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The intergenerational transmission of educational attainment among non-residential fathers and their children

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ABSTRACT

Research on the intergenerational transmission of educational attainment tends to assume that children are raised in traditional two-parent families. However, due to the rising prevalence of divorce, non-residential fatherhood is increasingly common in Western societies. This study investigates the differences in intergenerational transmission between residential and non-residential fathers because non-residential fatherhood might disrupt mechanisms that are assumed to be crucial for intergenerational transmission, such as regular contact between parents and children. In addition, we examine three factors that might explain why some non-residential fathers are better able to transmit their educational attainment than others: (1) the number of years a father lived with the child prior to divorce (exposure), (2) the age of the child at the time of divorce (timing) and (3) the year in which non-residential fatherhood started (cohort differences). The hypotheses are based on Coleman's concept of 'within-family social capital'. Our study focuses on the Dutch context and we use the Netherlands Kinship Panel Study (NKPS) (birth cohorts 1960–1985) as well as register data from the System of Social statistical Datasets (SSD) (birth cohort 1995) of Statistics Netherlands. The results of the NKPS indicate that the association between the educational attainment of fathers and children is weaker for non-residential fathers than for residential fathers. However, the difference between residential and non-residential fathers is almost absent in the more recent cohorts of the SSD. We ascribe those cohort differences to an increase in shared custody arrangements since the late 1990s.

1. Introduction

Due to the increasing prevalence of divorce, non-residential fatherhood has become more and more common in Western societies (e.g., Thomson, 2014). Nevertheless, most studies on the intergenerational transmission of educational attainment are still based on the assumption that children grow up in a traditional two-parent family in which both biological parents and their children share one residency. This mismatch between reality and research is problematic because mechanisms, which are assumed to be crucial for the transmission of educational attainment, might be disrupted in families with a non-residential father. For example, research suggests that regular contact and parental involvement are important for the successful transmission of educational attainment (Coleman, 1988; Grusec & Hastings, 2014) while we know from previous studies that non-residential fathers have on average less contact with their children and are less involved in the socialization processes (Cheadle, Amato, & King, 2010; Scott, Booth, King, & Johnson, 2007). Accordingly, there are reasons to believe that the intergenerational transmission of characteristics works differently in families with a non-residential father than in traditional two-parent families. Unfortunately, few studies have examined this hypothesis.

Previous literature has focused mostly on the main effects of divorce and there is a general consensus that a parental divorce is associated with lower socioeconomic attainment among children. Economic decline, interparental conflict and moving or changing schools have been named as explanatory mechanisms (for a review, see Amato, 2000). In this study we move away from the traditional focus on the main effects of divorce. Instead, we study interaction effects to examine the differences in intergenerational transmission between residential and non-residential fathers. This type of research is important for two reasons. First, it helps us to discover whether children in non-intact families are more likely to lose resources (Mare, 2011). Second, in data sets that are used for research on intergenerational transmission, socioeconomic characteristics are more often missing for non-residential fathers than for residential fathers. Consequently, non-residential fathers are more often excluded from the analysis and this could result in a bias, which

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becomes more severe with the increase in the number of non-residential fathers in society (Tach, 2015). Research is needed to learn more about this potential bias. Our first research question is: *How does the intergenerational transmission of educational attainment differ between non-residential biological fathers and residential biological fathers?*

We focus in this study on families in which the father left the household due to a divorce or separation. We exclude widowed families from the analysis because we want to focus on a comparison between residential and non-residential fathers who are potentially present in the life of a child. Furthermore, we exclude families in which the father never lived together with the child because children in these families face very different family dynamics; e.g., they never experienced a divorce between their biological parents. Another reason to exclude single-mother families are the demographic differences: single parenthood from birth onwards is more common among very young mothers and certain ethnic groups (Loozen, Pool, & Harmsen, 2014). The small sample size of the widowed and single-mother families does also not allow us to conduct a separate analysis with those groups. We refer to the families in which the father left the household due to a divorce or separation as 'non-intact families'. Non-intact families are compared to traditional two-parent families, which we name 'intact families' from now on.

Only a few studies have examined the differences in intergenerational transmission between parent types before (Biblarz & Raftery, 1993; Erola & Jalovaara, 2017; Kalmijn, 2015b) and their results are mixed: Some studies show that the association between the socioeconomic characteristics of fathers and adult children is weaker for non-residential fathers than for residential fathers (Biblarz & Raftery, 1993; Erola & Jalovaara, 2017) while others report no significant difference (Kalmijn, 2015b). This could be the result of inconsistencies in outcome variables; Kalmijn investigates the transmission of educational attainment while the others focus on occupational status. The transmission of educational attainment might have a stronger genetic basis which could render non-residential fathers a larger role. However, it might also be that the underlying reasons for the mixed results are more complex and driven by differences in for example context. In any case, the number of studies is still small and hence, more research is needed to get insight in the role of coresidence in the intergenerational transmission process and to obtain a better understanding of the contrasting results in existing studies.

One of the shortcomings of the present literature is that it tends to compare non-residential fathers to residential fathers as if those are homogeneous groups. Instead, one would expect that there are important differences within the group of non-residential fathers due to which some non-residential fathers are more successful in the transmission of educational attainment than others. Post-divorce aspects, such as contact between fathers and children after divorce, as well as pre-divorce aspects, focusing on the time the father and child still lived together, might be relevant in this respect. For practical reasons we focus in this study mainly on the latter. Non-residential fathers in our research were initially residential fathers and some lived with their children until they were teenagers while others left the household shortly after birth. To capture this heterogeneity we differentiate within the group of non-residential fathers based on the number of years a non-residential father and child lived together (exposure). In addition, we examine the age at which the child lived with the father. It is possible that not the number of years in coresidence is crucial for the intergenerational transmission but rather the presence of the father during crucial moments in the socialization process, such as during the transition from primary to secondary education (timing) (Mare, 1980; Sigle-Rushton, Lyngstad, Andersen, & Kravdal, 2014; Tieben, De Graaf, & De Graaf, 2010). Our second research question is: *What is the role of father-child coresidence, measured by the length and the timing of this residency, in the intergenerational transmission of educational attainment among non-residential fathers and their children?*

Finally, we examine whether the process of intergenerational transmission among non-residential fathers has changed over time. It is well known that visitation schedules, custody arrangements and co-parenting have become more common over cohorts (Bakker & Mulder, 2013; Poortman & Van Gaalen, 2017; Statistics Netherlands, 2009) and that these types of post-divorce arrangements are beneficial for paternal involvement and the frequency of contact between parents and children after divorce (Bjarnason & Arnarsson, 2011; Nielsen, 2011; Seltzer, 1998; Spruijt & Duindam, 2009). Hence, we formulate a third and last research question*: How did the differences between residential biological fathers and non-residential biological fathers in the intergenerational transmission of educational attainment change across cohorts?*

