Bringing Occupations Back In: Maternal Occupation-Specific Skills and Children's

Cognitive Development^{*}

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Abstract

This study investigates associations between maternal occupation-specific skills and 5-year-old children's cognitive ability. Scholarship on family SES and children's cognitive development did not fully capture the dimension of parental *human capital*. Following the literature on job conditions and personality development, the article suggests that *maternal occupation-specific skills* are another human capital dimension influencing children's cognitive development over and above parents' other human, economic, and social resources. Representative data from the UK Millennium Cohort Study on 13,543 children born in 2000-02 were complemented with occupation-level data ($n = 79$) from the British Skills Surveys on aggregate measures of the importance of job tasks. Ordinary Least Squares regression was used to analyze whether maternal occupation-specific skills (literacy, numeracy, problem-solving, verbal and physical) are uniquely associated with children's inductive reasoning, spatial awareness, and verbal ability at age five net of other parental resources. Mothers' verbal skills (e.g., presentation and teaching skills) were positively associated with children's verbal abilities over and above other parental resources. Mothers' physical skills (e.g., use of physical strength) were negatively associated with children's verbal abilities net of other parental resources. None of the maternal occupation-specific skills were associated with children's non-verbal ability (inductive reasoning, spatial awareness). Maternal occupation-specific skills contribute to social stratification in children's verbal development net of human, financial and social capital.

INTRODUCTION

Children from higher family socioeconomic status (SES) perform better on a wide array of cognitive, socioemotional, and health outcomes in early childhood than children from lower SES backgrounds (Bradley & Corwyn, 2002). Among other things, these differences arise because children growing up in high-SES families have access to more resources that are deemed beneficial for children's development than children in low-SES families (Brooks-Gunn & Duncan, 1997). Family SES can be conceptualized with the notion of capital (resources, assets), whereby differential access to financial, human, and social capital is associated with varying growth in children's development (Coleman, 1988).

Greater *financial* capital provides families with more opportunities to invest in goods and services that foster children's learning (Yeung, Linver, & Brooks-Gunn, 2002). It is typically operationalized with household income, occupational status, or occupational class. Families' *human* capital (any nonmaterial resources such as education, skills, or knowledge) enables them to engage their children in interactions and activities in cognitively stimulating ways (Harding, Morris, & Hughes, 2015). Studies measuring families' endowment with *human capital* commonly use parents' education as the primary indicator. The *social* capital of the family captures the relations between children and all other family members. Whether children gain access to family members' human capital depends on members' physical presence and attention towards their children (Coleman, 1988). Although different family SES dimensions are highly interrelated, they measure different resources and are uniquely associated with children's cognitive, language, and behavioral outcomes (Bradley & Corwyn, 2002; Duncan & Magnuson, 2003).

Scholars have long argued that work and occupations have ‘spillover’ and socialization effects on other life spheres such as parenting (Greenberger, O’Neil, & Nagel, 1994). For example, Melvin Kohn and colleagues’ seminal work showed that what people experience in their jobs translates into value orientations and behaviors that they apply outside their workplace, e.g., in parenting (Kohn & Schooler, 1982). Occupational characteristics such as maternal occupational complexity (task complexity, authority, and autonomy) influence parental skills and value orientations, which, in turn, affect their parenting styles and children’s cognitive outcomes and academic achievement (Parcel & Menaghan, 1994; Yetis-Bayraktar, Budig, & Tomaskovic-Devey, 2013). Hook, Ruppanner & Casper (2021) also found that occupational autonomy was positively associated with mothers’ time in interactive care. By contrast, mothers working in occupations with greater strain-based demands (e.g., aggression-conflict or physicality-hazards) spend less time with their children and less time on physical childcare activities (Hook et al., 2021).

In this article, we argue that the literature did not fully capture the dimension of parental *human capital* when estimating associations between family SES and children’s non-verbal (e.g., Schoon et al., 2012) or verbal skills (e.g., Dearden et al., 2011). We will extend the evidence on the role of occupational characteristics in child development to a range of maternal occupation-specific skills and investigate their association with children’s cognitive ability. We propose that *maternal occupation-specific skills* influence children’s expressive language, inductive reasoning, and spatial awareness skills over and above parents’ endowment with other forms of human, economic, and social resources.

We contribute to the literature on family SES and child development in two important ways. First, studies examining socioeconomic inequalities in children’s development may not have sufficiently measured all relevant forms of capital and, therefore, failed to assess the full scope of

socioeconomic disparities in child development. By investigating the impact of maternal occupation-specific skills, we improve parents' human capital measurement and provide a more robust assessment of socioeconomic differences in children's verbal and non-verbal abilities.

Second, we extend the scholarship on intergenerational transmission of skills and the impact of mothers' occupations on child development. Research on the association between parents' and children's skills commonly focused on parents' 'general' cognitive ability in the form of educational qualifications or cognitive test scores measured when they were children or adults (e.g., Brown, McIntosh, & Taylor, 2011; Crawford, Goodman, & Joyce, 2011). Research studying the impact of work characteristics on children's skill development mainly considered parents' 'intellectual capacities' formed through complex work environments (Parcel & Menaghan, 1994; Schooler, 1984). However, occupations require a wide range of specific skills and values, influencing family life and parenting (Jonsson et al., 2009).

We address this gap in the literature by investigating whether maternal occupation-specific skills (e.g., literacy, numeracy, and problem-solving) are associated with children's verbal and non-verbal development at age five net of other economic, human, and social capital forms. For this purpose, we link data from the Millennium Cohort Study (MCS) to the British Skills Surveys (BSS) to capture mothers' occupation-specific skills.

THEORETICAL CONSIDERATIONS

Family SES and Child Development

The formation of early cognitive ability is conceptualized as a process in which children's characteristics and contextual conditions within and outside the family impact their development and well-being in an early stage of life (Bronfenbrenner, 1979). Whereas early cognition can be

stimulated at any point during childhood (Shonkoff & Phillips 2000), it is deemed to be more malleable in early childhood than in school entry ages and adolescence (Knudsen et al., 2006).

A crucial micro-level factor that shapes children's developmental trajectories is family SES providing them with different resources to enhance children's non-verbal and verbal development (Bradley & Corwyn, 2002). Families can be endowed with financial, human, and social capital – each of which may have a unique and robust effect on children's development (Bradley & Corwyn, 2002; Duncan & Magnuson, 2012).

Financial capital.

Financial resources may be beneficial for providing a stimulating learning environment for children (Yeung et al., 2002). The family investment model suggests that financial hardship restricts low-SES parents in their ability to invest in inputs that enhance children's well-being and development (Mayer, 1997). In addition, financial resources help parents to avoid poor housing and neighborhood conditions that would otherwise be detrimental to their children's development (Shonkoff & Phillips, 2000). Financial hardship is also associated with lower levels of child nutrition and poor child health (e.g., Evans & Kim, 2007). Moreover, low-SES families have fewer resources to invest in toys, (text)books, and computer programs that stimulate their children's cognitive and language development (Guo & Harris, 2000).

