DO CHILDREN FROM SMALL FAMILIES DO BETTER?

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The education, income, wealth and satisfaction with life of Australians aged 25–54 are examined in relation to the circumstances of their childhood, paying particular attention to variation by number of siblings when growing up. The data are from the Household, Income and Labour Dynamics in Australia (HILDA) survey. Educational attainment, income earned and household wealth tend to be greater for people who grew up in relatively small families. The effect of the number of siblings on educational attainment is greater for females than for males. However the advantages of growing up in a smaller family do not translate into higher levels of satisfaction with life. The implications of the findings for the public debate on fertility and child-related benefits in Australia are discussed, as are the implications of a child-quality–child-quantity trade-off for the explanation of fertility levels in more developed countries.

Keywords: Australia, developed countries, family size, education, income, wealth, life satisfaction, fertility, economic theory, intergenerational social mobility

This paper examines how the 'success in life' of Australian women and men varies according to the platform provided by the circumstances of their childhood, paying particular attention to variation by number of siblings when growing up. Differences in the attainment of socio-economic status may mediate the relationships between early lifecourse variables, including the number of siblings a person had when growing up, and later lifecourse demographic outcomes, such as marriage and fertility (Kiernan 1989; Axinn, Clarkberg and Thornton 1994; Berrington and Diamond 1999; Murphy and Knudsen 2002; Parr 2005). However, there appears to be a dearth of studies in the Australian demographic literature linking early lifecourse variables to the attainment of socio-economic status. The three main outcome variables considered, educational attainment, income, and wealth, are ones which would widely be associated with social status. In order to add a broader perspective, the relationship between satisfaction with life and the early lifecourse variables is also considered.

The relationships between the size of the family of origin and socio-economic outcomes in later life, as well as representing an important element of the 'demography of disadvantage' (Jones 2004), may also contribute to the explanation of fertility levels. According to the theory of the Nobel Prize-winning US economist Gary Becker, a child quality–child quantity trade-off and the costs of child quality contribute to the explanation of fertility levels (Becker and Lewis 1973; Becker 1981; Becker and Mur-

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phy 2000). More recent modifications to this theory emphasize the role of parents' altruism towards their children (and future other descendants) as a factor determining fertility levels (Becker and Barro 1988; Becker and Murphy 2000). The earnings of children and the wealth they acquire are integral to the explanation of family size. A recent large–scale survey of Australians aged 20–39, described by Weston *et al.* (2004), found that roughly a fifth of both male and female respondents cited 'whether having another child would reduce the opportunities available to other children' as an important factor influencing having children.

Of the outcomes considered in this paper it is the relationship between the number of siblings and educational attainment which has received the most attention in the literature. The question of whether children from large families suffer disadvantage, particularly in their education, has been studied extensively in the context of less developed countries (e.g. Ahlburg, Kelley and Mason 1996; Jones 2004). Perhaps the most persuasive and extensive analysis of the relationships between family size and educational achievement in more developed countries has been Judith Blake's (1981, 1989) analyses of white Americans. According to Blake, a larger number of siblings has a negative effect on a person's educational achievement because of the dilution of per-child parental time, attention and interaction; the dilution of material resources per child; and the dilution of parental emotional and physical energy with the arrival of and provision of care for extra children. The more childlike intellectual level, which Blake claims prevails in families with more children, and the reduced sense of urgency to associate and play outside of the family of those with more siblings, according to Blake, may further help to explain the lower levels of educational attainment of those from larger families. Blake finds that children from smaller families are more likely to have been read to by parents early in life, and are more likely to engage in intellectual and cultural pursuits. This, she argues, may help to explain their better educational outcomes. Blake's analyses show the effect of the number of siblings on educational achievement to be greater on the chances of completing high school than on the chances of completing university. Marjoribanks (2002) finds that, whilst sibling structures are related to educational outcomes in Australia on some outcome measures, the differences can be attributed to differences in family background. His support for the significance of the effects of sibling structures on the availability of family economic and interpersonal resources is therefore qualified.

Recent research on Australia has examined aspects of the dilution of parental material resources and time dilution with increasing numbers of children. Henman's (2001) normatively-based estimates of the costs of children imply that total expenditure on children should rise as the number of children increases. However, the marginal cost of children should decrease as their number increases. Percival and Harding (2002) provide empirical evidence that, holding income constant, the total expenditure of households increases as the number of children increases, whilst the marginal expenditure on an additional child reduces as the number of children increases. However, as the authors point out, it is not easy to determine from their data the extent to which the reduction in marginal expenditure is attributable to economies of scale, such as the recycling of the books, toys and clothes of older siblings for use by younger siblings and the sharing of resources between siblings, and the extent to which the reduction reflects the needs of children having to be sacrificed because of the budgetary squeeze with increasing numbers of children. Moreover, the effects of children on household income are not factored in. Chapman *et al.* (2001)

and Breusch and Gray (2004a) show that the earnings forgone by women as a result of producing children are substantial, and that the loss is somewhat greater for those with larger numbers of children than for those with one child. However, it is the first child to which the bulk of the loss of earnings is attributable. Craig (2003) and Craig and Bittman (2003) show that the time parents spend on childcare is generally slightly greater for parents (and especially so for mothers) with two children than for parents with one child. However, the amount of time spent on childcare for those with three or more children is only greater than among those with two children when the youngest is over five years old. It is clear from their results that the number of hours spent on childcare divided by the number of children declines as the number of children increases. However one cannot necessarily infer that this represents a dilution of the quality and effect of parental childcare.

The 'parental resource dilution hypothesis' is not without its critics. For example economist Allan Kelley argues that neither the material resources nor the parental time spent per child need necessarily decrease as the number of children increases, because parents may work longer or harder to provide extra resources, may finance the activities of children by drawing on savings, or sacrifice expenditure (and time) on other activities in order to provide for additional children. Younger siblings in larger families, he argues, may benefit from the additional time, educational capital, experiences and materials of older siblings. Moreover, with familial economies of scale – the sharing between siblings of reading materials, other educational resources and non-educational purchases – large families could plausibly be beneficial to the educational outcomes of their members (Kelley 1996).

An individual's level of education is a major determinant of income in later life, with the returns in percentage terms from increased education being generally greater for females than for males (Larkins 2001; Psacharopoulos and Patrinos 2004). However, the effect of the number of siblings on income may be more than the product of its effect on educational attainment. Parental resource dilution may affect labour market outcomes directly, as well as through its effect on educational attainment, because the dilution of parental time, material resources, and energy with increasing numbers of children may affect the communication of parental aspiration for their children's labour market success, know-how on ways to succeed, and the provision of resources which may facilitate this end. Several studies have shown the number of a person's siblings to be related to the person's subsequent fertility and family formation (Duncan *et al.* 1965; Kiernan 1989; Axinn *et al.* 1994; Murphy and Knudsen 2002; Parr 2005). Family formation and cumulative fertility, in turn, have been found to affect individual income, especially in the case of females (Chapman *et al*. 2001; Breusch and Gray 2004a, b).

