

Social Disparities in Children's Vocabulary in Early Childhood. Does Preschool Education Help to Close the Gap?

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Abstract^{*}

Children start school with differing levels of skills. Thus, children of different social origin have different probabilities of educational success right from the start of their school career. This paper analyses how the gap in language abilities of children with different class background develops from age three to five. A focus lies on the question whether preschool education can help to close this gap. The data of the UK Millennium Cohort Study (MCS) show that children's score on a standardized vocabulary test strongly depends on their parents' social class. These class differences remains stable or even increase slightly over the two-year period. Using fixed effect models, it is demonstrated that children of higher class families can improve their vocabulary more strongly than children whose parents have either a lower or middle class position. Participation in an early education institution positively affects the vocabulary development of middle and lower class children while there is no significant preschool effect for children of higher class parents. The results indicate that preschool attendance does not lead to a catching up process of lower class children. But without preschool attendance, the gap between higher and lower class children widens even further.

Key Words: early education, educational inequality, preschool attendance, language skills, vocabulary, primary effect of stratification

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1. Introduction

Children's educational attainment depends on their social origin. This educational inequality can be found in all Western countries although the strength of this association varies between countries and has declined over time (see Ballarino et al., 2009; Breen et al., 2009; Esping-Andersen, 2004). In the discussion about the explanations of this phenomenon, usually two factors are differentiated which Boudon (1974) has termed primary and secondary effects of stratification. *Primary effects* relate to social differences in academic ability and school achievement. Children with higher class parents have on average better grades in school and score better on achievement tests compared to children with lower class parents (Mullis et al., 2007: 122-125; Schütz et al., 2008). The *secondary effects* of stratification relate to transition probabilities: Even at a given level of educational performance, educational decisions (e.g., about school continuation) differ according to the children's social background. This results because the evaluations of the perceived costs, benefits and probabilities of success differ systematically among social classes (Breen & Goldthorpe, 1997; Erikson & Jonsson, 1996). Both factors contribute to the emergence and persistence of educational inequality and thus – in the long run – to the reproduction of social inequality. The present paper focuses on the first factor and analyses class differences in children's abilities. Such differences in abilities are already present at an early age (Lee & Burkam, 2002; Zill & West, 2001). Thus, children already start their school careers with differing levels of skills and hence with different probabilities of educational success.

One main explanation of these early disparities in abilities refers to differences in parenting, home environments, parental stimulation and parent-child interactions (see Cheadle, 2008; Lareau, 1993, 2002). In short, the primary socialisation and childhood conditions differ by socioeconomic status (SES) which leads to differences in children's abilities already at an early age. This mechanism has been regarded as 'fairly similar between countries and stable over time' in the literature (Erikson & Jonsson, 1996: 50). So, are these SES-differences in children's abilities at an early age inevitable? One hope for more equal educational opportunities lies in early education programmes. The participation in preschool education could have compensational effects. The literature shows that preschool attendance positively affects the development of skills in various domains (e.g., Currie, 2001; Magnuson et al., 2004; NICHD, 2002a; Sammons et al., 2004). There are also some hints that 'disadvantaged children' (from lower educated, lower class, and/or poor parents) can benefit more from

preschool attendance than their more advantaged counterparts (Magnuson et al., 2004). Can preschool education therefore help to close the gap in children's abilities at an early age?

This paper analyses how the gap in language abilities of children with different class background develops from age three to five. The main question is whether preschool education can help to close this gap. Language skills are important determinants for children's educational success (Durham et al., 2007; Sullivan, 2001: 908). Examining the development of language skills therefore contributes to the explanation of educational inequality. Especially the ability level at an early age is essential because this builds children's 'starting capital' at the beginning of their school career. Class differences in children's skills at an early age are likely to remain stable or even increase over time (Feinstein, 2003). Or, as Heckman and Wax (2004) have put it: 'Like it or not, the most important mental and behavioral patterns, once established, are difficult to change once children enter school'. Thus, it is important to have a closer look at this critical early childhood period and examine whether interventions like preschool education are effective in reducing the ability differences.

For the empirical analyses, I use the second and third wave of the UK Millennium Cohort Study. In both waves, a standardized test of children's expressive vocabulary has been conducted. Fixed effects regressions are used to analyse the development of the children's vocabulary between the age of three and five. This method only considers the within-individual variation over time and, therefore, controls for any (even unmeasured) time-constant individual characteristics (see Allison, 2005). As a first step, I analyse whether the social class gap in children's language abilities remains stable, increases or decreases during this two-year period. In a next step, I examine whether the participation in any kind of early education institution influences children's vocabulary development. It is hypothesised that children from the lower class can benefit more strongly from such preschool attendance than children from the higher class. Thus, an interaction between social class and preschool attendance is tested. Finally, I analyse whether lower-class children who attend an early education institution are able to catch up to higher-class children. The results are discussed in the last section.

2. Studies on children's language abilities in early childhood

2.1 Disparities in language abilities at an early age

Various studies find an association between families' socioeconomic status and children's language abilities at an early age. Especially linguistic studies often examine children's language development longitudinally in a very detailed way. A good example of such a study is the one by Hoff (2003) which analyses the vocabulary development of two-year-old children during a ten week period. Children with a similar level of language development were selected at the start of the study. The families were visited at their homes and interactions between the mothers and their children were video-recorded. This was repeated ten weeks later. Although the children had a similar language level at time 1, children from high-SES families had a significant higher vocabulary level at time 2 compared to children from middle-SES backgrounds. So, the high-SES children had progressed at a faster rate. Hoff can show that this difference in children's development is due to differences in maternal speech characteristics. Controlling for properties of maternal speech reduces the SES-effect to non-significance (Hoff, 2003: 1373).

