Grandparents' resources and grandchildren's schooling: Does grandparental involvement moderate the grandparent effect?☆

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ABSTRACT

Recent studies have argued that grandparents have a direct effect on grandchildren's achievements, net of parental resources. However, little is known about the underlying mechanisms. One explanation is that grandchildren can benefit from the cultural resources that grandparents transmit to their grandchildren. If this is the case, one would expect strong effects in families where grandparents are highly involved in the lives of their grandchildren and weak or no effects in other families. Using new nationally representative survey data on three generations in the Netherlands, we examine if and how grandchildren's educational attainment is affected by three grandparental resources: education, occupational status, and cultural resources. We explore how these effects vary by the strength of the tie between grandparent and grandchild. We find no evidence for a main direct grandparental effect, nor do we find interactions with the strength of the tie between grandparent and grandchild. These null-findings are discussed in light of the mixed body of evidence that has been accumulated in the literature and contemporary theorizing on grandparenting.

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1. Introduction

In family sociology, there is a rapidly increasing amount of interest in the role of grandparents in families (Birditt et al., 2012; Chen et al., 2011; Hagestad, 2006; Luo et al., 2012; Silverstein and Marenco, 2001). Caring for grandchildren—'grandparenting'—is an important form of support that parents can provide to their adult children and has been studied as one dimension of the concept of intergenerational solidarity (Bengtson, 2001). Increases in longevity have presumably increased the number of grandparents who are present when parents have young children, although this is mitigated somewhat by parallel increases in the age at first birth. Probably more important is the rise in married women's labor force participation which has increased the demand for care from grandparents, especially in contexts where daycare is scarce or expensive (Thomese and Liefbroer, 2013). Recent evidence shows that child care by grandparents has become more common over time (Geurts et al., 2015).

A parallel development has occurred in the sociology of stratification and mobility. Studies of intergenerational reproduction that traditionally examined the influences of father's and mother's status characteristics on children's educational and occupational attainment increasingly consider three generations (Mare, 2011). Grandparents can play an indirect role: they affect their children's success, who in turn affect their children. Grandparents can also play a direct role, by affecting the status of their grandchildren even when the middle generation's status attributes are held constant. This would mean, for example, that when comparing children with similarly educated parents, the child who has a college educated grandparent will attain a higher level of education than the child with a grandparent who only has a high school degree. It is especially this direct influence which has received attention (Mare, 2011).

We make two contributions to this literature. First, the evidence for a grandparent effect so far is mixed. A number of studies showed that there is a direct effect of grandparents on grandchildren (e.g., Chan and Boliver, 2013; Modin et al., 2013; Zeng and Xie, 2014; Pfeffer, 2014; Hertel and Groh-Samberg, 2014), but several others found no evidence for such an effect (Warren and Hauser, 1997; Wolbers and Ultee, 2013; Erola and Moisio, 2007). These inconsistencies may have to do with differences in models, measures, data, and national or historical contexts. One important concern lies in the degree to which the characteristics of the 'middle generation' (the parents) have been taken into account. If the resources of the middle generation are not measured well enough, the measured status of the grandparent could 'pick up' this unmeasured parental influence. Supportive of this idea is the finding that when controls for the middle generation become more stringent across models, the remaining effect of the grandparent's status becomes weaker (Warren and Hauser, 1997; Wolbers and Ultee, 2013). In the present paper we extend the literature on grandparent effects with newly collected survey data in which we asked as extensively as possible about all the resources of grandparents (occupation, education, cultural resources). Because we use parallel measures of all these resources for the father and the mother of the grandchild, we are able to get a reliable estimate of direct grandparent effects.

Our second contribution is that we examine social heterogeneity in the grandparent effect. Prevailing explanations of the grandparent effect argue that grandparents transmit resources to grandchildren through interaction with the grandchild, much in line with Coleman's well-known social capital hypothesis about parental influences on children's schooling (Coleman, 1988; Teachman et al., 1997). Although some of the influence may not be social—e.g., financial transfers or 'legacy effects' in elite colleges (Mare, 2011)—a substantial part of the influence should depend on the amount of involvement of the grandparent in the grandchild's life. As a result, one would expect greater influences of grandparents when they are more involved in grandparenting. The social capital hypothesis has often been tested in two-generational research where parental involvement in school work and school activities is considered as a moderator of the effect of parental education and socioeconomic status on children's schooling outcomes (Crosnoe, 2004; Furstenberg and Hughes, 1995; Kim and Schneider, 2005; McNeal, 1999; Park, 2008; Teachman et al., 1997). This hypothesis has not been tested in three-generational research, despite its intuitive appeal (Erola and Moisio, 2007; Zeng and Xie, 2014). In the data that we collected, we have extensive and specific information about the involvement of all four grandparents in the lives of their grandchildren via retrospective measures of contact, care, socialization, emotional closeness, and residential proximity. By studying the interaction effect of grandparents' resources and grandparents' involvement, we are not only able to test one of the more important explanations of the grandparent effect, we also connect ideas on grandparenting from family sociology and the sociology of stratification and inequality, two fields of study that have written on grandparents in a rather separate mode so far.

Previous analyses of grandparent effects have been done in a range of countries, including the U.S., Great Britain, France, Germany, Sweden, Finland, and China (see Table 1). Our data come from the Netherlands. The Netherlands does not represent a special case in this group. To support this claim, we first compare child care by grandparents across countries. Hank and Buber (2009) show that the amount of support that grandparents give to grandchildren is higher in the Netherlands than in France, Sweden, and Germany, but differences are modest in size. Second, we compare educational inequality across countries. A distinct feature of the Netherlands is its early tracking system, which tends to increase the strength of parental background effects on children's schooling (Van de Werfhorst and Mijs, 2010). At the same time, the Netherlands has also been a country with a clear and strong decline in the effects of parental status on children's educational transitions and educational attainment (De Graaf and Ganzeboom, 1993). Other countries have witnessed a decline as well and the degree of educational inequality in the Netherlands—defined as the strength of parental status effects on children's schooling—is now similar to that in many other European countries (Breen et al., 2009).

2. Background and hypotheses

2.1. Previous studies

In the past decade, interest in the direct grandparental effect on grandchildren has increased considerably, partly because of the increasing availability of data for three generations. Our summary of the findings in Table 1 shows that evidence for the hypothesis is mixed. The studies used a variety of outcome variables (education, occupational class, school grades, school drop-out) and explanatory variables for both parents and grandparents (class, income, education). Some studies only focus on the full 'paternal line' (grandson—father—grandfather), whereas others analyze four grandparents. While the US has been the subject of most studies so far, the list of countries has grown rapidly.

Table 1

Overview of earlier studies on grandparent effects.

Study	Country	Grandchild's outcome	Parental variables	Grandparental variables	Method	Finding
Pohl and Soleilhavoup, 1982	France	Class (son)	Class (father)	Class (grandfather)	Loglinear	Effect of grandfather
Beck, 1983	US	Class (son)	Class (father)	Class (grandfather and grandmother)	Loglinear	Effect of grandfather
Warren and Hauser, 1997	US	Class, education	Class, education, income (father and mother)	Class, education, income (grandfather and grandmother)	Regression and SEM	No grandparent effects
Erola and Moisio, 2007	Finland	Class	Class (father and mother)	Class (grandfather and grandmother)	Loglinear	No grandparent effects[a]
Meier-Jæger, 2012	US	Education	Class, education, income (father and mother)	Class, education, income (grandfather and grandmother)	Regression	No main effects, only compensation for low SES parents.
Chan and Boliver, 2013	UK	Class	Class, education, income (father and mother)[b]	Class (grandfather)	Loglinear and regression	Effect of grandfather
Modin et al., 2013	Sweden	Education (school marks)	Education (father and mother)	Education and school grades (grandfather and grandmother)	Regression	Effect of grandparents[c]
Wolbers and Ultee, 2013	Netherlands	Education	Education (father and mother)	Education (grandfather and grandmother)	Regression	No grandparent effects
Zeng and Xie, 2014	China	School dropout	Class, education, income (father and mother)	Education (grandfather and grandmother)	Cox models	No main effect, only for co-resident grandparents
Hertel and Groh-Samberg, 2014	US & Germany	Class	Class (father)	Class (grandfather)	Loglinear	Effect of grandfather in both countries
Pfeffer, 2014	US	Education	Education	Education	Loglinear	Effect of grandparents, stronger at tails.
Wightman and Danziger, 2014	US	Education	Education, income (father and mother)	Income	Regression	Mixed findings, only for children of low SES parents some grandparent effects

Note. – This is not a complete list of studies focusing on grandparent effects, but these are studies that explicitly focus on the direct effects of grandparents on grandchildren.

