Nonresident fathers' involvement, family resources and children's cognitive and educational achievements in the UK

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Abstract

This article investigates the associations between nonresident fathers' involvement and cognitive and educational achievements in children. In particular, we tested the resource compensation hypothesis, which predicts that the involvement of nonresident fathers should compensate for the lack of family resources and that the effect should be strong, particularly in families with low resources. We use the British Millennium Cohort Study (n = 3,445), in which 11-year-old children's cognitive and educational assessments were measured using the British Ability Scale and family resources were measured using maternal education and occupation, family income, and number of books in the home (i.e., cultural capital). We found that, in general, the involvement of nonresident fathers was associated with higher scores of children. In addition, the involvement of nonresident fathers was associated with higher scores more strongly in families with the lowest level of cultural capital, compared with others. However, nonresident fathers' involvement was not associated with child scores more strongly in lower resource families than in higher resource families, when the resources were measured by maternal education and occupation and by family income. The results showed that, although the involvement of nonresident fathers might compensate for a lack of family resources, the effect tends to vary between resource types.

Introduction

As a part of great social and demographic changes, the number of divorces has grown rapidly in many Western countries (Lesthaeghe 2014). Currently, one of the highest divorce rates in Europe exists in the UK (OECD, 2014), where more than one third of children have been reported to experience parental separation by the age of 11 (Connelly, Joshi & Rosenberg, 2014). Because children usually stay with their mothers if their parents separate, there are an increasing number of children with nonresident fathers (Sobotka & Toulemon 2008). Studies have shown that children who live in single-mother families or families with step-fathers have, for instance, higher risk of academic failures, distress and emotional and behavioral problems than children who reside in intact families (e.g., Jeynes, 2002; Marshal, 2002). Because research on social mobility and stratification has shown that educational achievements in childhood predict socioeconomic success in adulthood (e.g., Duncan, Yeung, Brooks-Gunn & Smith, 1998; Heckman, 2006; Schneider, 2008), the absence of fathers could have detrimental effects on children, not only in the short term but also in the long term.

However, in current societies, parental separation does not mean that nonresident fathers totally lose contact with their children. In fact, in Western nations, the level of nonresident fathers' involvement has increased substantially in the last decades, and it is currently increasingly common for nonresident fathers to remain in touch with their children after parental separation (Amato, Mayers & Emery, 2009; Westphal, Poortman & van der Lippe, 2014). Many nonresident fathers regularly see their children, as well as provide financial and non-financial support to their children and their families (Modecki, Hagan, Sandler & Wolchik, 2014; Skinner & Davidson, 2009). The involvement of nonresident fathers might also help to prevent the detrimental effects of parental separation, although previous studies have shown that the influence of paternal involvement on the child's well-being tends to vary between contexts and types of involvement (see Adamsons & Johnson, 2013; Amato & Gilbreth, 1999 for reviews).

In the present investigation, we analyze the associations between nonresident fathers' involvement and educational achievements in children by testing predictions derived from the compensation model. In general, this model emphasizes that the lack of certain resources in a family (i.e., social, economic or cultural capital) can be compensated for by other resources (e.g., Bernardi, 2014; Bernardi & Grätz, 2015).

The model has been tested before in the context of parental divorce. The findings of Grätz (2015), based on the German Socio-Economic Panel Study, suggested that fathers' substantial resources might compensate for the negative long-term intergenerational effects of parental separation. Following similar reasoning, it could be expected that the involvement of nonresident fathers might prevent the detrimental effects of decreased family resources after parental separation. This prevention should occur particularly in families with meager resources, in which there are fewer other resources available with which to compensate. However, there has been a lack of studies investigating whether the involvement of nonresident fathers has different effects according to the different levels of family resources. Here, we use data from the UK to study whether the involvement of nonresident fathers compensates for the lack of family resources, i.e., whether nonresident fathers' involvement is associated more strongly with 11-year-old children's cognitive and educational scores in lower resources families compared with those in higher resource families.

Involvement of nonresident fathers

Previous studies have consistently provided evidence that parental separation has negative effects on educational achievements in children (e.g., Astone & McLanahan, 1991; Biblarz & Gottainer, 2000; Sun & Li, 2008). This effect has been explained by the resource deprivation model (e.g., Coleman, 1988: McLanahan & Sandefur, 1994), which starts from the prediction that high levels of parental resources help children to achieve educational success. Because parental separation tends to result in a decrease in family resources, it can have harmful effects for children. For instance, after parental separation, the financial resources and living standards of the family often decrease (Downey, 1995b). In addition, when one parent (usually the father) leaves the household, the parent who leaves may also take away immaterial resources, e.g., cultural capital. Thus, after parental separation, children might lose these resources, which otherwise (i.e., in cases in which parents stay together) would be available to them.

However, in present-day Western societies, it is common that nonresident fathers continue to be involved in their children's lives after parental separation (Amato et al., 2009; Skinner & Davidson, 2009; Westphal et al., 2014). Thus, the involvement of nonresident fathers might also reduce the detrimental effects of parental separation

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(Adamsons & Johnson, 2013; Amato & Gilbreth). In the present study, we exploit three commonly used indicators of nonresident fathers' involvement: contact frequency, relationship closeness and paternal support.

