

Nurse or Mechanic?

Nurse or Mechanic? The Role of Parental Socialization and Children's Personality in the Formation of Sex-Typed Occupational Aspirations

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Boys and girls with sex-typical aspirations are significantly more likely to end up in sex-typical jobs as adults. Preference formation among children is therefore relevant for subsequent occupational outcomes. This study investigates the role of parental socialization and children's agency in the formation of sex-typed occupational preferences using data for British children aged 11 to 15. We anchor agency in observable psychological attributes associated with children's capacity to act in the face of constraints. We focus on two such attributes, motivation and self-esteem. Our findings identify two main sources of parental influence: (1) parental sex-typical behaviors, from which children learn which occupations are appropriate for each sex; and (2) parental socio-economic resources, which affect children's occupational ambition. We find, additionally, that girls with high motivation and both girls and boys with high self-esteem are less likely to aspire to sex-typical occupations, net of parental characteristics. Motivation and self-esteem help girls aim higher in the occupational ladder, which automatically reduces their levels of sex-typicality. For boys, however, self-esteem reduces sex-typicality at all levels of the aspired occupational distribution. This suggests that boys with high self-esteem are better equipped to contradict the existing social norms regarding sex-typical behavior. Implications are discussed.

Introduction

Even today, most people work in jobs occupied largely by persons of their own sex (see, e.g., Chang 2004; Tomaskovic-Devey et al. 2006). Although this is true for both men and women, segregation is more acute for the latter, as they

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tend to concentrate in fewer occupations. Predominantly female occupations offer lower wages and fewer opportunities for career advancement, and hence segregation is often regarded as the main source of women's labor-market disadvantage (see, e.g., Maume 1999; Tomaskovic-Devey 1993). It is therefore not surprising that the study of gender segregation has for long been placed at the center of gender stratification research.

Gender segregation in occupations is the result of the actions and interactions of both firms and workers. Discrimination and social closure explanations focus on the role that employers, managers, and male coworkers play in hindering women's access to particular jobs (Roscigno, Garcia, and Bobbitt-Zeher 2007). However insightful, demand-side approaches cannot explain the existence of significant sex differences in career preferences and occupational aspirations, not only among adults, but also among young children who lack labor-market experience (Harper and Haq 2001; Okamoto and England 1999).

Sociologists have long stressed the crucial role that socialization processes play in the transmission of sex-specific norms, values, and aspirations leading to segregated occupational outcomes (Hitlin 2006; Okamoto and England 1999). According to classical socialization approaches, early childhood experiences would have a prime impact on the formation of gendered preferences, leaving a long-lasting imprint on people's lives. Gender socialization models provide a supply-side alternative to human capital and sphere specialization models in economics (Polavieja 2009) as well as to socio-biological and evolutionary explanations of gender-role differentiation (Kanazawa 2001; Udry 2000).

The existing sociological literature on gender socialization suffers, however, from two important empirical limitations. First, research has been much more concerned with establishing empirical associations, typically associations between parents' and children's characteristics, than with explaining the mechanisms whereby socialization influences operate (Reskin 2003). Consequently, we still know little about the actual channels and processes involved in the intergenerational transmission of sex-typed preferences. Second, empirical studies often draw on adult samples to address socialization processes that are thought to take place during childhood, which further complicates the identification of transmission mechanisms. As a result of these caveats, socialization is still largely a black box in gender stratification research.

Conventional socialization approaches have also been subjected to two important theoretical criticisms. First, it has been argued that classical approaches overemphasize the importance of early childhood experiences as primary sources of socialization (see, e.g., Corsaro and Fingerson 2003; Elder 1994). New approaches in developmental psychology, social psychology, and life-course research contend that socialization is a lifelong process and stress the *continuing* socializing role of small-group interactions, contextual influences, and peer effects (for a review, see Correll and Ridgeway 2003; Corsaro and Fingerson 2003; Elder 1994). The degree to which early socialization experiences have a lasting effect on subsequent adult behavior is today a contested theoretical question, which is still open to empirical testing.

A second criticism of classical socialization approaches is that they leave very little room for individual agency. It has been argued that socialization models typically portray actors as passive receptors of gender values and norms, and assume that all individuals are equally malleable by social influences. This leads to an over-socialized conception of human behavior (Gecas 2003; Hakim 1991; Hays 1994). In our view, this neglect of agency constitutes a fundamental theoretical shortcoming of conventional approaches. Understanding what the role of individual agency is and how it interacts with the social environment in the formation of sex-typical preferences is not only a crucial question for the development of gender socialization theory, but one that can shed light on the structure/agency debate that runs so deep in the sociological discipline (Corsaro 2005, chapter 1). Yet such a task poses one fundamental methodological challenge; namely, how to measure human agency.

In much of the existing empirical literature, agency has been equated with preference heterogeneity (see, e.g., Hakim 1991, 2000). Since individual preferences are seldom observed, it is often assumed that agency is to some extent represented by the amount of unexplained variance in empirical models (Hitlin and Elder 2007). In other words, individual agency is typically not measured but only inferred. This indirect approach carries with it the serious risk of over-individualization; that is, magnifying individuals' capacity to make independent choices. In order to shed empirical light on the socialization versus agency debate, it is therefore essential to find more direct ways of measuring the role of individual agency in preference formation.

This paper investigates the degree of sex-typicality in the occupational aspirations of British children under 16 and tests for different mechanisms involved in the acquisition of sex-typical occupational preferences. We establish that early occupational preferences have a real impact on occupational outcomes in adult life. We then address the following research questions: *First*, we want to know *whether* parental characteristics and parental behavior influence the degree of sex-typing in children's occupational aspirations, and if so, *how*. To this end, we propose an eclectic theory of parental socialization that incorporates explicit channels and mechanisms, which are empirically testable.

Second, we investigate the role of children's agency in the formation of occupational preferences. Hitlin and Elder (2007) argue that current sociological treatments of agency are too abstract to offer guidance for empirical research but can be illuminated by social psychology. They call for anchoring the "slippery concept" of agency in measurable psychological attributes. We put their recommendation into practice. We expect that children's heterogeneity in occupational preferences is associated with the distribution of certain psychological characteristics in the population. We are interested, specifically, in those psychological attributes that can exert an influence on individuals' capacity to act in the face of constraints—and hence to resist socialization pressures. We focus on two such attributes: motivation and self-esteem. We argue that if agency plays a role in the formation of occupational preferences, we should find an association between these personality attributes and the level of sex-typicality in children's occupational aspirations.

We test our model using information on parental, relational, and psychological variables for a representative sample of over 3,000 British children aged 11 to 15. This sample is drawn from waves 4 to 18 of the British Household Panel Survey (1994–2008). Over one-third of the children in this sample can be followed into their early occupational outcomes as adults. By investigating early gender differences in occupational aspirations, our approach helps open the black box of parental gender-role socialization, sheds light on the agency-structure debate, and fills an important gap in the sociological literature on gender segregation.

Theoretical Framework

Parental Socialization

Following Arnett (1995, 618), we can define socialization as “the process by which people acquire the behavior and beliefs of the social world—that is, the culture—in which they live.” The most important—but certainly not the only—agent of primary socialization in gender roles is the family (Bandura 1977; Cunningham 2001; Hitlin 2006; Okamoto and England 1999). But how can families shape children’s occupational aspirations? Drawing on social stratification, social learning, and developmental psychology, we identify two main channels of parental influence: (1) parental behavior in the economic and domestic spheres; and (2) parental socio-economic resources.

Behavioral role-modeling: Occupational imitation and sex-role learning According to role-model theories, children first learn about gender roles by observing and emulating the behaviors of their parents (Bandura 1977). Empirical studies have found a significant statistical association between the present behavior of daughters and the past behavior of their mothers in areas such as family formation, housework distribution, and female labor-market participation (see, e.g., Cunningham 2001; van Putten, Dykstra, and Schippers 2008). This evidence has been interpreted as proof of behavioral role-modeling. Yet it is still unclear *how* role-modeling actually operates. This is partly due to the shortage of data that can measure parental behavior contemporaneously with the formation of children’s preferences.

