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Educational differences in fertility desires, intentions and behaviour: A life course perspective ☆

Ann Berrington *, Serena Pattaro

ESRC Centre for Population Change, University of Southampton, UK

A B S T R A C T

Despite a long tradition of studying the relationship between education and fertility outcomes less is known about how educational differences in fertility intentions are formed and translated into achieved births over the life course. This paper provides new insights using data from a large cohort study and Miller's Traits-Desires-Intentions-Behaviour framework for understanding childbearing. We examine how parental aspirations for education, educational ability in childhood, and educational attainment in young adulthood relate to: males' and females' fertility desires in adolescence; fertility intentions in early adulthood; and educational differences in the achievement of fertility intentions. We conclude that family building preferences expressed in adolescence, especially those for the timing of entry into parenthood are shaped by parental socio-economic background, mediated through educational ability and parental expectations for education. In young adulthood, no clear, consistent educational gradient in intended family size is found. However, there is a negative educational gradient in the likelihood of achieving intended births by age 46, especially for women. The findings indicate the importance of educational differences in employment and partnership behaviour in mediating these relationships.

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1. Introduction

1.1. Background

Increased female education has been seen as one of the most important factors affecting levels of fertility (Axinn & Barber, 2001; Basu, 2002; Rindfuss, Bumpass, & John, 1980), operating either via a postponement effect of enrolment (Blossfeld & Huinink, 1991), economic opportunity costs of leaving the labour market to care for children (Becker, 1981;

Rondinelli, Aassve, & Billari, 2010; Willis, 1973), through the impact of education on female emancipation and a desire for personal fulfilment (Lesthaeghe, 1998; Lesthaeghe & Surkyn, 1988; Van de Kaa, 1987), or through the reduction in the number of unintended births (Musick, England, Edgington, & Kangas, 2009). Yet despite a long tradition of studying the relationship between education and fertility outcomes less is known about how or whether educational differences in fertility desires expressed in adolescence, are modified according to circumstances in early adulthood, and translated into achieved births over the life course. In part this is due to a lack of suitable prospective data. The National Child Development Study provides a unique opportunity to take such a life course approach having followed up men and women born in Britain in 1958 through their childhood, adolescence and adult years to the end of the reproductive period. We draw on the psycho-social approach of Miller (1992, 1994) to identify how education relates to British males' and females' fertility desires in adolescence,

* Corresponding author at: ESRC Centre for Population Change, Social Sciences, University of Southampton, Southampton SO17 1BJ, UK. Tel.: +44 02380594549.

E-mail address: a.berrington@soton.ac.uk (A. Berrington).

intentions in early adulthood and to the achievement of fertility intentions by age 46.

1.2. Existing evidence on educational differences in fertility intentions and outcomes

In contemporary developed countries there is relatively little evidence that more educated men or women want smaller families. Recent analyses of cross-sectional data show a diversity of findings across the European Union (Beaujouan, Sobotka, Brzozowska, & Neels, 2013; Testa, 2012), though overall, and in some specific countries, women with higher levels of education have a larger mean intended family size than their less educated counterparts (Heiland, Prskawetz, & Sanderson, 2005; Mills, Mencarini, Tanturri, & Begall, 2008; Testa, 2012). However, there remain significant educational differences in achieved fertility with highly educated women on average having smaller mean actual family size. Longitudinal individual level data on intentions and outcomes at the end of the reproductive lifetime show that women with higher education are more likely to have fewer births than they intend. For example, among US 1957–1964 birth cohorts followed up in the National Longitudinal Survey of Youth 1979, women enrolled in higher education were significantly more likely to underachieve their fertility intentions over the subsequent 20 years or so (although no impact of educational enrolment for men was seen) (Morgan & Rackin, 2010; Quesnel-Vallee & Morgan, 2003). Educational enrolment has a clear postponing effect on fertility since being a student and starting a family are generally seen as incompatible activities (Blossfeld & Huinink, 1991; Ni Bhrolcháin & Beaujouan, 2012). The postponement of the start of childbearing often leads to the underachievement of intentions (Berrington, 2004). Repeated postponement can lead to a subsequent decision not to have children, or foregone childbearing due to the constraints of the biological clock, especially for women (Morgan & Rackin, 2010). Higher levels of education have been previously found to be associated with greater instability in intentions across the life course, particularly for women (Heiland, Prskawetz, & Sanderson, 2008). As more educated women finish their studies and begin work they may become increasingly aware of barriers against combining motherhood and a career, revising their intentions downwards to sit more in line with reality (Liefbroer, 2009).

The impact of educational attainment on fertility is made complex by the fact that education may have an impact on either the timing or quantum of fertility (or both). Furthermore, educational differences in completed family size obscure greater divergences in completed parity distributions according to education (De Wachter & Neels, 2011; Kravdal, 1992; Kreyenfeld, 2002). The effect of educational attainment on the formation and achievement of intentions is also likely to depend upon the household and societal context within which individuals are operating. Previous research has demonstrated the importance of considering the partner's characteristics and intentions (Berrington, 2004; De Wachter & Neels, 2011; Rosina & Testa, 2009; Thomson & Hoem, 1998) and the level of institutional support for childbearing in a particular

country (Mills et al., 2008; Testa, 2012). Methodologically, the analysis of educational differences in the relationship between intentions and outcomes is made complex by the presence of recursive relationships e.g. between economic activity status and childbearing, anticipatory effects e.g. highly educated women might remain single since they can see how difficult it might be to combine work and family role, and the presence of unmeasured third variables e.g. economic inactivity and childlessness can both be related to underlying poor physical or mental health (De Wachter & Neels, 2011).

This paper provides new insights by placing the analyses of fertility intentions and outcomes within a life course framework which acknowledges the importance of parental background and childhood attributes in the formation of fertility desires and intentions. By examining subsequent employment and partnership patterns in adulthood we show some of the pathways through which educational differences in achieved fertility occur. Inspired by the developmental socio-psychological approach of Miller (1992, 1994) we use detailed prospective data collected within a national birth cohort study to explore how parental socio-demographic factors operate through parental aspirations for their offspring's education, and actual educational attainment to impact on family preferences at age 16. We then investigate fertility intentions reported at age 23 and examine the factors associated with their realisation by age 46. The large sample size and availability of data for both men and women permits the identification of gender differences in these processes. We also move beyond some previous work in explicitly incorporating uncertain fertility preferences and intentions into our analyses.

2. Analytical framework and hypotheses

Our analytical approach is based upon the Traits-Desires-Intentions-Behaviour (TDIB) model of fertility (Miller, 1994) shown in Fig. 1. According to Miller (1992, p. 266) motivations are "psychological traits or dispositions that are derived from the genetic makeup and/or experience of individuals and that endure in them over time". These motivations are generally not observed but, when activated, are experienced as childbearing desires. Only after an assessment of perceived situational constraints, e.g. in terms of partnership status or employment situation, are desires then converted into intentions. The latter are deemed to imply some degree of personal commitment to act, albeit within an unspecified time frame. Comparison of achieved fertility at the end of the childbearing years with intentions in young adulthood indicates the extent to which men and women realise their fertility intentions. Of course, intentions will change over the life course in response to further information concerning opportunities and constraints (Iacovou & Tavares, 2011) and we might expect this to be particularly so for those who delay the start of their childbearing (Liefbroer, 2009).