In previous studies, contact frequency was the most commonly used indicator of the involvement of nonresident fathers (see Adamsons & Johnson, 2013; Amato & Gilbreth, 1999 for reviews). Investigations of the associations between the nonresident fathers' contact and children's well-being have produced, mixed results, however. Although some researchers have detected a positive correlation between contact frequency and child outcomes (e.g., Dunn, Cheng, O'Connor, & Bridges, 2003), others have not (e.g., Smith, Robertson, Dixon, Quigley, & Whitehead, 2001). Moreover, two meta-analyses (Adamsons & Johnson, 2013; Amato & Gilbreth, 1999) of the subject have concluded that father-child contact might not improve child outcomes in general.

These previous findings can be explained by pure contact between fathers and children perhaps being a poor measurement of paternal involvement because the time that fathers and children share together can vary substantially in content. If fathers have supportive relationships with their children, one might predict that contact frequency is positively associated with child outcomes. In contrast, if the relationships is conflictual, or the fathers harm their children, contact might be negatively associated with child outcomes (Amato & Rezac, 1994; Amato & Sobolewski, 2004; King & Heard, 1999). The third option is that the effect of paternal involvement is neutral. Terms such as "Disneyland dad" and "fun parent" are used to refer to those fathers who do not engage in activities that could improve child development but rather spend only leisure time with their children (Jenkins, 2009). Although shared leisure activities with nonresident fathers can benefit small children (Jia et al., 2012), more instrumental paternal involvement, including helping to pay for school-related issues and other financial support, still tends to matter more in cases of older children and adolescents (Hawkins, Amato & King, 2007).

Nevertheless, the previous evidence for the benefits of paternal support for child outcomes has also been mixed. Several earlier studies have found that financial support from nonresident fathers to their children and their families is associated with improved outcomes in children (Furstenberg, Morgan, & Allison, 1987; King, 1994a; 1994b; McLanahan & Sandefur, 1994; McLanahan, Seltzer, Hanson, & Thompson, 1994). Thus,

Amato and Gilbreth (1999) were able to conclude their meta-analysis of 63 studies by stating that paternal financial help is associated with increased well-being in children. In contrast, a recent meta-analysis of 52 studies by Adamson and Johnson (2013) did not find that paternal financial transfers were associated with child outcomes. These authors claimed that this finding might be as a result of cultural and societal changes. During the 1980s and 1990s, the primary focus in Western societies was often on ensuring that nonresident fathers paid child support, but since then, the predominant discourse has emphasized that fathers should engage in their children's lives more actively and comprehensively.

Finally, nonresident fathers' involvement has been measured by relationship closeness between fathers and children. Based on the extensive review by Adamsons and Johnson (2013), a high quality relationship between nonresident fathers and children is the most influential type of involvement that improves children's well-being. Overall, based on the review by Adamsons and Johnson (2013), the relationship quality between fathers and children tends to have more beneficial effects on child well-being than the frequency of contact.

Although contact frequency, relationship closeness and paternal support are different measurements of involvement, they are not totally separate and thus can overlap with each other. It has been argued that those fathers who regularly see their children might be closer with them and also might be more likely to provide support to them (Dunn, 2004). In agreement with this argument, Hawkins and colleagues (2007), for instance, showed that contact frequency was strongly correlated with other paternal involvement indicators.

Family resources

In addition to paternal involvement, family resources (i.e., the socioeconomic and cultural assets of families) have consistently been shown to be correlated with academic achievements in children, e.g., when the resources in the home increase, so do the achievements (Davis-Kean, 2005; Duncan, et al., 1998; Heckman, 2006; Hampden-Thompson, 2009). Moreover, several studies have shown that there are lower levels of resources in single-mother families and stepfather families than in intact families (e.g., Downey, 1995b; McLanahan & Sandefur, 1994; Sun, 2001; Sun & Li, 2001). Thus, after

parental separation, various family resources might decrease, with negative effects on children's educational attainments (Sun & Li, 2009; Bernardi & Radl 2014; Mandemakers & Kalmijn 2014).

Here, we measured family resources by four factors, which indicate somewhat different aspects of resources, namely maternal education, maternal occupation, household income and cultural capital. Parental education, for instance, might indicate both cognitive skills and non-cognitive traits, whereas parental occupational position tends to indicate social status, and family income measures financial resources. Obviously, these socioeconomic factors overlap with each other because more highly educated individuals also tend to have, on average, higher incomes and occupational positions.

In addition to socioeconomic resources, cultural capital is an important family resource type and might be particularly important in the academic environment investigated in the present study. In his hallmark studies, Bourdieu (1977, 1984, 1986) argued that cultural resources represent immaterial types of capital and should be considered similar to financial resources. Esping-Andersen (2006, pp. 14) defined cultural capital as "the ability of parents to transmit the proper 'middle class' cultural baggage -- such as self-presentation or language skills -- to their children" (see also Lamont & Lareau, 1988). Cultural capital can be transmitted from parents to children via involvement and socialization.

Based on Bourdieu (1977), cultural capital consists of three levels, namely embodied, objectified and institutionalized cultural capital. Embodied cultural capital represents itself, for instance, by linguistic skills, proper preferences and cultural knowledge. Embodied cultural capital can be measured by objectified cultural goods, such as the number of books or artworks in the home. According to Bourdieu, cultural capital is not only one form of capital, but it also represents currency that can be exchanged into other currencies. In the academic world, cultural capital can be converted into educational success and credentials, i.e., institutionalized cultural capital. Thus, based on Bourdieu's theory, higher cultural capital should be associated with greater educational success.

