XXV IUSSP International Population Conference
Tours France 18–23 July 2005
Session 22 Tuesday 19 July 1.30–3.00pm
Family Formation

Generational differences in parity progression in Australia: The role of sex composition of children

Edith Gray edith.gray@anu.edu.au
Ann Evans ann.evans@anu.edu.au
Rebecca Kippen rebecca.kippen@anu.edu.au
The Australian National University

Abstract

This paper investigates generational differences in Australian parents' desire for both a son and a daughter. It is argued that in low fertility societies the sex composition of existing children is an important factor in parental decisions about whether to have another child. The main aim of this paper is to examine whether younger generations (having children under a low fertility regime) are more likely than older generations to have larger families due to sex of existing children. In doing so, we explore whether parents with children of the same sex are more likely to have an additional birth, and whether there are differences in the propensity to progress if the existing children are sons as compared to daughters. This paper uses a representative survey and is part of a larger project using census data and qualitative interviews to investigate the role of the sex composition of children on parity progression. We find evidence of a mixed-sex composition and a mild preference for daughters. Further, we find that sex of existing children is least important for parents who had their children under a higher-fertility regime.

Acknowledgements

Funding for this research was provided by the Australian Research Council under grant DP0558818.

The authors wish to thank Robert Ackland for programming assistance.

Introduction

In this paper we investigate whether sex of existing children is a factor in parental decisions to have a higher-order birth in Australia. Most research on sex preference focuses on non-Western countries (see Arnold, 1997), and this research tends to find that son preference dominates, although preference for at least one son and one daughter is common. However, there is no reason why the sex of existing children should have no impact on parity progression in more developed countries.

The United States is one developed country where researchers have investigated the influence of sex preference on parity progression. Considerable evidence has been building. Ben-Porath and Welch (1976) cite evidence from as early as the 1950s that there is a preference for a balanced sex composition in the US. This research continued in the 1980s with Bulatao also finding that 'wanting a son' or 'wanting a daughter' is a reason for successive childbearing at the third and fourth child (Bulatao, 1981). In 1983 Sloane and Lee found strong support for the sex of women's previous children in effecting their fertility intentions. This finding is particularly strong for women with two children, where they state 'The persistence of that effect among women with two children in particular argues strongly for including sex of previous children as an independent variable in models of fertility intentions' (Sloane and Lee, 1983: 353).

The evidence from the US continues to mount that the sex of existing children is particularly important for decisions to have a third or higher-order birth. Pollard and Morgan (2002) in summarising findings relating to women born from 1915 to 1954 find that there is a greater propensity to have a third birth if the sex of the first two children are the same. For cohorts born from 1955 they find an 'attenuation' of the effect of same-sex children on progression to third birth.

The findings from the US based on the impact of sex of existing children are not limited to *whether* parents progress or not, but *how long* it takes to have another child. Teachman and Schollaert's (1989) findings suggest that parents with two same-sex children progress more rapidly to a third birth than parents with a mixed-sex composition. Yamaguchi and Ferguson (1995) also argue that timing of births is important in low fertility settings, but did not find that sex composition of existing children affected the spacing of births.

Recent research from Europe also examines sex preference, and the findings support an increased likelihood of having higher-order births if the children already born are of the same sex (Andersson, Hank, Rønsen and Vikat, 2004). That research also finds some preference for having a daughter in Denmark (see also Jacobsen, Møller and Engholm, 1999), Norway and Sweden (see also Hank and Andersson, 2002), and a son preference in Finland.

In Australia, there has been little research on sex preference and parity progression. One study published in the 1970s finds that women with a mixed-sex composition of children have a lower probability of having another child, and have lower expected ultimate family sizes, than women with same-sex children (Young, 1977). A more recent study into the reasons for having children also finds that a similar proportion of men and women say it is important to have at least one/another girl (18 and 16 per cent respectively), while a larger proportion of men (23 per cent) say that it is important to have at least one/another boy (compared with 12 per cent of women) (AIFS, 2004: 126). Recent research using 2001 census data, suggests that women with two same-sex children (either two boys or two girls) are around 25 per cent more likely to have a third child than women with a son and a daughter. This contributes an additional 0.05 to the total fertility rate. That is, the fertility rate without these additional births would be around 1.70 rather than the current 1.75 (Kippen, Gray and Evans, 2005). Like the pattern found in some European countries, there also seems to be a daughter preference in addition to the mixed-sex composition preference.

Gray and Evans (2005) find that in a recent generation of childbearing women, those with two sons are more likely to have a third birth than those with two daughters.

The following sections outline the theoretical propositions used to explain the impact of sex of existing children on parity progression. After describing fertility and issues related to measuring parity progression, we describe the data and method used for this study. To explore the impact of sex of existing children on progression to, and timing of, higher-order births, we ask three questions:

- Is there a generational difference in the proportion of people who progress to higher-order births based on sex of existing children?
- Is there a difference in the timing of progression to higher-order births based on sex of existing children?
- Are there generational differences in the timing of progression to higher-order births based on sex of existing children?

Theoretical propositions

Two theoretical propositions purportedly explain the impact of sex of existing children on the decision to have another child. One suggests that parity progression is more important under low fertility regimes than under high fertility regimes. The other suggests parity progression due to sex preference is not important in countries with more egalitarian gender-role attitudes. These propositions need greater consideration as in many cases they are in opposition (i.e. countries with egalitarian gender attitudes often have low fertility regimes).

In low-fertility countries, even slight parental sex preference may bolster fertility levels as parents may 'adjust up' their intended family size in order to fulfill their desire for children of a particular sex, or to achieve a family with at least one son and one daughter. Hence, the desire for sons and daughters becomes more important in its impact on completed family size as fertility declines. It is argued that 'contemporary manifestations of son preference *(or equally, the desire for a son and/or daughter)* are activated in part by the more modern phenomenon of declining family sizes' (Goodkind, 1999:50; Williamson, 1976, Wood and Bean, 1977). In societies with *low fertility*, sex preference has the effect of increasing completed fertility. In comparison, under *high fertility* regimes a person's sex preference (including a mixed-composition preference) is normally satisfied because of the larger average completed family size (Williamson, 1976).

Sex preferences may also vary under different gender regimes. Williamson (1976) proposes a framework for understanding parental sex preferences. Under this framework a preference for a child of each sex is apparent if parents believe the child's sex is 'up to God', and in societies where there is sharp sex-role segregation. Preference for sex balance is also associated with the assumption that boys and girls will have different traits, strengths, leisure activities, and interests, and in societies where boys are linked to their fathers and girls to their mothers (or in fact *vice versa*).

