned}
\tag{1}
$$

where LS_{ij}^* is the latent unobserved propensity to be satisfied of individual i in neighbourhood j, LS_{ij} is the observed life satisfaction and λ_k is the kth estimated threshold (increasing in k) governing the relationship between LS_{ij}^* and LS_{ij}. X_{ij} is a vector of observed individual characteristics on individual i in neighbourhood j, μ_j is a neighbourhood-specific effect that is constant across individuals residing in neighbourhood j and ε_{ij} is a normally distributed random error term.

Given this simple framework, an important question to address is whether or not the neighbourhood-specific effects are uncorrelated with the individual characteristics X_{ij}. We examined this orthogonality assumption by testing for the equality of the parameter estimates across fixed and random-effects specifications and found that the assumption was not supported (see Frijters et al. 2004a). This would seem a sensible result, as we would expect some self-selection by individuals, based on their observable characteristics such an income and children into neighbourhoods. Consequently, we estimate an ordered probit model of life satisfaction that, in the first instance, includes a dummy variable for each of the 488 neighbourhoods to capture the neighbourhood fixed effect.

It is well-known that this sort of model, which is estimated by maximum likelihood, is theoretically inconsistent due to the problem of 'incidental parameters' (see Lancaster 2000). However, as we observe a relatively large number of individuals in each of the 488 fixed neighbourhoods, any potential bias to our results is unlikely to be large (see Greene 2004). In addition, to explore whether the estimates of the determinants of life satisfaction are sensitive to this aspect, we also provide the results from the corresponding model where the neighbourhood dummy

variables are excluded.[6] We are able to calculate the additional variance that is explained by the neighbourhood fixed effects and, importantly, identify whether this is due to true neighbourhood effects or simply a result of the random clustering of a small number of individuals. We do this by randomly assigning all the individuals in our sample to 488 'placebo clusters' and calculating the additional contribution of the resulting fixed effects to the explained variance of our dependent variable. We repeat this experiment 30 times, take the average value and then subtract it from the contribution of neighbourhood fixed effects in the model fitted with the actual neighbourhood dummy variables. This provides us with a measure of the true additional variance explained by common factors in the neighbourhood influencing individual life satisfaction scores in the same direction.

Once we have quantitatively established the relative importance of neighbourhoods in determining life satisfaction, we then directly include in the models a number of population census- and HILDA-derived neighbourhood-specific economic and social variables to highlight which particular characteristics of neighbourhoods are important. Importantly, we are able to calculate the contribution of these explanatory variables to the explained variance of individual life satisfaction. We also subsequently explore whether residential duration or an individual's relative household income position in the neighbourhood impact on their reported life satisfaction scores.

Due to the possibility of confusing intra-household effects with neighbourhood effects because members of the same household are obviously also residents of the same neighbourhood and previous studies have found that the determinants of life satisfaction differ by gender, all models are estimated separately for men and women. This, of course, does not entirely eliminate intra-household effects because we often observe more that one adult male, or female, living in the same household. Nevertheless, we have examined a sample restricted to a maximum of one male (or female) from each household and found little influence on the estimated importance of neighbourhood effects.

When interpreting the findings of the importance of area characteristics in explaining variations in life satisfaction, it is important to note that there are two possible competing explanations why we might observe individuals belonging to the same group (in our context, the same neighbourhood) behaving similarly or reporting similar levels of life satisfaction. The two main possibilities are (1) an 'endogenous effect', where the propensity of an individual to behave in some way varies with the prevalence of that behaviour in the group (contagion), and (2) the 'correlated effect', where individuals in the same group tend to behave similarly because they face similar external environments (e.g. pollution levels) or have similar individual characteristics (e.g. educational levels). Importantly, given that researchers very rarely (if ever in modern societies) observe random allocations of

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[6] As with many studies in the life satisfaction literature (e.g. Di Tella et al. 2003), we have also estimated the models using a linear fixed effects model on the assumption that the life satisfaction can be treated as continuous and cardinal. In practice, this assumption makes little difference to the estimates of the determinants of life satisfaction (see, for example, Ferrer-i-Carbonel and Frijters 2004). These results, all of which are available from the corresponding author, confirm this for our data, and crucially, the estimated importance of neighbourhood effects remains of the same magnitude.

individuals into different areas and that self-selection on observable neighbourhood characteristics might be important in an individual's choice of where to live, these two explanations are very difficult to distinguish between (see Manski 1993, 1995).[7] Self-selection would be likely to lead us to overestimate the importance of neighbourhood characteristics.