Previous studies have indeed found that children from homes with higher cultural capital also achieve greater success in the academic world (e.g., Andersen & Jaeger, 2014; Cheadle, 2008; Dumais, 2002; Xu & Hampden-Thompson, 2012). In this article, we

measured cultural capital by the number of books in the home, a factor that has been shown to have stronger power to explain children's educational achievements compared with several other measurements of cultural capital (Esping-Andersen, 2009; see also De Graaf, 1988). The correlation between the number of books in the home and educational success is explained by the presence of several books in the home perhaps indicates a high level of "scholarly culture" and a small number of books perhaps indicates a low level (Evans, Kelley, Sikora & Treiman, 2010). A high level of scholarly culture in turn tends to provide useful skills and knowledge of reading and numeracy that children can utilize in their schoolwork. In contrast, when the family has a low level of scholarly culture, it is more unlikely that the children have these useful skills and knowledge. Moreover, a previous study by Farkas and Hibel (2008) showed that the number of books in the home is one of the most exact indicators measuring parents' willingness to provide guidance to children. Thus, the number of books in the home represents material objects that can reflect everyday routines, including, reading books, talking about them and using knowledge. This is what Bourdieu (1984) called "habitus".

Although more highly educated and financially better off individuals might have a greater likelihood of possessing cultural capital, these different family resource factors are not always correlated with each other. For instance, teachers tend to have high levels of cultural capital, but they are often relatively poorly paid. In contrast, some higher income individuals, such as engineers, professional athletes or businessmen, do not necessarily possess high levels of cultural capital. Thus, it is important to study different aspects of family resources separately.

Potential confounding variables

Previous studies have shown that several factors are associated with both paternal involvement and child outcomes. Thus, it is important to control for these potentially confounding variables. With regard to gender, studies have shown that fathers see their sons more often than their daughters and also provide more support to sons (e.g., Harris & Morgan, 1991; Mitchell, Booth & King, 2009). However, research has consistently shown that girls earn higher scores on educational tests than boys (e.g., Hampden-Thompson, 2009). When studying children who are in the middle of their developing years, it is important to adjust for age because older students tend to perform better on

educational and cognitive tests than younger students due to a more advanced stage of development (Karwath, Relikowski, & Schmitt, 2014). Moreover, the influence of nonresident fathers' involvement tends to vary by ethnic background, although these associations can be complicated (King, Harris & Heard, 2004).

One of the most robust findings in the social mobility and stratification literature is that when the number of siblings increases, the academic achievements in children decrease (e.g., Jaeger, 2008; Sieben, Huinink, & de Graaf, 2001). This finding might occur because parental resources are finite; thus, new children in the household reduce the resources that parents are able to invest in any certain child (Coleman, 1988; Downey, 2001). Not only the number of siblings but also the birth order can be a factor, and studies have shown that first-born children tend to earn higher scores than later-born children (e.g., Conley & Glauber, 2006). Moreover, children with younger mothers have been found to earn lower educational and developmental scores than children with older mothers (Tanskanen & Danielsbacka, 2016), and close mother-child relationships tend to predict improved well-being in children (Hawkes et al., 2007). Finally, the timing of the father's absence can influence child outcomes, and some studies have found associations between family dissolution before the child's reaches the age of 5 and decreasing child outcomes (Allison & Furstenberg, 1989; Zill et al. 1993; Ermisch & Francesconi, 2001; Lansford et al. 2001). Moreover, previous studies have shown that the relationship between parents tends to be the most conflictual nearest to parental separation and that it decreases over time (Hetherington, 1999; King & Heard, 1999). Nevertheless, parental conflicts have been shown to have negative effects on child outcomes (Modecki et al., 2014).

Family structure has been shown to be associated with both nonresident fathers' involvement and child outcomes. First, previous studies have consistently shown that children from intact families achieve higher academic success than children from single-mother families, for instance (e.g., Biblarz & Gottainer, 2000; Sun & Li, 2009). Second, when children live with new stepfathers, they may receive less support from their nonresident fathers (e.g., Furstenberg, Nord, Peterson & Zill, 1983; Stephens 1996).

Objective

This study explores the associations between nonresident fathers' involvement (measured as contact frequency, relationship closeness, and paternal support) and children's cognitive and educational attainments in the UK. We tested the resource compensation hypothesis, which predicts that the involvement of nonresident fathers should compensate for a lack of family resources and thus, for the potentially negative effects of parental separation. Three questions are investigated: Is paternal involvement correlated with cognitive and educational achievements in children (Q1)? How do these potential correlations vary by the type of paternal involvement (Q2)? How are family resources (i.e., maternal education, occupation, family income and cultural capital) related to the associations between paternal involvement and child outcomes (Q3)?

In the case of Q1, we predict that paternal involvement improves the educational success of children in general. However, previous studies have shown that all paternal involvement factors might not benefit children equally (Adamsons & Johnson, 2013; Amato & Gilbreth, 1999). Thus, based on these previous findings, we assume that paternal support and relationship closeness between nonresident fathers and their children, rather than contact frequency, are associated with improved child outcomes (Q2). Finally, in the case of Q3, we hypothesize that the involvement of nonresident fathers should be correlated with increased educational scores in children more strongly in lower resource families than in higher resource families.

Material and methods

We used data from the British Millennium Cohort Study (MCS), which includes information about children born at the beginning of the new millennium in England, Wales, Scotland and Northern Ireland. We used the fifth round data collected in 2012, when the children were, on average, 11 years old. In the MCS, the cohort member children are targets, and information is collected by interviewing their parents or parental figures. The main respondents are usually the biological mothers of the children, who have responded to questions concerning cohort member children, other family members, and their socioeconomic and household situation. The fifth survey reached approximately

13,000 responding families, and the response rate was 69% (see Hansen, 2013, for a full data description).

