

# **Fewer children than wanted: updating plans, or failing to realise ambitions?**

## **Abstract**

If women are interviewed around the start of their childbearing years and asked how many children they want, these aspirations are consistently higher than the number of children they eventually go on to have. The degree to which women's aspirations outstrip their realised fertility differs between countries and between different groups of women, but in developed countries this is a robust finding. What is not clear is whether this "under-achievement" occurs because women are constrained (by work, economic circumstances or other factors) into having fewer children than they want, or whether it occurs because women update their aspirations over their childbearing years. Distinguishing between these two scenarios is important because they have very different implications in terms of social policy. We address this question using 17 waves of the British Household Panel Survey (BHPS), looking at the degree to which women amend their childbearing aspirations over the course of their lives, and the determinants of their original aspirations, changes in aspirations, and realised fertility.

## 1. Introduction

In recent years, birth rates have been falling across the developed world, to levels well below replacement in many countries (Kohler et al 2002). This has led to a renewed interest in fertility intentions as one determinant of achieved fertility. There is already a well-developed literature on how fertility intentions are formed as well as on the relationship between intended and realised fertility (Morgan 2001, Bernardi et al. 2009)

However, there is as yet very little research into the way in which individuals *revise* their fertility intentions over the course of their lives. This is potentially a very important issue: failing to acknowledge that intentions change over the life course implies that they are formed early on, remain an essentially static goal to be pursued during one's reproductive life, and to be either fulfilled or unfulfilled at the end of it.

In fact, existing cross-sectional evidence suggests that individuals change their reproductive intentions over their lives. Van Peer (2002) find that there is a much poorer match between the intentions of younger women and their eventual achieved fertility than there is between intentions and outcomes for older women; Smallwood and Jefferies (2003) show that, in general, the older the woman the more likely she is to express the intention for fewer than two or more children than two children; and Goldstein et al. (2003) show that the ideal number of children reported by respondents decreases with age.

Using longitudinal data we examine the determinants of individuals' fertility expectations: specifically, the determinants of changes in these expectations over the life course. By doing so we are indirectly addressing the issue of the "fertility gap" at the individual level, and we can assess the extent to which it should be interpreted as an unmet need for children arising from constraints over individuals' lives, as opposed to reflecting shifts in desired fertility over the life course which arise for other reasons.

This paper builds on existing findings in a number of innovative ways. First, we use a multivariate framework which allows us to analyse separately the determinants of upward and downward revisions in fertility intentions; we show clearly that these are not "equal and opposite" concepts, but that very different factors are at play in the two scenarios. Second, we analyse separately the influences on men's and women's fertility intentions. And third, we exploit the fact that the BHPS is a household survey, which contains data on respondents' partners, to analyse the effects not only of individuals' characteristics, but also of their partners' characteristics, showing that there are

substantial asymmetries between men and women in terms of the way they adjust their intentions in accordance with their partners' intentions.

## **2. Background**

As early as the 1950s, questions on fertility intentions were introduced in the American Fertility Survey with the purpose of helping to improve fertility forecasts. (Westoff and Ryder, 1977). Since then a rich literature has developed in order to assess the validity of fertility intentions as predictors of fertility behaviour. Despite the general consensus that there is a strong link between intended and achieved fertility, it is also recognized that there is substantial discrepancy between the two measures: fertility intentions are far from being a perfect predictor for achieved fertility, which generally falls short of reported expectations (Morgan 2001; Smallwood and Jefferies 2003).

The gap between average intended and achieved fertility has increased over recent decades as the fall of fertility to below-replacement levels in many developed countries has not been accompanied by an equal fall in fertility intentions (Bongaarts 2001). The fertility gap has often been seen as reflecting an "unmet need for children" (Chesnais 2000, Bongaarts 2001, Goldstein et al. 2003) arising from constraints – biological, economic and social.

That said, what is observed at the aggregate level is compatible with different scenarios at the individual level (Bernardi et al. 2009). When studying the American case, Quesnel-Vallée and Morgan (2003) show that the congruence between aggregate intention and observed fertility is mainly explained by the fact that individual-level errors cancel each other out, rather than by the ability of American women to anticipate how many children they will have. Hagewen and Morgan (2005) point out that even though observed fertility is attenuated by fertility postponement, infecundity and competition with other activities, it might also be augmented by factors such as unwanted fertility. The authors argue that while in the U.S. the latter factors compensate for the former ones that this might not hold universally. Implicitly this suggests that, the fertility gap between average fertility intentions and behaviour observed in Europe does not necessarily imply that all women fail to realize their fertility intentions - only that enough of them do. So, the overestimation of the average number of children per women resulting from women's intentions should not necessarily be interpreted as an unmet need for children (Smallwood and Jefferies 2003).

Fertility intentions are often assumed as static (Morgan 2001). Many studies assume that individuals form their desired family size early on and pursue this goal throughout their reproductive lives. However, individuals may revise their fertility intentions (Lee 1980, Miller and Pasta 1995), and this might also help explain the mismatch between intended and observed fertility at the individual level.

The few studies using longitudinal data which look at changes in fertility intentions examine, essentially, their stability (Westoff and Ryder 1977, Monnier 1989, Berrington 2004, Heiland et al. 2008 and Liefbroer 2008).

Westoff and Ryder (1977) distinguish between two components of inconsistency of intentions over time: the inconsistency attributable to change in intention and to failure to fulfil intention (up or downwards). About 70% of women who had said in the first interview that they intended at least one more child but reported no birth in the interim period said they changed their mind. Among those who had said they did not want more children and then they got one only 25% said that they had changed their minds – the other three quarters said that the birth just happened.

Monnier (1989) found that changes in intention depended on the nature of the original intention and, to a lesser extent, on the parity. His results also show that downward adjustment is more frequent than upward adjustment.