The work of Hart and Risley is especially notable in this field (Hart & Risley, 1992, 1995; Risley & Hart, 2006). They have done a very comprehensive longitudinal study of early language learning and the central role of home and family in this process. The vocabulary development of 42 children was analysed from the time they first began to say words (at about ten months) until they were three years old. The families were visited once-monthly during this period. One hour of parent-child interactions was recorded at each occasion. Although the children started to speak around the same time, large differences in their language skills were observed at the age of three. Children from high-SES families had larger vocabularies compared to children from working class families while children from welfare families had the most limited vocabularies. The authors show that 'parent talkativeness' completely accounts for this association. Children's vocabulary growth is strongly related to the amount of parent talk. And here, the authors detected very pronounced social differences: Toddlers in professional families hear, on average, three times as many words as children in welfare families. Also the quality of parents' verbal interactions differs by social background with children of high-SES families getting more encouragements. Other linguistic studies report similar results on SES-differences in parent-child interactions (Hoff-Ginsberg, 1991; Rowe, 2008) and the role of parental speech characteristics for children's language

development (Fish & Pinkerman, 2003; Olson et al., 1992; Pan et al., 2005; Pancsofar & Vernon-Feagans, 2006).

Also economic and sociological studies based on large-scale data sets report SES-differences in children's language abilities at an early age. In their study of class and race differences in oral vocabulary, Farkas and Beron (2004) used the data from the 'Children of the National Longitudinal Survey of Youth 1979' (CNLSY). The authors pooled together the survey waves 1986-2000 in which children between three and fourteen years were administered several skill assessments including the 'Peabody Picture Vocabulary Test' (PPVT). They find that at three years of age, a large social class gap in children's vocabulary has already emerged. This gap continues to widen until age five for black children but remains rather stable for whites. Also Ermisch (2008) reports large SES-differences in children's vocabulary at age three. Using the data of the 'UK Millennium Cohort Study' (MCS), he finds a strong association between the families' income when the child was nine months old and the child's 'Naming Vocabulary' test score at age three. An important part of this difference can be accounted for by stimulating activities like reading to the child. Results from the 'The Effective Provision of Pre-School Education' (EPPE) Project support this finding (Melhuish et al., 2008; Sylva et al., 2004): Social differences in children's language skills are already detectable at age three. Parental activities such as reading to their child, teaching songs and nursery rhymes, playing with letters and numbers, visiting the library, painting and drawing etc. have a significant influence on children's attainment at both age three years and later at the start of primary school, but significant SES-effects remain.

In summary, it can be stated that social differences in children's language skills emerge very early. Various linguistic studies have demonstrated that it is essential for children's language development how their parents communicate with them. It is important how often and in which way their parents speak to them. Also economic and sociological studies have found large SES-differences in children's language skills at an early age. 'What parents do with their children' in terms of familial activities partly accounts for these differences. But even after controlling for such parenting and home activities, social differences in children's language skills remain.

2.2 The role of preschool education

The last section has shown that the family background has a strong influence on children's language development. But also learning contexts outside the family can have an independent effect. Here, especially early education institutions can be important.¹ Such institutions explicitly aim at children's education and have trained personnel and stimulating materials to foster children's development in various domains.

Many international studies show that attending such an early education institution positively affects children's language skills (for an overview, see Currie, 2001). The early intervention studies in the USA with an experimental design have already demonstrated the impact of attending early education institutions. For example, the 'Perry Preschool Study' shows that (randomly assigned) programme participants in a special preschool programme perform better in language tests compared to non-participants. This advantage is preserved until adolescence (Schweinhart et al., 1993). Evaluating the impact of preschool attendance, non-experimental studies always have to face the problem of selective participation. A good solution to this problem is presented by Lamy et al. (2005) who used regression discontinuity (RD) techniques to evaluate the effects of participating in the 'New Jersey's Abbott Preschool Program'. The existence of an age cut-off date for enrolment eligibility made it possible to compare children who participated in the programme with children of roughly the same age who were going to participate in the following year. Attending the preschool programme for one year leads to an increase in children's receptive vocabulary by a quarter of a standard deviation (Lamy et al., 2005: 8-9). Also other studies find a positive effect of preschool attendance on children's language skills (e.g., Currie & Thomas, 1995; Sammons et al., 2004).

It is discussed in the literature whether the effect of preschool attendance differs depending on the children's family background. As already mentioned in the introduction, early education programmes may be one means for more equal educational opportunities. Early education institutions might buffer some of the negative influences of family risks such as poverty. But besides these compensational effects for 'disadvantaged children', it is also imaginable that

¹ There are various types of early education institutions. These vary from country to country but there is also a great variety of such institutions within many countries. Examples are child-care centres, preschools, prekindergartens, nursery schools, etc. In this paper, those institutions are not differentiated but are all classified as 'early education institution' or 'preschool' (these terms are used synonymously). I use a very basic definition of such an institution: The child care has to be provided by *qualified personnel* at a *special facility* that is equipped for this purpose (and not at the child's home).

preschool attendance might do harm in cases where the child care institution provides the child with poorer rearing experiences than the parents do at home (see NICHD, 2002b). Some empirical studies support the hypothesis of compensational effects. Using the data from the 'Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999' (ECLS-K), Magnuson et al. (2004) find positive preschool effects which are larger for children of poor parents and children of low-educated mothers compared to the effects for the full sample. But other authors provide only limited support for such compensational effects. For example, Burchinal et al. (2000) do not find a significant interaction effect between preschool quality and the families' poverty status. Similar findings are reported by the NICHD Early Child Care Research Network (2002a: 159). Thus, there are inconsistent results on the question whether children from disadvantaged family background can benefit more from preschool attendance compared to children with more advantageous social backgrounds.