In the present study, we selected in the analyses all cohort member children with nonresident fathers (biological or non-biological) who are living in single-mother or stepfather households. Only cases in which the mothers live in the same household as the cohort member child were included. In addition, in cases of twins and triplets, only one child of the set was included. Finally, children who did not participate in cognitive and educational attainment tests were excluded. After these exclusions, the analytic sample included 3,445 children.

In the fifth round of the MCS, children's cognitive and educational attainments were measured by the British Ability Scales (BAS), which measure verbal reasoning and knowledge in children (Elliott, Smith & McCulloch, 1996; 1997). BAS scores are based on the responses of cohort member children who are interviewed at home. In the analyses, we used the BAS scores, which were adjusted for the children's ages, because it is likely that older children earn higher scores than younger children due to their more advantaged levels of cognitive and educational development. Moreover, in the MCS, children were born throughout the year, so they were interviewed in part at different ages (Connelly, 2013). Thus, using the adjusted BAS scores, we attempted to control for the biases based on age differences. Adjusted scores were computed using the conversion tables from the BAS manuals, and the standardized scores have a mean of 50 with a standard deviation of 10 (Hansen, 2013). To correct for the skewness of the BAS score variable, it was transformed using square transformation and dividing the square by 1000.

The involvement of nonresident fathers was measured by contact frequency, relationship closeness, and paternal support. The information was based on the reports of the cohort member children's mothers. In the MCS, the responding mothers were asked to report how often the cohort member child sees his/her nonresident father, ranging from $0 =$ never to $6 =$ every day (M = 2.08, SD = 1.75). In addition, respondents were asked to report how close would they say the cohort member child is to his/her nonresident father. The scale of the father-child closeness variable ranges from $0 =$ not very close to $4 =$ extremely close (M = 1.83, SD = 1.45).

In the MCS, the support provided by nonresident fathers was measured by ten different questions: Does the father contribute money to child maintenance? Does the father buy clothes, toys or presents for the child? Does the father pay for the child's school-related activities? Does the father look after the child? Does the father help with repairs around the child's house? Does the father buy food for the child's household? Does the father help to pay rent or mortgage payments for the child's household? Does the father help to pay for utilities or other household bills for the child's household? Does the father help to pay for vacations for the child and/or take the child on vacation? Does the father help to pay for outings to special places or events for the child? Does the father he with other expenses? Each question was assessed on a scale of $0 =$ no or $1 =$ yes. The paternal support variable was calculated by totaling the answers to the ten questions (Cronbach's alpha = 0.78), and the scale of the summed variable was between 0 and 10 (M = 1.88, SD = 2.07). In the case of the paternal support variable, a higher score indicated stronger involvement.

In this study, we measure family resources by maternal education, occupation, family income and cultural capital. In the MCS, maternal education was measured by National Vocational Qualification (NVQ), in which a higher level of NVQ indicates higher educational qualifications. The scale ranges from $0 =$ no qualification to $5 =$ higher education degree or postgraduate qualification. The maternal occupation variable measures the occupational standing of the current job and includes seven categories ($0 =$ not working, $1 =$ routine, $2 =$ semi-routine, $3 =$ small employers, self-employed and lower supervisors/technical, $4 =$ intermediate, $5 =$ lower professional, $6 =$ higher professional). Family income was measured by equalized income quintiles, based on the UK income distribution (ranging from $1 =$ bottom to $5 =$ top). Finally, cultural capital was measured by number of books in the home, a variable shown to be a relevant measurement of cultural capital in several previous studies (e.g., Blake, 1981; Evans et al., 2010; Park, 2008). The scale ranged from $1 = 0–10$ books to $5 =$ more than 500 books. The distributions of family resource variables are presented in Table 1.

Methodologically, we used linear regression analysis with fixed effects, controlling for between country variation (OLS with country dummies) and several potentially confounding variables that were shown to be associated with paternal involvement and child outcomes in previous studies (e.g., Hampden-Thompson, 2009; Jaeger, 2008; Sun & Li, 2009). These variables are the child's age (in months), gender, ethnicity, number of

siblings, birth order, family structure (single-mother household or step-father household), and maternal age. In addition, using information gathered in the third, fourth and fifth MCS rounds, we constructed a variable measuring the time when the father left the household (1 = before the child's age of five, 2 = between the ages of five and seven, 3 = after the age of seven). Finally, we attempted to control for mother-child relationship quality by adjusting the variable measuring how often mothers talk to cohort member children about things that are important to him/her (ranging from 1 = less than monthly to 5 = every day). Descriptive statistics are presented in Table 2.