We distinguish between two different forms of sex-role-modeling: simple *imitation* and *behavioral sex-role learning*. Imitation is an essential component in children’s observational learning based on live models (Bandura 1977). Developmental psychologists have shown that pure imitation of same-sex parents plays a crucial role in infants’ sex-role learning (Bussey and Bandura 1999). The essential precondition for same-sex imitation is children’s identification with their same-sex parent. Today there is a growing consensus among developmental psychologists that same-sex identification is probably innate, as it requires some form of preexisting gender identity (Martin, Ruble, and Szkrybalo 2002). Same-sex identification with peers is also known to be strong among infants and pre-adolescent children (Corsaro and Fingerson 2003, 143–44).

We propose to test for *direct occupational imitation* as one potential mechanism of occupational socialization. Occupational imitation is expected to be homo-linear; that is, daughters are expected to aspire to their mother's occupation, while sons are expected to aspire to their father's. Direct occupational imitation will lead to sex-typed aspirations among daughters (sons) insofar as their mothers (fathers) work in segregated occupations themselves (H1). Occupational reproduction through imitation could therefore be the simplest form of intergenerational transmission of sex-typed occupational aspirations.

Behavioral sex-role learning is the process by which children discover and absorb what the prescribed behavior for their sex is by observing the actions of their parents (see, e.g., Crouter, Manke, and McHale 1995). This learning process is indeed more complex and cognitively demanding than simple imitation. Children must first identify socially prescribed gender roles by examining the behavior of their own parents and then form expectations about the costs and benefits of deviating from sex-typical behavior. Parents can be active or passive gender-role models for children. Active parents stimulate children's compliance with gender norms directly by using sanctions and rewards, which can be more or less subtle (Bandura 1977). But parents can also enact gender roles insentiently, simply because their sex-patterned behaviors *embody* the social structure.

Eagly (1987) builds on social-role theories to explain how sex-differentiated behaviors are replicated and sustained within an unequally structured society. The thrust of her argument is that sex-patterned behaviors provide crucial information about the social structure because they encapsulate the social constraints under which men and women carry out their lives (see also Eagly, Wood, and Diekmann 2000). By observing parental sex-typical behaviors in both the domestic and the public spheres, children learn about the social distribution of opportunities between the sexes. This implies that parental sex-typical behaviors can foster adaptive gendered processes of aspiration and sex-role assumptions even if parents do not actively seek to transmit traditional gender norms. We thus expect parents' sex-typical behaviors to promote sex-typical occupational aspirations among children (e.g., nurse for girls, mechanic for boys) even if such aspirations do not entail copying the exact occupations of their same-sex parents (H2).

More precisely, we expect that girls (boys) whose mothers (fathers) are employed in traditionally female (male) occupations develop more sex-typical occupational aspirations than girls (boys) whose mothers (fathers) are employed in less traditional jobs (H2a). Similarly, we expect that children living in households with a traditional distribution of housework—that is, where mothers do more than fathers—(H2b) and children of mothers with low labor-market attachment (H2c) develop more sex-typical occupational aspirations than children living in households with less traditional arrangements.

Parental resources, occupational ambition, and sex-typing It is well known that children's educational and occupational attainment is highly dependent on parental background (see, e.g., Gamoran 1996). Families with greater cultural and economic resources tend to have higher attainment aspirations for their offspring and to transmit these aspirations to children themselves. They are also

in a position to directly support their children's occupational ambition through increased opportunities and investment. We call this the *ambition* effect of parental resources. This ambition effect, we believe, can have implications for the degree of sex-typicality of girls' occupational preferences but not necessarily of boys'. This is because top-level occupations are traditionally male dominated. Hence for girls, aiming high on the occupational ladder typically means aspiring to occupations that are not female dominated. Yet boys have many sex-typical occupations to choose from at both ends of the occupational distribution and hence increasing occupational ambition has no obvious bearing on the degree of sex-typicality of their aspirations. Parental resources affecting children's occupational ambition are therefore expected to affect the degree of sex-typing in daughters' occupational aspirations (H3a), while having a neutral effect on sons' (H3b).

The role of personality In recent years, research in economics and sociology has paid increasing attention to certain psychological attributes that are shown to be relevant to socio-economic success (see, e.g., Heckman, Stixrud, and Urzua 2006; Jackson 2006). In research practice, these attributes are often reduced to composite indices that tap on the correlation between various measures of personal drive, motivation, and self-esteem (Carneiro and Heckman 2005). In competitive environments, such personality characteristics, often referred to as noncognitive skills, are expected to exert a crucial influence on individuals' attainment chances. The idea that personality attributes and dispositions might critically influence goal-oriented behavior comes from social and developmental psychology (Bandura 1997; Jacobs et al. 2002; Wigfield and Eccles 2000).

In this study, we focus on two psychological attributes, motivation and self-esteem, which are relevant in influencing children's capacity to act in the face of constraints. While both motivation and self-esteem promote achievement-oriented behavior, and can be regarded as partially overlapping, we expect self-esteem to have the additional effect of enhancing children's capacity to make independent choices. This expectation follows directly from Bandura's self-efficacy theory (Bandura 1977, 1990), which sees individuals' beliefs about their own capabilities as the core psychological determinant of human agency, understood as human's capacity for action in the face of constraints (see also Gecas 2003; Hitlin and Elder 2007).

While Bandura (1990) argues that self-efficacy is different from self-esteem, a number of authors have highlighted the intrinsic connection between the two, via self-competence, a critical dimension of self-esteem.¹ Tafarodi and Milne (2002), among others, argue that feelings of self-competence are so deeply intertwined with self-efficacy that the conceptual distinction between the two should be relaxed in practice.² For them, self-efficacy and self-competence are but two sides of the same cumulative process: that of exercising efficacious action. Similarly, Gecas (2003, 371) argues that self-efficacy is a prime source of self-esteem and hence considers both concepts as crucial components of agency.³ We concur with these approaches and treat self-esteem as (indirectly) reflecting people's capacity for autonomous action. This interpretation is in line with

accumulated empirical evidence in psychology showing that people with high self-esteem have greater initiative and hence greater capacity to deviate from the group's consensus (see Baumeister et al. 2003).⁴

We thus posit that both motivation and self-esteem will reduce the sex-typicality of occupational aspirations, but that it will do this through two distinctive mechanisms: *ambition* and *autonomy*. Children with high levels of motivation or self-esteem are expected to aim "higher" in the occupational structure (Carneiro and Heckman 2005; Heckman, Stixrud, and Urzua 2006). This *ambition* effect should reduce the level of sex-typicality in girls' occupational aspirations (H4a), but not in boys', since top-level occupations are typically male dominated (H4b). At the same time, children with high levels of self-esteem are expected to be better equipped to make independent choices, and hence to act against existing social norms, than their low-esteem counterparts. This *autonomy* effect should make children of both sexes more likely to choose occupations that are outside the range of what is socially prescribed for their sex (e.g., nurses for boys, mechanics for girls). We therefore expect more autonomous children to be more likely to choose sex-atypical occupations whatever their occupational ambition. However, since girls who select higher-ranking occupations are necessarily less likely to select female-dominated occupations, this *autonomy* effect might be indistinguishable from occupational ambition for girls (H5a). It is only among boys that we will be able to identify clearly whether self-esteem enables them to deviate from expected behaviors independently of occupational ambition (H5b).

In sum, *motivation* (trait) is expected to reduce sex-typicality through greater occupational *ambition* (mechanism), while *self-esteem* (trait) is expected to reduce sex-typicality through both greater *ambition* and greater *autonomy* (mechanisms). Given that patterns of occupational sex segregation differ by sex, empirical predictions are sex specific: Ambition is expected to reduce the degree of sex-typicality of girls' occupational aspirations but not necessarily of boys' (since top-level occupations are typically male dominated), while autonomy is expected to reduce sex-typicality for both girls and boys. Finally, since in the case of girls both autonomy and ambition mechanisms are expected to work in the same direction, their empirical effects are likely to be confounded. This implies that the effect of autonomy will most probably be identifiable only for boys. Table 1 summarizes our hypotheses, including channels and mechanisms, for both parental and personality effects.

