



Australian Population Association

12th Biennial Conference

population and society: issues, research, policy

15-17 September 2004 - Canberra, Australia

Parity progression in Australia: What role does sex of existing children play?

Edith Gray and Ann Evans (ann.evans@anu.edu.au)
The Australian National University

Abstract

In countries with low fertility regimes, researchers are focusing on what factors influence higher levels of parity and parity progression. This paper examines the impact of sex of existing children on parity progression by examining this topic in Australia. There are two dominant theoretical propositions about the effect of sex of existing children. Firstly, sex of existing children is more important in low fertility societies than under high fertility regimes in explaining parity progression, while secondly that sex of existing children is less important in societies with an egalitarian gender system.

We model what effect sex of existing children has on progressing to a second and third child by analysing data from a nationally-representative survey from Australia (Negotiating the Life Course), and consider the two theoretical positions. Other factors considered include continuity of relationship, educational background and religiosity. We find support that sex of children has some impact on explaining parity progression in Australia, particularly for recent cohorts of childbearing women, but suggest that qualitative research would be useful in understanding why parents want both sons and daughters in Australia.

Paper prepared for the 12th Biennial Conference of the Australian Population Association, 15-17 September 2004, Canberra.

Introduction

Having additional children is commonly referred to as *parity progression* in demographic literature. In societies that have experienced a decline in fertility levels, parity progression rates are particularly useful for examining cohort changes in the number of children ever born. Although these demographic changes occur at the macro-level, decisions to have another child occur at the couple, or sometimes the individual level. Studies show that in low fertility societies, sex composition of existing children is a factor in progressing to higher order births (Bongaarts & Potter, 1983; Pollard & Morgan, 2002; Wood & Bean, 1977). We examine the impact of sex of existing children on having a second birth and having a third birth in the context of other factors associated with parity progression. We firstly explore sex preference in the context of modernisation: two dominant theories have been proposed, one that sex preference is more important in low fertility societies, and second that sex preference is not important in societies that have an egalitarian gender system. We test the importance of sex preference in Australia using data a nationally representative survey, *Negotiating the Life Course*. The paper provides models of both birth of a second and a third child considering the sex of existing children and other factors associated with parity progression. To conclude our discussion highlights the importance of cohort and sex of existing children in modelling parity progression.

Sex preference in Western-industrial societies

Sex preference of children is generally not considered in Western societies. Evidence from non-Western countries varies, but where sex preference is found, son preference dominates, although preference for at least one girl and one boy is common (Arnold, 1997). On the balance of probability, in societies where completed family size is high, sex preference—whether it be no sex preference, son preference, daughter preference, or a desire for a mixed-sex composition—is usually satisfied (Williamson, 1976). In comparison, in societies with low fertility, sex preference has the effect of increasing fertility. This is demonstrated by Seidl (1995), who shows that preference for a son increases completed family size (although it does not influence the sex ratio). It has been calculated that 1.94 births are needed to have a son and 2.06 births to produce a daughter (Bongaarts & Potter, 1983) which are higher than fertility rates in most Western industrial societies.

Given the importance of parity progression in low fertility settings, investigations of the role of sex preference on family size is gaining interest in Western countries. In summarising evidence from the US, Pollard and Morgan (2002) find consistent evidence of a preference for a ‘balanced

family' (or mixed-sex composition), that is, a family with at least one son and one daughter. Hank and Kohler (2000) also find support for a mixed-sex composition in many European countries, but they also find some countries with a girl preference. For example, in Denmark there is a preference for a balanced composition, but also a mild girl preference in families with two same-sex children (Jacobsen, Møller & Engholm, 1999).

Interestingly studies in Western countries that focus on the sex preference of the first child (or where hypothetically a person is given the choice of choosing the sex of a child if they were to only have one child) find that there is a son preference (see Marleau & Saucier 2002 for overview). These studies tend to be based on college samples that have not entered the childbearing stage of their lifecycle. Studies that focus on pregnant women generally find the opposite—that there is a daughter preference—although there are fewer of these studies (Marleau & Saucier, 2002).

This contrast between boy and girl preference for a first child, and a mixed composition for a completed family, highlights an important measurement issue. Preferences for sex of children can be measured in two ways. The first is by intention data. This method focuses on the respondent's sex preference of intended or future births. The second method is by examining behavioural data. This approach investigates respondent's fertility behaviour given the sex of existing children. The findings of Marleau and Saucier (2002) suggest that intention data is situation dependent. In comparison, behaviour data reveals actual preferences, in that we can measure progression based on existing children. However, for investigating sex preference using this method, behaviour data can only be used for examining progression from at least one to higher parity. Behaviour data cannot be used to look at sex preference of an only or first child, assuming an absence of sex selective abortion (see Goodkind, 1999 for discussion of sex selective abortion in relationship to family size).