Table 1. Distribution of family resource variables

	n	%
Maternal education		
None	407	11.8
NVQ level 1	327	9.5
NVQ level 2	966	28.0
NVQ level 3	615	17.9
NVQ level 4	895	26.0
NVQ level 5	235	6.8
Maternal occupation		
Not working	1,379	40.0
Routine	204	5.9
Semi-routine	499	14.5
Small employer, self-employed		
and lower supervisor/technical	247	7.2
Intermediate	446	13.0
Lower professional	561	16.3
Higher professional	109	3.2
Family income		
Bottom quintile	1,137	33.0
Second	1,062	30.8
Third	612	17.8
Fourth	368	10.7
Top quintile	266	7.7
Number of books		
0-10	692	20.1
11-25	601	17.5
26-100	1,179	34.2
101-500	869	25.2
More than 500	104	3.0

Table 2. Descriptive stats

	n	%/mean	SD
Child's age (in months) (mean)	3,445	134.2	4.09

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Child's gender (%)			
Boy	1,745	50.6	
Girl	1,700	49.4	
Child's ethnicity (%)			
White	2,954	85.8	
Mixed	162	4.7	
Indian	29	0.8	
Pakistani and Bangladeshi	105	3.1	
Black	174	5.1	
Other	21	0.6	
Number of siblings (mean)	3,445	1.5	1.50
Birth order (%)			
First born	1,521	44.2	
Later born	1,924	55.9	
Family structure (%)			
Single-mother	2,514	73.0	
Step-father	931	27.0	
Maternal age (mean)	3,445	37.7	6.19
Maternal involvement (mean)	3,445	4.4	0.86
Point father left household (%)			
Before the child's age of 5	2,090	60.7	
Between the child's ages of 5 to 7	491	14.3	
After the child's age of 7	864	25.1	

Results

We first provided bivariate correlations of family resources and paternal involvement variables. Table 3 shows that the strongest correlations are between father-child closeness and contact frequency, paternal support and contact frequency and father-child closeness and paternal support. In addition, there are strong correlations between maternal occupation and family income, maternal occupation and maternal education, and maternal education and family income. In the case of family resource variables, the number of books (i.e., cultural capital) is not correlated with other family resource variables (i.e., maternal education, occupation and family income) as strongly as these three variables are correlated with each other.

Table 3. Bivariate correlations: family resources and paternal involvement variables

	1	2	3	4	5	6
1 Contact frequency	–					

2	Relationship closeness	**0.81**				
3	Paternal support	**0.61**	**0.66**			
4	Maternal education	**0.08**	**0.14**	**0.15**		
5	Maternal occupation	**0.14**	**0.19**	**0.19**	**0.48**	
6	Family income	**0.15**	**0.24**	**0.28**	**0.55**	**0.59**
7	Number of books	0.02	**0.06**	**0.10**	**0.32**	**0.23**	**0.28**

Notes. Bolded numbers indicate significant associations: $p < 0.001$

Table 4 shows that all types of paternal involvement factors (i.e., contact frequency, relationship closeness and paternal support) are associated with increased cognitive and educational scores in children. When maternal educational level increases, so do the scores of the children. Children with mothers who are small employers, self-employed workers or lower supervisors earn higher scores than children with unemployed mothers. Finally, when family income and number of books in the household increased, so did educational scores.

Next, we tested the prediction based on the compensation model and investigated whether paternal involvement had more influence on cognitive and educational scores in lower resource families than in higher resource families. First, we included interaction terms between paternal involvement variables and maternal education (Table 5). These results indicated that paternal involvement might benefit children with the least educated mothers more than others. However, these differences are primarily not significant.

Then, we included interaction terms between paternal involvement measurements and maternal occupation (Table 6). We found that only paternal support (but not other paternal involvement variables) is associated with educational scores more strongly in children with unemployed mothers than in children with mothers with higher professional positions.

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Subsequently, interactions between paternal involvement and family income were investigated (Table 7). Although there is a slight non-significant trend showing that paternal involvement might benefit children more in lower incomes families than in higher income families, we did not find convincing evidence for the compensation prediction.

Finally, we included interaction terms between paternal involvement factors and number of books (i.e., cultural capital) (Table 8). The results indicate that paternal involvement is associated more strongly with children's cognitive and educational scores in households with the lowest number of books when compared with others. This result is the case with all of the paternal involvement measurements, although there are some differences in the magnitude. These results provide support for the prediction that involvement received from nonresident fathers compensates for a lack of cultural capital.

Sensitivity analyses

Next, we ran several sensitivity analyses because we wanted to exclude the possibility of the finding that the involvement of nonresident fathers is associated with child attainments more strongly in children who live in homes with fewer than 10 books (i.e., the lowest level of cultural capital) compared with others could be explained by other factors, namely by family structure (single-mother households), other family resources, cumulative disadvantage or paternal education.

First, we constituted a sub-sample in which we included only single-mother families (n = 2,514), and we checked whether the results were different in this sub-group as one might assume (see, e.g., Sun & Li, 2009). However, the results in the single-mother group were similar to those of the main analyses (not shown in the tables). Second, we controlled for other family resource factors (i.e., maternal education, maternal occupation and family income) in the models in which interaction terms between paternal involvement and number of books were included. Controlling these other family resource factors did not, however, change the results (not shown in the tables).

Next, we tested the prediction that nonresident fathers compensate for the lack of cultural capital more strongly in the lowest cultural resource families compared with others could be explained by cumulative disadvantage (i.e., lowest level of cultural capital reflects

cumulative disadvantage). We constructed a variable in which we included children with the lowest level of family resources in all socioeconomic measurements, i.e., those children whose mothers were not working, who had the lowest level of education and who also had the lowest level of family income (n = 247). We found that, in the case of contact frequency, there was a marginally significant effect indicating that nonresident fathers' involvement was more strongly correlated with child outcomes in the lowest resource families than in others (ß = 0.06, SE = 0.03, p = 0.091, adjusted R2 = 0.06, n = 3,445). However, in the case of other paternal involvement factors, no significant correlations were found.