Data and Methodology

Data Sources

British Household Panel Survey The British Household Panel Survey is a longitudinal study of individuals who were living in private households in Great Britain in 1991 (University of Essex 2010). The original sample comprised around 5,500 households, with around 10,300 respondent adults. These original sample members are followed over time and reinterviewed each year, along with

Table 1. Parental Socialization and Personality Effects on Children's Sex-Typed Occupational Aspirations: Channels, Mechanisms, and Hypotheses

Channels	Parental socialization			Personality traits	
	Parental occupation	Parental domestic behavior	Parental socio-economic status	Motivation	Self-esteem
Mechanisms	-Imitation -Sex-role learning	-Sex-role learning	-Ambition	-Ambition	-Ambition -Autonomy
Hypotheses	-Homo-linear occupational imitation transmits sex-typicality (H1) -Parents in sex-segregated occupations increase children's sex-typicality homogeneously (H2a)	-Traditional distribution of housework increases children's sex-typicality (H2b) -Mothers with low labor-market attachment increase children's sex-typicality (H2c)	-Parental SES increases attainment aspirations ➤ Negative effect on girls' sex-typicality (H3a) ➤ Neutral effect on boys' sex-typicality (H3b)	-Motivation increases attainment aspirations ➤ Negative effect on girls' sex-typicality (H4a) ➤ Neutral effect on boys' sex-typicality (H4b)	-Self-esteem increases attainment aspirations ➤ Negative effect on girls' sex-typicality (H4a) ➤ Neutral effect on boys' sex-typicality (H4b) -Self-esteem increases children's capacity to make independent choices ➤ Negative (but confounded) effect on girls' sex-typicality (H5a) ➤ Negative effect on boys' sex-typicality (H5b)

other members of their households aged 16 and over. Data are available for all years up to 2008 (or wave 18).

In 1994, a self-completion questionnaire was introduced for children in the panel aged 11 to 15. This questionnaire (the youth panel) has been administered annually up to 2008. The youth panel provides the empirical backbone of this study. We are able to link information from the youth panel to household and individual adult respondent files in order to relate children's and their parents' responses to one another, to include family context, and to apply appropriate weights. Having contemporaneous self-reported data from both parents and children provides us with a distinctively rich resource of family information. Given the longitudinal nature of the survey, we can also link children's responses in the youth panel to their post-16 outcomes as, at age 16, they become eligible for the main adult interview.

Overall, just over 5,000 individual children were surveyed in the youth panel over the 15 waves.⁵ However, many of the questions, including those of particular interest to this study, are not asked in every sweep, meaning that some children are missed altogether for some questions and others have varying numbers of repeated observations on any particular measure. In order to ensure that an appropriately complete array of variables is available for each child in our study, and to exploit the value of panel data in providing repeat measures, we utilize information across all the sweeps in which they were observed. This enables us to provide rich information on their occupational aspirations and to construct measures of their psychological characteristics based on repeat observations.

Around 3,700 boys and girls provided a valid response to an open-ended question on occupational aspirations at some point. This question forms the basis of our dependent variable (see below). The question was not asked in waves 9, 10, or 11, so we do not have observations for those years. We utilize the latest valid response. For nearly half of the children, this was at age 15. Since different questions are asked in different years, answers to other variables may have taken place at other ages.

For child-level independent variables, such as age, where possible we measure them concurrently with the measure of occupational aspirations. Where they occurred only in prior waves, we utilize the latest observation. However, for the psychological variables, where we expect them to capture underlying, stable dispositions, such as with our measures of motivation and self-esteem, we exploit the advantages of repeat measures in panel data by utilizing measures across all observations on each child to construct a child-specific measure (see below).

By these means, we construct a cross-sectional data set, which accommodates the distinctive structure of the study, but which utilizes as much information as possible from across the observations. An illustration of this structure is given in figure 1.

Information from co-resident parents of each child was matched into the youth data using a similar approach. Allowing for missing data and questions not asked of particular children or parents because of the question cycles, our final analysis sample comprises 1,693 boys and 1,667 girls, which amounts to 91 percent of those for whom we have valid coded occupational aspirations.

Figure 1. Example of data set structure

Child ID	Original data					Analysis sample			
	Waves observed	Age	Response on occupational choice	Response on Vary	Response on VarZ (psychological variable)	Age when latest occupation measured	Last valid response on occupational choice	Last valid response on vary	Response on varZ (psychological Variable)
1	F	11	fireman	Yes	Important				
1	G	12	fireman	Not asked	Important				
1	H	13	Police officer	Not asked	Missing	13	Police officer	Yes	Mean of valid responses
1	I	14	Not asked	Not asked	Not asked				
1	J	15	Not asked	Not asked	Very important				
2	J	11	Not asked	Not asked	Not asked				
2	L	13	Actress	Yes	Not asked				
2	M	14	Actress	Yes	Not asked	14	Actress	Yes	Missing
3	K	12	Nurse	Not asked	Important				
3	L	13	Nurse	No	Very important				
3	M	14	Non-response	No	Very important				
3	N	15	Teacher	No	Very important	15	Teacher	No	Mean of valid responses
4	Q	11	Air pilot	Yes	Not asked				
4	R	12	Air pilot	Missing	Important	12	12	Yes	Important

Note : These cases are illustrative only and do not represent genuine respondents and their responses. The highlighted cells indicate the responses from the original longitudinal sample of children 1–4 that are utilised in the analytic sample of unique observations per child.

Measuring sex-typicality: The Labour Force Survey In order to measure the level of sex-typicality in children's favored occupations, we calculated segregation measures using the UK Labour Force Survey (LFS). We used 28 pooled quarters of the LFS, from the first quarter of 1994 (which corresponds to the start of the BHPS youth panel) to the last quarter of 2000 (Office for National Statistics 1994–2000). This gives us a pooled nationally representative sample, with current occupational information for 367,006 working-age adults across 371 occupations. From this, we calculated the average proportion of women/men for each three-digit occupation⁶ and then matched this information to children's identified job preferences as well as to each parent's job.⁷ We also matched the proportion of women and men in a given occupation to the realized occupational outcomes for those 567 girls and 620 boys from the BHPS youth panel who were both interviewed as adults and employed at the time.

We also use the LFS to calculate the average wage for each three-digit occupation in the data set. This provides a measure of the relative position of respondents' aspired occupation in the overall occupational distribution and hence accounts for the vertical dimension of occupational aspirations, which we use to differentiate between the *ambition* and the *autonomy* effects of children's motivation and self-esteem (see below).

Variables

Outcome variable Children's favored occupation was identified by an open question of the form "What job would you like to do once you leave school or finish your full-time education?" This was coded to three-digit SOC90 occupational codes. The proportion of women or men typically employed in each of these occupational codes was calculated using the LFS, as explained above, and matched to the occupational choice. While there was a degree of clustering of children's occupational choices, overall the 1,868 boys for whom we have valid responses identified 122 occupations and the 1,880 girls selected 153 occupations.⁸ The top 20 choices for each sex are listed in table 2.

The average proportion of women in children's aspired occupations was 42 percent (58 percent for girls and 23 percent for boys). The LFS adult population experienced an average of 46 percent women across occupations (71 percent for women, 25 percent for men). Real-life occupations are therefore somewhat more segregated for women on average than aspired occupations are for girls. Figure 2 shows the kernel densities for the proportion of men and women in boys' and girls' aspired occupations.