To answer the research questions, we use the first wave of the Netherlands Kinships Panel Study (NKPS) (Dykstra et al., 2005) and the System of Social statistical Datasets (SSD) of Statistics Netherlands in which register data and survey data are combined (Bakker, Van Rooijen, & Van Toor, 2014). Both data sets contain detailed information on the residential history of respondents and the educational attainment of their biological parents and are therefore suitable to answer our research questions. By analyzing these two data sets, we will be able to compare the older cohorts in the NKPS (children born between 1960 and 1985) to the more recent cohort in the SSD (children born in 1995). Moreover, both data sets are situated in the Dutch context which is a useful setting to investigate our hypothesis on the timing of coresidence due to the highly stratified educational system. Children are selected into academic and vocational tracks at age 12 when the influence of parents is usually still relatively strong (Tieben & Wolbers, 2010; Tieben et al., 2010).

2. Theory and previous research

This section discusses relevant theories on the role of coresidence in the intergenerational transmission of educational attainment. First, Coleman's concept of 'within-family social capital' is used to explain why differences between residential and non-residential fathers could be expected (2.1). Next, we use the same theoretical concepts to explore why some non-residential fathers are more successful in the intergenerational transmission than others (2.2).

2.1. Residential versus non-residential fatherhood

To start, it is important to acknowledge the relevance of shared genes. The idea that biological relatedness is vital for the intergenerational transmission of educational attainment because intelligence is, at least partly, hereditary, is widely accepted and confirmed by several studies (Eriksen, Sundet, & Tambs, 2013; Jencks, 1972; Nielsen, 2006). Based on this argument, we formulate an elementary hypothesis, that we use as a starting point for our research: *There is always a positive association between the educational attainment of biological fathers and their children regardless of whether they lived together during childhood (H_1).*

A sociological point of view suggests that biological relatedness in itself is not enough to transmit educational attainment to new generations and that there are reasons to expect that non-residential fathers differ from residential fathers in the transmission process. Parents have several forms of capital, such as financial and cultural capital, which enables them to increase their child's educational success (Bourdieu, 1990; De Graaf, 1987). Due to the extensive welfare state in the Netherlands, low-cost higher education, and educational subsidies to children of low-income parents, the financial barriers in the educational system are reduced to a minimum. Hence, financial capital does not play a major role in the educational attainment of children in the Netherlands (De Graaf, 1986; De Graaf, De Graaf, & Kraaykamp, 2000). In contrast, previous studies indicate that cultural capital, which could be defined as a combination of preferences, linguistic skills, norms, behavior and (cultural) knowledge (Bourdieu, 1990), is positively associated with the educational attainment of a child (De Graaf, 1988; De

Graaf et al., 2000). Nonetheless, Coleman argues that cultural and financial capital are not sufficient to guarantee a successful transmission of educational attainment. He suggests that a child will only profit from parental resources if there is also enough social capital within the family. 'Within-family social capital' consists of two central elements: the physical presence of parents and the attention given to the child (parental involvement) (Coleman, 1988). These two elements combined enable a parent to undertake activities, such as helping with homework, discussing school related topics or reading together, which have a positive impact on the educational progress.

The idea that social capital within the family is vital for the transmission of educational attainment has important implications for our first research question in which we ask about the differences in intergenerational transmission between non-residential and residential fathers. Previous research shows that for many non-residential fathers, the amount of contact with the child declines after they left the household due to a divorce or separation; fathers are no longer physically present during the daily routine of their children, interact less often with them and are less involved in the socialization processes (Cheadle et al., 2010; Kalmijn, 2015a; Scott et al., 2007). Accordingly, on average there will be less social capital available in non-intact families than in intact families. In other words, following Coleman's theory, it could be said that non-residential fatherhood hampers the intergenerational transmission of educational attainment due to a lack of social capital within the family. In addition, this process might be reinforced by other family dynamics that often occur during a divorce, such as interparental conflict; previous studies show that more post-divorce conflict between parents weakens the relationship between a non-residential father and his child (De Graaf & Fokkema, 2007; Ryan, Kalil, & Ziol-Guest, 2008). Altogether, we expect that *the association between fathers' educational attainment and the attainment of the child is weaker for non-residential biological fathers than for residential biological fathers (H_2)*.

Some studies indicate that other parent figures are able to compensate for the loss of resources as a result of non-residential fatherhood. For instance, it has been shown that the association in characteristics between mothers and children becomes stronger when children do not live together with their biological father (Erola & Jalovaara, 2017; Kalmijn, 2015b; Mandemakers & Kalmijn, 2014). This could be explained by an increasingly close relationship between mother and child or by conscious compensation by mothers who are aware of the risks that tend to accompany single-motherhood. However, mothers are not the only parent figures that might be able to compensate. One of the indirect implications of Coleman's theory is that other adults, who are not biologically related to the child, such as stepparents, are also able to transmit characteristics to children if they are physically present and intensively involved in the socialization process. Previous empirical studies confirm that stepparents are able to transmit socioeconomic characteristics onto their stepchildren (Eriksen et al., 2013; Erola & Jalovaara, 2017). We will not be able to examine the role of stepparents in this study because the NKPS contains only a relatively small number of stepfamilies and lacks information on the educational attainment of stepparents. However, we will examine the differences in the role of biological mothers between intact and non-intact families.

2.2. Differences within the group of non-residential fathers

We used Coleman's theory to explain differences between residential and non-residential fathers. However, the theory is also useful for our second and third research question in which we focus on the heterogeneity within the group of non-residential fathers. It is likely that the reduction of social capital is not the same in all families with a non-residential father. Some non-residential fathers left the household shortly after birth while others stayed until their child was already a teenager. The longer the father lived with the child, the more time and opportunities to create within-family social capital and to transmit educational attainment. Based on this line of reasoning we formulate our exposure hypothesis: *The more years a non-residential biological father shared a residency with his child, the stronger the association between the educational attainment of non-residential biological fathers and children (H_{3a})*.