Finally, using longitudinal information from the previous MCS rounds, we were able to produce a sub-sample including information about nonresident fathers' education (n = 1,949). For sensitivity purposes, we controlled for paternal education in the models in which interaction terms between paternal involvement and number of books were included because it is possible that, in particular, higher educated nonresident fathers are those who compensate for the lack of cultural capital and, thus, the result could be explained simply by paternal education. However, these models also produced similar results to the main analyses (not shown in the tables).

Conclusions

In this study, we investigated the associations between nonresident fathers' involvement and 11-year-old children's cognitive and educational attainments in the UK. First, in agreement with several previous studies (see Adamsons & Johnson, 2013 for review), we found correlations between paternal support and child outcomes, as well as between child-father relationship closeness and child outcomes. Moreover, positive correlations between contact frequency and child outcomes were detected. The last mentioned result is in contrast with some previous studies that did not find an association between contact frequency and child achievements (see Adamsons & Johnson, 2013; Amato & Gilbreth, 1999). In previous studies, the lack of correlation between contact frequency and children's educational attainments was explained by the fact that pure contacts may poorly measure paternal involvement in general. In the data used in this study, contact frequency was strongly correlated with other paternal involvement factors. Thus, contact

frequency and other paternal involvement variables measured more or less the same here (see also Hawkins et al., 2007).

In agreement with several previous studies, we also detected positive associations between family resources and child scores (e.g., Anderson & Jaeger, 2014; Hampden-Thompson, 2009). We found that, when the maternal educational level, family income and number of books in the home (i.e., cultural capital) increased, so did the cognitive and educational attainments of children. However, we did not find convincing support for the prediction that higher maternal occupational status is associated with increased educational scores in children. This finding indicates that all parental resources might not benefit children equally.

The main objective of this study was to analyze whether the involvement of nonresident fathers compensated for the lack of family resources more strongly in lower resource families than in higher resource families. We found that the involvement of nonresident fathers is associated with children's scores more strongly in children who live in homes with fewer than 10 books (i.e., in the group having the lowest level of cultural capital) compared with others. This was the case for all paternal involvement variables studied, and these results held even after we ran several sensitivity analyses. In addition, in the cases of maternal education and family income, we found a slight, non-significant trend toward paternal involvement perhaps benefitting children more in lower resource families than higher resource families. However, because these differences were not significant, they do not provide convincing support for the compensation model. Thus, we can conclude that the involvement of nonresident fathers seems to compensate for a lack of cultural capital but not for the lack of other family resources.

Although different family resource factors are often correlated with each other, they do not measure exactly the same aspects of stratification. In the present study, we found that maternal education, maternal occupation and family income variables were correlated more strongly with each other than with the number of books in the home. However, it is not self-evident why the compensation effect of nonresident fathers' involvement exists only in the case of cultural capital but not in the cases of other family resource factors. To some extent, similar results have nonetheless been reported elsewhere. For instance, Mollegaard and Jaeger (2015) studied grandparents' influence on grandchildren's educational success in Denmark. They found that only grandparents' cultural resources

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appear to have a directly positive effect, minus the parents' resources, whereas economic and social capital did not matter. The authors argued that one of the reasons for this finding is that cultural capital can be reused, unlike many other forms of capital. In other words, cultural capital is a resource that one cannot entirely deplete. In the case of the present study, it is important to note that the nonresident father might also have children by subsequent spouses in whom he must invest resources. The resources that cannot be reused (e.g., financial capital) might benefit only or mainly the children by a new spouse, but it is more likely that the cultural capital will benefit children from both previous and current relationships (e.g., all children can read the same books). Thus, a child from a low cultural capital household can utilize the cultural capital of a nonresident father without the risk of exhausting that capital. Further, one can speculate that in families with the least cultural capital, mothers or stepfathers have less ability or capability to be involved compared with other households; thus, in these family circumstances, the involvement of nonresident fathers matters the most.

Compared with previous studies investigating the associations between nonresident fathers' involvement and child outcomes, the present study has several strengths. Most former studies of the topic have used small and non-representative samples (see Adamsons & Johnson, 2013; Amato & Gilbreth, 1999 for reviews). Here, we have analyzed a large and representative sample from the UK, and we were also able to control for several potentially confounding variables. Moreover, we were able to use several paternal involvement factors, as well several family resource indicators. Thus, the results might be more generalizable than several previous investigations (see Henrich, Heine & Norenzayan, 2010 for discussion). The study also has some limitations. Because of the data structure, we have only a limited amount of information about nonresident fathers. For instance, we do not know whether the nonresident fathers have children by new spouses or even whether they have new spouses at all. Both of these factors likely influence nonresident fathers' involvement and, thus, might also be correlated with child outcomes. Moreover, in the data, cultural capital was measured by only one indicator, i.e., number of books in the home. Fortunately, previous studies have shown that this indicator is a relevant measurement of cultural capital (e.g., Evans et al., 2010; Park, 2008) because it has stronger explanatory power than several other measurements of cultural possessions (see Esping-Andersen, 2009 for discussion).

In conclusion, our results show that nonresident fathers may increase cognitive and educational achievements in children, which may also have policy implications. To promote children's educational success in single parent families and blended families, policy makers and practitioners should pay closer attention to how to encourage nonresident fathers' involvement. Although in Western countries the amount of nonresident fathers' involvement has increased in the last decades, there remains a large number of nonresident fathers who have no or very limited contact with their children (Amato et al., 2009). Compared with children living in intact families, children who have experienced parental separation tend to earn fewer academic achievements (e.g., Astone & McLanahan, 1991; Sun & Li, 2008). Thus, improving fathers' possibilities of being involved in their children's lives after parental separation might benefit those children who might often be at high risk for school failures.