This article focuses on progression from one child to two children and from two children to three children, considering sex of existing children. We explore the dominant theoretical explanations of sex preferences together with other explanations of parity progression to investigate the progression to higher order births. This approach provides a depiction of the importance of sex preference on parity progression while considering other factors of importance to parity progression in a Western society.

Theoretical background

Demographic research on the value of children is typically considered to facilitate understanding of fertility motivations. Children are said to be of value to parents in nine areas. As originally proposed by Hoffman and Hoffman (1973), these areas are not explicitly formulated to represent the value of sons or daughters *per se*, rather they are intended as the value of being parents. The nine categories of the value scheme are: (1) Adult status and identity; (2) Expansion of the self, 'immortality'; (3) Morality; (4) Group ties; (5) Stimulation; (6) Creativity and accomplishment; (7) Power; (8) Social comparison and competition; and, (9) Economic utility. Hypothetically, having one child satisfies many of these values, for example, adult status, expansion of the self, group ties (kin relations), and stimulation are all satisfied by having a first child (Bulatao, 1981). Certainly in Western societies becoming a parent is a sign of the transition to adulthood (Hogan & Astone, 1986). Second, third and further children provide different benefits, so it is important to consider parity level.

The themes evident in the value of children scheme are also found in a comprehensive research agenda focussing specifically on sex preferences (Williamson, 1976). Williamson considers what conditions are important for desiring a predominance of sons, equal numbers of sons and daughters, a predominance of daughters and a lack of sex preference. It is hypothesised that a strong son preference is characterised by the following economic, social and psychological conditions. Parents will have a strong son preference if, economically, sons are more productive than daughters. This includes providing for parents in old age, bringing a dowry to the family when married, and when boys have greater opportunities for advancement than girls. The social conditions for boy preference include: a system of patrilineal families and patrilocal residence; where continuity of the family line or name is important; where there is inter-group conflict; where social or religious customs require sons; and, in rural communities. The psychological reasons given for son preference are to provide companionship for fathers, and to provide status, security, and influence.

Under Williamson's framework, 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*).

The conditions influencing girl preference are also grouped into economic, social and psychological reasons¹. Economically, daughters are assumed to be preferred if women are more productive than men, if girls bring a bride price, or if daughters support parents in old age. A daughter may be desired for sex-segregated ‘women’s work’ such as caring and housework. Socially, a matrilineal family system supports daughter preference. Psychologically, daughters are preferred if they are more rewarding companions than sons, or if there is social competition between fathers and sons.

There is a general sense in the literature (or, as Brockmann notes ‘often implicit’ 2001: 190) that sex preference declines with modernisation, or at least, that it should decline with modernisation (Bongaarts, 1998). Pollard and Morgan (2002) reason that the gender system is less important in the US compared with traditional societies. They propose that the gender system influences the expected roles of sons and daughters: as traditional gender-role attitudes shift to expectations of shared roles there should be a weakened effect of sex of existing children because boys and girls are substitutable in an egalitarian society.

However, evidence indicates that mixed-sex composition is preferred. Parents with two children of the same sex are more likely to have a third child than parents who have a boy and a girl (Ben-Porath & Welch, 1976; Pebley & Westoff, 1982), although this was not apparent for a recent cohort of childbearers (Pollard & Morgan, 2002). This pattern of higher progression rates for parents with two same-sex children is also found in other Western countries, such as Denmark (Jacobsen, Møller & Engholm, 1999), Sweden (Murphy, 1992; Schullström, 1996), and in Australia (Young, 1977).

If shifts in gender-role attitudes reduce the level of sex preference then evidence of mixed-sex preference lends little support to this explanation. A preference for both a son and a daughter suggests that boys and girls are viewed as providing different benefits to parents. Hank and Andersson (2002) argue that traditionally, sons provide economic benefits and daughters provide caring benefits, and that shifts in gender-role attitudes do not account for the maintenance of mixed-sex composition preferences.