We operationalized sex-typed occupational aspirations as those occupational choices falling in the top 30 percent of the sex-specific occupational distribution of women (for girls) or men (for boys). Thus, we constrained around 30 percent of girls' and boys' occupational choices to be "sex-typical." As figure 2 shows, this corresponds roughly to the second peak in each of the bimodal distributions. We carried out robustness checks for alternative specifications, including continuous and multinomial specifications. While our findings were robust to

Table 2. Top 20 Preferred Occupations for Girls and Boys (Those Chosen by More Than 30), by Descending Order of Popularity, and Actual Jobs of Mothers and Fathers by Prevalence

Girls	Boys	Mothers	Fathers
Actors, stage managers, etc.	Athletes, sports officials, etc.	Sales assistants	Drivers of road goods vehicles
Hairdressers	Motor mechanics	Cleaners, domestics	Production, works managers
Primary and nursery education teachers	Armed forces	Care assistants and attendants	Service industry managers, etc.
Solicitors	Police officers	Educational assistants	Other managers and administrators
Vets	Artists, graphic designers, etc.	Nurses	Metal work, maintenance fitters
Artists, graphic designers, etc.	Computer analysts, programmers	Clerks	Carpenters and joiners
Nursery nurses	Architects	Account clerks, bookkeepers	Storekeepers and warehousepersons
Beauticians	Plumbers, heating engineers	Other child-care occupations	Gardeners, groundspersons
Nurses	Aircraft flight deck officers	Community and youth workers	Marketing and sales managers
Authors, writers, journalists	Actors, stage managers, etc.	Service industry managers	Motor mechanics, etc.
Police officers	Carpenters and joiners	Primary, nursery teachers	Builders, building contractors
Travel and flight attendants	Chefs, cooks	Other secretarial personnel	Cab drivers and chauffeurs
Medical practitioners	Secondary education teachers	Filing and record clerks	Building/contract managers
Secondary education teachers	Authors, writers, journalists	Other financial, etc., managers	Farm owners and managers, etc.
University teachers	Medical practitioners	Secondary education teachers	Other construction trades
Other child-care occupations	Solicitors	Retail cash and checkout operators	Electricians
Clothing designers	Electricians	Bar staff	All other laborers
Biological scientists	Builders, building contractors	Receptionists	Computer systems, etc., managers
Other health professionals	Musicians	Counter clerks and cashiers	Police officers
Psychologists	Chartered and certified accountants	Catering assistants	Plumbers, heating engineers

Source: British Household Panel Survey waves 4–18.

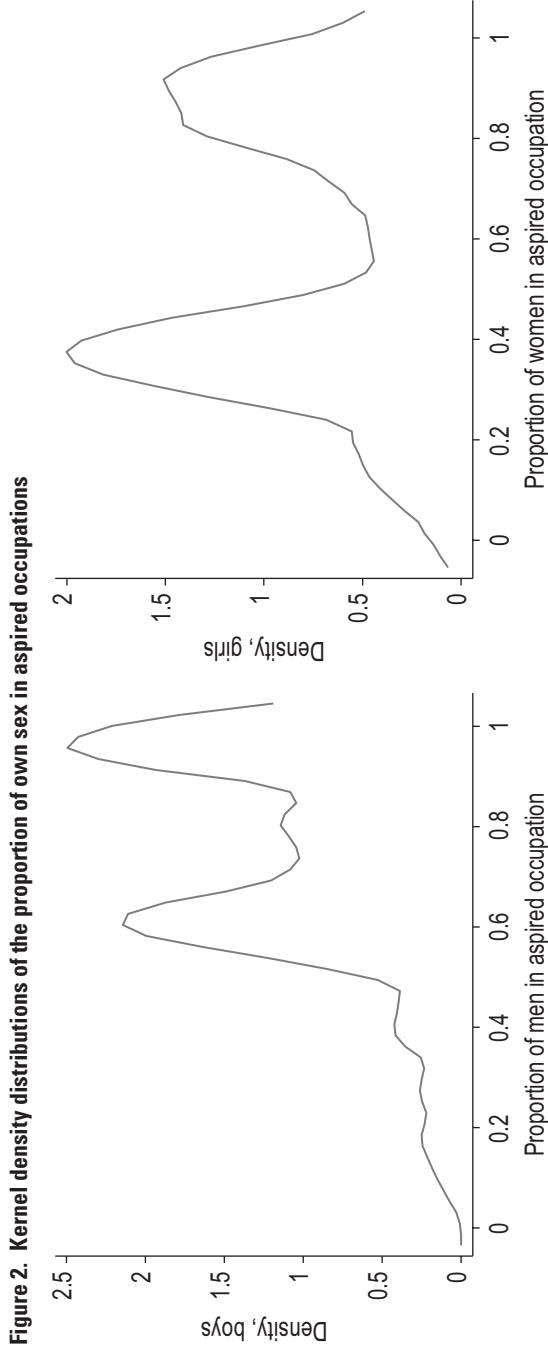


Figure 2. Kernel density distributions of the proportion of own sex in aspired occupations

Source: British Household Panel Survey waves 4–18 and UK Labour Force Survey pooled quarters 1994–2000.

these alternatives,⁹ we selected the binary specification as most clearly evidencing influences on sex-typicality of children's aspirations.

Parental variables *Parental resources* are measured by parental educational attainment using a dominance approach, whereby we use whichever parent's education is higher. For children with an absent father, mother's educational attainment is used. Educational attainment is measured using a set of discrete categories: university degree and above; A levels (typically obtained at age 18) and above but less than university; O levels or CSEs (typically obtained at age 16); and less than this or none. We employ a dummy for absent father to reflect the diminution of parental resources that this implies.

Occupational imitation is measured straightforwardly using dummies to reflect whether there is a direct match between boys' (girls') aspired occupation and the current occupation of their father (mother).

We include several measures for *parental behavior*. The level of sex segregation of both mother's and father's (last or actual) occupation is measured using a three-category variable that differentiates among sex-atypical, intermediate, and sex-typical occupations. The respective cutoff points for these categories were the top 30 percent, the middle 40 percent, and the bottom 30 percent of the sex-specific distributions. Alternative specifications of segregation measures were explored but did not alter the overall findings. Behavior within the home is captured by two measures. First, we compute the difference between the number of hours of housework contributed by mothers and the number of hours contributed by fathers (self-reported). This measure captures variation in housework requirements and preferences at the household level. Thus, a positive value indicates additional hours carried out by the mother (a gender-typical distribution), and a negative value indicates additional hours carried out by the father. Finally, we compute a variable that measures mothers' labor-market attachment by calculating the average incidence over the waves at which they were observed as out of the labor force through looking after home and family.

Children's psychological attributes The construction of psychological attributes follows the general principle of maximizing information and reducing error by using repeat measurements across waves and multiple items when available for each construct. Children's *motivation* is measured as school motivation using responses to the following two questions: "How much does it mean to you to do well at school?" and "How important do you think it is for you to get your GCSE/Standard Grades exams?"¹⁰ Each of these questions had four possible options, ranging from "a great deal/very important" to "very little/not very important." For each item, we first generate a (reversed) within-person average score over waves. The first item is asked every wave in the youth panel except the first, while the second appears only in the last seven waves. For respondents with observations on both items, we summed the two and then generated a *z*-score (i.e., normalized to a mean of zero and a standard deviation of one), while for respondents who had no observations

for the latter item, we created a z -score based on repeat responses to the former item alone.

Self-esteem is measured using the Rosenberg self-esteem items included in the BHPS. Out of the original complete 10-question battery, four questions were asked at every wave of the youth panel, and a further two were asked from wave 9 onward.¹¹ We thus use a restricted selection of items, which is not unusual in the specialized literature (e.g., Tafarodi and Swann 1995; see also Robins, Hendin, and Trzesniewski 2001). While there is ongoing debate as to whether the Rosenberg scale represents one or two constructs (Gray-Little, Williams, and Hancock 1997; Schmitt and Allik 2005; Tafarodi and Swann 1995), we assume for the purposes of this paper a global construct in line with the original claims. Our rationale is both conceptual and practical. Because feelings of self-competence obviously increase people's feelings of self-worth, and because high self-worth enhances the capacity for efficacious action (Tafarodi and Swann 1995), both dimensions are highly correlated in practice.¹² This provides the main justification for treating both dimensions as part of the same construct, as in Rosenberg's original formulation (1965).