3. Theoretical background

3.1 Explanations for class differences in children's skills

As reported in section 2.1, there are large class differences in children's language skills. Various explanations for this social class gap in children's abilities and educational outcomes have been discussed in the literature. These can roughly be categorised into three types of explanations (also see Erikson & Jonsson, 1996: 10-12; Fergusson et al., 2008: 278-280):

1. Genetic factors

Some authors like Herrnstein and Murray (1996) argue that social differences in children's abilities and educational outcomes are due to an underlying social difference in intelligence. These differences in intelligence are assumed to have a genetic origin and result from assortative mating. But for the present study, such possible genetic differences do not play any role: Since genetic characteristics are stable over time and the fixed effects method used in this study takes into account all time-constant characteristics, such genetic traits would be controlled.

2. Family factors

Many different explanations focus on family conditions and children's home environments. These explanations can be further differentiated. In a rather materialistic perspective, poverty

and access to material resources are regarded as the main source for the SES-gap in children's skills. This position assumes that a limited access to economic resources creates barriers that limit the development of children in such families (see Bradley & Corwyn, 2002: 379-383; Yeung et al., 2002). Other explanations see the origin of SES-differences in children's abilities in family and socialisation processes. These include parental aspirations, parenting styles, communication patterns, and stimulating activities (see Cheadle, 2008; Ermisch, 2008; Guo & Harris, 2000; Kiernan & Huerta, 2008). The basic idea is that parents' social background determines the way they communicate and interact with their children which then has consequences for a child's development in various domains (e.g., cognitive development, behavioural problems, and personality). A good example for this perspective is the approach by Lareau (1993, 2002). In her ethnographic study, Lareau finds great differences between middle-class and working-class parents in how they organize their children's lives around diverse leisure activities, promote their children's development, and interact with teachers. Middle-class parents engage in 'concerted cultivation': They enrol their children in numerous organized activities, which they view as 'transmitting important life skills' to children (Lareau, 2002: 748). They also stress language use and the development of reasoning. In contrast, working-class and poor parents emphasise the 'accomplishment of natural growth', providing the conditions under which children can grow, but leaving leisure activities to the children themselves (Lareau, 2002: 747).

All the approaches of this 'family perspective' have in common that the main mediator between the parents' socioeconomic status and their children's abilities is 'what parents do' with their children (Sylva et al., 2004: 14). If this parental treatment is stable over time, the fixed effects method used in the present study controls for it automatically. Thus, even unmeasured parental characteristics like their 'communication style' are taken into account. But to control for the possibility that changes in the family situation might cause changes in children's skill development, also time-varying family characteristics have to be controlled.

3. School factors

Some scholars have emphasised the role of educational institutions in contributing to the linkages between socioeconomic factors and educational achievement. Also within this perspective, there are different focuses. Some explanations see (institutional) discrimination or the 'middle class bias' in school as a main reason why children from lower-SES backgrounds do less well in school compared to children from higher-SES backgrounds. For

example, this cultural bias in school is a core element of Bourdieu's theory of social reproduction (Bourdieu, 1977). Other explanations focus more on contextual effects and differential learning environments (Dar & Resh, 1986; Pong, 1998; Willms, 1986). For the present study, these explanations are not relevant since children's abilities at age five are analysed – just at the beginning of children's school careers.

3.2 Aim of the present study and hypotheses

The present study analyses the development of the social class gap in children's language skills between the ages of three and five years. First of all, it will be shown that such a gap already exists at the age of three. Then, I will examine whether this gap remains stable, increases or decreases within this two-year period. The mediating mechanism *why* children with lower class parents have lower language skills than children with higher class parents will not be addressed in this paper. Only the role of preschool education with its possible 'compensation effects' will be focussed.

No predications about the overall development of the social class gap in children's language skills between the age of three and five are made. But two hypotheses regarding the preschool effect are formulated:

1. *Preschool attendance has a positive effect on the development of children's language skills.*

Since children with lower class parents get less cognitive stimulation at their homes (e.g., in form of stimulating materials or activities), learning context outside their homes may be more important for them compared to children of higher class backgrounds:

2. *This positive preschool effect is larger for children with lower-class parents compared to children with higher-class parents.*

If the second hypothesis turns out to be true, the possibility of compensation arises. Thus, the following third hypothesis is proposed:

3. *Those lower-class children who attend preschool are able to reduce the gap to the higher-class children.*

This last hypothesis is far from trivial. Even if the second hypothesis was supported and lower-class children could benefit more from preschool than higher-class children, it would still be possible that higher-class children improve their skills more strongly. Thus, it is an empirical question whether such a ‘catch up process’ really takes place or not.

4. Data and method

4.1 Data and operationalisations

I use data of the UK Millennium Cohort Study (MCS) for the empirical analyses in this paper. The MCS is a large-scale survey of children born in the four countries of the United Kingdom at the beginning of the century. Children living in areas with high rates of child poverty and in areas with high proportions of ethnic minorities were overrepresented in the sample. The first survey was carried out during 2001-2002 with about 18,500 parents when their babies were about nine months old. The second wave took place when the children were three years old and the third wave at age five. A detailed description of the MCS including sampling procedures, sample sizes and an overview of the modules can be found in the documentations at the UK data archive (see Hansen, 2008; Plewis, 2007; Plewis & Ketende, 2006).