The family stress model (Conger, Conger, & Martin, 2010) argues that economic deprivation leads to enhanced stress in the family environment. Psychological distress among parents will result in greater family conflict, a higher risk of separation, and the use of unresponsive parenting styles that, in turn, are harmful to children's development. Higher levels of stress may also lead to anxiety, depression, and other mental health problems, which have adverse effects on children's well-being (Conger, et al., 1994; Shonkoff & Phillips, 2000). Moreover, family stress

is linked to the use of punitive parenting and children's conduct problems (Rijlaarsdam et al., 2013) which adversely impacts their cognitive and language development (Malecki & Elliott, 2002).

Human capital.

Human capital “provides the potential for a cognitive environment for the child that aids learning” (Coleman, 1988: 109). Hence, parents' cognitive skills correspond to their capacity to promote their children's cognitive and language development (Harding et al., 2015). Most prominently, parents gain this set of skills via educational attainment, but they may also have developed some of these skills prior to education (e.g., through their childhood) or after their education (e.g., through their occupation).

The amount of human capital available in the family determines the quality and quantity of parent-child interactions and the availability of a stimulating learning environment deemed beneficial for children's cognitive development (Nisbett et al., 2012; Shonkoff & Phillips, 2000). Parental time spent in educational activities with children is the most productive input for children's cognitive development (Fiorini & Keane, 2014). Language acquisition and children's vocabulary growth is significantly influenced by the quantity and quality of linguistic input directed at children in their social environment (Hart & Risley, 1995; Hurtado et al., 2008; Weisleder & Fernald, 2013).

Highly educated parents do not only spend more time with their children but also use this time more efficiently for engaging their children in cognitively stimulating activities such as reading to their children, telling stories, reciting rhymes, singing songs, or doing art with their children (e.g., Kalil, Ryan, & Corey, 2012; Raikes et al., 2006). Due to their knowledge and skills, they also have a better idea of tailoring high-quality activities to the right developmental level of

their children and have advantages in the way they engage their children with activities (e.g., ask meaningful questions when reading to their children) (Kalil et al., 2012). They also speak more often to their children, use more variation in their vocabulary, are more responsive to their children, and encourage more child speech than parents with lower education (Hoff, 2003; Rowe, 2008; Shonkoff & Phillips, 2000).

Social capital.

Parents' use of other capitals is fruitful in fostering children's cognitive development if it is complemented by *social capital* (Coleman, 1988). The amount of social capital available in the family depends on the physical presence of family members and whether family members pay attention to their child. Physical presence is a necessary but not sufficient requirement for a child's well-being. If present, family members need to spend time with their children, monitor their activities, promote their well-being, and build close relationships and bonds with them (Parcel, Dufur, & Cornell Zito, 2010). The more social capital is available to children, the greater the transmission of human capital from parents and other family members to children, and the more stimulation of children's cognitive development.

Maternal occupation-specific skills and children's cognitive development.

The literature commonly measures the *human capital* in the family with mothers' education because of their primary role in caring for children (Harding et al., 2015). However, focusing on educational attainment may be too narrow because "human capital is created by [any] changes in persons that bring about skills and capabilities that make them able to act in new ways" (Coleman, 1988: 100). Other forms of human capital than education could help mothers foster their children's learning and development. For instance, growing evidence shows that parents' cognitive skills are associated with their children's cognitive skills (Crawford et al., 2011; Heineck & Anger, 2010;

Sullivan, Moulton & Fitzsimons, 2021). Aside from general cognitive ability, human capital also entails mothers' on-the-job training, which may help create a stimulating learning environment for children at home. Hence, occupations may endow parents with different skills that are beneficial for children's cognitive and language development net of other capitals (human, economic, social).

Occupation-specific skills' can be understood as a multidimensional concept including different cognitive, social, physical, verbal, and numerical skills required to perform tasks in a specific occupation (Elliott & Lindley, 2006). These specialized skills are formed in the workplace and are distinct from individuals' pre-existing general (cognitive) abilities (Liu & Grusky, 2013). Although occupations influence wages through their task content (e.g., Williams & Bol, 2018), skills developed through occupational task requirements may also shape the home environment, particularly maternal decisions on parenting and their *interactions* with their children (see Figure 1). Whereas decisions correspond to the "what" of parenting, interactions are about the "how". When it comes to childrearing, mothers must make a wide range of choices, including, for example, whether to breastfeed, which toys and books to buy, which play activities to engage in, how much to play, and which early childcare institution or extra-curricular programs to use. Parenting also involves much interaction, i.e., mothers' responding and communicating with their children – a concept that strongly overlaps with what is often referred to as parenting style (e.g., Chan & Koo, 2011).

Figure 1 illustrates that maternal occupation-specific skills influence their parenting decisions and interactions via three mechanisms. First, maternal occupation-specific skills have an indirect impact via maternal occupation-specific *values*. Our assumptions draw on Kohn's and Schooler's work (Kohn, 1963, 1976; Kohn & Schooler, 1969, 1973), who studied how employment conditions (e.g., occupational opportunities for self-direction, job pressure, position

in organization’s hierarchy) shape parenting values and parenting styles. They proposed that parents’ complex work environments require intellectual skills that foster self-directedness in other life domains, such as parenting (Alwin & Tufis, 2021). We extend this argument and suggest that maternal occupation-specific skills will translate into value orientations that favor these specialized skills and shape their parenting decisions and interactions (Eccles, 1993; Jodl et al., 2001). If an occupation rewards a certain cognitive effort (e.g., independent judgment), it stimulates individuals’ value orientation and motivation to develop further the required cognitive abilities (Schooler, 1984).

FIGURE 1 CONCEPTUAL MODEL LINKING MATERNAL OCCUPATION-SPECIFIC SKILLS WITH CHILDREN’S VERBAL AND NON-VERBAL SKILLS

For example, engineering occupations may promote construction skills and engineers’ appreciation of such skills. The occupation-specific value orientation is then generalized to other situations, resulting in parenting values and styles aligned with these values (Schooler 1984). Jonsson et al. (2009: 988), who studied the intergenerational transmission of “micro-classes”, provided an example illustrating the role of occupation-specific values for parents’ engagement with their children: “The engineer [...] may bring home toys that involve building things, may

focus conversation and inquiry on the world of things, and may impart a special interest in understanding how things work.” Hence, occupation-specific human capital may result in preferences for parental engagement and time with children, learning strategies, play, discussion, and parenting behavior that parents are skilled in or know about through occupational socialization.