Using the number of years in coresidence as a measure of exposure suggests that every extra year that the father lives with his child results in a stronger association between fathers' educational attainment and the child's educational success. However, this might not be a realistic representation of the socialization process. We know that some ages are more crucial for the socialization than others and the presence of parents during these crucial ages might be especially important. There exist several hypotheses on the crucial ages for the transmission of educational attainment but we focus on educational transitions in this study. Many researchers agree that what happens during an educational transition has a large impact on the final educational attainment of children (Lucas, 2001; Mare, 1980; Raftery & Hout, 1993). An educational transition is a moment in the educational career when a student has to decide in which educational track he/she wants to proceed. Just as in many other European countries, children in the Netherlands are during these transitions divided between academically and vocationally oriented tracks (Müller & Wolbers, 2003). Dutch children encounter their first educational transition at age 12 when they go from primary education to one of the three educational tracks in secondary education (lower general secondary education (VMBO), intermediate general secondary education (HAVO) and higher general secondary education (VWO)). Parents are able to influence this transition in two ways. First, they could stimulate the educational performance of their children throughout primary school (i.e., help with homework or reading books together). Second, previous studies show that parents tend to play a major role in the decisions made during this educational transition since children are only 12 years old (Tieben & Wolbers, 2010; Tieben et al., 2010). The distinction between the influence of parents of the educational performance and decisions of children could be linked to primary and secondary effects (Boudon, 1974; Girard & Bastide, 1963). Primary effects are the effects of family background on the educational performance (social and environmental but also genetic) while secondary effects are the effects of family background on the educational attainment, which remains after controlling for previous educational performance. Secondary effects are often explained by differences in educational decisions. Influencing educational performance as well as educational decisions happens throughout the entire time a child is in primary school but we argue that the years close to the transition are the most important. The school will recommend a certain track at the end of primary school based on test results and the teachers' professional opinion and it is difficult to enter a higher track than the teacher recommends. Parents can follow different strategies to influence the recommendation of the teacher within the two years prior to the transition. First, parents could train their children for the tests that are coming up. Especially training for the final large test in primary school (CITO) is common (Inspectie van het Onderwijs, 2016). Second, the transition will be discussed during the parent-teacher meetings and parents could try to put pressure on the teacher. Third, parents and children have to choose a particular school. Children and parents tend to discuss this choice in the years prior to the decision and it is common to start visiting secondary schools two years before the actual transition. Altogether, it could be said that the activities parents undertake to stimulate the educational attainment of their child, intensify in the years prior to the transition.

The day-to-day presence of a father improves the operation of primary and secondary effects; it is easier to help with homework or to discuss upcoming decisions if a father lives with the child throughout primary school. When a father leaves before the transition from primary to secondary school, these mechanisms might be disrupted. The disruption could even be stronger when a father leaves during the crucial years of the educational transition (between age 10 and 13) because

this change in family structure often coincides with tensions and conflict. This might (temporarily) be negatively associated on the educational performance and the father-child relationship which affects the decisions made during the educational transition. Based on this line of reasoning we formulate the timing hypothesis: *The association between the educational attainment of the non-residential biological father and his child is stronger if a father left the household after the educational transition from primary to secondary school (after age 13) compared to fathers who left before (< 10) or during (10–13) the transition (H_{3b})*. Naturally, we are aware that exposure and timing are highly correlated. However, both offer a different point of view on the transmission of educational attainment that is worthwhile to investigate. A comparison of model fit statistics will show us which line of reasoning fits our data better.

If within-family social capital plays a central role in the intergenerational transmission of educational attainment, as suggested in this theoretical framework, cohort differences in shared custody arrangements, legal visitation schedules and co-parenting should not be ignored. From January 1998 onwards, shared custody is the standard legal arrangement after divorce in the Netherlands while the norm was previously that only one parent received the full custody over the child (usually the mother) (Spruijt, Kormos, Burggraaf, & Steenweg, 2003; Poortman & Van Gaalen, 2017). Ever since the number of co-parenting couples has been growing; in 1998 about 4% of the divorces resulted in a co-parenting arrangement (Kalmijn & De Graaf, 2000), while this was already 22% in 2013 (Statistics Netherlands, 2016). According to previous studies, co-parenting and regular visitation schedules are beneficial for paternal involvement and the frequency of contact between non-residential fathers and their children (Nielsen, 2011; Seltzer, 1998; Spruijt & Duindam, 2009). Based on this research it could be said that there is on average more within-family social capital in divorced families with shared custody arrangements and that as a result, the fathers in these families are better able to transmit their educational attainment to new generations. Therefore, we formulate our fourth hypothesis: *The association between the educational attainment of non-residential biological fathers and their children is relatively stronger in the recent divorce cohorts than in older divorce cohorts (H_4)*.

3. Data and methods

Two data sources have been used two answer our research questions: The Netherlands Kinship Panel Study (NKPS) (3.1) and the System of Social statistical Datasets (SSD) (3.2). After a description of both datasets, we will shortly discuss their comparability (3.3).

3.1. Netherlands Kinship Panel Study

We use the first wave of the NKPS, which has been collected between 2002 and 2004 (Dykstra et al., 2005). In contrast to most other surveys used for research on the intergenerational transmission of characteristics, it is explicitly mentioned to the respondents in the NKPS that the questions on the (characteristics of) parents are about their *biological* parents. Without this specification, respondents, especially in non-intact families, might report about other important parent figures in their lives to whom they are not biologically related, such as step-, foster or adoptive parents. Many other surveys do not specify the biological relatedness precisely enough.

To increase the number of observations, we added the full siblings of the 'original' respondents to the sample. Respondents reported on the educational attainment of two randomly selected siblings and one of those siblings received a questionnaire. Initially, we have used the information on the educational attainment of siblings reported on by the respondent. However, to fill the gaps that exist due to a missing answer or the use of the 'don't know' option, we have used, if available, the self-reports of the siblings, to complement our data. When the answers of the respondents and the self-reported answers of their siblings did not match, the self-reports of the siblings were preferred. We treat siblings the same as original respondents and use them only to increase the statistical power of our analysis. However, due to the addition of siblings, the assumption of OLS regressions that residuals are independent is violated. Therefore, we use the cluster option in Stata to control for the correlation between siblings and to adjust our standard errors. Siblings are categorized in the same family type as the original respondent. However, if the sibling was already older than 16 during the parental divorce he/she is not included in the sample. By including siblings in this way, we assume that siblings lived with the same parent as the original respondent. This could cause a small bias because siblings might have lived with other parents or caretakers.

