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# Is the future female? Educational and occupational aspirations of teenage boys and girls in the UK

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# Contents

## Abstract

Gendered occupational segregation Western labour markets shows remarkable persistence, despite the increasing educational attainment and ambition of women and the dominance of egalitarian attitudes. Recent studies have paid attention to the ways in which both boys' and girls' expectations and attitudes contribute to the reproduction of gender divisions in the public and private spheres. In this paper we extend this research by examining the educational expectations and occupational aspirations of contemporary teenagers in the UK, using a large nationally representative sample of 14-year-olds, surveyed in 2015. In their teenage years, young men and women are highly susceptible to peer influences and therefore potentially more likely to conform to gender typical expectations, and choices at this age are consequential for their future life-courses and careers. It is therefore of interest to identify what factors are associated with less gender-typical expectations. Linking the teenagers' occupational aspirations to labour force data, we explore the extent to which girls and boys aim for professional, high-paying and (non-)gender typical jobs, taking into account their cognitive skills, family background, and educational expectations. We show that, despite their higher educational expectations, girls opt for occupations which pay on average less well than those sought by boys, and which are far more female dominated. Net of other family and individual characteristic, we find that greater propensity to risk taking is associated with lower educational expectations but higher paid occupational choices for boys, and with less gender-typical occupational aspirations. Our study confirms the relevance of individual attitudes and traits in shaping young people's future trajectories and emphasizes the importance of paying attention to boys' as well as girls' expectations if we are to understand the continuation of gendered labour market inequalities.

## Introduction

Girls and women are demonstrating ever-increasing educational success relative to boys (DiPrete and Buchman 2013; Breen and Goldthorpe 1997), and are breaking in increasing numbers into higher occupational echelons and the typical preserves of privileged men. Recent weeks saw the appointment of Jacinda Arden as prime minister of New Zealand, who becomes at the same time the world's youngest head of government. Does this indicate a point of transition where current generations of young women will begin to equalize their status with their male contemporaries and gradually replace the older male order, at least in the Western world?

The answer is not clear. In the UK case as in many other Western contexts, women's participation in employment has shown dramatic increases over the last few decades; and there is clear evidence on the educational success of women across all levels. There is also a consensus that returns to education in high-skilled labour markets remain substantial, despite negative impacts of the 2008 Recession on entry-level graduates (Hills et al. 2013). At the same time, there is considerable evidence of persistent gendered labour market inequalities (Brynin 2017, Green et al. 2017), in part fostered by occupational segregation, as well as by inequalities within broader occupational groupings.

Research has indicated that these inequalities may be sustained, at least in part, by the gendered expectations of both boys and girls (Polavieja and Platt 2014), in the context of enduring gendered norms and the transmission of more or less traditional gender role attitudes from parent to child (Moen et al. 1997; Platt and Polavieja 2016; van Putten et al. 2008). It is therefore highly relevant to consider the extent to which British teenage boys and girls, prior to or around the time of important educational decisions, are oriented towards more or less ambitious and more or less gender typical future prospects, and what factors contribute to differences in educational and occupational choices.

We present contemporary evidence on teenagers' educational expectations and occupational aspirations to identify how far these choices differ across boys and girls, when taking account of relevant family and individual characteristics (including socio-economic background and cognitive ability). We explicitly explore the role of personality traits, in particular risk-taking propensity, in shaping gender-atypical future orientations. Our analysis proceeds in stages. Having clarified young people's own expectations about their participation in higher education, and the family and individual influences on these, we then analyse their occupational aspirations, measured in terms of a) whether or not they are high-ranking jobs, b) the averages wages of the jobs and c) the share of women in their chosen occupation. We ascertain how far educational expectations can help to account for occupational choices. In this way, we demonstrate the extent to which contemporary girls and boys appear to reproduce, in their future orientations, gendered inequalities and gender segregation. Given strongly gender-typical aspirations, we then set out to distinguish those factors that may lead to more atypical or less normative choices, net of the economic rewards of the job.

We consider both parental expectations, in line with the Wisconsin model (Sewell, Haller and Portes 1969) and maternal gender role attitudes. We also examine the

contribution of children's own characteristics, alongside their cognitive ability, particularly self-esteem, which has been argued to be associated with more agentic and hence less gender-typical choices in earlier research (Polavieja and Platt 2014). To this we add risk propensity. Risk propensity and risk aversion have been associated with educational decision making in a number of ways. Broadly speaking, risk aversion has been judged in rational action theory to differentially constrain choices across class backgrounds, while leading to greater gender convergence (Breen and Goldthorpe 1997). At the same time, risk-propensity has been linked on the one hand to a range of non-optimal behaviours (such as smoking, underage drinking etc.) that are generally normatively sanctioned, and on the other to higher wages. Risk-taking propensity is also known to be higher among men than among women (Eckel and Grossman 2008). From these various insights we argue that risk-propensity will be implicated in girls' and especially boys' expectations and aspirations in complex ways. We posit that it will reduce their educational expectations but increase their wage expectations from their aspired job. We further argue that, given risk-taking is associated with non-normative behaviours, higher risk propensity will be associated with more gender-atypical choices, conditional on wages in the aspired job. We would expect these associations to be similar for boys and girls; but since risk-propensity is higher among boys, we anticipate that they may be more likely to be observed for boys in our data.

We show that contemporary UK teenage girls' and boys' future orientations are highly differentiated. While girls have higher expectations of attending university and are generally more likely to want to have a professional career, they aspire to jobs that both pay less and have a much higher proportion of women than those boys aspire to (even if their aspirations are higher than the jobs their mothers' generation are actually working in). We show the importance of parental and individual characteristics in shaping some of these preferences. We also demonstrate that for boys, risk taking propensity is associated with preferences for higher paying jobs, but net of pay, for more gender atypical jobs. Nevertheless, the contribution of individual and family characteristics to explaining the gender composition of teenage boys' and girls' chosen occupations is small.

In the next section we outline selected relevant literature and elaborate our approach. We then describe the data and measures, before presenting results for each of the four outcomes. In the final section we reflect on our findings.

## Background

Transformations in Western labour markets have seen the shares of women in employment expanding dramatically. Opportunities for, and the increasing supply of, highly educated women in contemporary labour markets have changed the gender-balance of employees in a number of occupations as well as involving the expansion of typically female-dominated occupations. Changes in the structure of particular occupations has resulted in the increasing feminization not only of poorly rewarded but also of some higher-rewarded occupations (Reskin 1991; Crompton and Harris 1998). There have also been substantial shifts in traditional gender role attitudes among men and women (Scott and Clery 2013). Yet, as Ridgeway (2011) highlighted, there is a paradox in contemporary Western labour markets (of which the UK provides a clear example): despite these changes and the widely held views that girls and boys should have the same opportunities, gendered divisions in paid and unpaid work demonstrate stubborn persistence.

Such persistence is likely to derive at least in part, from the lack of congruence between expressed attitudes and actual labour market (and domestic) behaviours (Platt and Polavieja 2016). Pay gaps remain within higher ranking occupations as well as being driven by differences between occupations; and the occupational structure in the UK remains highly segregated overall (ONS 2013). While gendered occupational segregation is not *necessarily* tied to inequality in wages (Jarman, Blackburn and Racko 2012), it has been strongly linked to gendered inequalities in pay (England 2005; Brynin and Perales 2016) and is, moreover, likely to reinforce normative expectations about women's place and potential.

When considering process of educational decision making, the sociological literature has drawn attention to how these decisions are informed by both strict economic considerations (in terms of the returns to education) as well as social considerations, that include the relative costs of or uncertainty related to particular decisions (Breen and Goldthorpe 1997), and the influence of peer groups, and wider social context (Jaeger 2007). Children learn about this wider social context both through the medium of early socialization processes (Eagly et al, 2000) and through directly observing their parents (Polavieja and Platt 2014). In their teen years, they become especially sensitive to peer influences and the gendered expectations of others (Brown 2004; Kågeten et al. 2016). We would argue that such normative expectations arising from the broader social context (media, friends' parents etc.) about what men and women do and do not do, as well as how those expectations are policed, will shape their

expressed aspirations at this critical age, with consequences for their actual subsequent behaviours (Morgan et al. 2013).

Young people, then, enter the last years of compulsory schooling and the point of decision-making about future education and subsequent trajectories with a clear understanding of the sorts of behaviour expected from men and women and the types of opportunities open to the two sexes, and with the disposition to conform to such expectations. Figure 1 illustrates how women and men were distributed across jobs with different shares of women in the period from 2003-2012 in the UK, demonstrating the gendered labour market context by which today's teenagers were surrounded in their formative years. In this context, it is perhaps not surprising that girls and boys will tend to aspire to the sorts of jobs that are typical for their sex. While aspirations do not directly translate into outcomes, there is now a considerable body of evidence to suggest that they matter for decisions at particular points in educational trajectories (e.g. Goodman et al. 2011; Fernández-Reino 2016), and there is also suggestive evidence that they are linked to actual labour market outcomes (e.g. Polavieja and Platt 2014).