Second, maternal occupation-specific skills influence their parenting *indirectly* through their parental *self-efficacy*. Parental self-efficacy corresponds to parents’ belief in their ability “to influence the child and his or her environment to foster the child’s development and success” (Ardelt & Eccles, 2001: 945). The literature suggests that parental self-efficacy determines whether and how parents engage with their children (Coleman & Karraker, 1998; Jones & Prinz, 2005) and that it is a belief that is specific to distinct situations or “tasks” rather than a global, stable belief (Coleman & Karraker, 1998). For instance, parental self-efficacy is one of the key factors determining whether parents get involved in their children’s schooling (Hoover-Dempsey & Sandler, 1997). More specifically, mothers’ reading self-efficacy is associated with the barriers they perceive to reading to their child (Lin et al., 2015), and parents’ mathematic self-efficacy is linked to their own and their children’s emotions and behaviors towards mathematics (Bartley & Ingram, 2018). Mothers’ “task-specific” self-efficacy may be stronger if their occupation promotes skills in the respective domain or tasks and may, in turn, influence their decisions about parenting and the way they interact with their children.

Third, maternal occupation-specific skills *directly* impact parenting because mothers use their skills when interacting with their children. For example, mothers with numerical skills will be better at and more engaged in playing numeracy games than mothers with no or low levels of such skills. Similarly, mothers with crafts skills are more likely to use their abilities and inspire

their children in creative activities such as drawing, painting, and making things with their hands than mothers with little craft skills.

Hypotheses.

Mothers' occupation-specific skills may shape their parenting decisions and interactions; they create parenting environments for their children influenced by their occupations (Jodl et al., 2001; Jonsson et al., 2009). These, in turn, shape children's verbal and non-verbal development. From this reasoning, we deduce a *first hypothesis*: Net of economic, social, and other human capital, maternal occupation-specific skills have a positive impact on children's verbal and non-verbal ability.

We differentiate between five specific groups of maternal occupation-specific skills: literacy, numeracy, problem-solving, verbal (e.g., teaching and presentation skills), and physical skills (e.g., use of physical strength, tools, hands, and fingers). Table 1 provides an overview of these groups and their expected impact on children's non-verbal and verbal abilities.

We suggest that mothers' literacy and verbal skills are more influential for children's verbal ability than for their non-verbal ability. Mothers with these skills may, for instance, promote their children's verbal abilities through reading them plenty of books and speaking a lot with them (Ece Demir-Lira et al., 2013; Sénéchal & LeFevre, 2002; Frijters et al., 2000; Sullivan et al., 2021). By contrast, mothers' numeracy skills may benefit children's non-verbal ability than verbal ability. For example, mothers with high levels of numerical skills may buy toys such as blocks and engage in construction play or puzzles, which influence children's early numeracy skills, non-verbal problem solving, and spatial transformation skills (Levine et al., 2012; Niklas & Schneider, 2014; Segers et al., 2015; Trawick-Smith et al., 2017). Likewise, we expect that mothers' problem-solving skills influence children's non-verbal spatial and reasoning development more than their

verbal ability because mothers can use their analytical thinking in cognitively stimulating play with their children (Mondell & Tyler, 1981). Parents who require physical skills in their work may promote children’s fine motor skills, which, in turn, are associated with better visual-spatial processing (van der Fels et al., 2015). Our *second hypothesis* suggests that mothers’ literacy and verbal skills are more strongly associated with children’s verbal ability; mothers’ numeracy, problem-solving, and physical skills are more strongly associated with children’s non-verbal ability.

Table 1. *Maternal occupation-specific skills and their potential impact on children’s verbal and non-verbal abilities*

Maternal occupation-specific skills	Description	Impact on child cognitive ability	
		<i>Non-verbal ability</i>	<i>Verbal ability</i>
Literacy	Reading and writing documents of different lengths.		+
Numeracy	Mathematical actions at different levels of difficulty (e.g. subtracting, calculating fractions, statistical procedures).	+	
Problem-solving	Spotting problems, finding solutions and finding causes.	+	
Verbal	Teaching people, persuading others, planning tasks of others.		+
Physical	Use of physical strength for different lengths of time, use of hands and fingers, knowledge of use of operation tools.	+	

Note: ‘+’ stronger positive association than with other child ability.

METHOD

Data

The study draws mainly on data collected for the UK Millennium Cohort Study (MCS). We also use British Skills Surveys (BSS) data to generate mothers’ occupation-specific skill variables. The MCS is a survey of around 19,000 children born between September 2000 and January 2002. The

sample was selected from all births in a random sample of electoral wards and was disproportionately stratified, allowing for greater representation of all UK countries, deprived areas, and areas with high concentrations of Black and Asian families in England. Due to disproportionate sampling, we used sampling weights throughout the analysis. The first sweep of the study was conducted when MCS children were about nine months old. Further sweeps were collected at ages 3, 5, 7, 11, 14, and 17.

For our analysis, we chose to sample families who responded to the third survey ($n = 15,431$), considering outcome measures of expressive language, inductive reasoning, and spatial awareness ability at the age of five. We used information from the first three waves to derive family financial, human, and social capital measures. Small case numbers prohibited the inclusion of specific family structures in our analysis that may differ systematically from the majority sample. Therefore, our analytical sample excluded children whom grandparents raised, adoptive parents, or foster parents ($n = 55$), i.e., families in which no natural parent was present. Our analyses are based on children and their natural mothers (or natural fathers if natural mothers were not present in the household), for whom we have complete data on all measures, leaving us with 13,543 observations. In addition to using sampling weights, we corrected for non-selective loss to follow-up using MCS attrition/non-response weights.

The BSS is a nationally representative survey conducted between 1997 and 2017 to gather information on job skills of employed adults aged 20 to 60 years (some surveys also include adults aged 61 to 65). We used data from the surveys in 2001 ($n = 4,470$), 2006 ($n = 7,787$), and 2012 ($n = 3,200$) to create several occupation-specific skills variables, which we then assigned to mothers in the MCS using their Standard Occupational Classification-codes (SOC2000). The SOC2000 is

the UK's official occupational classification system. Jobs are classified by work content and skill level.

Measures

Child cognitive ability.

Around their fifth birthday, MCS assessed children with a *Naming Vocabulary*, a *Picture Similarities*, and a *Pattern construction* task, child assessments from the British Ability Scales, Second Edition (Elliott, Smith, & McCulloch, 1997). Interviewers directly administered all tasks at the child's home. *Naming Vocabulary* is our verbal ability measure assessing children's expressive language ability and knowledge of nouns by asking them to identify different objects in a colored picture booklet. The *Picture Similarities* assessment captures children's inductive reasoning ability by asking them to match a picture card (e.g., an animal) to one of four other picture cards (e.g., a house, a person, a car, or another animal) based on whether they see any conceptual or elementary link. Finally, the *Pattern Construction* task tests children's spatial awareness by asking them to construct a design putting together flat squares or solid cubes with black and yellow patterns on each side. We used MCS standardized scores for all BAS II tasks, which were adjusted for both item difficulty and age. They are bounded between 10 and 80, have a mean of 50, and a standard deviation of 10.