2.1. Fertility desires in adolescence

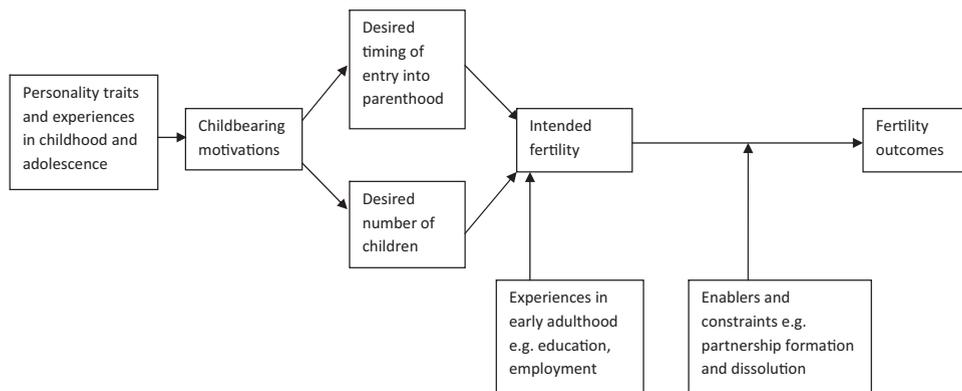Parental socio-economic background impacts on fertility desires in adolescence through the inter-generational

Fig. 1. Analytical framework based on Miller (1994).

transmission of childbearing behaviour and socio-economic differences in educational ability and aspirations (Rindfuss et al., 1980). The inter-generational transmission of both the timing of entry into parenthood (Barber, 2001; Steenhof & Liefbroer, 2008) and family size (Axinn, Clarkberg, & Thornton, 1994; Kotte & Ludwig, 2011; Murphy & Wang, 2001) have previously been explained by genetic predisposition (Kohler, Rodgers, & Christensen, 1999), socialisation in childhood – whereby children observe the family formation patterns of their parents (Murphy & Wang, 2001), and through the transmission of values and preferences (Axinn et al., 1994; Barber, 2000). Preferences expressed at age 16 are likely to be influenced by the social norms and family building behaviour prevalent at the time and are unlikely to represent a definite commitment to have that particular number of children.

In part, the intergenerational transmission of fertility behaviour reflects the intergenerational transmission of educational experience, since educational enrolment is a key factor delaying entry into parenthood (Blossfeld & Huinink, 1991). As argued by Miller (1992, p. 269) "as a result of different degrees of academic success, the individual may develop skills, interests, and goals that tend either to reinforce or to extinguish skills, interests, and goals related to childbearing". Parents' educational expectations have consistently been found to be a strong predictor of the timing of entry into parenthood (Kiernan, 1997). Kneale (2010) found that parental expectations were stronger than the child's expectations in predicting early fertility and suggests that parents play a key role since it is they who provide the economic and social resources available to children. In our analyses we include a measure of childhood academic ability, and parental expectations for their offspring's school leaving age to capture educational skills and goals. We hypothesise that

H1. Increased parental expectations for the respondent's age at leaving education and the respondent's childhood academic ability will be associated with preferences for older ages at entry into parenthood and smaller family sizes.

2.2. Educational differentials in intended family size

The hypothesised effect of increased education on fertility intentions is ambiguous since it depends on the magnitude of a number of counteracting forces. Much economic literature has focused on the labour market channels through which education impacts on fertility, emphasising in particular, substitution and income effects. Higher earnings raise the opportunity costs of leaving the labour market to rear children (Becker, 1981). Since earnings are assumed to be higher for more highly educated women this substitution effect will encourage those with greater levels of education to intend fewer children. On the other hand, higher average earnings will make a large family more affordable and manageable. This is reinforced by partnership homogamy whereby those with higher levels of education are more likely to have a high income partner (Heiland et al., 2005). The income effect may however be weaker if parents with higher incomes prefer children of higher quality (Becker & Lewis, 1973). At the highest levels of income, couples are more able to pay for formal childcare and hence avoid some of the opportunity costs associated with leaving the labour force (Ermisch, 1989). The importance of this effect is likely to be greater within country contexts where high quality childcare is available for purchase (Bernhardt, 1993). For most of the period when the 1958 cohort were rearing young children formal childcare provision in the UK was patchy and expensive. Joshi (2002) argues that degree educated women were those most likely to pay less educated women to look after their children enabling high earning women to return quickly to the labour market and hence minimise their earnings loss from motherhood.

There are other ways in which education is postulated to impact on fertility intentions and behaviour. Higher education may be associated with the postponement of fertility to later ages – for those embarking on a career track it is economically rational to wait until one has established a career before making a career break for childbearing (Liefbroer & Corijn, 1999) even though actual foregone earnings may be greater with increased seniority. Negative associations between educational attainment and intended fertility are also predicted by ideational theories which argue that increased education encourages greater emphasis on postmaterialist values and desire for personal fulfilment which tend to be in conflict with a parenting role (Lesthaeghe, 1998; Lesthaeghe & Surkyn, 1988; Van de Kaa, 1987). Furthermore, Heiland et al. (2005) suggest that education helps women to cope with

the social stigma of having no or only one child. In summary, there are a number of arguments which would lead to the expectation that:

H2a. Higher levels of education will be associated with smaller intended family sizes in early adulthood.

Alternatively, another set of arguments would lead us to expect that:

H2b. Higher levels of education will be associated with larger intended family sizes in early adulthood.

Whilst previous research has tended to concentrate on educational differentials in fertility for women, less is known about educational differentials in desired and achieved fertility for men. Micro-economic theory would lead us to expect that for men the income effect would dominate – highly educated men can have lots of children since childbearing is less likely to interfere with their career (Becker, 1981). Such arguments lead to a third hypothesis:

H2c. Education will be more positively associated with intended family size among men as compared women.

Often those with uncertain fertility intentions are ignored in analyses, for example when calculations of mean intended family size are made. This can be problematic since, depending on the actual question wording used, a significant proportion of individuals remain uncertain about their intentions (Berrington, 2004; Ni Bhrolcháin, Beaujouan, & Berrington, 2010). There are a number of reasons why we might expect those with higher levels of education to provide more uncertain responses. Firstly, it may reflect educational differences in the timing of family formation – uncertainty tends to decline with increasing parity and for those already in a stable partnership (Morgan, 1982). Hence more educated men and women who postpone partnership and parent-hood to later ages will be more likely to have uncertain fertility intentions in their early 20s. It may however, reflect a true educational gradient. If combining a career and parenthood is more difficult for more highly educated individuals (particularly women) they may be more cautious in declaring an intention. Related to this is the idea that uncertainty may be an acknowledgement that delaying childbearing could lead to foregoing parenthood (Testa, 2012). All of the above arguments would lead us to expect that:

H3. Educational attainment will be positively associated with greater uncertainty in fertility intentions in early adulthood.

2.3. Educational differentials in the realisation of fertility intentions

There are a number of reasons why we would expect highly educated men and women to be less likely to achieve their fertility intentions. Firstly, higher education is associated with a delay in first partnership formation and hence a reduction in the time exposed to the risk of conception (Morgan & Rackin, 2010). Furthermore, the postponement – quantum interaction highlights the biological limits to childbearing at older ages and the possibility that highly educated postponing couples may run out of time to reach their intended parity (Kohler, Billari, & Ortega, 2002). Other commentators note how the preference for postponing a first birth among those with higher education may lead to interests in other areas which may then lead to a decision not to have any children (Rindfuss et al., 1980; Berrington, 2004). Thus our expectation is that:

H4a. Educational attainment will be negatively associated with the achievement of fertility intentions expressed in early adulthood.

On the other hand there are a number of reasons why we would expect highly educated individuals to be more likely to achieve their intentions. Firstly, it is possible that higher educated men and women are more able to collate the resources required in order to achieve their intentions. This effect is reinforced by the tendency of higher educated women to have a partner with a higher income who, for example, is better able to help purchase formal childcare. Secondly, higher education, although asso-ciated with a delay in partnership formation, is also associated with lower risks of partnership dissolution in the UK (Berrington & Diamond, 1999) – a major determinant of the underachievement of fertility inten-tions (Berrington, 2004; Quesnel-Vallee & Morgan, 2003). Thus increased education, through improved partnership stability may be more able to achieve their intentions. These arguments would lead us to the following expectation:

H4b. Educational attainment will be positively associated with the achievement of fertility intentions expressed in early adulthood.

The impact of education on the achievement of fertility intentions may differ by gender. Morgan and Rackin (2010), among others, note that the challenges of balancing a demanding career with family obligations are not generally so severe for highly educated men since they tend to have fewer childrearing responsibilities. Further-more, the delay of entry into parenthood to later ages may not have such a large impact on men's completed fertility because they are less constrained by the decline in fecundity with age. The impact of economic uncertainty on achieved fertility is also likely to differ by gender. For men, success in the marriage market can depend on having a stable occupation (Oppenheimer, 1988) and hence men with low education may not achieve their fertility intentions as a result of partnership formation, especially marriage, being delayed or foregone. In contrast, low educated women may accelerate their childbearing in the face of unemployment or economic insecurity, highly educated women tending to delay further (Kreyenfeld, 2010; Schmitt, 2012). Morgan and Rackin (2010) suggest that women with low levels of education will be more likely to be employed in female dominated jobs with flexible entry and exit and hence where other women who

Table 1
Socio-economic and demographic context within which the 1958 NCDS birth cohort experienced their childbearing.