Wealth reflects the acquisition, disposal, and changes in the value of physical and financial assets and liabilities over time. In Australia the process of accumulating wealth was changed significantly by the introduction by the Federal Government of compulsory mass superannuation in 1992, involving a requirement for both employee and employer to pay specified percentages of the employee's wage or salary into a specified fund (Drew and Stanford 2003). The value of superannuation is now second only to the value of housing as a component of wealth in Australia (Headey, Marks and Wooden 2005). Another important change has been the Federal Government's introduction in 1989 of the Higher Education Contribution Scheme (HECS), a loan imposed on higher education students on which repayments are made when income

exceeds a specified threshold (Jackson 2002). Outstanding liabilities for HECS have reduced the net wealth of younger adults who obtained their higher education in Australia. The number of siblings, as well as affecting wealth through its effects on education, income, and household and family formation, may also affect a person's wealth through its effects on the value of the financial resources he or she receives as a result of inheritance and transfers from parents whilst they are alive, and the example and know-how parents are able to provide about investment practices (Keister 2003). In addition, by affecting the affordability of private schooling, the up-front repayment of HECS liabilities, and enrolment in higher education on a full-fee basis, the number of siblings a person has may affect educational attainment and the income and wealth which flow from it (Jones 2004).

Material well-being, along with family life and physical health, is one of people's most frequently cited concerns in life (Crimmins and Easterlin 2000; Easterlin 2005). Since the number of siblings a person grew up with may affect both that person's material well-being and his or her family formation in later life, the relationship between the number of siblings and satisfaction with life may reflect far more than any satisfaction or dissatisfaction which arises from the relationships the individual has with the siblings. Wealth and income have been found to have positive effects on satisfaction with life in Australia (Headey and Wooden 2004). People who are either married or in a *de facto* relationship tend to report higher levels of satisfaction with life than the never married or the formerly married. However, according to Shields and Wooden (2003), satisfaction with life decreases as the number of dependent children aged less than 15 years increases, but increases as the number of adult children living away from home increases. This appears to support the conclusion that additional children ultimately raise satisfaction with life, but only when they leave home! Despite satisfaction with life (or 'happiness' as he refers to it) having such relationships to the major domains of human life, Easterlin (2005) found that changes in satisfaction over the adult life cycle were small, with satisfaction with life reaching a peak at age 45.

Three main research questions are examined in this paper. Are the numbers of siblings Australian males and females had when growing up inversely related to child quality as measured by educational attainment, income, wealth, and satisfaction with life? What are the differences between males and females in the effects of numbers of siblings on the above measures of child quality? Is there any evidence that the strength of the relationship between child quantity and child quality is related to the national levels of fertility in more developed countries?

In his review of the contributions of economic theories to the explanation of fertility, one of Robinson's (1997) main conclusions is the need for the clearly-defined and empirically-focused establishment of the relationships between child quality and fertility. A limitation of Blake's (1981, 1989) empirical examinations of the effects of the number of siblings on 'child quality' is her apparent equation of 'child quality' solely with educational outcomes. This paper advances the understanding of the effects of numbers of siblings in the Australian context by presenting empirical analysis of the effects of family size on a more extensive range of aspects of 'child quality'. Indeed it is arguable that the other variables considered here, namely income, wealth and the life satisfaction of children, are given more importance by most parents than is mere educational attainment. Moreover, evidence is presented linking the strength of the relationship between number of siblings and the quality of children to fertility at the

national level in more developed countries. Such evidence has been notably absent from literature on the interrelationship between child quality and fertility (Becker and Lewis 1973; Blake 1981, 1989; Becker 1981; Becker and Barro 1988; Becker and Murphy 2000).

Data and methods

The data are from Waves 1 and 2 of the Household, Income and Labour Dynamics in Australia Survey (HILDA). Wave 1 of this nationwide, longitudinal survey was conducted in 2001 and Wave 2 between August 2002 and March 2003. The sample design is a multistage cluster sample of households. Remote areas of the country were not sampled (Watson and Wooden 2002a, b, c). The analysis presented here has been restricted to 3,477 males and 3,863 females aged 25–54 (age at Wave 2) for whom number of siblings is available. Respondents aged less than 25 were excluded from the analysis because many had yet to complete their education and establish themselves in the labour force. Respondents aged 55 and over were excluded because for many their income and wealth have been affected by retirement.

Respondents were asked whether they ever had any brothers or sisters 'when growing up' and, if so, how many. They were instructed to include half or adopted siblings but not step- or foster-siblings. The main focus of this study is to consider the variation of the educational attainment, income, wealth and life satisfaction of 25–54-year-olds by the number of siblings. The results are presented separately for males and females because educational attainment, income, wealth, and satisfaction with life differ between the sexes.

Five response variables are analysed. For educational attainment, two binary variables are analysed using logistic regression: whether the respondent completed Year 12 (or the overseas equivalent education), and whether she or he completed a Bachelor's degree (or higher i.e. Bachelor's honours, Master's, Postgraduate Certificate or Diploma, or Ph.D).

Gross income from all sources for last financial year (2001–02). Recorded sources of income are wages and salaries from jobs, income from own businesses, dividends, royalties, interest, rental income, government benefits, government pensions and allowances, private pensions and superannuation, inheritance and bequests, transfers from non-resident parents, transfers from other household members, child support and maintenance, workers compensation, accident and sickness insurance, redundancy and severance payments, other public sources, and other private sources (Headey 2003).

Net household wealth (assets less debts). This was calculated from the values of: the home and other properties owned or being purchased, own, joint and children's bank accounts, private pensions and superannuation, life insurance, shares and other equity-type investments, bonds and other cash-type investments, trust funds, businesses, vehicles owned, collectibles, outstanding debts for home and car loans, own and joint credit card debts, debts for the Higher Education Contribution Scheme (HECS), and debts related to loans of other types (Headey 2003).

Life satisfaction, measured by responses on a 0–10 scale to the question: 'all things considered, how satisfied are you with your life?'

In order to control for the selectivity of family size, the multiple regression models include variables relating to the socio-economic status and intactness of the family

when the respondent was aged 14, ethnicity (measured by birthplace of respondent, birthplace of respondent's father and Aboriginal or Torres Strait Islander status of respondent), birth order (whether or not the respondent was the eldest sibling) and age.

The values of some of these control variables may have been affected by the respondent's number of siblings. Parental occupation measured when the respondent was aged 14, especially mother's occupation, may have been influenced by the respondent's number of siblings in that added child care responsibilities reduce the likelihood of mothers working outside the home. The type of schooling the respondent had may also have been influenced by the number of siblings, since a larger number of children may have reduced parents' ability to afford to send their children to private schools. The possibility that some of the effect of the number of siblings is mediated by these variables was assessed by the change in the coefficient when the variable was omitted from the model. The robustness of conclusions to outlying values of income, wealth and number of siblings was also considered.

The lack of availability of certain early lifecourse variables limits the interpretation of the models. For example, parental occupation effects would be expected to be influenced by parental education, which is not available in the dataset. Moreover, the effects of type of schooling would be expected to be influenced by parental wealth, which is also unmeasured. Parental wealth may also have influenced the respondents' family size, as well as their educational, income and wealth outcomes (Weerasinghe and Parr 2002).

Results

Table 1 presents the bivariate relationships between educational attainment, income and household wealth and the number of siblings and other background variables. The average level of educational attainment tends to decrease as the number of siblings a person grew up with increases. For both males and females the percentage who completed Year 12 (or its overseas equivalent) reaches its maximum value at one sibling (i.e. in a two-child family) and decreases steeply thereafter. There is a general inverse relationship between the percentage who attained a Bachelor's degree or higher and the number of siblings a person had, with the gradient being somewhat steeper for females than for males. The ratio of the number completing a Bachelor's degree or higher to the number who completed Year 12 also decreases as the number of siblings increases, with the decrease being steeper for females.