Maternal occupation-specific skills.

We measure *occupation-specific skills* with information on job tasks provided by the respondents in the BSS data. A core part of the BSS involves questions about how important a certain task is for a person's job. The tasks include, for instance, reading short or long documents, persuading, or influencing others, and analyzing complex problems in depth. Respondents could

choose between the answering categories (1) *not at all important/does not apply*, (2) *not very important*, (3) *fairly important*, (4) *very important* and (5) *essential*.

We conducted a factor analysis with principal component extraction on 33 of such task variables, and – applying a selection rule of Eigenvalues larger than 1 – we found an eight-factor solution. For this analysis, the original BSS sample of 15,457 was reduced to 13,457 because of missing values on three task variables (in particular, a variable on the use of statistics with 1,530 missing values). Further, six cases were not used as they had missing values on the occupation-code variable leading to a sample size of 13,451. After oblique promax rotation, we generated indices representing the mean values of the variables loading on these factors with loadings of more than 0.4. Two skills-variables out of the 33 were excluded through this procedure as their loadings are below 0.4.

In the next step, we reduced the 81 three-digit SOC2000-occupation groups to 79 groups by merging two groups with similar groups because they had less than 20 cases (see Williams & Bol, 2018 for a similar approach). We then calculated the mean of each index for respondents working in those 79 occupation groups. The case numbers across these occupation groups range from 20 to 818. The eight indices (literacy, numeracy, problem-solving, verbal, social, physical, teamwork, self-planning), the underlying items, and the means of the indices at BSS sample and occupation-group level are presented in Table 2.

Lastly, we merged the eight occupational skills variables from the BSS with mothers' information on their occupations in the MCS data based on three-digit SOC2000 codes. Information on mothers' occupation was taken from the first sweep when children were nine months old and supplemented by information from the second sweep when children were three

years old if mothers were not employed in the first sweep. If mothers were not present in the household, we used respective information from the father.

From a theoretical point of view, it seems unclear how social skills (dealing with people, selling a product), teamwork (working with a team, listening to colleagues), and self-planning skills (planning own activities, organizing own time, thinking ahead) correspond to improvements in children's verbal and non-verbal ability. The social skills index has a Cronbach's alpha of 0.62, suggesting an internal consistency lower than acceptable (> 0.7). Self-planning and teamwork skills are strongly correlated with literacy skills (0.83 and 0.71 respectively), verbal skills (0.77 and 0.67 respectively), and problem-solving skills (0.66 for teamwork) (see Table S1 in the Supplementary Material). For these reasons, we refrained from using these occupation-specific skills in our analyses. This leaves us with five skill variables in line with our theoretical considerations (see Table 1): literacy, numeracy, problem-solving, verbal, and physical. These skill variables were standardized to a mean of zero and a standard deviation of one.

Table 2. *Maternal skills-indices, underlying variables, Eigenvalues, Cronbach's alphas, and factor loadings*

Skills index and underlying variables	Eigen-value	Cronbach's alpha	Factor loading	Mean (BSS full sample; $n = 13,451$)	Mean (occupation-level sample; $n = 79$)
<i>Literacy</i>	9.41	.88		2.62	2.56
Reading written information (e.g., forms, notices, signs)			.81		
Reading short documents			.82		
Reading long documents			.77		
Writing materials such as forms, notices or signs			.87		
Writing short documents			.71		
Writing long documents			.60		
<i>Numeracy</i>	1.30	.84		2.08	1.98
Arithmetic (adding, subtracting, multiplying, dividing numbers)			.89		
Arithmetic involving fractions (decimals, percentages, fractions)			.91		

Advanced mathematical/ statistical procedures			.77		
<i>Problem-solving</i>	1.68	.87		3.09	3.12
Spotting problems or faults			.87		
Working out cause of problems/ faults			.92		
Thinking of solutions to problems			.81		
<i>Verbal</i>	2.19	.79		2.12	2.06
Teaching people (individuals or groups)			.52		
Making speeches/ presentations			.75		
Persuading or influencing others			.62		
Planning the activities of others			.52		
<i>Social**</i>	1.45	.62		2.74	2.68
Dealing with people			.52		
Counselling, advising or caring for customers or clients			.60		
Selling a product or service			.85		
Knowledge of particular products or services			.67		
<i>Physical</i>	1.13	.82		1.98	2.08
Physical strength			.89		
Physical stamina			.89		
Skill or accuracy in using hands/fingers			.72		
Knowledge of use or operation of tools			.61		
<i>Teamwork*</i>	1.53	.77		3.17	3.12
Working with a team			.90		
Listening carefully to colleagues			.82		
<i>Self-planning*</i>	3.29	.83		3.14	3.12
Planning own activities			.88		
Organising own time			.89		
Thinking ahead			.75		

Note: BSS=British Skills Surveys; *These variables are excluded from the main analyses due to very high correlations with other skills (e.g., literacy). ** The skill variable ‘Social’ is excluded due to a Cronbach’s alpha <0.7.

Family resources.

We further operationalize *human capital* in the family with mothers’ highest educational qualification at the child’s age of five. Maternal educational qualifications were classified into seven categories, five of them equivalent to the National Vocational Qualification (NVQ) scale: (1) No qualifications, (2) NVQ level 1 (e.g., GCSE grades D, E, F, G), (3) level 2 (e.g., GCSE grades A*, A, B, C) corresponding to lower secondary attainment, (4) NVQ level 3 to upper

secondary attainment (e.g., A-levels), (5) NVQ level 4 to undergraduate education (e.g., Bachelor's degree), (6) NVQ level 5 to postgraduate education (e.g., Master's degree), and the last category indicates (7) overseas qualifications.

To operationalize families' *financial capital*, we used family income, housing tenure, and parental class. As our indicator of financial resources, we used quintiles of equivalized net household income (adjusted for household size and composition), applying modified OECD scales for equivalization. For housing tenure, we differentiated between children living in "publicly subsidized housing" from those living in other housing types (own outright, own – mortgage/loan, and private renting). We measured parental social class using the 7-class "analytical" version of the National Statistics Socioeconomic Classification (NS-SEC): (1) Higher managerial, administrative and professional occupations, (2) Lower managerial, administrative, and professional occupations, (3) Intermediate occupations, (4) Small employers and own account workers, (5) Lower supervisory and technical occupations, (6) Semi-routine occupations and (7) routine occupations. It captures differences in employment relations associated with advantages and disadvantages in income security, short-term income stability, and longer-term income prospects. We used the highest class among parents and, in the case of single-parent households, the present parent's class.