[a] Chan and Boliver (2014) re-analyzed the data and argue that there are direct grandparent effects in Finland.

[b] In the loglinear models only parental class is used, in the ordinal logistic regression the other parental variables are added as controls.

[c] Modin et al. (2013) find differential effects along gender-lines (e.g., for mathematics grandfathers have the strongest influence).

What becomes apparent from the table is that studies focusing on the educational attainment of the grandchild find less support for direct effects of grandparents than studies focusing on occupational class. This could also be related to the different methods that are exploited in these types of studies. Studies that analyze occupational class typically use loglinear models, whereas studies that focus on education use regression analyses. Of the studies using loglinear models, 4 out of 5 find evidence for grandparent effects, for the regression studies, this is true for 2 out of 6. Loglinear analyses often use fewer control variables than regression analyses and are therefore less able to control for the middle generation. This might be one explanation of why different methods lead to different results.

The above mentioned studies focus on the average grandparental effect, sometimes split up by the educational or social class of the parents, but always without making a distinction between the involvement of grandparents in grandchildren's lives. As a result, the discussed studies give little information about the mechanism(s) through which grandparents may affect grandchildren. One exception in this respect is the study by Zeng and Xie (2014). In their analysis of three generations in China, they find that only when grandparents live with their children (co-resident grandparents), the grandparent's status characteristics affect the odds of grandchildren's school drop-out. This suggests that grandparents matter more for educational outcomes of children when they are highly involved in their lives.

2.2. Hypotheses

The literature has presented a number of explanations for why there may be a direct effect of grandparents. A first explanation lies in economic resources. A long tradition of research in family sociology and population economics has examined financial transfers during life (inter-vivos transfers) and after death (intergenerational inheritance) over two generations (Hochguertel and Ohlsson, 2009). In so far as parents support their adult children financially, they may indirectly support the schooling outcomes of their grandchildren by improving the standard of living that these grandchildren experience when growing up. Such transfers will have an additive effect and do not depend on the amount of interaction in the family. Transfers may also occur across multiple generations. Grandchildren can, for example, receive money from their grandparents or inherit money after they die and this may help the grandchildren to get ahead in society. While financial resources can be important for children's chances in school, in the Netherlands, evidence suggests that financial resources are not very important for children's schooling outcomes (De Graaf et al., 2000).

A second mechanism lies in cultural resources. Cultural resources are defined as an orientation towards and affinity with high-status cultural codes and behaviors (Kraaykamp and van Eijck, 2010; Lamont and Lareau, 1988). Concrete examples of such resources are reading habits, participation in cultural leisure activities, and the use of an elaborate rather than a restricted language code. Parents with high cultural resources are better able to help their children with school work, they read to their children more often, they instill a certain amount of curiosity and perhaps a taste for learning in their children, and they teach their children the importance of higher education. Several studies have supported the cultural nature of the intergenerational transmission process. For example, studies have shown that parental education is a stronger predictor of children's success in school than parental occupation, suggesting that cultural resources are more important than economic resources (De Graaf and Ganzeboom, 1993). Research that directly measures cultural practices of parents has shown that participation in high cultural activities by parents, parents' reading behavior, and parental practices focused on concerted cultivation have positive effects on children's schooling outcomes (Cheadle, 2008; De Graaf et al., 2000; Aschaffenburg and Maas, 1997; Roksa and Potter, 2011).

Arguments about cultural resources can be generalized to grandparents. Grandparents may encourage their grandchildren to do well in school, they may voice expectations about the choices their grandchildren will make in school, they may take their grandchildren to a museum or a library, and they may teach their grandchildren, directly or indirectly. In some cases, grandparents can become an informal mentor in the child's life (Erickson et al., 2009). The question is whether this influence works independently of the influence of parents. In many cases, the education of parents and grandparents will be positively correlated so that cultural socialization by parents and grandparents will be similar. To understand why there will be an added effect of grandparents, we suggest two mechanisms.

First, it can be argued that additional teaching and socialization will be beneficial. For example, if a child learns from more than one adult that higher education is important, he or she will be more likely to adapt to that norm. The more socializing agents are working in the same direction, the stronger the influence. Second, parents may not always be strongly involved in the child's life. Especially when parents spend little time with their children, when one of the parents is not living at home, or during long summer vacations (Chin and Phillips, 2004), the grandparent's role in the socialization process can become important. In these cases, grandparents are to some extent substitute parents and may become an independent force in the attainment process.

The arguments about cultural resources also imply interaction effects. In his work on family-based social capital, Coleman argued that parents transmit their (non-economic) resources to their children via social interaction (Coleman, 1988). Parents transmit norms about the importance of schooling to their children by communicating with the child about school. Moreover, parents transmit their knowledge and skills by helping children with homework and by engaging in conversations with the children. In general, Coleman argued that the strength of the parent–child relationship can be seen as a form of social capital because this tie is instrumental in passing on resources from one generation to the next. Coleman also argued that the social

capital hypothesis implies an interaction: the effect of the parent's own cultural capital on children's educational outcomes should be stronger when the relationship between parents and children is stronger.[1]

This interaction hypothesis has not been examined for grandparents, although the generalization to grandparents is straightforward. There is variation in how often grandparents see their grandchildren, how much they are involved in the socialization process, how close the grandchildren feel to the grandparents, and how far away they live from their grandchildren. We argue that this variation in involvement leads to differential influences of grandparents. One would expect little influence of grandparents when these were not involved in the lives of their grandchildren, whereas the effect of grandparents' resources will be strong when grandparents were highly involved in the grandchild's life. Under these conditions, grandparents have more opportunities to pass on their resources to their grandchildren. This implies a positive interaction effect: the effect of the resources of grandparents on grandchildren's schooling will be stronger when the tie between grandparents and grandchildren was stronger. Below we test this hypothesis using new data on grandparenting in the Netherlands.

3. Method

3.1. Data

The data that we use come from the publicly available LISS survey (Longitudinal Internet Studies for the Social Sciences, see www.lissdata.nl). This survey is based on a nationally representative probability sample of about 5000 households in the Dutch population. The response rate at the household level was 48%, which is about average for response rates in the Netherlands (Scherpenzeel, 2009). All household members of 16 years of age and older were asked to complete short internet questionnaires on a monthly basis. Respondents were promised incentives when they were invited to participate in the panel and were paid for each completed questionnaire. Households without internet (or without broadband) received a broadband internet connection and were loaned a computer if they did not have one. Elderly respondents received training if they did not know how to use computers. Each month, a different module was presented, covering a specific topic (e.g., work, health, family). In addition, respondents are repeatedly asked to answer special modules. Monthly response rates vary from 70% to 80%. A series of response-increasing measures is initiated (including extra incentives) when panel members do not respond for 2—3 consecutive months. The LISS was funded by the Netherlands Organization for Scientific Research and was done by a university-based research center. Compared to other internet surveys, the survey was unique in that it was based on a random sample of the population register and an elaborate procedure to approach and motivate potential respondents to participate (Scherpenzeel and Toepoel, 2012). The response in LISS has been compared to national statistics in terms of age, education, living situation, and urbanization (Knoef and de Vos, 2009). In comparison to national statistics, elderly and single persons are somewhat underrepresented in LISS but there are no systematic differences in terms of education. Compared to one standard online survey, LISS had a better representation of the elderly, in part because the elderly received free internet access and training in how to use a computer.