	Interview year and age of respondents				
	1974 Age 16	1981 Age 23	1991 Age 33	2000 Age 42	2004 Age 46
Completed family size for women currently aged 46[a]	2.24	2.42	2.19	2.02	1.99
Mean age at first birth[a]	24.0	24.8	25.7	27.1	27.5
UK unemployment rate[b]	3%	10%	7%	5%	5%
HE enrolment rate for new entrants aged 17–20[c]	14%	13%	23%	32%	32%

[a] ONS Fertility Statistics Series FM1 Various years.
[b] 1974–1991 Administrative Unemployment Rate, Denman & McDonald (1996), 2000–2004 ILO Unemployment Statistics based on Labour Force Survey, Eurostat (2013). http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Unemployment_rate,_2000-2011_%28%25%29.png&filetimes-tamp=20120502100338
[c] Boliver (2011). English domiciled students entering UK Higher Education Institutions.

are mothers work. Pronatalist contexts lower the norma-tive, emotional, and monetary costs to childbearing. These arguments lead to the expectation that:

H4c. The association between education and the fulfil-ment of fertility intentions will be more positive for men than for women.

2.4. Individual biographies within socio-economic context

The life course approach emphasises the intersection of social and historical factors with personal biography and development (Elder, 1994). The 1958 British birth cohort grew up during a period of significant social change which has to be acknowledged when interpreting their experi-ences. The cohort form part of the baby boom generation, born into families with an average of well over two children (Table 1). In 1974, when the respondents were aged 16, the mean age at first birth for women was just 24.0 years and mean completed family size for women reaching the end of their reproductive years was 2.24 children. When the cohort entered their teens, at the start of the 1970s, marriage and childbearing continued to take place at young ages (Lewis & Kiernan, 1996). However, throughout the subsequent period the mean age at first birth increased, associated with a rapid expansion in higher education and the increased availability of efficient contraception, particularly the pill (Murphy, 1993). Although it is likely that more educated women were better positioned to utilise this new form of birth control, the availability of the pill contributed to the de-coupling of sex and childbearing and permitted couples to delay marriage and family formation. Since the 1980s, there have also been considerable changes in the relationship between childbearing and female employment. Histori-cally in the UK, graduate, high income women were most likely to use expensive private childcare (Del Boca, Pasqua, & Pronzato, 2005) and mothers of pre-school children were mostly at home and mothers with children in school were typically employed part time (Joshi, 2002). However, by the 1990s, the majority of mothers of pre-school children were in employment (Lewis, 2003). Thus reconciling motherhood and paid work was in many ways easier for more educated mothers who had delayed childbearing to

their thirties. The cohort experienced two periods of economic recession during young adulthood, the first in the early 1980s and the second in the early 1990s. This is reflected in a significant number of respondents experien-cing unemployment at the time of the age 23 interview, and hence we are able to observe how economic uncertainty is associated with fertility intentions and achievements over the life course and how this may differ by gender.

3. Data and methods

3.1. The National Child Development Study (NCDS)

The NCDS has followed up around 17,000 British births which occurred in March 1958. Respondents (or their parent) have been interviewed on multiple occasions with information on parental and childhood characteristics being collected at birth, ages 7, 11 and 16. Adult interviews took place at ages 23, 33, 42, 46 and 50. At these ages retrospective data relating to fertility, partnership and employment trajectories were collected. As for any long running longitudinal survey some respondents have moved out of scope, e.g. they moved abroad or died, some missed out a survey wave only to return later, whilst others have been permanently lost to follow up (CLS, 2012). Those who missed out an adult wave were asked about events that occurred in the period between the last time they were interviewed and the current wave. By seaming together fertility histories collected at ages 23, 33 and 46[1] we can identify the reported fertility of two-thirds of respondents who were present in at least one adult survey. Comparison of estimates of entry into motherhood by age within the NCDS as compared to national data from vital registration suggests that our analysis sample under-represents teenage mothers. However, the completed family size and parity distributions of the analysis sample are very close to those found in national registration data.

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[1] We do not include experience from age 46 to age 50 since this would result in the further reduction of the sample to those who were successfully interviewed at age 50. This is not justifiable given the very small numbers of births recorded by male cohort members in their late forties.

In order to retain the most representative sample for each stage of our investigation, the analyses of the determinants of family preferences at age 16 are based on the sample who gave a respondent interview at age 16, irrespective of response in other waves. Similarly, when modelling intended family size at age 23 we use the sample who gave an interview at age 23. Examination of factors facilitating the achievement of fertility intentions are based on those who gave an interview at age 23 and whose fertility and partnership histories are known up to at least age 46. Not known categories of covariates are used to address item non-response.

3.2. Measures of fertility preferences and intentions

Box A1 in Appendix provides the question wording for the family preferences and intentions questions. At age 16 respondents are asked about their preferred[2] timing and quantum of childbearing "At what age would you ideally like to start a family?" and "What size family would you like to have?" We interpret the latter as a measure of desired family size. At this stage in the life course respondents are likely to provide a response without much consideration of whether such a goal is realistic and a report that they want two children should not be taken to mean that they have a clear intent and commitment to act. Morgan and Bachrach (2011, p. 15) suggest that such reports capture family schemas held by teens that shape both intentions and fertility behaviour. Respondents will tend to avoid socially undesirable responses such as zero children. Following Morgan (1982) we treat "don't know" responses to both questions as a valid response indicating uncertainty.

At age 23 cohort members who had not previously declared themselves unable to have children[3] were asked "Would you like to have any (more) children of your own?" and if they answered "yes" they were asked "How many children would you like altogether?" Total intended family size is estimated as either a) the respondent's parity at age 23 if they report that they do not want, or cannot have (further) children; or b) the answer to "How many children would you like altogether" if they want some or more children; or c) estimated as "uncertain" if they respond that they don't know whether they want any (more) children, or said they do want children but do not know how many. We believe that the responses to such questions can provide additional insight into the reproductive decision making process, although we are mindful of their limitations. For example, such questions do not provide information on the degree of certainty with which an intended number of children are desired and in what time horizon (Morgan, 1982; Ni Bhrolcháin et al., 2010;

Testa & Toulemon, 2006); they do not account for births that are unplanned (Bumpass & Westoff, 1969; Jones, Forrest, Henshaw, Silverman, & Torres, 1988); and that responses often reflect existing social norms (Bumpass & Westoff, 1969; Hagewen & Morgan, 2005).

3.3. Covariates

Father's social class and maternal education, both measured at the time of the respondent's birth, are used to indicate parental socio-economic background.[4] The Registrar General's social class classification identifies five groups: professional and intermediate; skilled non-manual; skilled manual; semi and unskilled manual; not known and not applicable. Maternal education is measured according to whether the respondent's mother stayed on in education past the compulsory school age (generally age 15). Parental family formation behaviour is identified by the respondent's mother's number of siblings: 0 siblings; 1–3 siblings; 4+ siblings; not known; and the respondent's mother's age at her first birth: 16–19 years; 20–24 years; 25+ years; not known. Childhood academic ability is identified using the respondent's reading comprehension test score at age 11 (Shepherd, 2012). This is coded as quartiles with a final not known category in cases where the child did not take the test. Academic expectations are based on the parent's aspirations for the age at which their child will leave education as reported when the child was aged 16: leave at age 16; leave at 17–18; leave at 19+ years; not known. The cohort member's own sibling group size at age 16 is recorded as zero for only children; 1 sibling; 2 siblings; 3 siblings; 4+ siblings; and not known.