Brockmann (2001) argues that it is not shifts in gender-role attitudes that changes sex preference; it is the context of different welfare regimes that impact on preference for specific sex of

¹ Although Williamson also discusses a daughter preference for adopted children.

children. In line with the argument that sons provide financial support while daughters provide caring support, Brockmann finds that different welfare regimes impact on sex preference. For example, under welfare regimes that disadvantage care conditions for the older part of the population, a significant girl preference is found because daughters provide caring roles for parents.

In modern societies, children are more of a financial cost than financial benefit (Thomson, 2001). The costs of children are typically viewed as direct and indirect (or opportunity) costs (Robinson and Horlacher, 1971). Direct costs are based on a 'basket of goods' (or budget surplus) approach, while opportunity costs are the costs to women due to a reduction in labour force participation. These costs have been considered in most Western countries and findings from Australia (Breusch & Gray, 2003), Great Britain (Joshi, 1990) and the US (Calhoun & Espenshade, 1988) suggest that the amount forgone is greatest at the birth of the first child.

Calculating the 'costs' of children may help explain why people do not have children, but it contributes little to our understanding of why people do have children (Schoen et al., 1997). In this context it is argued that children provide social capital (Schoen et al., 1997) and psychological benefits (Bulatao, 1981) to parents. However, we note that research has found sons have a beneficial financial effect (Lundberg & Rose, 2002), that there is a lesser likelihood of divorce in families with sons (Andersson & Woldemicael, 2001; Morgan, Lye & Condran, 1988), and that there remains a significant division in household labour and caring along gender lines (Baxter, 1998). If boys and girls are valued for different reasons, then these and other social effects may be influencing the value of children as a social resource.

There are other factors which are associated with parity progression and which may mitigate the influence of sex of previous children. As described by Brockmann (2001), parity progression differs according to four areas of social cleavage: age at first birth, marital status, education and labour force commitment.

Possibly the most important factor associated with parity progression is the later age at childbearing experienced by recent cohorts of women. Median age of mothers giving birth has increased in many Western countries, including the United States (median age at first birth was 22.0 in 1972 increasing to 24.6 years in 2000; Martin et al., 2002) and Australia (median age of all mothers giving birth was 25.4 years in 1971 increasing to 30.2 in 2002; ABS, 2003). The increasing age at first birth is important in fertility analysis. A substantial proportion of the variation in the fertility rate is due to changes in the timing of births (Yamaguchi & Ferguson,

1995). This is supported in Australia where Kippen (2003) finds that it is delayed first and second births contributing to recent declines in fertility. Age at first birth is typically considered in parity progression analyses as women who enter childbearing at later ages may have less opportunity to pursue having children of a desired sex (see for example Yamaguchi & Ferguson, 1995).

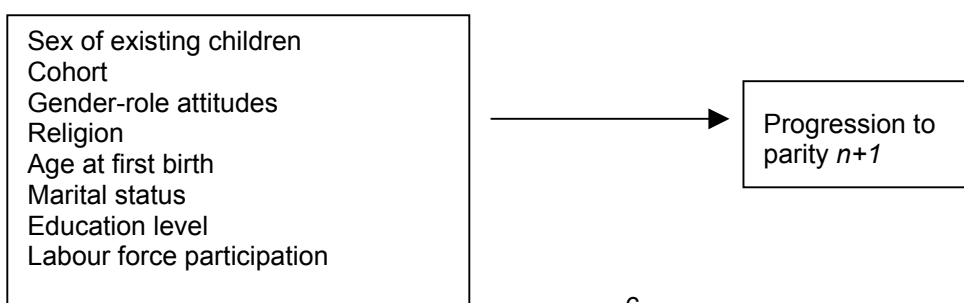
The second important consideration for the analysis of parity progression is relationship status. Schoen et al. (1997) note that marital or union status is a determinant of fertility. In the case of parity progression, women who experience a relationship break-up after the birth of their last child are less likely to have another child compared with women who remain partnered.

Education is the third factor associated with parity progression as outlined by Brockmann (2001). In many Western societies, there is a negative relationship between education and fertility, but perhaps more importantly in terms of parity progression, higher education is associated with later ages at childbearing (Rindfuss, Morgan, & Offutt 1996). Finally, labour force participation or commitment to the labour force is associated with individual fertility decisions. A longer time in the labour force prior to first birth is associated with higher commitment to the labour force, whether it be for career reasons or because of financial commitments.