The *social capital* within the family is measured with four variables: family structure differentiating between (1) Both natural parents in the household, (2) Natural parent and another parent (e.g., step or adoptive) in the household, (3) Single-parent household; the number of siblings indicating (1) no siblings, (2) one, (3) two, (4) more than two; and whether grandparents or other adults are present in the household. Hence, these variables capture adults' physical presence in the family and how much attention these adults can give to the child (J. S. Coleman, 1988).

We calculated correlation coefficients to assess potential collinearity among our family resources. Some family resources (e.g., parental class and family income) were strongly correlated, but they were not collinear. The average correlation among all forms of financial, human, and social capital was 0.20 (Min = 0.00; Max = 0.60). The full correlation matrix is presented in the Supplementary Material (Table S2). Maternal occupation-specific skills were also correlated with other family resources but were, likewise, far from collinear (Min = 0.00; Max = 0.61). Maternal literacy skills were most strongly correlated with other family resources. Parental class was the capital that was most substantially linked with all maternal occupation-specific skills. All correlations between maternal occupation-specific skills and other family resources can be found in Supplementary Table S3.

Other covariates.

We further adjust for the following covariates in our analysis: the UK region (North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland); neighborhood deprivation deciles based on the respective index of deprivation in each UK country; the child's sex; the child's ethnic group: (1) White, (2) Mixed, (3) Indian, (4) Pakistani and Bangladeshi, (5) Black or Black British, (6) Other ethnic group; and the child's age (in months). We also control for a child's age because the age adjustment in the standardized scores is made within three-month age bands. Summary statistics for all variables can be found in Table S4 in the Supplementary Material.

RESULTS

Table 3 shows the correlations between maternal occupation-specific skills and children's verbal and non-verbal ability at age five. All maternal occupation-specific skills, except physical skills,

were positively but weakly correlated with children’s outcomes. Correlations were somewhat stronger for children’s verbal ability (Naming Vocabulary) than for non-verbal ability (Picture Similarities, Pattern Construction). When comparing maternal occupation-specific skills, the positive correlations did not vary considerably in size, with literacy and verbal skills having slightly stronger associations with child outcomes than other maternal occupation-specific skills.

To test associations between maternal occupation-specific skills and children’s verbal and non-verbal skills net of other parental resources, we conducted a series of linear regression models predicting Naming Vocabulary, Picture Similarities, and Pattern Construction scores (standardized to a mean of 50 and a standard deviation of 10) separately. In addition, we tested for collinearity using the variance inflation factor (VIF) and detected no VIF values (>10) that may warrant further examination (Min = 1.00; Max = 4.61). For a list of VIF values for all variables, see Table S5 in the Supplementary Material. Figure 2 illustrates the associations between maternal occupation-specific skills and children’s verbal ability (Naming Vocabulary) when conditioning on the other maternal skills (M1) and when additionally adjusting for covariates, including other financial, human, and social resources (M2). The full regression outputs can be found in Tables S6-S8 in the Supplementary Material.

Table 3. *Correlations (Pearson’s r) between maternal occupation-specific skills and child verbal and non-verbal ability ($n=13,543$)*

	Naming Vocabulary	Picture Similarities	Pattern construction
Literacy	.24	.13	.15
Numeracy	.17	.10	.12
Problem-solving	.17	.10	.11
Verbal	.21	.12	.13
Manual	-.19	-.11	-.13

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted for. All correlations are significant at the 0.01%-level.

Except for numerical skills, all maternal occupation-specific skills were significantly associated with children’s verbal ability after conditioning on other maternal occupation-specific skills. As in the bivariate case, mothers’ physical skills were negatively associated with children’s verbal ability once other occupation-specific skills were conditioned on. Mothers’ verbal skills had the strongest positive association with children’s verbal ability holding all other occupation-specific skills constant. A one standard deviation increase in maternal verbal skills was associated with more than a one-point increase in the standardized Naming Vocabulary score (i.e., more than one-tenth of a standard deviation).

FIGURE 2. ASSOCIATIONS BETWEEN MATERNAL OCCUPATION-SPECIFIC SKILLS AND CHILD VERBAL (NAMING VOCABULARY) AND NON-VERBAL ABILITY (PICTURE SIMILARITIES AND PATTERN CONSTRUCTION) (WITH 95%-CONFIDENCE INTERVALS).

Source: MCS1–MCS3; BSS. Note: Estimates derived from linear regressions presented in Supplementary Material Tables S2-S4; Sample weights, clustering and stratification accounted for.

When adjusting for covariates, including other capitals (human, economic, and social), the association between maternal literacy skills and children’s verbal ability was statistically non-significant. Likewise, the association between maternal problem-solving skills and children’s

verbal ability was statistically non-significant once adjusting for confounders. However, mothers' verbal skills were significantly associated with children's verbal ability after conditioning on other parental resources and covariates. By contrast, mothers' physical skills remained negatively associated with children's Naming Vocabulary scores.

Regarding non-verbal ability (both Picture Similarities score and Pattern Construction score), maternal numeracy and problem-solving skills had non-significant associations when adjusting for other occupation-specific skills. Mothers' literacy, verbal and physical skills were significantly associated with both measures of children's non-verbal ability after adjusting for other maternal skills. However, none of these maternal skills were significantly associated with non-verbal ability scores after conditioning on other family resources. Hence, maternal occupation-specific skills were not uniquely associated with children's ability of inductive reasoning and spatial awareness when measured at age five net of other forms of human, economic, and social capital.

DISCUSSION

Scholars have consistently shown that SES differences in child development arise from unevenly distributed family resources, including social, economic, and human capital (Bradley & Corwyn, 2002; Duncan & Magnuson, 2012). In this paper, we argued that parental human capital operates not only through educational attainment – the typical operationalization of human capital – but also through mothers' occupation-specific skills. Drawing on research investigating the relationship between mothers' work characteristics and children's development (Parcel et al., 1984) and parental self-efficacy (Ardelt & Eccles, 2001), we suggested that parental occupation-specific skills influence parents' preferences and decisions in life areas outside their job such as child-rearing. The tasks performed in work and the skills required may influence how parents

interact with their children, the activities they engage them in, and the types of toys and conversation topics they choose. This, in turn, may shape children's cognitive development to different degrees, depending on parents' endowment with occupation-specific skills. For instance, we hypothesized that if parents' jobs require high levels of verbal skills, these will significantly impact children's verbal development; if parents apply extensive numeracy skills in their jobs, they will more strongly shape children's inductive reasoning and spatial problem-solving skills net of all other family resources.