For regression analyses of intended family size at age 23 we additionally include educational attainment, economic activity, socio-economic group and partnership status (all as reported at age 23). Highest educational attainment[5] is classified as: degree or higher; advanced level (A level) and equivalent, including nursing and teaching qualifications; General Certificate of Education Ordinary Level (O level) and Certificate of Secondary Education (CSE). O level and CSE qualifications are generally achieved at age 16 upon leaving secondary school; and no qualifications. Economic activity is grouped as employed; unemployed; and economically inactive. Socio-economic group is used as an indicator of occupational class: employers and managers; professional and intermediate non-manual; junior non-manual; skilled manual; semi and unskilled manual; other; and not known. De-facto partnership status at age 23 is categorised as: never married no current partner; never married cohabiting; currently married; formerly married.[6]

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[2] The terms 'preferred' and 'desired' are used interchangeably in this paper.
[3] This included 100 individuals who reported that they had been sterilised (overwhelmingly female respondents) and a further 50 respondents who had been advised that they could not or should not have children for medical reasons. These individuals are retained in the analysis with their total intended family size set at their parity at the time of the age 23 interview.

[4] Only mother's, and not father's education was collected at birth. We use paternal occupational class since, in 1958, a high proportion of the respondent's mothers were undertaking family care. Using paternal occupational class and maternal education we minimise the degree of co-linearity in these two measures of parental socio-economic status.
[5] Few respondents remain in full time education at age 23 since the majority of those who enter higher education at age 18/19 have completed their studies by age 23 in the UK.
[6] This includes those with and without a current partner.

Table 2
Coefficients from best fit multinomial logistic regression model of desired age to start a family reported at age 16. Baseline outcome is "start a family at 22–25".

	Males				Females			
	16–19	20–21	26+	Uncertain	16–19	20–21	26+	Uncertain
Father's social class (ref. prof. and intermediate)								
Skilled non-manual	0.826+	0.071	−0.020	−0.175				
Skilled manual	0.371	0.314+	−0.285**	−0.212+				
Semi and unskilled manual	0.637	0.288	−0.210+	−0.366*				
Not known/applicable	0.615	0.030	−0.147	−0.359*				
Respondent's mother's age at first birth (ref. 16–19)								
20–24 years	−0.561**	−0.125	0.197+	0.149	−0.524*	−0.115	0.029	−0.096
25+ years	−1.499**	−0.268+	0.434**	0.387**	−0.531**	−0.397**	0.377**	−0.006
Not known	−1.230*	−0.024	0.275+	0.341	−0.184	−0.249	0.523**	0.329
Reading ability at age 11 (ref. lowest quartile)								
Quartile 2	−0.488*	−0.386**	−0.028	−0.218	−0.559*	−0.151	−0.100	−0.310+
Quartile 3	−1.131**	−0.411**	−0.059	−0.157	−0.883**	−0.583**	−0.079	−0.236
Quartile 4	−1.180**	−0.533**	0.065	0.105	−0.783*	−0.613**	0.240+	−0.149
Not known	−0.118	−0.230	0.141	0.146	−0.105	−0.353*	0.099	−0.309
Parents' educational expectations (ref. leave at 16)								
Leave at 17–18 years	−1.150*	−0.362*	0.294**	0.135	−0.947**	−0.354**	0.127	0.153
Leave at 19+ years	−0.390	−0.568**	0.420**	0.416**	−2.123**	−0.886**	0.469**	0.211
Not known	−0.115	−0.025	0.247**	0.067	−0.050	−0.099	0.384*	0.549*
Number of siblings (ref. 0 siblings)								
1 sibling					0.314	0.222	−0.197	−0.504*
2 siblings					−0.437	0.257	0.068	−0.061
3 siblings					0.169	0.101	0.010	−0.297
4+ siblings					0.386	0.198	0.116	0.021
Not known					0.131	0.259	−0.308	−0.736*
Constant	−2.107**	−1.094**	−0.754**	−1.351**	−1.975**	−0.828**	−1.524**	−1.717**
Sample N	5193				5188			

+ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.

In analyses of achieved fertility we delineate those in work according to whether they are full time or part time and whether they have low (less than £1.60); medium (£1.60–£2.09); or high (£2.10 or more) net hourly earnings. The categories are: full time high earner; full time medium earner; full time low earner; part time high earner; part time medium earner; part time low earner; employed but earnings not known; unemployed; inactive. In addition we identify the partnership trajectory of respondents between age 23 and 46. Since there are a large number of potential pathways we focus only on legal marital transitions giving the following categories: remained never married; married after age 23 and remained in that marriage until 46; married after age 23 but later separated (including those who did and did not remarry); already married at 23 and remained in that marriage till 46; already married at age 23 but later separated and did not remarry; already married at age 23, later separated and remarried; had already experienced a marital dissolution by age 23 – all subsequent trajectories.

3.4. Analytical strategy and model selection

Multinomial logistic regression is used to estimate significant predictors of preferences for the timing and quantum of childbearing as expressed at age 16 by males and females. Multinomial regression is preferred over ordinal regression because we need to be able to include those who are uncertain as a response category. Categories of the dependent variable (desired family size at 16) are: 0 children; 1 child; 2 children (reference)[7]; 3 children; 4+ children; and uncertain. Categories for the dependent variable for the model of desired age at entry into parenthood are: 16–19; 20–21; 22–25 (reference); 26+ years; and uncertain.[8] We first include variables relating to parental background and then childhood characteristics. Only covariates found to significantly improve model fit at the 5% level are retained in the final models shown in Tables 2 and 3.

Next we examine educational differences in intended family size. The unadjusted relationship is shown in Table 4. Predictors of intended family size at age 23 are identified using multinomial logistic regressions built up following a life course approach. First we include parental characteristics and childhood traits significantly associated with intentions at 23. We then sequentially add

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[7] In models of desired and intended family size "two children" is taken as the baseline category of the dependent variable since this is the modal category.

[8] The regression model of desired age at parenthood does not include the 3% of adolescents who reported that they did not wish to have children.

Table 3
Coefficients from best fit multinomial logistic regression model of desired family size reported at age 16. Baseline outcome is "desired two children".

	Men					Women				
	0 children	1 child	3 children	4+ children	Uncertain	0 children	1 child	3 children	4+ children	Uncertain
Respondent's mother's number of siblings (ref. 0 siblings)										
1–3 siblings	0.077	−0.357	0.098	0.055	0.055	−0.173	−0.028	0.125	0.124	0.098
4+ siblings	−0.252	−0.440[+]	0.337[*]	0.256	0.022	0.189	−0.149	0.111	0.337[*]	0.427[*]
Not known	−0.468	0.007	0.161	0.411	0.482[*]	−0.055	0.164	−0.596[+]	0.203	0.293
Respondent's mother's age at first birth (ref. 16–19)										
20–24 years						0.033	−0.425[+]	0.222[*]	0.109	0.351[*]
25+ years						−0.169	−0.099	0.364[**]	0.307[*]	0.199
Not known						−0.102	−0.954	0.934[**]	0.094	0.179
Reading ability at age 11 (ref. lowest quartile)										
Quartile 2	−0.870[**]	−0.803[**]	−0.077	−0.145	−0.252[+]	0.035	−0.656[*]	0.161	0.143	0.072
Quartile 3	−0.566[*]	−0.452[*]	−0.147	−0.419[**]	−0.360[*]	0.349	−0.456	0.200[+]	0.312[**]	0.052
Highest quartile	−0.491[*]	−0.714[**]	−0.223[*]	−0.470[**]	−0.304[*]	0.704[**]	0.120	0.190	0.143	−0.054
Not known	−0.085	−0.446[+]	−0.026	−0.159	0.091	0.522[+]	−0.264	0.031	0.294[*]	−0.087
Parents' educational expectations (ref. leave at 16)										
Leave at 17–18 years						−0.370	−0.616[*]	0.062	−0.019	0.001
Leave at 19+ years						0.050	−0.985[**]	0.210[+]	0.096	0.390[*]
Not known						−0.678[+]	−0.766[+]	0.080	0.100	0.371
Number of siblings (ref. 0 siblings)										
1 sibling	0.382	−1.250[**]	−0.022	−0.028	0.126	−0.512	−1.088[**]	0.242	0.068	0.078
2 siblings	0.538	−0.923[**]	0.823[**]	0.677[+]	0.381	0.261	−0.699[**]	0.705[**]	0.235	−0.230
3 siblings	0.779[+]	−0.571[*]	0.763[**]	1.566[**]	0.384	0.375	−0.771[**]	0.627[**]	0.768[**]	0.353
4+ siblings	0.612	−0.972[**]	1.095[**]	2.073[**]	0.724[**]	0.231	−0.731[+]	0.787[**]	1.103[**]	0.501[+]
Not known	0.575	−0.590[*]	0.535[**]	1.045[**]	0.251	0.547	−0.429	0.571[*]	0.608[*]	−0.185
Constant	−2.821[**]	−1.143[**]	−1.648[**]	−2.870[**]	−1.864[**]	−3.082	−1.525[**]	−1.932[**]	−2.112[**]	−2.734[**]
Sample N	5395					5348				