4 Results

4.1 Explanatory power

The results from the ordered probit models with and without neighbourhood fixed effects are presented in Table 2. The first point to note is that most of the estimated coefficients for life satisfaction among Australians are in line with both prior expectations and previous international research. This gives some validation to the HILDA Survey data. Second, the estimated coefficients are fairly consistent across the two model specifications. Third, for each of the models, we calculated how much of the variance in latent life satisfaction, LS_{ij}^*, is explained by the explanatory variables. In this respect, the models without neighbourhood fixed effects that control for an extensive range of individual economic and social characteristics are found to explain about 14% of the variation in latent life satisfaction for both males and females. The additional inclusion of neighbourhood fixed effects leads to a substantial improvement in the fit of the models, which now capture 22.6 and 23.3% of the variance in latent life satisfaction for males and females, respectively. However, the 'true' additional contribution of neighbourhood effects is only just under 1.5% for males and 2.3% for females. The remainder of the additional explained variance is that which would be obtained from a random clustering of individuals (i.e. it is arising from the fact that we have small clusters of individuals, around 15 per neighbourhood on average).

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[7] One potential method to tackle this issue is the approach adopted by Dustmann and Preston (2001) who used broad region of residence dummies as instruments for local area ethnic density in equations explaining feelings of racial hostility in the UK. Their argument was that individuals (given their taste for living in close proximity to ethnic minorities) can self-select into and out of areas that have different ethnic minority densities. However, while whites might decide not to reside in high ethnic minority density areas, they are unlikely to move out of the broader region of residence (i.e. they simply might locate to a neighbourhood a few miles away, but still live in the same broad region). In our context, the use of regional dummies (i.e., states and territory dummies) to instrument neighbourhood characteristics in life satisfaction equations is less appropriate given that there are state-level differences in Australia that are likely to directly impact on life satisfaction (as suggested by our estimates). On a practical level, we also would require a number of instruments as we find that neighbourhood characteristics are multi-dimensional in their association with life satisfaction. Clearly, forming one aggregate neighbourhood index would lose valuable information. Consequently, we would need to find at least three exogenous instruments with enough statistical power to determine the differential effects of the various 'groups' of neighbourhood characteristics, which simply are not available in our data.

Table 2 Determinants of life satisfaction in Australia by gender: ordered probit estimates with and without neighbourhood fixed effects