We utilize repeat measurements across waves in order to reduce measurement error and take the average score for each item. For those who were observed at least once from wave 9 onward, we then use the sum score of the averages for all six items. For those who were only ever asked four questions (less than a quarter of the total sample), we calculate the sum score across those four items. In order to render the measurement equivalent between the two, we standardize the scores for both the four-question and six-question responses.

For our operationalization of agency (motivation score and self-esteem score), it was important to be able to distinguish the net effect of the two concepts, recognizing that as measured they showed some overlap (correlation of 0.2). To better interpret the specific contribution of each of these partially collinear variables, we orthogonalized the standardized scores (Sribney 1995). This resulted in only minimal adjustment but enabled us to distinguish the contribution of self-esteem from that of motivation.

The final test for our theoretical predictions regarding the role of personality consists of differentiating empirically between the *ambition* and the *autonomy* effects of children's motivation and self-esteem. This we do by introducing the log average wages of each aspired occupation as a measure of occupational hierarchy in a second model.¹³ The logic of this test is simple: If the effect of any given personality indicator on the degree of sex-typicality in children's occupational preferences disappears after controlling for the average wages in aspired occupations, we should conclude that all the impact of this estimated psychological attribute is due to its effect on children's occupational ambition, in that they aspire to higher-paid jobs. If, on the other hand, the effect persists, we should conclude that this given attribute decreases sex-typicality at all levels of the aspired occupational distribution, which would be consistent with an autonomy effect. Log average wages should also mediate any effect of parental resources on girls' sex-typing since, as discussed, having higher-educated parents will tend to increase children's occupational ambition, resulting in a higher

propensity to select top-rank occupations, which are typically male dominated (and hence sex-atypical for girls).

In addition to parental and psychological variables, models include age of child, which is the age at which their job aspirations were last measured with a valid response, number of siblings, since the number of siblings is associated with levels of parental investment and hence occupational ambition, and dummies for the presence of older male or female siblings, who might be expected to influence occupational aspirations. We also include dummies for the wave at which the child is observed. The descriptive statistics for all variables used in the analyses, separated by sex, can be found in table 3.

The Model

We estimate a series of logit regression models, fitted to our nationally representative sample of British children aged 11 to 15. We explore those groups of factors hypothesized as shaping children's chances of aspiring to a sex-typical occupation. We conduct separate analyses for boys and girls. Thus, equation (1.1) is the model for girls and (1.2) is the model for boys. Y_g is the probability of a girl's aspired occupation being sex-typical; that is, with the density of women in the occupation being in the top 30 percent of girls' choices; and Y_b is the probability of a boy's aspired occupation falling in those for which the density of men is in the top 30 percent. V is a vector of independent family and child characteristics, and W is a set of controls for the wave.

$$\log\left(\frac{Y_g}{1-Y_g}\right) = \alpha + \beta_{1v}V_v + \gamma_{1w}W_w + e; v = \{1\dots V\}; w = \{1\dots 11\} \quad (1.1)$$

$$\log\left(\frac{Y_b}{1-Y_b}\right) = \alpha + \beta_{2v}V_v + \gamma_{2w}W_w + e; v = \{1\dots V\}; w = \{1\dots 11\} \quad (1.2)$$

Vector V includes variables for family structure, parental resources, parental behaviors, and children's psychological attributes. As explained above, our final test consists of introducing the log average wage in children's aspired occupations, as a means to control for the vertical dimension of children's occupational preferences, and thereby to disentangle the role of ambition from that of autonomy (equations [2.1] and [2.2]).

$$\log\left(\frac{Y_g}{1-Y_g}\right) = \alpha + \beta_{1v}V_v + \gamma_{1w}W_w + \text{Ln}(\text{occwage}) + e; v = \{1\dots V\}; w = \{1\dots 11\} \quad (2.1)$$

Table 3. Descriptive Statistics of Estimation Sample

	Girls					Boys				
	mean	sd	min	max	count	mean	sd	min	max	count
Aspire sex-typical occupation	0.29	0.45	0	1	1,667	0.29	0.45	0	1	1,693
Wave	12.55	4.51	5	18	1,667	12.37	4.56	5	18	1,693
Age	14.01	1.39	11	16	1,667	13.89	1.40	11	16	1,693
Absent father	0.23	0.42	0	1	1,667	0.22	0.42	0	1	1,693
Total number of siblings	1.03	0.98	0	7	1,667	1.10	0.98	0	7	1,693
Older brother	0.28	0.45	0	1	1,667	0.28	0.45	0	1	1,693
Older sister	0.24	0.43	0	1	1,667	0.24	0.43	0	1	1,693
Parental educational level	2.57	0.96	0	4	1,667	2.63	0.95	0	4	1,693
Homo-lineal occupational match	0.01	0.11	0	1	1,667	0.02	0.16	0	1	1,693
Mother occupational segregation	1.99	0.75	1	3	1,667	2.04	0.75	1	3	1,693
Father occupational segregation	2.00	0.77	1	3	1,667	2.01	0.77	1	3	1,693
Prop time mother housewife	0.23	0.30	0	1	1,667	0.24	0.30	0	1	1,693
Housework inequality	12.73	13.32	-34	89	1,667	12.77	13.27	-53	70	1,693
School motivation	-0.15	0.86	-1.61	4.38	1,667	0.05	0.99	-1.92	6.21	1,693
Self esteem	-0.17	0.97	-3.64	2.12	1,667	0.25	0.91	-4.39	2.12	1,693
Log wage in aspired occupation	2.22	0.47	1.30	3.17	1,667	2.31	0.36	1.30	3.17	1,693
Achieved sex-typical occupation as adult	0.27	0.45	0	1	567	0.29	0.46	0	1	621

Note: Sample statistics are weighted; Ns are unweighted.

$$\log\left(\frac{Y_b}{1 - Y_b}\right) = \alpha + \beta_{2v} V_v + \gamma_{2w} W_w + \text{Ln}(\text{occwage}) + e; v = \{1 \dots V\};$$

$$w = \{1 \dots 11\}$$
(2.2)

To ascertain if there is a relationship between sex-typicality in aspired and achieved occupations, we initially estimate logit models of the probability of being in a sex-typed occupation in adulthood, for both young men and young women, exploring the impact of childhood sex-typical aspirations, and incorporating basic controls. We also estimate linear regression models for the impact of sex-typical preferences in childhood on achieved wages in early adulthood.

In all analyses, the data were weighted, using the cross-sectional weight for the wave at which children's occupational aspirations were measured, to account for nonresponse in that wave and of the differential weightings for the additional samples. Additionally, standard errors were adjusted for repeat observations in households; that is, where there was more than one child respondent per family, though in practice there were few such cases in our sample.

As a robustness test, we also fitted ordinary least squares regression models on the proportion female/male in children's aspired occupations and multinomial regression models on a three-category variable including high, medium, and low values of sex-typicality. Results were robust to these alternative specifications, which are available on request.

Results

Our analysis first addresses the crucial question of whether children's early sex-typical occupational aspirations have real consequences in adult life. Table 4 illustrates the influence of early preferences on two important outcomes—occupational segregation and wages—for the approximately 1,200 children who can be followed into their early adult occupational outcomes. Even though by this stage only a mere six percent of them work in the exact occupation that they aspired to as children, we find that both girls and boys with sex-typed preferences are significantly more likely to end up in sex-segregated occupations as adults. The effects are strong. This suggests that early sex-typical preferences, as manifested during childhood, express some underlying tendency for gender-typical behavior that leaves visible traces later in life. We also find that women who aspired to sex-typical occupations as children are likely to have lower wages in their first significant jobs. This is hardly surprising, given that female-dominated occupations are known to pay lower average wages. In sum, early preference formation appears to have identifiable consequences for gender segregation and consequently for women's earnings in adult life. Given the relevance of children's occupational aspirations for their subsequent occupational outcomes, we turn to the factors that help us understand how these early preferences are formed.