Analyzing representative data on British mothers and their 5-year-old children, we found partial evidence supporting our central assumption that mothers' occupational skills influence children's cognitive development. Conditioning on other family resources, we did not find associations between maternal occupation-specific skills and children's non-verbal development, measured as inductive reasoning and spatial awareness skills assessments. However, over and above human, social, and economic capital, mothers' verbal skills (e.g., presentation and teaching skills) were positively associated with children's verbal ability. This result is in line with research showing that children's vocabulary levels are strongly shaped by parents' and other caregivers' verbal interactions with them (Hurtado et al., 2008; Weisleder & Fernald, 2013). By contrast, mothers' physical skills were negatively associated with children's verbal development. This may be because mothers applying physical skills work in occupations with greater strain-based demands and thus spend less time with their children affecting their verbal development (Hook et al., 2021). Overall, children's verbal ability seems to be particularly malleable by the immediate home environment, including differences in parental occupation-specific skills.

Our findings indicate that processes through which family background contributes to social stratification in child development may be more complex and multilayered than the literature has

assumed. Parents' occupations affect children's verbal development via parental social class, income and work conditions, but also via tasks parents perform in their jobs shape their parenting. This implies that socioeconomic inequalities in child outcomes and the intergenerational transmission are amplified through differential skills that occupations demand and promote. Hence, there also seems to be potential to reduce socioeconomic inequalities by providing parents with the skills needed to foster their children's verbal skills. As with increases in maternal education after childbirth (e.g., Harding, 2015), life-long learning and further training in mothers' verbal skills may positively impact children's development, particularly among mothers who apply physical skills in their jobs.

Our study has several caveats that should be considered when interpreting the results. *Firstly*, maternal occupation-specific skills are derived from respondents' subjective information provided in a different survey (the BSS) and aggregated to the occupational level. Hence, our maternal skill measures are based on average skills within occupational groups, ignoring within-group variance. Ideally, scholars have access to data from large-scale surveys on parenting and child outcomes, including questions and assessments on parents' general and occupation-specific skills. *Secondly*, the study is restricted to occupational skills that emerged from the employment questions asked in the BSS survey. Hence, the paper investigates the association between maternal occupation-specific skills and children's verbal and non-verbal development exploratively. Other dimensions of occupation-specific skills not captured in this survey may be important to consider when predicting child outcomes. *Thirdly*, our study remains descriptive as we cannot disentangle whether mothers have gained their skills through occupations or whether they self-selected into specific occupations with pre-existing skills. Finally, the associations between maternal occupation-specific skills and children's verbal development may be genetically confounded (S.

A. Hart et al., 2020). Mothers share genes related to verbal ability with their children. At the same time, their verbal ability could be associated with occupational choices.

Leaving these limitations aside, we found that some maternal occupation-specific skills had a positive (verbal) and a negative (physical) influence on their children's verbal skills net of other resources. Future research could follow up on this by studying a broader range of children's abilities, including verbal and numerical abilities at a later age and academic achievement in different subjects. For example, parents' numeracy skills could become more influential as children transition into school and need support with mathematics homework (Bartley & Ingram 2018). In addition, parents' occupation-specific skills may become more important as children grow older because parent-child interactions become more "subject-specific" in terms of conversation topics parents choose, school subjects they help with and occupation-related values and preferences they foster in their children. At older ages, parents' occupation-specific skills likely influence their children's interests and values of certain subjects, which, in turn, will impact their motivations to develop the relevant abilities and pursue similar occupational careers (Jonsson et al., 2009).

Future research may further be concerned with the mediating pathways between maternal occupation-specific skills and children's verbal development. We presented a detailed theoretical model on the processes through which parental occupation-specific skills influence children's verbal and non-verbal ability, but we did not investigate these processes empirically. The next steps could include, for instance, the collection of data through parent interviews or observations in the family to investigate whether parents' reasoning and behavior are in line with our theoretical model.

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Supplementary material

Table S1. Correlation matrix for maternal occupation-specific skills (n=13,543)

	Literacy	Numeracy	Problem-solving	Verbal	Social	Physical	Self-planning	Team-work
Literacy	-							
Numeracy	.49	-						
Problem-solving	.63	.59	-					
Verbal	.74	.41	.58	-				
Social	.10	.26	.10	.31	-			
Physical	-.57	-.58	-.20	-.27	-.08	-		
Self-planning	.83	.52	.66	.77	.16	-.48	-	
Team-work	.71	.30	.44	.67	.37	-.22	.44	-

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted for. All correlations are statistically significant at the 0.01%-level.

Table S2. Correlation matrix for family resources (n=13,543)

	Family income	Parental class	Housing tenure	Maternal education	Family structure	Number of siblings	Grandparent presence	Other adult presence
Family income	-							
Parental class	-.60*	-						
Housing tenure	-.49*	.45*	-					
Maternal education	.41*	-.47*	-.30*	-				
Family structure	-.46*	.41*	.37*	-0.19*	-			
Number of siblings	-.17*	.06*	.07*	-0.09*	-.13*	-		
Grandparent presence	-.08*	.05*	-.06*	-0.01	.08*	-.05*	-	
Other adult presence	-.05*	-.05*	.00	-0.01	.10*	-.03	.23*	-

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted for. * $p < 0.001$

Table S3. Correlations between maternal occupation-specific skills and other family resources (n=13,543)

	Literacy	Numeracy	Problem- solving	Verbal	Physical
Family income	.44*	.33*	.32*	.35*	-.37*
Parental class	-.61*	-.47*	-.44*	-.46*	.51*
Housing tenure	-.34*	-.27*	-.26*	-.24*	.27*
Maternal education	.45*	.29*	.32*	.43*	-.29*
Family structure	-.21*	-.17*	-.16*	-.15*	.17*
Number of siblings	-.06*	-.08*	-.05*	-.03*	.10*
Grandparent presence	-.02*	-.02	-.03*	-.03*	.01
Other adult presence	-.02*	-.02*	-.01*	-.00*	.03*

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted for. * $p < 0.001$

Table S4. *Summary statistics (n=13,543)*

	Mean/Proportion	SD
<i>Child verbal ability</i>		
Naming Vocabulary	54.90	11.28
<i>Child non-verbal ability</i>		
Picture Similarities	55.17	10.68
Pattern Construction	50.42	10.50
<i>Maternal occupation-specific skills*</i>		
Literacy	2.51	0.51
Numeracy	1.93	0.56
Problem-solving	2.96	0.28
Verbal	1.98	0.53
Physical	1.96	0.65
<i>Maternal education</i>		
No qualifications	.09	
NVQ Level 1	.08	
NVQ Level 2	.30	
NVQ Level 3	.15	
NVQ Level 4	.32	
NVQ Level 5	.04	
Overseas qualification	.02	
<i>Parental class</i>		
Higher managerial and professional occ.	.17	
Lower managerial and professional occ.	.31	
Intermediate occ.	.15	
Small employers and own account workers	.07	
Lower supervisory and technical occ.	.08	
Semi-routine occ.	.14	
Routine occ.	.08	
<i>Net household income (quintiles)</i>		
Lowest	.15	
20 - < 40%	.17	
40 - < 60%	.21	
60 - < 80%	.22	
Highest	.24	
<i>Housing tenure</i>		
Social housing	.21	
<i>Family structure</i>		
Both natural parents	.77	
Natural parent and step/adoptive parent	.05	
Natural parent only	.18	
<i>Number of siblings</i>		
No siblings	.17	
One	.50	
Two	.23	
More than two siblings	.10	
Grandparent present in the household: yes	.03	
Other adults in the household: yes	.03	
<i>Region</i>		
North East	.03	