Data and Method

The following analytical model (Figure 1) is used to examine the influence of sex of existing children on parity progression, while controlling for other associated factors. The model distinguishes different cohorts of women because of different patterns of childbearing. As discussed, in societies where completed family size is high, sex preference is usually satisfied. Gender-role attitudes are included to assess whether people with egalitarian attitudes are less likely to desire children of both sexes than people with a more traditional gendered outlook. The other individual factors, such as age at first birth, relationship status, education level, and labour force participation are important factors associated with parity level.

Figure 1. Factors associated with parity progression.



The analysis of parity progression in this paper is based on *Negotiating the Life Course 1997* data (NLC). The NLC is a nationally representative panel study conducted in Australia (McDonald, Evans, Baxter & Gray, 2000). The first wave of data was collected in 1997 and two subsequent waves were conducted in 2000 and 2003. In 1997, respondents were aged 18 to 54, with one participant per household randomly selected for interview. Sample weights are available for population estimates (Breusch, 2003). The sample used for this analysis is women who have had at least one child at the time of the interview, providing a sample of 875² women.

One of the key challenges in studying fertility decisions is the ability to model variables pertinent at the time of the decision to have a child from cross-sectional data. The first wave of NLC data contains a rich set of retrospective data. Data were collected on the dates of all major demographic events, such as dates of birth of all children. The data also contain the date each marriage began and ended, whether by separation, divorce or widowhood. Corresponding dates are included for de-facto relationships, both those that led to marriage and those that did not.

In addition to demographic events NLC records work force and educational activity for each year since the respondent turned 15. This allows us to determine the level of education prior to the first birth, in addition to educational and work force activity between births. Thus, the unique properties of this dataset allow us to model variables whose construction is time dependent. A description of these variables follows.

The analytical strategy employed to examine parity progression is based on a separate logistic regression model for progression to second birth for all women with a first birth and progression to third birth for all women with a second birth. We will refer to these models as Model 1 (describing second birth) and Model 2 (describing third birth). Both of these models are run separately for older and younger women to control for the effect of cohort.

Variables

Cohort

The NLC includes participants born between 1941 and 1977. In order to control for the effect of changing fertility regimes we have conducted each analysis separately for those born prior to 1960 and for those born from 1960. We argue that in societies with higher levels of childbearing,

² Two cases were dropped due to missing data.

the sex preference of children is more likely to be satisfied. Therefore we would expect the sex of previous children to be more prominent in the following analysis for those born in the 60s and 70s (the younger cohort) than for those born in the 40s and 50s (the older cohort), as the older cohort had their children under a higher fertility regime than the younger cohort.

For Model 1 there were 517 people in our restricted sample born prior to 1960 and 358 people born from 1960 onwards. In the older cohort 88 per cent had progressed to second birth compared to 70 per cent of the younger cohort (see Table 1).

Model 2 includes only those who have had a second birth. There were 457 women in the older cohort and 251 women in the younger cohort. In the older cohort 52 per cent progressed from a second to a third birth, as did 41 per cent of the younger cohort.

Sex of existing children

When predicting progression to second birth, we considered the sex of the first child. Overall, 51 per cent of women had a boy. For Model 2 we compared those who had two boys or two girls with those who had both a boy and a girl. For the older cohort 23 per cent had two girls and 28 per cent had two sons. For the younger cohort there were 25 per cent with two sons and a further 25 per cent with two daughters. For both cohorts almost 50 per cent of women had both a son and a daughter.

Age first birth

As discussed, age at first birth is an important indicator in understanding parity progression. In Model 1 average age at first birth is 25 years for the older cohort and 24 years for the youngest cohort. For Model 2 the average age at first birth is 24 years for the older cohort and 23 years for the younger cohort.

Gender-role attitudes

The attitude question used was a measure of the extent to which people feel that the traditional breadwinner model is the best model of the family. The question asked was “How much do you agree or disagree with the following statement: It is better for the family if the husband is the principal breadwinner and the wife has primary responsibility for the home and the children”. There were five response options: Strongly agree, Agree, Mixed feelings, Disagree, Strongly disagree. The average gender-role attitude score is the same over the two cohorts for Model 1, and very similar for Model 2. It is worth noting that this attitude measure is the only independent

variable in our models that could not be retrospectively collected to reflect attitudes at the time of birth or during the birth interval.

Table 1: Summary of variables used, Model 1 and Model 2.