Pollard and Morgan (2002) attribute the recent weakening of the desire for a mixed-sex composition in the US to a decline in traditional gender-role attitudes. They reason that the gender system is less important in the US compared with traditional societies, and propose that as traditional gender-role attitudes shift there should be a weakened effect of sex of existing children because boys and girls are substitutable in an egalitarian society. This argument is very much in line with Williamson's theory that where there is a sharp sex-role segregation, there will be a desire for families that have both sons and daughters. Yet there is plenty of evidence that a mixed-sex composition is preferred in many countries that could be described as 'egalitarian' (Hank and Andersson, 2002).

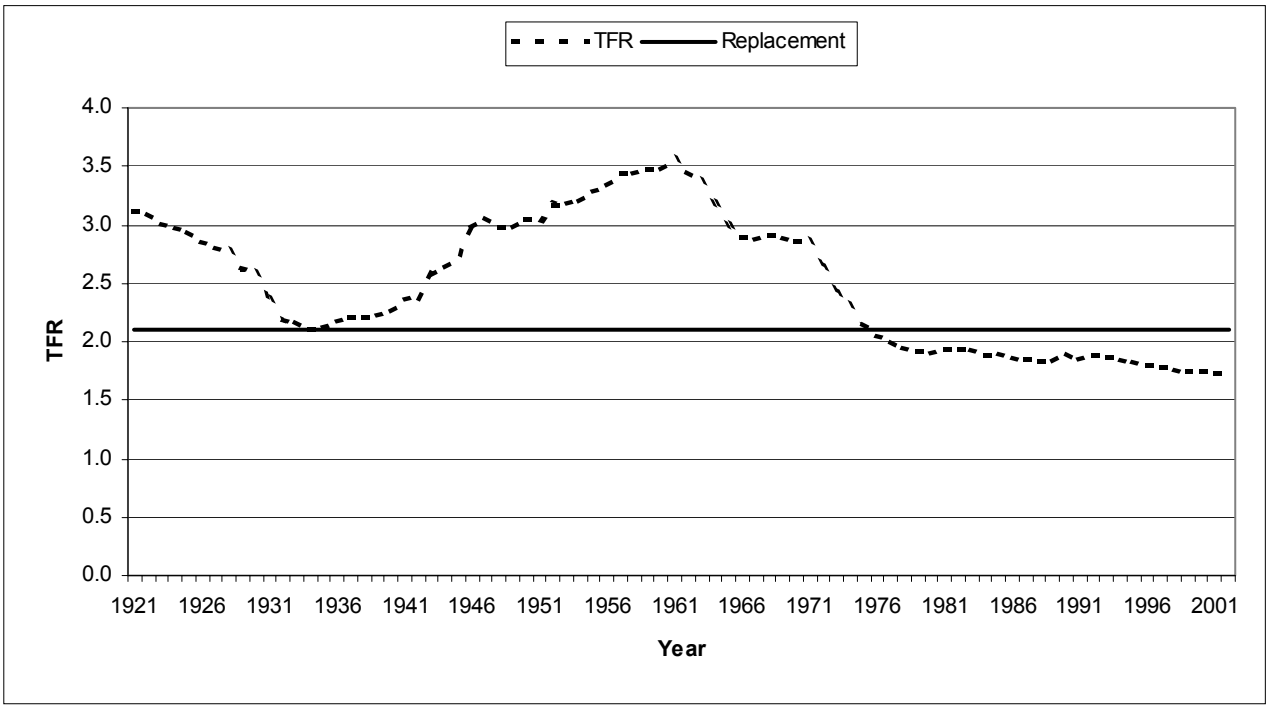
To test these propositions in the Australian context we examine the effect of sex of existing children and the effect of differing fertility regimes on progression to third and fourth births. We start by identifying the fertility regimes and then use survival analysis and proportional hazards models to examine both the propensity for, and timing of, higher-order births. Finally, we discuss generational changes (or otherwise) in parents' desire for sons or daughters.

Examining parity progression

When measuring fertility it is important to consider higher-order births; that is, the proportion of women who have third or further births (Kippen, 2004). In Australia the fertility rate is kept from being very low because women have higher proportions of three or more births as compared to other modern societies (McDonald, 1998). However, we do not know what impact the sex of existing children has on contributing to higher-order births. Evidence from other countries shows that it is certainly a factor in explaining third (or further) births—parents with two children of the same sex are more likely to have a third child than parents with a son and a daughter. We explore the impact of sex of existing children on parity progression. To contribute to the theoretical propositions we compare three cohorts of women. These cohorts represent women having children under different fertility regimes. They also made their childbearing decisions under differing gender-attitude regimes.

The total fertility rate (TFR) in Australia is currently 1.75 births per woman (ABS, 2003). This is a moderately high fertility rate in comparison with some other developed countries. The average TFR for the 'more developed world' is 1.6, while the TFR is as high as 2.0 in the United States and New Zealand, and as low as 1.2 in some Eastern and Southern European countries (PRB, 2004). The TFR in Australia has been around the level of 1.7 to 1.8 for the last ten years, and has been below replacement level since 1976. Over the twentieth century the TFR dropped from over 3.0 in the early 1920s to 2.1 in 1935. It then increased to 3.0 or higher from 1946, peaking at 3.56 in 1961 (Figure 1).