North West	.10	
Yorkshire and the Humber	.08	
East Midlands	.07	
West Midlands	.08	
East of England	.10	
London	.10	
South East	.16	
South West	.09	
Wales	.05	
Scotland	.10	
Northern Ireland	.04	
<i>Neighborhood deprivation (deciles)</i>		
Most Deprived Decile	.09	
10 - < 20%	.09	
20 - < 30%	.09	
30 - < 40%	.09	
40 - < 50%	.10	
50 - < 60%	.10	
60 - < 70%	.10	
70 - < 80%	.10	
80 - < 90%	.11	
Least Deprived Decile	.12	
Child's sex: female	.49	
<i>Child's ethnic group</i>		
White	.89	
Mixed	.03	
Indian	.02	
Pakistani and Bangladeshi	.03	
Black or Black British	.02	
Other Ethnic group (incl. Chinese)	.01	
Child's age (in months)	62.53	2.90

Source: MCS1–MCS3; BSS. Sample weights, clustering and stratification accounted for. *Prior to standardisation.

Table S5. Variance Inflation Factor (VIF)

	VIF
<i>Maternal occupation-specific skills</i>	
Literacy	4.61
Numeracy	2.58
Problem-solving	2.85
Verbal	2.78
Physical	2.84
Net household income	2.26
Housing tenure	1.64
Parental class	2.46
Parental education	1.48
Family structure	1.61
Number of siblings	1.13
Grandparent present	1.14
Other adults present	1.13
Neighborhood deprivation	1.62
Region	1.08
Child sex	1.00
Child ethnic group	1.32
Child's age (in months)	1.04

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted

Table S6. Summary of OLS regressions predicting verbal ability (Naming Vocabulary) from maternal occupation-specific skills and covariates (n = 13,385)

	M1	M2
<i>Maternal occupation-specific skills</i>		
Literacy	0.86 ^{***} (0.22)	-0.14 (0.24)
Numeracy	-0.09 (0.17)	-0.31 (0.16)
Problem-solving	0.58 ^{**} (0.19)	0.31 (0.17)
Verbal	1.04 ^{***} (0.16)	0.47 ^{**} (0.15)
Physical	-1.32 ^{***} (0.15)	-0.53 ^{**} (0.17)
<i>Net household income (Ref. Lowest quintile)</i>		
20 - < 40%		0.47 (0.39)
40 - < 60%		0.35 (0.47)
60 - < 80%		0.78 (0.52)
Highest quintile		1.00 (0.52)
<i>Housing tenure (Ref. No social housing)</i>		
Social housing		-1.78 ^{***} (0.36)
<i>Parental class (Ref. Higher managerial and professional occ.)</i>		
Lower managerial and professional occ.		-1.16 ^{***} (0.32)
Intermediate occ.		-1.83 ^{***} (0.41)
Small employers and own account workers		-2.62 ^{***} (0.53)
Lower supervisor and technical occ.		-2.64 ^{***} (0.52)
Semi-routine occ.		-3.19 ^{***} (0.46)
Routine occ.		-2.90 ^{***} (0.65)
<i>Parental education (Ref. No qualifications)</i>		
NVQ level 1		1.93 ^{***} (0.53)
NVQ level 2		2.91 ^{***} (0.41)
NVQ level 3		3.44 ^{***} (0.43)

NVQ level 4	4.83*** (0.46)
NVQ level 5	5.81*** (0.66)
Overseas qualifications only	0.75 (0.76)
<i>Family structure (Ref. Both natural parents)</i>	
Natural parent and step/adoptive parent	0.18 (0.46)
Natural parent only	-0.27 (0.34)
<i>Number of siblings (Ref. zero siblings)</i>	
One sibling	-1.32*** (0.29)
Two siblings	-2.18*** (0.33)
More than two siblings	-3.80*** (0.43)
<i>Grandparent present (Ref. no)</i>	
Yes	-1.29* (0.64)
<i>Other adults present (Ref. no)</i>	
Yes	-1.79** (0.54)
<i>Neighborhood deprivation (Ref. Most deprived decile)</i>	
10 - < 20%	-0.34 (0.43)
20 - < 30%	0.10 (0.45)
30 - < 40%	0.09 (0.50)
40 - < 50%	0.66 (0.50)
50 - < 60%	0.64 (0.56)
60 - < 70%	0.23 (0.56)
70 - < 80%	2.05** (0.62)
80 - < 90%	0.95 (0.63)
Least Deprived Decile	2.08*** (0.56)
<i>Region (Ref. Scotland)</i>	
North East	-0.63 (0.89)

North West		0.26 (0.52)
Yorkshire and the Humber		-0.33 (0.50)
East Midlands		0.18 (0.61)
West Midlands		-0.47 (0.61)
East of England		-0.18 (0.75)
London		-1.19 (0.75)
South East		-0.74 (0.63)
South West		0.48 (0.61)
Wales		-1.93*** (0.50)
Northern Ireland		-0.08 (0.60)
<i>Child sex (Ref. Male)</i>		
Female		0.88*** (0.23)
<i>Child ethnic group (Ref. White)</i>		
Mixed		-1.54* (0.62)
Indian		-3.91*** (0.76)
Pakistani and Bangladeshi		-10.17*** (0.70)
Black or Black British		-5.39*** (0.62)
Other Ethnic group		-8.01*** (1.24)
<i>Child's age (in months)</i>		
		-0.12*** (0.03)
Constant	54.81*** (0.18)	62.04*** (2.29)
R^2	0.07	0.19

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted for. Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table S7. Summary of OLS regressions predicting the picture similarities score from maternal occupation-specific skills and covariates (n = 13,385)