**Figure 1 Distribution of Men and women by the share of women in their occupations.**


Source: Quarterly Labour Force Survey Jan-March 2003 to Oct-Dec 2012. The mean share over this period for women was 70 per cent (median 75%), while for men it was 32 per cent (median 25%).

At the same time, educational expansion and the fact that women now surpass men at all educational levels (Adcock, Bolton and Abreu 2016), means that girls may typically expect to engage in higher education to a greater degree than boys, and hence, presumably, anticipate the sorts of 'good jobs' that flow from that. Similarly, the feminization of a range of high ranking jobs (Reskin (1991), Crompton and Harris 1998) – even if alongside the persistent gendering of some low-ranking jobs (England 2005) – means that in choosing to be gender typical girls do not necessarily need to 'aim low'. Conversely, while the 'best' jobs tend still to be dominated by men (ONS 2013), boys can still make highly gender-typical choices without necessarily aiming high in terms of wages. Job ambition and gender typicality do not, therefore, go hand in hand. To the extent that girls and boys are expressing aspirations that are likely to be somewhat higher, on average, to the labour market as a whole, it is of interest to ascertain the extent to which there are nevertheless systematic differences in the sex composition of these jobs. It is also relevant to consider how far educational expectations or occupational 'ambition' do or do not not mediate the tendency to express gender typical occupational aspirations.

For all three types of preference, educational, job 'quality' (as proxied by wages) and gender-segregated or not, it is informative for both understanding the mechanisms of persistent labour market inequalities and for policy to identify family and individual characteristics are associated with the tendency to choose 'higher' or more 'atypical' – for both boys and girls. Existing literature provides some guidance on what factors might influence young people's aspirations in relation to both tertiary education and future occupations. These have largely been studied in terms of family level factors and those of the children themselves, though theory and research also point to the significance of peer and contextual influences. A central role is of course played by socio-economic family background, and its indirect as well as direct effect on educational decisions and occupational outcomes (Sewell, Haller and Portes 1969; Gugushvili et al. 2017). While social class origins are not the main focus of this study, it is clearly essential to incorporate relevant measures of family background when analyzing young people's aspirations. Studies have clearly demonstrated differences in aspirations by ethnic group (Berrington 2016; Fernandez-Reino 2016; Strand 2014). Again, while not the primary focus of this paper, it is important to allow for the potential influence of ethnic origins on our outcomes of interest.

Literature on the intergenerational transmission of values and attitudes has highlighted the ways in which these can shape persistence of more traditional views into the next generation (e.g. Moen et al. 1987, Cunningham 2001; Escriche 2007). While much of

this literature has focused on mother to daughter transmission, the beliefs and expectations of sons are clearly also critical for the subsequent shape of labour markets (Davis and Wills 2010; Polavieja and Platt 2014; Platt and Polavieja 2016). Analysis of the 'mother in law' effect has demonstrated how the influence of mothers on sons can shape the participation of daughters in law (Fernandez et al. 2004, Arcarons 2017). Both mothers' attitudes and their behaviour, and their potentially different impact on daughters and sons are important mechanisms to explore in relation to understanding differences in young people's preferences. Among young people themselves, as well as their own cognitive skills, Polavieja and Platt (2014) highlighted the role of self-esteem as enabling autonomous action or 'agency' (Bandura 2001; Schoon and Ng-Knight 2017), and hence facilitating non-gender typical choices for both boys and girls. We therefore ascertain if these agency effects of self-esteem can be replicated in the current study, using a comparable measure.

To these factors, we add an additional potential mechanism, that of risk propensity. Risk aversion (rather than risk propensity) has been linked to earlier exit from education in classic models (Breen, van de Werfhorst and Jaeger 2014) – but the theory suggests that the expectations relating to avoiding uncertainty could work in either direction. While in the Danish education system, used in Breen et al's (2014) analysis, choosing the academic track may be associated with increased uncertainty; in a context of high and normative expectations about participation in tertiary education among both parents and children, it is not so clear that this would be the case. Moreover, the fact that women both tend to be more risk averse (Dohmen et al. 2011; Hartog et al. 2002; Eckel and Grossman 2008), and to opt into higher education more than men, suggests that there is no necessary association between risk aversion and earlier exit from education. Risk propensity encapsulates an element of impulsivity or reluctance to delay rewards.[1] The theoretical and empirical association of risk taking with preference for more immediate rewards is clear. Risk propensity has also been associated with higher wages (Shaw 1996), with a number of studies linking risk taking to selecting jobs with potential for high economic rewards (Bonin et al. 2007; Dohmen and Falk 2011). Differences in risk propensity has also been invoked to help to explain the gender pay gap (Croson and Gneezy 2009). Following Beck et al. (2006), we argue that increased propensity to take risk will (net of other factors) not only lead to aspiring to ambitious jobs in terms of wages. Finally, risk propensity and impulsivity suggest an

[1] In the Breen et al. paper, time discounting is distinguished conceptually and empirically from risk aversion; however, risk our measure of risk propensity captures impulsivity, even if it is separated from simple delay aversion (Atkinson 2015).

insensitivity to the broader normative expectations of peers, compared to the rewards offered by participation in sanctioned or 'risk' behaviours. We therefore anticipate that those with higher risk propensity will also demonstrate greater willingness to opt for non-normative or gender atypical occupations (cf. Beck et al, 2006).

We test these various propositions and expectations using a large-scale study of contemporary teenagers, wave 6 (age 14) of the Millennium Cohort Study, exploiting prior information on their skills and traits as well as on their family background and parental attitudes that are therefore not directly confounded with their educational and occupational choices. We next describe these data and our specific measures.

## Data, variables and methods

### Data and sample: The Millennium Cohort Study (MCS)

The multi-purpose longitudinal Millennium Cohort Study (MCS) is a study of approximately 19,000 babies born to families living in the UK between September 2000 and January 2002, who are followed over time (Plewis 2007; Connelly and Platt 2014; Mostafa 2014). Data have been collected when the children were aged around 9 months, 3 years, 5 years, 7 years, 11 years and most recently 14 years (Calderwood et al, 2015).

We draw on information from the first six sweeps: personal interviews and self-completion questionnaires administered to parents, self-completion questionnaires administered to the cohort children at age 11 and age 14, together with a cognitive assessment carried out with the children at age 11, and a neuropsychological assessment that enabled us to construct a measure of their risk-taking propensity. Occupational aspirations were also collected at the age 7 and age 11 sweeps, and revealed highly gendered patterns at age 7 (Moulton et al. 2016). However, our focus in this paper on the measures at age 14, since this is a time when young people are particularly sensitive to normative peer expectations and when their expectations may have consequences for their immediate, and consequential, educational choices. In future work we analyse the trajectories of occupational choice from age 7 to age 14 and how these differ across young people with different characteristics.

We use a complete case sample for modelling university expectations and professional or managerial occupation aspirations (n=7769). For the measures of wages and proportion women in an occupation we use a reduced sample (n=5445), given that a quarter (25.4%) of the responding teenagers in the age 14 survey chose not to answer the optional occupational question and a further 7.4% of responses not being codeable. These young people with uncoded occupational responses were, however, included in the educational aspirations model and were allocated to 'non-managerial' in our professional / managerial occupations model. We compared the characteristics of those who did and did not provide occupational information and they were remarkable similar (see Table 1), providing reassurance that the sample was not selected in any observable way. That is, the teenagers who did not answer the occupation question did not differ systematically from those who did. For robustness, we also estimated models for educational expectations and professional or managerial aspirations on the reduced sample and the results were comparable to those in the larger sample. Hence we retained the larger sample for analysis of our first two outcomes.

**Outcome Measures**

We have four outcomes measures at age 14.

*University expectations*

Cohort members were asked to indicate on a scale of 0-100% "*How likely do you think it is that you will go to university?*". For ease of interpretation of effect sizes, and comparability with the measure of share of women in the occupation, we transform these percentages to proportions (i.e. from 0 to 1).

*Occupation aspirations*

Cohort members were asked "*When you grow up what would you like to be?*" These aspirations were first coded to four-digit standard occupational (SOC) codes and then linked to measures of labour market segregation and pay in these jobs using information from the Quarterly Labour Force Survey (LFS).