[+] $p < 0.10$.
[*] $p < 0.05$.
[**] $p < 0.01$.

current educational attainment, economic activity and occupational class, and partnership status. Parameter estimates from the best fit models containing covariates significant at the 5% level are shown in Table 5. By building up the analysis in this way we observe how educational differences in fertility intentions are mediated through educational differences in economic activity, occupation and partnership status.

Finally, we examine educational differentials in the achievement of intentions. First we show the overall relationship between education and achieved fertility by age 46 (Table 6). Next we undertake multinomial regression analyses of the predictors of under and over achievement of intentions, focusing on those who intended to have two children (Table 7), and those who intended to have three (Table 8). In combination, these groups cover 75% of male respondents and 69% of female respondents. In these models the dependent variable has three categories: achieved less than intended number of children; achieved intended number; and achieved more than intended children.

4. Results

4.1. Fertility desires in adolescence

Parental socio-economic status is a key predictor of desired age at parenthood, mediated through academic ability and higher aspirations for continuing on into further and higher education (Table 2). For women, father's social class and maternal education are no longer retained in the model once reading ability and expectations for school leaving age are included. There is a strong monotonic relationship between reading ability and the desire to postpone entry into parenthood. Around 10% of the cohort at age 16 was uncertain as to the best age to start childbearing. The likelihood of giving an uncertain response is significantly higher among those whose parents expected them to stay on in education. Even after controlling for parental socio-economic background, we find a positive inter-generational relationship between the respondent's mother's age at first birth and the respondent's own preferred timing of entry into parenthood.

Mean desired family size, as reported at age 16, was 2.31 men and 2.57 for women, a little higher than the observed completed family sizes of women reaching the end of their reproductive years in the late 1970s. The regression results (Table 3) suggest that, in contrast to fertility timing, desired family size is only weakly associated with parental socio-economic status and more strongly associated with size of the respondent's sibling group and the size of the extended family. Few respondents want none, or just one child. Most prefer at least two with a significant number desiring three. Only a minority desire four or more children but this is far more common

Table 4
Bivariate relationship between educational attainment and intended family size at age 23.[a]

	Intended number of children							Mean intended family size[b]
	0	1	2	3	4+	Uncertain	Sample size (100%)	
Males								
Degree	7.6	0.6	48.0	15.9	8.9	19.0	662	2.25
A level	5.1	2.2	58.8	15.9	5.7	12.4	1838	2.18
O level	5.3	3.8	55.7	17.0	6.2	12.0	2058	2.21
None	4.4	4.5	55.6	16.4	8.6	10.6	1540	2.27
Total	5.2	3.2	55.8	16.4	6.9	12.5	6098	2.22
Females								
Degree	8.4	0.9	42.6	22.9	10.3	14.9	571	2.32
A level	8.1	3.0	43.4	21.2	12.0	12.4	1227	2.32
O level	6.1	4.7	52.0	19.0	9.4	8.8	2528	2.26
None	4.3	7.3	48.8	20.7	11.0	8.0	1825	2.32
Total	6.2	4.8	48.5	20.3	10.5	9.8	6151	2.29

[a] Sample includes all those present at the age 23 survey, irrespective of whether they were later followed up.
[b] Mean family size based on those who gave a numerical response to the fertility intention question.

Table 5
Coefficients from best fit multinomial regression of fertility intentions at age 23. Baseline outcome is "intended to have two children".

	Males					Females				
	0	1	3	4+	Uncertain	0	1	3	4+	Uncertain
Reading ability at age 11 (ref. lowest quartile)										
Quartile 2	0.268	−0.238	0.099	−0.099	0.069	−0.012	−0.040	−0.079	−0.057	−0.180
Quartile 3	0.276	−0.171	0.020	−0.485**	0.206	0.301	0.100	−0.020	0.069	0.284+
Highest quartile	0.611**	0.141	−0.003	−0.466**	0.404**	0.724**	0.202	0.041	0.287+	0.360*
Not known	0.314	0.223	0.164	−0.344+	0.374**	0.290	0.153	−0.100	0.096	0.057
Respondent's number of siblings (ref. 0 siblings)										
1	0.808*	−0.611+	0.142	−0.073	0.156	−0.183	−0.276	0.144	−0.116	0.109
2	1.004**	−0.440	0.745**	0.263	0.378+	−0.220	0.327	0.551**	0.271	0.357
3	0.577	−0.523	0.461*	0.811**	0.412+	0.110	−0.016	0.559*		0.303
4+	0.781*	−0.059	0.793**	1.014**	0.383+	−0.289	0.560+	0.655**	0.816**	0.166
Not known	0.965**	−0.137	0.638*	0.429	0.344+	−0.089	0.229	0.430*	0.408+	0.090
Highest educational qualification at age 23 (ref. degree or higher)										
A level and equivalent	−0.240	1.034+	−0.188	−0.582**	−0.363**	0.273	1.237*	−0.073	0.269	0.115
O level and CSE	−0.009	1.469**	−0.125	−0.534**	−0.275+	0.055	1.392**	−0.402**	−0.123	−0.252
None	−0.105	1.401*	−0.273+	−0.453*	−0.448**	0.122	1.713**	−0.384*	−0.087	−0.279
Economic activity at age 23 (ref. full time employed)										
Part time[a]						−0.602*	0.729**	0.006	0.414*	0.198
Unemployed	0.769**	0.215	0.228*	0.233	0.357**	0.013	0.854**	0.122	0.232	0.510**
Inactive	0.309	−0.399	0.291	0.654**	0.556**	−1.108**	0.466**	0.437**	0.731**	0.384**
Socio-economic group current or last job (ref. employers and managers)										
Prof. and intermediate	0.039	−0.535	−0.447*	0.034	−0.160	−0.869**	−0.616+	0.097	−0.317	−0.223
Junior non manual	−0.272	−0.126	−0.318+	−0.014	0.075	−0.596*	−0.635+	0.089	−0.394	−0.280
Skilled manual	−0.308	−0.053	−0.252	−0.112	−0.087	−0.939**	−0.690	−0.253	−0.757*	−0.621
Semi- and unskilled man.	−0.359	0.364	−0.141	0.101	0.238	−0.508	−0.454	0.154	−0.344	−0.213
Other	0.019	−0.329	−0.315	0.110	0.010	−0.281	−0.601	−0.038	−0.469	0.289
Not known	−0.116	0.160	−0.143	0.229	−0.035	−0.589*	−0.903*	0.065	−0.455+	0.024
Partnership status at age 23 (ref. never married no partner)										
Formerly married	−0.299	1.585**	0.240	0.102	0.430+	0.120	0.604*	0.061	0.163	0.083
Currently married	−0.665**	0.822**	0.007	−0.183	−0.876**	−0.898**	−0.165	−0.228**	−0.682**	−0.698**
Never married cohabiting	0.546*	1.028**	−0.019	0.690**	0.050	−0.085	−0.139	−0.215	−0.137	−0.069
Constant	−3.190**	−4.341**	−1.446**	−1.927**	−1.538**	−1.094**	−3.579**	−1.031**	−1.459**	−1.358**
Sample N	6098					6151				

[a] The small number of men employed part time have been grouped with full time workers.
+ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.