Explanatory variables	Without neighbourhood fixed effects				With neighbourhood fixed effects			
	Males		Females		Males		Females	
	β	t stat	β	t stat	β	t stat	β	t stat
Age	−0.040	−6.70	−0.027	−5.49	−0.045	−7.34	−0.030	−5.86
Age-squared /100	0.000	7.29	0.000	6.59	0.001	7.79	0.000	6.91
Married	0.305	6.24	0.202	4.23	0.328	6.29	0.202	3.95
Co-habiting	0.230	4.33	0.126	2.36	0.216	3.83	0.135	2.40
Separated	−0.161	−1.61	−0.304	−3.58	−0.090	−0.85	−0.323	−3.70
Divorced	−0.083	−1.04	−0.083	−1.23	−0.065	−0.78	−0.066	−0.94
Widowed	−0.030	−0.23	0.080	1.08	0.022	0.16	0.072	0.92
Lone-parent	−0.103	−0.65	−0.246	−3.75	−0.098	−0.58	−0.215	−3.11
Number of children	−0.053	−3.47	−0.027	−1.85	−0.062	−3.84	−0.045	−2.84
Number of adults in household	0.009	0.59	0.015	0.89	0.013	0.78	0.006	0.35
Aboriginal/Torres Strait islander	0.337	2.44	0.201	2.20	0.393	2.71	0.231	2.44
Immigrant (English speaking country)	0.039	0.95	0.071	1.67	0.045	1.01	0.094	2.10
Immigrant (non-English-speaking country)	−0.123	−2.63	−0.164	−3.81	−0.048	−0.95	−0.112	−2.42
Poor English language speaking ability	−0.284	−3.60	−0.400	−5.70	−0.248	−2.98	−0.376	−5.11
Severe long-term health condition	−0.608	−3.61	−0.754	−4.36	−0.639	−3.70	−0.778	−4.39
Moderate long-term health condition	−0.424	−9.47	−0.484	−11.64	−0.432	−9.20	−0.500	−11.64
Slight long-term health condition	−0.170	−3.48	−0.098	−1.75	−0.184	−3.62	−0.105	−1.77
Degree or higher	−0.246	−6.03	−0.225	−6.18	−0.219	−4.79	−0.190	−4.77
Diploma	−0.205	−4.02	−0.159	−3.40	−0.176	−3.24	−0.129	−2.60
Certificate level 3 or 4	−0.050	−1.29	−0.127	−2.69	−0.050	−1.23	−0.136	−2.79
Certificate level 1 or 2	−0.119	−1.97	−0.096	−2.22	−0.121	−1.87	−0.048	−1.06
Year 12 only	−0.158	−3.33	−0.134	−3.12	−0.116	−2.32	−0.101	−2.20
Education level unknown	0.040	0.40	−0.177	−2.44	0.078	0.75	−0.205	−2.68
Self-employed	−0.026	−0.59	0.029	0.50	−0.076	−1.63	−0.012	−0.19
Owner manager	0.073	1.24	0.252	2.88	0.085	1.38	0.237	2.55
Employee (part-time)	0.017	0.33	0.062	1.80	−0.019	−0.35	0.094	2.59
Unemployed	−0.449	−3.48	−0.274	−1.67	−0.429	−3.08	−0.234	−1.43
Unemployed * unemployment rate	0.026	2.73	0.004	0.30	0.023	2.19	−0.001	−0.10
Permanently sick	−0.054	−0.69	−0.049	−0.66	−0.115	−1.42	−0.100	−1.30
Retired	0.152	2.19	0.164	2.68	0.162	2.24	0.222	3.46
Full-time student	0.156	2.09	−0.005	−0.06	0.198	2.51	0.006	0.07
Other non-participant	0.183	2.05	0.208	4.81	0.158	1.75	0.242	5.37
Log annual household income	0.036	1.79	0.027	1.27	0.061	2.89	0.063	2.83
Household income missing	0.372	1.68	0.286	1.24	0.641	2.72	0.664	2.74
Negative household income	0.335	1.22	0.258	1.00	0.653	2.29	0.530	1.87
House renter	−0.175	−4.99	−0.135	−4.12	−0.165	−4.31	−0.128	−3.62
Rent free	−0.122	−1.34	0.039	0.44	−0.245	−2.45	−0.051	−0.52
Religion is important (0–10)	0.034	8.39	0.029	7.56	0.036	8.48	0.032	7.80
Suspicious of interview questions	−0.136	−2.08	0.021	0.33	−0.164	−2.40	−0.070	−1.03
Savings time horizon (1–6)	0.025	2.65	0.049	5.61	0.027	2.77	0.050	5.50
Savings time horizon missing	−0.075	−1.29	0.015	0.26	−0.054	−0.86	0.037	0.64
Others present during interview	0.096	3.43	0.140	5.14	0.108	3.55	0.115	3.96
Lived with both parents aged 14	0.106	2.72	0.056	1.57	0.101	2.45	0.074	2.00
Neighbourhood controls	No	No	No	No	Yes	Yes	Yes	Yes
Log likelihood	−11352		−12387		−11042		−12046	
Variance in LS_i^* explained by $X_i'\beta_1$	0.1407		0.1460		0.2257		0.2317	
Additional variance explained by random allocation alone	–		–		0.0705		0.0598	

Table 2 (continued)

Explanatory variables	Without neighbourhood fixed effects				With neighbourhood fixed effects			
	Males		Females		Males		Females	
	β	t stat	β	t stat	β	t stat	β	t stat
Additional variance explained by true neighbourhood effects	–		–		0.0145		0.0259	
Total additional variance explained by neighbourhood fixed effects	–		–		0.0850		0.0857	
Sample	6,594		7,309		6,594		7,309	

Robust standard errors calculated. Omitted categories are single with no children, native-born (non-ATSI), fluent English language speaking ability, no long-term health condition, no qualifications, employee (full-time), owner/mortgage, not suspicious about interview questions, no others present during interview and did not live with both parents at age 14.