We constructed a pooled data set of 40 quarters of the LFS, from the first quarter of 2003 to the last quarter of 2012 in order to cover the labour market across the cohort children's childhoods prior to the age 14 survey. Pooling the quarters also ensured we had enough observations at the four-digit SOC level to construct robust measures of average wages and share of women in the occupation. The pooled data set provided

329,831 observations with four-digit SOC code and 225, 323 who also supplied wage information. The Labour Force Survey has a short-panel structure with the same respondents revisited over five quarters. We used wage information collected in the first wave. The measure of wages was a derived variable of hourly wage, constructed from information on usual hours and usual earnings (including overtime if usual). It therefore has a value for all employees regardless of hours worked, but does not cover self-employment income. Wages were then averaged across each four-digit occupation. Following standard practice, given the skewed distribution of wages, we log-transformed the wage in the occupation. The degree to which occupations were gendered was captured by constructing the share of women in each four-digit occupation directly from the data, this was then measured as a proportion from 0-1 (i.e. none to 100% female).

The three occupation based outcome measures are therefore:

- Aspirations for a Professional or Managerial occupation (0/1)
- Log of average Hourly Pay of the occupation, and
- Share (proportion) of women in the occupation (0-1).

**Explanatory variables**

In line with our discussion and expectations we focus on the contribution to educational expectations and occupation aspirations of a set of individual and family (maternal) factors, while controlling for family background and other individual-level characteristics

*Sex of the young person*
Our key measure of interest is the difference in expectations between boys (coded 0) and girls (coded 1).

We also include two measures of children's agentic and impulsive traits in line with the discussion above.
*Self-Esteem (measured at age 11)*

The survey collected five of the 10 items from the Rosenberg Self-esteem scale (Rosenberg, 1965). Responses are made on a 4-point scale, with answers ranging from strongly agree to strongly disagree. The scale is thought to have good reliability and validity as a tool to measure self-esteem in psychology and the social sciences. Reduced versions of the scale, such as the positive items used here, have also been

demonstrated to represent the underlying construct for the scale (see, for example, the discussion in Polavieja and Platt 2014). The scale was developed using a sample of over 5000 children drawn from schools in the state of New York and has since been widely applied. Responses to the four items were summed with a higher score representing greater self-esteem and standardized.

*Risk-taking behavior (measured at age 11)*

The Cambridge Gambling Task (CGT), which is part of the Cambridge Neuropsychological Test Automated Battery (CANTAB; Robbins et al., 2004; 2008), measures risk-taking behaviour and decision-making under uncertainty. Participants make bets under conditions of known risk, rather than ambiguity, therefore minimising learning, executive and working memory demands that can confound the interpretation of test scores (e.g., Bechara, Damasio, Tranel & Damasio 2005; Lejuez et al., 2002). There are six key outcome measures, but here we focus only on risk taking, the measure that most closely links to our expectations about the role of risk-taking propensity in young people's expectations and aspirations. Scores range between .05 to .95 (mean =0.53, sd=0.17). (For further details see Atkinson, 2015).

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**Family Covariates**

At the family level, we argued that maternal behaviours and attitudes were likely to be implicated in children's choices, and that these might be particularly consequential for girls. We include one measure of behaviour and two sets of attitudes – expectations for university attendance and gender role attitudes.

*Mother in work (measured at age 14)*

The working status of mother's is thought to have an influence on the aspirations of children, particularly girls. In particular, Novakovic & Fouad (2013) found that mother's work status outside of the home had an impact on girls' career choices. We use a contemporary (age 14) measure of whether or not the mother is in paid work in order to identify the current influence of maternal work status on the young person, and on

the basis that a mother who is not in paid work when a child is in their mid-teens is more likely to be a dedicated home-maker. The measure is coded as 0=not in paid work, 1=in paid work.

*Parental university expectation (measured at age 11)*

Parental support and ambitions for their children have an established influence on a child's own expectations and aspirations for their future (Gregg & Washbrook, 2011; Schoon & Eccles, 2014). This was captured from the main carer's response to '*How likely or unlikely do you think it is that your child will attend university?*', with four answer categories, ranging from 'not at all likely' to 'very likely'. We include this as a continuous measure.

*Mother's support for gender equality (measured at age 5)*

We measure maternal egalitarianism by the main carers response to '*Sons should be encouraged more than daughters*' on a 5-point Likert-type scale ranging from strongly agree to strongly disagree. We include this as a continuous measure, hence a higher score represents greater egalitarianism.

## Controls

We additionally control for the following individual and family level factors. We introduce these into the models in blocks with the other child (individual) or family/parent characteristics respectively.

### *Individual covariates*

*Cognition (measured at age 11)*

Cognitive ability can be expected to be associated with educational choices, but also, independently of education with occupational ambition. At age 11, the cohort members completed the British Ability Scales II Verbal Similarities assessment. This assessment provides a measure of 'crystallised intelligence' (Elliott, 1996). The score was standardised (mean = 0, sd = 1). Full details of the test, including its design and theoretical basis is provided in the BAS II Technical Manual (Elliott et al. 1997).

*Age at time of cognitive test (measured at age 11), Season born*

These were both included as older children and children born earlier on in the academic year have a cognitive and academic advantage over younger, Summer born children (Crawford et al, 2014; Parsons and Hallam, 2014).

*Ethnicity*

There are substantial ethnic differences in both education attainment (Crawford and Greaves 2015) and occupation status (Zuccotti 2015). The format of the ethnic group question varies depending on whether the data was collected in England, Wales, Scotland or Northern Ireland. We use the harmonised 8-category measure of ethnic group (ONS, 2013).

***Family covariates***

Family socio-economic position (SEP) has a strong influence on children's future educational and occupational attainment (Gregg and Macmillan, 2010; Sullivan et al, 2014, 2016). The 'poverty gap' in education shows that children from poorer backgrounds do less well than their richer counterparts (Goodman and Gregg, 2010). There are many SEP measures available in MCS. Here we use parental qualifications and family income to minimize multicollinearity. That is, there was strong correlation between parental social class and family income (.66); and income had a stronger relationship with the outcome measures.

*Parent Highest Qualification (14)*

Parents' highest held academic or vocational qualification was coded to National Vocational Qualification (NVQ) levels, ranging from no qualifications to NVQ5: higher academic degree, or equivalent professional qualification. NVQ2, equivalent to a GCSE grade A*-C was used as the reference category.

*Family Income quintiles (14)*

We used equivalised weekly family income split into quintile groups. The lowest income quintile group is used as the reference category.

*Lone Parenthood (14)*

Having a lone mother could be expected to influence both the educational and occupational aspirations of children. We coded couple parent families as 0 and lone parent families as 1.

*Older siblings (at nine months)*

Parity is a well-established predictor of educational chances, with an advantage for children higher up the birth order (Nisbet, 1953). We include the number of older siblings the cohort member was living with at the time they were born (range 0-9).

Descriptive statistics for the two samples used in analysis are shown in Table 1.

**Table 1: Descriptive table of means / proportions**

| | N=7769 | | N=5445 | |
|---|---|---|---|---|
| | University expectations Prof/man occupation | | Average hourly wage Proportion women | |
| | prop/mean | Sd | prop/mean | Sd |
| ***Outcome measures*** | | | | |
| University expectations | .67 | .29 | .68 | .29 |
| Professional / Managerial | .36 | .48 | .51 | .50 |
| Mean hourly wage (£6.37 – £65.41) | | | £20.73 | £13.90 |
| Proportion women in job | | | .43 | .29 |
| ***Individual characteristics*** | | | | |
| Girl | .50 | .50 | .51 | .50 |
| *Ethnicity* | | | | |
| White | .87 | .34 | .87 | .34 |
| Mixed | .05 | .22 | .05 | .21 |
| Indian | .02 | .12 | .01 | .12 |
| Pakistani | .02 | .14 | .02 | .14 |
| Bangladeshi | .01 | .08 | .01 | .08 |
| Black Caribbean | .01 | .11 | .01 | .10 |
| Black African | .01 | .11 | .01 | .11 |
| Other (inc. Chinese) | .02 | .13 | .02 | .14 |
| Cognition (z-score) (-6.5 – 3.4) | .04 | .91 | .04 | .90 |
| Age (years) (10.2 – 12.3) | 11.1 | .33 | 11.1 | .33 |
| *Season born* | | | | |
| Autumn | .26 | .44 | .25 | .43 |
| Winter | .23 | .42 | .23 | .42 |
| Spring | .25 | .43 | .26 | .44 |
| Summer | .26 | .44 | .26 | .44 |

| | N=7769 | | N=5445 | |
|---|---|---|---|---|
| | University expectations Prof/man occupation | | Average hourly wage Proportion women | |
| | prop/mean | Sd | prop/mean | Sd |
| Risk-taking behavior (.05 - .95) | .53 | .16 | .53 | .17 |
| Self-Esteem (z-score) (11) | .05 | .86 | .05 | .85 |
| ***Family characteristics*** | | | | |
| *Parent Highest Qual* | | | | |
| None | .04 | .20 | .04 | .20 |
| NVQ1 | .06 | .24 | .06 | .24 |
| NVQ2 | .21 | .41 | .21 | .41 |
| NVQ3 | .15 | .36 | .15 | .36 |
| NVQ4 | .37 | .48 | .37 | .48 |
| NVQ5 | .17 | .37 | .16 | .37 |
| **Family Income quintiles** | | | | |
| Q1 | .13 | .34 | .13 | .34 |
| Q2 | .17 | .38 | .19 | .39 |
| Q3 | .20 | .40 | .20 | .40 |
| Q4 | .23 | .42 | .23 | .42 |
| Q5 | .26 | .44 | .25 | .43 |
| **Lone Parenthood** | .26 | .44 | .27 | |
| **Mother in work** | .76 | .43 | .76 | .43 |
| **Mother support gender equality (5)** *Sons should be encouraged more than daughters (1,SA – 5,SD)* | 4.3 | .99 | 4.2 | .99 |
| **Older siblings (0) (0 – 9)** | .88 | .98 | .88 | .98 |
| **Parent university expectation (11)** 1, Not at all likely – 4, Very likely | 3.0 | .84 | 3.0 | .85 |