For females, mean gross annual income decreases continuously as the number of siblings increases. The major component of the significant reduction in total income with increasing numbers of siblings is the significant reduction in gross incomes from wages and salaries. However there are also significant reductions in other private incomes (gifts, inheritances etc) and in transfers from non-resident parents as the number of siblings increases (data not shown). For males, mean income generally declines as the number of siblings increases. However, the mean gross incomes of males with two or three siblings are slightly higher than those for males with one sibling or none. As for females, the major component of the significant reduction in total income with increasing numbers of siblings is the significant reduction in the gross income from wages and salaries. There is also a reduction in other private incomes. However, unlike for females, for males the reduction in transfers from non-resident

Table 1 Percentage who completed Year 12,[a] percentage who completed a Bachelor's degree or above, mean gross annual income, mean net household wealth and mean life satisfaction score by sex, number of siblings and other background variables, Australia, 2001–2003

Variable	Year 12[a]	Bachelor's +	Income	Wealth	Satisfaction	n
			Females			
Number of siblings						
0	55.9	30.7	32,286	248,228	7.81	127
1	56.2	31.9	30,643	268,927	7.74	778
2	53.0	29.2	30,306	246,778	7.72	1,055
3	48.0	25.2	29,719	247,682	7.69	814
4	41.2	17.6	27,021	176,692	7.80	386
5 or more	34.0	17.5	24,817	196,123	7.78	703
Is eldest sibling						
Yes	54.4	31.3	29,905	231,809	7.74	1,193
No	45.2	23.2	28,584	236,643	7.74	2,668
Type of schooling						
Government	42.8	20.8	27,736	218,921	7.72	2,878
Catholic	56.9	35.3	32,067	288,137	7.82	589
Other	73.3	46.9	33,531	274,064	7.76	390
Father's occupation						
Managerial & administrative	56.6	31.8	32,435	276,022	7.66	648
Professional	74.6	51.5	34,530	307,507	7.79	515
Associate professional	54.2	31.1	30,270	213,507	7.82	483
Tradespersons & related	42.8	17.5	27,170	196,852	7.77	804
Advanced clerical & service	69.4	44.4	30,572	328,839	7.67	36
Intermediate clerical & service	50.8	24.6	30,532	258,081	7.83	260
Intermediate transport & production	31.3	13.9	24,563	232,336	7.71	511
Elementary clerical, sales & service	34.3	14.8	25,995	193,566	7.87	108
Labourers & related	25.3	11.1	26,118	225,629	7.77	304
None	35.1	14.4	22,702	119,564	7.42	194
Father absent or deceased	34.7	17.4	26,312	197,141	7.51	190
Mother's occupation						
Managerial & administrative	51.2	28.5	29,448	199,594	7.75	207
Professional	70.5	46.7	33,998	246,174	7.72	488
Associate professional	67.9	37.7	33,925	272,164	7.58	212
Tradespersons & related	58.0	34.3	33,441	267,916	7.78	583
Advanced clerical & service	42.4	19.7	27,870	258,933	7.78	573

Intermediate clerical & service	48.4	25.3	28,724	322,857	7.66	95
Intermediate transport & production	51.2	30.5	32,581	224,337	7.96	131
Elementary clerical, sales & service	33.1	13.1	25,990	183,268	7.71	245
Labourers & related	28.2	10.7	24,530	203,379	7.80	422
None	40.6	18.7	25,285	214,408	7.69	907
Mother absent or deceased	32.7	12.7	24,129	186,531	7.31	55
Country of birth						
Australia	45.2	24.4	29,136	245,206	7.77	2,933
Main English-speaking	47.8	28.2	32,068	248,234	7.82	358
Europe	52.5	22.4	29,318	177,513	7.52	179
East or Southeast Asia	69.3	38.5	24,867	158,864	7.54	205
Other overseas	66.0	29.3	24,978	197,053	7.62	188
Father's country of birth						
Australia	44.9	24.4	29,467	246,872	7.77	2,390
Main English-speaking	44.8	26.6	29,987	245,730	7.86	571
Europe	52.0	23.9	29,129	224,953	7.62	477
East or Southeast Asia	69.1	39.2	25,198	170,864	7.56	204
Other overseas	62.4	27.6	24,440	166,684	7.52	221
Aboriginal or TSI						
Yes	21.4	10.7	23,485	112,887	7.69	84
No	48.6	26.0	29,112	237,845	7.74	3,778
All females	48.1	25.7	28,989	235,393	7.73	3,863
			Males			
Number of siblings						
0	47.2	28.8	49,300	361,602	7.55	125
1	55.2	27.8	51,283	239,985	7.64	776
2	47.0	25.8	52,687	252,960	7.66	969
3	42.0	22.9	52,427	228,481	7.66	678
4	35.2	18.1	46,696	242,081	7.58	374
5 or more	32.9	18.8	45,938	172,088	7.69	554
Is eldest sibling						
Yes	51.8	29.0	53,694	236,628	7.63	1,078
No	40.9	21.4	49,039	234,629	7.66	2,393
Type of schooling						
Government	38.3	19.1	48,576	221,531	7.64	2,661
Catholic	58.2	36.0	54,692	242,116	7.72	478
Other	73.2	44.6	59,415	339,907	7.59	332
Father's occupation						
Managerial & administrative	46.1	25.3	54,126	294,220	7.67	610
Professional	72.6	46.7	56,458	258,933	7.67	482
Associate professional	51.9	30.8	58,820	269,653	7.69	399

Tradespersons & related	38.2	17.0	47,362	204,080	7.76	752
Advanced clerical & service	53.9	30.8	64,401	253,837	7.42	26
Intermediate clerical & service	53.1	31.5	55,218	195,803	7.46	213
Intermediate transport & production	27.0	11.1	45,199	184,003	7.59	422
Elementary clerical, sales & service	30.9	15.5	49,546	262,526	7.78	97
Labourers & related	25.9	11.5	40,576	231,186	7.54	297
None	38.0	15.6	38,265	181,791	7.44	179
Father absent or deceased	35.4	19.4	41,760	261,346	7.53	175
Mother's occupation						
Managerial & administrative	49.4	26.5	53,207	271,870	7.69	162
Professional	65.6	40.9	58,691	216,841	7.59	413
Associate professional	56.6	29.7	49,598	277,140	7.68	182
Tradespersons & related	56.7	32.9	58,811	274,180	7.69	526
Advanced clerical & service	38.5	20.3	52,081	230,351	7.72	556
Intermediate clerical & service	38.3	13.6	47,177	293,385	7.81	81
Intermediate transport & production	42.2	19.3	47,284	281,878	7.64	109
Elementary clerical, sales & service	35.3	19.4	47,620	279,109	7.66	201
Labourers & related	29.7	13.1	45,616	193,436	7.66	367
None	36.1	18.0	43,652	205,065	7.56	880
Mother absent or deceased	33.3	10.0	40,800	186,702	7.35	70
Country of birth						
Australia	41.1	21.3	50,389	245,254	7.70	2,653
Main English-speaking	49.1	26.5	55,911	211,582	7.50	373
Europe	44.5	26.3	49,768	179,114	7.44	137
East or Southeast Asia	61.3	36.3	42,817	177,837	7.45	119
Other overseas	68.7	45.1	46,505	213,356	7.49	195
Father's country of birth						
Australia	39.6	20.8	50,296	245,097	7.71	2,149
Main English-speaking	47.6	25.2	53,469	232,280	7.62	555
Europe	47.6	23.8	51,374	231,742	7.50	416
East or Southeast Asia	63.2	36.8	45,535	195,520	7.58	125
Other overseas	64.2	42.2	46,076	178,558	7.41	232
Aboriginal or TSI						
Yes	13.0	6.5	34,468	73,901	7.61	46
No	44.7	24.1	50,695	237,378	7.65	3,431
All males	44.3	23.8	50,479	235,359	7.65	3,477

a Or overseas equivalent education.