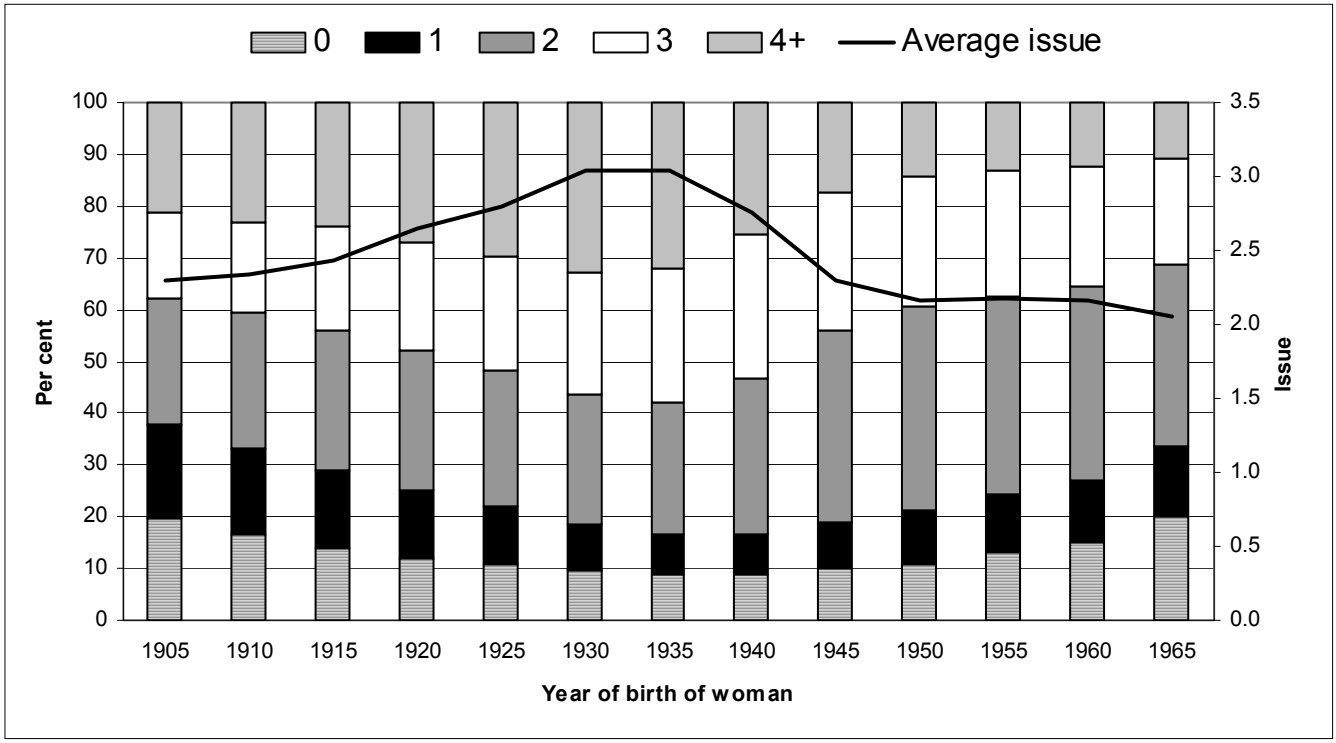
Figure 1: Period fertility 1921 to 2002, Australia



Source: ABS, 2003.

Cohort fertility reflects these changes in the TFR. The cohort born from 1905 to 1924 experienced moderate levels of completed fertility, with greater than 50 per cent having two children or fewer (see Figure 2). The cohort born from 1925 to 1944 (baby boomer cohort) had high levels of completed fertility, reaching an average of over three births per woman for women born between 1930 and 1939. This baby boomer cohort had over 50 per cent of women having three or more children. The final cohort born from 1945 to 1964 has experienced relatively low levels of completed fertility at just over replacement level.

Figure 2: Completed fertility: Cohorts 1905 to 1065, Australia



Source: ABS, 1999: 39.

Using behaviour data to examine parity progression

We use behavioural data to examine the impact of sex of existing children on parity progression. This approach investigates respondents' fertility behaviour (i.e. whether they have a subsequent child or not) given the sex of existing children. We believe that this is superior to analysing intention data for two reasons. Firstly, intention data is situation specific. In reviewing research on sex preferences, Marleau and Saucier (2002) find that college samples tend to report a son preference for a first or only child, while studies based on reports of pregnant women indicate a daughter preference. Secondly, intentions may not be realised, and may not be realistic. On the whole, behaviour data reveal actual preferences, although we recognise that fertility outcomes are not always chosen.

Although behaviour data are useful for examining the progression from *n* child to *n+1* children, it is not suitable to examine sex preference of first child. The examination of behaviour data to examine sex preferences for the sex of the first child is only valid if there are substantial levels of sex selection or sex-selective abortion in the society (see Goodkind, 1999). Neither of these techniques are legally sanctioned or widely used in Australia. However, we do not dispute that sex preference for a first child may exist, as it is evident in other Western countries (see Pebley and Westoff, 1982; Marleau and Saucier, 2002, Hank and Kohler, 2003).

Most analyses of parity progression from one child to two children in developed countries find no difference by sex of first child (see Andersson et al. 2004). If we consider Bulatao's (1981) model for the reasons (or values) parents give for having a second child, i.e. as a companion for siblings, the pleasure of watching them grow, we would not expect sex of existing child to impact on having a second birth. The influence of 'having a boy', or 'having a girl' is not important until the third birth (Bulatao, 1981). In our results we provide information on the probability of having a second child based on the sex of the first child, but do not expect to find any difference in progression rates. The focus of our analysis is on progression from two to three, and from three to four children.

The timing of parity progression

There is evidence to suggest that the sex of existing children impacts on the time taken to have another birth (Teachman and Schollaert, 1989). As our investigation compares generations of people who had their children under different fertility regimes, we also analyse the timing of additional births. This is because it has been argued that timing of births is an important factor that impacts on parity progression in low fertility settings (Yamaguchi and Ferguson, 1995). Women in recent generations tend to have their first births at later ages, possibly leaving less time to complete fertility. This would have the effect of reducing the time between births.

Data and method

We use the Household and Income Labour Dynamics in Australia survey (HILDA) to examine the impact of sex of existing children on parity progression over different generations of Australian families. HILDA is a longitudinal survey and we use the second release of the first wave of data collected in 2001. The information collected covers income, labour market, education, and family dynamics (see Watson and Wooden, 2002).

The sample size of the first wave is 13,969 respondents. The benefits of using HILDA are twofold. The first benefit is that the sample includes respondents aged 15 years and older, making it possible to investigate generational shifts in detail. The second is that the large sample size makes it especially suitable in analysing the timing of progression to next birth.

The survey used four questionnaires: a household form, a household questionnaire, a person questionnaire for all household members aged 15 years and over, and a self-completion questionnaire. In wave 1, all components were administered by personal interview except for the self-completion questionnaire. To determine sex and age of own children, we matched details on the household form to respondent's personal information. In addition, we matched information on non-resident children's age and sex. Children's information was sorted by age to determine the timing of first (and subsequent) birth(s). We restrict our sample to include only the household reference person and their own children. We also only include people aged 37 years and over in order to limit the effect of incomplete fertility. This results in a sample size of 5,327.