The original sample of the NKPS consists of 8,161 respondents. We limited our sample to respondents born between 1960 and 1985 (age 19 to 43). Respondents born before 1960 are not included in the sample because they grew up in a different time when divorce was relatively rare while respondents born after 1985 are excluded because they were still in secondary education. By limiting our sample to a small range of cohorts, we get a relatively homogeneous sample. In total, we removed 4,509 respondents because they were born before 1960 or after 1985. In addition, we included only children who grew up in one of the two family types of interest: intact families or non-intact families in which the child lived with the mother after the parental divorce (before age 16). Children from other family types, such as families in which a parent passed away, adoptive families or families with a non-residential mother, are not included in the sample (577). This includes also respondents whose family status was not clearly defined. Some respondents reported a divorce or separation but no change in family structure or no divorce but a change in family structure after which they lived with only one parent. Those mismatches probably occurred because the questions were asked at different moments in the questionnaire and not directly linked to each other. Finally, 241 respondents without information on their own or their parents' educational attainment are removed from the sample. Altogether, this results in a sample of 2,834 respondents. We put the same restrictions on our sample of siblings. In addition, siblings were not allowed to differ more than 20 years in age from the original respondents. With these restrictions, we were able to add 4,019 siblings. This results in a final sample of 6,856 respondents in 2,834 families. 148 families (5.2%) and 269 children (3.9%) in the sample experienced a divorce or separation.

A potential weakness of the NKPS is that missing values are not randomly distributed across the sample: the educational attainment of the father is more often missing for non-residential fathers than for residential fathers. We conducted a robustness check using multiple imputation under the Missing At Random (MAR) assumption to ensure that the skewed non-response did not affect our results. We imputed only fathers' educational attainment using all variables in the models as well as the occupational status of the father (ISEI) and dummies to indicate whether the father was continuously employed, had subordinates and was self-employed or not. In total, 286 values were imputed after which we were able to include 7,139 respondents in 2,968 families in the NKPS. In this case 180 families (6.1%) and 322 children (4.5%) experienced a divorce or separation. Table A1 shows the percentage of missing values in the NKPS with and without the use of multiple imputation. It becomes clear from the table that the missing values are no longer selective with respect to family type when multiple imputation is used. The results of the analysis with multiple imputation are included in Table A2. The overall conclusions based on the analysis with and without multiple imputation are similar. Accordingly, we could say that the skewed non-response does not seem to affect our results. We decided to use multiple imputation only as a robustness check in this study since we are not completely able to meet the MAR assumption. The MAR assumption implies that the probability that a variable is missing does not depend on unobserved data. In our case the quality of the relationship between fathers and children during childhood, might affect the chance that the educational attainment of the father is missing but we are not able to control for this. Consequently,

the MAR assumption might be violated. Nevertheless, multiple imputation is useful to give us a reasonable estimation of the effect of the skewed non-response on our results.

3.2. System of Social statistical Datasets

The SSD is a longitudinal system, which combines registers and survey data (Bakker et al., 2014). It contains information on important demographic and socioeconomic characteristics of the complete population of the Netherlands as well as time varying variables, such as household composition. The educational variables in the SSD are based on three main sources: (1) several educational registers, (2) data from the Employee insurance Agency (UWV) and (3) the only non-administrative source: the Labour Force Survey (LFS) (Linder, Van Roon, & Bakker, 2011; Statistics Netherlands, 2017). The data from the UWV and LFS are used to supplement the educational registers because the Dutch government started to register the educational achievements of the population only relatively recently; the register on higher vocational (HBO) and university (WO) degrees is the oldest and started in 1986, other educational registers are of more recent dates. Statistics Netherlands creates annually new versions of the educational attainment variables in the SSD. We use the 2015 version for the educational attainment of the parents (released in October 2017) (Statistics Netherlands, 2017) and measure the educational attainment of the children at age 19.

We limit the sample of the SSD to respondents born in 1995 because they are the oldest cohort in the SSD for which we have complete information on their living situation throughout childhood. Older cohorts have missing data in their residential history while younger cohorts are still in secondary education and therefore not suitable for this study. The SSD contains information on all children born in 1995 that lived in the Netherlands during childhood (N = 206,289). However, just as in the NKPS, some observations are removed from the sample for the purpose of this study. To start, 24,902 children are removed from the sample due to missing values in the residential history. These missing values exist for example if children lived in a foreign country during their childhood. Second, we limit our sample, just as in the NKPS, to children who grew up in an intact or non-intact family in which the father left the household due to a divorce or separation. 66,659 children who lived in other family structures are not included in the sample. Third, since the 2015 release of the SSD contains a relatively large number of observations derived from the Employee Insurance Agency (UWV), low-income families with a migrant background are overrepresented in the educational data. This group is not representative for the migrant population and including them could bias our results. Therefore, 17,711 children with a migrant background are removed from the sample.[1] Finally, 72,424 children could not be included because we had no information on their educational attainment or the educational attainment of one of their parents. Altogether, this selection results in a sample of 24,593 children. 5,067 children (20.6%) in the sample grew up in a divorced family.

Since the number of deleted observations is large, we have compared the selected sample to the population. Table A3 presents the differences between the full and selected sample based on the number of divorces, urbanization, number of children in the household and income. The results indicate that we have a slight overrepresentation of divorced and low-income families. This could be the result of the data derived from the UWV. Parents (and especially mothers) might look for a job after a divorce and apply to the UWV. Moreover, people that are registered at the UWV are often unemployed or disabled, which could explain the overrepresentation of low-income families. However, we argue that the discrepancies are minimal and will not change our conclusions.[2]

3.3. Comparison of datasets

We use two data sets to make a comparison between cohorts possible. Ideally, we would test cohort differences with a three-way interaction within one pooled data set. However, this requires information of a wide range of cohorts to include respondents who experienced a parental divorce before the rise in shared custody arrangements as well as relatively young cohorts who experienced a parental divorce more recently. The range of useable cohorts in both the NKPS and the SSD is too small to actually test cohort differences in one combined analysis. We argue that the test with two separate data sets, as presented in this study, is currently the best possible option.

The main difference is that the NKPS is based on survey data while the SSD is mainly based on register data, which has implications for our indicators of residential history. In the SSD, we only know whether the child was registered in the same household as a parent after divorce. Custody arrangements or visitation schedules remain invisible in this approach but it is reasonable to assume that the registration of a child in the household of a parent indicates that this parent is also the main caretaker of the child. In the NKPS, respondents report themselves with whom they lived after the divorce. In theory, custody arrangements are in this set-up easier to detect. However, in practice, it is likely that the self-reported history also does not fully capture custody arrangements and visitations schedules. There was no answer category that the respondent could use to report that they lived with both parents. Moreover, only few respondents used the 'else' category to say that their parents had a co-parenting arrangement. In other words, we believe that the two data sets have similar limitations in their measure of residential history.