In the present study, I used information from the second and third wave to analyse the change in children’s vocabulary between the age of three and five years. Only for the construction of parents’ social class (which is assumed to be rather constant in time), I also used information from the first survey in cases where it was missing in the later waves. I only included cases for which full information on all time-varying model variables was available in wave 2 as well as in wave 3. I also restricted my sample to white children and families with English as the only language spoken at home. This leaves an analysis sample of 10,175 children. Because of the stratified nature of the sample, the sampling weights provided in the dataset were used in all analyses. The operationalisations of the model variables are presented next.

Children’s vocabulary

The test ‘naming vocabulary’ from the ‘British Ability Scales’ (BAS) was conducted in wave 2 and in wave 3 of the MCS. The BAS is a battery of individually administered tests of cognitive abilities and educational achievements (see Hansen, 2008: 43). The subtest ‘naming vocabulary’ measures the expressive vocabulary of children. It is suitable for use with

children aged from 2;6 (two years and six months) to 7;11. In this test, the children are shown coloured pictures of objects and are asked to name them. For the present analyses, the ‘normative scores’ were used. These are derived from standard BAS tables and defined with reference to the standardisation sample. To have a better interpretation of these scores, they were z-standardized with an overall mean of 0 and a standard deviation of 1 across wave 2 and 3.

Parents’ social class

The National Statistics Socio-Economic Classification (NS-SEC) is provided in the dataset for the respondents’ and their partners’ occupations (see Office for National Statistics, 2005). With this information, the following three social classes were constructed using the highest social class of both parents:

Low: routine or semi routine occupations;

Middle: lower supervisory or technical occupations; small employers and self-employed; intermediate occupations;

High: professional or managerial occupations; large employers.

Preschool attendance

To measure children’s experience with early education institutions, I constructed a dichotomous variable indicating whether or not a child had already participated in any kind of educational institution at the time of each interview. For this purpose, I used the retrospective question in wave 3: ‘Has [child’s name] ever been to any of the early education or childcare providers on this card?’ A list of 6 answers was provided for the respondents (nursery school/nursery class; playgroup; preschool; childminder; day nursery; none of these). If applicable, the starting times were asked in the next questions. I counted nursery school/ nursery class, playgroup, preschool, and day nursery as an ‘early education institution’. For simplicity, I will refer to the participation in any of these early education institutions as ‘preschool attendance’.

Time-varying family characteristics (control variables)

To control for the possibility that changes in the children’s vocabulary test score are attributable to a change in the families’ situation, the following time-varying family characteristics are used as control variables:²

2 Only time-varying family characteristics that were measured (virtually) identically in wave 2 and 3 could be selected. Thus, no further variables from the module ‘parenting activities’ could be used here.

- *Regular bedtimes*: Does [child’s name] go to bed at regular times? [1: never or almost never; to 4: always].
- *Regular mealtimes*: Does [child’s name] have meals at regular times? [1: never or almost never; to 4: always].
- *Frequency of reading to child*: How often do you read to [child’s name]? [0: not at all; to 5: every day].

4.2 Method

When evaluating the impact of preschool attendance, the problem of selectivity occurs. It is very probably not at random which parents send their child to early education institutions at all and which children start these preschools earlier. Not accounting for this selectivity can lead to biased estimates. Even when statistically controlling for some relevant characteristics of the family (e.g., parents’ education), there are always further unmeasured variables that are correlated with preschool attendance and may also be relevant for children’s vocabulary acquisition. Some of these variables might also be very difficult to measure at all (e.g., parents’ general involvement in their child’s early education). This problem of unobserved heterogeneity (also termed ‘omitted variable bias’) is always present in non-experimental studies and can lead to biased results.

Fixed effects methods offer a solution for (at least time-constant) unobserved heterogeneity if repeated measures of the dependent and independent variables are available for the same individuals. Instead of considering differences *between* individuals, changes *within* individuals over time are regarded (see Wooldridge, 2006: 485-487). This allows controlling for any person-specific time-constant characteristics (see Allison, 2005). A disadvantage of fixed effects regressions is that only independent variables can be used that show a sufficient variability over time (for further disadvantages like larger standard errors because of disregarding the between variation, see Allison, 2005: 1-6). For this reason, effects of time-constant variables like sex or ethnic origin cannot be estimated (but these are nevertheless controlled as all other time-constant characteristics). But also variables like parents’ education or social class rarely change over time, so that their effects cannot be estimated here. To account for the possibility that changes in the families’ situation might have (partly) caused changes in children’s vocabulary, time-varying family characteristics have to be included. But also interactions with time-constant variables are possible. For example, it is possible to

analyse whether the effect of preschool participation is different for children whose parents have different class positions.

5. Results

Table 1 shows descriptive statistics of the model variables by survey wave separately for the three social classes. Children differ greatly in their vocabulary test results according to their parents' social class. The difference between children of higher and lower class parents is 0.58 standard deviations at the age of three. This gap in children's test score has not narrowed in the following two years: At age five, the difference amounts to 0.66 standard deviations. So, there seems no catching up process to be going on. If anything, the disparities have even widened a bit. The average test score of five-year-old children of lower class parents is still below the average test score of three-year-old children of higher class parents.