We developed a special module for the LISS on grandparenting in 2013 and 2014. This module uses the middle generation (G2) as respondents which means that we have retrospective data on grandparents (G1) and recent data on grandchildren (G3). In the remainder of this paper, we use the terms *grandparents* for G1, *parents* for G2, and *grandchildren* for G3. It is plausible that parents have the best detailed information on grandparents' resources while they are also knowledgeable about grandchildren's ties to the grandparents (Mare, 2014:126). In this module the population was defined as all respondents who have one child of 18 years or older. In couple households, both parents received the questionnaire. The response rate to our module was 85%.

We focus on one specific adult grandchild (18 years or older), whom was chosen randomly by the computer after the parent gave an overview of all his or her children. If both biological parents of this child are still in the household, they get assigned the same randomly chosen grandchild. By focusing on a specific grandchild, we believe the measures of grandparent involvement become more reliable than when we would have asked about 'the grandchildren in general.' The grandchildren in our data were born in the 1960s, 1970s, 1980s, and 1990s. On average, they were 36.4 years of age at the time of the survey.

We include only one lineage in our analyses and not the two sets of grandparents simultaneously. More specifically, we randomly chose the father's or the mother's parents if both parents responded or chose the grandparents attached to the one responding parent. An advantage of this approach compared to using both lineages in one model is that it requires less imputation. In 43% of the couple households, we have data from only one parent. Another advantage of the individual design is that it includes single parents (parents who were single when the grandchild was growing up). In an additional set of models, we estimate effects separately for fathers and mothers. This set of models allows us to compare paternal and maternal grandparents, and hence, to examine if grandparent effects are gender-specific. The reason to present these as additional models and not as baseline models is that they are based on a somewhat smaller sample and hence, less powerful statistically.

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[1] The second aspect of Coleman's social capital hypothesis—intergenerational closure or community based social capital—is less applicable in the present case as it applies to the relationships between parents of different children enrolled in the same school.

If grandparents were no longer alive when the grandchild was growing up, we do have measures of their education and last occupation but we do not have information on cultural resources, residential proximity, and tie strength. Hence, in the baseline models, grandchildren with deceased grandparents are included but in the interaction models, where we use involvement measures, grandchildren are dropped when *both* grandparents (in one lineage) were deceased when the grandchild was eight years old (6.8%). Note also that if the current parent is not the biological parent of G3, we did not include information from that parent and the associated grandparent in the data.

We also made use of a special biographical module (held in 2012) in which respondents (parents) were asked to report about their parents (grandparents) when growing up. The biographical module yields identical measures of grandparental resources, even though the timing of the measures differs. In the biographical module, the grandparent measure refers to the time the parent rather than the grandchild was growing up. To improve the measurement of our variables, we used the average of the measures in the grandparent module and the biographical module for each resource (or one of the two measures if only one is available). This procedure reduces the number of missing values and makes the measure more reliable than when a one-item measure would have been used. Few previous studies used multiple-item measures for measuring grandparental occupation and education (except for instance, Warren and Hauser, 1997).

3.2. Variables

The highest level of educational attainment of the grandchild is the dependent variable. Educational attainment is measured in eight hierarchical categories: (1) secondary vocational, lower level (lbo), (2) secondary vocational, middle level (vmbo), (3) tertiary vocational, lower level (mbo), (4) secondary general, lower level (havo), (5) secondary general, higher level (vwo), (6) tertiary vocational (hbo), (7) tertiary university (wo, master and bachelor), and (8) PhD. The education system in the Netherlands is tracked, but the tracking in secondary and tertiary education is hierarchical and education can therefore be measured as an ordinal variable. The decision to put (3) below (4) and (5) is that (4) and (5) require more academic skills, are associated with better labor market prospects, and also bring more cultural resources (De Graaf and Ganzeboom, 1993). Note that (4) prepares for (6) and (5) prepares for (7). For grandchildren who are at least 21 years of age and still in school (7.3%), we assume that the present level will be completed (in the majority of cases, this is a valid assumption). We checked what happens when we deleted these students but found very similar results. The advantage of including these students is that it increases the sample size and hence, the statistical power of the model.

For all parents and grandparents, occupational status is measured by letting respondents classify occupations in nine categories: (1) professional and technical, (2) higher administrator, (3) clerical, (4) sales, (5) service, (6) skilled workers, (7) semi-skilled workers, (8) unskilled workers, and (9) farmers. Although these are relatively broad categories, previous research has shown that they explain only a little less variance in outcomes in normal status attainment models than detailed occupational categories (Ganzeboom, 2005). We take the average occupational status of these nine occupational groups, measured by ISEI as our measure of occupational status (Ganzeboom et al., 1992). For parents and grandparents, occupations refer to the occupation they had at the time the grandchild was growing up. For non-employed (grand)parents and grandparents who were not alive at that time, we asked about the last occupation. Respondents who were unable to classify their own or their parents' occupations in the nine categories were asked to write down this occupation. We coded these specific occupations to an ISEI score in so far as possible.

Educational attainment is measured for all parents and grandparents and is recoded to the number of years of schooling formally attached to the completed level, following the approach suggested by De Graaf and Ganzeboom (1993). This linear approach is a simple but powerful way to estimate intergenerational effects, especially when using interactions.

For measuring cultural resources, we follow the spirit of earlier empirical work on cultural capital (De Graaf et al., 2000; Kraaykamp and van Eijck, 2010). Specifically, we use the following items: (a) book reading, (b) visiting classical music concerts, opera or ballet, (c) visiting an art museum, and (d) visiting the theatre. The items had four answering categories: (1) never, (2) hardly, (3) sometimes, and (4) often. The reliability of the scales is good ($\alpha = 0.82$ paternal grandmothers, $\alpha = 0.82$ paternal grandfathers, $\alpha = 0.82$ maternal grandmothers, $\alpha = 0.80$ maternal grandfathers, $\alpha = 0.75$ for fathers, $\alpha = 0.74$ for mothers). The scale is the mean of the standardized items for each person.

To make the models more parsimonious, we decided to aggregate some of the measures. Specifically, we aggregated educational attainment across the two grandparents within a lineage and we did the same for their cultural resources. Next, we decided to drop grandmother's occupational status because many grandmothers never had an occupation (33%). Finally, we aggregated father's and mother's occupational status to avoid the problem of dealing separately with non-working mothers. Father's and mother's cultural resources were also aggregated since such cultural activities are often done together (Kalmijn and Bernasco, 2001). Aggregation was done by taking the average of the two measures. If only one measure was available, that is the one we used.

To measure grandparent's involvement, we asked the following questions about the G1–G3 relationship when the grandchild was in primary school: (a) how often the grandparent looked after the grandchild, (b) how often the grandchild stayed overnight at the grandparent's house, (c) how often there was face-to-face contact between grandparent and grandchild, (d) how involved the grandparent was in the upbringing of the child, and (e) how strong the tie was between grandparent and grandchild. These questions were asked separately for each grandparent (except for question (a) and (b)). Scales were made by standardizing all items and taking the mean. The reliability of this scale is very

good ($\alpha = 0.79$ paternal grandmothers, $\alpha = 0.79$ paternal grandfathers, $\alpha = 0.83$ maternal grandmothers, $\alpha = 0.82$ maternal grandfathers). We aggregated grandfather's and grandmother's involvement within a lineage by taking the average.

In addition to the strength of the tie, we measured where the grandparent lived when the grandchild was six years old. Residential proximity and involvement represent a similar underlying concept. Involvement has to do with actual patterns of interaction, proximity has to do with opportunities for influence and support (Silverstein and Bengtson, 1997). We consider proximity as a separate measure here in order to replicate (in part) a study by Zeng and Xie (2014), which showed that only co-resident grandparents have a direct effect on the educational outcomes of the child. Co-residence of older parents and adult children (and hence, of grandparents and parents) is uncommon in the Netherlands, as is the case in most other Western European societies, but close proximity is common (Hank, 2007). Instead of asking how far away the grandparents lived, we asked how long it took them to get to their home. The number of minutes was logged (natural log) because relative changes in travel time may matter more at shorter distances than at longer distances. To enable the log conversion, 0 min was recoded to 1 min. There is a correlation between how far away grandparents live and how strong the tie between them and the grandchildren is, but the correlation is not very strong ($r = -0.32$ for the paternal grandparents and $r = -0.32$ for the maternal grandparents). Descriptive information on all variables can be found in Table 2 for the independent and dependent variables and Table 3 for the variables on involvement.