Table 5 below shows the results of estimating the logit models for the probability that children aspire to sex-typical occupations. Model 1 includes

Table 4. Children's Gendered Aspirations and Adult Outcomes among Currently Employed Young Adults, Logistic and Linear Regression Estimates

	Probability of sex-typed adult occupation		Adult wage	
	Girls	Boys	Girls	Boys
Adult age	-0.0593 (0.0442)	-0.146*** (0.0360)	0.0495*** (0.00715)	0.0319*** (0.00499)
Gender-typical aspirations	0.841*** (0.213)	1.288*** (0.207)	-0.116** (0.0383)	-0.0376 (0.0283)
Matched child-adult occupation	1.739*** (0.424)	0.469 (0.298)	0.0387 (0.0853)	0.145** (0.0447)
Constant	-1.035† (0.583)	-0.184 (0.522)	1.585*** (0.105)	1.700*** (0.0763)
Observations	567	621	567	620
Adjusted R ²	0.09	0.12	0.24	0.12

Note: Additional controls for wave not shown. Weighted estimates. Standard errors adjusted for clustering in households. Standard errors in parentheses.

*** $p < 0.001$ ** $p < 0.01$ † $p < 0.10$

children's socio-demographic characteristics, parental influences, and children's personality attributes, as well as a range of controls for family structure. Model 2 adds the average log wages of children's aspired occupation as a means to control for occupational hierarchy. Hence, model 1 corresponds with equations 1.1 and 1.2 and model 2 corresponds with equations 2.1 and 2.2 above. Several important findings are worth reporting.

First, our models provide *some* evidence that homo-linear occupational imitation might be a transmitter of sex-typicality, but effects are significant only for boys. Boys whose occupational aspirations exactly match the occupations of their fathers are more sex-typical than boys who do not imitate. Yet it must be noted that only a mere three percent of boys in our sample actually have aspirations that match their fathers' occupations. This means that occupational imitation plays only a very minor role in the formation of sex-typical occupational preferences.

Our findings regarding behavioral sex-role learning are largely consistent with our expectations. In particular, we find very strong evidence of behavioral sex-role learning from parental occupations for both boys and girls. Model 1 shows that daughters whose mothers are (or were last) employed in sex-atypical occupations (i.e., male dominated) have a lower probability of aspiring to sex-typical occupations than observationally equivalent girls whose mothers are employed in integrated and sex-typical occupations. This effect is net of direct occupational imitation and parental education. If this correlation were

an artifact of the intergenerational transmission of occupational ambition from mothers to daughters, it should disappear once we control for the occupational ranking of daughters' aspirations. Yet model 2 shows that the association between mothers' and daughters' sex-atypical preferences holds even after controlling for the average wages of girls' aspired occupations. Girls whose mothers are employed in sex-atypical jobs are thus more likely to aspire to sex-atypical occupations across the aspired occupational distribution (e.g., to surgeons as much as to mechanics). Similarly, we find that boys whose fathers are employed in typically masculine jobs are themselves more likely to aspire to sex-typical occupations than boys whose fathers are employed in integrated and female-dominated occupations. This effect for boys is also robust to direct occupational imitation and wage controls (see model 2). We find no significant effect of mothers' occupational sex-typicality on their sons' aspirations, nor do we find any effect of fathers' occupational sex-typicality on their daughters'. The evidence is therefore highly consistent with a process of homo-lineal sex-role learning from parental occupations (H2a), whereby girls learn to be sex-atypical from their sex-atypical mothers while boys learn to be sex-typical from their sex-typical fathers.

When looking within the household, we also find that a traditional distribution of housework tasks between spouses, revealed in a positive coefficient on housework inequality, seems to reinforce children's sex-typical occupational aspirations, although in this case effects are observed only for boys. This is an interesting finding, as it suggests that parental behavior in the domestic sphere can have sex-role learning effects on children's occupational preferences (H2b), although the effects seem sex specific. Finally, model 1 shows that, net of other behavioral variables, having a mother with high domestic (low labor-market) attachment has no significant impact on children's occupational preferences, which contradicts our expectations (H2c), although it must be noted that the sign of the coefficient is in the expected (i.e., positive) direction.

Consonant with our expectations, we are also able to identify an ambition effect of parental education on the probability that daughters have sex-typical occupational aspirations (H3a). Girls of parents with higher levels of education have a significantly lower probability of aspiring to sex-typical occupations than girls from low-educated parents. As expected, this is due entirely to the effect that parental SES has on daughters' occupational ambition. Hence, when we introduce average wages in the aspired occupation, the effects of parental education on girls' sex-typicality disappear (see model 2). In other words, girls from more privileged backgrounds tend to aspire to better-paid occupations, which are on average less sex-typical (since there are few women in the better-paid jobs).

Interestingly, we also find a significant negative effect of parental education on sons' probability of sex-typical aspirations, but in this case effects are observed only for sons of parents with tertiary education (when compared to sons of uneducated parents). This difference between the degree of sex-typicality of boys coming from the two extremes of the parental educational distribution

is not fully accounted for by controlling for average wages in sons' aspired occupations (see model 2). This suggests that highly educated backgrounds could reduce boys' levels of sex-typicality through channels other than occupational ambition.

Model 1 also tests for personality effects. As explained above, these effects are measured using repeated multi-item measures of children's motivation and self-esteem. Crucially, both personality indicators seem to have a direct influence on the degree of sex-typing of children's occupational aspirations. Girls—but not so clearly boys—with high levels of motivation and both girls and boys with high levels of self-esteem report less sex-typical occupational preferences. These results are symmetric in that if we construct our dependent variable as low, rather than high, sex-typicality, we find consistent results. We have hypothesized that motivation and self-esteem could influence sex-typicality through two distinctive mechanisms: ambition and autonomy, though with motivation being particularly associated with ambition. Both motivation and self-esteem are, as we would expect, positively and significantly correlated with the wages of the aspired occupation, consistent with an ambition mechanism.¹⁴ By introducing average wages as a control for the hierarchy of children's occupational aspirations, model 2 tests this ambition effect controlling for background characteristics and allows us to investigate whether there is evidence for the autonomy mechanism.

We note that the negative effect of both school motivation and self-esteem on girls' occupational sex-typicality disappears when occupational hierarchy is accounted for. This suggests that both self-esteem and motivation increase girls' occupational ambition, which by itself decreases occupational sex-typicality (H4a). Again, the results are consistent if we regress on low rather than high sex-typicality. Yet, given the high negative correlation between average wages and proportion of women in aspired occupations, we cannot tell whether self-esteem has, as expected, an extra independent effect on girls' levels of sex-typicality. Daughters who aim for high-paid occupations are at the same time ambitious and sex-atypical, and this makes it particularly hard to separate autonomy from ambition effects for girls.

It is boys who provide the best grounds for testing the autonomy mechanism—that is, the idea that self-esteem boosts children's capacity to act against the existing social norms regarding sex-typical behavior. Boys can choose male-dominated occupations at both ends of the occupational distribution, and this implies that ambition and autonomy effects are not necessarily confounded for them. Crucially, model 2 shows that the negative effect of self-esteem on sex-typical aspirations for boys is fully resistant to controlling for the average wage of the aspired occupation, our measure of the occupational ranking of children's aspirations. This indicates that self-esteem reduces boys' occupational sex-typicality at all levels of the aspired occupational hierarchy, a finding that is fully consistent with the *autonomy* mechanism. Our interpretation is that boys with high self-esteem are better predisposed to exercise their individual agency and hence more capable of acting independently of those social influences that promote sex-typical behavior (H4b).