# Methods

We first describe the unadjusted differences in university expectations and occupation aspirations by child sex. We then estimate a series of nested OLS regression models to identify how far being a girl relative to being a boy was associated with different outcomes on our four measures, after controlling for the range of individual and family level characteristics detailed. While professional or managerial aspirations is a binary outcome variable, we estimated a linear probability model for this outcome for ease of comparison and interpretation. Estimates from a logistic regression model gave substantively the same results. We include interactions between child's sex and relevant characteristics, that we anticipated might be associated with outcomes in a different way for girls and boys, specifically risk propensity, maternal gender attitudes,

and mother's work status, and, for the share of women in the occupation self-esteem and the child's university expectations.

In line with our theoretical expectations, we estimated five nested models for university expectations, six models for professional or managerial occupation aspirations and average hourly wage of occupation and seven models for how female dominated an occupation is. The models are summarized below.

*University Expectations*

Model 1: child sex (base model of raw differences between girls and boys)

Model 2: model 1 + individual characteristics, including self-esteem and risk-taking propensity

Model 3: model 2 + girls*risk taking

Model 4: model 3 + family characteristics, including parental university expectations, working mother and maternal gender attitudes

Model 5: model 4 + girl*maternal gender attitudes and girl*working mother

*Occupational outcomes: professional / managerial aspirations and wage of aspired occupation*

Model 1: child sex (base model of raw differences between girls and boys)

Model 2: model 1 + individual characteristics, including self-esteem and risk-taking propensity

Model 3: model 2 + child's university expectations

Model 4: model 3 + girl*risk taking

Model 5: model 4 + family characteristics, including working mother and maternal gender attitudes

Model 6: model 5 + girl*maternal gender attitudes and girl*working mother

*Proportion women in the occupation*

Since we expect child characteristics to decrease gender-typicality for both boys and girls for this outcome, this implied interacting more of our key variables with child sex, since a negative effect for girls and a positive effect for boys would both imply more gender atypical preferences.

Model 1: child sex (base model of raw differences between girls and boys)

Model 2: model 1 + individual characteristics, including girl*self-esteem

Model 3: model 2 + girl*child's university expectations

Model 4: model 3 + girl*risk taking (and excluding non-significant interactions from earlier specifications, to avoid over-parameterisation)

Model 5: model 4 + family characteristics, including working mother and maternal gender attitudes

Model 6: model 5 + girl*maternal gender attitudes and girl*working mother

Model 7: model 6 + (log of) average wage of job

Appropriate weights were used to account for the complex sampling design of the survey and non-response bias (Plewis, 2007).

# Results

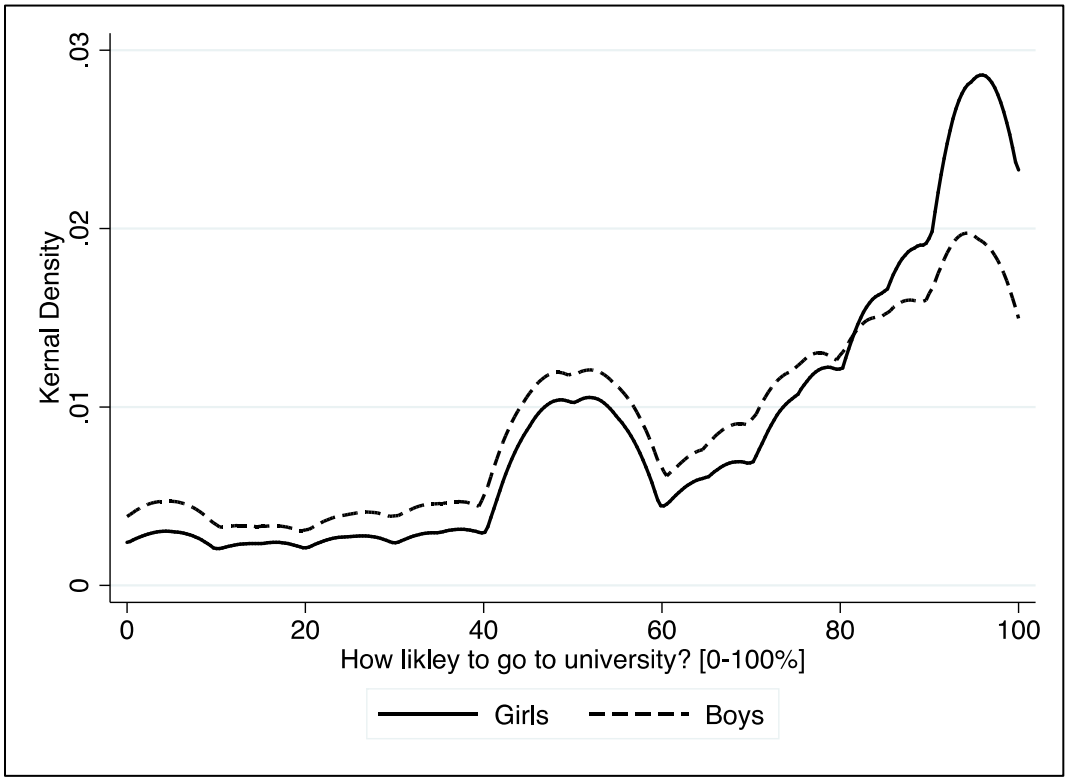
## Descriptive findings

### *University Expectations*

Latest UCAS figures show that 42% of 18-year old school leavers were accepted on to a university course in 2014[2]. The expectations among the MCS 14-year olds in 2015 were much higher than this. As Figure 2 illustrates, only a few teenagers thought they had a less than 40% likelihood of going to university. A fair share thought their chances were around 50:50, but most thought their likelihood of university attendance was 60% or higher. On average, girls thought they had a 71% chance of going, whereas boys were less certain – their average expectation was 63%. More girls were 100% sure that they would go: 14.4% to 9.7% of boys.

[2] https://www.ucas.com/sites/default/files/eoc-report-2015-v2.pdf#page=37

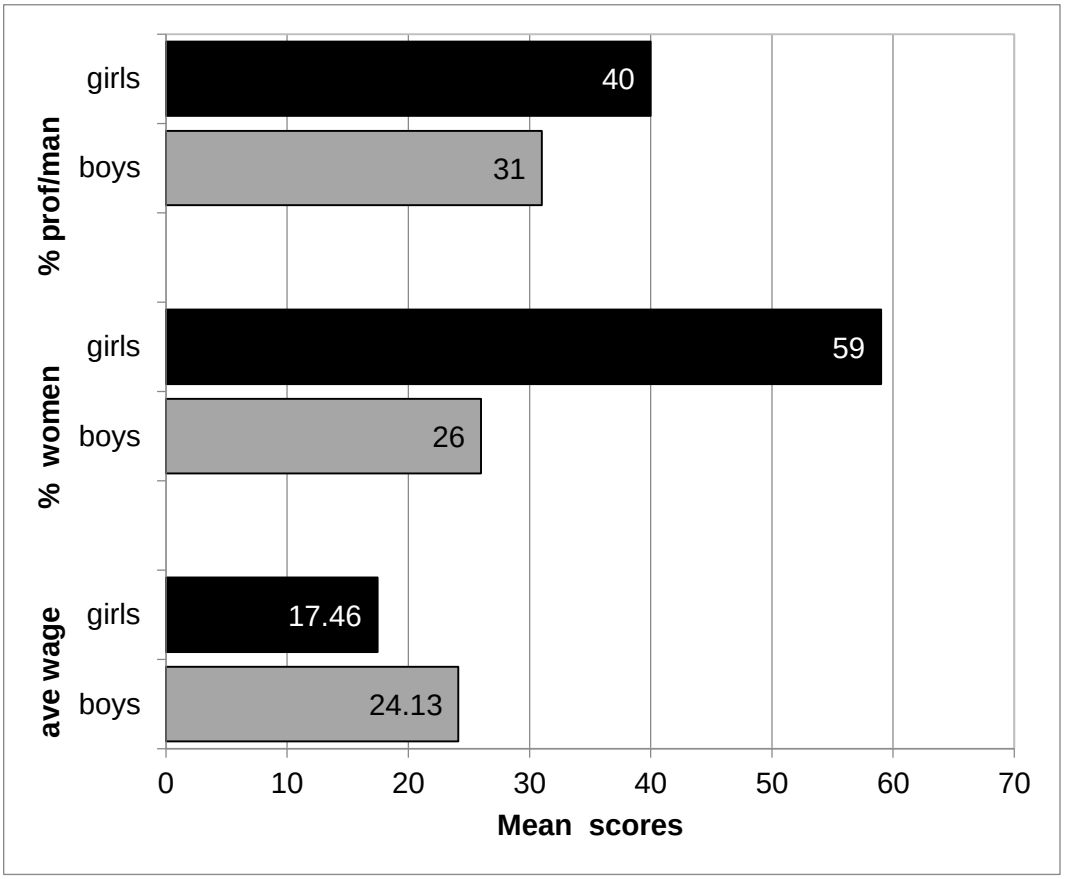
**Figure 2: How likely do you think it is that you will go to university?**