4.2 'Internal' characteristics

Age is found to exhibit the usual u-shaped relationship with life satisfaction, reaching a minimum in the early forties for both males and females. Similarly, our finding of a positive association between marriage and life satisfaction conforms to previous results. Interestingly, co-habitees report significantly higher levels of life satisfaction than single individuals, but the effect is roughly two thirds as large as that among those who are married. Separated persons (and especially females) are found to be significantly less satisfied than single persons, unlike divorced persons who are generally thought to experience some adaptation to their changed circumstances over time. Lone parenthood is negatively associated with life satisfaction, although only significantly so among women. Conversely, the greater the number of children, the larger and more statistically significant is the negative effect on the life satisfaction reported by men.

One unexpected finding is the coefficient on the indigenous identifier. Other things held constant, aboriginal and Torres Strait islanders report higher scores on the life satisfaction scale than non-indigenous people. Moreover, the size of the effect is relatively large. In contrast, immigrants from non-English-speaking countries report significantly lower levels of life satisfaction, even after controlling for poor English language speaking ability, which is also negatively correlated with large latent effects. As expected, individuals with poor health report significantly lower levels of life satisfaction, with increasingly large latent effects for long-term health conditions with greater degrees of severity. We also find that significantly lower levels of life satisfaction are reported among the most educated, which, perhaps, reflects unfulfilled aspirations (Clark and Oswald 1994).

Turning to employment status, our results are in line with previous research, with the unemployed standing out as those with the lowest levels of life satisfaction for both males and females. We also find evidence of a social norm of unemployment among men. Their life satisfaction levels are significantly higher if they reside in areas with high unemployment. Interestingly, we find that retired persons, non-participants, male full-time students, female owner managers and female part-time

workers are all significantly more likely to report higher levels of life satisfaction than full-time employees, other things being equal.

Our results also suggest that household income does matter to some extent for Australians. In the absence of neighbourhood fixed effects, however, the size of the coefficients and their statistical significance indicates the effect is both relatively small and weak. Once we allow for fixed neighbourhood effects, the magnitude of the income coefficient approximately doubles in size and is much more robust. This result implies that failure to adequately control for the variation in life satisfaction scores across neighbourhoods will lead to income effects to be understated. Nevertheless, the importance of income should not be overstated. For example, a doubling in gross household income from say $50,000 per annum to $100,000 per annum would still only raise life satisfaction (of both men and women) by less than 0.1 of a point.

Our other findings mostly accord with intuition. Persons who are renting report significantly lower levels of life satisfaction, while individuals who think religion is important in their lives are relatively more satisfied. Males perceived by the interviewer to be suspicious of the interview questions report significantly lower life satisfaction levels, whereas individuals who are more forward looking in their planning are more likely to be more satisfied, with a pronounced effect among women. The presence of another adult during the interview tends to increase average self-reported life satisfaction scores by around 0.1 of a point, which we hypothesise reflects the impact of social desirability bias. Finally, respondents who had lived with both their parents at age 14 report significantly higher life satisfaction, suggesting a long-term scarring effect of being a child of a lone-parent. This latter effect clearly suggests an interesting direction for future research.

4.3 'External' characteristics

We now turn to the results of our exploration of the statistical associations between neighbourhood characteristics and life satisfaction. The results from the additional models, incorporating the census- and HILDA-derived neighbourhood characteristics, are reported in Table 3. For the sake of brevity, only the estimates relating to these additional variables are presented and discussed. The inclusion of all these measures of neighbourhood characteristics only increases the proportion of explained variance to 15 and 16% for males and females, respectively. Hence, these additional measures account for approximately 66% of the estimated neighbourhood fixed effect for males and around 55% of that for females. Note, however, that given individuals, to some extent, self-select into neighbourhoods based on local characteristics, our estimates of the importance of neighbourhood effects are likely to be an upper bound of the true effect.