There are three distinct fertility cohorts evident in the 20th Century (Figure 2). In Figure 2 it is apparent that less than 50 per cent of the cohort of women born before 1924 and after 1945 have three or more children, whereas the cohort born from 1925 to 1944 have greater than 50 per cent of women with three or more children. We classify our birth cohorts based on the proportion of women who have three or more children. Cohort 1 contains people born from 1910 (the oldest age represented in HILDA data) to 1924. At the time of the survey, respondents are aged 77 to 91. Cohort 2 contains people born from 1925 to 1944, making respondent 57 to 76 at the time of the survey. Cohort 3 includes people born from 1945 to 1964, aged 37 to 56 in 2001. The different fertility regimes are evident in the differences between cohorts in children ever born and age at first birth (Table 1).

Table 1: Selected fertility indicators of birth cohorts

	Birth cohort		
	1910-1924	1925-1944	1945-1964
Number	464	1,740	3,123
Age in 2001 (years)	77-91	57-76	37-56
Mean age at first birth	26.6	26.1	27.0
Mean children ever born	2.8	2.8	2.1
Percentage with three or more births	50.2	55.6	36.5

Source: HILDA survey data 2001.

In order to take account of the timing of higher-order births we use survival analyses and proportional hazards models to estimate the effect of sex of existing children and cohort on progressing to a higher-order birth. Survival analysis allows us to compare the interval between births for different groups. Using such a life-table method allows analysis for all people, irrespective of whether they have progressed to an additional birth (censored cases). We build on this analysis by conducting proportional hazard models to compare timing of progression to higher-order births controlling for other factors. We control for factors associated with higher parity such as age at first birth, ethnicity, size of family of origin and the importance of religion. These factors are described at Appendix Table 1.

The following section presents the results of these analyses and answers the following questions:

- Is there a generational difference in the proportion of people who progress to higher-order births based on sex of existing children?
- Is there a difference in the timing of progression to higher-order births based on sex of existing children?
- Are there generational differences in the timing of progression to higher-order births based on sex of existing children?

Results

Is there a generational difference in the proportion of people who progress to higher-order births based on sex of existing children?

As indicated previously, there was a boom in fertility for women born in the second quarter of last century, resulting in higher completed fertility than for women born prior to 1925 or after 1944 (Figure 2). This high level of fertility is not only evidenced by greater proportions of higher-order births but also in the percentage of individuals who have at least one birth. People in the youngest cohort (aged 37 to 56 year old in 2001) are the least likely to have ever had one birth (83%) (Table 2). Parenthood is more common for the earlier cohorts, with roughly 90 per cent having a first birth.

Having a second child (for those who have had a first) is more likely for the middle cohort than for the two other cohorts. When progression to second birth is conditioned on sex of the first child there is no difference in the propensity to have a second birth for any cohort. This is what would be expected if (as we have argued in the case of Australia) parents want a child or each sex rather than a child of a particular sex.

The middle cohort is the most likely to have had a third birth. There is also evidence of sex preference with progression to third birth being influenced by the sex of the existing children. The argument for a balanced family is supported by the fact that progression is least likely where the individual already has a child of each sex. Daughters appear to be most desired with 70 per cent progressing to third birth if the first two children are boys compared with 65 per cent if the first two children are daughters. Reflecting the pattern evident for the middle cohort, we find that

progression to third birth is least likely if the individual already has a child of each sex for the youngest cohort. Progression to third birth is most likely for the youngest cohort if the first two children are sons (54%) followed by two daughters (48%).

Table 2: Percentage ever having a first, second, third, or fourth birth by sex of existing children and cohort

	Birth cohort		
	1910-1924	1925-1944	1945-1964
% having first child	89	90	83
% progressing to have a second child	83	90	85
… where first child is a son	83	90	85
… where first child is a daughter	83	90	84
		**	**
% progressing to have a third child	58	63	48
… where first children are sons	65	70	54
… where first children are daughters	58	65	48
… where first children are mixed	55	57	45
			*
% progressing to have a fourth child		51	36
… where first children are sons	na	55	43
… where first children are daughters	na	52	40
… where first children are mixed	na	50	33

*p< 0.05 **p<0.01 na=Not applicable (too few births)

When it comes to having a fourth birth the sex of existing children is related to progression for the youngest cohort but not for the middle cohort. That is, sex preference is more evident for the cohort who experienced lower levels of completed fertility than for the baby boom cohort. For the youngest cohort, having a fourth birth is more common for individuals whose first three children are all of the same sex than for those who already have children of each sex. There is a slightly greater chance of progression to fourth birth for those with three sons that for those with three daughters.

This analysis indicates that Australians do have a preference when it comes to the sex of their children, but rather than desiring one sex over another, they display a preference for a son and a daughter. This preference is most evident amongst the youngest cohort, that is those who have experienced the lowest levels of fertility seen in Australia, who are most likely to progress to a third or a fourth birth if they have children of only one sex. Progression to higher-order births for this cohort is slightly higher if the existing children are sons. This pattern suggests a mild daughter preference.

Is there a difference in the timing of progression to higher-order births based on sex of existing children?

We propose that the sex of existing children may not only have an impact on the propensity to have a third or fourth birth but also in the timing of such births. If it is the case that a higher-order birth is required in order to achieve a child of a desired sex it would be logical to assume that the interval between births would be shorter (Teachman and Schollaert, 1989).

In order to test this hypothesis we conduct survival analysis, allowing us to take account of censoring (people who have not had a second, third or fourth birth) in calculating the probability of having a higher-order birth at yearly intervals. Figure 3 plots the survival curves for birth

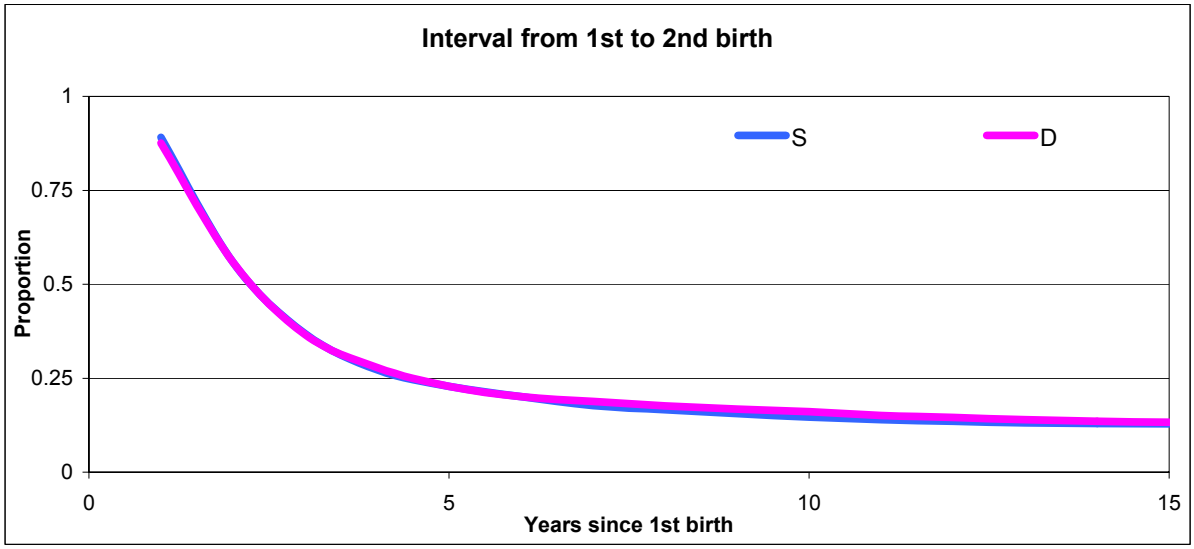
intervals based on the sex of existing children, that is, the proportion who have had a second, third or fourth birth at yearly intervals.