*Occupational Aspirations*

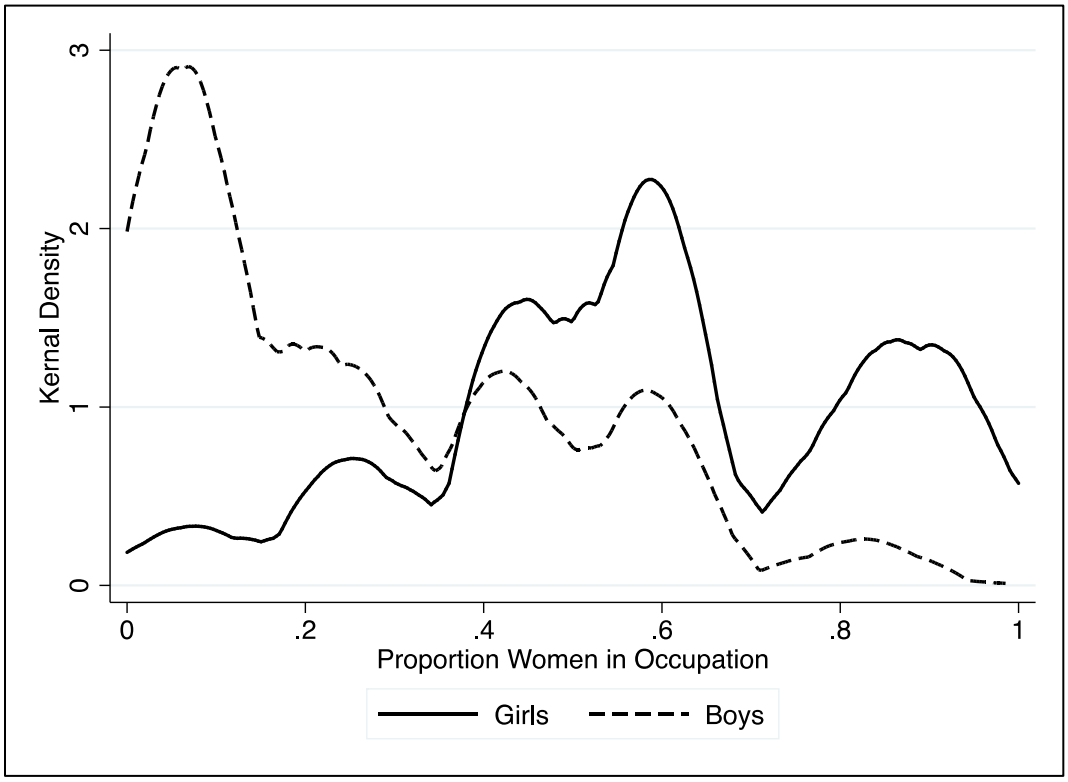
Around 1 in 3 teenagers had aspirations for a professional or managerial occupation, but Figure 3 shows this was significantly higher for girls (40%) than boys (31%). Despite their higher aspirations for professional and managerial jobs, teenage girls wanted to work in occupations that were female dominated (jobs with 59% women on average), while boys wanted to work in male dominated occupations (jobs that averaged 26% women).

**Figure 3: Occupation aspirations by gender**




If we relate this to the context of the labour market in which they were growing up, as we saw in Figure 1, this was highly segregated. While we do not expect that young people will necessarily observe the composition of female or male dominated jobs, nor that this will be a direct factor in occupational aspirations, the context of a gendered labour market provides the wider environment in which norms and expectations are developed and expressed. These norms are then likely to shame their own orientations. As we saw, the average occupation for women over the period 2003-2012 had a share of 70 per cent of women, whereas, overall, men were working in occupations with on average 32 per cent women. Boys' aspirations therefore are for jobs that are, if anything, more segregated than the labour market their fathers participated in, while girls are opting for jobs that are substantially less segregated than those held by women in the labour market they grew up in. This also comes through by looking at the full distribution in Figure 4, where we see how girls' aspirations are much more clustered around those jobs with around half women and half men.

**Figure 4: Distribution of share women in girls' and boys' aspired occupations, MCS age 14**

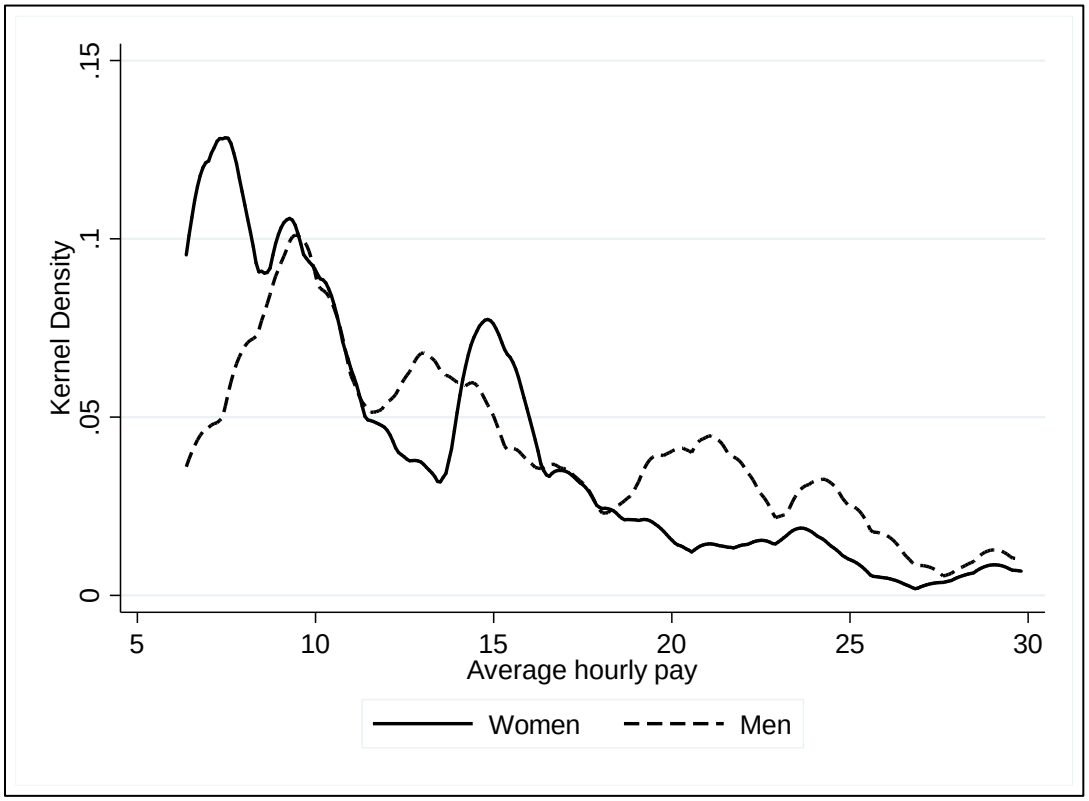



Nevertheless, girls' choices are more typically female than they would be if they were making 'gender neutral' choices, i.e. choices that reflected the total labour market while they were growing up, in which occupations held only 51 per cent women on average. Part of the reason why girls' choices tend towards a reduction in labour market segregation while boys' do not may be in part to do with the fact that both sexes are choosing 'good jobs', and good jobs and male-dominated jobs are, albeit imperfectly, correlated (correlation of around 0.3 between wages and the share of men in the pooled Labour Force Survey data).

We address this issue of how far job aspirations can be linked to their rewards in the multivariate analysis that follows. It is clear, however, from the lower panel of Figure 3 that both girls and boys are aspiring to high paying jobs. Again, we can draw on the Labour Force Survey to illustrate the context of the wage distribution at the time the children were growing up.