3.2.1. Models

To analyze educational attainment of G3, we use an ordered logit model. This model is often preferred for a tracked educational system like the Netherlands. A disadvantage of this model lies in the assumption of proportional odds. We tested this and most models do violate the proportional odds assumption. We estimated generalized ordered logit models which do not rely on this assumption and these models give the same results. Since these are less parsimonious, we present and discuss the standard ordered logit models in the main tables and the generalized versions in the Supplementary Appendix A. Note that the order of the categories (listed above) is adapted from De Graaf and Ganzeboom (1993).

We estimate the effects of grandparents separately for each type of resource (occupation, education, and cultural resources). In addition, we present models with and without controls for the parents. This yields 6 models which are presented in Table 4. To examine the moderating role of the strength of the tie and residential proximity, we tested interaction effects separately for the three types of resources. This yields 6 extra models which are presented in Table 5. We furthermore analyzed the interaction hypothesis by looking at different subgroups based on the strength of the tie and the proximity variable. These analyses are presented in Figs. 1 and 2. Finally, we present results in a more condensed format for grandparents of the paternal and the maternal lineage (Table 6).

Table 2
Descriptive statistics.

	N	Mean	SD	%Missing
G1 − respondent				
Grandparent's education	1490	0.88	0.22	3.25
Grandfather's ISEI	1471	0.41	0.13	4.48
Grandparent's cultural resources	1527	0.05	0.73	0.84
Tie strength[a]	1471	0.09	0.95	4.48
Proximity (*ln* minutes)[a]	1471	3.09	1.17	4.48
G2				
Respondent's education	1535	1.16	0.29	0.32
Partner's education	1466	1.15	0.26	4.81
Parent's ISEI	1506	0.48	0.11	2.21
Parent's cultural resources	1509	0.03	0.75	2.01
G3				
Education				
lbo	1540	0.10		0.00
vmbo	1540	0.14		0.00
mbo	1540	0.17		0.00
havo	1540	0.11		0.00
vwo	1540	0.08		0.00
hbo	1540	0.23		0.00
university	1540	0.13		0.00
post-tertiary	1540	0.04		0.00
Female	1540	0.51		0.00
Birth cohort				
1950s	1540	0.03		0.00
1960s	1540	0.21		0.00
1970s	1540	0.30		0.00
1980s	1540	0.25		0.00
1990s	1540	0.21		0.00

[a] These missings are not imputed, as they refer to respondents for which both grandparents where deceased when G3 was born (N = 69). Hence, we are not able to calculate variables referring to the tie strength between G3 and G1.

Table 3
Descriptive information on the strength of the tie between grandparent and grandchild.

	N	%	Valid %	N	%	Valid %
Looking after grandchild when G3 was 6	*Grandparents*					
never	638	41.43	43.37			
rarely	546	35.45	37.11			
about once a month	94	6.10	6.39			
about 2–3 times a month	90	5.84	6.11			
about weekly	103	6.69	7.00			
already deceased	69	4.48				
total	1540	100.00	100.00			
Staying overnight at grandparents' house	*Grandparents*					
never	587	38.12	39.91			
rarely	440	28.57	29.91			
1–2 times a year	163	10.58	11.08			
3–5 times a year	137	8.90	9.32			
6–11 times a year	73	4.74	4.96			
12 times a year or more	71	4.61	4.83			
already deceased	69	4.48				
total	1540	100.00	100.00			
Face-to-face contact with	*Grandmother*			*Grandfather*		
never	69	4.48	4.94	150	9.74	12.18
once a year	37	2.40	2.65	47	3.05	3.82
a couple of times per year	262	17.01	18.75	229	14.87	18.60
about monthly	354	22.99	25.34	282	18.31	22.90
about weekly	463	30.06	33.14	371	24.09	30.14
more than once a week	145	9.42	10.38	107	6.95	8.69
almost every day	67	4.35	4.80	45	2.92	3.65
already deceased	143	9.29		309	20.06	
total	1540	100.00	100.00	1.540	100.00	100.00
Involvement in the upbringing	*Grandmother*			*Grandfather*		
not at all	452	29.35	32.36	502	32.60	40.78
hardly	441	28.64	31.57	353	22.92	28.67
a little	362	23.51	25.92	266	17.27	21.60
somewhat	112	7.27	8.01	84	5.45	6.82
a lot	30	1.95	2.15	26	1.69	2.11
already deceased	143	9.29		309	20.06	
total	1540	100.00	100.00	1.540	100.00	
The strength of the tie with …	*Grandmother*			*Grandfather*		
very weak	86	5.58	6.15	159	10.32	12.91
weak	100	6.49	7.15	110	7.14	8.93
not weak, not strong	620	40.26	44.38	534	34.68	43.38
strong	461	29.94	33.01	343	22.27	27.86
very strong	130	8.44	9.30	85	5.52	6.91
already deceased	143	9.29		309	20.06	
total	1540	100.00	100.00	1.540	100.00	100.00
Distance to grandparents' house	*Grandparents*					
less than 10 min	251	16.30	17.06			
10–30 min	528	34.29	35.90			
more than 30 min	692	44.94	47.05			
already deceased	69	4.48				
total	1540	100.00	100.00			

Note. – Already deceased refers to grandfathers or grandmothers that were already deceased when the grandchild that is analyzed was 8 years of age or younger.

In all models, we used multiple imputation whenever information for grandparents or parents was missing (Rubin, 1987). The dependent variable and the interactions are included in the imputation procedure but cases with missing information on the dependent variable are not included in the final models. Information on the strength of the tie and distance is not imputed. Imputations are done separately when estimating interaction effects (cf. Von Hippel, 2009). Using Stata's-mi-module, we analyze 25 multiple imputed datasets, where missing data are imputed using chained equations. Note that the number of missing cases is small (see Table 2).

Table 4
Ordered logistic regression models of grandchildren's educational attainment.

	1	2	3	4	5	6
G1						
Grandparent's education (×10)	1.322**	−0.056				
	(0.207)	(0.223)				
Grandfather's ISEI (×100)			2.206**	0.060		
			(0.345)	(0.371)		
Grandparent's cultural resources					0.408**	−0.044
					(0.062)	(0.069)
G2						
Respondent's education (×10)		1.094**		1.082**		0.924**
		(0.189)		(0.188)		(0.188)
Partner's education (×10)		1.244**		1.235**		1.055**
		(0.222)		(0.221)		(0.224)
Parent's ISEI (×100)		3.990**		3.953**		3.435**
		(0.565)		(0.573)		(0.570)
Parent's cultural resources						0.420**
						(0.074)
G3						
Female (G3)	−0.381	−0.336	−0.417	−0.337	−0.392	−0.361
	(0.215)	(0.217)	(0.216)	(0.217)	(0.215)	(0.217)
Cohort (G3)	−0.220**	−0.289**	−0.203**	−0.291**	−0.169**	−0.255**
	(0.057)	(0.058)	(0.056)	(0.058)	(0.056)	(0.058)
Female*cohort (G3)	0.217**	0.206*	0.234**	0.207**	0.221**	0.197*
	(0.079)	(0.080)	(0.080)	(0.080)	(0.079)	(0.080)
N	1540	1540	1540	1540	1540	1540

Note. − Coefficients are presented as log odds, standard errors are listed in brackets. Most models violate the proportional odds assumption. Generalized ordered logit models, however, give the same results (see the Supplementary Appendix A).
*p < 0.05; **p < 0.01, two-tailed tests.