Source: Living in Australia (HILDA) Wave 1 and Wave 2 combined data.

parents with an increasing number of siblings is not significant, whilst the reduction in investment income is significant (data not shown).

Both for males and for females, household wealth generally decreases as the number of siblings increases. For males, only children have the highest mean household wealth, whilst for females those with one sibling do so. For both sexes the general pattern of reduction reflects reductions in the values of property (both the value of the family home and the value of other properties), superannuation, bank accounts, and vehicles as the number of siblings increases. For females the value of business assets also decreases as the number of siblings increases. For males the value of equity investments increases and the size of the 'other debts' category decreases as the number of siblings increases (data not shown). For both sexes a reduction in the average size of outstanding HECS debts and other student loans, which would be explained by the lower percentage of graduates from higher education among those who grew up in larger families, only slightly offsets the reduction in wealth due to changes in other components.

Despite these relationships of educational attainment, income and wealth with the number of siblings, there is no clear and significant relationship between life satisfaction and number of siblings, with the variation by number of siblings being slight. Whilst for males those who grew up as only children have the lowest mean life satisfaction score, females who grew up as only children have the highest mean score.

Table 1 also shows wide variations in levels of education, income and wealth between people with differing types of schooling, socio-economic background, and ethnicity. The levels of educational attainment, income and wealth for males and females who attended government schools are considerably lower than for those who attended non-Catholic non-government schools (most of which would be fully independent schools, but which would also include schools affiliated to other religious or secular organizations), and also are lower than for those who attended Catholic schools. For both males and females, the offspring of parents in professional occupations have the highest levels of educational attainment. They also generally have relatively high levels of income and wealth. Males and females who at age 14 had one or both parents either absent from home or dead have relatively low levels of educational attainment and income. Migrants are generally more highly educated than the Australia-born. However, despite this, with the exception of those from the main English-speaking countries, migrants generally have lower average levels of income and wealth. The differences between the levels of education, income and wealth of Aboriginal and Torres Strait Islanders and the rest of the population are enormous: for both males and females on all these measures the Aboriginal and Torres Strait Islanders fare worse (Hunter 1999).

Despite the differences in education, income and wealth between some of the tabulated groups being large, the differences in the mean levels of life satisfaction are generally quite small. Males and females who attended Catholic schools are on average slightly more satisfied with life than those who attended other types of school. There is no clear pattern to the variation in the average life satisfaction by parental occupation. Men and women who had one or both parents either absent from home or dead have lower than average levels of life satisfaction. The Australia-born and migrants from the main English-speaking countries have higher levels of life satisfaction than migrants from the non-English speaking countries. Despite their enormous

differences from the rest of the population in education, income and wealth, the Aboriginal and Torres Strait Islander males and females are on average only slightly less satisfied with life.

The multivariate analyses of the relationships between educational attainment, income, household wealth and satisfaction with life and the number of siblings and other background variables are shown in Tables 2–6.

Educational attainment

The multiple regression analyses presented in Tables 2 and 3 show a persistence of the reduction in levels of educational attainment with increases in the number of siblings a person had when growing up, even after a range of possible confounding factors are controlled for. The magnitudes of the negative effects of the number of siblings on whether Year 12 was completed are similar for males and females. However, the effect of the number of siblings on the apparent propensity of those who completed Year 12 to progress to completion of a Bachelor's degree or higher is significantly greater for females than for males.

The results also illustrate the importance of parents' socio-economic status as a determinant of educational attainment. Children with parents at the 'high end' of the occupational spectrum are significantly more likely to complete Year 12 and to progress from Year 12 to completion of a Bachelor's or higher degree than those with parents at the 'low end'. In particular, having a father in a professional occupation has an especially large positive effect on whether a person completed Year 12 and on the apparent rate of progression from Year 12 to completion of a Bachelor's degree or higher. The higher educational achievement of the children of higher socio-economic status parents would reflect the transmission of parental educational capital, the promotion of higher levels of achievement, and the provision of higher levels of psychological support for their children to continue their education (Marjoribanks 2002).
The educational attainment of the children of women who were not working differs between males and females. For female children the educational outcomes of those whose mothers were not working are lower than those whose mothers were in 'high end' occupations and are higher than those whose mothers were in 'low end' occupations. For male children the educational outcomes of those whose mothers were not working are lower than those with mothers in 'high end' occupations and not significantly different from those with occupations at the 'low end' or in the 'middle' of the occupational spectrum. The intactness of the parental relationship is associated with better educational outcomes: those who at age 14 had one or both parents who were either absent from the parental home or deceased are less likely to have completed Year 12 and less likely to have attained a Bachelor's degree than those whose parental relationship was intact.

The type of schooling a person had is a significant factor affecting educational attainment. People who attended government schools are significantly less likely to have completed Year 12 and significantly less likely to progress from Year 12 to completion of a Bachelor's or higher degree than those who attended non-government, non-Catholic schools. The likelihood of having completed Year 12 of children who attended Catholic schools is between those for the two other schooling sectors. However the likelihood of progressing from Year 12 to completion of a Bachelors' degree of children who attended Catholic schools is similar to that for children from other non-government schools. Differences in parental wealth may have affected these out-

Table 2 Logistic regressions of whether Year 12[a] was completed by background variables, Australia, 2001–2003

	Females		Males	
Variable	β	SE(β)	β	SE(β)
Number of siblings	–0.13***	0.02	–0.12***	0.02
Is eldest sibling	0.26***	0.08	0.31***	0.08
Type of schooling				
Government	–0.81***	0.14	–1.12***	0.15
Catholic	–0.28+	0.16	–0.37*	0.17
Other	0.00		0.00	
Father's occupation				
Managerial or administrative	0.83***	0.21	0.26	0.21
Professional	1.28***	0.22	1.09***	0.22
Associate professional	0.56*	0.22	0.33	0.22
Tradespersons & related	0.30	0.21	–0.03	0.21
Advanced clerical & service	1.22**	0.43	0.17	0.46
Intermediate clerical & service	0.48*	0.24	0.51*	0.24
Intermediate transport & production	–0.12	0.22	–0.37+	0.23
Elementary clerical, sales & service	0.08	0.29	–0.23	0.30
Labourers & related	–0.31	0.24	–0.44+	0.24
None	0.00		0.00	
Father absent or deceased	–0.27	0.20	–0.37+	0.20
Mother's occupation				
Managerial or administrative	0.08	0.18	0.32+	0.19
Professional	0.73***	0.14	0.76***	0.14
Associate professional	0.81***	0.18	0.57**	0.19
Tradespersons & related	0.36**	0.12	0.58***	0.13
Advanced clerical & service	0.07	0.12	0.10	0.13
Intermediate clerical & service	–0.06	0.24	0.23	0.26
Intermediate transport & production	0.40+	0.21	0.35	0.22
Elementary clerical, sales & service	–0.30+	0.17	0.16	0.18
Labourers & related	–0.51***	0.14	–0.06	0.15
None	0.00		0.00	
Mother absent or deceased	–0.56+	0.32	–0.06	0.28
Country of birth				
Main English-speaking	0.38*	0.18	0.19	0.18
Europe	0.48*	0.21	0.05	0.23
East or Southeast Asia	1.13+	0.64	0.58	0.43
Other overseas	0.92***	0.27	0.87**	0.30
Australia	0.00		0.00	
Father's country of birth				
Main English-speaking	–0.25+	0.15	0.28+	0.15
Europe	0.27*	0.14	0.50***	0.00
East or Southeast Asia	0.29	0.65	0.67	0.42
Other overseas	0.20	0.25	0.50+	0.27
Australia	0.00		0.00	
Aboriginal or TSI	–0.55+	0.30	–1.19*	0.50
Age	–0.06***	0.01	–0.03***	0.01
Constant	2.32***	0.30	1.41***	0.30