Table 5. Logistic Regression Estimates for Probability of Aspiring to a Highly Sex-Typed Occupation

	Girls, model 1	Girls, with wage control	Boys, model 1	Boys, with wage control
Age	0.103 [†] (0.0543)	0.197** (0.0655)	0.212*** (0.0512)	0.195*** (0.0527)
Absent father	0.00983 (0.198)	0.137 (0.246)	0.327 (0.201)	0.351 [†] (0.203)
Parental qualifications (Ref = none)				
Higher	-0.871*** (0.234)	-0.00920 (0.291)	-0.747** (0.238)	-0.532* (0.241)
Upper secondary	-0.348 [†] (0.197)	0.170 (0.242)	-0.408* (0.206)	-0.309 (0.207)
Lower secondary	-0.531** (0.191)	-0.293 (0.227)	-0.133 (0.192)	-0.0631 (0.192)
Child's occupation matches same-sex parent	0.528 (0.434)	0.383 (0.666)	0.917* (0.377)	0.642 [†] (0.373)
Mother's occ. gender typicality (ref = intermediate)				
Gender atypical	-0.447** (0.151)	-0.577** (0.186)	-0.0827 (0.155)	-0.0335 (0.157)
Gender typical	-0.00879 (0.144)	-0.00834 (0.179)	0.117 (0.145)	0.119 (0.146)
Father's occ. gender typicality (ref = intermediate)				
Gender atypical	0.125 (0.182)	0.333 (0.231)	-0.0278 (0.196)	0.0166 (0.203)
Gender typical	-0.0645 (0.183)	-0.0320 (0.225)	0.676*** (0.183)	0.697*** (0.190)
Average occasions mother was housewife	0.382 [†] (0.220)	-0.193 (0.265)	0.176 (0.234)	0.0621 (0.236)
Housework inequality	-0.00195 (0.00535)	0.0000367 (0.00555)	0.0125* (0.00507)	0.0126* (0.00523)
Motivation score	-0.276*** (0.0675)	-0.0407 (0.0895)	-0.103 [†] (0.0612)	-0.0192 (0.0623)
Self-esteem score	-0.175** (0.0633)	-0.0402 (0.0778)	-0.191** (0.0682)	-0.148* (0.0692)
Log of hourly wage in aspired occupation		-3.304*** (0.160)		-1.353*** (0.232)
Constant	-0.806* (0.325)	5.634*** (0.495)	-1.187*** (0.332)	1.877** (0.584)
Observations	1,667	1,667	1,693	1,693
Pseudo R ²	0.05	0.31	0.07	0.10

Note: Controls for wave and family composition included. Estimates weighted and standard errors adjusted for clustering in the household. Standard errors in parentheses.

*** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$ [†] $p < 0.10$

Discussion

Occupational sex segregation is an enduring feature of Western labor markets that has been strongly implicated in the perpetuation of gender inequality. Analyzing the factors that influence the formation of sex-typical occupational preferences is therefore critical for illuminating our understanding of gender stratification. It is clear that gendered occupational choices begin early, before girls and boys have any experience of the labor market. Moreover, these early choices have real consequences in later life.

This study set out to shed light on the factors that shape the degree of sex-typing in early occupational preferences. We exploited a data set that allowed us to measure both children's aspirations prior to labor-market contact and their parents' coterminous characteristics, as well to follow the children into their early occupational outcomes. We investigated different channels of parental influence on children's occupational aspirations that are relevant for the transmission of sex-typical preferences. At the same time, we have allowed for the role of individual agency in the process of preference formation. In order to avoid the risk of over-individualization, we have defended a restricted definition of agency that is anchored in observable psychological attributes. This definition turns a hitherto intangible concept into one that is both theoretically grounded and empirically testable. Our analytical strategy has allowed us to estimate simultaneously the relative impact of parental influences and individual psychological characteristics on the development of sex-typical occupational aspirations in what constitutes an innovative approach to the study of preference formation.

We have identified several distinctive channels of parental influence, including two distinctive mechanisms linking parental behavior to children's occupational preferences: occupational imitation and behavioral sex-role learning. Our empirical models show that boys (but not girls) who imitate homo-linearly are significantly more likely to have sex-typical aspirations. Yet very few young children actually imitate, which suggests that this mechanism plays only a very minor role in the intergenerational reproduction of sex-typed preferences.

Consonant with the social structural insights of sex-role theory, we have found that the daughters of mothers who work in male-dominated jobs tend to aspire to less sex-typical occupations themselves, while the sons of fathers who work in traditionally male jobs display more sex-typical aspirations. Moreover, boys—but not girls—living in families with a traditional division of housework tend to aspire to more traditionally male occupations. Parents' enactment of gender roles, both inside and outside the household, thus seems to exert a significant influence on the degree of sex-typicality of their children's occupational aspirations.

We further posited that parental socio-economic resources should affect the degree of sex-typing in occupational preferences by influencing children's occupational ambition. Given the existence of vertical sex segregation, this ambition effect was expected to have consequences for sex-typicality only in the case of daughters, since for them, aiming high on the occupational ladder typically means aspiring to occupations where women do not predominate. Boys, on the

other hand, can find traditionally male occupations at both ends of the occupational distribution, so higher occupational ambition does not automatically imply lower sex-typicality. We have found that parental education does indeed increase daughters' occupational ambition, which in turn reduces the probability of their having sex-typical occupational aspirations. Yet we have also found that boys from highly educated backgrounds are less sex-typical than boys from low-educated parents at all levels of the aspired occupational hierarchy. This latter finding suggests that parental education could influence boys' sex-typical preferences through channels other than occupational ambition, most probably the intergenerational transmission of certain values (e.g., egalitarianism) that are linked to higher education.¹⁵

Finally, we have found that psychological predispositions also have a significant impact on children's occupational preferences. Girls with high school motivation and both girls and boys with high self-esteem are less likely to aspire to gender-typical occupations, regardless of other family influences. Motivation and self-esteem make girls more likely to aim higher on the occupational ladder, where female-dominated jobs are scarce. This is why, when we control for the average wage of girls' aspired occupations, both motivation and self-esteem effects disappear. Vertical segregation makes it particularly hard for us to identify the exact mechanisms linking motivation and self-esteem to sex-typical preferences in the case of girls.

We have found, however, that the effect of self-esteem on boys' levels of sex-typicality survives controls for wages in their aspired occupation. This means that boys with high self-esteem are significantly less likely to aspire to traditionally male occupations at all levels of the occupational ladder. We interpret this finding as indicating that boys with high self-esteem are better predisposed to contradict the existing social norms regarding sex-typical behavior. This we have called the *autonomy* effect of self-esteem. Autonomy is the core component of agency, understood as the capacity to make independent choices.

To our knowledge, this study provides the first psychologically anchored test of agency effects in the formation of children's sex-typed occupational aspirations. One interesting implication of this study is that any action directed to increasing children's motivation and self-esteem, if successful, is likely to reduce occupational sex segregation in the future. Another obvious implication of this study is that boys' preferences also matter. Stressing that supply-side processes leading to occupational sex segregation concern both genders might seem self-evident, as obviously it takes both to make occupational sex segregation. Yet the gender literature has traditionally paid much more attention to women's choices than to men's. By focusing disproportionately on women's preferences, research on gender stratification could be missing out.

By stressing the importance of psychological predispositions in early preference formation, this study also contributes to contemporary supply-side theories of gender stratification. In a number of influential papers, Correll (2001, 2004) has shown that social-psychological processes of status generalization in achievement-oriented settings (e.g., schools) can lead to gender-biased assessments about task-specific self-competence. Such biased assessments (e.g., beliefs

about mathematical competence) may in turn lead to sex-typed academic choices, from which segregated occupational outcomes are likely to follow. We believe a unique contribution of our approach is that it can help us better understand why some individuals are more sensitive to status-generalization processes than others, a question that contemporary supply-side models have not addressed to date (see also Correll and Ridgeway 2003; Ridgeway 1997, 2011; Ridgeway and Correll 2004).

Our final comment concerns what we cannot explain. Although our models show that there is an interpretable structure in the distribution of preferences, on the strength of the pseudo R -squared statistics, their overall contribution to the explanation of segregation in occupational aspirations must be judged as modest. This means that much still remains to be explained.