Figures 5 shows the wage distribution of men and women in the Labour Force Survey over the years 2003-2012. We can see how women are concentrated in the lower paying jobs, while men tend to dominate higher paying jobs. This illustrates how the contemporary pay gap is driven both by women being more likely to occupy low paying jobs as well as men having a premium in higher-paying jobs.

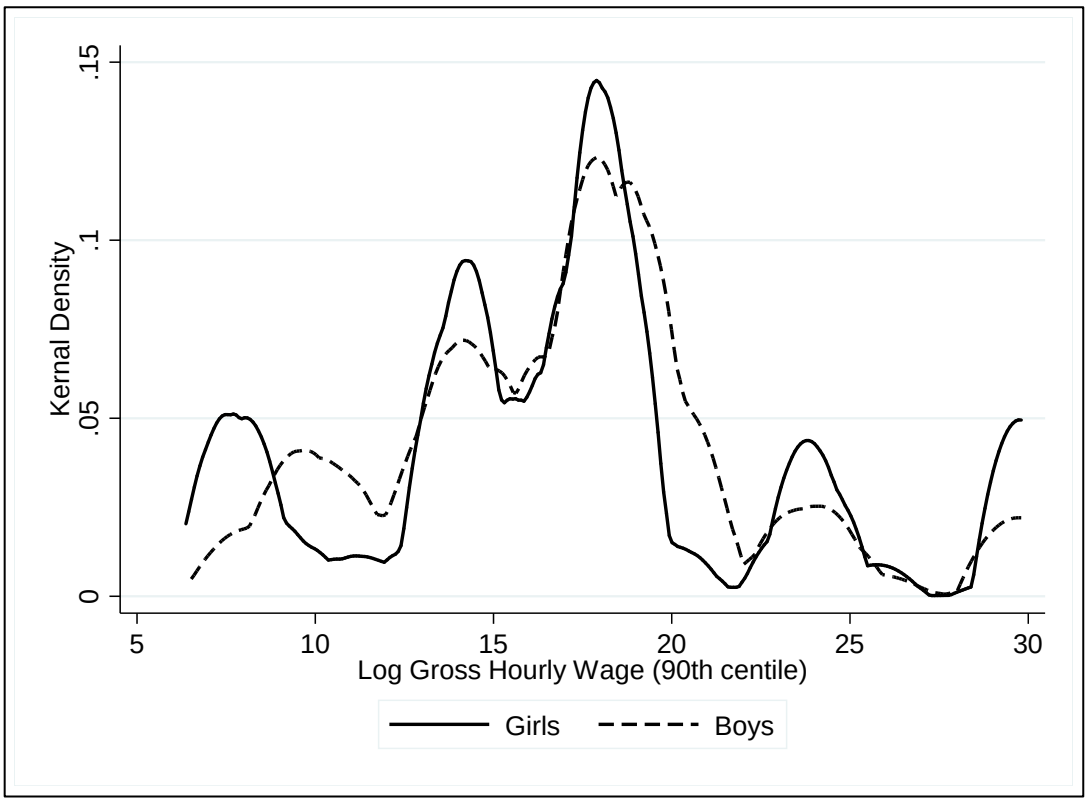
**Figure 5: Average wages of men and women, 2003-2012**




Source: Quarterly Labour Force Survey Jan-March 2003 to Oct-Dec 2012. For this illustrate, wages are censored at £30 per hour which is just above the 99th percentile. The mean wage for women over this period (at 2012 prices) was £12.51 (median £10.40), while that for men was £15.00 (median £13.50)

Figure 5 also illustrates that both boys and girls are aspiring to jobs with wages that are substantially higher than those their parents would have received (on average) while they were growing up. This is to be expected since these are aspirations with, as yet, no adjustment to labour market and family experience, nor actual educational attainment. Nevertheless, as Figure 3 and Figure 6 show, girls still aspired to lower paying jobs than boys. While some girls aspired to high-paying jobs, across the distribution the line for boys tends to be to the right of that for girls. The average gap is striking: and were girls and boys able to fulfil their aspirations, it would imply a pay gap that is greater than that which applies in today's labour market.

**Figure 6: Average log wage of aspired aspirations of girls and boys, MCS age 14 survey**




**Multivariate results**

We now move on to consider how far the differences between boys and girls are influenced by other individual and family characteristics and the extent to which particular factors are associated with higher or less gender-typical aspirations. We present the results from a series of nested linear regression models, as outlined above, focusing just on the measures of interest for this study. Full table of results are available on request.

*University expectations*

Table 2 shows that teenage girls' significantly higher expectations of going to university are robust to the inclusion of the full range of individual- and family-level characteristics (Models 1-4), though the gap is somewhat attenuated. However, model 5, which includes the interaction between gender equality attitudes and the sex of the child, shows that this effect of mother's egalitarianism is relatively large and statistically significant for girls only. That is, girls with more egalitarian mothers are more likely to anticipate they will attend university, net of other individual and family characteristics, including parental expectations relating to university attendance, which is itself strongly

and significantly related to children's expectations. By contrast, and as might be expected, such attitudes have no impact on boys' university expectations. Moreover, this interaction renders the main effect no longer significant. That is, girls with mothers with inegalitarian attitudes are no more likely to expect they will attend university than their male counterparts, other things being equal.

**Table 2: OLS regression results, University Expectations (0-1)**

| | m1 | m2 | m3 | m4 | m5 |
|---|---|---|---|---|---|
| Individual measures | | | | | |
| Girl | 0.08**** | 0.08**** | 0.05** | 0.04* | -0.04 |
| | (0.01) | (0.01) | (0.02) | (0.02) | (0.04) |
| Risk-taking propensity | | -0.06** | -0.08** | -0.05* | -0.05* |
| | | (0.03) | (0.03) | (0.03) | (0.03) |
| Girl*risk-taking | | | 0.05 | 0.03 | 0.03 |
| | | | (0.05) | (0.04) | (0.04) |
| Self-esteem | | 0.01**** | 0.01**** | 0.00**** | 0.00**** |
| | | (0.00) | (0.00) | (0.00) | (0.00) |
| Family measures | | | | | |
| Parent university expectation | | | | 0.12**** | 0.12**** |
| | | | | (0.00) | (0.00) |
| Gender-equality attitude | | | | 0.01 | -0.00 |
| | | | | (0.00) | (0.01) |
| Girl*gender-equality | | | | | 0.02** |
| | | | | | (0.01) |
| Working mother | | | | 0.02* | 0.01 |
| | | | | (0.01) | (0.01) |
| Girl*working mother | | | | | 0.01 |
| | | | | | (0.02) |
| Individual controls | NO | YES | YES | YES | YES |
| Family controls | NO | NO | NO | YES | YES |
| _cons | 0.56**** | 0.49** | 0.58*** | 0.25 | 0.29* |
| | (0.01) | (0.19) | (0.19) | (0.17) | (0.17) |
| *N* | 7769 | 7769 | 7769 | 7769 | 7769 |
| $R^2$ | 0.017 | 0.108 | 0.108 | 0.270 | 0.271 |

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Individual characteristics: gender, ethnicity, cognitive ability (age 11), age sat test (age 11), risk-taking behaviour (age 11), season born in, self-esteem (age 11).

Family characteristics: parent qualifications (age 14), family income quintiles (age 14), lone parenthood (age 14), number of older siblings (birth), mother in work (age 14) parent support for gender equality (age 5), how likely parent thought their child would go to university (age 11).

Turning to our other measures of interest, having high self-esteem was positively associated with higher expectations of going to university. This aligns with the agentic

understandings of the role of self-esteem in decision making (Polavieja and Platt 2014). By contrast, risk-taking was negatively associated with university expectations. We discussed above how risk-aversion is sometimes associated with lower propensity to commit to higher education, depending on the uncertainty associated with different choices, while impulsiveness might also be associated with lower expectations of attending higher education. Here we see clearly that it is risk taking rather than risk aversion that reduces expectations of university attendance, in line with interpretations of risk-propensity as more impulsive behaviour. It also aligns with the extent to which (as reflected in high average expectations), tertiary education is viewed as a normative future pathway, even if in practice fewer than half of the cohort might be expected actually to complete it in the end.

As well as maternal gender role attitudes being strongly associated with university expectations for girls, we see that having a working mother is also associated with higher expectations of university – but in this case, the effect applies to girls and boys equally.

Given the differences in education systems in different parts of the UK (e.g. the fact that fees do not apply to higher education in Scotland), we also estimated an additional model in which we included country dummies. As anticipated, there was a positive association between living in Scotland (and also living in Northern Ireland) and university expectations compared to living in England. The main results, however, remained unchanged.

Having established the higher university expectations of girls, and the importance of family expectations, we next review how far their occupational aspirations differ, including when we add in their university expectations, which might be expected to drive aspirations for 'better' jobs.