Using waves 2 and 8 of BHPS, Berrington (2004) describes how fertility intentions differ by age, parity and gender and examines whether couples report conflicting intentions as well as the extent to which women's fertility intentions are persistent over time. She finds that whilst not always the case, there is a tendency for women to revise their intention downwards, especially among younger women. Half of the women aged 18–24 at wave 2 had the same intended family size six years later, almost a third had reduced their intended family size, and one fifth had increased it. The author points out that the impact of time-varying covariates such as partnership formation on women's intentions and behaviour could be analysed but because in her multivariate analysis she only looks at childless women aged 30–39, doing so would reduce too much the sample size.

Heiland et al. (2008), using a West German longitudinal survey, find that up to 50% of all individuals report different total desired fertility across interviews (6 to 7 years apart). Then, they estimate two different models: a linear probability model of whether individual's total desired family size is unstable –and so they do not take into account the “direction” of the revision; and a fixed-effects model using the two

observations they have on the desired family size. In their panel estimates they find that having children between the first and the second wave increases the total number of children wanted among women with children. However, given that the question used refers to total desired fertility, this could be reflecting post-rationalization. The authors hypothesise that life course experiences cause people to alter their perceptions of the costs and benefits of childbearing, thereby affecting desired fertility but provide very weak empirical confirmation for this hypothesis.

Liefbroer (2008) uses data from a Dutch panel survey to address the question of the stability of family size intentions. A random-slope model is estimated to examine whether the age-related change in family size intentions varies between respondents, and whether this variation in the slope can be explained by differences between individuals in their experiences in the family and the occupational life domains. The results show that, on average, family size intentions are adjusted downwards with increasing age.

These studies find that while, on average, respondents revise their intentions downwards over the course of their lives, some respondents adjust them upwards, which challenges the idea that there is a *generalized* unmet need for children. Knowing what leads these individuals to increase the number of intended children is potentially as informative as knowing why many people revise their expectations downwards.

For West Germany, Heiland et al. (2008) show that one third of childless women aged 18 to 25 who stated in 1988 that they did not want to have children, in 1994/95 wanted 2 children; among the women in the same age band who already had a child in 1988 and had said back then that they wanted one child, 30 % were saying that they want 2 children 6 years later, 10% wanted 3 children and 20 % wanted 4 or more children. An impressive 64% of the childless 26-35 women in 1988 who at that time stated that they would like to have a single child had revised that number upwards in 1994/95. Berrington (2004) shows that not only one fifth of the women aged 18–24 at wave 2 had increased their intended family size six years later but also 17.5% and 10.3 % of women aged 25-29 and 30-34 respectively, revised upwards.

There is evidence that the mismatch between fertility intentions and outcomes is patterned – as Morgan (2001) points out. Having children, for example, is correlated with revising upwards. Monnier (1989) interprets his results as an indication that decisions are made sequentially - Nambodiri (1983) and Udry (1983) suggest the same – and that intentions are revised whenever a new baby is born. The arrival of a child

brings more information about childbearing and childrearing and, at least for some women, this additional information might make the balance tip in favour of the benefits of having children.

### **3. Data**

The data used in this analysis come from the British Household Panel Survey (BHPS), a UK-based survey which has been conducted each year since 1991 on a nationally representative sample of about 10,000 individuals in 5500 households. The BHPS is household-based, meaning that each year every member of sample households aged 16 years or over is interviewed. 17 waves of data are available, with the latest available wave being collected in 2007.

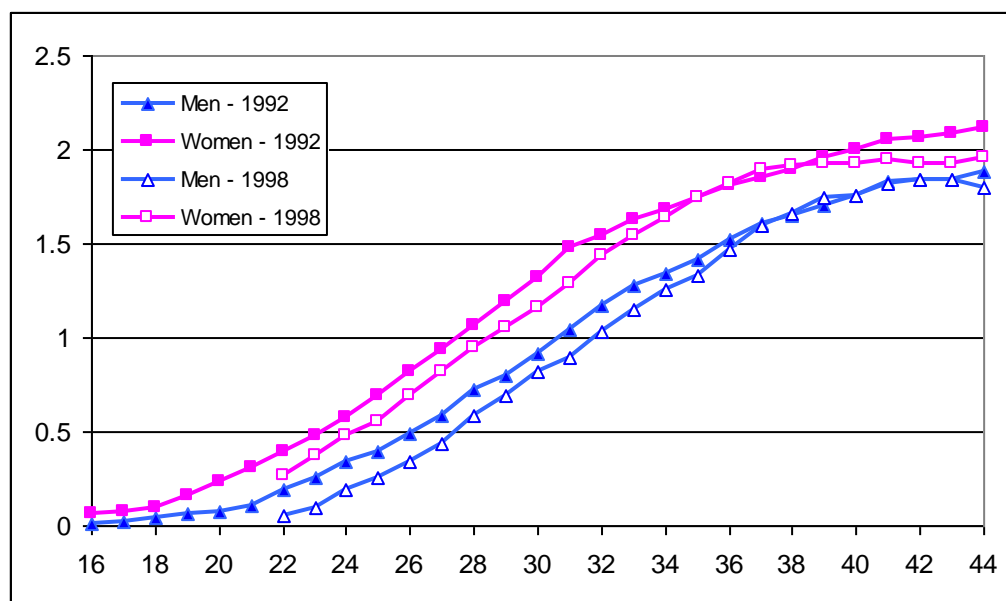
As well as a rich set of background variables, the BHPS asks several questions relating to fertility. At Wave 2, in 1992, respondents were asked about all the children they had ever given birth to or fathered. This question was not repeated again until Wave 8 of the survey, after which it was asked annually to all new entrants to the survey; each respondent was only asked this question once over the course of the survey. For the years when a respondent did not reply to this question, we calculate a measure of actual, or achieved, fertility as follows. Starting with the year in which a respondent was asked about the number of children he or she had had, we carry this number forward to the following year, increasing the total by one (or two or more in the case of multiple births) if a new baby is present in the household who had not been born at the previous interview, and who is recorded in the household grid as being the child of the respondent. We carry this running total forward year by year, adding to the total each time a new baby is observed.

This procedure is likely to be highly reliable for women (who almost always live in the same household as their new babies), but slightly less so for men, who are somewhat more likely to live in a household apart from new babies they have fathered.