	Older cohort (born 1940- 1959)	Younger cohort (born 1960-1979)	Total
Model 1			
N	517	358	875
% boy first child	53.8	48.0	51.4
% had second child	88.4	70.1	80.9
Age at first birth	24.9	23.9	24.4
Average gender-role attitude score	3.3	3.3	3.3
% Catholic	22.5	29.9	25.6
% Anglican	22.3	18.5	20.8
% Other religion	31.3	23.3	28.0
% No religion	23.9	28.3	25.7
Had post-school qualification prior to first birth	40.6	42.2	41.3
% who studied in first birth interval	12.2	15.9	13.7
% of first birth interval in work force	43.6	51.4	46.8
% in continuous relationship in first birth interval	82.0	73.5	78.5
Model 2			
N	457	251	708
% had third child	52.3	41.4	48.5
% with two boys	28.2	24.7	27.0
% with two girls	22.5	25.1	23.5
Age at first birth	24.2	23.1	23.8
Average gender-role attitude score	3.3	3.2	3.2
% Catholic	23.5	30.8	26.1
% Anglican	22.2	20.4	21.6
% Other religion	31.4	22.4	28.2
% No religion	22.9	26.4	24.1
Had post-school qualification prior to first birth	39.4	39.4	39.4
% who studied in second birth interval	19.7	10.8	16.5
% of second birth interval in work force	51.7	46.5	50.0
% in continuous relationship in second birth interval	75.3	82.5	77.8

Religion

A further indicator of positive attitudes to larger families is religion. Different religious teachings place varying weight on issue such as the importance of family, as well as proscriptive messages regarding fertility control measures such as contraception and abortion. We would expect that

Catholics and Muslims would place the highest premium on large families. To measure religion we have created dummy variables indicating whether or not a respondent is Catholic, Anglican, any other religion³, or have no religion. For both models the younger cohort are over represented among those with no religion or Catholic religion, whereas the older cohort are more likely to be Anglican or to have a religion other than Catholic or Anglican.

Education

We use two measures of education. The first is a measure of the level of education a woman has received prior to first birth. Slightly fewer of the older cohort completed a post-school qualification prior to first birth (41% compared to 42%).

The second is a measure of education during birth intervals. For Model 1 this is an indication of those who had done any study, full- or part-time, in the years between their first and second birth. For those who have not had a second birth the endpoint is the date they were surveyed. The younger cohort are more likely to have studied in the first birth interval (16% compared to 12%).

For Model 2 this is a measure of those who had done any study, full- or part-time, in the years between their second and third birth. For those who have not had a third birth the endpoint is the date they were surveyed. The younger cohort are less likely to have studied in the second birth interval (11% compared to 20%).

Work force participation

Work force participation in Model 1 is measured as the proportion of time in the first birth interval in which the respondent was in full- or part-time employment. For those who have not had a second birth the endpoint is the date they were surveyed. There are substantial differences between the two cohorts. For those in the older cohort the average time spent in employment is 44 per cent compared to 51 per cent for the younger cohort.

In Model 2 work force participation is measured as the proportion of time in the second birth interval in which the respondent was in full- or part-time employment. If the respondent has no third birth the endpoint is the date of the survey. In the older cohort the average time spent in the work force is 52 per cent compared to 47 per cent in the younger cohort.

³ Includes 7 Muslim, 2 Buddhist, and 5 Hindu.

Relationship

To measure the stability of relationships we first calculated the proportion of time between births where the respondent had been living in a marriage or defacto⁴ relationship. We then considered those who had been in a relationship for 100 per cent of the time to be in a ‘continuous’ relationship and those who had not been in a relationship for 100 per cent of the time to be in a ‘broken’ relationship. It is possible that someone could have been in multiple relationships and still be classified as ‘continuous’ if they had never missed a month of being in a relationship. This was found to be the true for only two cases. They are considered to be ‘continuous’ as they were at risk of childbearing through the entire period.

For Model 1, a larger proportion of the older cohort are classified as having a continuous relationship (82% compared to 73%). In Model 2, those in the older cohort are less likely to be in a continuous relationship (75% compared to 82%).

Results

Multivariate models

The first model predicts the odds of having a second child. The results are presented in Table 2. The socio-demographic characteristics included as control variables are significantly associated with progression to second birth with three exceptions. Identifying as having any religion was not associated with having a second child for either of the two cohorts. Having a post-school qualification prior to first birth is a significant factor for the older cohort but not for the younger cohort. Similarly, the proportion of time spent in the workforce in the first birth interval is a significant predictor of having a second child only for the older cohort.