*Professional or Managerial occupation aspirations*

We first use the extended sample to consider how far teenage girls and boys differ in their expectations for a 'good' or 'service' class, professional / managerial occupation. Table 3 shows that teenage girls have higher aspirations for professional or managerial occupations than teenage boys. This association is robust to the inclusion of the full range of individual and family characteristics, including their expectations of university attendance which are positively associated with professional / managerial expectations (though the effect size is small). This indicates that, girls' occupational expectations,

even if descriptively they appeared to be somewhat lower than boys' (Figure 3, above), are sufficiently clustered above the threshold for this category of professional or managerial expectations to exceed boys' more diffuse distribution of expectations.

**Table 3: Linear Probability Model regression results, Professional or Managerial occupation aspirations**

| | m1 | m2 | m3 | m4 | m5 | m6 |
|---|---|---|---|---|---|---|
| Individual measures | | | | | | |
| Girl | 0.08**** | 0.09**** | 0.05**** | 0.10* | 0.08* | 0.16** |
| | (0.01) | (0.01) | (0.01) | (0.05) | (0.05) | (0.08) |
| Risk-taking propensity | | -0.04 | -0.02 | 0.03 | 0.02 | 0.02 |
| | | (0.04) | (0.04) | (0.06) | (0.06) | (0.06) |
| Girl*risk-taking | | | | -0.08 | -0.07 | -0.08 |
| | | | | (0.09) | (0.09) | (0.09) |
| Self-esteem | | 0.00** | 0.00 | 0.00 | -0.00 | -0.00 |
| | | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| University expectations | | | 0.43**** | 0.43**** | 0.42**** | 0.42**** |
| | | | (0.02) | (0.02) | (0.02) | (0.02) |
| Family measures | | | | | | |
| Maternal gender-equality attitude | | | | | 0.01 | 0.01 |
| | | | | | (0.01) | (0.01) |
| Girl*gender-equality | | | | | | -0.01 |
| | | | | | | (0.01) |
| Working mother | | | | | 0.01 | 0.03 |
| | | | | | (0.02) | (0.02) |
| Girl*working mother | | | | | | -0.04 |
| | | | | | | (0.03) |
| Individual level controls | NO | YES | YES | YES | YES | YES |
| Family level controls | NO | NO | NO | NO | YES | YES |
| _cons | 0.23**** | 0.21 | -0.00 | 0.03 | 0.02 | -0.01 |
| | (0.02) | (0.35) | (0.34) | (0.34) | (0.35) | (0.35) |
| *N* | 7769 | 7769 | 7769 | 7769 | 7769 | 7769 |
| $R^2$ | 0.008 | 0.021 | 0.082 | 0.082 | 0.087 | 0.088 |

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Individual characteristics: gender, ethnicity, cognitive ability (age 11), age sat test (age 11), risk-taking behaviour (age 11), season born in, self-esteem (age 11). Teenagers own university aspirations (14) model 4 – 6.

Family characteristics: parent qualifications (age 14), family income quintiles (age 14), lone parenthood (age 14), number of older siblings (birth), mother in work (age 14) parent support for gender equality (age 5), how likely parent thought their child would go to university (age 11).

Having higher self-esteem was also positively associated with high career aspirations, in line with expectations; but given the association of self-esteem with university

expectations this effect disappeared on the inclusion of university expectations. Hence the effect of positive self-concept appears to operate via educational expectations. This provides an interesting additional insight into how self-esteem operates, building on earlier findings (Polavieja and Platt 2014). Our other measures of interest were not significantly associated with this outcome, potentially indicating the inability of this binary measure to adequately capture the distinctions in aspirations that are likely to drive girls' and boys' subsequent choices and behaviours.

With this in mind we turn to considering the more specific attributes of the jobs that girls and boys aspire to, namely the wages associated with them and the degree of gender segregation, operationalised as the share of women in the occupation.

*Average hourly wage*

Table 4 illustrates the associations with the log wage of the aspired job. In line with the descriptive findings we see that teenage boys were significantly more likely to want a job that has higher earning potential. Girls' job choices were associated with a pay deficit of over 20 per cent of boys' aspired wages. We see that this deficit is robust to the inclusion of individual level characteristics. Among those individual level characteristics, we see that self-esteem is associated with expectations of higher wages, but, again this is mediated by the association of self-esteem with higher university expectations.

**Table 4: OLS regression results, (log of) Average Hourly Wage**

| | m1 | m2 | m3 | m4 | m5 | m6 |
|---|---|---|---|---|---|---|
| Individual measures | | | | | | |
| Girl | -0.23**** | -0.22**** | -0.25**** | -0.12* | -0.10 | -0.16 |
| | (0.02) | (0.02) | (0.02) | (0.07) | (0.07) | (0.12) |
| Risk-taking behaviour | | 0.07 | 0.09 | 0.23** | 0.23** | 0.24** |
| | | (0.06) | (0.06) | (0.10) | (0.10) | (0.10) |
| Girl*risk-taking | | | | -0.25** | -0.28** | -0.28** |
| | | | | (0.12) | (0.12) | (0.11) |
| Self-esteem | | 0.01** | 0.00 | 0.00 | 0.00 | 0.00 |
| | | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| University expectations | | | 0.35**** | 0.35**** | 0.29**** | 0.29**** |
| | | | (0.04) | (0.04) | (0.03) | (0.03) |
| Family measures | | | | | | |
| Maternal gender-equality attitude | | | | | 0.00 | -0.01 |
| | | | | | (0.01) | (0.02) |
| Girl*gender-equality | | | | | | 0.02 |
| | | | | | | (0.02) |
| Working mother | | | | | 0.04 | 0.06* |
| | | | | | (0.02) | (0.03) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Girl*working mother | | | | | | -0.05 (0.04) |
| Individual level controls | NO | YES | YES | YES | YES | YES |
| Family level controls | NO | NO | NO | NO | YES | YES |
| _cons | 3.23**** (0.03) | 3.12**** (0.47) | 2.95**** (0.46) | 2.63**** (0.46) | 2.50**** (0.46) | 2.50**** (0.46) |
| *N* | 5445 | 5445 | 5445 | 5445 | 5445 | 5445 |
| $R^2$ | 0.051 | 0.073 | 0.109 | 0.111 | 0.120 | 0.121 |

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Individual characteristics: gender, ethnicity, cognitive ability (age 11), age sat test (age 11), risk-taking behaviour (age 11), season born in, self-esteem (age 11). Teenagers own university aspirations (14) model 4 – 6.

Family characteristics: parent qualifications (age 14), family income quintiles (age 14), lone parenthood (age 14), number of older siblings (birth), mother in work (age 14) parent support for gender equality (age 5), how likely parent thought their child would go to university (age 11).

We posited that risk propensity would be associated with higher wages, and that this effect would potentially be more pronounced for boys. In Models 2 and 3 we see no direct effect of risk taking, but in Model 4, when we interact the risk-taking measure with the child's sex, we see a large and significant positive association for boys, that is entirely negated for girls. Hence, the main effect in Model 4, which remains negative and significant prior to the inclusion of family-level controls is the predicted gap in wages of aspired job for a risk-averse girl compared to a risk averse boy. This main effect becomes smaller and non-significant on the inclusion of family characteristics, but an entirely risk-loving girl is expected to have a significantly lower wage than a risk-loving boy, for whom the main effect of risk-taking is positive and significant. Thus we see the expected association of risk propensity with wages, but only for boys.

Given that a substantial number of boys were, even at age 14, aspiring to be sports professionals, a group who command large average wages in the Labour Force Survey, we carried out additional analysis excluding those who chose this option to see if it was driving the results. While it remains relevant that these boys are seeing their future in terms of sports roles, particularly when we consider the implications for labour market norms and occupational segregation, these relatively unrealistic expectations may not be especially informative about the extent to which they are 'aiming high' in job aspirations. In the additional analysis, which excluded those who selected sports professional occupations, the size of the effects on risk taking reduced

substantially, demonstrating that these choices are indeed associated with greater impulsivity or risk taking. Nevertheless, they remained statistically significant and showed the same pattern –i.e. a significant and positive coefficient for risk-taking for boys that was counterbalanced by a negative interaction with risk-taking for girls, while the main effect of girl with wages remained negative. This suggests that the wage implications of risk-propensity are not being driven by the choices of a select group or boys but reflect a broader insight into how more risk-loving boys envision their futures.

Among the other characteristics of interest, mother's gender egalitarianism did not appear to translate into girls' aspiring to higher paying jobs. However, having a working mother was positive for the aspired wages in boys' rather than girls' jobs (model 6). This finding was rather against our expectations, but can potentially be understood in relation to the jobs that mothers are observed to be doing. It merits further investigation.

*Proportion of women working in an occupation*

Finally, we turn to our concern with the extent to which boys and girls are developing more or less gender-typical aspirations in relation to their future jobs. Table 5 shows the set of nested models predicting the share of women in the aspired occupation. What is most striking is the size and the persistence of the association of higher proportions of women across the full set of models, amounting to a gap of over 30 percentage points in the share of women in the jobs aspired to.