*** $p \leq 0.001$ ** $p \leq 0.01$, * $p \leq 0.05$, + $p \leq 0.10$.

a Or overseas equivalent education.

Source: Living in Australia (HILDA) Wave 1 and Wave 2 combined data.

Table 3 Logistic regressions of whether a Bachelor's degree or higher was completed by background variables, Australia, 2001–2003

	Females		Males	
Variable	β	SE(β)	β	SE(β)
Number of siblings	–0.14***	0.02	–0.09***	0.02
Is eldest sibling	0.32***	0.09	0.29**	0.09
Type of schooling				
Government	–0.70***	0.13	–0.81**	0.13
Catholic	–0.01	0.15	–0.01	0.16
Other	0.00		0.00	
Father's occupation				
Managerial or administrative	0.79**	0.26	0.46+	0.27
Professional	1.31***	0.26	1.16***	0.26
Associate professional	0.65*	0.26	0.62*	0.27
Tradespersons & related	0.09	0.26	0.02	0.27
Advanced clerical & service	1.10**	0.43	0.40	0.51
Intermediate clerical & service	0.35	0.29	0.71*	0.29
Intermediate transport & production	–0.12	0.27	–0.34	0.30
Elementary clerical, sales & service	–0.00	0.37	0.08	0.38
Labourers & related	–0.14	0.30	–0.31	0.31
None	0.00		0.00	
Father absent or deceased	–0.18	0.24	–0.15	0.24
Mother's occupation				
Managerial or administrative	0.22	0.19	0.26	0.22
Professional	0.76***	0.14	0.86***	0.15
Associate professional	0.57***	0.18	0.53**	0.20
Tradespersons & related	0.39**	0.14	0.66***	0.15
Advanced clerical & service	–0.03	0.15	0.25*	0.15
Intermediate clerical & service	–0.01	0.27	–0.25	0.36
Intermediate transport & production	0.59**	0.22	0.16	0.28
Elementary clerical, sales & service	–0.38+	0.22	0.28	0.21
Labourers & related	–0.57**	0.19	–0.05	0.19
None	0.00		0.00	
Mother absent or deceased	–0.77+	0.43	–0.78+	0.43
Country of birth				
Main English-speaking	0.16	0.19	0.07	0.20
Europe	0.05	0.24	0.19	0.26
East or Southeast Asia	0.42	0.59	0.32	0.45
Other overseas	0.26	0.29	0.41	0.28
Australia	0.00		0.00	
Father's country of birth				
Main English-speaking	0.03	0.16	0.25	0.17
Europe	0.06	0.15	0.36*	0.17
East or Southeast Asia	0.55	0.59	0.66	0.43
Other overseas	0.05	0.28	0.88***	0.27
Australia	0.00		0.00	
Aboriginal or TSI	–0.22	0.38	–1.39+	0.76
Age	–0.01*	0.01	0.02**	0.01
Constant	–0.56+	0.34	–2.00***	0.35

*** $p \leq 0.001$ ** $p \leq 0.01$, * $p \leq 0.05$, + $p \leq 0.10$.
Source: Living in Australia (HILDA) Wave 1 and Wave 2 combined data.

comes. It is also possible that the some of the school sector effects are due as much to a selection of the type of schooling on the basis of parents' aspirations for their children as they are to the effectiveness of teaching in the different sectors. Children from larger families are more likely to have attended government schools than those from smaller families. If family size is a causal factor behind this relationship (and it is entirely plausible that those with more children would be less able to afford to send their children to non-government schools), it may be argued that the effect of the number of siblings a person had when growing up is somewhat greater than the regression analyses indicate, with some of the effect being mediated by the type of schooling the children have.

First-generation migrants are more likely than the Australia-born to have completed Year 12 or the overseas equivalent, significantly so for females. Second-generation migrants are more likely than the Australia-born to complete Year 12 and males are noticeably more likely to complete a Bachelor's or higher degree. These patterns would reflect the selectivity of recent migrants in term of skills, and the success in education of first and second-generation migrants (Parr and Mok 1995; Birrell and Khoo 1995; Marks, McMillan and Hillman 2001; Parr and Guo 2005). The educational attainment of the Aboriginal and Torres Strait Islander population has increased somewhat in recent years (AIHW 2005), but even so, Tables 2 and 3 show that the educational attainment of Aboriginal and Torres Strait Islanders is significantly lower than that of non-Aboriginal and Torres Strait Islanders. This is despite the small number of Aboriginal and Torres Strait Islanders in the sample and the exclusion of the more remote areas of Australia where the more distinctive and disadvantaged elements of the Aboriginal and Torres Strait Islander are found. Older females are less likely to have completed Year 12 or to have completed a Bachelor's degree or higher than younger females, a pattern which would reflect the advancement of females in education and the greater emphasis on skills in migrant selection over time.

Income

Table 4 shows that the number of siblings a person had when growing up has a negative effect on total annual income, even after controlling for the effects of a range of other early lifecourse variables. In the analysis for males, nine outlying observations (those with total annual income greater than $500,000) were excluded because some of the coefficients were found to be influenced considerably by their inclusion. The effect of the number of siblings on a female's income is more than the product of its effect on her educational attainment, since the coefficient remains significant after the addition of variables measuring educational attainment to the model (results not shown). Part of the explanation of the negative effect of the number of siblings on females' income appears to be due to an intergenerational transmission of fertility: Figure 1 shows that women who grow up with larger numbers of siblings are more likely to have larger numbers of children themselves and are less likely to be childless. For females a larger number of children is associated with lower levels of income, with the difference in income between the childless and those with one or more children being considerably greater than the differences in income with further additions to the number of children (Chapman *et al.* 2001; Breusch and Gray 2004a).