For the older cohort, having a post-school qualification prior to first birth is associated with increased odds of having a second child. The indicator used to determine study between births is significant for both cohorts but the magnitude of the effect is greater for the older cohort. For those born in the 1940s and 1950s that studied during the first birth interval, the odds of having a second child are 16 per cent of the odds of having a second child for those who did not study during the period between first and second birth. The corresponding figure for those born in the

⁴ In the NLC a defacto relationship is defined as a relationship where the couple live together for more than 3 months.

1960s and 1970s is 40 per cent. For the older cohort longer periods in the work force after the first birth (either full- or part-time) are associated with reduced odds of having a second child. Results also confirm the proposition that age at first birth is negatively associated with having a second child for both cohorts.

Table 2: Having a second child (Odds Ratios)

Model 1	Older cohort (born 1940-1959)	Younger cohort (born 1960-1979)
First child was a son	1.11	1.14
Age at first birth	0.73 **	0.80 **
Gender-role attitude	1.41 *	0.77 **
Catholic	2.01	1.10
Anglican	1.51	1.22
Other religion	1.23	0.87
Had a post school qualification prior to first birth	3.11 **	0.99
Studied during first birth interval	0.16 **	0.41 **
% of first birth interval in work force	0.98 **	1.00
Continuous relationship in first birth interval	10.32 **	6.04 **

Notes: **<0.05 *<0.10

Older cohort: Number of observations=513; Significance of model <0.001; Pseudo R² 0.44.

Younger cohort: Number of observations=357; Significance of model <0.001; Pseudo R² 0.19.

Our main hypothesis, that Australian couples favour a balanced sex composition for their families is supported. That is, there is no significant difference in the progression to a second child based on the sex of the first child for both the older and the younger cohorts. These results also suggest that factors other than sex of first child are much more important in explaining second birth. As expected, educational background and continuity of relationship are important predictors of having a second birth.

It appears that gender-role attitudes have a different effect for the two cohorts. We suggest that it is impossible to interpret the impact of gender-role attitude for the older cohort, as this measure is not retrospective. For the current cohort of childbearers, those who disagree that it is better for the father to be breadwinner are less likely to have a second child.

The second model (Table 3) predicts the odds of having a third child for those who have a second child. In Model 2 attitudes toward the breadwinner model of the family are not significantly associated with having a third child. For the younger cohort both of the measures of education are also poor predictors of progression to a third child. However, for the older cohort both of the education measures are associated with having a third child in the same way that they are for having a second. That is, people who have a post-school qualification prior to first birth

are more likely to have a third birth and people who studied after the second birth are less likely to progress to a third birth.

Age at first birth and work force participation also show a similar pattern in predicting a third birth as they do in predicting a second birth. Increasing age at first birth is associated with reduced odds of progression to a third birth. Similarly, being in the work force for longer periods in the second birth interval is associated with reduced odds of progression to a third birth. As with Model 1 the continuity of relationship is an important predictor of having a third birth in Model 2. Those people who are in a relationship for the entire birth interval are more likely to have a third child than those who have a disrupted pattern of relationship.

We show in Table 2 that those with a religion are not significantly more likely than are those with no religion to progress to a second birth. When predicting progression to a third birth Catholics are more likely to have a third birth than are those who report no religion. This relationship is only true for those in the older cohort. Religion does not have an effect on progression to third birth for the younger cohort.

Table 3: Having a third child (Odds Ratios)

Model 2	Older cohort (born 1940-1959)	Younger cohort (born 1960-1979)
First two children were daughters	0.94	1.96 *
First two children were sons	1.22	1.29
Age at first birth	0.79 **	0.83 **
Gender-role attitude	1.12	0.99
Catholic	2.58 **	1.31
Anglican	1.47	0.91
Other religion	1.14	1.05
Had post-school qualification prior to first birth	1.96 **	0.95
Studied during second birth interval	0.16 **	0.70
% of second birth interval in work force	0.98 **	0.99 *
Continuous relationship in second birth interval	3.34 **	2.32 **

Notes: **<0.05 *<0.10

Older cohort: Number of observations=454; Significance of model <0.001; Pseudo R² 0.32.

Younger cohort: Number of observations=250; Significance of model <0.001; Pseudo R² 0.12.

The results support the theory that sex preference is more important under a low fertility regime. The two variables describing sex of previous children are not significant for the older cohort, as women who had two boys or two girls were no more likely to have a third birth than those with a son and a daughter. This indicates that progression to a third birth was not associated with sex of

existing children. In comparison, for the younger cohort, those with two daughters are more likely to progress to a third child than are those who have both a son and a daughter.