Both the level of remoteness of the neighbourhood and the state of residence are found to be important in explaining the variance in life satisfaction in Australia. In particular, life satisfaction levels are highest for males and females living in outer regional Australia and for females living in remote Australia, and lowest for those living in the major cities of Australia. Such results appear to suggest that, on balance, residents in rural and regional Australia perceive themselves to be better off than their urban counterparts. It needs to be recognised, however, that this result

Table 3 Determinants of life satisfaction in Australia by gender: ordered probit estimates with census- and HILDA-derived neighbourhood characteristics

Explanatory variables	Male				Female			
	Census		Census and HILDA		Census		Census and HILDA	
	β	t stat	β	t stat	β	t stat	β	t stat
Log annual household income	0.052	2.55	0.052	2.54	0.048	2.27	0.049	2.28
Inner regional Australia	−0.005	−0.11	−0.032	−0.76	0.061	1.57	0.049	1.23
Outer regional Australia	0.129	2.37	0.086	1.51	0.194	3.68	0.173	3.16
Remote Australia	0.124	1.02	0.043	0.35	0.204	1.82	0.181	1.59
Victoria	0.040	1.12	0.057	1.56	0.016	0.45	0.021	0.60
Queensland	−0.074	−1.85	−0.057	−1.40	−0.082	−2.06	−0.075	−1.86
South Australia	0.024	0.46	0.057	1.07	0.058	1.18	0.071	1.43
Western Australia	−0.058	−1.16	−0.043	−0.85	−0.104	−2.30	−0.098	−2.15
Tasmania	0.069	0.77	0.096	1.07	0.129	1.59	0.142	1.76
Northern Territory	−0.084	−0.43	−0.003	−0.02	−0.318	−2.11	−0.288	−1.90
ACT (Canberra)	−0.039	−0.45	0.017	0.20	−0.203	−2.24	−0.186	−2.00
Neighbourhood characteristics (census)								
% Unemployed	0.006	1.64	0.005	1.39	0.005	1.51	0.005	1.48
% Lone parents	−0.010	−2.58	−0.008	−2.08	−0.012	−3.59	−0.012	−3.19
% Immigrants (non-English-speaking countries)	−0.006	−3.65	−0.005	−2.99	−0.004	−2.89	−0.004	−2.58
% Home owners	−0.001	−1.16	−0.002	−1.67	−0.002	−1.46	−0.002	−1.68
% Professionals	−0.002	−1.27	−0.002	−1.13	−0.001	−0.31	0.000	−0.19
% Over 64 years	0.000	0.19	0.000	−0.14	0.000	−0.21	−0.001	−0.40
Neighbourhood characteristics (HILDA)								
Neighbourly social interaction and support	–	–	0.081	4.19	–	–	0.032	1.75
Local disamenity	–	–	0.010	0.86	–	–	0.003	0.24
Insecurity in the neighbourhood	–	–	0.000	−0.01	–	–	−0.003	−0.28
Log likelihood	−11,322		−11,313		−12,337		−12,335	
Variance in LS_i^* explained by $X_i'\beta_1$	0.1475		0.1503		0.1597		0.1602	
Variance explained without neighbourhood characteristics (from Table 1, columns 1 and 2)	0.1407		0.1407		0.1460		0.1460	
Additional variance explained by neighbourhood characteristics	0.0067		0.0096		0.0137		0.0142	
% Additional variance, explained by true neighbourhood effects, due to characteristics	≈46		≈66		≈53		≈55	
Sample	6,594		6,594		7,309		7,309	

Robust standard errors calculated. The same other explanatory variables included in Table 2 are also included in each of these models. The additional omitted categories are major cities of Australia and New South Wales.

comes from a specification that holds differences across individuals in both income and labour force status constant, and the level of average household income is lower and the rate of unemployment higher in non-urban locations.

Interestingly, there are clear state of residence influences on female life satisfaction that are not found for males. Relative to living in New South Wales,

females located in Queensland, Western Australia, the Australian Capital Territory (Canberra) and the Northern Territory report significantly lower levels of life satisfaction, while residing in Tasmania has a weak positive association.

The population-census-derived neighbourhood characteristics measuring aspects of deprivation and social exclusion in the immediate locality are only found to explain a small additional amount of variation in life satisfaction. In particular, for both genders, living in a neighbourhood with a higher percentage of lone parents or immigrants from non-English-speaking countries was found to be associated with lower life satisfaction. These findings suggest that deprivation in the neighbourhood is important, in addition to deprivation at the individual level in terms of income and employment status. However, none of the other census-derived variables were statistically significant.