4. Variables

We use the highest educational attainment of respondents as our dependent variable. If respondents were in school at the time of the interview, their current educational level has been used. We recoded the educational attainment into ten groups: (1) less than primary school, (2) primary school, (3) lower vocational education (LBO), (4) lower general secondary education (VMBO), (5) intermediate general secondary education (HAVO), (6) intermediate vocational education (MBO), (7) upper general secondary education (VWO), (8) higher vocational education (HBO), (9) university and (10) post-graduate education. Following the 2003 coding of Ganzeboom and Treiman (2012), we recoded educational degrees in years of education, ranging from 5 years for less than primary school to 20 years for post-graduation education, and centered the variable. The educational attainment of siblings (NKPS), mothers, and fathers are all coded into the same ten groups, recoded into years of education and centered around the mean.

Indicator variables are used to indicate whether a respondent grew up in an intact or non-intact family. In intact families, the family structure did not change and the parents did not divorce or pass away before the child turned 16. Non-intact families are those in which children experienced a change in family structure before he or she turned 16 while the first change in family structure was not caused by the death of a parent. In addition, we include a variable for the number of years a child lived with the father to measure exposure. This is calculated separately for respondents and siblings. Furthermore, we

[1] This will not affect our comparison between data sets because the number of migrants in the NKPS is much smaller than in the SSD. In addition, there is no overrepresentation of low-income families and unemployed people in the migrant sample of the NKPS.

[2] To strengthen our belief that the differences between the population and the sample did not affect our results, we created two types of simple weights based on the income percentiles of both parents by dividing the percentage of people in an income quintile in the population by the percentage of people in the same quintile in our sample. This results in the following weights: Fathers; q1 = 0.777, q2 = 0.912, q3 = 0.980, q4 = 1.027, q5 = 1.112. Mothers; q1 = 0.776, q2 = 0.897, q3 = 0.999, q4 = 1.057, q5 = 1.132. Applying these weights did not change our regression estimates.

Table 1
Descriptive statistics NKPS (left) and SSD (right).

	Intact							
	NKPS (N = 6,584)				SSD (N = 19,526)			
	mean	s.d.	min	max	mean	s.d.	min	max
Boy (=1)	0.46	–	0	1	0.51	–	0	1
Age	33.62	6.43	19	44	19	–	19	19
Year of birth	1969	6.41	1960	1985	1995	–	1995	1995
Years of educ. respondent	12.40	3.16	5	20	13.13	2.74	6	17
Years of educ. mother	9.48	2.76	5	20	11.86	2.93	5	20
Years of educ. father	10.45	3.68	5	20	12.45	3.17	5	20
	Divorced							
	NKPS (N = 269)				SSD (N = 5,067)			
	mean	s.d.	min	max	mean	s.d.	min	max
Boy (=1)	0.45	–	0	1	0.49	–	0	1
Age	31.99	6.32	19	43	19	–	19	19
Year of birth	1971	6.34	1960	1984	1995	–	1995	1995
Years of educ. respondent	12.16	3.25	5	20	11.98	2.42	6	17
Years of educ. mother	10.80	3.04	5	17	11.20	2.89	5	20
Years of educ. father	11.02	3.53	5	17	11.49	3.12	5	20
Years lived with father	8.54	4.00	0	15	8.09	4.10	1	15
Step (=1)	0.29	–	0	1	0.46	–	0	1
	Total							
	NKPS (N = 6,853)				SSD (N = 24,593)			
	mean	s.d.	min	max	mean	s.d.	min	max
Boy (=1)	0.46	–	0	1	0.51	–	0	1
Age	33.55	6.43	19	44	19	–	19	19
Year of birth	1969	6.42	1960	1985	1995	–	1995	1995
Years of educ. respondent	12.39	3.16	5	20	12.89	2.72	6	17
Years of educ. mother	9.53	2.79	5	20	11.73	2.93	5	20
Years of educ. father	10.47	3.67	5	20	12.25	3.19	5	20

include three dummies to measure timing: one indicating whether the father left before the educational transition (< 10), a second whether a parent left during the crucial years of the educational transition (10–13) and the third, families in which the father left later than age 13, form the reference category. Finally, we control for sex (boy = 1), year of birth (centered by subtraction of the mean; only applicable in NKPS) and the presence of a stepparent in the household of the child (=1). Descriptive statistics of the dependent and independent variables by family type are presented in Table 1.

5. Results and discussion

We analyze our data with linear regression models and use interactions to investigate whether the intergenerational transmission of educational attainment differs between types of parents. We start with two models in which respondents of both family types are included (Table 2). These models are designed to answer our first research question. After that, we move on to models including only non-intact families to answer our second research question (Tables 3 and 4). When we use the term 'effects' we refer to statistical effects and do not mean to imply a causal relationship.

This first model in Table 2 shows the main effects and confirms a number of general patterns found in previous studies on the intergenerational transmission of educational attainment. First, the analysis shows in both data sets, just as previous studies (Breen, Luijkx, Müller, & Pollak, 2009; Ganzeboom, Luijkx, Dronkers, & Ultee, 1995; Tieben & Wolbers, 2010), that the educational attainment of fathers and mothers is positively associated with the educational attainment of their child. Second, the results of both analyses indicate, in line with previous literature, that growing up in a divorced family is associated with lower levels of educational attainment

Table 2
Linear regression of child's educational attainment (in years). Unstandardized coefficients.

	Model 1		Model 2	
	NKPS	SSD	NKPS	SSD
Boy (=1)	−0.036	−0.324***	−0.035	−0.324***
	(0.072)	(0.030)	(0.072)	(0.030)
Year of birth	0.011 +		0.011 +	
	(0.006)		(0.006)	
Divorce (=1)	−0.555*	−0.677***	−0.660**	−0.694***
	(0.228)	(0.049)	(0.236)	(0.049)
Education mother	0.256***	0.249***	0.249***	0.253***
	(0.018)	(0.006)	(0.018)	(0.007)
Education father	0.227***	0.226***	0.233***	0.233***
	(0.013)	(0.005)	(0.014)	(0.006)
Stepfather	−0.587	−0.204**	−0.545	−0.230***
	(0.474)	(0.067)	(0.467)	(0.067)
Educ. mother*divorce			0.134 +	−0.020
			(0.075)	(0.014)
Educ. father*divorce			−0.134*	−0.037*
			(0.064)	(0.013)
Constant	0.140**	0.323***	0.140**	0.322***
	(0.051)	(0.023)	(0.051)	(0.023)
N	6853	24,593	6853	24,593
AIC	33758	112141	33756	112129
BIC	33806	112190	33817	112194
R^2	0.194	0.241	0.194	0.242

Standard errors in parentheses $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
All continuous variables are centered around the mean.