**Table 5: OLS regression results, Proportion Females working in Occupation**

| | m1 | m2 | m3 | m4 | m5 | m6 | m7 |
|---|---|---|---|---|---|---|---|
| **Individual measures** | | | | | | | |
| Girl | 0.32**** | 0.41*** | 0.54**** | 0.56**** | 0.56**** | 0.56**** | 0.50**** |
| | (0.01) | (0.05) | (0.05) | (0.04) | (0.04) | (0.05) | (0.05) |
| Self-esteem | | 0.00 | -0.00 | | | | |
| | | (0.00) | (0.00) | | | | |
| Girl*self-esteem | | -0.01** | -0.00 | | | | |
| | | (0.00) | (0.00) | | | | |
| University expectations | | | 0.22**** | 0.22**** | 0.24**** | 0.24**** | 0.26**** |
| | | | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| Girl*university expectations | | | -0.28**** | -0.29**** | -0.29**** | -0.29**** | -0.23**** |
| | | | (0.03) | (0.03) | (0.03) | (0.03) | (0.03) |
| Risk-taking behaviour | | | | 0.03 | 0.04 | 0.03 | 0.07** |
| | | | | (0.03) | (0.03) | (0.03) | (0.03) |
| Girl*risk-taking | | | | -0.08 | -0.07 | -0.07 | -0.12** |
| | | | | (0.05) | (0.05) | (0.05) | (0.05) |
| Average hourly wage | | | | | | | -0.16**** |
| | | | | | | | (0.01) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Family measures | | | | | | | |
| Gender-equality attitude | | | | | -0.00 | 0.00 | 0.00 |
| | | | | | (0.00) | (0.01) | (0.00) |
| Girl*gender-equality | | | | | | -0.00 | -0.00 |
| | | | | | | (0.01) | (0.01) |
| Working mother | | | | | 0.01 | 0.00 | 0.01 |
| | | | | | (0.01) | (0.01) | (0.01) |
| Girl*working mother | | | | | | 0.02 | 0.00 |
| | | | | | | (0.02) | (0.02) |
| Individual | NO | YES | YES | YES | YES | YES | YES |
| Family | NO | NO | NO | NO | YES | YES | YES |
| _cons | -0.06**** | -0.21 | -0.30 | -0.33 | -0.28 | -0.28 | 0.14 |
| | (0.01) | (0.21) | (0.21) | (0.21) | (0.21) | (0.21) | (0.19) |
| *N* | 5445 | 5445 | 5445 | 5445 | 5445 | 5445 | 5445 |
| $R^2$ | 0.313 | 0.317 | 0.343 | 0.343 | 0.349 | 0.349 | 0.418 |

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Individual characteristics: gender, ethnicity, cognitive ability (age 11), age sat test (age 11), risk-taking behaviour (age 11), season born in, self-esteem (age 11). Teenagers own university aspirations (14) model 4 – 7, average wage of the occupation model 7.

Family characteristics: parent qualifications (age 14), family income quintiles (age 14), lone parenthood (age 14), number of older siblings (birth), mother in work (age 14) parent support for gender equality (age 5), how likely parent thought their child would go to university (age 11).

The robustness of this association to the full range of family and individual level characteristics is striking. It indicates that regardless of their educational aspirations and other characteristics, girls and boys are anticipating working in very different types of occupation. This effect is, moreover, not driven by the different rewards associated with different types of occupations preferred by boys and girls: Model 6 shows that the wage in the aspired occupation is negatively and strongly associated with the share of women, as we might expect, but the differences between girls and boys in the occupations measured in terms of their share of women remain. While, as noted in previous research (Polavieja and Platt 2014), there is only a limited direct association between the actual jobs aspired to and the jobs men and women actually carry out, there is an association between the share of women in aspired and achieved aspirations. That is, the more gendered the aspirations the more likely men and women are to work in segregated occupations, hence reproducing gender segregation over time and across generations and contributing to Ridgeway's 'paradox'. Moreover, the extent to which more gender-typical aspirations are the norm is revealing about the

contexts in which teenage girls and boys find themselves, with strong expectations of gender-normative behaviours and hence future orientations.

This brings us to consider whether there are characteristics associated with less gender-normative aspirations. Mothers' gender role attitudes and work status appear to have no impact in the gendered occupational choices of either their sons or daughters. At the individual level, we see effects in the expected direction for self-esteem, but these are entirely captured by differences in university expectations. Higher university expectations are associated with higher shares of women in the job for boys, perhaps suggesting the sorts of professional jobs that are becoming increasingly feminised, while jobs with higher shares of men do not necessarily require university level qualifications. We see the reverse relationship for girls, for whom university qualifications suggests higher status and thus less feminised occupations.

We posited a potential role for risk-propensity in enabling boys and girls to act in ways that were not reinforced by their peers. When we interact risk-taking with the sex of the teenager, we observe effects in line with our expectations (a positive association with share female for boys and a negative association with share female for girls). But it is only when we control additionally for wage, that these interactions become statistically significant. This makes sense as we already observed that risk-propensity is associated with higher waged occupational preferences for boys, and, if anything lower waged preferences for girls. Hence, once we condition on the wage of the occupation, we find that boys who take higher risks are more likely to aspire to occupations with a higher share of women. For girls we do not observe this effect: if anything, they aspire to occupations with a lower share of women when they have higher risk propensity, in line with similar non-normative processes. Though not huge these effects are not negligible either. A move from the least to the most risk-taking among boys is associated with a six percentage point increase in the share of women in the aspired occupation. We also note that our final model is able to account for a substantial share of the variance in occupational choices.

Once again, we checked that the results were robust to the exclusion of those boys who aspired to sports professional occupations, and were able to show that they were. In a further specification we also adjusted for girls' and boys' own gender role attitudes. These are potentially endogenous to the outcome variable, so were not included in our preferred specification. (Additional models available on request.) These additional analyses illustrated that gender egalitarianism was positively associated with the share of women in their occupation for boys and negatively associated with the share of

women for girls, as we would expect. This does suggest that the attitudes that are formed at home and at school can also be influential in shaping future labour markets and the gendered organisation of society.

## Conclusions

Despite multiple gains in employment on many fronts and dominance of gender egalitarian attitudes in Western societies, systematic gender inequalities remain and are perpetuated across generations. In this paper we set out to ascertain how far the future educational and labour market orientations of girls and boys differ, and the extent to which individual and family characteristics aspirations for the future.

We found that girls had higher average expectations for university attendance than boys, and that critical in the formation of these expectations was the gender egalitarianism of their mothers. Moreover, self-esteem was also important in leading teenagers to develop expectations of university attendance (controlling for cognitive ability and family background); while risk-propensity was negatively associated with university expectations. Girls were also more likely to select occupations that are broadly characterised as professional or managerial, but this did not imply, when looking in more detail at occupational choices, that they were selecting occupations that offered greater financial rewards. Rather, they were selecting occupations in which the average pay is substantially lower than those selected by teenage boys. At the same time, there was a complex interaction with risk-propensity: this heightened the wage expectations for boys (even when discounting those who wanted to be sports professionals) while risk-propensity, if anything, reduced the wage expectations of girls. While the higher wages associated with boys' higher risk propensity were in line with our expectations, the converse finding for girls suggests that the (gender atypical) impulsiveness associated with risk propensity may lead to heterogeneous effects.

Our key interest was, however, in the extent to which girls and boys were aspiring to occupations that were gender-typical and would therefore tend to both reflect and reproduce gendered norms and a gendered social order. We found substantial gaps in the share of women in the jobs that teenage boys and girls aspired to, and these could not be accounted for by individual or family characteristics. It then becomes highly relevant for both understanding the mechanisms behind this gendered reproduction and, potentially for policy, to ascertain what characteristics were associated with less gender-typical choices. We hypothesised that at the individual level both self-esteem and risk-taking would be linked to less gender-typical preferences, while at the family level, we anticipated that mothers' egalitarianism and

work status might shape their sons' and daughters' preferences. Interestingly, we were not able to support our expectations in relation to mothers' attitudes and behaviour for either sons or daughters, but we did observe that those who are more risk-taking were more likely to defy gender-typical patterns of future orientations, even if the size of the effect is modest.

In all these analyses, we drew on the rich set of covariates that are available in the Millennium Cohort Study to ensure that our results were not confounded by family background or child cognitive ability. We could also employ measures of our key covariates taken at earlier sweeps to capitalise on the potential of temporal ordering for more closely approximating causal relationships, though we would not like to go so far as to claim that the identified effects are causal.

There are clearly some limits to our analysis, and there are some results we are not adequately able to account for. Nevertheless, we consider that our paper moves forward our understanding of the gendered reproduction of labour markets and how girls and boys make choices in the context of strong socially endorsed gendered norms.

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