Our hypothesis, that women under a low fertility regime are more likely to progress to a third child if their existing two children are of the same sex is partly confirmed by the results of Model 2. Results indicate that parents with two daughters are more likely to have a third birth than women with a son and a daughter. However, women with two sons are not more likely to have a third child. The results reveal a difference in behaviour between the two cohorts, with progression to a third birth being unaffected by existing sex composition in the older cohort, while third birth in the younger cohort is associated with sex composition of existing children.

Discussion

It has been argued that in low fertility societies, the sex of existing children is important in understanding the progression to a further birth. In high fertility societies a mixed-sex composition usually results. This is not necessarily true when family size is limited. What is not clear is why it is important for parents to have a balanced sex composition.

Past research on the value of sons and daughters finds that sons and daughters provide different social, economic and psychological benefits (Williamson, 1976). This research from the 1970s may not explain current parental attitudes on the value of sons and daughters. As Pollard and Morgan (2002) argue, changes in gender-role stratification may be associated with a substitutability of sons and daughters, that is, sons and daughters may provide the same values to parents. While there is some evidence of a decline in the desire for balanced families in the US supporting this theory, this is not true for other egalitarian Western societies. In the case of Australia, there is more evidence of an increasing importance of the sex of existing children than a decreasing importance.

The value of sons and daughters under the current gender-role system needs to be better understood to inform theory on the importance of sex of existing children on parity progression. There is a large body of evidence indicating that both sons and daughters are desired. What then, is the importance of sons and daughters to parents in modern egalitarian societies? What do parents perceive that sons provide which daughters do not, and *vice versa*? Qualitative research on the value of sons and daughters in modern societies is needed to understand the dimensions of sex-composition on parity progression.

A further important consideration in determining the value of children to parents is the role of men in family formation. Fertility decisions are not usually made by the mother alone, and fathers have a potentially large impact on the decision to have another child. Whether having a son and a daughter is important for both parents needs to be carefully considered in any analysis of the value of sons and daughters.

Our article finds evidence supporting the theory that the sex of existing children is more important under low fertility regimes than under high fertility regimes. However, the finding is mixed, as the younger cohort is more likely to have a third birth if the mother has two daughters as compared to a son and a daughter, but not if she has two sons. Perhaps this indicates that boys are more desired in Australia, but an alternate explanation could be that mothers stop after having two boys because they do not want to risk having a third son in the pursuit of a daughter. These comments are very speculative, and are given in a context of poor understanding on what sons and daughters provide parents. Without qualitative research, quantitative investigations on parity progression can provide only speculations on the value of sons and daughters in modern egalitarian societies.

References

- Andersson, G., & Woldmichael, G. (2001). Sex composition of children as a determinant of marriage disruption and marriage formation: Evidence from Swedish register data. *Journal of Population Research*, 18, 143-153.
- Arnold, F. (1997). Gender preferences for children. *Demographic and Health Surveys Comparative Studies No. 23*. Maryland: Macro International.
- Australian Bureau of Statistics (ABS). (2003). *Births, Australia 2002*. Catalogue No. 3301.0. Canberra: Australian Bureau of Statistics.
- Baxter, J. (1998). Moving towards equality? Questions of change and equality in household work patterns. In M. Gatens & A. Mackinnon (Eds.), *Gender and Institutions: Welfare, Work and Citizenship* (pp.55-72). Cambridge: Cambridge University Press.
- Ben-Porath, Y., & Welch, F. (1976). Do sex preferences really matter? *The Quarterly Journal of Economics*, 90, 285-307.
- Bongaarts, J. (1998). Fertility and reproductive preferences in post-transitional societies. *Policy Research Division Working Paper No. 114*. New York: Population Council.
- Bongaarts, J., & Potter, R.G. (1983). *Fertility, Biology, and Behavior*. New York: Academic.
- Breusch, T. (2003). Negotiating the Life Course, Waves 1 and 2: Sampling Weights for Persons and Income Units. *Negotiating the Life Course Discussion Paper Series DP-016*.
- Breusch, T., & Gray, E. (2003) A re-estimation of mothers' forgone earnings using Negotiating the Life Course (NLC) data, *Negotiating the Life Course Discussion Paper Series, DP-017*.
- Brockmann, H. (2001). Girls preferred? Changing patterns of sex preferences in the two German states. *European Sociological Review*, 17, 189-202.
- Bulatao, R.A. (1981). Values and disvalues of children in successive childbearing decisions. *Demography*, 18, 1-25.
- Calhoun, C., & Espenshade, T. (1988). Childbearing and wives' foregone earnings. *Population Studies*, 42, 5-37.
- Goodkind, D. (1999). Should prenatal sex selection be restricted? Ethical questions and their implications for research and policy. *Population Studies*, 53, 49-61.
- Hank, K. & 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., & Kohler, H-P. (2000). Gender preferences for children in Europe: Empirical results from 17 FFS Countries. *Demographic Research*, 2.
- Hoffman, L.W., & Hoffman, M.L. (1973). The value of children to parents. In J.T. Fawcett (ed.), *Psychological Perspectives on Population* (pp.19-76). New York: Basic Books.
- Hogan, D.P., & Astone, N.M. (1986). The transition to adulthood. *Annual Review of Sociology*, 12, 109-130.
- Jacobsen, R. Møller, H., & Engholm, G. (1999). Fertility rates in Denmark in relation to the sexes of preceding children in the family. *Human Reproduction*. 14, 1127-1130.