Figure 1 plots our measure of achieved fertility for the sub-sample of men and women who were present in the BHPS in both 1992 and 1998. The measure of achieved fertility in 1992 is taken from respondents' own reports of how many children they had had; the measure six years later, in 1998, is derived using the 1992 question, updated with annual information on new babies present in the household. There is evidence of a degree of under-reporting of achieved fertility by men. Given that men in the UK are on average two years older than their female partners, one would expect achieved fertility

at every age to be lower for men than for women, but the difference between the two sets of curves here is rather larger than the expected difference, indicating that men may be under-reporting the number of children they have by an average of around 0.2 children. Interestingly, the difference in height between the men's and the women's graphs is very similar in both 1992 and 1998, indicating that to the extent that we under-record male fertility, this is as a result of men under-reporting their fertility in response to the question in 1992, rather than as a result of our procedure failing to pick up new children in the years following 1992.

**Figure 1: Achieved fertility by age and gender, 1992 and 1998**



The BHPS also carries questions relating to expected fertility. Respondents aged 45 or under (women) and 50 or under (men) are asked: “Do you think you will have any [more] children?” and (if the answer to the first question is positive): “How many [more] children do you think you will have?” From these questions we derive a measure of expected fertility, by adding the number of extra children respondents think they will have to the number they already have. Again, this measure will underestimate men’s expected fertility, because of the issue of under-reporting of children discussed previously.

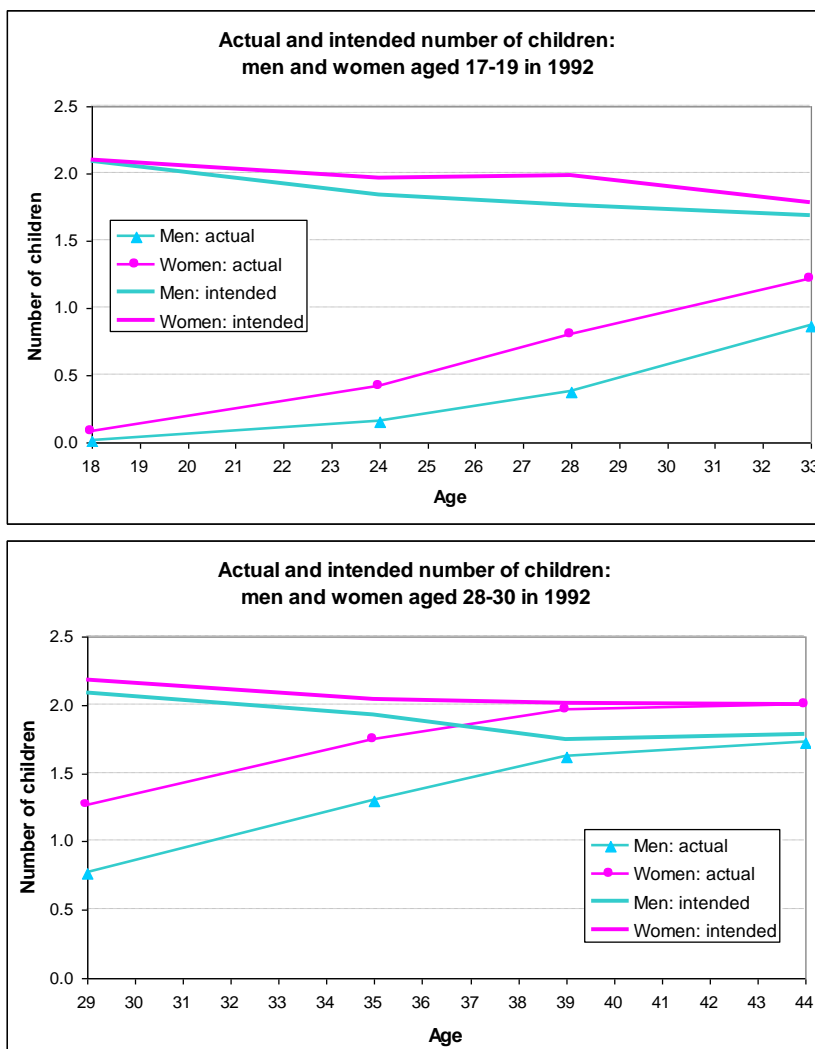
The questions on expected fertility are asked in wave 2, and repeated in Waves 8, 12, 13 and 17, as well as Wave 11 for certain subsamples. These repeated observations potentially allow us to examine changes in fertility expectations over different time intervals: short-term year-on-year changes (between Waves 11, 12 and 13); medium-

term changes (using the five- or six-year intervals between Waves 2 and 8, 8 and 13, and 12 and 17); and long-term changes (between Waves 2 and 17).

Miller (1992) and others have investigated the differences between measures of expected fertility and measures of desired fertility; the questions in the BHPS clearly relate to expected rather than desired fertility.

Figure 2 plots both expected and achieved fertility for two cohorts of men and women in the BHPS. The upper panel relates to those aged 17-19 in 1992, and plots expected and achieved fertility in waves 2, 8, 12 and 17. As the BHPS is not yet long enough to follow this cohort right through their reproductive lives, the lower panel presents the same information for an older cohort aged 28-30 in 1992.

**Figure 2: Expected and achieved by age and gender, for two cohorts.**



We note that expected fertility falls over the life course. For the younger cohort it falls by 0.3 children (women) and 0.4 children (men) between the ages of 18 and 33; for the older cohort it falls by around 0.2 children (women) and 0.3 children (men) between



the ages of 29 and 44. This reduction is of the same order as the reduction recorded by Liefbroer (2008), although rather smaller.

## 4. Results

### 4.1 *Expected fertility and fertility outcomes*

This paper is motivated by the discrepancy between people's intended fertility towards the beginning of their reproductive lives, and their achieved fertility towards the end of their reproductive lives. We begin this section with some descriptive statistics which tabulate this discrepancy.