	M1	M2
<i>Maternal occupation-specific skills</i>		
Literacy	0.47* (0.21)	0.12 (0.24)
Numeracy	0.14 (0.17)	0.08 (0.17)
Problem-solving	0.24 (0.19)	-0.01 (0.18)
Verbal	0.53** (0.16)	0.23 (0.16)
Physical	-0.61*** (0.17)	-0.22 (0.16)
<i>Net household income (Ref. Lowest quintile)</i>		
20 - < 40%		0.55 (0.40)
40 - < 60%		0.70 (0.47)
60 - < 80%		0.81 (0.48)
Highest quintile		1.30** (0.50)
<i>Housing tenure (Ref. No social housing)</i>		
Social housing		-0.74 (0.38)
<i>Parental class (Ref. Higher managerial and professional occ.)</i>		
Lower managerial and professional occ.		-1.35*** (0.30)
Intermediate occ.		-1.51*** (0.40)
Small employers and own account workers		-1.12* (0.50)
Lower supervisor and technical occ.		-1.56** (0.54)
Semi-routine occ.		-1.93*** (0.47)
Routine occ.		-1.77** (0.64)
<i>Parental education (Ref. No qualifications)</i>		
NVQ level 1		0.95 (0.58)
NVQ level 2		1.55** (0.46)
NVQ level 3		2.04*** (0.47)

NVQ level 4	2.34*** (0.51)
NVQ level 5	3.27*** (0.66)
Overseas qualifications only	1.67* (0.70)
<i>Family structure (Ref. Both natural parents)</i>	
Natural parent and step/adoptive parent	-0.85 (0.45)
Natural parent only	0.08 (0.35)
<i>Number of siblings (Ref. zero siblings)</i>	
One sibling	-0.02 (0.30)
Two siblings	0.13 (0.32)
More than two siblings	-1.14* (0.44)
<i>Grandparent present (Ref. no)</i>	
Yes	-0.01 (0.59)
<i>Other adults present (Ref. no)</i>	
Yes	0.55 (0.69)
<i>Neighborhood deprivation (Ref. Most deprived decile)</i>	
10 - < 20%	-0.54 (0.54)
20 - < 30%	-0.86 (0.59)
30 - < 40%	-0.42 (0.60)
40 - < 50%	-0.70 (0.63)
50 - < 60%	-0.57 (0.64)
60 - < 70%	-1.23* (0.60)
70 - < 80%	0.41 (0.63)
80 - < 90%	-0.41 (0.62)
Least Deprived Decile	0.32 (0.63)
<i>Region (Ref. Scotland)</i>	
North East	-0.23 (0.70)

North West		2.26** (0.85)
Yorkshire and the Humber		0.61 (0.52)
East Midlands		1.67** (0.60)
West Midlands		-0.22 (0.52)
East of England		-0.18 (0.73)
London		1.30 (0.75)
South East		0.62 (0.56)
South West		0.60 (0.59)
Wales		1.04 (0.55)
Northern Ireland		3.68*** (0.61)
<i>Child sex (Ref. Male)</i>		
Female		1.20*** (0.24)
<i>Child ethnic group (Ref. White)</i>		
Mixed		0.18 (0.62)
Indian		0.09 (0.67)
Pakistani and Bangladeshi		-1.46* (0.70)
Black or Black British		-0.10 (0.76)
Other Ethnic group		1.48 (1.29)
<i>Child's age (in months)</i>		
		-0.08* (0.04)
Constant	55.13*** (0.17)	58.43*** (2.70)
R ²	0.02	0.05

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted for. Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table S8. Summary of OLS regressions predicting the pattern construction score from maternal occupation-specific skills and covariates (n = 13,385)

	M1	M2
<i>Maternal occupation-specific skills</i>		
Literacy	0.55* (0.21)	-0.00 (0.22)
Numeracy	0.23 (0.17)	0.03 (0.16)
Problem-solving	0.30 (0.18)	0.10 (0.18)
Verbal	0.46** (0.15)	0.10 (0.14)
Physical	-0.68*** (0.16)	-0.19 (0.16)
<i>Net household income (Ref. Lowest quintile)</i>		
20 - < 40%		-0.04 (0.38)
40 - < 60%		0.17 (0.44)
60 - < 80%		0.63 (0.46)
Highest quintile		0.34 (0.51)
<i>Housing tenure (Ref. No social housing)</i>		
Social housing		-1.43*** (0.35)
<i>Parental class (Ref. Higher managerial and professional occ.)</i>		
Lower managerial and professional occ.		-1.26*** (0.30)
Intermediate occ.		-1.70*** (0.38)
Small employers and own account workers		-1.41** (0.46)
Lower supervisor and technical occ.		-1.64** (0.48)
Semi-routine occ.		-2.25*** (0.47)
Routine occ.		-1.41* (0.59)
<i>Parental education (Ref. No qualifications)</i>		
NVQ level 1		0.86 (0.54)
NVQ level 2		2.38*** (0.38)
NVQ level 3		2.38*** (0.40)

NVQ level 4	3.29*** (0.41)
NVQ level 5	3.41*** (0.58)
Overseas qualifications only	1.17 (0.69)
<i>Family structure (Ref. Both natural parents)</i>	
Natural parent and step/adoptive parent	-0.68 (0.46)
Natural parent only	-0.62 (0.35)
<i>Number of siblings (Ref. zero siblings)</i>	
One sibling	0.09 (0.28)
Two siblings	-0.18 (0.31)
More than two siblings	-1.09* (0.43)
<i>Grandparent present (Ref. no)</i>	
Yes	-1.33* (0.60)
<i>Other adults present (Ref. no)</i>	
Yes	0.81 (0.57)
<i>Neighborhood deprivation (Ref. Most deprived decile)</i>	
10 - < 20%	-0.44 (0.53)
20 - < 30%	0.56 (0.57)
30 - < 40%	0.26 (0.62)
40 - < 50%	-0.08 (0.61)
50 - < 60%	1.02 (0.70)
60 - < 70%	0.67 (0.66)
70 - < 80%	0.96 (0.69)
80 - < 90%	0.95 (0.62)
Least Deprived Decile	1.64** (0.63)
<i>Region (Ref. Scotland)</i>	
North East	1.13 (0.86)

North West		2.36** (0.83)
Yorkshire and the Humber		1.46 (0.82)
East Midlands		0.91 (0.71)
West Midlands		1.64* (0.67)
East of England		0.27 (0.78)
London		1.80* (0.83)
South East		1.94** (0.72)
South West		1.06 (0.85)
Wales		1.67* (0.70)
Northern Ireland		1.97** (0.67)
<i>Child sex (Ref. Male)</i>		
Female		1.89*** (0.20)
<i>Child ethnic group (Ref. White)</i>		
Mixed		-0.81 (0.69)
Indian		-0.49 (0.61)
Pakistani and Bangladeshi		-3.05*** (0.59)
Black or Black British		-3.12*** (0.85)
Other Ethnic group		0.28 (0.93)
<i>Child's age (in months)</i>		
		-0.38*** (0.03)
Constant	50.37*** (0.18)	70.72*** (2.16)
R^2	0.03	0.09

Source: MCS1–MCS3; BSS. Note: Sample weights, clustering and stratification accounted for. Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.