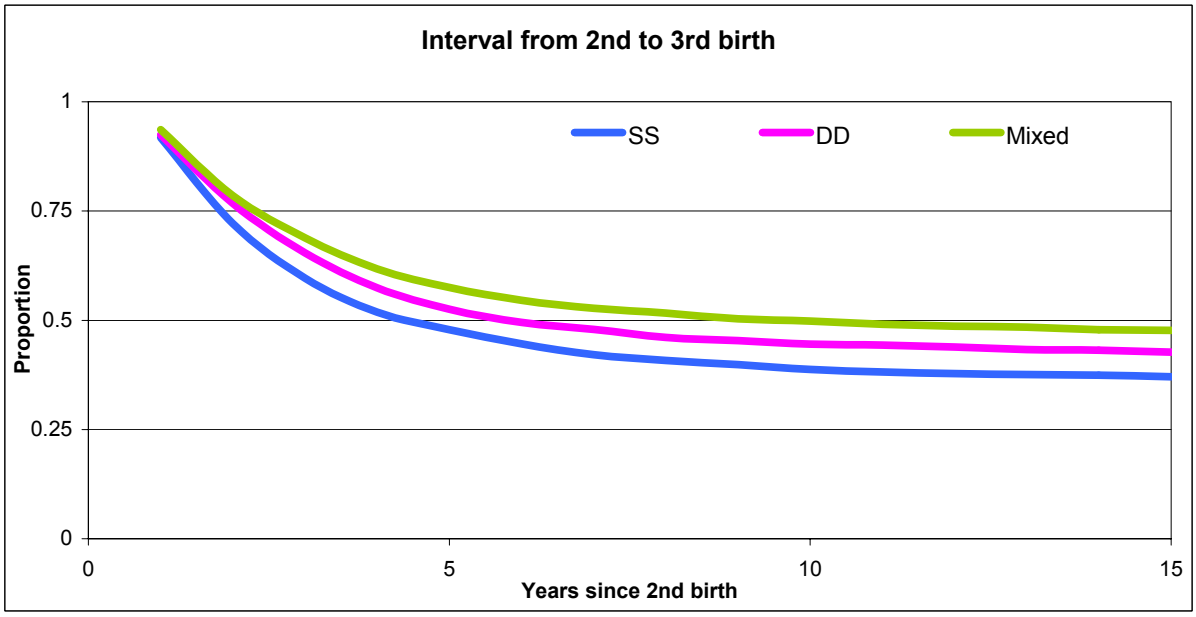
There is no difference in the length of the second birth interval for people whose first child is a son and those whose first child is a daughter (Figure 3). This confirms the previous finding that there is a desire for balance rather than a desire for a particular sex, given that there is no difference in the proportion who have a second birth based on sex of the existing child (Table 2).

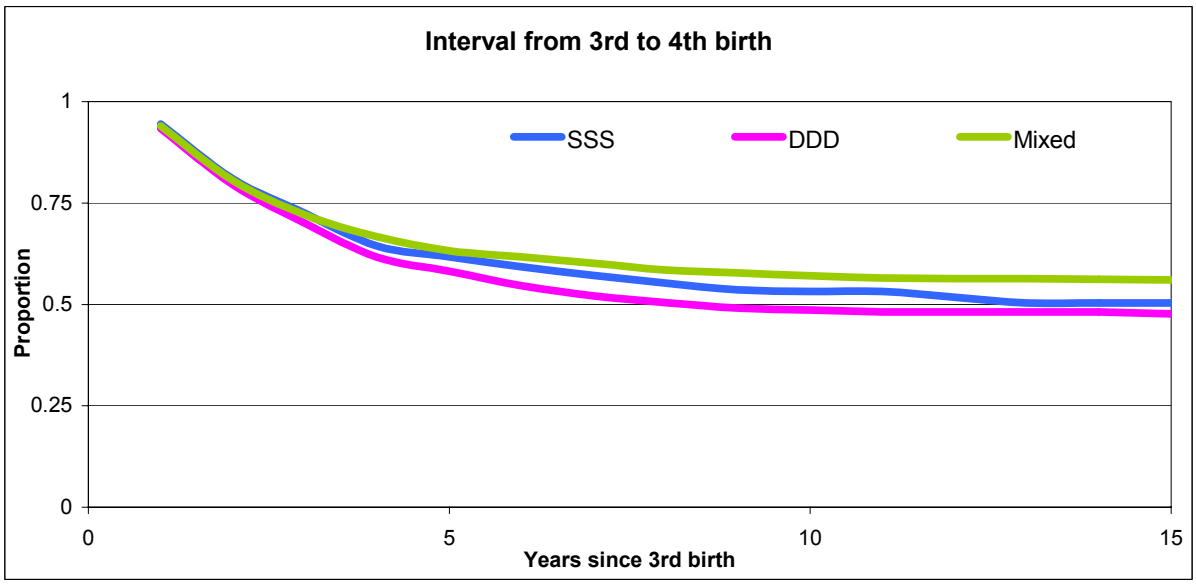
For third and fourth children there is a difference in the length of birth intervals, with shorter intervals apparent for people whose previous children are of the same sex. People with two sons show the fastest progression to third birth followed by those with two daughters. Five years after the second birth 52 per cent of people with two sons have a third birth compared with 48 per cent of people with two daughters and 42 per cent of people with a son and a daughter.