4. Results

4.1. Grandparent's involvement

Table 3 provides descriptive information about grandparental involvement broken down by gender of the grandparent (not by gender of the parent). We see that in this specific cohort, a nontrivial minority of grandparents looked after the grandchildren on any regular basis. About 20% of the grandparents looked after the grandchildren at least once a month. Almost half of the grandmothers had at least weekly contact with their grandchildren, a number that closely matches how often parents see their adult children in the general population (Kalmijn, 2006). Moreover, more than 40% of the relationships between grandmother and grandchild are characterized as strong. Ties to grandfathers are somewhat weaker and contact is also less frequent. Although the G1–G3 tie seems strong, a different picture emerges when we look at the upbringing of the grandchild. Only a small minority of grandparents is involved in the upbringing of the grandchildren, at least according to the middle generation. This suggests that the nuclear family is dominant: there is much contact with grandparents but they are not supposed to 'interfere' in their upbringing (Kemp, 2004).

4.2. Regression models without interactions

In Table 4 the results of the ordered logistic regressions using grandchildren's highest level of educational attainment are presented. All effects are reported as unstandardized coefficients. We focus on the three main characteristics of grandparents that we are interested in: education, occupational status and cultural resources. Model 1 only includes information on the educational attainment of grandparents, without controlling for parental characteristics. We find positive and significant total effects of grandparents' educational attainment on grandchildren's schooling. In Model 2 we add covariates for the parents' educational attainment and occupational status. As expected, all of the parental variables have positive and significant effects on the child's educational attainment. We also see that after controlling for the middle generation there is no direct effect left of grandparents' educational attainment on the grandchild's education. The point estimate is now close to zero and no longer significant.

A second variable that we investigate is the occupational status of grandfathers (Model 3). Again we find a significant effect of the grandfather's occupational status. However, when we add parental information in Model 4, this effect is almost zero and becomes insignificant. The effects of parental occupational status and education in Model 4 are similar to the estimated effects in Model 2, indicating that adding either grandparental education or grandfather's occupational status does not affect the estimated effect of G2 (parents) on G3 (grandchildren).

Table 5
Ordered logistic regression models analyzing interaction effects.

	1	2	3	4	5	6
G1						
Grandparent's education (×10)	−0.064			0.000		
	(0.228)			(0.617)		
Grandfather's ISEI (×100)		0.104			0.255	
		(0.384)			(0.976)	
Grandparent's cultural resources			−0.033			−0.072
			(0.071)			(0.194)
Tie strength	−0.135	−0.021	−0.028			
	(0.175)	(0.147)	(0.050)			
Tie strength*education	0.144					
	(0.191)					
Tie strength*ISEI		0.024				
		(0.338)				
Tie strength*cultural resources			0.008			
			(0.059)			
Proximity (ln minutes)				−0.017	−0.018	−0.048
				(0.147)	(0.123)	(0.042)
Proximity (ln minutes)*education				−0.017		
				(0.163)		
Proximity (ln minutes)*ISEI					−0.040	
					(0.281)	
Proximity (ln minutes)*cultural resources						0.011
						(0.055)
G2						
Respondent's education (×10)	1.085**	1.076**	0.924**	1.104**	1.089**	0.940**
	(0.192)	(0.190)	(0.191)	(0.192)	(0.191)	(0.192)
Partner's education (×10)	1.281**	1.264**	1.068**	1.296**	1.288**	1.096**
	(0.227)	(0.226)	(0.229)	(0.228)	(0.228)	(0.231)
Parent's ISEI (×100)	4.119**	4.045**	3.550**	4.144**	4.084**	3.622**
	(0.574)	(0.580)	(0.578)	(0.577)	(0.585)	(0.582)
Parent's cultural resources			0.407**			0.412**
			(0.076)			(0.076)
G3						
Female (G3)	−0.310	−0.311	−0.330	−0.308	−0.311	−0.330
	(0.221)	(0.221)	(0.221)	(0.221)	(0.221)	(0.221)
Cohort (G3)	−0.275**	−0.277**	−0.237**	−0.283**	−0.286**	−0.251**
	(0.059)	(0.059)	(0.060)	(0.060)	(0.059)	(0.060)
Female*cohort (G3)	0.197*	0.199*	0.186*	0.197*	0.199*	0.185*
	(0.082)	(0.082)	(0.082)	(0.082)	(0.082)	(0.082)
N	1471	1471	1471	1471	1471	1471

Note. − Coefficients are presented as log odds, standard errors are listed in brackets.
*p < 0.05; **p < 0.01, two-tailed tests.

The final variable for which we estimate direct effects are the cultural resources of the grandparents. Model 5 shows that the uncontrolled effect of the cultural resources of grandparents is positive and significant. As with the other two dimensions, the effect of cultural resources disappears when we add information on the parents' educational attainment, occupational status, and cultural resources. In line with previous studies we find an effect of parental cultural resources independent of the educational and occupational attainment of parents.

The four parental status variables all have strong effects (Model 6). One standard deviation increase in the respondent's education increases the odds that the child reaches educational level $j > k$ rather than $j \leq k$ by 31% (i.e., $1 - e^{0.924*0.29}$). The other standardized effects are 32% for partner's education, 46% for parental occupational status, and 37% for parental cultural resources. The effect of parents' education and occupational status decline when we add parental cultural resources (cf. Model 4 and 6), showing that cultural resources in part mediate the effects of parental status (De Graaf et al., 2000).

4.3. Regression models with interactions

Since we do not find a main effect of grandparents, one may wonder how useful it is to analyze if 'effects' are moderated by the involvement of grandparents. This analysis is still important because if a moderator effect exists, it may in principle blur the main effect of grandparents. If there is a significant effect in one subgroup and an insignificant effect in another subgroup, the overall effect may be weak and insignificant. In Table 6, we study two of these conditions: the strength of the tie between G1 and G3 and residential proximity.

Grandparent effects and the strength of the G1-G3 tie
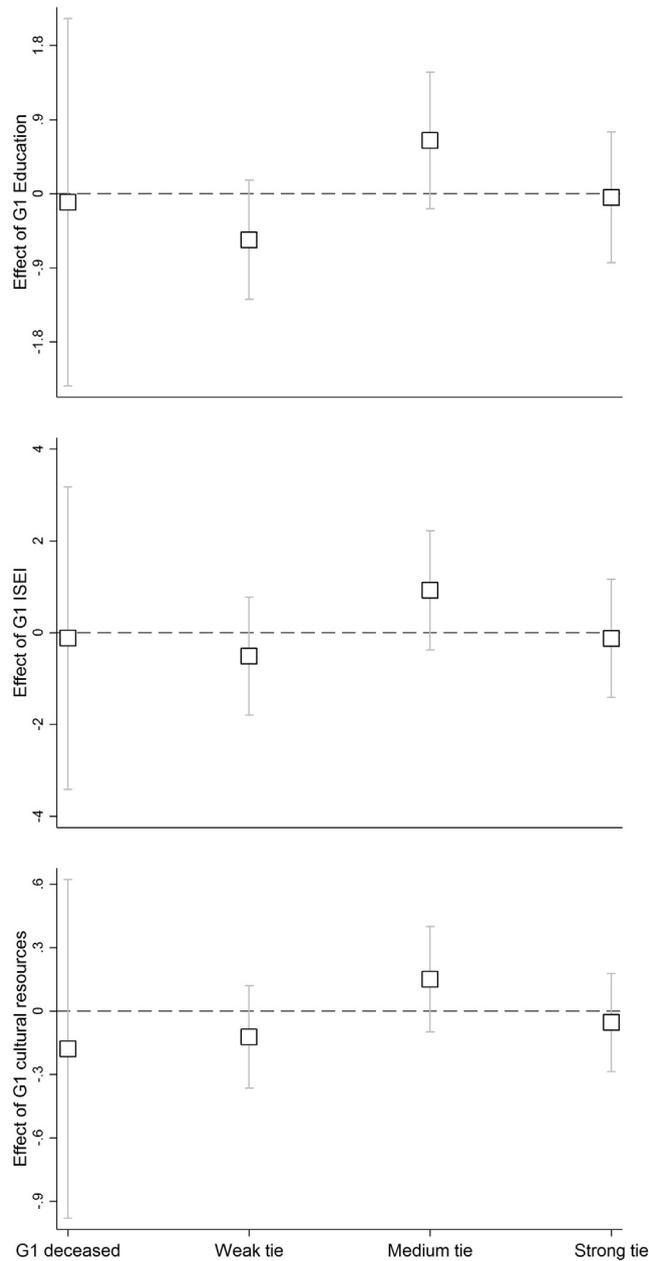
Note: Predicted effects for different subgroups. Whiskers depict the **95%** confidence interval.
The full models for the subgroup analyses are available from the first author.