Also the preschool attendance rates at age three differ by social class. 58 percent of the lower-class children participate in any kind of early education institution at age three. This is true for 67 percent of the middle class children and for 72 percent of the higher class children. At age five, the vast majority of all children has experienced preschool. Thus, almost all children seem to attend an early education institution at some time before school, but there seems to be social selectivity in the starting time.

Differences can also be found in the distribution of the other family characteristics, although these are less pronounced. In higher class families, there are more regular bedtimes and mealtimes and the parents read books to their child more frequently compared to the other social classes. These means are lowest in the lower social class. Regarding these control variables, there is not very much change between the two panel waves.

-- about here table 1 --

The results of table 1 have already shown that children of lower class parents – as a whole group – do not catch up with higher class children. But there could be variation within the subgroup of lower class children: some could catch up and others could fall behind even further. This might depend on their preschool experience. To get a first impression whether

this association shows up, figure 1 depicts the mean vocabulary test scores by social class and preschool experience.

-- about here figure 1 --

Figure 1 illustrates the social differences in children's vocabulary test scores: Within all preschool subgroups, children with higher class parents (gray bars) score better than middle class children (white bars) who in turn score better than children with parents in lower class positions (black bars). Within each social class, children who have already some preschool experience at age three ('early preschool' group) have the best starting position: They score better in the vocabulary test compared to children who start preschool later or not at all. This could be traced back either to the early preschool attendance in this group or to some selectivity. The other two groups that start preschool later ('late preschool' group) or not at all ('no preschool' group) are similar in their test performance at age three.

Regarding children's test results at age five, there seems to be an interaction between social class and preschool attendance. Children of lower class parents score best in the 'early preschool' group and worst in the 'no preschool' group. The same is true for middle class children, only at a higher level. Only for higher class children, the preschool condition seems to have no effect at all: Children of higher class parents reach very high test scores – independently from their preschool experience. This supports the view that especially lower class children can profit from preschool attendance. But it has to be noted that even in the 'early preschool' group, the differences by social class remain very strong.

As a next step, the results of fixed effects regressions are presented in table 2. Model 1 shows that the children improve their vocabulary between the age of three and five. This is notable because the vocabulary scores are age-adjusted. A reason for this improvement may be that almost all children have started school at the time of the interview in wave 3. Model 1 also includes interactions between the survey wave and children's class background. Children with lower class parents build the reference category. While the gain in children's test scores is identical for lower and middle class children, children with higher class parents can improve their vocabulary more strongly. As the descriptive results have already indicated, there is no catching up process. On the contrary, the class differences even increase.

-- about here table 2 --

Model 2 adds the family control variables. Regular bedtimes and reading to the child positively affect children's vocabulary while the variable 'regular mealtimes' has no significant effect. Model 3 additionally includes children's preschool experience. Preschool attendance has a significant positive effect which supports the first hypothesis. The attendance of an early education institution leads to an increase in children's vocabulary by 7 percent of a standard deviation. This seems to be a rather low effect. But it equals the effect of changing children's bedtimes from 'never regular' to 'always regular'.

In the last model 4, interactions between preschool attendance and the social class are tested. In fact, the effect of preschool attendance differs by social class. The main effect of preschool attendance which refers to lower class children has strongly changed compared to model 3: Within lower class children, attending an early education institution increases their vocabulary by a sixth of a standard deviation. Middle class children can benefit a little less from preschool, but this difference is not statistically significant. Most remarkable is the significant negative interaction effect between preschool experience and the higher social class: The effect of preschool attendance is 0.15 standard deviations lower for children with higher class parents compared to children with lower class parents. This leaves a total preschool effect of 0.01 for the higher class children. These differential preschool effects by social class are also illustrated in figure 2. The interaction effect supports the second hypothesis that especially children from the lower class can profit from attending early education institutions. By contrast, children from higher class families seem not to benefit from preschool attendance at all.

-- about here figure 2 --

The differential preschool effect by social class seems to point to compensation processes: Lower class children can profit more strongly from preschool experience. Can it now be concluded that more (and earlier) preschool attendance of lower class children will lead to a catching up process? This does not necessarily need to be the case. Model 1 in table 2 has already shown that higher class children have improved more strongly between age three and age five than lower class children. In model 4, this interaction effect between the time and the higher social class has even increased compared to model 1: Independently of any preschool

attendance, higher class children gain 0.15 standard deviations more than lower class children. In order to find out whether lower class children with preschool experience really catch up (hypothesis 3), the differential preschool effect as well as this interaction effect between time and social class has to be considered simultaneously. The predicted improvements in children's vocabulary by social class and preschool experience are depicted in figure 3. Two results stick out: Firstly, the differential preschool effect is visible here again: Lower and middle class children can benefit from preschool attendance (the black bars are higher than the gray bars) while there is no preschool effect for higher class children. Secondly, lower and middle class children who attend preschool do not gain more than higher class children who either attend preschool or not. So, there is no catching up process – not even for the children who attend an early education institution (the black bars are all at a similar height). But for the children who do *not* attend preschool (gray bars), the class differences even increase.

-- about here figure 3 --

6. Summary and discussion

The present study confirms a result which has already been found by other authors: Social differences in skills are established early in life. Until the age of three years, large differences in children's language skills have already emerged. This gap in children's skills in early childhood lays the foundation for later educational inequality and thus – in the long run – the reproduction of social inequality.