Table 3
Linear regression of child's educational attainment (in years) on years lived with father (exposure). Unstandardized coefficients.

	Model 1		Model 2	
	NKPS	SSD	NKPS	SSD
Boy (=1)	0.142	−0.456***	0.119	−0.458***
	(0.377)	(0.060)	(0.384)	(0.060)
Year of birth	−0.013		−0.013	
	(0.032)		(0.032)	
Education mother	0.392***	0.235***	0.576***	0.256***
	(0.078)	(0.012)	(0.155)	(0.025)
Education father	0.092	0.196***	0.051	0.198***
	(0.062)	(0.011)	(0.119)	(0.023)
Years with father	0.033	0.015*	0.063	−0.013+
	(0.047)	(0.007)	(0.051)	(0.008)
Educ. mother*years with father			−0.023	−0.003
			(0.018)	(0.003)
Educ. father*years with father			0.006	0.000
			(0.014)	(0.003)
Constant	−1.105***	−0.530***	−1.264**	−0.512***
	(0.493)	(0.075)	(0.509)	(0.078)
N	269	5067	269	5067
AIC	1356	22134	1358	22136
BIC	1377	22166	1387	22182
R^2	0.179	0.215	0.184	0.215

Notes: Only non-intact families included.
Standard errors in parentheses $^{+}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.
All continuous variables are centered around the mean.

Table 4
Linear regression of child's educational attainment (in years) on age of divorce (timing). Unstandardized coefficients.

	Model 1		Model 2	
	NKPS	SSD	NKPS	SSD
Boy (=1)	0.168	−0.457***	0.140	−0.457***
	(0.377)	(0.060)	(0.380)	(0.060)
Year of birth	−0.018		−0.017	
	(0.031)		(0.031)	
Education mother	0.391***	0.236***	0.230	0.254***
	(0.077)	(0.012)	(0.194)	(0.033)
Education father	0.087	0.197***	0.074	0.185***
	(0.061)	(0.011)	(0.158)	(0.030)
Timing (ref. after (> 13)				
Before (< 10)	0.006	−0.054	−0.191	−0.048
	(0.502)	(0.094)	(0.522)	(0.096)
During (10–13)	−0.111	0.034	−0.216	0.027
	(0.521)	(0.104)	(0.547)	(0.105)
Before*educ. mother			−0.036	−0.009
			(0.168)	(0.036)
During* educ. mother			0.075	−0.049
			(0.177)	(0.040)
Before*educ. father			0.240	0.012
			(0.216)	(0.033)
During* educ. father			0.120	0.018
			(0.205)	(0.037)
Constant	−0.686	−0.387***	−0.551	−0.387***
	(0.500)	(0.091)	(0.502)	(0.092)
N	269	5067	269	5067
AIC	1358	22138	1364	22143
BIC	1383	22177	1403	22208
R^2	0.178	0.214	0.184	0.215

Notes: Only non-intact families included.
Standard errors in parentheses $^{+}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.
All continuous variables are centered around the mean.

(Fischer, 2004; McLanahan & Sandefur, 1996): children in divorced families have about half a year less schooling. Third, the analysis of the SSD indicates that boys are on average lower educated than girls while the differences between boys and girls is not observed in the NKPS. This is in line with recent studies, which show that girls did not only catch up with the educational performance of boys but are currently outperforming boys (Statistics Netherlands, 2015). Finally, a negative effect of the presence of a stepparent is found but the effect is only statistically significant in the SSD and we do not have any information on the educational attainment of the stepparent.

In the second model we add interactions between divorce and the educational attainment of both parents to answer our first research question. The model tests our first two hypotheses in which we formulated the expectation that the educational attainment of biological fathers and their children is always positively associated (H_1) but that the association would be weaker for non-residential fathers than for residential fathers (H_2). The negative and statistically significant interaction between fathers' educational attainment and divorce in the NKPS confirms the second hypothesis. It indicates that the association between father's educational attainment and the educational attainment of the child is 2.4 times stronger for residential fathers than for non-residential fathers (0.233 versus 0.233 − 0.134 = 0.099). At the same time, the interaction implies, in line with our first hypothesis, that there is still a positive association between the educational attainment of non-residential fathers and children left (b = 0.099).

Our fourth hypothesis states that the difference between residential and non-residential fathers is smaller in more recent divorce cohorts. In line with this hypothesis, we find that the interaction between fathers' educational attainment and divorce is about three times smaller in the SSD than in the NKPS (−0.037 versus −0.134). The difference between the NKPS and the SSD thus seems to confirm our fourth hypothesis and suggests that differences between residential and non-residential fathers have decreased over cohorts. Finally, the interaction between divorce and mothers' educational attainment in the NKPS indicates in line with previous studies that the mother might compensate for the loss of resources (e.g., Mandemakers & Kalmijn, 2014). However, the effect is only marginally significant. There is no compensation effect found in the SSD but the loss of resources also seems to be smaller in the SSD and hence, there is less need for compensation.

The risk of testing our fourth hypothesis on cohort differences with a comparison between two datasets is that the findings are not the result of cohort differences but caused by other discrepancies between datasets. For example, one could argue that the skewed distribution of missing values in the NKPS biases our results: the educational attainment of fathers was more often missing in non-intact families than in intact families. Therefore, we used multiple imputation to impute father's educational attainment. As a result of this imputation method, the missing values were no longer selective based on family type (Table A1) and this could help to reduce the difference in outcomes between the NKPS and the SSD. However, the overall conclusions based on the analysis with and without multiple imputation are similar (Table A2). Hence, the argument that the results of the NKPS and the SSD differ because of the skewed distribution of missing values in the NKPS, does not seem to be plausible. Another explanation could be that the initial non-response in the NKPS is not distributed equally across intact and non-intact families. However, one would expect that the group of people refusing to participate to a survey in which family relationships are extensively discussed, such as the NKPS, have the most troubled family history and the least amount of within-family social capital. This means that if there was selective non-response in the NKPS, it would probably work against a difference between residential and non-residential fathers whereas our results show a larger difference in the NKPS than in the SSD. Hence, we argue that the discrepancy in the results between the data sets should be attributed to cohort differences and not methodological differences.