Fig. 1. Grandparent effects and strength of the tie.

First, we present the results of interaction analyses where each of the grandparental characteristics is interacted with either the strength of the tie or residential proximity. Models 1, 2, and 3 focus on the linear interactions of the three grandparental resources with the strength of the tie. We find no significant main effects of grandparental resources. Since the moderator variables are centered on the mean, the main effect refers to those with an average G1–G3 tie. There are no significant interaction effects either, indicating that the effects of grandparental education, occupation, and cultural resources do not vary in a linear fashion with the strength of the G1–G3 tie. Although the point estimate for the interaction effect between grandparental education and the strength of the tie is positive, it is by no means significantly different from zero. These results do not support the claim that the grandparent effect is stronger when grandparents are more involved in the life of their grandchildren.
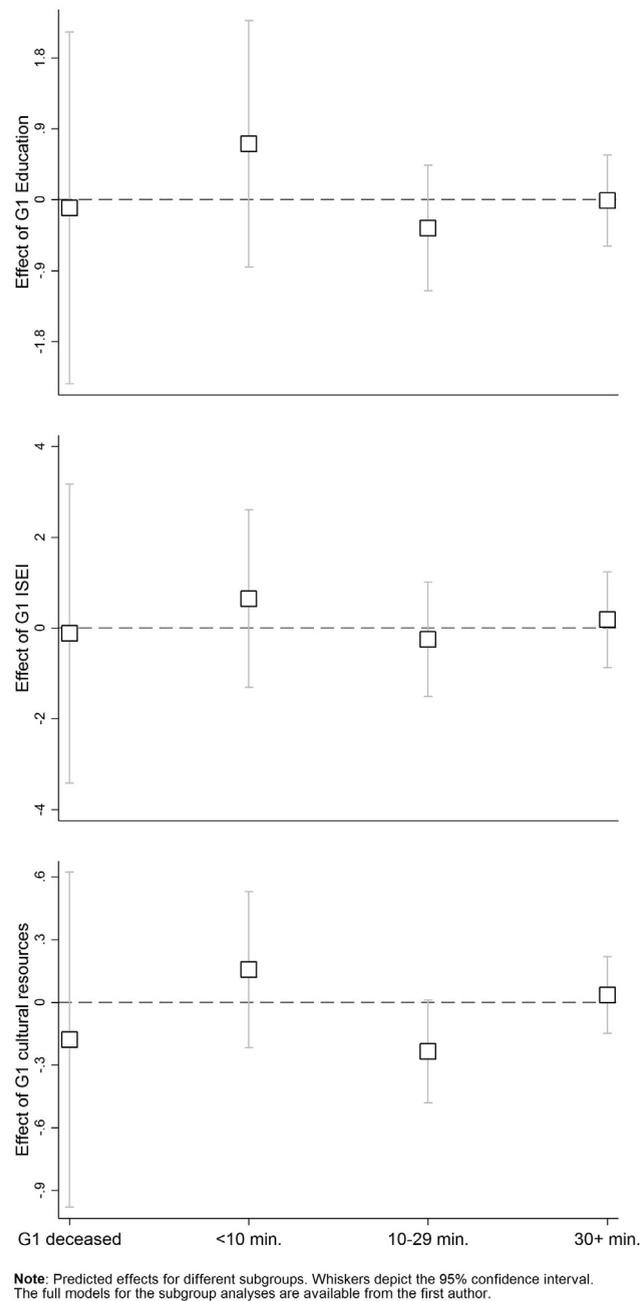
Fig. 2. Grandparent effects and residential proximity.

In Models 4, 5, and 6 of Table 5, we investigate if there might be a relation between the direct effects of grandparents on their grandchildren and residential proximity, testing if the effect is stronger when grandparents live more nearby. The results for residential proximity are very similar to the findings for the strength of the tie: all interaction effects are close to zero and statistically insignificant. The point estimates of the interaction effects are not positive for most resources, showing that the absence of the effect is not caused by issues of statistical power.

In the analyses in Table 5 we assume linearity, whereas the interaction between the strength of the tie and grandparental resources might be non-linear. It is for example possible that the effect is especially strong for those who had intensive contact with their grandparents, but similar for those grandchildren who had medium or little contact with their grandparents. For this reason, we estimated separate ordered logistic regressions for subgroups that score differently on the two moderating

Table 6
Selected results from gender-specific ordinal logistic regressions.

	Paternal lineage		Maternal lineage	
	1	2	3	4
G1				
Grandparent's education (×10)	−0.123		0.125	
	(0.297)		(0.270)	
Grandfather's ISEI (×100)	0.191		0.266	
	(0.477)		(0.431)	
Grandparent's cultural resources	−0.005		−0.072	
	(0.090)		(0.084)	
Tie strength*education		−0.005		0.002
		(0.285)		(0.226)
Tie strength*ISEI		−0.031		−0.198
		(0.469)		(0.398)
Tie strength*cultural resources		−0.076		0.014
		(0.079)		(0.073)
Proximity (ln minutes)*education		0.038		−0.035
		(0.232)		(0.189)
Proximity (ln minutes)*ISEI		−0.032		0.020
		(0.386)		(0.317)
Proximity (ln minutes)*cultural resources		−0.022		0.041
		(0.078)		(0.066)

Note. − Coefficients are presented as log odds, standard errors are listed in brackets. The presented effects are controlled for the same set of covariates as shown in Table 4. Although we do not present any of the main effects in Model 2 and 4, these are included in our estimation. None of these main effects reached significance for either the paternal or maternal line.
$^*p < 0.05$; $^{**}p < 0.01$, two-tailed tests.

variables (strength of tie and residential proximity). We divided both variables in three groups (tertiles for the strength of tie; categories of minutes for residential proximity). Grandparents who were already deceased when the grandchild was growing up are presented as a separate subgroup.

Fig. 1 shows if and how the direct grandparent effect varies with the strength of the tie with the grandchild. The models on which these figures are based, use the same set of control variables as we used in Table 6. What is immediately clear from Fig. 1 is that the grandparent effect does not vary with the strength of the tie. All of the estimated effects are not significant, which means that in none of the subgroups there is evidence for a direct effect of either the grandparent's education, occupation, or cultural resources on the grandchild's educational attainment. There are no significant effects for deceased grandparents. Even if we forget about the significance of the effects for a moment; in this figure we would expect an upward trend; where the grandparent effect is strongest for the subgroup with the strongest tie. But the point estimates do not show such a pattern. There seems to be a pattern where the effect of grandparents is strongest for those with a tie of medium strength. Still, none of these effects are statistically significant.

Fig. 2 shows the analyses of subgroups with a different residential proximity to their grandchildren. We treat this as a second indicator of the strength of the tie with the grandchild. We have split up this variable in three categories; those grandparents who live less than 10 min away, those who live between 10 and 29 min away, and those who live at least 30 min away. The frequency of the three groups (see Table 3) shows that this is a useful distinction. Since respondents who score higher on our scale of residential proximity live farther away, we expect a downward trend: especially strong grandparent effects for those grandparents who live nearby. The results in Fig. 2 give, again, no evidence for heterogeneous grandparent effects. None of the estimated effects of the subgroup analyses is significantly different from zero. The pattern seems to be more in line with our expectations, however, especially for grandfather's occupational status, where there is a downward trend. Statistically, this pattern is not significant: next to the absence of a linear interaction effect, the effects for families where grandparents live closest are not significant as well.