The regression models show that males and females whose parents were in 'high end' occupations earn more as adults than those whose parents were in occupations

Table 4 Linear regressions of gross income (all sources) on background variables, Australia, 2001–2003

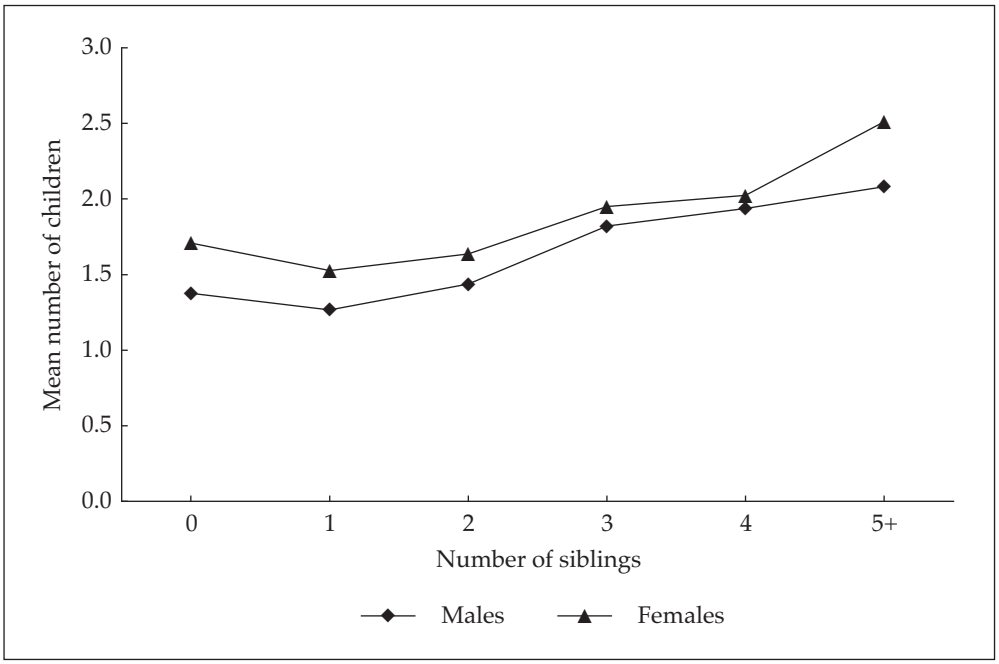
	Females		Males	
Variable	β	SE(β)	β	SE(β)
Number of siblings	–724***	190	–828**	310
Is eldest sibling	69	846	2,458+	1,358
Type of schooling				
Government	–3,150*	1,361	–6,292**	2,219
Catholic	–325	1,603	–263	2,665
Other	0		0	
Father's occupation				
Managerial or administrative	7,694***	2,251	10,029**	3,469
Professional	7,886***	2,300	10,418**	3,542
Associate professional	4,714*	2,315	8,824*	3,634
Tradespersons & related	2,685	2,175	3,756	3,384
Advanced clerical & service	3,598	4,426	18,737*	7,748
Intermediate clerical & service	5,162*	2,516	5,347	3,989
Intermediate transport & production	619	2,257	2,699	3,575
Elementary clerical, sales & service	1,907	3,055	8,155+	4,773
Labourers & related	3,691	2,394	–2,582	3,716
None	0		0	
Father absent or deceased	993	2,059	–4,200	3,164
Mother's occupation				
Managerial or administrative	2,433	1,892	7,504*	3,169
Professional	5,815***	1,414	8,481***	2,275
Associate professional	6,011***	1,861	4,835	2,997
Tradespersons & related	5,413***	1,338	9,612***	2,099
Advanced clerical & service	1,295	1,309	6,967***	2,021
Intermediate clerical & service	–494	2,679	–445	4,383
Intermediate transport & production	6,062**	2,255	2,250	3,711
Elementary clerical, sales & service	352	1,732	3,204	2,882
Labourers & related	–659	1,429	3,514	2,296
None	0		0	
Mother absent or deceased	–3,188	3,253	–3,312	4,408
Country of birth				
Main English-speaking	3,593+	1,845	3,577	2,875
Europe	512	2,229	–2,874	3,795
East or Southeast Asia	–3,244	6,218	–10,422	7,022
Other overseas	–752	2,840	–6,253	4,543
Australia	0		0	
Father's country of birth				
Main English-speaking	–1,874	1,524	–1,348	2,456
Europe	–272	1,460	3,562	2,339
East or Southeast Asia	147	6,239	6,628	6,845
Other overseas	–3,387	2,651	1,449	4,210
Australia	0		0	
Aboriginal or TSI	–579	2,689	–7,368	5,476
Age	148**	48	506***	78
Constant	21,361***	3,095	25,246***	4,816

*** $p \leq 0.001$ ** $p \leq 0.01$, * $p \leq 0.05$, + $p \leq 0.10$.

a Analysis for males excludes 9 observations for which total annual income is over A$500,000.

Source: Living in Australia (HILDA) Wave 1 and Wave 2 combined data.

Figure 1 Mean number of children of females and males aged 25–54 by number of siblings, Australia, 2001–2003



Source: Living in Australia (HILDA), Wave 1 and Wave 2 combined data.

at the lower end of the spectrum. The sons and daughters of men who were in an advanced or an intermediate clerical, sales or service occupation are also relatively high earners. Some of these differences, particularly the higher incomes of people whose fathers were in professional occupations, are attributable to the differences in educational attainment. However, even after controlling for the effects of differences in respondents' educational attainment, substantial parental occupational effects on income remain.

The incomes of males and females who attended government schools are considerably lower than the incomes of those who attended non-government schools, with the difference being noticeably wider for males than for females. This reflects both the lower average income from wages and salaries and the lower average income from other sources (such as businesses and investments) of those who attended government schools (data not shown). A significant part of the difference in total income is attributable to differences in educational attainment. However, particularly in the case of males, there remains a sizeable component of the income difference between people with different types of schooling which is not attributable to educational attainment. It may be that males who attend non-government schools, as well as progressing further in education, also benefit from the acquisition of know-how on how to succeed in the labour market, and from 'old school tie' networks. The wealthier backgrounds of the privately educated and a related greater recipience of financial transfers from parents may also help to explain their higher incomes from sources other than wages and salaries.

Despite their having lower levels of education, older people earn significantly more on average than younger people. This would reflect the cumulative advancement of rank and tenure within the labour market with age and the withdrawal from the labour force and switches to part-time work of younger females with young children to raise.

Household wealth

Males and females who grew up with larger number of siblings have on average significantly lower levels of household wealth than those who grew up in smaller families. Table 5 shows that significant differences in household wealth between those who grew up in families of different sizes remain even after the effects of a range of other early lifecourse factors are controlled for. Both for males and for females this reflects those who grew up with larger numbers of siblings tending to have significantly lower values of net equity in property, superannuation and bank accounts, and also in the case of males a lower value of equity investments and a lower net value of vehicles owned (data not shown). The greater wealth of those who grew up with fewer siblings would in part be due to their higher levels of educational attainment and higher income levels (Tables 2–4). However, in view of the fairly modest variation in income levels with the number of siblings it may be that much of the difference in household wealth is attributable to the greater financial transfers from parents received by those with smaller numbers of siblings and the ensuing accumulation of their value. As seen in Figure 1, males and females who grew up with larger numbers of siblings tend to have larger numbers of children. A resultant greater expenditure on children and a loss of earnings (usually) of the female partner may also contribute to the explanation of their lower levels of household wealth.