Table 1 tabulates expected fertility at Wave 2, using the sample of men and women aged 25-35. The first two columns relate to the whole sample, the right-hand columns to men and women who have not (yet) had any children. Among both groups there is a distinct modality at 2; among those who have not had children, there is also a substantial group (21% of men, 24% of women) who do not expect to have children.

**Table 1: *Expected number of children measured at Wave 2 (men and women aged 25-35)***

|      | All  |       | Those with no children (yet) |       |
|------|------|-------|------------------------------|-------|
|      | Men  | Women | Men                          | Women |
| None | 9.6  | 8.6   | 21.2                         | 24.2  |
| 1    | 9.7  | 10.7  | 7.8                          | 12.1  |
| 2    | 51.7 | 49.6  | 57.3                         | 51.4  |
| 3    | 21.1 | 21.8  | 11.4                         | 8.7   |
| 4    | 6.2  | 7.4   | 2.4                          | 3.4   |
| 5+   | 1.8  | 2.0   | 0.0                          | 0.3   |

In Table 2, we examine the relationship between expected fertility and later outcomes. Panel 1 of Table 2 takes as a sample all men and women aged 25-35 at Wave 2 of BHPS, and tabulates expected fertility at Wave 2 against the actual outcome 15 years later in 2007. Of those who wanted no children, 83% of men and 88% of women actually went on to have no children, and may therefore be said to have achieved their desired level of fertility. Of those who wanted one child, 66% of men and 61% of women achieved this; this group were several times more likely to overshoot their target by having two or more children, than to under-achieve, by having no children. Of those who wanted two children, 61% of men and 69% of women achieved this target, with the majority of those who did not achieve their target achieving fewer, rather than more,

children than they expected. Of course, these figures include men and women who have already achieved their desired number of children. In panel 2 we restrict the sample to those who have not yet had any children; among this sample, the percentage of people achieving their expected fertility is dramatically lower than in the full sample; the only individuals who have a greater than 50% chance of achieving their desired fertility are those who do not want any children, and women who want only one child.

**Table 2: Expected number of children and actual number 15 years later (row percentages)**

**Panel 1: Men and women aged 25-35 at Wave 2 (40-50 at wave 17)**

|                                       |    | Actual number of children at Wave 17 |             |             |             |             |             |
|---------------------------------------|----|--------------------------------------|-------------|-------------|-------------|-------------|-------------|
| Men                                   |    | 0                                    | 1           | 2           | 3           | 4           | 5+          |
| Number of children expected at Wave 2 | 0  | <b>82.5</b>                          | 11.8        | 2.8         | 3.0         | 0.0         | 0.0         |
|                                       | 1  | 4.1                                  | <b>66.1</b> | 22.7        | 5.3         | 1.8         | 0.0         |
|                                       | 2  | 14.7                                 | 13.8        | <b>61.3</b> | 7.8         | 1.9         | 0.5         |
|                                       | 3  | 5.2                                  | 5.1         | 27.5        | <b>54.6</b> | 7.2         | 0.4         |
|                                       | 4  | 5.5                                  | 12.5        | 10.6        | 22.1        | <b>42.3</b> | 7.1         |
|                                       | 5+ | 0.0                                  | 2.3         | 0.0         | 0.0         | 20.0        | <b>77.7</b> |
| Women                                 |    | 0                                    | 1           | 2           | 3           | 4           | 5+          |
| Number of children expected at Wave 2 | 0  | <b>87.7</b>                          | 5.5         | 4.4         | 2.5         | 0.0         | 0.0         |
|                                       | 1  | 10.2                                 | <b>61.2</b> | 24.4        | 0.0         | 4.2         | 0.0         |
|                                       | 2  | 10.5                                 | 11.3        | <b>69.1</b> | 8.8         | 0.4         | 0.0         |
|                                       | 3  | 1.7                                  | 3.5         | 21.8        | <b>63.3</b> | 7.4         | 2.4         |
|                                       | 4  | 7.7                                  | 2.6         | 11.9        | 20.1        | <b>55.5</b> | 2.2         |
|                                       | 5+ | 4.2                                  | 0.0         | 2.1         | 10.0        | 31.5        | <b>52.2</b> |

**Panel 2: People aged 25-35 at Wave 2 who no children at Wave 2**

|                                    |    | Actual number of children at Wave 17 |             |             |             |             |
|------------------------------------|----|--------------------------------------|-------------|-------------|-------------|-------------|
| Men                                |    | 0                                    | 1           | 2           | 3           | 4+          |
| No. of children expected at Wave 2 | 0  | <b>82.5</b>                          | 11.8        | 2.8         | 3.0         | 0.0         |
|                                    | 1  | 9.5                                  | <b>46.3</b> | 36.9        | 7.3         | 0.0         |
|                                    | 2  | 30.7                                 | 20.4        | <b>40.8</b> | 5.9         | 2.2         |
|                                    | 3  | 24.7                                 | 4.5         | 34.1        | <b>32.2</b> | 4.5         |
|                                    | 4+ | 23.8                                 | 15.9        | 8.4         | 51.9        | <b>0.0</b>  |
| Women                              |    | 0                                    | 1           | 2           | 3           | 4+          |
| No. of children expected at Wave 2 | 0  | <b>87.7</b>                          | 5.5         | 4.4         | 2.5         | 0.0         |
|                                    | 1  | 28.5                                 | <b>51.7</b> | 19.8        | 0.0         | 0.0         |
|                                    | 2  | 31.0                                 | 23.5        | <b>38.9</b> | 6.6         | 0.0         |
|                                    | 3  | 12.7                                 | 9.6         | 40.4        | <b>31.6</b> | 5.7         |
|                                    | 4+ | 38.0                                 | 11.4        | 11.3        | 28.8        | <b>10.5</b> |

Three stylised facts may be drawn from Table 2:

1. People who do not expect to have children are more likely to achieve this target than people who do expect to have children; it is in some sense easier not to have children than to have children.
2. In general, the higher an individual's expected fertility, the lower is the probability that he or she will achieve this exactly.
3. Among men and women who have not yet had children but who expect to go on to have children, well under half will go on to fulfil that expectation exactly.
4. Among those who do not exactly achieve their expected fertility, there is a substantial degree of "overshooting" as well as "undershooting".