4.4. Gender specific effects?

So far, we analyzed the effects of the grandparents of either the father or the mother in the household. Are effects of grandparents different for the paternal and the maternal lineage? While stratification studies have shown that father's and mother's resources both play an important role in the intergenerational reproduction of education (Korupp et al., 2002), earlier research on the direct effect of grandparents focused solely on the paternal line (e.g., Chan and Boliver, 2013; Hertel and Groh-Samberg, 2014). In Table 6, we present the main effects of the three resources as well as interactions with resources separately for grandparents on the father's side and grandparents on the mother's side. Results are presented in a condensed format: we present the effects of the three resources from Model 2, 4, and 6 (Table 4) in one column. We present the main effects and interaction effects from Model 1, 2, and 3 (Table 5) in another column. Other effects are included but not printed.

These results show that there is very little variation in the estimated effects across the paternal and maternal lineage. First, we find no direct grandparent effects of either of the resources (Model 1 and Model 3). There are some differences in the point estimates, most remarkably for the effect of grandparental education on grandchildren's educational attainment. While this effect is negative for the paternal lineage, it is positive for the maternal lineage. However, both effects are very weak and, again, far from being significant. Second, with respect to the interaction effects (Model 2 and Model 4), we find very little gender-variation, and most of the interaction effects are very close to zero both for the models that analyze the paternal grandparents and the models that analyze the maternal grandparents.

5. Conclusion

In this article we investigated the grandparent effect in the Netherlands. Our analyses yield two main empirical findings. First, we estimated the gross effects of grandparents and showed to what extent these effects are 'explained' by the status characteristics of the father and the mother (the middle generation). Our study finds that all three grandparental resources—educational attainment, occupational status, and cultural resources—affect the grandchild's educational attainment only if we do not control for parental characteristics. Once we include information on resources of the middle generation, the grandparent effects disappear, indicating that there is no direct effect of grandparents on grandchildren.

Second, we tested one of the more often mentioned mechanisms for a grandparent effect. Following Coleman's work on family-based social capital (1988), we argued that grandparents transmit their resources to grandchildren through interaction and involvement. This implies that the effect of grandparents' characteristics should be stronger when they are more closely involved in their grandchildren's lives. Our analysis does not provide evidence for such an interaction effect. The grandparent effect does not vary with the strength of the tie, nor is there an effect in 'highly involved' subgroups of grandparents. There is also no evidence for a stronger effect when grandparents live close.

Why do we find no evidence for a grandparent effect and what are the more general implications of this refutation? First, one may wonder if our refutation is peculiar for the Netherlands. Earlier studies have provided mixed evidence, with about half of the studies finding a grandparent effect and the other half finding no effect (Table 1). Since the Netherlands is not an exceptional case in terms of the strength of family relationships (Hank and Buber, 2009), nor in the strength of parental background effects on grandchildren's schooling (Breen et al., 2009), we do not think our finding is in any way special. Obviously, we cannot generalize the negative Dutch finding to other countries, comparative research is needed to do that.

Second, are the findings specific for our data set? The measures in our survey are not weaker than they are in other surveys. It is true that we rely on indirect reports from parents on grandparents and children, but this is also the case in many previous studies on grandparent effects. Moreover, we suspect that if indirect reports bias a grandparent effect, this bias is more likely to be upward than downward. Finally, the measurement for the grandparent generation is probably more elaborate in our data than it was in previous studies. In this sense, we do not think our data are biased toward a null effect. We note that one earlier Dutch study which was based on another data set did not find significant grandparent effects either (Wolbers and Ultee, 2013).

What are the theoretical implications of our study? In our view, the refutation of the commonly assumed interaction hypothesis suggests that ideas should be considered about why grandparents have *no* direct effect on grandchildren. Even though grandparents have become more involved in the lives of grandchildren now that more mothers are working and in need of assistance, the nuclear family is still dominant in Western Europe. This means that many parents will feel that grandparents should not take part in the upbringing of the grandchildren. Our data show high levels of contact and affection, but not a strong role in how the grandchildren are raised. Previous studies have pointed to a so-called norm of non-interference (Kemp, 2004) and to the tension between involvement and interference (Breheny et al., 2013). In a sense, there is much support and interaction between grandparents and grandchildren, but the nuclear family remains stronger than the extended family (Reher, 1998). This suggests that grandparents in the Netherlands are rarely 'substitute' parents and hence, may not have an additional influence on children's life chances once effects of the middle generation are included.

In concluding, we would like to propose the hypothesis that grandparent effects may still be present under special circumstances. Following the line of reasoning used in social capital theory, we suspect that grandparents play a role when parents themselves withdraw from or drop out of the family. For example, grandparental resources may play a role when a parent dies, when children are raised by a single parent, or when migration processes disrupt a (nuclear) family (DeLeire and Kalil, 2002; Dunifon and Kowaleski-Jones, 2007; Landale et al., 2011). Such cases are common in certain ethnic-racial groups, in certain historical contexts, and in specific non-western societies (Mair and Chen, 2008; Zeng and Xie, 2014). In these conditions, the social capital of one or both parents disappears and grandparents may become substitute parents. When grandparents are substitute parents, there could very well be a main and direct influence of their resources on grandchildren's schooling outcomes (DeLeire and Kalil, 2002). This also implies an interaction effect of grandparental resources, but an interaction with parental involvement rather than with grandparental involvement.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.ssresearch.2015.09.011.

References

Aschaffenburg, K., Maas, I., 1997. Cultural and educational careers: the dynamics of social reproduction. Am. Sociol. Rev. 573–587.

Beck, S.H., 1983. The role of other family members in intergenerational occupational mobility. Sociol. Quart. 24 (2), 273–285.

Bengtson, V.L., 2001. Beyond the nuclear family: the increasing importance of multigenerational relationships in American society. J. Marriage Fam. 63, 1–16.

Birditt, K.S., Tighe, L.A., Fingerman, K.L., Zarit, S.H., 2012. Intergenerational relationship quality across three generations. J. Gerontol. Ser. B Psychol. Sci. Soc. Sci. 67, 627–638.

Breen, R., Luijkx, R., Muller, W., Pollak, R., 2009. Nonpersistent inequality in educational attainment: evidence from eight European countries. Am. J. Sociol. 114, 1475–1521.

Breheny, Mary, Stephens, Christine, Spilsbury, Lorraine, 2013. Involvement without interference: how grandparents negotiate intergenerational expectations in relationships with grandchildren. J. Fam. Stud. 19, 174–184.

Chan, T.W., Boliver, V., 2013. The grandparents effect in social mobility: evidence from British birth cohort studies. Am. Sociol. Rev. 78, 662–678.

Chan, T.W., Boliver, V., 2014. Social mobility over three generations in Finland: a critique. Eur. Sociol. Rev. 30, 13–17. http://dx.doi.org/10.1093/esr/jct012.

Chen, F.N.A., Liu, G.Y., Mair, C.A., 2011. Intergenerational ties in context: grandparents caring for grandchildren in China. Soc. Forces 90, 571–594.

Cheadle, J.E., 2008. Educational investment, family context, and children's math and reading growth from kindergarten through the third grade. Sociol. Educ. 81, 1–31.

Chin, T., Phillips, M., 2004. Social reproduction and child-rearing practices: social class, children's agency, and the summer activity gap. Sociol. Educ. 77, 185–210.

Coleman, J.S., 1988. Social capital in the creation of human capital. Am. J. Sociol. 94, S95–S120.

Crosnoe, Robert, 2004. Social capital and the interplay of families and schools. J. Marriage Fam. 66, 267–280.

De Graaf, Nan Dirk, De Graaf, Paul M., Kraaykamp, G., 2000. Parental cultural capital and educational attainment in the Netherlands: a refinement of the cultural capital perspective. Sociol. Educ. 73, 92–111.

De Graaf, Paul M., Ganzeboom, H.B.G., 1993. Family background and educational attainment in the Netherlands for the 1891–1960 birth cohorts. In: Shavit, Y., Blossfeld, H.-P. (Eds.), Persistent Inequality: Changing Educational Attainment in Thirteen Countries. Westview Press, Boulder, pp. 75–99.

DeLeire, T., Kalil, A., 2002. Good things come in threes: single-parent multigenerational family structure and adolescent adjustment. Demography 39, 393–413.