The addition of the neighbourhood variables derived from the HILDA Survey data provides interesting and potentially important insights. In particular, the variable related to neighbourly social interaction and support is strongly positively associated with individual life satisfaction for both males and females, whereas the more tangible factors of local disamenities and insecurity in the neighbourhood are not statistically significant in these results. It is striking, in this regard, that the latent effect of neighbourly social interaction and support is twice as large (and more statistically significant) in the case of males compared with females. This result contrasts with the finding reported by Shields and Wheatley Price (2005) that intra-household correlations in individual psychological well-being and perceived social support are much greater among females than across males. Furthermore, the inclusion of these variables eliminates the finding for males of increased life satisfaction levels in outer Australia while also slightly reducing the importance of the regional and state controls among females. In sum, our results provide further evidence to suggest that inter-personal effects are potentially important avenues for future research in the area of life satisfaction and well-being.

The estimated results of our final fitted models are provided in Table 4. The specifications reported in this paper add, in turn, our measure of residential tenure and controls for relative income in the neighbourhood. Years at the current address are positively related to life satisfaction levels for males, but not for females, without affecting the influence of other factors such as neighbourly social interaction and support. As expected, individuals living longer in a neighbourhood have significantly higher levels of life satisfaction, even after controlling for a host of neighbourhood-specific characteristics. Of some interest, this result is only of statistical significance for men. While somewhat speculative, this might reflect a tendency for women to be better at developing ties to their neighbourhoods. Men, on the other hand, may be slower at developing such ties and, thus, only enjoy the benefits they bring after a relatively long period in one place. For this study, however, what is most important is not the size of these coefficients on residential duration but the impact of the inclusion of these variables on the coefficients on the other neighbourhood variables included in our specifications. As can be seen, the magnitudes of the coefficients on the neighbourhood variables change very little with the inclusion of residential tenure in the model.

The inclusion of relative income controls appears to wipe out the absolute income effect for both males and females and provides some weak evidence to suggest that

Table 4 Determinants of life satisfaction in Australia by gender: ordered probit estimates with residential duration and relative income measures

Explanatory variables	Male				Female			
	Residential duration		Relative income		Residential duration		Relative income	
	β	t stat	β	t stat	β	t stat	β	t stat
Years at current address	0.003	2.17	–	–	0.002	1.37	–	–
Log annual household income	0.051	2.51	0.033	1.00	0.049	2.32	0.009	0.26
<50% of median household weekly income in neighbourhood	–	–	−0.125	−1.59	–	–	−0.079	−1.14
>200% of median household weekly income in neighbourhood	–	–	0.045	1.02	–	–	0.085	1.86
Inner regional Australia	−0.026	−0.63	−0.046	−0.95	0.049	1.25	0.044	0.93
Outer regional Australia	0.087	1.52	0.048	0.71	0.173	3.15	0.128	1.94
Remote Australia	0.041	0.33	0.080	0.51	0.182	1.60	0.279	2.00
Victoria	0.052	1.43	0.052	1.20	0.020	0.57	0.038	0.90
Queensland	−0.053	−1.31	−0.040	−0.83	−0.074	−1.82	−0.083	−1.70
South Australia	0.055	1.03	0.009	0.14	0.069	1.40	0.019	0.31
Western Australia	−0.040	−0.80	−0.091	−1.57	−0.098	−2.13	−0.091	−1.70
Tasmania	0.080	0.89	0.095	0.93	0.135	1.66	0.123	1.37
Northern Territory	−0.001	−0.01	−0.225	−1.02	−0.288	−1.90	−0.398	−2.72
ACT (Canberra)	0.010	0.12	−0.075	−0.70	−0.190	−2.03	−0.213	−1.99
Neighbourhood characteristics (census)								
% Unemployed	0.005	1.43	0.004	0.94	0.005	1.54	0.007	1.84
% Lone parents	−0.008	−2.17	−0.007	−1.47	−0.012	−3.23	−0.013	−2.93
% Immigrants (non-English-speaking countries)	−0.005	−3.08	−0.005	−2.82	−0.004	−2.65	−0.005	−2.84
% Home owners	−0.002	−1.78	−0.002	−1.45	−0.002	−1.75	0.000	−0.16
% Professionals	−0.002	−1.09	−0.002	−0.85	0.000	−0.21	0.001	0.66
% Over 64 years	0.000	−0.07	−0.003	−1.47	−0.001	−0.38	−0.001	−0.51
Neighbourhood characteristics (HILDA)								
Neighbourly social interaction and support	0.079	4.12	0.078	3.43	0.031	1.66	0.012	0.51
Local disamenity	0.008	0.72	0.010	0.69	0.001	0.07	0.005	0.34
Insecurity in the neighbourhood	0.000	0.02	−0.009	−0.74	−0.003	−0.26	0.005	0.43
Log likelihood	−11,301		−8,032		−12,327		−8,569	
Sample	6,594		4,717		7,309		5,080	