A different pattern is apparent for the interval between third and fourth birth. The interval is similar for the first three years with no difference between families with different sex compositions. However, after three years the intervals start to diverge. At five years after the third birth 38 per cent of people with three sons have a fourth birth compared with 42 per cent for people with three daughters, and 37 per cent of people with children of both sexes. These patterns continue with families of three girls progressing to a fourth birth the fastest, and families of sons catching up by 13 years after the third birth.

Figure 3: Length of 2nd, 3rd and 4th birth intervals by sex of existing children







Are there generational differences in the timing of progression to higher-order births based on sex of existing children?

Having found that sex of existing children impacts the progression to higher-order births and on the timing of that progression we then test to see if the difference in timing of births is the same across the three generations. For each cohort there are no significant differences between the speed at which they progressed to a second birth based on the sex of the first child (Figure 4).

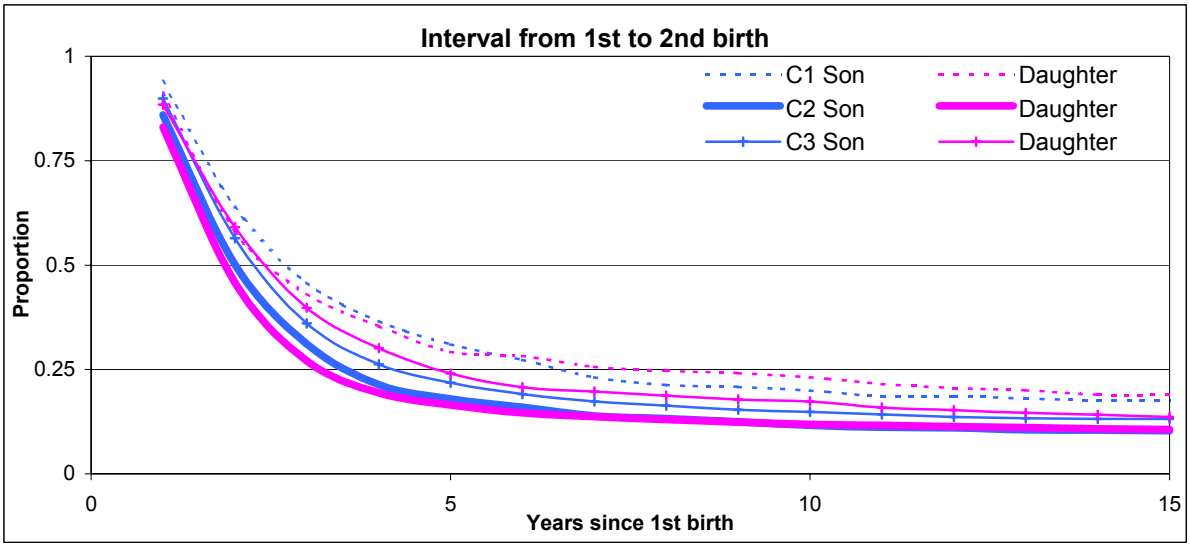
There is little variation between the sex differences for generations when comparing the survival curves. For each cohort progression to third birth is faster where the first two children are boys, followed by families where the first two children are girls. Families with mixed sex compositions progress to a third birth at the slowest rate for each generation.

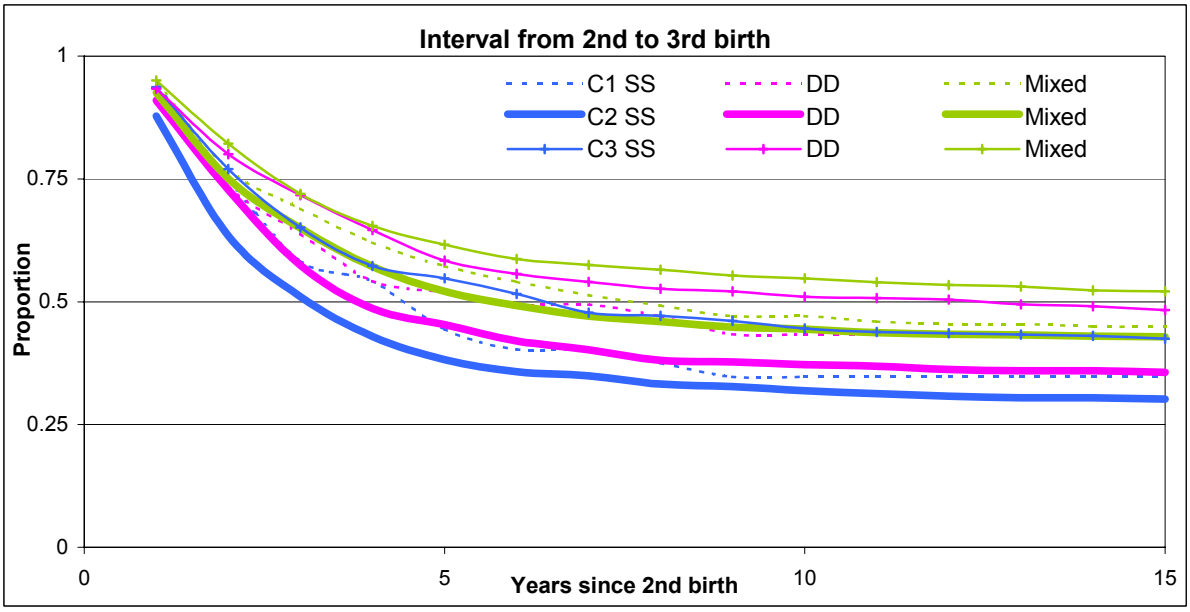
The only deviation from this pattern can be found in the youngest cohort (C3) where the time to third birth for families with all daughters is similar to that for families with mixed sex compositions. The timing of the third birth for these two groups does not diverge until the fourth year of the birth interval. After that time families with all daughters progress to third birth more quickly than families with children of both sexes.