Table 6
Achieved parity and mean family size at age 46 according to highest level of education at age 23.[a]

	Achieved parity					Mean achieved family size	Sample size (100%)
	0	1	2	3	4+		
Males							
Degree or higher	25.5	11.9	37.9	18.5	6.2	1.69	486
A level and equivalent	19.6	16.0	41.6	17.6	5.2	1.74	1298
O level and CSE	23.1	16.1	38.9	16.2	5.6	1.67	1338
None	21.9	15.7	35.5	17.8	9.2	1.80	798
Total	22.0	15.5	39.0	17.3	6.3	1.72	3920
Females							
Degree or higher	25.2	11.6	43.9	13.4	5.9	1.65	440
A level and equivalent	21.6	13.7	42.4	17.2	5.2	1.72	928
O level and CSE	14.4	14.6	46.3	18.4	6.4	1.90	1835
None	11.6	12.8	40.8	23.3	11.5	2.14	1114
Total	16.3	13.6	43.8	18.9	7.4	1.90	4317

[a] Sample includes all those present at the age 23 survey and whose subsequent childbearing history up to age 46 is known.

among those who themselves came from large families. Holding other variables constant at their baseline level the predicted probability of desiring four children for men aged 16 is 3% for those with no or one sibling, rising monotonically to 17% for those with four siblings. Our results suggest a rather complex relationship between childhood academic ability and desired family size not consistent with H1 (which suggested that parental educational expectations and academic ability would be associated with smaller desired families). Among adolescent men, those with the lowest test scores stand apart from the rest, being more likely to desire to remain childless, or to have large families. Among adolescent females, increased academic ability is associated with the desire to remain childless, whilst increased parental expectations for their daughter's age at leaving school is significantly associated with a lower likelihood of desiring one child. Overall 10% of adolescent males and 6% of adolescent females are uncertain about how many children they would like. Those with four or more siblings are significantly more likely to be uncertain as compared to those with none: holding other characteristics constant at their baseline, the probability of an uncertain response is 12% for men with four or more siblings, compared to 9% for those with no sibs.

In summary, we find only partial support for our first hypothesis. Preference for delayed entry into parenthood as expressed in adolescence is more common among those with higher academic ability and parental aspirations for the age at which they would leave education. However, academic ability and parental aspirations have an inconsistent relationship with desired family size. Desired family size at age 16 is related to the respondent's socialisation in childhood as indicated by parental family formation behaviour, particularly the number of siblings that the respondent has.

4.2. Educational differentials in intended family size

By age 23, mean intended family size had reduced from that reported in adolescence; from 2.31 to 2.22 for men and from 2.57 to 2.29 for women. Just over one-third of respondents reported a smaller intended family size at 23 as compared their report at age 16, whilst 18% reported a larger intended family size.[9] The level of uncertainty increased with age, 12% of men and 10% of women giving an uncertain response at age 23. Table 4 shows the unadjusted bivariate relationship between educational attainment and intended family size. Only a small minority intended to remain childless, with the proportion being higher at around 8% for degree educated men and women as compared with 4% among those no or lower than Ordinary Level (O level) qualifications. In contrast, the proportion desiring just one child shows the reverse pattern, with less than 1% of degree educated women intending to have one child as compared with 7% of women with no or below O level qualifications. There is a clear preference for two children, especially among men, where the overall percentage intending two is 56%. Among women, there is greater heterogeneity with around 30% overall intending 3 or more children. Degree educated women are just as likely as their less educated pears to desire large families. At the same time, uncertainty in intended family size is significantly greater among those with higher levels of qualification: for example, among men aged 23 19% of those with degrees were uncertain as compared with 11% of those with no or less than O level qualifications.

Parameter estimates from the best fit model of predictors of intentions at age 23 are shown in Table 5. For both genders the inclusion of economic activity, socio-economic group and partnership status reduces educational differences in intentions as compared with the unadjusted effects, particularly differentials in intentions to remain childless. However, degree educated men and women remain less likely to intend one child and more likely to intend three children (in the case of degree educated women) or four children (in the case of degree educated men). Not surprisingly, women working part

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[9] A slightly higher proportion of women, as compared men, reduced their intended family size. We note that the question wording at age 16 and age 23 was different so this is approximate.

time or economically inactive were particularly unlikely to intend to remain childless and more likely to intend to have large families, reflecting the association between entry into motherhood and reductions in working hours. Female employers and managers are more likely to intend to remain childless or to have a single child as compared with other professional women or women working in junior non-manual occupations. Among men, those unemployed were significantly more likely to intend to remain childless as compared with those in employment, whilst economic uncertainty, as indicated by being unemployed or economically inactive is associated with greater uncertainty in intentions for both men and women.

Current partnership status is strongly associated with fertility intentions. Married respondents were the least likely to intend to remain childless and to be uncertain. Divorced and separated men and women were the most likely to intend a single child. Those never married and without a partner were the most uncertain as to how many children they intended to have. Since males and females with higher levels of education are less likely to be married in early adulthood and more likely to be never married and unpartnered, controlling for partnership status attenuates further educational differentials in intended family size.

In summary, among the 1958 birth cohort, a non-monotonic relationship between educational attainment and intended family size in young adulthood is seen, not fully consistent with either hypothesis 2a (a negative relationship), or hypothesis 2b (a positive relationship). Intending to remain childless was uncommon among all educational groups, although there is some evidence that women employed as employers and managers were more likely to intend to remain childless. Male and female graduates were particularly unlikely to intend to have a single child, being more likely to intend three children (in the case of female respondents) or four or more (in the case of male respondents). At higher intended parities there appears to be more support for a positive association between education and intended fertility, particularly for men (consistent with hypothesis H2c which suggests a gender difference). Finally we confirm the hypothesis (H3) that degree educated men and women are more likely to have uncertain fertility intentions in young adulthood but that this is mediated in large part by delayed marriage.

4.3. Educational differentials in the realisation of fertility intentions

At age 46, mean completed family size (1.76 and 1.91 for men and women respectively) is significantly lower than that originally intended (2.23 and 2.30 respectively). In total, just 36% of men and 43% of women achieved their intended number of children, with correspondence greatest for those who wished to remain childless (around one-half of those who intended to remain childless at age 23 did not have any children by age 46) and those who intended two births (among whom 42% of the men and

52% of the women ended up with two children). In general, there is a tendency to under achieve fertility intentions, especially among those who originally intended larger families. Of those who intended three births, only one quarter of males and 30% of females actually achieved three children.

Table 6 shows achieved parity and mean family size by gender and education. Among women, but not men, there is a strong monotonic relationship between education and childlessness at 46. Around one-quarter of women with degree level qualifications remained childless as compared with one in eight women with no qualifications. Having one child is less common among degree educated men and women. Among men, there are relatively small educational differences in the probability of having three or more children (although men with no qualifications are seen to be more likely to have four or more), whilst among women, there is a strong educational gradient in the likelihood of having three or more children. Thus mean achieved family size is significantly higher among women with no qualifications (2.14), as compared degree educated women (1.65). Given that intended family size was similar according to education (Table 4) educated women are clearly less likely to fulfil their intentions.

Variables found to significantly predict the under-achievement, achievement and overachievement of intentions to have two and three children are shown in Tables 7 and 8, respectively.[10] When considering the bivariate relationship (Model 1), educational attainment is not significantly related to the achievement of fertility intentions among men but among women, there is a consistent effect whereby increased education is associated with the underachievement of intentions to have two or three children. These educational variations are reduced when economic activity status at age 23 is controlled (Model 2). At age 23, women with higher levels of education were more likely to be working full time and to have higher earnings. In contrast to these full time workers, part time workers and those economically inactive were far less likely to underachieve their intentions and more likely to overachieve. Those working part time or economically inactive at age 23 were likely to have already started their childbearing and there is a clear positive relationship between an early age at entry into motherhood and higher completed family sizes. Educational attainment becomes largely insignificant in models of achieving two children once partnership transitions are controlled (Model 3). Partnership transitions are a key proximate determinant of fertility and those who remain never married are far more likely to underachieve an intention to have two children. Furthermore, among men but not women, remarriage following divorce is significantly associated with the over-achievement of intentions.

Among those intending to have three children, degree educated women are not only more likely to under-

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[10] None of the parental background or childhood characteristics were found to significantly predict the achievement of fertility intentions.