Robust standard errors calculated. The same other explanatory variables included in Table 2 are also included in each of these models. The additional omitted categories are own household weekly income (deflated to 1996 prices) is greater than or equal to 50% and less than or equal to 200% of the median household weekly income in the neighbourhood as recorded in the 1996 census, major cities of Australia and New South Wales.

being in a relatively low income household in the neighbourhood may be associated with lower male life satisfaction, whereas female life satisfaction appears to be higher when they are in relatively well-off households. None of these results, however, are statistically significant at conventional levels, and thus, it is difficult to conclude that, in these data at least, relative income is necessarily more important than absolute income. It is worth noting, however, that the lack of significance on the relative income variable should not be all that surprising and might reflect the

imprecision of its construction, with median income for each CD being only available in very broad income bands.

5 Conclusions

Recent years have seen a growth in interest by economists in the economic and social determinants of individual life satisfaction or happiness. Apart from a small literature looking at the impact of being unemployed in low versus high unemployment areas, this emerging research has mainly focused on the effects of 'internal' factors such as income, being unemployed and marriage. Our contribution is to highlight the importance of 'external effects' on life satisfaction and, specifically, neighbourhood effects. Our empirical evidence is based on data drawn from the first wave of the HILDA Survey that enable us to identify individuals residing in the relatively small geographical units of 488 census districts. Furthermore, at this level, we have been able to match in a number of neighbourhood characteristics obtained from the population census, as well as additional descriptive measures of the locality using information contained in the HILDA Survey questionnaires.

Our substantive finding is that location matters, but not a great deal, which is consistent with the recent conclusion of Propper et al. (2005) for the UK with respect to mental health. We find that neighbourhood effects in Australia are significantly correlated with individuals' self-reported life satisfaction but these fixed effects only explain between 1.5 and 2.5% of the variation in life satisfaction responses, in addition to the 14 to 14.5% explained by our extensive set of controls for 'internal' factors. To shed some light on which neighbourhood effects might be important, we have explored the influence of a number of population-census-derived neighbourhood characteristics as well as some measures that may capture spillover effects. Our measures of social deprivation and exclusion at the neighbourhood level, including the proportion of lone parents and immigrant density rates, were found to explain a small amount of the variance in life satisfaction. We have also found some evidence that tentatively suggests that neighbourly social interaction and support are positively and significantly associated with life satisfaction, particularly for males. Together, these neighbourhood characteristics in our data can explain just over half of the life satisfaction variance due to neighbourhood fixed effects.

However, a clear separation of the influence of exogenous and endogenous neighbourhood effects is very difficult, given that we do not observe any random allocation of individuals into neighbourhoods in Australia. We hope that showing that neighbourhood effects are clearly associated with life satisfaction will encourage further research on this issue.