Males and females who attended government schools have lower levels of wealth than those who attended non-government schools, but the difference is only statistically significant for males. This would reflect their lower levels of educational attainment and income. Differences in household formation patterns may also play a role, particularly the greater numbers of children, the lower proportion who are childless, and the higher percentage who are divorced or separated among those who attended government schools (Parr 2005). Males and females whose fathers were in professional or managerial occupations have higher levels of wealth than people whose fathers were in other occupational categories, with the differences being more marked for females than for males for whom it is not significant. This would reflect their higher levels of educational attainment and may also reflect the knowledge of how to succeed in the labour market and finance which may be transferred to them by their fathers. An initially surprising finding that the female children of fathers in labouring and related occupations have one of the higher levels of household wealth is the product of a small number of outlying values for household wealth.

First-generation migrants generally have lower levels of household wealth than people who were born in Australia (although for some birthplaces the difference is not statistically significant). This is despite the higher levels of educational attainment of migrants. For some migrant groups lower income levels would be a contributory factor. Lower incomes in the country of origin before migration, the costs of migration, and the disruption to the working career as a result of the migration may be other factors. The effect of being Aboriginal or Torres Strait Islander is negative and, especially for males, is large. However the effects are not statistically significant,

Table 5 Linear regressions of net household wealth on background variables, Australia, 2001–2003

	Females		Males	
Variable	β	SE(β)	β	SE(β)
Number of siblings	–16,702***	3,846	–16,659***	3,885
Is eldest sibling	–15,316	17,065	–14,374	17,035
Type of schooling				
Government	–31,710	27,256	–101,999***	27,760
Catholic	30,806	32,107	–81,977*	33,306
Other	0		0	
Father's occupation				
Managerial or administrative	88,379+	45,577	66,666	43,463
Professional	134,301**	46,592	46,124	44,579
Associate professional	42,065	46,865	34,437	45,441
Tradespersons & related	27,861	44,116	–12,324	42,436
Advanced clerical & service	135,218	90,570	19,883	96,402
Intermediate clerical & service	79,818	50,978	–27,853	49,970
Intermediate transport & production	68,480	45,828	–33,454	44,847
Elementary clerical, sales & service	14,469	61,536	59,618	59,728
Labourers & related	86,911+	48,633	24,247	46,705
None	0		0	
Father absent or deceased	–3,018	41,665	33,833	39,881
Mother's occupation				
Managerial or administrative	–12,282	37,939	44,624	39,701
Professional	13,474	28,454	11,377	28,471
Associate professional	35,185	37,645	74,910*	37,877
Tradespersons & related	29,357	26,872	59,331*	26,338
Advanced clerical & service	26,839	26,391	27,271	25,265
Intermediate clerical & service	73,870	53,205	21,830	54,195
Intermediate transport & production	–10,352	44,668	62,970	46,549
Elementary clerical, sales & service	–34,026	34,904	59,035	36,008
Labourers & related	–2,455	28,858	–3,575	28,836
None	0		0	
Mother absent or deceased	–50,146	67,210	–35,283	5,5516
Country of birth				
Main English-speaking	–27,431	37,338	–85,196*	36,239
Europe	–114,878**	44,814	–152,478**	47,641
East or Southeast Asia	–147,113	123,893	–111,760	88,580
Other overseas	4,819	57,092	19,866	57,783
Australia	0		0	
Father's country of birth				
Main English-speaking	6,292	30,679	28,375	30,921
Europe	14,757	29,382	42,934	29,279
East or Southeast Asia	98,272	124,330	71,389	86,670
Other overseas	–50,262	53,455	–53,817	53,596
Australia	0		0	
Aboriginal or TSI	–52,001	56,754	–112,827	7,1072
Age	10,168***	978	10,635***	979
Constant	–158,254*	62,668	–79,850	60,351

*** $p \leq 0.001$ ** $p \leq 0.01$, * $p \leq 0.05$, + $p \leq 0.10$.
Source: Living in Australia (HILDA) Wave 1 and Wave 2 combined data.

possibly because of the small numbers of Aboriginal and Torres Strait Islanders in the sample and the exclusion of the more remote areas. It is not surprising to find that older people are significantly wealthier than younger people, in view of their higher incomes and the greater length of time they have had in which to accumulate wealth.

Satisfaction with life

The most striking feature of the regression models in Table 6 of the effects of early lifecourse variables on life satisfaction score is how few are significant. The father having been in employment and the mother not having been absent from the home or deceased are significantly associated with higher levels of satisfaction with life among females. There are also some significant differences between first and second-generation migrant groups. Despite its disadvantageous effects on the attainment of education, income and wealth, the number of siblings a person had when growing up does not have a significant effect on his or her satisfaction with life.

Is there an effect on fertility?

The national-level relationship between fertility levels and the strength of the association between family size and educational outcomes are now considered. In order to explore whether an inverse relationship between child quantity and child quality helps to explain the variation in levels of fertility in more developed countries, simple linear regression models of reading literacy scores on number of siblings were estimated using data for 24 countries[1] from the OECD Programme for International Student Assessment (PISA 2000). For all countries, the regression slope is negative (Park 2005). The steepest slopes are for two Southern European countries, Italy and Portugal, and the least steep for two Northern European countries, Finland and Iceland. These slopes are plotted against the TFR of these countries in Figure 2. It is seen that in those countries where the relationship between reading literacy and number of siblings is more strongly negative, total fertility tends to be lower. In other words, where having a larger family is more strongly detrimental to the educational attainment of the children people tend to have fewer children.

Conclusion

The results of this study show that children from small families generally fare better than children from large families, at least in educational attainment, income earned, and the accumulation of wealth. Recently in what has become a much-publicized soundbite, the Australian Federal Treasurer Peter Costello told the nation: 'If you can have children it's a good thing to do – you should have one for the father, one for the mother and one for the country, if you want to fix the ageing demographic' (Dodson 2004). The implication of the results in this paper is that those who have already had 'one for father' or 'one for father and one for mother', by having 'one (or more) for the country' do so to the detriment of their existing children, at least in regard to their prospects for attaining education, income and wealth.

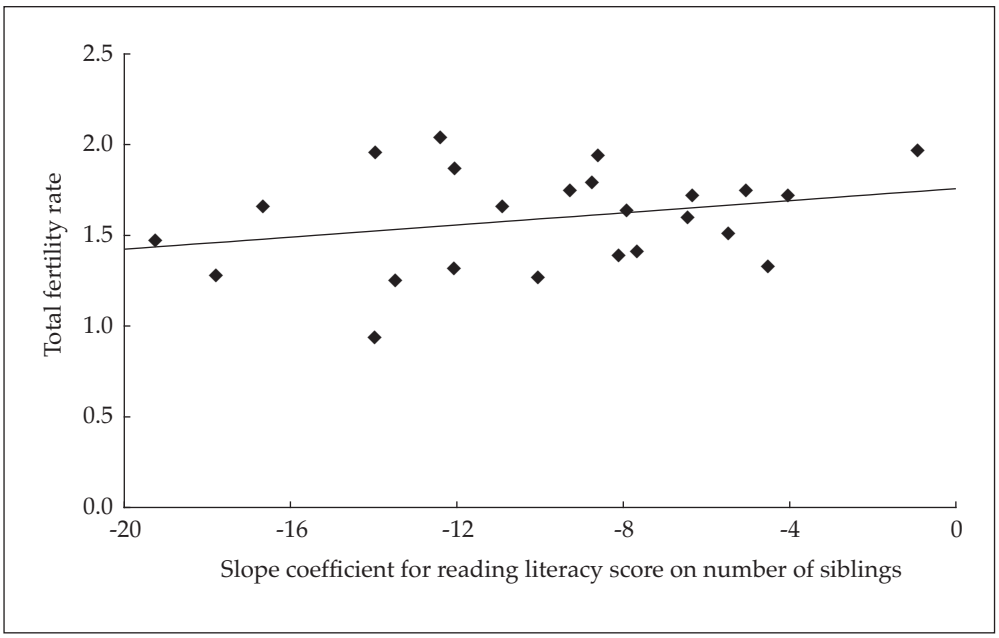
The effect of the size of the family in which an Australian grew up on progression from Year 12 to completion of a Bachelor's or higher degree is noticeably greater for females than it is for males. The sex differences in the effects of number of sib-