Dunifon, R., Kowaleski-Jones, L., 2007. The influence of grandparents in single-mother families. J. Marriage Fam. 69, 465–481.

Erickson, L.D., McDonald, S., Elder, G.H., 2009. Informal mentors and education: complementary or compensatory resources? Sociol. Educ. 82, 344–367.

Erola, J., Moisio, P., 2007. Social mobility over three generations in Finland, 1950–2000. Eur. Sociol. Rev. 23, 169–183. http://dx.doi.org/10.1093/esr/jcl027.

Furstenberg Jr., F.F., Hughes, M.E., 1995. Social capital and successful development among at-risk youth. J. Marriage Fam. 580–592.

Ganzeboom, H.B.G., De Graaf, Paul M., Treiman, D.J., 1992. A standard international socio-economic index of occupational status. Soc. Sci. Res. 21, 1–56. http://dx.doi.org/10.1016/0049-089X(92)90017-B.

Ganzeboom, Harry B.G., 2005. On the cost of being crude: a comparison of detailed and coarse occupational coding. In: Hoffmeyer-Zlotnik, J.H.P. (Ed.), Methodological Aspects of Cross-national Research, Zuma-Nachrichten, pp. 241–258 (Mannheim).

Geurts, T., van Tilburg, T., Poortman, A.-R., Dykstra, P.A., 2015. Child care by grandparents: changes between 1992 and 2006. Ageing Soc 35 (06), 1318–1334.

Hagestad, G.O., 2006. Transfers between grandparents and grandchildren: the importance of taking a three-generation perspective. Z. für Fam. 3, 315–333.

Hank, K., 2007. Proximity and contacts between older parents and their children: a European comparison. J. Marriage Fam. 69, 157–173.

Hank, Karsten, Buber, Isabella, 2009. Grandparents caring for their grandchildren: findings from the 2004 survey of health, ageing and retirement in Europe. J. Fam. Issues 30, 53–73.

Hertel, F.R., Groh-Samberg, O., 2014. Class mobility across three generations in the US and Germany. Res. Soc. Stratif. Mobil. 35, 35–52. http://dx.doi.org/10.1016/j.rssm.2013.09.007.

Hochguertel, S., Ohlsson, H., 2009. Compensatory inter vivos gifts. J. Appl. Econ. 24, 993–1023.

Jæger, M.M., 2012. The extended family and children's educational success. Am. Sociol. Rev. 77, 903–922.

Kalmijn, M., 2006. Educational inequality and family relationships: influences on contact and proximity. Eur. Sociol. Rev. 22, 1–16.

Kalmijn, M., Bernasco, W., 2001. Joint and separated lifestyles in couple relationships. J. Marriage Fam. 63, 639–654.

Kim, D.H., Schneider, B., 2005. Social capital in action: alignment of parental support in adolescents' transition to postsecondary education. Soc. Forces 84 (2), 1181–1206.

Korupp, Sylvia E., Ganzeboom, H.B.G., Van der Lippe, T., 2002. Do mothers matter? A comparison of models of the influence of mothers' and fathers' educational and occupational status on children's educational attainment. Qual. Quant. 36, 17–42.

Kemp, Candace L., 2004. "Grand" expectations: the experiences of grandparents and adult grandchildren. Can. J. Sociol. 29, 499–525.

Knoef, Marike, de Vos, Klaas, 2009. The Representativeness of LISS, an Online Panel. CentERdata, Tilburg.

Kraaykamp, G., van Eijck, K., 2010. The intergenerational reproduction of cultural capital a threefold perspective. Soc. Forces 89, 209–231.

Lamont, Michèle, Lareau, Annette, 1988. Cultural capital: allusions, gaps and glissandos in recent theoretical developments. Sociol. Theory 6, 153–168.

Landale, N.S., Thomas, K.J.A., Van Hook, J., 2011. The living arrangements of children of immigrants. Future Child. 21, 43–70.

Luo, Y., LaPierre, T.A., Hughes, M.E., Waite, L.J., 2012. Grandparents providing care to grandchildren: a population-based study of continuity and change. J. Fam. Issues 33, 1143–1167.

Mair, C.A., Chen, E., 2008. Black and white grandparents who parent: does social support moderate health differently by racial group over time? Gerontologist 48, 612–612.

Mare, R.D., 2011. A multigenerational view of inequality. Demography 48, 1–23.

Mare, R.D., 2014. Multigenerational aspects of social stratification: issues for further research. Res. Soc. Stratif. Mobil. 35, 121–128. http://dx.doi.org/10.1016/j.rssm.2014.01.004.

McNeal, R.B., 1999. Parental involvement as social capital: differential effectiveness on science achievement, truancy and dropping out. Soc. Forces 78, 117–144.

Modin, B., Erikson, R., Vagero, D., 2013. Intergenerational continuity in school performance: do grandparents matter? Eur. Sociol. Rev. 29, 858–870.

Park, Hyunjoon, 2008. The varied educational effects of parent-child communication: a comparative study of fourteen countries. Comp. Educ. Rev. 52, 219–243.

Pfeffer, F.T., 2014. Multigenerational approaches to social mobility. A Multifaceted Research Agenda. Res. Soc. Stratif. Mobil. 35, 1–12. http://dx.doi.org/10.1016/j.rssm.2014.01.001.

Pohl, R., Soleilhavoup, J., 1982. La transmission du statut social sur deux ou trois générations. Econ. Stat. 144 (1), 25–42.

Reher, D.S., 1998. Family ties in western Europe: persistent contrasts. Popul. Dev. Rev. 24, 203–234.

Roksa, J., Potter, D., 2011. Parenting and academic achievement: intergenerational transmission of educational advantage. Sociol. Educ. 84, 299–321.

Rubin, D.B., 1987. Multiple Imputation for Nonresponse in Surveys. John Wiley, New York.

Scherpenzeel, A., Toepoel, V., 2012. Recruiting a probability sample for an online panel: effects of contact mode, incentives, and information. Public Opin. Q. 76, 470–490.

Scherpenzeel, A., 2009. Start of the Liss Panel: Sample and Recruitment of a Probability-based Internet Panel. CentERdata, Tilburg.

Silverstein, M., Bengtson, V.L., 1997. Intergenerational solidarity and the structure of adult child-parent relationships in American families. Am. J. Sociol. 103, 429–460.

Silverstein, Merril, Marenco, Anne, 2001. How Americans enact the grandparent role across the family life course. J. Fam. Issues 22, 493–522.

Teachman, J.D., Paasch, K., Carver, K., 1997. Social capital and the generation of human capital. Soc. Forces 75, 1343–1359.

Thomese, F., Liefbroer, A.C., 2013. Child care and child births: the role of grandparents in the Netherlands. J. Marriage Fam. 75, 403–421.

Van de Werfhorst, H.G., Mijs, J.J.B., 2010. Achievement inequality and the institutional structure of education systems: a comparative perspective. Annu. Rev. Sociol. 36, 407–428.

Von Hippel, P.T., 2009. How to impute interactions, squares and other transformed variables. Sociol. Methodol. 39, 265–291. http://dx.doi.org/10.1111/j.1467-9531.2009.01215.x.

Warren, J.R., Hauser, Robert M., 1997. "Social stratification across three generations: new evidence from the Wisonsin longitudinal study. Am. Sociol. Rev. 62, 561–572.

Wightman, P., Danziger, S., 2014. Multi-generational income disadvantage and the educational attainment of young adults. Res. Soc. Stratif. Mobil. 35, 53–69. http://dx.doi.org/10.1016/j.rssm.2013.09.004.

Wolbers, Maarten H.J., Ultee, Wout C., 2013. Driegeneraties- en Tweeoudersvragen over het Opleidingsniveau van Mannen en Vrouwen in Nederland. Mens Maatsch. 88, 276–294.

Zeng, Zhen, Xie, Yu, 2014. The effects of grandparents on children's schooling: evidence from rural China. Demography 51, 599–617. http://dx.doi.org/10.1007/s13524-013-0275-4.