This last point suggests that any analysis of the relationship between expected and achieved fertility should not think only in terms of the problem of individuals having *fewer* children than they wanted, but should also consider the other side of the coin: namely, that many individuals go on to have *more* children than they originally wanted.

Table 2 as it stands does not allow us to calculate the relative importance of under- and over-shooting targets, because the figures are presented as row percentages. However, a simple calculation produces the figures tabulated in Table 3, which show that the majority of people aged 25-35 (61% of men and 67% of women) go on to achieve exactly their expected number of children 15 years later; 27% of men and 22% of women have fewer children than they expected, while 12% of men and 11% of women have more children than they expected. Thus, among this sample, people who have more children than they originally expected account for between one quarter and one third of people who do not have exactly the number of children they originally expected.

***Table 3: Percentage of men and women aged 25-35 who achieve under, exactly and over their expected number of children 15 years later.***

|                                  | Men  | Women |
|----------------------------------|------|-------|
| Has fewer children than expected | 27.0 | 22.1  |
| Has exactly the number expected  | 61.2 | 67.2  |
| Has more children than expected  | 11.8 | 10.7  |

#### 4.2 Revisions in fertility expectations

The main focus of this paper is to examine the way in which individuals revise their fertility expectations over the course of their lives. Before proceeding to multivariate analysis in which we examine the determinants of these revisions in expectations, we present descriptive statistics on these revisions. Table 4 tabulates expected fertility at two points in time six years apart, for men and women aged 20-39; the figures are row percentages. Thus (for example) 85.4% of men who initially expressed the expectation that they would not have children expressed the same intention again six years later; 5.4% of men who initially said they expected to have no children said six years later that they expected to have one child; and so on.

The majority of people do not change their expectations; however, this varies according to the number of children they originally wanted. We found in the previous section that individuals who do not expect to have children are more likely than others to realise that expectations exactly; in the same way, we also find here that individuals who do not expect to have children are more likely than other people to maintain their expectations constant. Among both men and women, the groups most likely to change their expectations are people who expect to have only one child and those who expect three children; in all cases, expectations tend to move towards the modal expectation, which is two children. Men are rather more likely to amend their expectations than women.

**Table 4: changes in fertility expectations over the medium term: men and women aged 20-39**

|                               |    | Expected fertility six years later |             |             |             |             |             |
|-------------------------------|----|------------------------------------|-------------|-------------|-------------|-------------|-------------|
|                               |    | Men                                | 0           | 1           | 2           | 3           | 4+          |
| Initial fertility expectation | 0  |                                    | <b>85.4</b> | 5.4         | 7.2         | 2.1         | 0.0         |
|                               | 1  |                                    | 7.7         | <b>61.8</b> | 25.7        | 4.4         | 0.4         |
|                               | 2  |                                    | 5.8         | 10.6        | <b>76.9</b> | 5.9         | 0.9         |
|                               | 3  |                                    | 1.9         | 4.2         | 26.7        | <b>63.2</b> | 4.1         |
|                               | 4+ |                                    | 1.7         | 2.8         | 8.7         | 16.2        | <b>70.7</b> |
|                               |    |                                    | Women       | 0           | 1           | 2           | 3           |
| Initial fertility expectation | 0  |                                    | <b>87.3</b> | 8.1         | 4.0         | 0.6         | 0.0         |
|                               | 1  |                                    | 7.1         | <b>72.2</b> | 18.4        | 2.3         | 0.0         |
|                               | 2  |                                    | 3.4         | 7.3         | <b>79.9</b> | 9.0         | 0.4         |
|                               | 3  |                                    | 0.3         | 2.6         | 20.8        | <b>71.7</b> | 4.6         |
|                               | 4+ |                                    | 0.7         | 1.1         | 11.0        | 15.0        | <b>72.2</b> |

In reporting statistics for a sample of individuals spanning the age range from 20 to 39, Table 4 masks the fact that there is a good deal of heterogeneity between age groups. Table 5 divides the sample into four age groups, and summarises revisions in expected fertility for each of them.

**Table 5: Revisions in their fertility expectations over a six-year period, by age**

|       |       | Revise down | Stay the same | Revise up | Revise down by 2 or more | Revise up by 2 or more |
|-------|-------|-------------|---------------|-----------|--------------------------|------------------------|
| Men   | 20-24 | 33.3        | 54.9          | 11.8      | 9.8                      | 2.5                    |
|       | 25-29 | 23.9        | 59.7          | 16.4      | 7.1                      | 1.1                    |
|       | 30-34 | 15.9        | 75.2          | 8.9       | 4.3                      | 0.6                    |
|       | 35-39 | 6.3         | 90.0          | 3.7       | 1.7                      | 0.2                    |
| Women | 20-24 | 27.1        | 54.1          | 18.8      | 16.3                     | 2.5                    |
|       | 25-29 | 19.8        | 66.9          | 13.3      | 12.2                     | 1.1                    |
|       | 30-34 | 10.2        | 81.7          | 8.1       | 7.5                      | 0.6                    |
|       | 35-39 | 4.0         | 93.7          | 2.3       | 2.1                      | 0.2                    |

The first three columns in Table 5 sum to 100%, and show the percentages who revise their expectations downwards; whose expectations stay the same; or who revise them upwards. The two right-hand columns show the percentages of people who adjust their fertility expectations over this period by more than one child; these serve to demonstrate that although the majority of people who change their expectations do so by only one child, a substantial minority change their expectations by two or more children.

The following stylised facts may be drawn from this table:

1. The proportion of people whose intentions are stable over time is higher among older age groups, and the proportion of individuals revising their expectations upwards or downwards is higher at younger ages and lower at older ages. The only exception to this is that men in the 25-29 age group are more likely to revise their expectations upwards than men in the 20-24 age group.
2. More people revise their expectations downwards than upwards. Upward revisions account for about 40% of total revisions, except for the youngest group of men, where they account for only about 25% of total revisions.