Table 6 Linear regressions of life satisfaction on background variables, Australia, 2001–2003

	Females		Males	
Variable	β	SE(β)	β	SE(β)
Number of siblings	–0.00	0.01	0.02	0.01
Is eldest sibling	0.00	0.06	–0.03	0.06
Type of schooling				
Government	–0.06	0.09	0.05	0.09
Catholic	0.03	0.11	0.11	0.11
Other	0.00		0.00	
Father's occupation				
Managerial or administrative	0.17	0.15	0.13	0.15
Professional	0.32*	0.16	0.17	0.15
Associate professional	0.33*	0.16	0.16	0.15
Tradespersons & related	0.29+	0.15	0.23	0.14
Advanced clerical & service	0.18	0.30	–0.08	0.33
Intermediate clerical & service	0.35*	0.17	–0.08	0.17
Intermediate transport & production	0.21	0.15	0.06	0.15
Elementary clerical, sales & service	0.37+	0.21	0.23	0.20
Labourers & related	0.29+	0.16	0.03	0.16
None	0.00		0.00	
Father absent or deceased	–0.10	0.14	–0.05	0.13
Mother's occupation				
Managerial or administrative	0.02	0.13	0.08	0.13
Professional	–0.06	0.10	0.00	0.10
Associate professional	–0.22+	0.13	0.07	0.13
Tradespersons & related	–0.02	0.09	0.10	0.09
Advanced clerical & service	0.01	0.09	0.13	0.09
Intermediate clerical & service	0.01	0.18	0.17	0.18
Intermediate transport & production	0.21	0.15	0.09	0.16
Elementary clerical, sales & service	–0.02	0.12	0.11	0.12
Labourers & related	0.05	0.10	0.07	0.10
None	0.00		0.00	
Mother absent or deceased	–0.40+	0.22	–0.27	0.19
Country of birth				
Main English-speaking	–0.05	0.12	–0.27*	0.12
Europe	–0.15	0.15	–0.12	0.16
East or Southeast Asia	–0.30	0.42	–0.49	0.30
Other overseas	0.10	0.19	0.08	0.19
Australia	0.00		0.00	
Father's country of birth				
Main English-speaking	0.12	0.10	0.07	0.10
Europe	–0.11	0.10	–0.18+	0.10
East or Southeast Asia	0.09	0.42	0.30	0.29
Other overseas	–0.31+	0.18	–0.30+	0.18
Australia	0.00		0.00	
Aboriginal or TSI	–0.01	0.18	–0.13	0.23
Age	–0.00	0.00	0.00	0.00
Constant	7.63***	0.21	7.39***	0.20

*** $p \leq 0.001$ ** $p \leq 0.01$, * $p \leq 0.05$, + $p \leq 0.10$.
Source: Living in Australia (HILDA) Wave 1 and Wave 2 combined data.

Figure 2 Plot of total fertility rate against slope coefficient of a regression of reading literacy score on number of siblings, 24 OECD countries, 2000



Sources: Slope coefficients from author's calculations using data from OECD Programme for International Student Assessment. <http://www.pisa.oecd.org>. Accessed: 2005. Total fertility rates from United Nations, *World Population Prospects 2004 Revision Population Database*. <http://esa.un.org/unpp/> Accessed: 2005.

lings imply that the educational attainment of females relative to that of males is somewhat greater among those who grow up in relatively small families than among those who grow up in larger families. Thus the decline in fertility rates that was evident in Australia between 1961 and 2001 and especially rapid in the early 1970s, may have contributed to a general raising of the status of women, not only by facilitating the participation in education and the labour force of women of childbearing age, but also by enhancing the educational success of female children.

The strength of the relationships between family size and attainment are likely to change as the socio-economic parameters of raising a family change. For example the extensive changes to child-related payments in Australia announced in 2004 by Treasurer Costello, including the provision of a universal maternity payment at the birth of each child and changes to family-tax benefits (means-tested payments made to the parents of children), may lessen the extent to which growing up in a large family is disadvantageous to educational attainment, income and wealth by weakening the extent to which a larger family size dilutes family financial resources. However, recent changes to the provision of higher education, particularly the introduction of full-fee-paying places and schemes facilitating the up-front payment for higher education (which is often paid by parents), may serve to enhance the advantage of those who grow up in smaller families, in terms of the completion of university degrees and the accumulation of personal wealth.

The rise of child-centred attitudes and a resulting restriction of fertility in order that children can be provided for adequately, more particularly that they can be educated, is an important part of the explanation of the onset of fertility decline (Caldwell 1982; Parr 2002). According to Robinson (1997: 64); 'the key change in the course of fertility decline is a preference shift towards higher quality children'. The correlation between total fertility and the strength of the (negative) relationship between the PISA reading literacy score and the number of siblings may be presented tentatively as empirical evidence that child quantity-to-quality trade-off is linked to the explanation of the variations in fertility levels between post-transitional, more developed countries. The strength of child quantity-quality trade-off may be a relatively important factor in the explanation of current very low levels of fertility in Southern European countries, particularly in Italy and Portugal, since it is in these countries that the trade-off appears to be strongest. According to Becker and Murphy (2000: 20), 'rapid declines in fertility are usually explained by economic growth, the growing education of women, and the interaction between the quantity and quality of children'. They note that falls in birth rates in Southern Europe to very low levels are not readily explained by economic or educational advancement, but appear unaware of the strength of child-quantity to child-quality trade-off which is apparent from the PISA data for these countries. The strength of the correlation ($r = 0.27$) in Figure 2 is considerably less than correlations observed for OECD countries between fertility and certain economic variables and indicators of the status of women relative to men (d'Addio and d'Ercole 2005). Hence, child-quantity to child-quality trade-off may not play a leading role in the explanation of the variation in fertility between such countries. Clearly further research on this question is needed, particularly to assess whether confounding factors, such as the levels of family and childcare benefits (which may both encourage higher fertility and attenuate the budgetary squeeze experienced with a larger family size), economic factors and levels of gender equity (McDonald 2000) can account for the association shown in Figure 2.

Finally, whilst the size of the family in which people grow up is an important determinant of their educational and socio-economic attainment in later life, it has little effect on satisfaction with life, as indeed is the case for most of the other early lifecourse variables considered. A larger number of siblings may hold a person back when it comes to getting ahead in education and the labour market and in accumulating wealth, but is not detrimental to the person's happiness. Further research is needed to identify those elements of satisfaction with life which are enhanced by a larger number of siblings.

Acknowledgment

Presidential Address presented to the 12th Biennial Conference of the Australian Population Association, Canberra, 15–17 September 2004.

Note

1 Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Italy, Japan, Liechtenstein, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, UK, USA.

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