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Tables in the text

Table 4. Associations between nonresident fathers' involvement, family resources and educational scores in children

	Model 1			Model 2			Model 3		
	Contact frequency			Relationship closeness			Paternal support		
	β	SE	p	β	SE	p	β	SE	p

	β	SE	p	β	SE	p	β	SE	p
Paternal involvement	0.03	0.01	0.001	0.04	0.01	0.001	0.02	0.01	0.022
Maternal education									
None	ref			ref			ref		
NVQ level 1	0.10	0.07	0.133	0.10	0.07	0.136	0.10	0.07	0.129
NVQ level 2	0.13	0.05	0.017	0.13	0.05	0.021	0.13	0.05	0.019
NVQ level 3	0.16	0.06	0.014	0.16	0.06	0.015	0.16	0.06	0.014
NVQ level 4	0.16	0.06	0.009	0.16	0.06	0.010	0.17	0.06	0.008
NVQ level 5	0.20	0.09	0.023	0.20	0.09	0.027	0.19	0.09	0.030
Maternal occupation									
Not working	ref			ref			ref		
Routine	0.11	0.07	0.118	0.11	0.07	0.114	0.11	0.07	0.120
Semi-routine	0.05	0.05	0.392	0.05	0.05	0.376	0.05	0.05	0.352
Small employer, self-employed and lower supervisor/technical	0.17	0.07	0.017	0.16	0.07	0.018	0.17	0.07	0.016
Intermediate	0.08	0.06	0.145	0.08	0.06	0.146	0.09	0.06	0.134
Lower professional	0.03	0.06	0.640	0.03	0.06	0.623	0.03	0.06	0.566
Higher professional	0.17	0.10	0.104	0.17	0.10	0.104	0.18	0.10	0.077
Family income									
Bottom quintile	ref			ref			ref		
Second	0.17	0.05	0.001	0.16	0.05	0.001	0.17	0.05	0.001
Third	0.20	0.06	0.002	0.19	0.06	0.003	0.20	0.06	0.002
Fourth	0.21	0.08	0.007	0.20	0.08	0.011	0.20	0.08	0.010
Top quintile	0.31	0.09	0.001	0.30	0.10	0.002	0.30	0.10	0.002
Number of books									
0-10	ref			ref			ref		
11-25	0.13	0.05	0.018	0.12	0.05	0.020	0.12	0.05	0.020
26-100	0.27	0.05	< 0.001	0.27	0.05	< 0.001	0.27	0.05	< 0.001
101-500	0.46	0.05	< 0.001	0.46	0.05	< 0.001	0.45	0.05	< 0.001
More than 500	0.50	0.10	< 0.001	0.50	0.10	< 0.001	0.50	0.10	< 0.001
Adjusted R2	0.11			0.11			0.10		
n	3,445			3,445			3,445		

Notes. Control variables: child's age, gender, ethnicity, number of siblings, birth order, family structure, maternal age,

mother-child relationship quality and point father left household

Table 5. Associations between paternal involvement and children's educational scores by maternal education

	Model 1			Model 2			Model 3 Paternal support		
	Contact frequency			Relationship closeness					
	β	SE	p	β	SE	p	β	SE	p
Paternal involvement	0.07	0.02	0.003	0.09	0.03	0.002	0.05	0.02	0.029
Maternal education									
None	ref			ref			ref		

	0.24	0.10	0.015	0.24	0.10	0.021	0.10	0.09	0.239
NVQ level 1	0.24	0.10	0.015	0.24	0.10	0.021	0.10	0.09	0.239
NVQ level 2	0.35	0.08	< 0.001	0.36	0.08	< 0.001	0.28	0.07	< 0.001
NVQ level 3	0.37	0.09	< 0.001	0.33	0.09	< 0.001	0.37	0.08	< 0.001
NVQ level 4	0.45	0.08	< 0.001	0.48	0.09	< 0.001	0.43	0.07	< 0.001
NVQ level 5	0.68	0.12	< 0.001	0.71	0.13	< 0.001	0.63	0.11	< 0.001
Maternal education x paternal involvement									
Paternal involvement x none	ref			ref			ref		
Paternal involvement x NVQ 1	-0.06	0.04	0.087	-0.08	0.05	0.109	0.01	0.03	0.856
Paternal involvement x NVQ 2	-0.06	0.03	0.037	-0.08	0.04	0.031	-0.03	0.03	0.248
Paternal involvement x NVQ 3	-0.02	0.03	0.549	-0.01	0.04	0.872	-0.03	0.03	0.383
Paternal involvement x NVQ 4	-0.02	0.03	0.489	-0.05	0.04	0.202	-0.02	0.03	0.475
Paternal involvement x NVQ 5	-0.07	0.04	0.108	-0.11	0.05	0.048	-0.05	0.03	0.105
Adjusted R2	0.07			0.07			0.07		
n	3,445			3,445			3,445		

Notes. Control variables: child's age, gender, ethnicity, number of siblings, birth order, family structure, maternal age,

mother-child relationship quality and point father left household

Table 6. Associations between paternal involvement and children's educational scores by maternal occupation

	Model 1 Contact frequency			Model 2 Relationship closeness			Model 3 Paternal support		
	β	SE	p	β	SE	p	β	SE	p
Paternal involvement	0.03	0.01	0.018	0.05	0.02	0.003	0.04	0.01	0.010
Maternal occupation									