In this study, I analysed the development of the social class gap in children's language skills between the age of three and five using the UK Millennium Cohort Study. Overall, this gap remains rather stable or even widens slightly during this time period. The size of this gap is large: Five-year-old children with lower class parents, on average, score worse on the vocabulary test than three-year-old children of higher class parents. Thus, children of different social origin have different skills and therefore different probabilities of educational success before they even start their school career.

Early education programmes are seen as a means to provide more equal education opportunities. Such preschool institutions explicitly aim at children's education and have trained personnel and stimulating materials to foster children's development in various domains. Many studies have demonstrated that the participation in such early education

institutions positively affects children's development in different domains. There are also some hints in the literature that children from disadvantaged backgrounds may even especially profit from such preschool attendance. In this case, preschools could offer a means for compensation and children from lower class backgrounds might catch up in their skill development. The empirical analyses in this paper have shown that preschool attendance has in fact a positive effect on children's language development. Children who attend any kind of early education institution can improve their vocabulary more strongly between the age of three and five. Also a significant interaction effect between the preschool attendance and the social class was detected. This indicates that lower class children can benefit more strongly than higher class children from preschool attendance. In fact, while preschool attendance is quite helpful for children with lower or middle class parents, children from higher class parents cannot profit from preschool attendance at all.

This differential preschool effect seems to point to compensation effects of preschool. But it has to be regarded that higher class children improve their vocabulary more strongly than lower class children – independently from preschool attendance. In sum, there is no catching up process of lower class children. Children with lower class parents who attend preschool can improve their vocabulary as much as higher class children. The gap that already exists remains stable in this case. So, it seems that preschool does not lead to more equal probabilities of educational success. But this interpretation would neglect the other side of the finding: Children of lower class parents who do *not* attend preschool fall even further behind higher class children. In this case, the social class gap increases. In total, the participation in early education institutions does not lead to a catching up process of lower class children. But without preschool attendance, the gap between higher and lower class children widens even further. So, preschool attendance seems highly recommendable especially for lower class children even though it fails to accomplish the goal of creating equal opportunities for all children at the start of their school career.

The result that preschool attendance has no effect at all for children of higher class parents might seem surprising. But at this point it has to be considered that only a very rough measure of preschool attendance has been used here: whether or not the child has participated in any kind of early education institution at the time of the interview. This completely neglects differences between various types and kinds of preschools. Of course, there is a large variety of preschool institutions and the effect sometimes differs between the concrete types (see

Sylva et al., 2004). However, the quality of the concrete institution seems to be most important. The ‘NICHD (National Institute of Child Health and Human Development) Study of Early Child Care’ has demonstrated that the quality of child care institutions has a significant positive effect on children’s language abilities (NICHD, 2002a, 2004; Belsky et al., 2007). This result is also supported by the ‘Cost, Quality, and Child Outcomes Study’ (CQO) (Burchinal et al., 2000; Peisner-Feinberg et al., 2001). Thus, it does not only matter whether or not and at what age children attend an early education institution but also which concrete institution is selected. And here the literature provides some evidence that *all* children can benefit from attending a high-quality preschool (for an overview, see Roßbach, 2005). In combination with the finding from the present study, it can be hypothesised that for lower class children the pure quantity of preschool experience as well as the preschool quality are important while for higher class children only the attendance of high-quality preschools might have an effect. This should be studied in more detail in the future.

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Tables and Figures

Table 1: Descriptive statistics (means or proportions)

	Lower class		Middle class		Higher Class	
	Age 3	Age 5	Age 3	Age 5	Age 3	Age 5
Vocabulary test score	-0.60	-0.16	-0.30	0.13	-0.02	0.50
Preschool attendance	0.58	0.93	0.67	0.94	0.72	0.93
Regular bedtimes	2.96	3.41	3.12	3.51	3.34	3.58
Regular mealtimes	3.32	3.42	3.38	3.55	3.45	3.58
Reading to child	3.92	4.06	4.29	4.22	4.62	4.42
N (number of cases)	2003	2003	3232	3232	4939	4939

Source: UK Millennium Cohort Study, own calculations

Table 2: The influence of preschool attendance on children's vocabulary development between age 3 and 5 (results of fixed effects regressions)