Table 7
Coefficients from multinomial regressions of under and over achievement of intended fertility. Baseline outcome is "achieved two children". Men and women who intended two children at age 23.

	Men						Women					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Achieved <2	Achieved >2	Achieved <2	Achieved >2	Achieved <2	Achieved >2	Achieved <2	Achieved >2	Achieved <2	Achieved >2	Achieved <2	Achieved >2
Highest qualification at 23 (ref. degree)												
A level and equivalent	−0.049	−0.067	0.054	−0.023	0.188	−0.080	−0.473*	0.228	−0.476*	0.259	−0.138	0.293
O level and CSE	0.174	−0.082	0.131	−0.029	0.354+	−0.119	−0.475**	0.254	−0.382*	0.163	−0.070	0.218
None	−0.169	0.120	0.151	0.142	0.382+	0.060	−0.600**	0.724**	−0.286	0.488+	0.006	0.535*
Economic activity/earnings at 23 (ref. full time high earner)												
Full time medium earner			−0.588**	−0.286+	−0.292*	−0.318+			−0.078	−0.56	−0.019	−0.060
Full time low earner			−0.806**	−0.214	−0.388*	−0.255			−0.158	0.234	−0.177	0.262
Part time high earner[a]									−0.815*	0.835*	−0.650	0.834*
Part time medium earner									−0.476	0.542	−0.018	0.645
Part time low earner									−0.330	0.119	−0.048	0.165
Employed but earnings not known			−0.777**	−0.460*	−0.714**	−0.466*			−0.230	0.264	−0.301	0.248
Unemployed			0.023	0.070	−0.169	0.081			0.017	0.424	0.001	0.431
Economically inactive			0.076	0.116	0.106	0.140			−1.724**	0.741**	−1.484**	0.801**
Partnership trajectory (ref. remained never married)												
Never married at 23, later married and stayed married at 46					−2.717**	0.112					−2.394**	−0.118
Never married at 23, later married but then separated					−1.948**	0.214					−1.866**	−0.384
In first marriage at 23, stayed in this marriage at 46					−3.648**	0.177					−3.455**	−0.506
In first marriage at 23, later separated and not remarried at 46					−2.992**	0.391					−2.790**	−0.553
In first marriage at 23, later separated and remarried by 46					−3.064**	0.870+					−2.572**	−0.025
Experienced separation of first marriage by age 23, all subsequent trajectories					−2.496**	0.407					−2.337**	−0.036
Constant	−0.169	−0.683**	0.235	−0.535*	2.383**	−0.706	−0.143	−1.321**	0.074	−1.552**	2.263**	−1.274*
Sample N	2262		2262		2262		2119		2119		2119	

Model 1 contains only the covariate for educational attainment at age 23. Model 2 additionally controls for economic activity/earnings at age 23 and Model 3 additionally controls for partnership trajectory experienced between age 23 and age 46.

[a] The small number of men working part time have been grouped to those working full time.

+ $p < 0.10$.

* $p < 0.05$.

** $p < 0.01$.

Table 8

Coefficients from multinomial regressions of under and over achievement of intended fertility. Baseline outcome is "achieved three children". Men and women who intended three children at age 23.

	Men						Women					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Achieved <3	Achieved >3	Achieved <3	Achieved >3	Achieved <3	Achieved >3	Achieved <3	Achieved >3	Achieved <3	Achieved >3	Achieved <3	Achieved >3
Highest qualification at 23 (ref. degree)												
A level and equivalent	0.036	0.401	0.031	0.470	0.181*	0.203	−1.057**	−1.186**	−1.166**	−1.336**	−1.043**	−1.226*
O level and CSE	0.447	0.850	0.473	1.004+	0.658*	0.697	−1.198**	−1.123**	−0.998**	−1.519**	−0.776*	−1.376*
None	−0.325	0.971+	0.016	1.127+	0.124	0.930	−1.838**	−0.906*	−1.306**	−1.433**	−1.131**	−1.294*
Economic activity/earnings at 23 (ref. full time high earner)												
Full time medium earner			0.179	0.052	0.469+	−0.076			−0.104	−0.371	−0.08	−0.342
Full time low earner			−0.038	−0.011	0.274	−0.132			−0.086	−0.473	0.00	−0.430
Part time high earner[a]									−1.276**	0.657	−0.995+	0.984
Part time medium earner									−0.739**	1.227	−0.506	1.394
Part time low earner									−2.410**	−0.176	−2.300**	0.010
Employed but earnings not known			−0.082	0.298	−0.002	0.005			−0.538	0.109	−0.428	0.123
Unemployed			−0.148	0.139	0.017	−0.115			−0.940**	0.718	−0.876*	0.882
Economically inactive			0.384	1.118	0.281	1.043			−1.667**	0.783+	−1.460**	0.995*
Partnership trajectory (ref. remained never married)												
Never married at 23, later married and stayed married at 46					−1.806**	0.211					−2.043**	0.031
Never married at 23, later married but then separated					−1.291*	0.411					−2.077**	−0.333
In first marriage at 23, stayed in this marriage at 46					−1.851**	0.975					−2.505**	−0.890
In first marriage at 23, later separated and not remarried at 46					−3.066**	0.593					−2.399**	−0.634
In first marriage at 23, later separated and remarried by 46					−2.334**	1.957					−2.259**	0.075
Experienced separation of first marriage by age 23, all subsequent trajectories											−2.473**	−0.533
Constant	0.821**	−1.482**		−1.709**	2.236**	−2.089+	1.910**	−0.182	2.471**	−0.302	4.443**	−0.107
Sample N	654		654		654		883		883		883	

Model 1 contains only the covariate for educational attainment at age 23. Model 2 additionally controls for economic activity/earnings at age 23 and Model 3 additionally controls for partnership trajectory experienced between age 23 and age 46.

[a] The small number of men working part time have been grouped to those working full time.

+ $p < 0.10$.

* $p < 0.05$.

** $p < 0.01$.

achieve their intentions, they are also more likely to overachieve their intentions. This is consistent with the parity distributions shown in Table 6, whereby of the selected group of degree educated women reaching at least three births, almost one-third went on to have another. We speculate that, in this cohort, highly educated women who had at least three births were selected to be particularly family orientated.

In summary, for men, no consistent educational difference is found in the propensity to achieve two intended children. Among women, however, we find evidence in support of the hypothesis (H4a) that educational attainment is negatively associated with the fulfilment of childbearing intentions. Whilst we cannot identify the direction of causality, we have shown that these relationships are mediated through the greater propensity of highly educated women to delay childbearing to later ages; to be working full time, to be in high earning jobs, and to have never married. Apart from the rather select group of women who were employed as managers and employers at age 23 we find little evidence of an association between degree education and intended childlessness. Remaining childless and having only one child are rejected by degree educated men and women. Yet, at age 46, one in four men and women with degrees remained childless and a further 12% had just one child. For men, having a completed family size of zero or one child is common in all educational groups. An important mechanism through which childlessness occurs is non-marriage and remaining never married by age 46 is more likely among both degree educated high earning men, but also low educated men who were unemployed or economically inactive. In contrast, among women, twice as many degree educated women remained never married (14% as compared with no qualifications 7%).

Although degree educated men and women in the 1958 cohort were more likely to remain childless, once they had entered parenthood they were quite likely to go on to have larger families. For example, women with degrees are similarly likely as those with no educational qualifications to progress from three to four children – around 30%. Among men, there is evidence of a u-shape relationship of education with fertility, whereby it is those with no qualifications and those with degrees who are more likely to have three or more children providing some limited support for our final hypothesis (4c) that the association between education and the fulfilment of fertility intentions will be more positive for men than women.