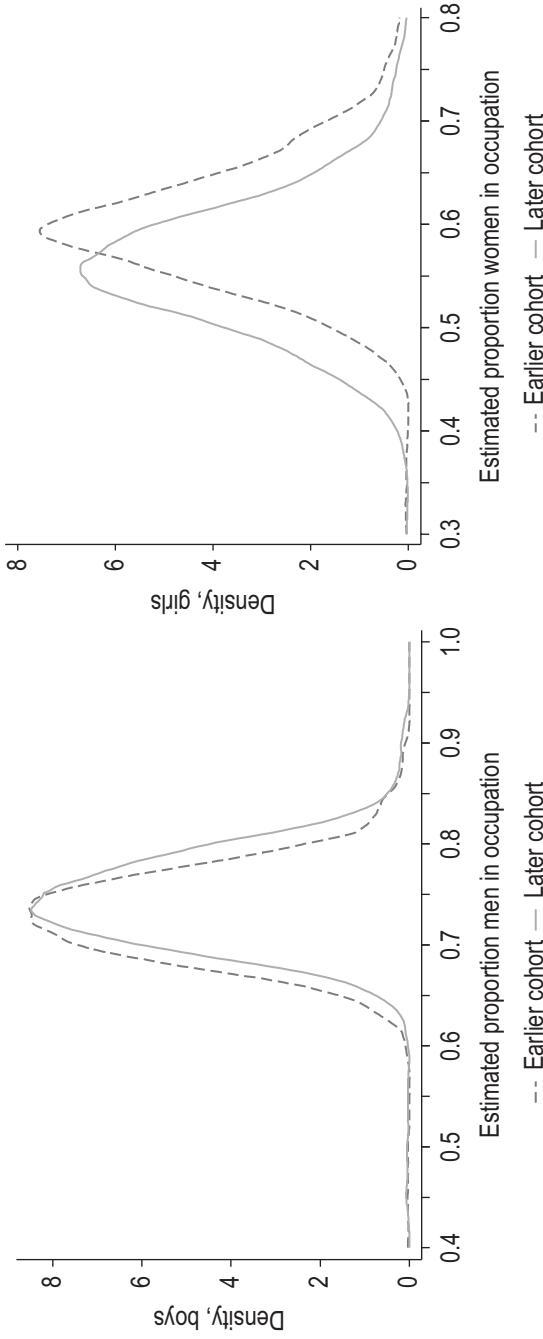
The impact of other socialization agents (e.g., peers, teachers, mass media) and situational contexts (e.g., schools) unaccounted for in this study could play an important role in explaining part of the variance currently represented by children's own sex (Corsaro and Fingerson 2003; Hitlin 2006). Similarly, recent explanations suggest that in informing their occupational choices children could learn from wider social signals besides their own family experiences (Polavieja 2012). Yet testing for these wider social influences seems particularly hard with the existing data, since we lack direct measures of horizontal socialization that are external to the family.

Given these constraints, perhaps the best way of approaching horizontal influences, the impact of which is expected to affect all children at a given time, is by looking at cohort shifts. Cohort shifts should be expected if there are societal changes that affect the socialization milieu in which all children are embedded. Such shifts would include macro-level changes in the labor market and domestic behavior—from which children can learn—as well as changes in gender attitudes, values, and cultural representations. In all these realms, observed trends in advanced Western societies have worked in favor of greater gender equalization.

Partially consistent with horizontal pressures for gender equalization, our data show a decline over time (net of other factors) in the tendency for girls to prefer sex-typical occupations (see figure 3). This decline represents a reduction of around four percent in the aspired proportion female from one decade to the next.¹⁶ Yet no cohort trend is found for boys.¹⁷ Given the lack of convergence from boys and the modest size of the effect for girls, we must conclude that, even if horizontal socialization pressures for sex-typing are declining over time for girls, it would take several generations before this was reflected in a shift from the current picture of highly segregated aspirations.

Meanwhile, we believe this study has already shown that focusing on the interplay between socialization influences and individual psychological predisposition can yield important analytical payoffs. We have provided new insights into the correlates of sex-typing in the occupational choices of children. Our findings strongly suggest that both social influences and individual psychological predispositions provide the essential cogs and wheels of preference formation. Yet we still lack a clear understanding of how these pieces are assembled. To

Figure 3. Cohort shifts in the sex-typicality of children's occupational aspirations by sex, estimates from full models



Source: Distributions estimated from full regression models fitted separately by sex, British Household Panel Survey Waves 4–18.
Note: Cohorts are defined so as to split the sample into two equal halves. Earlier cohort comprises observations from waves 4 to 13 (1994–2003), later cohort comprises observations from waves 14 to 18 (2004–2008).

advance our study of mechanisms further may entail exploring the formation of explicit gendered aspirations and expectations even earlier in children's lives, to account for the crucial influence of peers and context, and to explore the effects of other psychological attributes and traits possibly associated with children's capacity to make independent choices.

Notes

1. Self-esteem is argued to be composed of two dimensions: self-worth and self-competence (see, e.g., Tafari and Swann 1995; Cast and Burke 2002).
2. Tafari and Swann (2001, 655) define self-competence as the "valuative imprint of self-efficacy on identity."
3. Consistent with this interpretation, several empirical studies have failed to clearly distinguish between global self-esteem and generalized self-efficacy (see Bernard et al. 1996; Judge et al. 1998; Judge et al. 2002).
4. While our argument stems largely from discussions of the self-competence dimension of self-esteem, the distinction between the self-worth and self-competence dimensions can easily break down conceptually and empirically (see further Data and Methodology). Thus, our interpretation connecting self-esteem to agency should also hold for a single global measure combining both dimensions.
5. Only about one-third of these were observed five times, which is the maximum number of waves a respondent can be in the youth panel; around 15 percent were observed for each of two, three, or four waves, and 19 percent were observed only once.
6. We matched on SOC90 occupational codes, avoiding a series break at the change to SOC2000 in the LFS in 2001.
7. For parents not currently in paid work, we used information on their last job.
8. To ensure that our findings were not driven by a few favored aspirant occupations of boys and girls, we estimated an alternative specification of our models excluding the favorite five occupations of both boys and girls. This did not alter our results.
9. Results are available on request.
10. The GCSE, General Certificate of Secondary Education, is an academic qualification awarded in a specified subject, generally taken in a number of subjects by students aged 14–16 in secondary education in England, Wales, and Northern Ireland. In Scotland, the exam is called Standard Grades.
11. The four measures asked from wave 4 were (1) "I feel that I have a number of good qualities"; (2) "All in all, I am inclined to feel that I am a failure"; (3) "I am able to do things as well as most other people"; and (4) "I feel I do not have much to be proud of." The measures added from wave 9 were (5) "I certainly feel useless at times"; and (6) "At times I think I am no good at all." In the social psychology literature, items 1, 4, and 6 are considered part of the self-worth dimension, while items 2, 3, and 5 are considered part of self-competence. However, exploratory factor analysis indicated that all items loaded on a single factor, and there was no support for higher inter-item correlation among the items covering each individual dimension compared to those crossing dimensions.
12. The fact that our data set includes only a limited version of the full Rosenberg scale is possibly the reason we cannot precisely identify each theoretical dimension.
13. Since average wages are highly endogenous to the outcome variable, we avoid any interpretation of its coefficient in terms of "effects."
14. The correlations are around 0.17 for motivation and around 0.10 for self-esteem.

15. Lower-educated parents in our data can be shown to have significantly higher gender traditionalism scores than higher-educated ones.
16. This effect was robust to splitting the period at different points. Results are available on request.
17. It is also worth noting the lower average proportion of women in girls' aspired occupations (58 percent) compared to their mothers' achieved occupations (71 percent), whereas boys' aspirations are little different from the average gender concentration experienced by their fathers, at around 23 percent. This is consistent with the observed cohort shift for girls in aspirations.

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