The importance of these findings lies in the way they motivate our multivariate analysis. Studies in this area tend to treat revisions in fertility expectations as (a) occurring in a downwards direction, and (b) a phenomenon concentrated among older women in reaction to the reality of the biological clock. In fact, we have shown that although it is true that more downward than upward revisions do occur; and that the mean trajectory of fertility expectations over the life course is therefore downwards, a very substantial proportion of revisions occur in the upwards direction. In addition, it is not true that downward revisions in fertility expectations are concentrated among older women; in fact, downward revisions are far more common among *younger* men and women, reflecting the generally higher fluidity of expectations among the younger age group. While it may certainly be true that the reasons for downward revisions differ between different age groups, and that limitations of the biological clock play a significant role for older women, the fact that younger women are more likely to revise their expectations downwards should be borne in mind when interpreting the multivariate analysis.

#### *4.3 Revisions in expectations: multivariate analysis*

Liefbroer (2009) uses a random slopes model with intended family size as the dependent variable; Heiland et al (2008) report results from the linear probability model, as well as fixed and random effects models. All these models have their advantages, but they share a common drawback, namely that they treat increases in fertility intentions as equal and opposite to decreases. Under these approaches, the effect of any covariate on increases in intentions is constrained to be equal and opposite to the effect of that same covariate on decreases in intentions.

In order to allow us to explore the possibility that some covariates may have an effect on expectations in one direction but not the other, we use a multinomial logit framework. We define our dependent variable as changes in expectations over a six-year period. Three outcomes are specified separately: the reference group is individuals whose expectations do not change over the period, while the other two groups are defined as individuals whose expectations increase and decrease over the same period. This approach may be criticised on the grounds that it treats all individuals whose expectations increase as members of the same group, rather than distinguishing between people whose expectations increase by one, by two, and so on. We did experiment with a more refined version of the dependent variable which took this into account, but what

little extra insight was gained from this approach was far outweighed by the loss in simplicity of the results.

Earlier in this paper, we noted that the BHPS allows us to examine changes in expectations over three time frames: short-term year-on-year changes; medium-term changes over six years; and longer-term changes over 15 years. We focus here on changes over the medium term. It is possible to estimate equations looking at changes over the longer term; the problem is that because the BHPS only records fertility expectations for women up to age 45 and men up to age 50, changes over the longer term are observable only for women who are aged under 30, and men who are aged under 35, in Wave 2. Equations estimating short-term changes may be estimated over the full sample, and produce qualitatively similar results to the ones we display here; however, the estimates are less well defined because the percentage of individuals changing their expectations between one year and the next is smaller than the percentage changing their expectations over a six-year period.

The first specification reported in Table 6 shows regressions which include only selected personal-level characteristics as covariates. These include a quadratic in age; a dichotomous variable indicating whether the individual has a partner in the base year; dichotomous variables indicating whether the individual gains or loses a partner between the two observations; the individual's income; and whether the individual has a job.

This first specification is rather parsimonious; it is worth mentioning that we experimented with a wide range of additional covariates which were not finally included. We experimented with a more sophisticated specification for partnership status, including variables distinguishing between marriage and cohabitation, and variables identifying complex trajectories through partnership formation and dissolution. However, this specification yielded no additional information, and was abandoned in favour of the simpler specification. We tried including indicators of ethnicity; the coefficients on all such indicators were consistently insignificant, so we also dropped these from the regressions. We tested different ways of including educational attainment in the regressions, but found that when income was also included, educational attainment had no effect and served only to confound our estimates. We tried including an indicator of the size of the individual's family of origin, an indicator of the individual's birth order in his or her family of origin, and a set of variables capturing the Big Five personality traits. All of these are significant in

regressions in which fertility expectation is the dependent variable; however, they are found to have no effect when the locus of interest is not fertility expectations, but changes in these expectations.

In respect of age, this first set of regressions shows that for both men and women, the probability of either increasing or decreasing expectations is increasing in age and decreasing in age squared. Examining the coefficients more closely shows that the turning point in this function occurs in the early twenties for men, and at age 15 or 16 for women – in other words, this confirms the earlier descriptive finding that revisions in expectations in both upward and downward directions are more common in younger than in older individuals. Having a partner is associated with a lower probability of reducing one's expectations, but is not significantly associated with the probability of increasing one's expectations, while there is no significant association at all with getting or losing a partner over the six-year period. Personal income plays a significant role for women, with increased income being associated with a higher probability of reducing one's expectations. If labour market status is omitted from the equation, personal income is also associated with a lower probability of increasing expectations for women; as it is, it is the coefficient on women's employment status which is negative. There is no effect at all from personal income or employment status for men.

The second specification also includes variables relating to the individual's partner. Because the age of an individual and his or her partner tend to be closely related, controlling for partner's age presents problems of collinearity, and we have not done this. We include a pair of dichotomous variables indicating whether an individual's partner expects to have more, or fewer, children than the individual him- or herself. There is clear evidence that people adjust their expectations in accordance with those of their partners. Both men and women whose partners expect to have more children than they do are likely to revise their expectations upwards; and both men and women whose partners expect to have fewer children than they do are likely to revise their expectations downwards. The effect appears to be stronger in the downwards direction, indicating that one reason for the general downward trajectory of expectations over the reproductive life may be associated with couples' expectations tending to adjust towards the lower of the two individual expectations. Variables relating to



partner's income and employment status are also included<sup>1</sup>; the coefficients on these variables are insignificant for women, but significant for men. Men whose partners have higher incomes are more likely to revise their expectations downwards; men whose partners have a job are less likely to revise their expectations upwards. We observe here that male employment and earnings play very little role here; it is women's employment and earnings which affect both their own probability, and the probability of their partner, revising their expectations.