5. Discussion

Recent research has provided useful insights on the role of attitudes, subjective norms and perceived behavioural control in the formation of fertility intentions (Billari, Philipov, & Testa, 2009; Dommermuth, Klobas, & Lappegard, 2011). However, the challenge is to place these processes within the dynamic life course where fertility outcomes need to be understood in the context of both childhood socialisation and in relation to other life course behaviours such as partnership formation and employment (Morgan & Bachrach, 2011). This paper has attempted to make progress in this direction by using a life course perspective and Miller's TDIB framework. Prospective data from a birth cohort study have provided insights as to how parental characteristics and experiences and traits in childhood come together to influence childbearing preferences. We have shown that family building preferences are formed early on in the life course. Consistent with Miller's TDIB framework, both socialisation in childhood (for example sibling group size and parental expectations for education) and individual traits (such as academic ability) influence preferences for the timing of entry into parenthood as reported in adolescence. The findings were similar for males and females. The 1958 British birth cohort were themselves part of the baby boom generation and, in adolescence, their family building preferences were strongly influenced by the (generally above replacement level) size of their family of origin and the (generally youthful) age which their own mother had her children. Such findings point to the need for a life course approach. Intentions data collected from adults in cross sectional surveys are likely to understate the role of family of origin factors and overstate the role of current factors, in influencing fertility intentions.

Consistent with the TDIB framework, family size intentions are revised downwards in young adulthood as individuals experience more of life, entering the labour market and seeing for themselves the economic and non-economic opportunity costs that childbearing entails. The importance of family background and childhood traits in predicting intentions at age 23 is reduced since their influence is mediated through educational attainment. Nevertheless size of family of origin remains a significant predictor of intended family size in young adulthood independently of the respondent's own characteristics.

However, among this British cohort, there is no clear, consistent educational gradient in intended family size in young adulthood. Only a minority of respondents intended to remain childless with the percentage only slightly higher among graduates. More striking is the rejection by degree educated men and women of a one child family. Instead, the latter are more likely to intend three children (in the case of female respondents), or four or more (in the case of male respondents). At higher parities the evidence for Britain is consistent with that seen in other European countries whereby education is positively associated with higher desired family sizes (Heiland et al., 2005; Testa, 2012). These findings emphasise the need for research to consider not only educational differences in *mean intended family* size but in *intended parity distributions*.

Unlike much previous research, this paper has explicitly considered those who have uncertain childbearing intentions. In this cohort young men were found to be more uncertain than young women, whilst graduates of both genders were significantly more likely to report uncer-

tainty in their childbearing intentions (supporting our third hypotheses). We have shown that this increased uncertainty in fertility intentions among more educated young adults is largely mediated by their delayed marriage. At the same time, even having controlled for partnership status, we find that men who were unemployed or economically inactive were more likely to have uncertain intentions. The impact of economic recession on the achievement of intentions is discussed further below.

Consistent with evidence from the US (Morgan & Rackin, 2010; Quesnel-Vallee & Morgan, 2003) we find that that only 36% of men and 43% of individuals achieved exactly the number of births they intended. Overall the 1958 cohort were more likely to underachieve than overachieve their intended family size with underachievement more common among those intending higher numbers of children. For men and women, overall achieved family size was around 0.4 of a birth less than intended – a difference which is comparable to in magnitude to that found in the US 1957–1961 birth cohorts studied by Quesnel-Vallee and Morgan (2003). Among women, but not men, we found a clear negative educational gradient in the propensity to achieve fertility intentions and the mean achieved family size was smallest for degree educated women. In large part this is due to the significantly higher levels of childlessness among graduate women.

Despite only a small minority of the 1958 cohort intending to remain childless, by age 46 22% of men and 16% of women in our sample did so.[11] Consistent with previous findings (Kneale & Joshi, 2010), among women there is a clear educational gradient in the proportion ultimately childless, ranging from 25% of those with degrees to just 12% of those with no qualifications. We have shown how the propensity of degree educated women to underachieve intentions to have two or three children relates to their higher propensity to work full time in better paid jobs, and to a delayed entry into marriage and hence postponement of entry into motherhood. Among men, the pattern is more complex, since remaining childless is associated with both high education, but also socio-economic disadvantage. Operating largely through non-marriage, young men who were unemployed or economically inactive were particularly likely to end up childless. Our findings concerning educational differences in the achievement of intentions need to be interpreted in the context that intentions were reported at age 23. Men and women who were already parents will have more information about the costs and benefits of childbearing and their own capabilities as parents and may revise down their intended fertility accordingly. Furthermore, for those who have already become a parent at age 23 it is not possible to intend to remain childless. It may be the case then, that the observed educational differences in the likelihood of realising intended fertility may be a result

of the slower entry into parenthood among those with higher levels of education. However, in further analyses (not shown), where we use desired fertility expressed at age 16, we found a similar negative educational gradient in the achievement of fertility desires. Thus we believe that there is a real negative association between education and the likelihood of achieving fertility intentions.

However, the extent to which the negative educational gradient in achieved fertility relates to a causal effect e.g. resulting from increased substitution costs, or whether it is an association resulting from the tendency of more educated women to delay the start of their childbearing to later ages, is not possible to say. If we are to fully understand the dynamic recursive processes of education, employment and family formation we would require a very detailed prospective dataset containing, among other things, repeated measures of individuals' and couples' attributes, orientations and intentions to behave in certain ways e.g. in terms of education, employment and childbearing (Bernhardt, 1993; Ni Bhrolcháin, 1986). Unfortunately such data do not exist, at least for the UK.

This paper confirms previous work for the UK highlighting a strong social norm against one child families (Jefferies, 2001). However, despite few respondents intending to have one child as young adults, around one in eight men and women have a completed family size of one child. Further research is required to understand the extent to which those who stop at one do so through choice or constraint. It is not clear how much the postponement of entry into partnership and parenthood and constraints arising from lower fecundity at older ages can explain the underachievement of the two child norm (Blake, 1981), or the extent to which increased partnership fragility is the explanation (Jefferies, 2001). The research reported here has provided new evidence, in accordance with Miller's framework, that partnership experiences are key proximate determinants of whether family size intentions are under or overachieved. Whilst those who experienced marital dissolution without repartnering often ended up with fewer children than intended, respondents, particularly men who were already married by age 23, but who later divorced and remarried were significantly more likely to exceed their fertility intentions.

The life course approach considers the socio-economic context within which cohorts experience their biographies. Family transitions among the 1958 birth cohort were affected by recessions in both the early 1980s (when respondents were in their early to mid-twenties) and early 1990s (when they were in their early to mid-1930s). Our findings suggest that economic insecurity (as measured by being unemployed or economically inactive) is associated both with intending to remain childless or to be uncertain about intended family size and the underachievement of fertility intentions. These patterns persist even when current partnership status is controlled for suggesting that economic precariousness can affect childbearing both through the timing of partnership formation, but also through childbearing once partnered.

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[11] In this cohort only a few men had a first birth after age 46 and so this figure is a good estimate of childlessness for both sexes.

Future research is required to examine whether the educational differentials in the development and achievement of fertility intentions holds for more recent birth cohorts. On the one hand we might anticipate a narrowing of educational differences in the achievement of fertility intentions among women due to the rapid increases in the 1990s and 2000s in childcare provision and affordability. At the same time, economic insecurity increased among more recent cohorts, especially for young men, is likely to be associated with greater uncertainty in fertility intentions and in a reduced ability to achieve family size goals as a result of not being able to form stable partnerships. Partnership instability will be an even more important factor affecting family outcomes in more recent birth cohorts. We have seen that partnership dissolution can be associated with lower fertility but among those, especially men, who remarry at a fairly young age, achieved family sizes can exceed expectation.

Appendix

Box A1. Questions on fertility desires and intentions asked to NCDS cohort

Question	Possible responses
Age 16	
At what age would you ideally like to start a family?	*Ring one number*
	16 or 17
	18 or 19
	20 or 21
	22–25
	26–30
	Over 30
	Uncertain or don't know
	Don't wish to have children
What size family would you like to have?	*Ring one number*
Asked to all, irrespective of answer to previous question	No children
	One child
	Two children
	Three children
	Four children
	Five children
	Six or more children
	Don't know
Age 23	
Would you like to have any (more) children of your own?	1. Yes–answer
This is not asked to women who in previous questions volunteered t	2. No
hat they were unable to have children, or that they should not have children for health reasons	8. Don't know
How many children would you like altogether?	*Ring code*
Asked to those answering ''yes'' to previous question	1
	2
	3
	4
	5
	6
	7+

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