Appendix

Table 5 Sample means and standard deviations

	Males		Females	
	Mean	Standard deviation	Mean	Standard deviation
Age	43.34	17.50	43.83	17.82
Married	0.552	0.497	0.528	0.499
Co-habiting	0.097	0.296	0.096	0.295
Separated	0.026	0.159	0.035	0.183
Divorced	0.045	0.207	0.061	0.240
Widowed	0.019	0.135	0.076	0.266
Single	0.262	0.440	0.203	0.403
Lone parent	0.009	0.095	0.060	0.238
Number of children	0.547	1.024	0.625	1.064
Number of adults in household	2.342	0.984	2.256	0.992
Native-born (not aboriginal/Torres Strait islander)	0.726	0.446	0.728	0.445
Aboriginal/Torres Strait islander	0.015	0.121	0.022	0.146
Immigrant (English-speaking country)	0.116	0.320	0.103	0.304
Immigrant (non-English-speaking country)	0.143	0.350	0.147	0.353
Poor English language speaking ability	0.048	0.214	0.053	0.224
Severe long-term health condition	0.012	0.109	0.008	0.090
Moderate long-term health condition	0.165	0.371	0.155	0.362
Slight long-term health condition	0.078	0.267	0.055	0.228
No long-term health condition	0.746	0.435	0.781	0.413
Degree or higher	0.173	0.378	0.196	0.397
Diploma	0.081	0.273	0.080	0.272
Certificate level 3 or 4	0.258	0.438	0.094	0.292
Certificate level 1 or 2	0.061	0.240	0.111	0.314
Year 12 only	0.107	0.309	0.111	0.314
Education level unknown	0.016	0.127	0.031	0.174
No qualifications	0.304	0.460	0.377	0.485
Self-employed	0.107	0.309	0.051	0.221
Owner manager	0.055	0.228	0.022	0.147
Employee (full-time)	0.437	0.497	0.241	0.427
Employee (part-time)	0.087	0.282	0.229	0.420
Unemployed	0.053	0.224	0.035	0.184
Unemployed × unemployment rate	0.651	3.159	0.398	2.392
Permanently sick	0.079	0.270	0.061	0.240
Retired	0.113	0.316	0.113	0.317
Full-time student	0.039	0.194	0.038	0.192
Other non-participant	0.030	0.170	0.209	0.407
Log annual household income	7.575	4.898	7.256	4.952
Household income missing	0.285	0.451	0.305	0.460
Negative household income	0.005	0.067	0.007	0.082
Owner/mortgage	0.724	0.447	0.718	0.450
House renter	0.253	0.435	0.258	0.438
Rent free	0.022	0.148	0.024	0.152
Religion is important (0–10)	4.165	3.571	5.179	3.587
Suspicious of interview questions	0.052	0.221	0.043	0.203
Savings time horizon (1–6)	2.497	1.667	2.552	1.687
Savings time horizon missing	0.087	0.282	0.083	0.276
Others present during interview	0.430	0.495	0.367	0.482
Lived with both parents aged 14	0.854	0.352	0.853	0.355

Table 5 (continued)

	Males		Females	
	Mean	Standard deviation	Mean	Standard deviation
Years at current address	9.558	11.606	9.563	11.508
<50% of median household weekly income in neighbourhood	0.104	0.305	0.139	0.346
>200% of median household weekly income in neighbourhood	0.292	0.455	0.259	0.438
Major cities of Australia	0.583	0.493	0.593	0.491
Inner regional Australia	0.279	0.449	0.277	0.448
Outer regional Australia	0.121	0.326	0.116	0.320
Remote Australia	0.017	0.128	0.015	0.121
New South Wales	0.307	0.456	0.309	0.471
Victoria	0.254	0.436	0.260	0.439
Queensland	0.192	0.394	0.192	0.391
South Australia	0.102	0.303	0.097	0.295
Western Australia	0.094	0.292	0.093	0.290
Tasmania	0.029	0.167	0.030	0.170
Northern Territory	0.017	0.128	0.017	0.129
ACT (Canberra)	0.005	0.067	0.005	0.071
Neighbourhood characteristics (census)				
% Unemployed	9.897	5.937	9.826	5.855
% Lone parents	9.878	4.826	9.973	4.863
% Immigrants (non-English-speaking countries)	12.530	12.412	12.778	12.512
% of home owners	67.732	16.384	67.624	16.165
% of professionals	16.442	8.388	16.703	8.560
% over 64 years	12.266	8.374	12.594	9.034
Neighbourhood characteristics (HILDA)				
Neighbourly social interaction and support (2–10)	6.499	0.870	6.486	0.859
Local disamenity (4–20)	10.324	1.468	10.366	1.519
Insecurity in the neighbourhood (4–20)	9.970	1.713	9.984	1.716
Sample	6,589		7,303	

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