The next specification adds a set of variables relating to childbirths which intervene between the two years at which expectations are measured. It is not altogether simple to operationalise these variables. Because of the way expected fertility is constructed, any birth which brings an individual's total number of children to a total higher than the number of children he or she previously expected to have will have the effect of increasing that individual's expected number of children. Births which bring an individual's total number of children up to the expected total will by definition mean that the individual cannot reduce their expectations in the second period. Thus, simply adding in an indicator for new births, or for the number of new births, during the intervening six-year period, means that we will to an extent be observing effects which occur purely by construction, rather than because of any effect on behaviour. We therefore take the following approach, defining a set of variables:

|                |  |
|----------------|--|
| Birth_equal_1  | a first birth, when expected fertility in the initial year is 1  |
| Birth_equal_2  | a second birth, when expected fertility in the initial year is 2   |
| Birth_equal_3  | a third or higher order birth, which brings achieved fertility up to expected fertility measured in the initial year               |
| Birth_lower_1  | a first birth, when expected fertility in the initial year is $\geq 2$   |
| Birth_lower_2+ | a second or higher-order birth, after which achieved fertility is still lower than expected fertility measured in the initial year |

The reference group is individuals who had no new children over the period; 357 individuals who had children which brought their achieved fertility by the end of the second period over their expected fertility measured in the first period are excluded from the sample in this specification.

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<sup>1</sup> In order to preserve sample sizes, partner variables are set to the mean in the case of income, or the modal value in the case of the dichotomous variables, where the individual has no partner or data for the partner is missing.

Having a first child, when an individual initially wanted one child, is associated with an increase in expectations for both men and women. Having a second child, when the individual initially wanted two children, is associated with a much more modest probability of increased expectations for women, and no increase at all for men. There is no analogous increase in expectations, for either men or women, associated with having a third or higher-order birth which brings achieved fertility equal to expected fertility in the first year, over the period.

Looking now at births which do not bring achieved fertility up to expected fertility as measured at year 1, we see that first births which fall into this category (i.e., first births to individuals who initially expected to have two or more children) are associated with an increased probability of *both* increases *and* decreases in expectations for men, but they are associated only with reduced expectations for women. Second and subsequent births to women who would have expected to go on to have even more children are associated with an even stronger increase in the probability of reducing one's expectations. It appears that an element of learning may be operating: people form their expectations, and amend them in the light of what they discover about being the parent of a particular number of children. This is consistent with the suggestion of Monnier (1989), Nambodiri (1983) and Udry (1983) who suggest that childbearing decisions are made sequentially and revised on the arrival of a new child; here, we have refined these results to show that these effects occur in both directions, and that they vary by gender and by parity.

The final specification in Table 6 includes interactions with age. Liefbroer (2009) points to the importance of interacting key variables with age, in order to identify a possible effect from the biological clock. Here, we began with a full set of interaction terms, and retained those which were significant at the 10% level or better in any of the four equations reported. The interaction between `birth_lower_1` and age is significant for both men and women. This indicates that the increased probability of a reduction in expectations observed in people who initially said they expected to have more than one child, and who went on to have a first child, is more pronounced for older mothers and fathers.

|                              | REDUCE EXPECTATIONS |           |           |          |                      | INCREASE EXPECTATIONS |           |          |           |                      |
|------------------------------|---------------------|-----------|-----------|----------|----------------------|-----------------------|-----------|----------|-----------|----------------------|
| MEN                          | II                  | II        | III       | IV       | IV: Age interactions | II                    | II        | III      | IV        | IV: Age interactions |
| Age                          | 0.330***            | 0.321***  | 0.301**   | 0.303*   |                      | 0.524***              | 0.503***  | 0.379*   | 0.493**   |                      |
| Age squared                  | -0.007***           | -0.007*** | -0.007*** | -0.006** |                      | -0.011***             | -0.010*** | -0.008** | -0.009*** |                      |
| Has a partner                | -0.377*             | -0.543    | -0.648    | 1.315    | -0.067*              | 0.34                  | 1.450***  | -0.324   | 4.083***  | -0.088*              |
| Gets a partner               | 0.131               | 0.145     | -0.034    | 2.594*   | -0.103*              | 0.311                 | 0.329     | -0.376   | 0.21      | 0.009                |
| Loses a partner              | 0.526               | 0.726*    | 0.846**   | -1.075   | 0.061                | -0.049                | -0.084    | 0.68     | 1.255     | -0.05                |
| Monthly Income x 100         | -0.001              | -0.006    | 0         | -0.038   | 0.001                | 0.005                 | 0         | 0.021    | -0.062    | 0.002                |
| Has a job                    | -0.107              | -0.066    | -0.134    | 0.887    | -0.038               | -0.241                | -0.026    | -0.235   | 0.811     | -0.026               |
| Partner wants more children  |                     | 0.168     | 0.131     | 0.177    |                      |                       | 1.129***  | 1.662*** | 0.908***  |                      |
| Partner wants fewer children |                     | 1.593***  | 1.239***  | 1.294*** |                      |                       | 0.399     | 0.598    | 0.617     |                      |
| Partner has job              |                     | -0.254    | -0.27     | -0.223   |                      |                       | -0.785**  | -0.387   | -0.853**  |                      |
| Partner monthly income x 100 |                     | 0.043**   | 0.042*    | 0.040*   |                      |                       | 0.032     | 0.057*   | 0.037     |                      |
| Birth_equal_1                |                     |           | .         | .        |                      |                       |           | 2.390*** | 1.041*    |                      |
| Birth_equal_2                |                     |           | .         | .        |                      |                       |           | 0.499    | -1.185**  |                      |
| Birth_equal_3                |                     |           | .         | .        |                      |                       |           | 0.001    | -2.100*   |                      |
| Birth_lower_1 <sup>st</sup>  |                     |           | 1.153***  | -2.702*  | 0.138**              |                       |           | 1.334*** | -1.194    | 0.04                 |
| Birth_lower_2+               |                     |           | 3.208***  | 3.287*** |                      |                       |           | 0.755    | -1.146    |                      |
| Constant                     | -4.089**            | -4.155**  | -3.863**  | -4.573** |                      | -7.957***             | -9.038*** | -7.809** | -9.264*** |                      |
| N                            | 2359                | 2359      | 2262      | 2359     |                      |                       |           |          |           |                      |
| Pseudo R-squared             | 0.132               | 0.159     | 0.272     | 0.243    |                      |                       |           |          |           |                      |