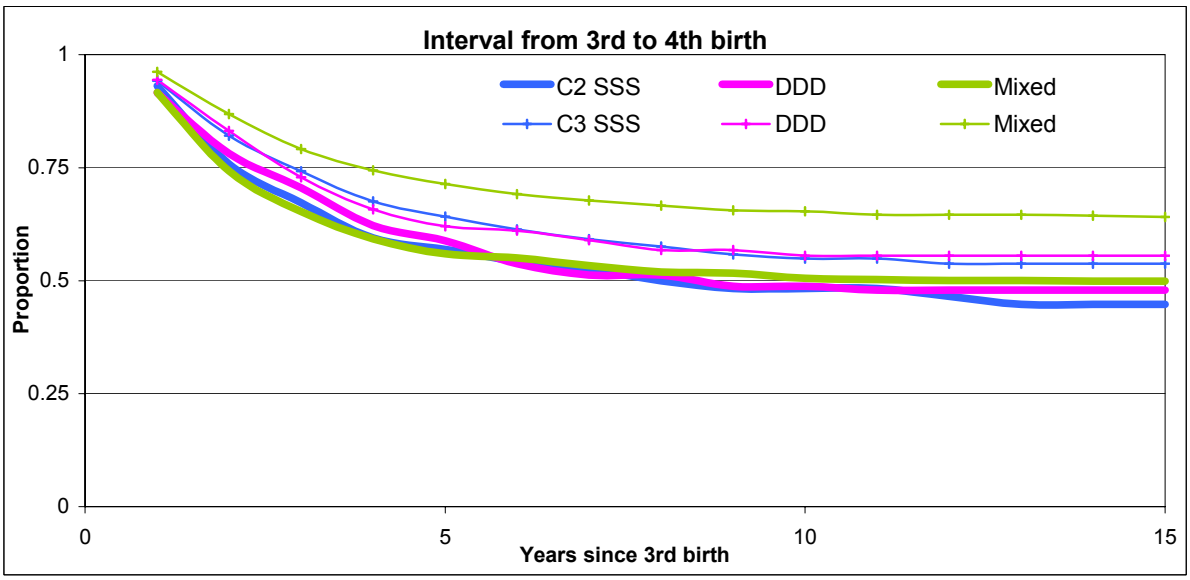
As predicted, sex of existing children is significantly related to the speed of progression to fourth birth for the most recent cohort, but not for the middle cohort[1]. The difference in the propensity of the two cohorts to have a fourth birth is demonstrated by the level at which the curves flatten out. For the middle cohort, the survival curves are similar irrespective of the sex composition of the existing three children. For the younger cohort, both the speed and the propensity to have a fourth birth are greater for families who have children of only one sex. For this low fertility cohort, the desire for a mixed sex family is a factor in the decision to have a fourth birth, and in the speed with which this is realised.

[1] The early cohort (born 1910-1924) is not included in this analysis as the number of recorded births is too few.

Figure 4: Length of 2nd, 3rd and 4th birth intervals by sex of existing children and birth cohort of respondent







To further explore the issue of differential length of birth intervals by sex of existing children across generations we estimate the hazard, or relative risk, of progression to third and fourth birth controlling for other characteristics for each cohort. Results are presented in Table 3.

Table 3: Proportional hazards models predicting third and fourth births

Progression to third birth	C1 1910-1924		C2 1925-1944		C3 1945-1964	
	Relative risk	Sig.	Relative risk	Sig.	Relative risk	Sig.
Two sons	1.33		1.35	**	1.25	**
Two daughters	1.10		1.20	*	1.06	
Age of first birth	0.97		0.94	**	0.95	**
Born in a non-English speaking country	1.29		0.76	**	0.69	**
Aboriginal or Torres Strait Islander	na		1.36		1.39	
Number of siblings	1.00		1.04	**	1.05	**
Importance of religion	1.04		1.03	**	1.03	**
Progression to fourth birth[1]			C2 1925-1944		C3 1945-1964	
			Relative risk	Sig.	Relative risk	Sig.
Three sons			1.05		1.44	*
Three daughters			1.01		1.32	
Age of first birth			0.96	**	0.96	**
Born in a non-English speaking country			0.85		1.12	
Aboriginal or Torres Strait Islander			1.77		1.48	
Number of siblings			1.04	*	1.08	**
Importance of religion			1.04	**	1.03	*

*p< 0.05 **p<0.01 na=Not applicable (no indigenous respondents)

[1] The early cohort (born 1910-1924) is not included in this analysis as the number of recorded births is too few.

When predicting a third birth, the sex of existing children is significantly associated with parity progression for those born from 1925. For cohort 2, the risk of having a third birth is increased when a family has children of the same sex compared with families where the children are of mixed sex. Further, where the first two children are sons, we find a higher relative risk resulting in a shorter survival time indicating a preference for daughters. For the most recent cohort progression to third birth is significantly faster where the first two children are sons.

All of the background characteristics are significant predictors for cohorts 2 and 3 except for indigenous status. Each increased year in age at first birth results in a longer survival time. Being born in a non-English speaking country has a lower relative risk than being born in an English-speaking country. Higher number of siblings and importance of religion both result in a reduction in survival time.

The findings are similar when predicting a fourth birth. We only model progression to fourth birth for the middle and most recent cohorts. The main difference in the results is that the effect of having three sons is only a significant predictor for the youngest cohort. This analysis supports our initial findings that Australian families continue to have children in order to realise their desire for a daughter.

Discussion

In this paper we examine two theories about the effect of sex of existing children on parity progression. Firstly, it is assumed that under high-fertility regimes, sex preference is a less important factor because parents are likely to meet their sex preference due to the larger

completed family size. The second assumption is that in societies where there are more egalitarian gender-role expectations, sons and daughters will be substitutable. Hence, sex preference will not be important in explaining parity progression. We investigate generational differences in parity progression and in parity timing based on sex of existing children.

Our main finding is that there is evidence of a mixed-sex preference for Australian parents. There is no difference in progressing to a second birth by whether parents have a son or a daughter. These findings are similar to many developed countries where this type of analysis has been conducted (Andersson et al. 2004). There is also no evidence that this varies under different fertility regimes. In examining the effect of sex of existing children on progression to a third birth, we find that parents who are least likely to have a third child are parents who have a mixed-sex composition. However, we also find that parents who have two sons are most likely to progress to a third birth. This pattern is found for all generations. So the second finding to highlight is evidence of a mild daughter preference.

Thirdly, we find that the cohort that has the highest level of fertility is least likely to consider sex of children when progressing to a fourth birth. This lends some support to the argument that under high-fertility regimes sex of children is not a driving factor in parity progression. Given that around 30 per cent of women in this cohort had a fourth birth or higher, the absence of sex preference in progression is significant. In analysing progression to the fourth birth, we find that for the youngest generation those who have three sons are more likely to progress to a fourth birth than those with three daughters or a mixed-sex composition.

The timing of subsequent births is an important factor to be considered in the impact of sex of children on parity progression. It is argued that parents will progress faster to a subsequent birth if they have not had a child of the desired sex. In examining timing, we find that there is no difference in the progression to second birth by sex of first child. In progressing to a third child, families with two sons progress faster to a third birth than do those with two daughters, who in turn progress faster than those with a mixed-sex composition. In conducting a proportional hazards model for each cohort, we find that sex of existing children impacts timing of third birth for the middle and youngest cohorts. However, for the youngest cohort the difference is only evident for parents of two sons. These findings support a preference for a mixed-sex composition and a mild daughter preference.