Tables 3 and 4 are designed to answer our second research question

regarding the effect of coresidence on the intergenerational transmission of educational attainment and to test hypothesis 3a and 3b. Hypothesis 3a states that the longer a father and child share a residency, the stronger the association between the educational attainment of fathers and children (exposure) (Table 3). In hypothesis 3b we formulated the expectation that the association between the educational attainment of father and child is stronger among fathers who left after the educational transition from primary to secondary school (> 13) compared to those who left before (< 10) or during (10–13) the transition (timing) (Table 4). We have tested our exposure hypothesis with an interaction between the years the father lived with the child and fathers' educational attainment. We find a small significant effect of the main effect of exposure in the SSD; the longer fathers lived with their children, the higher the child's educational performance. However, the interaction effects between father's education and the years lived with father are small and not statistically significant in both datasets. We used the same technique to test our timing hypothesis in Table 4. Again, the coefficients are small and statistically insignificant. Therefore, we reject hypothesis 3a and 3b and conclude that the association between the educational attainment of fathers and children is not stronger for fathers who lived longer with their children.

One might argue that the small sample size in the NKPS increases the probability to incorrectly retain a null-hypothesis (sometimes referred to as a 'false negative' or a 'type II error'). Therefore, we conducted a power analysis using the power module in Stata. This method uses an F-test to calculate the number of observations required to detect a certain increase in R^2 with 80% power using a 5%-level two-sided test. Power is in this case the probability to correctly reject the null-hypothesis if it is false. We compared the two models in Table 3 to investigate how many cases we would need to get a significant increase in R^2 when the exposure interactions are added. The analysis shows that we need 1,459 cases to be able to detect a significant increase in R^2. We did the same analysis in Table 4 to discover how many cases would be needed to detect a significant increase in R^2 between model 1 and 2. The analysis indicates that 1,252 cases are needed. The large N, needed for a significant increase in R^2 after the addition of two interactions to the model, indicates that the lack of significance is not due to our modest sample size. If we would have a dataset with a larger sample, let's say 1000 cases instead of the present 269 cases, we would still not be able to detect a significant interaction effect. Therefore, we conclude that our lack of exposure or timing interaction effects is not the result of our sample size.

As a robustness check, we repeated our analyses using a different coding mechanism for educational attainment called ISLED. ISLED is an optimal scale score for all country-specific education categories distinguished in the European Social Survey Round 1–4 and developed by Schröder and Ganzeboom (2013). The optimal scaling technique maximizes the indirect effect of parental resources on outcomes (children's occupation and partner's education) via children's educational attainment and minimizes the direct effect. In this way the ISLED provides a scale of education that best accounts for the conversion of parental resources into children's outcomes. This robustness check, helps us to understand whether our effects are driven by the way we recoded the level of education in years. The results are presented in Table A4 and show a similar pattern as our 'original' analysis although the interaction between fathers' educational attainment and divorce in the NKPS has a slightly higher p-value of 0.057.

6. Conclusion

This study tried to answer three research questions regarding the intergenerational transmission of educational attainment among non-residential fathers and their children. First, following previous studies on this topic (e.g., Erola & Jalovaara, 2017; Kalmijn, 2015b), the differences in intergenerational transmission between residential and non-residential fathers were investigated (RQ1). Afterwards, we switched our focus to the heterogeneity in the effects of non-residential fatherhood. We asked whether coresidence, measured by the length and the timing of this residency (RQ2), and the year of divorce (cohort effects) (RQ3) could help us to explain why some non-residential fathers are better able to transmit their educational attainment to new generations than others. Most previous studies have focused on the main effects of divorce on children's educational attainment (for a review, see Amato, 2000). This classic literature suggests that mechanisms such as economic decline, interparental conflict, moving and a change of schools might explain the negative divorce effect. Our study adds to the existing literature with a focus on interaction effects to investigate whether a loss of within-family social capital might play a role in the educational attainment of children in non-intact families. Especially our focus on the heterogeneity in the effects of non-residential fatherhood on the intergenerational transmission of education is an important contribution to the literature. Studying intergenerational transmission in this way helps us to understand the process of intergenerational transmission in general and among non-residential fathers in particular.

Based on Coleman's concept of within-family social capital, we formulated the expectation that the association between the educational attainment of fathers and children would be weaker for non-residential fathers than for residential fathers (H_2) but that this difference has decreased over cohorts (H_4). Our analyses largely confirm these hypotheses: the results of the NKPS, in which older divorce cohorts are analyzed, indicate that the association between fathers' educational attainment and the educational success of the child is weaker for non-residential fathers than for residential fathers. In contrast, the discrepancy in the effect of education between residential and non-residential fathers is almost absent in the more recent divorce cohorts of the SSD. We argue that the stronger association between the educational attainment of non-residential fathers and children in the SSD could be interpreted as more influence among non-residential fathers in the recent cohorts although we are aware that the regression effects are not a direct indicator of the father's influence. In other words, it could be argued that there is a decline in the importance of non-residential fatherhood in the transmission process.

Most likely this change occurred because co-parenting and involvement in the socialization of the child have become more common among non-residential fathers over time. A policy change in 1998 might have reinforced the upward trend in post-divorce paternal involvement: since 1998 shared custody is the legal standard arrangement after divorce while previously usually one parent (usually the mother) received custody. This policy change improved the legal position of the parents and we know that the number of families with a co-parenting arrangement has increased drastically ever since (from 4% in 1998 to 22% in 2013). As a result, non-residential fathers in the SSD had on average more frequent contact with their children than non-residential fathers in the older cohorts of the NKPS. When fathers stay actively involved in the socialization of a child, a decline in influence is less likely because within-family social capital will be maintained.

In addition, we formulated two hypotheses to investigate the influence of exposure and timing and to answer our second research question. First, we hypothesized that non-residential fathers who lived longer with their children before separation are more successful in the transmission of educational attainment (exposure) (H_{3a}). Second, we formulated the hypothesis that fathers who left after the educational transition from primary to secondary school were more successful in the intergenerational transmission than those who left before or during the transition (timing) (H_{3b}). We do not find any supporting evidence for these hypotheses in our data.

Being one of the first to study this topic with a focus on the heterogeneity in effects among non-residential fathers, our study leaves also some challenges for other researchers. One puzzle that remains is that one might think that the absence of an effect of exposure contradicts the aforementioned cohort effects since both hypotheses suggest that parents who spend more time with their children are better able to transmit educational attainment to new generations. We speculate that one of the reasons for the lack of a substantial and/or statistically significant effects of exposure and timing might be the measure we use: the years a father and child lived together. The weakness of this

measure is that it does not include information on the involvement of the father in the socialization of the child during the period of co-residence or the contact quantity and quality after the father left the household. In contrast, the cohort effect is probably better able to capture the change in the average involvement of non-residential fathers before and after the divorce. Other studies show a major change in the frequency and quality of contact between divorced fathers and their children across cohorts (Van Spijker, Kalmijn, & Van Gaalen, 2017; Westphal, Poortman, & Van der Lippe, 2014). Therefore, we suggest that the significant cohort effect might indicate that the concepts 'exposure' and 'timing' are useful for our understanding of the transmission processes but that the available measure (time lived in same household) is too indirect. More research is needed in which sophisticated measures, such as pre- and post-divorce contact frequency and quality, are used to investigate whether our line of reasoning is correct and to learn more about the role of exposure and timing.