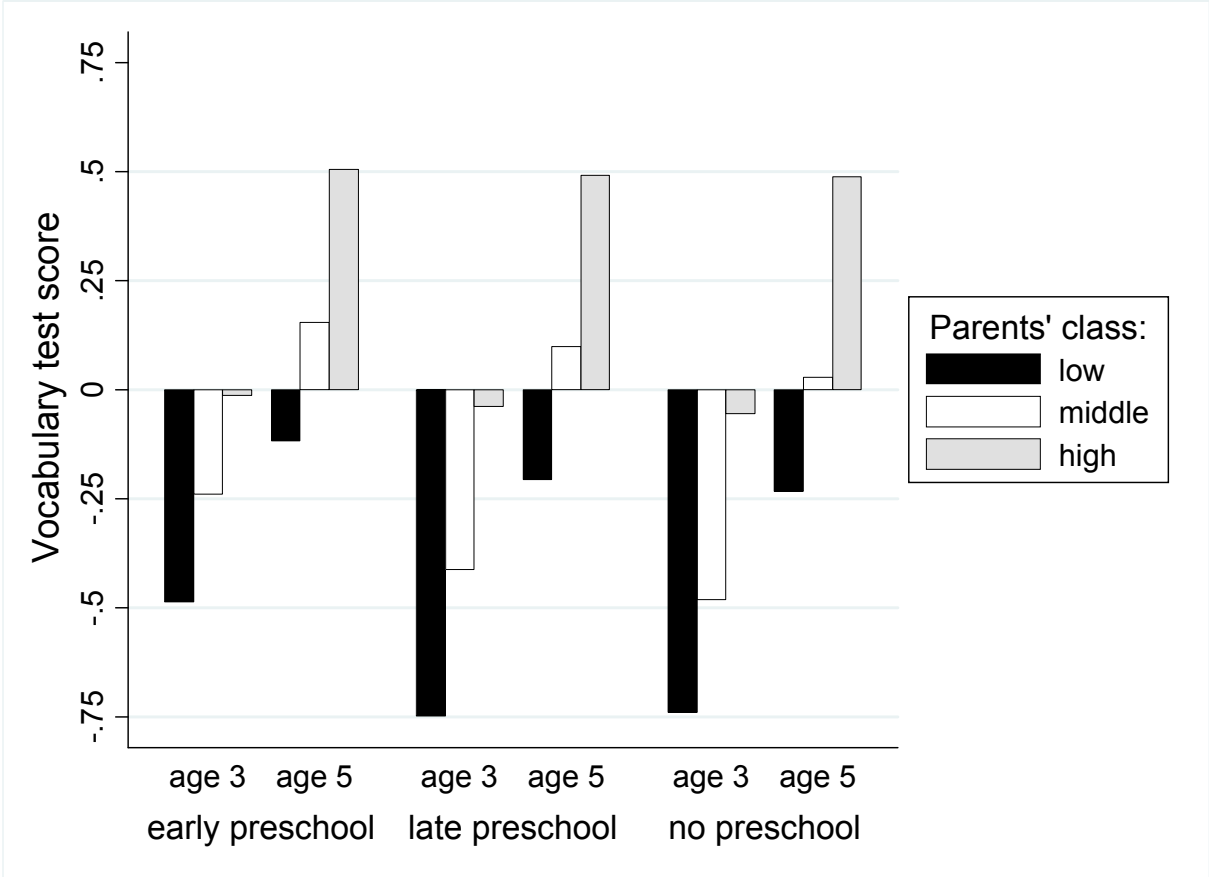
	Model 1	Model 2	Model 3	Model 4
Wave	0.44 (0.02)*	0.43(0.03)*	0.40 (0.03)*	0.37 (0.02)*
Wave * middle class	-0.01 (0.03)	-0.00(0.03)	0.01 (0.03)	0.03 (0.04)
Wave * higher class	0.08 (0.03)*	0.10(0.03)*	0.11 (0.03)*	0.15 (0.04)*
Regular bedtimes		0.02(0.01)*	0.02 (0.01)*	0.02 (0.01)*
Regular mealtimes		-0.01(0.01)	-0.01 (0.01)	-0.01 (0.01)
Reading to child		0.02(0.01)*	0.02 (0.01)*	0.02 (0.01)*
Preschool attendance			0.07 (0.03)*	0.16 (0.05)*
Preschool * middle class				-0.05 (0.07)
Preschool * higher class				-0.15 (0.06)*
R ² (within)	0.1963	0.1973	0.1980	0.1986
Number of cases	10175	10175	10175	10175
Number of observations	20350	20350	20350	20350

Source: UK Millennium Cohort Study, own calculations

Notes: Regression coefficients from fixed effect regression (within children) with standard errors in parentheses.

* p≤0.05

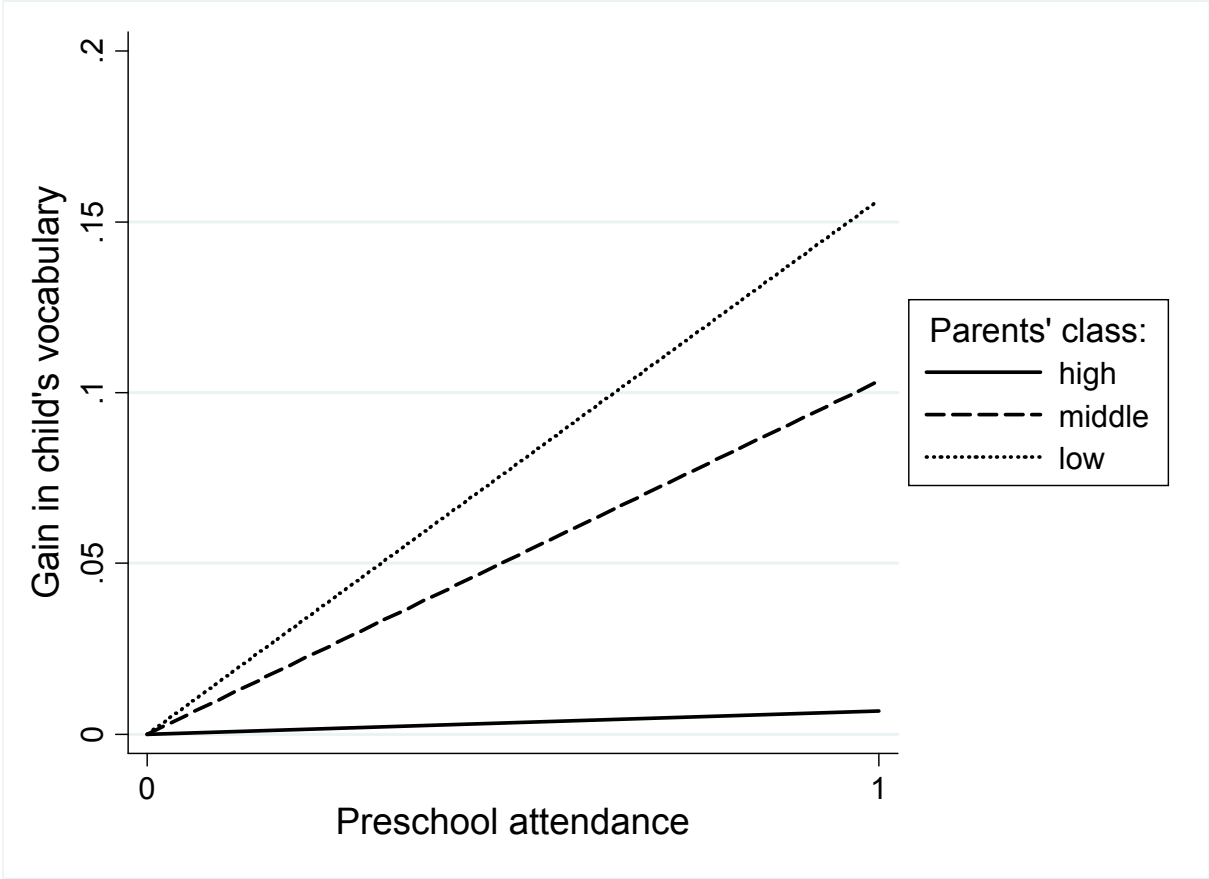
Figure 1: Children’s vocabulary test score by age, social class and preschool attendance