- Joshi, H. (1990) The cash opportunity costs of childbearing : an approach to estimation using British data. *Population Studies*, 44, 41-60.
- Kippen, R. (2003). Trends in age- and parity-specific fertility in Australia. *Working Papers in Demography, No.91*. Canberra: Research School of Social Sciences, The Australian National University.
- Lundberg, S., & Rose, E. (2002). The effects of sons and daughters on men's labor supply and wages. *The Review of Economics and Statistics*, 84, 251-268.
- Marleau, J.D., & Saucier, J-F. (2002). Preference for a first-born boy in Western societies. *Journal of Biosocial Science*, 34, 13-27.
- Martin, J.A., Hamilton, B.E., Ventura, S.J., Menacker, F., Park, M.M. (2002). Births: Final data for 2000. *National Vital Statistics Reports; vol 50 no. 5*. Hyattsville, Maryland: National Center for Health Statistics.
- McDonald, P., Evans, A., Baxter, J., & Gray, E. (2000). The Negotiating the Life Course Survey experience. *Negotiating the Life Course Discussion Paper Series DP-001*.
- Morgan, S.P., Lye, D.N., & Condran, G.A. (1988). Sons, daughters, and the risk of marital disruption. *American Journal of Sociology*, 94, 110-129.
- Murphy, M. (1992). The progression to the third birth in Sweden. In J. Trussell, R. Hankinson, & J. Tilton (eds.) *Demographic Applications of Event History Analysis* (pp.141-156). Oxford: Clarendon Press.
- Pebley, A., & Westoff, W. (1982). Women's sex preferences in the United States: 1970 to 1975. *Demography*, 19, 177-189.
- Pollard, M.S., & Morgan, S.P. (2002). Emerging parental gender indifference? Sex composition of children and the third birth. *American Sociological Review*, 67, 600-613.
- Rindfuss, R., Morgan, S. P., & Offutt, K. (1996). Education and the Changing Age Pattern of American Fertility: 1963-89. *Demography*, 33, 277-290.
- Robinson, W., & Horlacher, D. (1971). Population growth and economic welfare. *Reports on Population and Family Planning No.6*. New York: Population Council.
- Schoen, R., Kim, Y. J., Nathanson, C. A., Fields, J., & Astone, N. M. (1997). Why do Americans want children? *Population and Development Review*, 23, 333-358.
- Schullström, Y. (1996). Garçon ou fille? Les preferences pour le sex des enfants dans les generations suédoises 1946-1975, *Population*. 6, 1243-1245.
- Seidl, C. (1995). The desire for a son is the father of many daughters. A sex ratio paradox. *Journal of Population Economics*, 8, 185-203.
- Thomson, E. (2001). Value of children. In N.J. Smelser & P.B. Baltes (Eds.) *International Encyclopedia of the Social and Behavioral Sciences Vol 8*. (pp.1725-1729). Amsterdam: Elsevier Science.
- Williamson, N.E. (1976). *Sons or Daughters: A Cross-Cultural Survey of Parental Preferences*. Volume 31, Sage Library of Social Research. Beverly Hills: Sage Publications.
- Wood, C.H., & Bean, F.D. (1977). Offspring gender and family size: Implications from a comparison of Mexican Americans and Anglo Americans. *Journal of Marriage and the Family*, 39, 129-139.

- Yamaguchi, K., & 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*, 60, 272-298.
- Young, C. (1977). Family building differences between same sex and mixed sex families in Australia. *Australian Journal of Statistics*, 19, 83-95.