There are a number of other challenges left for future research due to the data limitations of this research. First, we were not able to investigate the role of stepparents in this study because we had no information on their educational attainment in the NKPS. Previous studies have shown that the presence of a stepparent might influence the transmission processes of biological parents and that stepparents are also able to transmit characteristics onto their stepchildren (Eriksen et al., 2013; Erola & Jalovaara, 2017). It might therefore be interesting for future researchers to look into the role of stepparents and how this is associated with the cohort differences reported in this study. A second limitation is that we had to test our cohort hypothesis with two different datasets. Ideally, we would have tested this hypothesis with a three-way interaction within one pooled data set. However, this is not possible with the present data. The disadvantage of a test with two different datasets is that other discrepancies between datasets, besides the cohort differences, might influence our results. A potential problem was the possibility of selective non-response in the NKPS. However, we would expect that if there was selective non-response in the NKPS, it would work against a difference between residential and non-residential fathers because families that refuse to participate have probably the most troubled family history and the least amount of within-family social capital. In contrast, our results show a larger difference in the NKPS than in the SSD. Related to this point, one should be aware of the fact that we only compare two cohorts in this study. A future study including more cohorts should be conducted to strengthen our conclusions.

In conclusion, two important lessons can be learned from this study for future research. First, our study suggests that there might be important differences in the intergenerational transmission of educational attainment among non-residential fathers based on cohort. This suggests that researchers should be careful to draw conclusion about young non-residential fathers when data on older cohorts is used. The meaning of non-residential fatherhood changes quickly as shared custody arrangements become more common. Future research should be aware of this and focus as much as possible on recent data. Second, one could focus on a more direct test of the role of custody arrangements, exposure and timing (measured by pre- and post-divorced contact). For both points, new large scale and survey based data collection is necessary. Therefore, it could be said that, in order to move forward in this strand of literature, more data should be gathered which especially focuses on non-intact family structures, post-divorce contact, custody arrangements and a wide variety of characteristics of parents and children before and after divorce.

Appendix

Table A1
Distribution missing values NKPS with and without multiple imputation.

		Intact	Divorce	Total
NKPS without imputation	Useable N	6,584	269	6,853
	% missing	6.62%	19.22%	7.19%
NKPS with imputation	Useable N	6,817	322	7,139
	% missing	3.32%	3.30%	3.32%

Table A2
Linear regression models of child's educational attainment (in years) with multiple imputation. Unstandardized coefficients.

	Model 1	Model 2
Boy (=1)	0.002	0.003
	(0.070)	(0.070)
Year of birth (centered)	0.009	0.009
	(0.006)	(0.006)
Divorce (=1)	−0.664**	−0.762**
	(0.212)	(0.220)
Education mother (centered)	0.258***	0.251***
	(0.018)	(0.018)
Education father (centered)	0.226***	0.231***
	(0.013)	(0.014)
Stepfather	−0.564	−0.490
	(0.395)	(0.393)
Educ. mother*divorce		0.129+
		(0.072)
Educ. father*divorce		−0.132*
		(0.064)
Constant	0.094+	0.093+
	(0.050)	(0.050)
N	7,139	7,139

Notes: Only father's educational attainment imputed. Only NKPS data used.
Standard errors in parentheses $^{+}\ p < 0.10$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$.

Table A3
Distribution missing values SSD.

	Full sample[a]			Selected sample 2015		
	N	Mean	SD	N	Mean	SD
Divorced (=1)	97,017	0.16	0.37	24,593	0.21	0.40
Number of children in household	97,015	2.50	0.99	24,593	2.48	0.95
Urbanization (scale 1–5)	97,004	3.21	1.21	24,591	3.15	1.21
Income[b]						
Father	95,982	62.74	24.57	24,467	60.35	25.30
Mother	96,926	59.62	25.26	24,574	56.76	25.93
	N	Percentage	-	N	Percentage	-
Income quintiles[b]						
Father						
1st quintile	6,821	7.11		2,239	9.15	
2nd quintile	11,168	11.64		3,121	12.76	
3rd quintile	22,043	22.97		5,732	23.43	
4th quintile	29,042	30.26		7,209	29.46	
5th quintile	26,908	28.03		6,166	25.20	
Mother						
1st quintile	8,682	8.96		2,857	11.63	
2nd quintile	13,782	14.22		3,899	15.87	
3rd quintile	23,115	23.85		5,872	23.90	
4th quintile	27,688	28.57		6,644	27.04	
5th quintile	23,659	24.41		5,302	21.58	

[a] Selected sample but missing values on educational variables allowed.
[b] Standardized household income in percentiles.

Table A4
Linear regression of children' educational attainment using ISLED coding.

	Model 1		Model 2	
	NKPS	SSD	NKPS	SSD
Boy (=1)	−0.941*	−1.788***	−0.925*	−1.790***
	(0.452)	(0.166)	(0.452)	(0.166)
Year of birth (centered)	0.087*		0.086*	
	(0.038)		(0.038)	
Divorce (=1)	−4.633**	−3.764***	−4.989**	−3.859***
	(1.502)	(0.268)	(1.587)	(0.269)
Education mother (isled)	0.244***	0.231***	0.239***	0.235***
	(0.016)	(0.005)	(0.016)	(0.006)
Education father (isled)	0.241***	0.197***	0.246***	0.203***
	(0.013)	(0.005)	(0.014)	(0.005)
Stepfather (=1)	−2.139	−1.250**	−1.898	−1.386**
	(3.089)	(0.368)	(3.063)	(0.369)
Educ. mother*divorce			0.099	−0.018
			(0.070)	(0.012)
Educ.father*divorce			−0.127+	−0.029*
			(0.066)	(0.011)
Constant	1.387***	1.884***	1.379***	1.875***
	(0.323)	(0.126)	(0.323)	(0.126)
N	6856	24,593	6856	24,593
AIC	59005	196089	59004	196078
BIC	59053	196138	59065	196143
R^2	0.211	0.257	0.212	0.258

Standard errors in parentheses $^{+}\ p < 0.10$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$.

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