|                              | REDUCE EXPECTATIONS |          |           |           |                      | INCREASE EXPECTATIONS |          |          |          |                      |
|------------------------------|---------------------|----------|-----------|-----------|----------------------|-----------------------|----------|----------|----------|----------------------|
| WOMEN                        | II                  | II       | III       | IV        | IV: Age interactions | II                    | II       | III      | IV       | IV: Age interactions |
| Age                          | 0.281*              | 0.245    | 0.312*    | 0.249     |                      | 0.215                 | 0.216    | 0.082    | 0.178    |                      |
| Age squared                  | -0.008***           | -0.007** | -0.008*** | -0.007*   |                      | -0.006**              | -0.006** | -0.005   | -0.005   |                      |
| Has a partner                | -0.29               | -0.52    | -0.31     | 0.51      | -0.028               | 0.025                 | 0.805*   | 0.453    | 3.877*** | -0.107**             |
| Gets a partner               | -0.304              | -0.297   | -0.438    | -0.486    | 0.003                | 0.269                 | 0.28     | 0.155    | 0.088    | 0.015                |
| Loses a partner              | -0.136              | -0.14    | -0.107    | 3.924     | -0.149               | -0.439                | -0.362   | 0.261    | -1.092   | 0.022                |
| Monthly Income x 100         | 0.036**             | 0.040**  | 0.033*    | -0.271**  | 0.010**              | 0.015                 | 0.016    | 0.044    | -0.261*  | 0.009**              |
| Has a job                    | -0.173              | -0.189   | -0.236    | 3.362**   | -0.121**             | -0.634**              | -0.641** | -0.175   | 1.708    | -0.080*              |
| Partner wants more children  |                     | 0.336    | 0.555     | 0.645*    |                      |                       | 0.924*** | 1.079**  | 0.842**  |                      |
| Partner wants fewer children |                     | 1.546*** | 1.315***  | 1.456***  |                      |                       | 0.013    | 1.141**  | 0.187    |                      |
| Partner has job              |                     | 0.494    | 0.466     | 0.51      |                      |                       | 0.122    | -0.394   | 0.134    |                      |
| Partner monthly income x 100 |                     | -0.014   | -0.014    | -0.016    |                      |                       | -0.009   | 0.029*   | -0.002   |                      |
| Birth_equal_1                |                     |          | .         | .         |                      |                       |          | 2.346*** | 0.972*   |                      |
| Birth_equal_2                |                     |          | .         | .         |                      |                       |          | 0.712*   | -0.786** |                      |
| Birth_equal_3                |                     |          | .         | .         |                      |                       |          | -0.972   | -2.824** |                      |
| Birth_lower_1 <sup>st</sup>  |                     |          | 0.930***  | -5.658*** | 0.258***             |                       |          | 0.185    | -3.909   | 0.116                |
| Birth_lower_2+               |                     |          | 3.473***  | 3.554***  |                      |                       |          | 1.246    | -0.386   |                      |
| Constant                     | -2.914              | -2.843   | -4.016*   | -3.57     |                      | -2.418                | -3.429   | -2.227   | -3.249   |                      |
| N                            | 2347                | 2347     | 2207      | 2347      |                      |                       |          |          |          |                      |
| Pseudo R-squared             | 0.108               | 0.130    | 0.255     | 0.227     |                      |                       |          |          |          |                      |

The interaction coefficients on income and labour market status are also significant for women. This indicates a complex interaction between earnings and labour market status. Women with jobs are more likely to revise their intentions downwards, but this tendency is less marked among older women – especially those with high monthly incomes. This may be indicative of delayed fertility decisions among high-earning women<sup>2</sup>.

Finally, we restrict the sample to individuals who have not

## **5. Conclusions**

Our conclusions are as follows. One of the questions which motivated this research relates to the fact that individuals' reported fertility expectations early in life are on average higher than their realised fertility at the end of their reproductive years. It asks whether this difference should be interpreted as an unmet need for children (ie, whether people continue to want the number of children they wanted earlier in life, but they revise their expectations downwards as they come to realise that they will be constrained, biologically, economically, or for some other reason, to have fewer children than they want). Alternatively, does it simply reflect a process of individuals changing their minds over their lives about the number of children they want, for reasons unrelated to constraints. This research shows that it is not correct to think solely in terms of an unmet need. We have identified at least one reason why people adjust their fertility which arguably has little to do with constraints: both men and women adjust their expected fertility, upwards, as well as downwards, to fit in with their partners' expectations. In fact, the finding that revisions occur in both upward and downward directions is important in itself – our research shows (a) that both types of revisions occur, and (b) that they are not equal and opposite. There is a clear benefit in separating out the two types of revisions for analytical purposes; and the fact that upward revisions occur, and account for around one third of all revisions, adds weight to the argument that individuals revise their fertility expectations for a range of rich and complex reasons, not all of which are related to constraints on their lives.

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<sup>2</sup> Would still like: new partner; partner's children outside the home; sex of first two children.

The descriptive analysis demonstrated that men and women revise their fertility expectations both upwards and downwards. One innovative feature of our multivariate analysis is that we analyse these upward and downward revisions separately, rather than assuming that they are equal and opposite phenomena. We find good evidence that upward and downward revisions are *not* equal and opposite phenomena, but that they have rather different determinants.

Both upward and downward revisions are made in response to the expectations of a partner: both men and women revise their expectations upwards if their partner expects to have more children than they do; and both men and women revise their expectations downwards if their partner wants fewer children than they do. Income is also a factor in both directions, but the effect varies interestingly by gender. Women whose own incomes are higher are more likely than other women to decrease, and less likely to increase, their fertility expectations over the six-year period. However, the effect for men relates not to their own income but to their female partner's income: men with higher-earning partners are more likely to decrease, and less likely to increase, their expectations.