Source: UK Millennium Cohort Study, own calculations

Notes: Arithmetic means of the vocabulary test score.
 Early preschool: First preschool attendance before the interview at age 3.
 Late preschool: First preschool attendance after the interview at age 3 but before the interview at age 5.
 No preschool: No preschool attendance up to the interview at age 5.

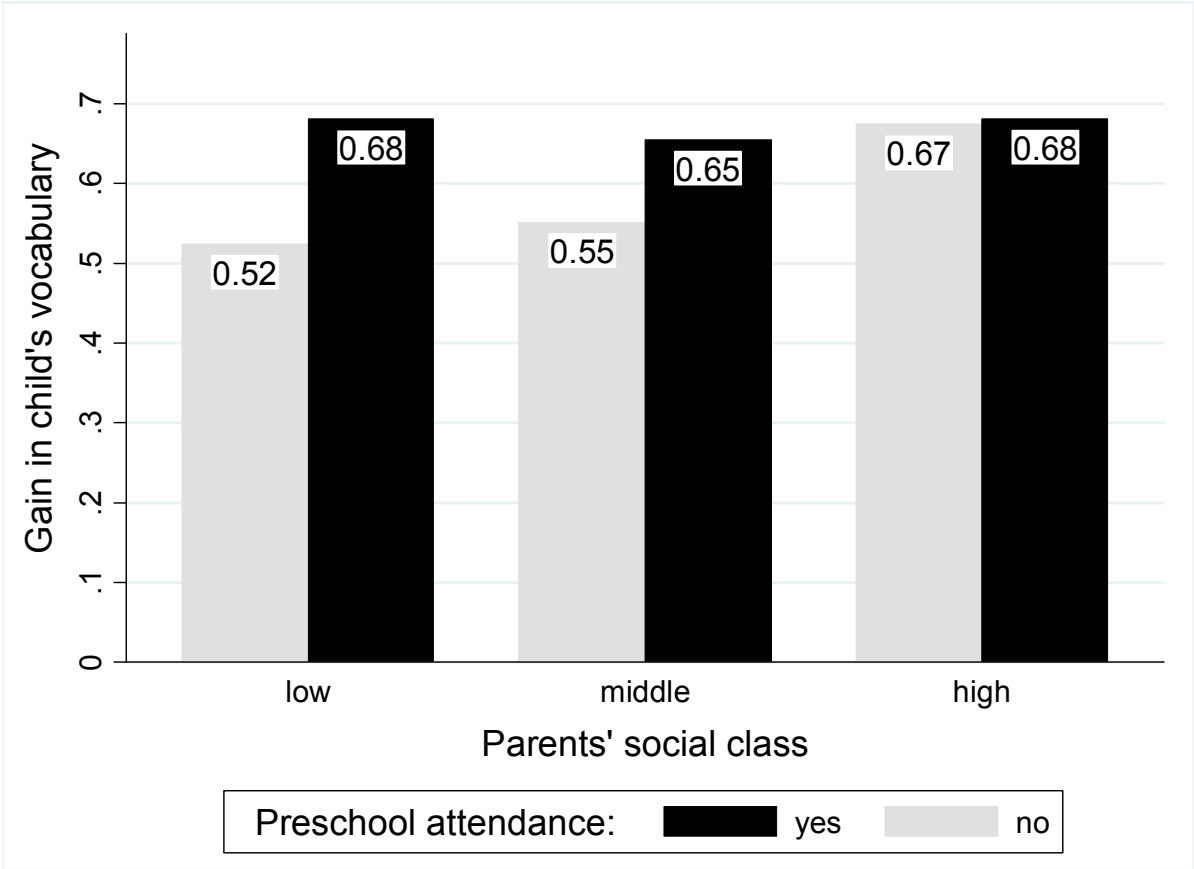
Figure 2: Preschool effect by social class



Source: UK Millennium Cohort Study, own calculations

Notes: Combined effects of preschool attendance and social class * preschool attendance from model 4, table 2.

Figure 3: Predicted gain in child's vocabulary by social class and preschool attendance



Source: UK Millennium Cohort Study, own calculations

Notes: Predicted values from model 4, table 2 All other variables are set on mean.