	β	SE	p	β	SE	p	β	SE	p
1 Not working	ref			ref			ref		
2 Routine	0.22	0.11	0.046	0.19	0.11	0.093	0.18	0.10	0.069
2 Semi-routine	0.07	0.08	0.345	0.11	0.08	0.164	0.11	0.07	0.120
4 Small employer, self-employed and lower supervisor/technical	0.41	0.11	< 0.001	0.37	0.11	0.001	0.30	0.09	0.001
5 Intermediate	0.27	0.08	0.002	0.23	0.09	0.011	0.24	0.08	0.002
6 Lower professional	0.26	0.08	0.002	0.33	0.09	< 0.001	0.30	0.07	< 0.001
7 Higher professional	0.57	0.20	0.004	0.64	0.22	0.003	0.73	0.16	< 0.001
Maternal occupation x paternal involvement									
Paternal involvement x 1	ref			ref			ref		
Paternal involvement x 2	-0.04	0.04	0.273	-0.04	0.05	0.462	-0.03	0.03	0.395
Paternal involvement x 3	0.03	0.03	0.362	0.01	0.04	0.845	0.01	0.03	0.670
Paternal involvement x 4	-0.04	0.04	0.275	-0.03	0.05	0.472	-0.0004	0.03	0.990
Paternal involvement x 5	-0.01	0.03	0.788	0.01	0.04	0.846	0.003	0.03	0.915
Paternal involvement x 6	-0.0002	0.03	0.993	-0.04	0.03	0.286	-0.02	0.02	0.320
Paternal involvement x 7	-0.04	0.06	0.566	-0.08	0.08	0.340	-0.10	0.05	0.036
Adjusted R2	0.07			0.07			0.07		
n	3,445			3,445			3,445		

Notes. Control variables: child's age, gender, ethnicity, number of siblings, birth order, family structure, maternal age,

mother-child relationship quality and point father left household

Table 7. Associations between paternal involvement and children's educational scores by family income

	Model 1			Model 2			Model 3		
	Contact frequency			Relationship closeness			Paternal support		
	β	SE	p	β	SE	p	β	SE	p
Paternal involvement	0.04	0.02	0.006	0.05	0.02	0.010	0.04	0.02	0.022
Family income									

	β	SE	P	β	SE	p	β	SE	p
1 Bottom quintile	ref			ref			ref		
2 Second	0.34	0.06	< 0.001	0.32	0.06	< 0.001	0.28	0.06	< 0.001
3 Third	0.42	0.08	< 0.001	0.41	0.08	< 0.001	0.47	0.07	< 0.001
4 Fourth	0.52	0.11	< 0.001	0.48	0.11	< 0.001	0.49	0.09	< 0.001
5 Top quintile	0.52	0.14	< 0.001	0.61	0.15	< 0.001	0.63	0.12	< 0.001
Family income x paternal involvement									
Paternal involvement x 1	ref			ref			ref		
Paternal involvement x 2	-0.03	0.02	0.243	-0.02	0.03	0.475	-0.0001	0.02	0.997
Paternal involvement x 3	-0.01	0.03	0.667	-0.01	0.03	0.690	-0.04	0.02	0.082
Paternal involvement x 4	-0.03	0.04	0.393	-0.03	0.04	0.537	-0.03	0.03	0.328
Paternal involvement x 5	0.04	0.05	0.406	-0.002	0.05	0.964	-0.02	0.03	0.611
Adjusted R2	0.07			0.07			0.07		
n	3,445			3,445			3,445		

Notes. Control variables: child's age, gender, ethnicity, number of siblings, birth order, family structure, maternal age, mother-child relationship quality and point father left household

Table 8. Associations between paternal involvement and children's educational scores by cultural capital

	Model 1 Contact frequency			Model 2 Relationship closeness			Model 3 Paternal support		
	β	SE	P	β	SE	p	β	SE	p
Paternal involvement	0.10	0.02	< 0.001	0.11	0.03	< 0.001	0.07	0.02	< 0.001
Number of books									
1) 0-10	ref			ref			ref		
2) 11-25	0.41	0.08	< 0.001	0.31	0.08	< 0.001	0.25	0.07	< 0.001
3) 26-100	0.48	0.07	< 0.001	0.45	0.07	< 0.001	0.43	0.06	< 0.001
4) 101-500	0.67	0.07	< 0.001	0.66	0.08	< 0.001	0.61	0.07	< 0.001
5) More than 500	0.78	0.16	< 0.001	0.94	0.17	< 0.001	0.81	0.14	< 0.001
Number of books x paternal involvement									
Paternal involvement x 1	ref			ref			ref		
Paternal involvement x 2	-0.12	0.03	< 0.001	-0.09	0.04	0.010	-0.06	0.03	0.024
Paternal involvement x 3	-0.07	0.03	0.005	-0.07	0.03	0.021	-0.06	0.02	0.009
Paternal involvement x 4	-0.06	0.03	0.037	-0.07	0.03	0.050	-0.04	0.02	0.079
Paternal involvement x 5	-0.08	0.06	0.142	-0.18	0.07	0.016	-0.11	0.04	0.016
Adjusted R2	0.10			0.09			0.09		
n	3,445			3,445			3,445		

Notes. Control variables: child's age, gender, ethnicity, number of siblings, birth order, family structure, maternal age, mother-child relationship quality and point father left household