In examining progression to fourth birth we note that there is no difference in progression based on sex of existing children for the high-fertility cohort. This finding is sustained in the investigation of timing to fourth birth. There is no difference in the interval to fourth birth based on sex of existing children for this cohort. In comparison, for the youngest cohort, families who have three sons are at increased risk of a fourth birth compared with families with a mixed-sex composition, whereas those with three daughters are not. This supports the proposition that when fertility is high, sex preference is realised, whereas for low fertility cohorts, family size is ultimately increased because of parental desire for daughters.

References

Andersson, G., Hank, K., Rønsen, M., and Vikat, A. (2004). Gendering the family composition: Sex preferences for children and childbearing behavior in the Nordic Countries. *MPIDR Working Paper WP 2004-019*. Rostock: Max Planck Institute for Demographic Research.

Arnold, F. (1997). Gender preferences for children. *Demographic and Health Surveys Comparative Studies No. 23,* Maryland: Macro International.

Australian Bureau of Statistics (ABS). (1999). *Births Australia 1998,* Cat. No.3301.0, Canberra: ABS.

Australian Bureau of Statistics (ABS). (2003). *Births Australia 2002,* Cat. No.3301.0, Canberra: ABS.

Australian Bureau of Statistics (ABS). (2004). *Births Australia 2003,* Cat. No.3301.0, Canberra: ABS.

Australian Institute of Family Studies (AIFS). (2004). *It's not for lack of wanting kids: A report on the Fertility Decision Making Project*. Melbourne: AIFS.

Ben-Porath, Y., and Welch, F. (1976). Do sex preferences really matter? *The Quarterly Journal of Economics*, Vol. 90(2): 285-307.

Brockmann, H. (2001). Girls preferred? Changing patterns of sex preferences in the two German states. *European Sociological Review.* Vol. 17(2): 189–202.

Bulatao, R. (1981). Values and disvalues of children in successive childbearing decisions. *Demography,* Vol. 18(1):1–25.

Goodkind, D. (1999). Should prenatal sex selection be restricted? Ethical questions and their implications for research and policy. *Population Studies,* Vol. 53: 49–61.

Gray, E. and Evans, A. (2005 *forthcoming*). Parity progression in Australia: What role does sex of existing children play? *Australian Journal of Social Issues*.

Hank, K. and Andersson, G. (2002). Parental gender indifference or persistent sex preferences for children at the turn to the 21st century? A reflection on Pollard and Morgan (2002) with reference to the Swedish case. *MPIDR Working Paper WP 2002-049*. Rostock: Max Planck Institute for Demographic Research.

Hank, K. and Kohler, H-P. (2000). Gender preferences for children in Europe: Empirical results from 17 FFS Countries. *Demographic Research*, Vol. 2, Article 1.

Hank, K. and Kohler, H-P. (2003). Sex preferences for children revisited: New Evidence from Germany. *Population (English)*, Vol. 58(1):133–144.

Jacobsen, R. Møller, H. and Engholm, G. (1999). Fertility rates in Denmark in relation to the sexes of preceding children in the family. *Human Reproduction*. Vol. 14(4): 1127–1130.

Kippen, R. (2004). Declines in first- and second-birth rates and their effect on levels of future fertility. *People and Place*. Vol. 12(1): 28–37.

Kippen, R., Gray, E. and Evans, A. (2005). The impact on Australian fertility of wanting one of each. *People and Place.* Vol. 13(2).

Marleau, J. and Saucier, J-F. (2002). Preference for a first-born boy in Western societies. *Journal of Biosocial Science*, Vol. 34: 13–27.

McDonald, P. (1998). Contemporary fertility patterns in Australia: first data from the 1996 Census. *People and Place*, Vol. 6(1): 1–13.

Pebley, A. and Westoff, W. (1982). Women's sex preferences in the United States: 1970 to 1975. *Demography*, Vol. 19(2): 177–189.

Pollard, M. and Morgan, S. (2002). Emerging parental gender indifference? Sex composition of children and the third birth. *American Sociological Review*, Vol. 67: 600–613.

Population Reference Bureau (PRB). (2004) *2004 World Population Data Sheet.* Available at: http://www.prb.org/Template.cfm?Section=PRB&template=/ContentManagement/ContentDisplay.cfm&ContentID=11320 [Date last accessed 10 June 2005].

Sloane, D. and Lee, C-F. (1983). Sex of previous children and intentions for further births in the United States, 1965–1976. *Demography*, Vol. 20(3): 353–367.

Teachman, J. and Schollaert, P. (1989). Gender of children and birth timing. *Demography,* Vol.26(3):411–423.

Watson, N. and Wooden, M. (2002) The Household, Income and Labour Dynamics in Australia (HILDA) Survey: Wave 1 Survey Methodology, *Hilda Project Technical Paper Series*, No. 1/02, Melbourne: The Melbourne Institute, The University of Melbourne.

Williamson, N. (1976). *Sons or Daughters: A Cross-Cultural Survey of Parental Preferences*. Volume 31, Sage Library of Social Research, Beverly Hills: Sage Publications.

Wood, C., and Bean, F. (1977). Offspring gender and family size: Implications from a comparison of Mexican Americans and Anglo Americans. *Journal of Marriage and the Family*, Vol. 39(1): 129–139.

Yamaguchi, K., and Ferguson, L.R. (1995). The stopping and spacing of childbirths and their birth-history predictors: Rational-choice theory and event-history analysis. *American Sociological Review*, Vol. 60: 272–298.

Young, C. (1977). Family building differences between same sex and mixed sex families in Australia. *Australian Journal of Statistics*, Vol. 19(2): 83–95.

Appendix Table 1: Variables used in analyses by birth cohort

	Birth cohort		
	1910-1924	1925-1944	1945-1964
Number	464	1,740	3,123
% whose first two children are sons	21	26	27
% whose first two children are daughters	24	24	23
% whose first two children are mixed-sex	55	51	50
% whose first three children are sons	10	13	15
% whose first three children are daughters	12	14	12
% whose first three children are mixed-sex	79	73	73
% Born in a non-English speaking country	9	17	15
% Aboriginal or Torres Strait Islander	-	1	2
Mean number of siblings	3.7	3.3	3.2
Mean importance of religion	6.6	5.7	4.5

Source: HILDA survey data 2001.